حكومة مملكة البحرين
Government of Bahrain

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نظام اصدار رخص البناء
BUILDING PERMIT PORTAL

Unified Guidebook of Building Permit Regulations

Kingdom of Bahrain
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البحرين
BAHRAIN

HM King Hamad bin Isa Al Khalifa
King of Kingdom of Bahrain

H.R.H. Prince Khalifa bin Salman
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Executive Summary:

This guidebook aims to collate all building permit regulations and their interpretations in the Kingdom of Bahrain in a unified document, in line with Vision 2030 and in accordance to the latest international standards and best practices.

The following requirements of the following entities are covered under this guidebook:

- Urban Planning and Development Authority.
- Municipalities Affairs at the Ministry of Works, Municipalities Affairs and Urban Planning.
- Directorate of Roads Planning and Design at the Ministry of Works, Municipalities Affairs and Urban Planning.
- Directorate of Sanitary Engineering Planning and Projects at the Ministry of Works, Municipalities Affairs and Urban Planning.
- Electricity Distribution Directorate Industrial Security and safety Directorate at the Electricity and Water Authority
- Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department) at the Electrcity and Water Authority.
- Electricity and Water Conservation Directorate (Thermal Insulation Department) at the Electricity and Water Authority.
- Civil Aviation Affairs at the Ministry of Transportation and Telecommunications.
- Industrial Areas Operations Directorate at the Ministry of Industry, Commerce and Tourism
- General Department of Civil Defence at the Ministry of Interior

This document is made in Arabic and English. In the event of a dispute or inconsistency between both versions, the Arabic language version shall prevail.

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Chapter 1

The requirements of the Urban Planning and Development Authority

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The requirements of the Urban Planning and Development Authority

1. Definitions

In the application of the provisions of this Edict, unless the context requires otherwise, the following words and expressions shall have the meanings assigned opposite each:

Construction: The process of building, preparation for building, division of land in preparation for the construction of buildings or land reclamation for building or excavation for mining, carrying out any operation above or under the ground nor making any significant change in the use of buildings, land areas or spaces inside a plot of land.

Construction Areas: Areas which shall be subject to the zoning regulations for construction in various parts of the Kingdom provided for herein.

Construction Land Areas: Land areas that are suitable for construction and are approved by general and detailed planning thereof and overlook one or more usable and accessible roads, provided that such roads are linked to the road network and public utilities.

Private Residential Area: Residential areas permitted to be occupied by one or more residential units on each plot of land with low or medium building density.

Connected Residential Area: Residential areas which are in the centre of cities, villages and their extensions permitted to be occupied by one or more residential units connected from one or more sides and of medium or high building density.

Garden Residential Area: A residential area situated outside the boundaries of towns and villages and has a low building density.

Industrial Areas: Areas intended for all kinds of industrial and manufacturing purposes in which processed and semi-processed raw materials are converted into other products.

Agricultural Areas: Areas intended for agricultural purposes and a related activity such as greenhouses, nurseries, cattle sheds, stables and development of animal resources.

Green Belt: Areas intended for agricultural activities only with the aim of maintaining and developing it in order to protect the surrounding environment. .

Villa (Residential House): A separate or connected building comprising a living room, bedroom, dining room, sanitary utilities, closed and open spaces and has its own entrances and internal staircase, if any, separately from any other residential house.

Outbuildings: Utilities intended for serving the residence such as an outside kitchen, watchman's room, outside majlis, washing room, stores and similar facilities whether ~connected to or separate from the main building.

Building Appurtenances: Utilities that serve a building (such as a residential, commercial or similar building) and include the watchman's room, gas cylinder room, substations for the building, utilities, stores and similar facilities situated whether connected to the main building or separate therefrom.

Flat: Every part of a floor constituting a residential unit that is separate from the remaining floors and

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consisting of one room or more and includes a minimum of a kitchen and bathroom. Its occupants may have ingress to or egress therefrom without going through another residential unit on the same floor or in the same building.

Shop: A building which is open to a public footpath or an approved public road with one front or more, and it is permitted to be used for commercial activities as shall be specified by the approved construction plans.

Residential Garden Compound: It is a plot of land overlooking an approved road comprising villas, residential houses, services, utilities, and a garden and common open footpath. Each compound may have one entrance or more.

Building: A separate building overlooking an approved road consisting of several stories, residential flats, business suites or independent business premises that are combined or separate in the entrances, staircase and lifts.

Building Percentage: The maximum percentage allowed for the total building surfaces in relation to the land area.

Building Surfaces: Built-up areas of all floors of a building or buildings situated within a plot of land measured from the outside of external walls or from the line dividing the common wall. Such built-up areas shall include the following:

1. A surface of all floors in the building's closed spaces including towers.

2. Spaces arising from constructional elements that may become habitable areas.

3. All built spaces that have not been excluded when calculating the built spaces.

Mezzanine Floor: An excluded floor including part of the height of the ground floor whether it is a retail outlet, factory, workshop or service facility, provided that its building percentage shall not exceed 70% (seventy percent) of the ground floor area. It shall be intended for storage, management, offices and business purposes. It shall not be directly accessible from outside. Its entrance shall be from the ground floor level and its height shall not be more than 2.60 meters (Two meters and sixty centimetres), provided that the height of the ground floor including the mezzanine floor shall not be more than 6 meters (Six meters).

Building Recession Areas: Areas between the property's boundaries and the building line of each of the building's facades. Types of recessions are as follows:

1. **Front Recession:** Minimum distance between the property's boundary overlooking a road and the building line of the fa'ade overlooking it on the ground floor and all floors unless upper projections are allowed.

2. **Side Recession:** Minimum distance between the property's boundary overlooking a side neighbouring property parallel to the front facade and the building line of the face overlooking it, whether the neighbouring property is a plot of land, garden, empty space or footpath on the ground floor and all floors unless upper projections are allowed.

3. **Rear Recession:** Minimum distance between the property's boundary overlooking a rear neighbouring property on the side opposite to the front facade and building line of the fa'ade overlooking it, whether the

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neighbouring property is a plot of land, garden, empty space or footpath on the ground floor and all floors unless provision is allowed for upper projections.

Building Height: The vertical dimension in front of a building's fa'ade overlooking a rear neighbouring property from the side which is opposite the front facade and the building line of the facade overlooking it, whether the neighbouring property is a plot of land, garden, empty space or footpath.

It is measured from the centre of the building's facade in case of sloping streets. The vertical dimension measurement shall not include parapets, domes and minarets in religious buildings, stairwells, lift machinery rooms, water tanks and air-conditioners, if any, where heights not exceeding 7 meters (Seven meters) are permitted above the roof of the upper floor.

Building Line: A line defining the area in which building is permitted on the ground floor inside the plot of land. It may be identical to the planning line (if any) or may recede from the road border, street, garden or footpath by recessions to be determined by the zoning regulations for the facades overlooking them.

Planning Line: A line to which a building recedes as shown by the approved detailed plans whereby it separates between privately owned property and public property.

Road Axis: A line specifying the middle of the road width.

Road Border: A line specifying the middle of the road's width from one side of the road centre. Each road has two borders.

Road Boundary: It means the space between the road borders and includes viewing angles, intersections and spaces reserved for public utilities along the road.

Footpaths and Service Paths: A space which separates properties and road borders and is used for pedestrian or service traffic, or both. Vehicular traffic shall not be permitted through them.

Covered Car Parks: Areas intended as car parks provided with covers to protect vehicles from all external elements.

Uncovered (Open) Car Parks: Areas intended as car parks but have no roofs.

Multi-storey Car Parks: A single storey or parts of multi-storey building or separate buildings intended to be used as car parks.

Approved Commercial Street: A Street where shops are allowed to open in the buildings overlooking it according to the approved development plans.

Approved Service Street: A Street where service workshops are allowed to open in the buildings overlooking it according to the approved development plans.

Service Workshop: A building within a plot of land connected to one or more approved footpath or Commercial Street where it is permitted to be used for service activities.

Approved Development Plans: General and detailed plans of the area in which development is permitted according to the decision of the Minister concerned with Municipalities Affairs and Agriculture. They include determination of the development areas in whose land the zoning regulations set forth in this Edict shall be applicable. They also show the public roads, planning lines, if any, open areas and areas in which

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development is permitted according to special development and construction conditions as well as the areas in which development is postponed.

Site Development Planning Approval: It is a certificate issued by the General Directorate of Urban Planning approving the validity of the site for development, at the request of the owner of the land or property.

Special Regulations Areas: Areas that are near major landmarks, archaeological, historical or religious areas or areas designed for significant planning purposes and are defined by plans for classification of development areas in the Kingdom or which are determined by an order of the Minister concerned with Municipalities Affairs and Agriculture in accordance with article (20) of the said law for Building Regulation.

Areas for Projects with a Special Nature: There are areas for non-standard projects that are not governed by provisions of the Zoning Regulations as set forth in this Edict. They may be set up in areas for which general or detailed development plans have been prepared or in open areas where no plans have been prepared. For the approval thereof, specialized studies shall be prepared incorporating the following:

1. Construction planning effects of the projects on contiguous areas.

2. Traffic effects on the existing road network on various levels.

3. Environmental and Marine effects.

4. Social, Cultural and Economic effects.

5. Any other studies required for deciding upon the project's application.

A project shall be considered with a special nature in view of the required development of plans to absorb its construction requirements including the development of the road network and facilities situated in the land areas neighbouring it.

Areas with a Special Development Nature: Archaeological or Historic areas or areas introduced to have their own distinctive nature. Upon the application of the requirements set forth in this Edict, the special development conditions of such areas shall be complied with in addition to ensuring the planning aspects in terms of providing car parks and maintaining the architectural style of their buildings.

2. Laws and Regulations

Decision No. (55) for the year 2016 to amend some of the regulatory construction requirements in all areas of the Kingdom, promulgated by the decision No. (28) for the year 2009.

Decision No. (28) for the year 2009 to issue the regulatory constructions requirements in all areas of the Kingdom.

3. Requirements

1. Areas of Residential Houses

1.1. Private Residential Area – A

1.1.1 Uses:

Residential uses are permitted and include detached residential villas but residential apartments shall not be permitted as indicated in the plans for determination of approved development areas.

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1.1.2 Building Percentages:

1. The building percentage shall not be more than 180% (one hundred and eighty percent) of the land area.
2. Built-up area of any floor shall not exceed 60% (sixty percent) of the land area.
3. Additional building percentages not exceeding 15% (fifteen percent) of the land area shall be permitted to be built with a maximum area of 100 square meters (one hundred square meters) designated for the residence's utilities only. Building shall be permitted on the line of the side wall on one side only, provided that its height shall not be more than one floor with a maximum height of 4 meters (four meters) measured from the pavement level.
4. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) with a level similar to the level of the staircase room on the roof may be built.
5. An external majlis with an area not exceeding 10% (ten percent) of the land area shall be permitted to be built. Its area shall not exceed 100 square meters (one hundred square meters) to be calculated from the approved building percentage. The majlis shall be built on the front border overlooking a street or road, provided that the length of the majlis and entrances to the car parks shall not exceed 40% (forty percent) of the length of the land's front. The building shall be permitted on the side border of a neighbour on one side only, provided that the majlis height shall not be more than one floor of a maximum height of 4 meters (four meters) measured from the pavement level.
6. A park for at least two vehicles shall be provided within the plot of land. Car parks shall not be calculated as part of the aforesaid permitted building percentage.
7. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage.

1.1.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor at a distance of at least 3 meters (three meters) from the land

border of the front overlooking street or road. Upper projections above the ground floor shall be permitted with a maximum of 1.20 (one meter and twenty centimetres). In case the land overlooks more than one street, the building recession shall be at a distance of no less than 3 meters (three meters) from the most important street to the site. Projections over the ground floor from the branch street side for a maximum of 1 meter (one meter) shall be permitted.

2. Rear and Side Recessions:

Building shall be permitted on the ground floor at a distance of at least 2 meters (two meters) from the side and rear borders of the land. Upper projections shall not be permitted above the ground floor level.

1.1.4 Height:

1. A building's height shall not exceed 3 stories (three stories) with a maximum height of l5 meters (fifteen meters). In case of building a basement, the maximum height shall be 16.50 meters (sixteen meters and fifty centimetres).

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2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

1.1.5 Special Requirements:

1. Connected villas shall be permitted to be built on one side or more or detached or both, provided that the share of each villa shall not be less than 200 square meters (two hundred square meters) of the land area.

2. The width of internal roads in residential compounds shall not be less than 8 meters (eight meters), provided that the recession of the villa's facade shall not be less than 5 meters (five meters) from the border of the internal road.

3. Building is permitted above covered car parks (garages) and residence's utilities, provided the building area does not exceed 50 square meters (fifty square meters) and with a height of one storey not exceeding 4 meters (four meters).

1.2 Private Residential Area - B

1.2.1 Uses:

Residential uses are permitted (detached and connected residential units) as indicated in the plans for determination of approved development areas.

1.2.2 Building Percentages:

1. The building percentage shall not be more than 180% (one hundred and eighty percent) of the land area.

2. Built-up area of any floor shall not exceed 60% (sixty percent) of the land area.

3. An additional building with a building percentages not exceeding 20% (twenty percent) of the land area shall be permitted to be built to be designated for building an external majlis and the residence's utilities only, provided that the height shall not be more than one floor and a height not exceeding the level of the ground floor ceiling. Building of the majlis shall be permitted on the line of the front border of the land overlooking a street or road, so that the total length of the majlis front and entrances to the car parks shall not be more than 40% (forty percent) of the length of the front of the land.

4. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) with a level similar to the level of the staircase room on the roof may be built.

5. A park for at least two vehicles shall be provided within the plot of land. Car parks shall not be calculated as part of the aforesaid permitted building percentage.

6. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage.

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1.2.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor at a distance of at least 3 meters (three meters) from the land border of the front overlooking a street or road. Upper projections above the ground floor shall be permitted with a maximum of 1.20 meters (one meter and twenty centimetres). In case the building overlooks more than one street, the building recession shall be at a distance of no less than 3 meters (three meters) on the side of the street on which an entrance is allowed to be made thereon. Projections above the ground floor for a maximum of 1 meter (one meter) from the branch street side shall be permitted. In the event of building residential flats car parks may be roofed to the front borders of the land provided the buildings in the upper floors recede 1.8 meters (one meter and 8 centimetres) from the front border of the land.

2. Rear and Side Recessions:

Building shall be permitted on the ground floor at a distance of at least 2 meters (two meters) from the side and rear borders of the land. Upper projections shall not be permitted above the ground floor level.

1.2.4 Heights:

1. A building's height shall not exceed 3 stories (three stories) with a maximum height of l5 meters (fifteen meters). In case of building a basement, the maximum height shall be 16.50 meters (sixteen meters and fifty centimetres).

2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

1.2.5 Special Requirements:

1. In land whose area is less than 300 square meters (three hundred square meters) or whose front facade's length ranges between 12 to 15 meters, building shall be permitted on the neighbour's side boundary on one side only.

2. In land whose front facade is less than 12 meters (twelve metes), the building on the front side shall recede by 3 meters (three meters) and on the rear side by a distance of 1.50 meters (one meter and fifty centimetres), provided that building shall be permitted on the two side boundaries of the land.

3. Building shall be permitted above covered car parks (garages) and the residence's utilities, provided that the built-up area above the car parks and utilities shall not be more than 50 square meters (fifty square meters). For one floor only with a height not exceeding 4 meters (four meters).

4. More than one housing unit may be permitted to be built on a plot of land in the form of connected housing units on one side or more or detached or both, provided that the share of each housing unit shall not be less than 150 square meters (one hundred and fifty square meters) of the land area subject to ensuring the availability of car parks at the rate of one car park per flat.

5. More than one housing unit may be permitted to be built on a plot of land in the form of apartments in stories, provided that the apartment's area shall not be less than 100 square meters (one hundred square meters) provided that car parks shall be provided at the rate of one car park per apartment.

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6. In case the land is situated in a commercial or service road subject to the zoning requirements with respect to areas of 3-storey buildings. (Three stories) situated in commercial and service roads indicated in Article 58 Clause 3.

7. The width of internal roads in residential compounds shall not be less than 8 meters (eight meters), provided that the recession of the building's front facade shall not be less than 5 meters from the border of the internal road.

1.3 Connected Residential Area - A

1.3.1 Uses:

Residential uses are permitted (residential houses, villas and flats) as indicated in the plans for determination of approved development areas in the Kingdom.

1.3.2 Building Percentages:

1. The building percentage shall not be more than 210% (one hundred and twenty percent) of the land area.

2. Built-up area of any floor shall not exceed 70% (seventy percent) of the land area including the residence's utilities.

3. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) with a level similar to the level of the staircase room on the roof may be built.

4. A park for one vehicle shall be provided for each residential unit. Car parks shall not be calculated as part of the aforesaid permitted building percentage.

5. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a planning approval shall be obtained taking into account the existing roads and services.

1.3.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor at a distance at least 3 meters (three meters) from the land border of the front overlooking a street. Upper projections above the ground floor shall be permitted with a maximum of 1.20 meters (one meter and twenty centimetres). In case the building overlooks more than one street, the building recession shall be at a distance of no less than 3 meters (three meters) on the side of the more important street to the site and a distance of 2 meters on the side of the other street. Upper projections are permitted over the ground floor on the branch street side for a maximum of l meter (one meter).

2. Side Recession:

Building shall be permitted on the ground floor on the side border of the land. In case of making openings overlooking the side neighbour, ventilation shafts shall be provided (internal and external yards) as provided for in the Implementing Regulations of the Constructional Organization of Buildings Law No. 13 of the Year 1977.

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3. Rear Recession:

Building shall be permitted on the ground floor at a distance of at least 2 meters (two meters) from the rear borders of the land. Upper projections shall not be permitted on the floors above the ground floor level.

1.3.4 Heights:

1. A building's height shall not exceed 3 stories (three stories) with a maximum height of 13 meters (thirteen meters). In case of building a basement, the maximum height shall be 14.50 meters (fourteen meters and fifty centimetres).
2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

1.3.5 Special Requirements:

1. Residential flats whose floor area shall not be less than 80 square meters (eighty square meters) shall be permitted to be built. A car park shall be provided for each residential flat.
2. For plots of land overlooking an approved commercial or service road, the building recession shall be at a distance of no less than 5 meters (five meters) from the front border of the land overlooking the commercial or service road. Such recession areas shall be used as footpaths and uncovered car parks provided and they are prepared by the land lord. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall be permitted to add a mezzanine floor so that the height shall be in compliance with the Law on Constructional Organization of Buildings, provided that it shall not be reckoned as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.

1.4 Connected Residential Area - B

1.4.1 Uses:

Residential uses are permitted (residential houses, indicated in the plans for determination of approved development areas in the Kingdom,

1.4.2 Building Percentages:

1. The building percentage shall not be more than 300% (three hundred percent) of the land area.
2. The above percentages shall include all buildings including the veranda, services, staircases and lift shafts.
3. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) with a level similar to the level of the staircase room on the roof may be built.
4. When building residential flats on a land overlooking a road connected to an approved road network, car parks must be provided at a rate of one park for each flat. The car park area shall not be calculated as a part of building percentage provided the following conditions are fulfilled:

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a. The width of the road on which the land is located shall not be less than 6 meters (six meters), measured from the road regulation line, if any, or the distance between the land border overlooking the road and the neighbouring property. However, if the land was located on two roads whose width exceeds 6 meters (six meters), the provision of car parks shall be by recession on the wider road in the event that entrances are allowed on it.

b. The land area shall not be less than 250 square meters (two hundred fifty square meters).

c. The length of the land facade on the road connected to the approved road network shall not be less than 8 meters (eight meters).

5. A basement shall be permitted to be built and its land area shall not be calculated as part of the permitted building percentage, provided a part not less than 70% (seventy percent) is used as car park, upon planning approval in consideration for existing roads and services.

1.4.3 Recessions:

1. Front Recessions:

Building shall be permitted on the ground floor on the front border of the front of the plot of land.

2. Side and Rear Recessions:

Building shall be permitted on the border of the side and rear of the land. In case of making openings overlooking the side or rear neighbour, ventilation shafts shall be provided (internal and external yards) as provided for in the Implementing Regulations of Constructional Organization of Buildings Law.

1.4.4 Heights:

1. A building's height shall not exceed 3 stones (three stories) with a maximum height of 13 meters (thirteen meters). In case of building a basement, the maximum height shall be 14.50 meters (fourteen meters and fifty centimetres).

2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface level.

1.4.5 Special Requirements:

1. Residential flats whose floor area shall not be less than 60 square meters (sixty square meters) or one flat per floor in case of being unable to provide the required area inclusive of the stairs.

2. In case of providing car parks on the ground floor, they shall be compensated by giving permission to build on the fourth floor for an area equivalent to the area allocated for the car parks.

3. In case the land is situated in a commercial or service road, a mezzanine shall be added but shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.

4. The requirements with respect to local areas shall be complied with in respect of the Architecture standards for the area's construction and heritage nature, if any.

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5. Car Parks

a. At least one car park must be provided in the event of construction of one residential unit (house) for lands connected to the existing road network situated on a road with a width of 6m (six meters) or more.

b. Car Parks must be provided for residential flats only in lands located on approved commercial roads.

c. Car Park must be provided inside the land plot at a rate of one park for each residential flat for the existing road network, the following shall be expected:

1.4.6 For Residential Areas: The following lands shall be expected from the implementation of the condition for provision of car parks.

1. Lands located on one road whose width is less than 6m (six meters) measured from the road regulation line if any or the distance between the land edge overlooking the road and the opposite property.

2. Lands with an area of less than 250 square meters (two hundred and fifty square meters) or which have one flat only on each floor, whichever is more.

3. Lands whose front facade is less than 12 meters (twelve meters) in length.

1.4.7 For Commercial Areas: Existing commercial areas which have lands built up on their front borders with a percentage exceeding 50% (fifty percent) of the total length of the commercial road shall be expected in one of the following cases:

1. Lands overlooking a single road, but if the land was located on two roads, the width of thebranch road of which exceeds 6 meters (six meters), car parks must be provided by recession on the branch road side, provided the land length on the branch road side is not less than 12 meters (twelve meters).

2. Lands whose area is less than 600 square meters (six hundred square meters).

Provided all cases that are not subject to the requirements mentioned in the above article are presented to the concerned committee formed by the Minister concerned with Municipalities Affairs to take the appropriate action.

1.5 Garden Residential Area

1.5.1 Uses:

Residential uses are permitted (residential houses, separate and attached villas and garden flats) as indicated in the plans for determination of approved development areas.

1.5.2 Building Percentages:

1. The building percentage shall not be more than 55% (fifty five percent) of the land area for all buildings. More than one residential unit shall be permitted to be built on the land, provided that each residential unit shall have an area of no less than 500 square meters (five hundred square meters) of the land area.

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2. The area of utilities on the ground floor for each residential unit shall not be more than 5% (five percent) of the unit's share with a maximum of 25 square meters (twenty five square meters). Building of the utilities shall be permitted on the border of the side neighbour of the building on one side only, provided that their height shall not be more than one floor with a maximum of 4 meters (four meters) measured from the level of the pavement and shall not be calculated as part of the building percentages.

3. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) with a level similar to the level of the staircase room on the roof may be built.

4. An external majlis or multi-purpose hall and combined public recreational facilities shall be permitted to be built on the land so that their percentage shall not be more than 10% of the land area and shall not be calculated as part of the permitted building percentages. The majlis shall be permitted to be built on the border of the land overlooking a road or street so that the majlis' length shall not be more than 25% (twenty five percent) of the length of the front of the land with a maximum of 30 meters (thirty meters). There shall also be permitted to build on the border of the side neighbour on one side only with a length of no more than 30 meters of the length of the side border of the land so that the majlis height shall not be more than one floor with a maximum of 4 meters (four meters) from the pavement level.

5. A park shall be provided for at least two cars within the plot for each unit. The car parks shall not be calculated as part of the building percentage.

6. A basement shall be permitted to be built and its area shall not be calculated as pan of the permitted building percentage.

1.5.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor at a distance of no less than 5 meters (five meters) from the front border of the plot of land overlooking a road or street allowing the opening of entrances upon it. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

2. Side and Rear Recessions:

Building shall be permitted on the ground floor at a distance of no less than 3 meters (three meters) from the side and rear borders of the land. Upper projections shall not be permitted to be made on the floors above the ground floor.

1.5.4 Heights:

1. A building's height shall be2 stories (two stories) with a maximum height of 10 meters (ten meters). In case of building a basement, the maximum height shall be 11.50 meters (eleven meters and fifty centimetres).

2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

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1.5.5 Special Requirements:

1. More than one housing unit shall be permitted to be built on the plot in the form of houses or villas as connected units on one side or more or detached or both, provided that they shall be distributed within the plot and car parks shall be provided at the rate of one car park for each housing unit.

2. The distance between detached housing units within the plot of land shall not be less than 4 meters (four meters). The recession areas between units shall be permitted to be used as covered car parks whose ceiling height shall not be more than 3 meters (three meters).

3. The width of internal roads in housing compounds shall not be less than 8 meters (eight meters), provided that the recession of the building's front facade shall not be less than 5 meters (five meters) from the border of the internal road.

4. There shall be permitted to build more than one housing unit on the plot in the form of housing units (garden flats) so that the area of each flat shall not be less than 150 square meters (one hundred and fifty square meters) with providing car parks at the rate of at least one car park per housing unit.

2. Buildings Areas

2.1 Investment Apartment Block Areas (A)

2.1.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

2.1.2 Building Percentages:

The building percentages in such areas shall be as follows:

1. The building percentage shall not be more than l200% (one thousand two hundred percent) of the land area.

2. The built-up floor area shall not be more than 60% (sixty percent) of the land area.

3. Basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof whose area is not less than 70% (seventy percent) shall be used as car parks and provided that the height of the ground floor shall not be more than 1.50 meters (one meter and a half meter) from the pavement level.

2.1.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor on the front border of the plot unless there is an approved building line in the detailed plans that requires the recession of the building thereto. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

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2. Side and Rear Recessions:

Ground floor recessions shall not be less than 6 meters (six meters) from the side and rear borders of the land to be used as corridors. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres) for each border.

2.1.4 Special Requirements:

1. It shall be imperative to provide car parks within the plot of land at the rate of at least one car for each flat so that the number of parks shall not be less than one car park per 100 square meters (one hundred square meters). Required car parks must be provided on the ground floor, the upper floors in the basement or in all of them. It shall also be permitted to build multi-storey car parks on the borders of the land from all sides which shall not be calculated as part of the permitted building and height percentages.

2. The areas used for recreational activities and special utilities and services shall not be calculated as part of the permitted building percentage, provided that it shall not exceed 20% (twenty percent) of the total building percentage.

3. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.

4. For plots overlooking approved commercial roads, commercial and management uses shall be permitted provided that the building's recession shall be at a distance of no less than 6 meters (six meters) from the ground floor on the front border of the land to be used as footpaths and car parks. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall also be permitted to add a mezzanine floor that shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.

5. In the cases where the areas of plots of land are less than the areas stipulated in the Implementing Regulations of Law No.(3) of the Year 1994 with respect to the Partition of Land Intended for

6. For plots situated in the Diplomatic Area, the building percentage shall not be more than 700% (seven hundred percent) of the land area. Building shall be permitted on the front border of the land provided that an arch shall be provided with a width of 3.60 meters (three meters and sixty centimetres) and with a height of at least 5.80 meters (five meters and eighty centimetres), provided that the building's recession shall be from remaining sides at a distance of no less than 3 meters (three meters), subject to the provision of car parks as shown in clause (1) hereof.

2.2 Investment Apartment Block Areas (B)

2.2.1 Uses:

There shall be permitted in such areas residential commercial management or all such uses as shall be shown by plans determining the approved development areas.

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2.2.2 Building Percentages:

The building percentages in such areas shall be as follows:

1. The building percentage shall not be more than 750% (seven hundred and fifty percent) of the land area.
2. The built-up floor area shall not be more than 60% (sixty percent) of the land area.
3. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof whose area is not less than 70% (seventy percent) shall be used as car parks and provided that the height of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

2.2.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor on the front border of the plot unless there is an approved building line in the detailed plans that requires the recession of the building thereto. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 (one meter and twenty centimetres).

2. Side Recession:

Ground floor recessions shall not be less than 4.50 meters (Four meters and fifty centimetres) from the side borders of the land to be used as corridors. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

3. Rear Recession:

Ground floor recessions shall not be less than 6 meters (six meters) from the rear borders of the land and shall be used as car parks or foot paths. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

2.2.4 Special Requirements:

1. It shall be imperative to provide car parks within the plot at the rate of at least one car for each flat so that the number of car parks shall not be less than one car park per 100 square meters (one hundred square meters). In case it is not feasible to provide the required car parks on the plot in the ground floor, it shall be necessary to provide car parks either on the upper floors or by building a basement or both. It shall also be permitted to build multi-storey car parks on the borders of the land from all sides which shall not be calculated as part of the permitted building and height percentages.
2. The areas used for recreational activities and special utilities and services shall not be calculated as part of the permitted building percentage, provided that it shall not exceed 20% (twenty percent) of the total building percentage.
3. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non-residential uses.

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4. For plots overlooking approved commercial roads, commercial and management uses shall be permitted on the ground floor provided that the building's recession shall be at a distance of no less than 6 meters (six meters) from the ground floor on the front border of the land to be used as footpaths and car parks. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall also be permitted the addition of a mezzanine floor that shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.
5. In the cases where the areas of plots of land are less than the areas stipulated in the Implementing Regulations of Law No.(3) of the Year 1994 with respect to the Partition of Land Intended for Construction and Development, the zoning regulations required for the zones whose areas are compatible therewith shall be applicable.

2.3 Investment Apartment Block Areas (C)

2.3.1 Uses:

There shall be permitted in such areas residential commercial management or all such uses as shall be shown by plans determining the approved development areas.

2.3.2 Building Percentages:

The building percentages in such areas shall be as follows:

1. The building percentage shall not be more than 500% (five hundred percent) of the land area.
2. The built-up floor area for any floor shall not be more than 60% (sixty percent) of the land area.
3. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof whose area is not less than 70% (seventy percent) shall be used as car parks and provided that the height of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

2.3.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor on the front border of the plot unless there is an approved building line in the detailed plans that requires the recession of the building thereto. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 meter (one meter and twenty centimetres).

2. Side Recession:

Ground floor recessions shall not be less than 3.50 meters (three meters and fifty centimetres) from the side borders of the land to be used as corridors. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

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3. Rear Recession:

Ground floor recessions shall not be less than 5 meters (five meters) from the rear borders of the land used as corridors or car parks. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

2.3.4 Heights:

1. A building's height shall not be more than 10 stories (ten stories) with a maximum height of 50 meters (fifty meters). In case of building a basement, the maximum height shall be 51.50 meters (fifty-one meters and fifty centimetres) in addition to the height of floors dedicated for services and car parks.

2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

2.3.5 Special Requirements:

1. Car parks must be provided inside the plot of the land at a rate of at least one car park for each flat, and the number of car parks must not be less than one park for every 100 square meters (one hundred square meters). The required car parks must be provided on the ground floor, upper floors, the basement or all of them. Multi-storey car parks may also be built on the land borders from all sides. Car parks shall not be calculated as a pan of the permitted building percentages and heights.

2. The areas used for recreational activities and special utilities and services shall not be calculated as part of the permitted building percentage, provided that it shall not exceed 20% (twenty percent) of the total building percentage. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.

3. For plots overlooking approved commercial roads, commercial and management uses shall be permitted on the ground floor provided that the building's recession shall be at a distance of no less than 6 meters (six meters) from the ground floor on the front border of the land to be used as footpaths and car parks. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall also be permitted the addition of a mezzanine floor that shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.

4. In the cases where the areas of plots are less than the areas stipulated in the Implementing Regulations of Law No. (3) of the Year 1994 with respect to the Partition of Land Intended for Construction and Development, the zoning regulations required for the zones whose areas are compatible therewith shall be applicable.

2.4 Investment Apartment Block Areas (D)

2.4.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

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2.4.2 Building Percentages:

The building percentages in such areas shall be as follows:

1. The building percentage shall not be more than 300% (three hundred percent) of the land area.
2. The built-up floor area shall not be more than 60% (sixty percent) of the land area.
3. A single floor is permitted to be built and allocated for utilities recreational activities and residential services, provided the built-up area is not more than 60% (sixty percent) of the land area. This area shall not be calculated as a part of the overall building percentage, provided the height of the floor is not more than 4 meters (four meters).
4. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof the area of which is not less than 70% (seventy percent) shall be used as car parks.

2.4.3 Recessions:

1. Front Recession:

Building shall be permitted on the ground floor borer of the plot of land unless there is an approved building line in the detailed plans that requires the recession of the building thereto. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 (one meter and twenty centimetres).

2. Side and Rear Recessions:

Ground floor side and rear recessions shall not be less than 3 meters (three meters) from the side and rear borders of the land and can be used as passages. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres) for each border.

2.4.4 Heights:

1. A building's height shall be 6 stories (six stories) with a maximum height of 30 meters (thirty meters). In case of building a basement, the maximum height shall be 31.50 meters (thirty one meters and fifty centimetres) in addition to the height of the floors intended for services and car parks.
2. In case of building a basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

2.4.5 Special Requirements:

1. Car parks must be provided inside the plot of the land at a rate of at least one car park for each flat, and the number of car parks must not be less than one park for every 100 square meters (one hundred square meters). The required car parks must be provided on the ground floor, upper floors, the basement or all of them. Multi-storey car parks may also be built on the land borders from all sides. Car parks shall not be calculated as a part of the permitted building percentages and heights.

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2. For plots overlooking approved commercial roads, commercial and management uses shall be permitted on the ground floor provided that the building's recession shall be at a distance of no less than 6 meters (six meters) from the ground floor on the front border of the land to be used as footpaths and car parks. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall also be permitted to add a mezzanine floor that shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.
3. In the cases where the areas of plots are less than the areas stipulated in the Implementing Regulations of Law No. (3) Of the Year 1994 with respect to the Partition of Land Intended for Construction and Development, the zoning regulations required for the zones whose areas are compatible therewith shall be applicable.
4. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.

2.5 Investment Apartment Block Areas (E)

2.5.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

2.5.2 Building Percentages:

The building percentages in such areas shall be as follows:

1. The building percentage shall not be more than 300% (three hundred percent) of the land area.
2. The built-up floor area shall not be more than 30% (Thirty percent) of the land area.
3. Additional building percentages shall be permitted but not exceeding 50% (fifty percent) of the upper floor area to be allocated for the residence's utilities only, with a height of no more than 4 meters (four meters).
4. A basement shall be permitted to be built under building allocation and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof whose area is not less than 70% (seventy percent) shall be used as car parks. And the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

2.5.3 Recessions:

1. Front Recession:

The building recession shall be at a distance of 10 meters '(ten meters) or 30% (thirty percent) from the front border of the plot whichever is less- overlooking a road or a street, unless there is an approved building line shown by detailed plans which shall be complied with. Upper projections shall be permitted above the ground floor with a maximum of 1.20 meters (one meter and twenty centimeters).

2. Side Recession:

Building recessions on the ground floor shall not be less than 4.50 meters (four meters and fifty centimetres)

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on the side borders of the land and can be used as foot paths. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

3. Rear Recession:

Building of the ground floor shall be permitted at a distance of 5 meters (five meters) from the rear borders of the land and shall be used as foot paths. Upper projections on the floors above the ground floor shall be permitted to be made with a maximum of 60 centimetres (sixty centimetres).

2.5.4 Special Requirements:

1. Car parks must be provided inside the plot of the land at a rate of at least one car park for each flat, and the number of car parks must not be less than one park for every 100 square meters (one hundred square meters). The required car parks must be provided on the ground floor, upper floors, the basement or all of them. Multi-storey car parks may also be built on the land borders from all sides. Car parks shall not be calculated as a part of the permitted building percentages and heights.

2. Areas used for recreational activities and private utilities and services shall not be calculated as part of the permitted building percentages, provided they do not exceed 20% (twenty percent) of the overall building percentage.

3. In case of overlooking approved commercial roads, commercial and management uses shall be permitted on the ground floor provided there a recession on the ground floor from the front border of the land for distance of no less than 6 meters (six meters), and shall be used as foot paths and car parks. Upper projections shall be permitted to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). A mezzanine floor may also be added with an area not more than 70% (seventy percent) of the ground floor area and shall not be calculated as a part of the building percentage.

4. In the cases where the land areas are less than those stipulated in the Executive Orders of Law No.(3) of 1994 concerning the division of lands prepared for construction and development, regulation requirements mentioned in areas compatible with their areas shall be applied.

5. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.

2.6 Apartment Blocks - 4 Stories

2.6.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

2.6.2 Building Percentages:

Building percentages in these areas shall be determined as follows:

1. The building percentage shall not be more than 240% (two hundred and forty percent) of the land area.

2. The built-up floor area shall not be more than 60% (Sixty percent) of the land area.

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3. A single floor is permitted to be built and allocated for utilities recreational activities and residential services, provided the built-up area is not more than 60% (sixty percent) of the land area. This area shall not be calculated as a part of the overall building percentage, provided the height of the floor is not more than 4 meters (four meters).

4. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof the area of which is not less than 70% (seventy percent) shall be used as car parks.

2.6.3 Recessions:

1. Front Recession:

Building shall be permitted at a distance not less than 3 meters (Three meters) from the front border of the land for the facade overlooking a road or a street allowing entrances to be opened on it. Upper projections above the ground floor for a height of 1.20 meters (one meter and twenty centimeters) are permitted. In case the land is located on more than one road, the building recession shall be at least 3 meters (three meters) from the land border overlooking the most important road of the site while upper projections on the floors above the ground floor shall be permitted at a maximum of 1.20 meters (one meter and twenty centimetres) and a distance of no less than 2 meters (two meters) from the border of the land overlooking other roads.

2. Side and Rear Recession:

Building recessions on the ground floor shall not be less than 2 meters (two meters) from the side and rear borders of the land to be used as footpaths. Upper projections on the floors above the ground floor of such side and rear sides shall not be permitted.

2.6.4 Heights:

1. A building's height shall be 4 stories (four stories) with a maximum height of 20 meters (twenty meters). In case of building a basement, the maximum height shall be 21.50 meters (twenty one meters and fifty centimetres) in addition to the height of the floors intended for services and car parks.

2. In case of building basement, the height of the floor of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the level of the pavement surface.

2.6.5 Special Requirements:

1. The area of each flat shall not be less than 80 square meters (eighty square meters).

2. It shall be imperative to provide car parks within the plot at the rate of at least one car park for each residential unit (flat). Car parks must be provided on the ground floor, upper floors, the basement or all of them. Multi-storey car parks may be built on all sides of the land border. Car parks shall not be calculated as a part of the permitted building percentages and the heights permitted.

3. For plots overlooking an approved commercial or service road, the building recession shall be at a distance of no less than 5 meters (five meters) from the front border of the land overlooking the commercial or

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service road. Such recession areas shall be used as footpaths and uncovered car parks provided and they are prepared by the landlord. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall be permitted to add a mezzanine floor so that the height shall be in compliance with the Law on Constructional Organization of Buildings, provided that it shall not be reckoned as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.

4. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non-residential uses.

2.7 Apartment Blocks 3 Stories

2.7.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

2.7.2 Building Percentages:

1. The building percentage shall not be more than 180% (one hundred and eighty percent) of the land area.

2. Built-up area for any floor must not be more than 60% (sixty percent) of the land area.

3. A single floor is permitted to be built and allocated for utilities recreational activities and residential services, provided the built-up area is not more than 60% (sixty percent) of the land area. This area shall not be calculated as a part of the overall building percentage, provided the height of the floor is not more than 4 meters (four meters).

4. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof the area of which is not less than 70% (seventy percent) shall be used as car parks.

2.7.3 Recessions:

1. Front Recession:

Building shall be permitted at a distance not less than 3 meters (three meters) from the front border of the land for the facade overlooking a road or a street allowing entrances to be opened on it. Upper projections above the ground floor for a height of 1.20 meters (one meter and twenty centimetres) are permitted. In case the land is located on more than one road, the building recession shall be at least 3 meters (three meters) from the land border overlooking the most important road of the site while upper projections on the floors above the ground floor shall be permitted at a maximum of 1.20 meters (one meter and twenty centimetres) and a distance of no less than 2 meters (two meters) from the border of the land overlooking other roads.

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2. Side and Rear Recessions:

Building the ground floor shall be permitted on the side and rear border of the land at a minimum distance of 2 meters (two meters) from the land border on the side and rear borders, and shall be used as footpaths. Upper projections on floors above the -ground floor are not permitted.

2.7.4 Heights:

1. A building's height shall be 3 stories (three stories) with a maximum height of 15 meters (fifteen meters). In case of building a basement the maximum height shall be 16.50 meters (sixteen meters and fifty centimetres) in addition to the height of the floors intended for services and car parks.
2. In case of building a basement, the maximum height of the floor or f the ground floor shall not be more than 1.50 meters (one meter and fifty centimeters) from the pavement level.

2.7.5 Special Requirements:

1. The area of each flat shall not be less than 80 square meters (eighty square meters).
2. It shall be imperative to provide car parks within the plot at the rate of at least one car park for each flat. It shall be necessary to provide the required car parks either on the ground floor, the upper floors, and basement or in all of them. Multi-storey car parks may be built on all sides of the land borders. Car parks shall not be calculated as part of the building percentage and the permitted height.
3. For plots of land overlooking an approved commercial or service road, the building recession shall be at a distance of no less than 5 meters (five meters) from the front border of the land overlooking the commercial or service road. Such recession areas shall be used as footpaths and uncovered car parks provided and they are prepared by the land lord. Upper projections shall be allowed to be made above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres). It shall be permitted to add a mezzanine floor so that the height shall be in compliance with the Law on Constructional Organization of Buildings, provided that it shall not be reckoned as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.
4. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non-residential uses.

2.8 Connected Building Areas

2.8.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

2.8.2 Building Percentages:

1. Building Percentages must not be more than 500% (five hundred percent) of the land area.
2. A single floor is permitted to be built and allocated for utilities recreational activities and residential

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services, provided the built-up area is not more than 60% (sixty percent) of the land area. This area shall not be calculated as a pan of the overall building percentage, provided the height of the floor is not more than 4 meters (four meters).

3. In lands located in commercial areas or areas overlooking main commercial roads a mezzanine floor may be added which shall not be calculated as part of the said percentage, and its area shall not be more than 70% (seventy percent) of the ground floor area.

4. A basement shall be permitted to be built whose area shall not be calculated as part of the building percentage, provided a part of whose area is not less than 70% (seventy percent) is used as parks.

2.8.3 Recessions:

1. Front Recession:

The ground floor is permitted to be built on the front border of the land.

2. Side and Rear Recession:

Building is permitted on the side and rear borders of the land, and in the case of making openings overlooking the neighbours ventilators (internal or external courtyards) shall be left as stipulated by the executive regulations of the law for regulating buildings.

2.8.4 Heights:

The height of the building must not be more than 5 stories (five stories with a maximum of 22 meters (twenty two meters). In the case of building a basement, the height must not exceed 23.50 meters (twenty three meters and fifty centimetres) in addition the height of floors allocated for services and car parks if any.

2.8.5 Special Requirements:

1. Residential Apartments may be built, provided the area of each apartment is not less than 60 square meters (Sixty Square meters).

2. Additional car parks must be provided at a rate of one car park per each apartment for residential uses, and the number of car parks must not be less than one park for every 100 square meters (one hundred square meters) for built up areas allocated for other uses. The required car parks must be either on the ground floor, the upper floors, basement or all of them. Car parks shall not be calculated as part of the permitted building percentage and height. Planning approval must be obtained in consideration for the requirements of Roads, Utilities and Services.

3. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.

3. Commercial Showroom Area

3.1 Uses:

There shall be permitted in such areas residential, commercial, management or all such uses as shall be shown by plans determining the approved development areas.

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3.2 Building Percentages:

1. The building percentage shall not be more than 300% (three hundred percent) of the land area.
2. The built-up floor area shall not be more than 60% (sixty percent) of the land area.
3. A mezzanine shall be built with an area of not more than 70% (seventy (percent) of the ground floor area and its area shall not be calculate as part of the permitted building percentage.
4. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exceeding 30% (thirty percent) of the roof area. And if the roof area was less than 100 square meters (one hundred square meters) an area not exceeding 30 square meters (thirty square meters) maybe built with a height of 3 meters (three meters).
5. A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage, provided that a part thereof whose area is not less than 70% (seventy percent) shall be used as car parks.
6. The showroom's area shall not be less than 100 square meters of built-up area.
7. Stores belonging to the commercial showrooms shall be permitted with a percentage of no more than 30% (thirty percent) of the permitted percentage for the total built surfaces.
8. Showrooms shall be permitted to be built with a depth not exceeding 100 meters (one hundred meters) measured from the approved planning line or depth of the property, whichever is less.

3.3 Recessions:

1. Front Recessions:

Building shall be permitted on the ground and mezzanine floors at a distance of no less than 6 meters (six meters) from the front border of the land. The recession areas shall be allocated for uncovered car parks for serving the commercial showrooms. Projections shall be permitted to be made on the floors above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

2. Side and Rear Recessions:

Building shall be permitted on the ground floor at a distance of no less than 3 meters (three meters) from the side and rear borders of the land. No upper projections shall be permitted to be made on the floors above the ground floor.

3.4 Heights:

1. A building's height shall be 5 stories (five stories) with a maximum height of 25 meters (twenty five meters). In case of building a basement, the maximum height shall be 26.50 meters (twenty six meters and fifty centimetres).
2. When building multi storey car parks, the provision of car parks shall be as follows:

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a. Recession from the front side shall be for 6 meters, allocated for car parks to serve commercial showrooms on the first floor and mezzanine. Existing roads and those allowed to be built as per an existing regulation shall be exempted.

b. Provision of the necessary parks for residential and management uses by a basement or in repeated floors. The area of these parks shall not be calculated as part of building percentages and heights.

c. In case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

3.5 Special Requirements:

1. Workers accommodation shall be permitted to be built provided that the percentage allocated for residential uses shall not be more than 30% of the land area and must be on the rear side of the land that does not overlook the front road.

2. It shall be imperative to provide car parks within the plot of land at the rate of at least one car park for each 100 square meters (one hundred square meters) for the built surfaces in the residential and business uses. It shall be necessary to provide the required car parks either on the ground floor, the upper floors, and basement or in all of them. Car parks shall not be calculated as part of the building parentage and the permitted height.

3. It shall be necessary to provide special areas for loading and unloading within the perimeters of the property without conflicting with the other components of the building and its facilities.

4. Subject to the provisions of clause (2) hereof, the front border of the properties overlooking the roads in front of which service areas and car parks are provided, maybe built upon, provided car parks are provided for all uses

5. In the case of private commercial complexes the basement may be used for commercial purposes provided it is calculated as a part of the total built up area allowed and that it does not affect the number of car parks necessary for the project, since each project will be considered separately in accordance with the mechanism of special nature projects.

4. Areas of Investment Buildings in Seef Area

4.1 Areas of Investment Buildings (B1) overlooking the main roads

4.1.1 Uses:

1. Commercial use (commercial showrooms) shall be permitted only on the ground floor and the mezzanine floor of the main facade at depth of no less than 18 meters (eighteen meters) measured from the approved planning line or the depth of the property, wherever is greater, in the buildings overlooking King Mohammed the Sixth Avenue and the two avenues numbered 2809 and 2819, and the two roads numbered 38 and 40.

2. Residential or business uses or all of them on the first floor and the floors above it are permitted.

3. The rear service road shall only be used as an entrance and car park area, and for loading unloading and emergency exits.

The requirements of the Urban Planning and Development Authority

4.1.2 Building Percentages:

1. Building percentages in these areas are determined as follows:
2. The building percentage shall not be more than 750% (seven hundred and fifty percent) of the land area.
3. The built-up floor area for any floor shall not be more than 60% (sixty percent) of the land area.
4. A mezzanine floor may be built provided its percentage does not exceed 70% (seventy percent) of the ground floor area.
5. The showroom area shall not be less than 100 square meters (one hundred square meters).
6. A basement shall be allowed to be built and its areas shall not be calculated as part of the aforesaid building percentage provided that it shall be the area is not less than 70% (seventy percent) as car parks and be used as utilities, services and entrances.

4.1.3 Recessions:

1. Front Recessions:

Building shall be permitted on the front border of the land in land overlooking King Mohammed the Sixth Avenue, the Avenue number 2809 and 2819, and Road Numbers 38 and 40, and also for facades overlooking internal walk ways in the event of them being the building's main facade, unless there was an approved building line in the detailed plans in which case building shall be permitted on its border as per approved drawings.

2. Side Recession:

Building shall be permitted at a distance of no less than 4.50 meters (four meters and fifty centimetres) from the side border of the land overlooking the side road or connected to the neighbouring land.

3. Rear Recession:

A ground floor is permitted to be built at a distance of no less than 6 meters (six meters) from the rear border of the land. This area may only be used in floors used as car parks, and their area shall not be calculated as a part of determined building percentages an heights.

4.1.4 Heights:

1. The height of the ground floor roof and the mezzanine floor combined shall be 7.5 meters (seven meters and fifty centimetres) measured from the pavement level to the bottom of the tiles of the constructional roof of the mezzanine.
2. In the case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

4.1.5 Special Requirements:

1. Car parks shall be provided inside the plot as per the regulatory requirements table for car parks for buildings and installations stipulated in Article (1 13) hereof.

The requirements of the Urban Planning and Development Authority

2. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non-residential uses.

3. Separate entrance and exit must be provided for car parks on the rear service road.

4. Boundary fence is not allowed to be built for buildings on the land border.

5. Areas used for recreational activities, special utilities and services shall not be calculated as part of the permitted building percentages, provided they don't exceed 20% (twenty percent) of the overall building percentage.

6. In case where the areas of the plots are less than areas stipulated in the executive regulations of Decree law No. (3) of 1994 concerning the Division Lands Prepared for Construction and Development, the regulatory Requirements in areas of similar sizes shall apply.

4.2 Areas of Investment Buildings (B2) Overlooking Internal Courtyards and Walkways

4.2.1 Uses:

1. Commercial use is only permitted on the ground floor and the mezzanine floor of the main facade at a depth of no less than 6 meters (six meters) from the land border for buildings overlooking internal courtyards and footpath.

2. Multiple residential or management or all of them are permitted on the first floor and upper floors.

3. The recession area of the ground floor overlooking the rear service road shall only be used as car parks and for loading and unloading.

4.2.2 Building Percentages:

Building percentages in these areas shall be determined as follows:

1. The building percentage shall not be more than 750% (seven hundred and fifty percent) of the land area.

2. The built up areas for any floor shall not be more than 60% (sixty percent) of the land area.

3. A basement shall be allowed to be built and its area shall not be calculated as part of the aforesaid building percentage provided it shall use up an area of no less than 70% (seventy percent) as car parks.

4.2.3 Recessions:

1. Front Recession:

a. Building shall be permitted on the front border of the land for lands overlooking internal courtyards or internal walkways which is considered as the main facade of the buildings unless there was an approved building line in the detailed plans, in which case building shall be on its border as per approved drawings

b. Recession on the first floor and its upper floors shall not be less than 3 meters (three meters) from the front border of the land overlooking internal courtyards and internal walkways.

The requirements of the Urban Planning and Development Authority

2. Side Recession:

Building shall be permitted on the side border of the land in the ground floor and the mezzanine floor overlooking the neighbouring land. Recession shall be at a distance of 4.50 meters (four meters and fifty centimetres) in the first floor and the floors above it, unless there is an approved building line in the detailed plans, in which case building shall take place on the land border as per approved drawings.

3. Rear Recession:

A ground floor is permitted to be built at a distance of no less than 6 meters (six meters) from the rear border of the land. This area may only be used in floors used as car parks, and their area shall not be calculated as a part of determined building percentages and heights.

4.2.4 Heights:

The height of the ground floor roof and the mezzanine floor combined shall be 7.5 meters (seven meters and fifty centimetres) measured from the pavement level to the bottom of the tiles of the constructional roof of the mezzanine.

In the case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

4.2.5 Special Requirements:

1. Car parks shall be provided inside the plot as per the regulatory requirements table for car parks for buildings and installations stipulated in article (113) hereof.
2. In case of multiple uses, the entrances, lifts and staircases leading to the residential uses shall be separated from the remaining non- residential uses.
3. Separate entrance and exit must be provided for car parks on the rear service road.
4. Boundary fence is not allowed to be built for buildings on the land border.
5. Areas used for recreational activities, special utilities and services shall not be calculated as part of the permitted building percentages, provided they don't exceed 20% (twenty percent) of the overall building percentage.
6. In case where the areas of plots are less than areas stipulated in the executive regulations of Decree law No (3) of 1994 concerning the Division Lands Prepared for Construction and Development, the regulatory Requirements in areas of similar sizes shall apply.

4.3 Land Allocated for Multi-storey Car Park Building

4.3.1 Uses:

Commercial uses (commercial showrooms) shall be permitted in the ground floor and the mezzanine floor overlooking Avenue 40. The building may be used as car parks from the first floor to the fifth floor as a maximum.

The requirements of the Urban Planning and Development Authority

4.3.2 Recessions:

1. Front Recession:

Building shall be on the front border of the land overlooking Avenue 40, which is considered as the main facade of the building.

2. Side Recession:

Side recession shall be 4.5 meters (four meters and fifty centimetres) from the side border of the land attached to the neighbour and on the side road unless there was an approved building line.

3. Rear Recession:

Recession from the rear border of the land overlooking the rear service road shall not be less than 6 meters (six meters) from the ground floor.

4.3.3 Heights:

1. The height of the ground floor roof and the mezzanine floor combined shall be 7.5 meters (seven meters and fifty centimetres).
2. Building height shall not be more than 5 stories (five stories) with a maximum of 21 meters (twenty one meters).

4.3.4 Special Requirements:

Separate vehicle entrances and exits must be provided on the rear service road.

5. Industrial Areas

5.1 industrial manufacturing projects (a)

Without prejudice to the applicable industrial laws and regulations, industrial projects category (a) in industrial areas shall be deemed as projects of a special nature that require obtaining a planning approval from the General Directorate of Urban Planning with respect to the suitability of the site from the planning aspect in coordination with the competent authorities.

5.2 Industrial Manufacturing Projects (b)

5.2.1 Uses:

They are intended for industrial manufacturing purposes, management offices, showrooms and warehouses for the products of such industries as indicated in the plans for determination of development area.

5.2.2 Building Percentages:

1. The total built-up areas of all buildings shall not be more than 240% (two hundred and forty percent) of the land area.
2. The built-up area of any floor shall not be more than 60% (sixty percent) of the land area.

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3. A mezzanine floor shall be permitted to be built with an area of no more than 70% (seventy percent) of the ground floor area that shall not be calculated as part of the permitted building percentages.

4. The total built-up area intended for use as showrooms shall not be more than 20% (twenty percent) of the ground floor area.

5. A basement shall be allowed to be built as required and its area shall not be calculated as part of the aforesaid building percentage provided that it shall fulfil the safety and security requirements mm shall be decided by the competent authorities.

5.2.3 Recessions:

1. Front Recession:

Building on the ground floor and the mezzanine shall be permitted at a distance of at least 6 meters (six meters) from the front border of the land overlooking a road or street. Such area shall be allocated as uncovered car parks. Upper projections shall be permitted to be made on the floors above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

2. Side and Rear Recessions:

The recessions shall not be less than 4 meters (four meters) from the land border for side and rear facades. Upper projections shall not be permitted to be made on the floors above the ground floor.

5.2.4 Heights:

1. A building's height shall not be more than 4 stories (four stories) with a maximum height of 24 meters (twenty four meters). The height shall be permitted to be increased in the cases required by industrial facilities with special specifications upon obtaining the approval of the General Directorate of urban planning.

2. In case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimeters) from the pavement level.

5.2.5 Special Requirements:

It shall be imperative to provide additional car parks at the rate of at least one car park for each 200 square meters (two hundred square meters) for the built surfaces. It shall be necessary to provide the required car parks either on the ground floor, the upper floors, and basement or in all of them. Car parks shall not be calculated as part of the prescribed building parentage.

5.3 Light Industries Areas

5.3.1 Uses:

They are intended for light industrial uses, workshops, management offices, stores and showrooms for industrial products and workers accommodation as indicated in the plans for determination of development area.

The requirements of the Urban Planning and Development Authority

5.3.2 Building Percentages:

1. The total built-up areas of all buildings shall not be more than 240% (two hundred and forty percent) of the land area.
2. The built-up area of any floor shall not be more than 60% (sixty percent) of the land area.
3. A mezzanine floor shall be permitted to be built with an area not exceeding 70% (seventy percent) of the ground floor area that shall not be calculated as part of the permitted building percentage.
4. The total built up area allocated for workers accommodation shall not be more than 120% (one hundred and twenty percent) of the land area.
5. The area of a single workshop shall not be less than 100 square meters (one hundred square meters).
6. A basement shall be allowed to be built as required and its area shall not be calculated as part of the aforesaid building percentage provided that it shall fulfil the safety and security requirements as shall be decided by the competent authorities.

5.3.3 Recessions:

1. Front Recession:

Building on the ground and mezzanine floors shall be permitted at a distance of no less than 6 meters (six meters) from the front border 0 75" land overlooking a road or street and such area shall be used as uncovered car parks. Upper projections shall be permitted to be made on the floors above the ground floor with a maximum of 1.20 meters (one meter and twenty centimeters).

2. Side and Rear Recessions:

The recessions shall not be less than 4 meters (four meters) from the land border on the side and rear facades. Upper projections shall not be permitted to be made on the floors above the ground floor.

5.3.4 Heights:

1. A building's height shall not be more than 4 stories (four stories) with a maximum height of 24 meters (twenty four meters). An increase of the height shall be permitted in the cases required by industrial facilities with special specifications upon obtaining the planning approval thereof.
2. In case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

5.3.5 Special Requirements:

1. It shall be imperative to provide additional car parks so that the number of car parks shall not be less than one car park for each 200 square meters (two hundreds square meters) of the built surfaces. Car parks shall be provided on the ground floor, upper floors, in the basement or in all of them. It is also permitted to build multi-storey car parks, provided the legal recessions stipulated in clause (1) and (2) of article (90) hereof are adhered to. Car parks shall not be calculated as part of the permitted building percentage.
2. Light industrial buildings, workshops and connected or semi- connected stores shall be permitted to be built subject to obtaining the approval of the General Directorate of Civil Defence with respect to

determination of emergency exits, assembly points and such other requirements of security and safety in emergencies such as fire while ensuring the easy movement between groups of buildings.

5.4 Workshops and Maintenance Services Areas

5.4.1 Uses:

They are intended for light industrial and service workshops, as indicated in the plans for determination of development area.

Building Percentages:

1. The total built-up areas of all buildings shall not be more than 240% (two hundred and forty percent) of the land area.
2. The built-up area of any floor shall not be more than 60% (sixty percent) of the land area.
3. A mezzanine floor shall be permitted to be built with an area not exceeding 70% (seventy percent) of the ground floor area that shall not be calculated as part of the permitted building percentage.
4. The area of a single workshop shall not be less than 50 square meters (fifty square meters).
5. The total area allocated for workers accommodation shall not be more than 120% (one hundred and twenty percent) of the land area.
6. A basement shall be allowed to be built and its area shall not be calculated as part of the aforesaid building percentage provided that it shall fulfill the safety and security requirements as shall be decided by the competent authorities.

5.4.2 Recessions:

1. Front Recession:

Building on the ground and mezzanine floors shall be permitted at a distance of no less than 6 meters (six

meters) from the front border of the land overlooking a road or street and such area shall be used as uncovered car parks. Upper projections shall be permitted to be made on the floors above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

2. Side and Rear Recessions:

The recessions shall not be less than 2 meters (two meters) from the land border on side and rear facades.

Upper projections shall not be permitted to be made on the floors above the ground floor.

5.4.3 Heights:

1. A building's height shall not be more than 4 stories (four stories) with a maximum height of 24 meters (twenty four meters). An increase of the height shall be permitted in the cases required by industrial facilities with special specifications.

The requirements of the Urban Planning and Development Authority

2. In case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

5.4.4 Special Requirements:

It shall be imperative to provide additional car parks so that the number of car parks shall not be less than one car park for each 200 square meters (two hundreds square meters) of the built-up areas. Car parks shall be provided on the ground floor, upper floors, in the basement or in all of them. Car parks shall not be calculated as part of the permitted building percentage.

5.5 Service Areas

5.5.1 Uses:

They are intended for light industrial uses, maintenance repair and oil change service workshops and for tire repairs as well as similar services in addition to management offices, industrial and service showrooms and workers accommodation as indicated in the plans for determination of development area.

5.2.2 Building Percentages:

1. The total built-up areas of all buildings shall not be more than 180% (one hundred and eighty percent) of the land area.
2. The built-up area of any floor shall not be more than 60% (sixty percent) of the land area.
3. A mezzanine floor shall be permitted to be built with an area not exceeding 70% (seventy percent) of the ground floor area that shall not be calculated as part of the permitted building percentage.
4. The built up percentage allocated for accommodation shall not be more than 90% (ninety percent) of the land area.
5. The area of a single workshop shall not be less than 30 square meters (thirty square meters).
6. A basement shall be allowed to be built and its area shall not be calculated as part of the aforesaid building percentage provided that it shall fulfil the safety and security requirements as shall be decided by the competent authorities.

5.5.3 Recessions:

1. Front Recession:

Building on the ground and mezzanine floors shall be permitted at a distance of no less than 5 meters (five meters) from the front border of the land overlooking a road or street and such area shall be used as uncovered car parks. Upper projections shall be permitted to be made on the floors above the ground floor with a maximum of 1.20 meters (one meter and twenty centimetres).

2. Side Recession:

Building shall be permitted on the side borders of the land. In case of making openings overlooking a neighbouring property, light shafts shall be provided (internal or external courtyards) as provided for in the Implementing Regulations of the Constructional Organization of Buildings.

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3. Rear Recession:

The recessions on the rear facade shall be at a distance of no less than 2 meters (two meters) from the rear border of the land. Upper projections shall not be permitted to be made on the floors above the ground floor.

5.5.4 Heights:

1. A building's height shall not be more than 3 stories (three stories) with a maximum height of 18 meters (eighteen meters).
2. In case of building a basement, the height of the flooring of the ground floor shall not be more than 1.50 meters (one meter and fifty centimetres) from the pavement level.

6. Agricultural Areas

6.1 Uses:

The following uses shall be permitted as indicated in the plans for determination of the approved development areas:

1. All agricultural and recreational activities and building green houses and plant nurseries shall be permitted in such area.
2. Special residential units, residential compounds and farmers accommodation shall be permitted to be built.
3. Permission shall be granted for carrying on animal husbandry activities and establishment of poultry farms and animal stables upon obtaining a planning approval from the General Directorate of Urban Planning concerning the fitness of the site from the planning aspect in co-ordination with the concerned authorities, provided that the license to carry on the aforesaid activities shall be issued by the authority concerned with agricultural affairs and General Commission for Protection of Marine Wealth, Environment and Wildlife.
4. A basement may be built where area shall not be calculated as a part of the aforesaid building percentage, provided at least 70% (seventy percent) thereof is used as car parks.

6.2 Building Percentages:

1. The total built-up areas of residential units shall not be more than 30% (thirty percent) of the land area as more than one housing unit shall be permitted to be built, provided that the share of a single residential unit shall not be less than 2,000 (two thousand square meters) of the land area and shall be grouped in one side of the land.
2. The total built-up area of the farmer's accommodation shall not be more than 5% (five percent) of the land area.
3. The total area of animal pens and stables shall not be more than 10% (ten percent) of the land area.

6.3 Recessions:

1. Front Recession:

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1. Building of green houses and plant nurseries shall be permitted with a recession of the land border overlooking a road or street distance of no less than 3 meters (three meters).
2. Special residential units shall have a recession from the property borders by a distance of no less than 6 meters (six meters).
3. The building of the office, watchman's room, pump room and stores shall be adjacent to the fencing wall at the entrance and on one side only of the land.
4. The distance between the animal pens and nearest residential house shall not be less than 50 meters (fifty meters).
5. The recession of the farmer's accommodation shall not be less than 6 meters (six meters) from the front border of the land.
6. The front recession of the animal pens or stables shall not be less than 15 meters (fifteen meters) from the front borders of the land.

2. Side and Rear Recessions:

1. Building of green houses and plant nurseries shall be permitted with a recession of the land border overlooking a neighbour, footpath by a distance of no less than 6 meters (six meters).
2. Special residential units and farmers accommodation shall have a recession from the property borders by a distance of no less than 6 meters (six meters) from the land border of the sides connected to neighbor or foot path.
3. The animal pens and stables shall have a recession of no less than 15 meters (fifteen meters) from the sides connected to a neighbour or foot path.
4. The distance between the residential units shall not be less than 4 meters (four meters).

6.4 Heights:

1. A residential units' height shall not be more than 2 stories (two stories) with a maximum height of 10 meters (ten meters).
2. The height of the office, watchman's room, fanners' accommodation, pump rooms and stores shall not be more than one floor with a maximum height of 4 meters (four meters).
3. In case of building a basement the height of the flooring of the ground floor must not be more than 1.50 meters (one meter and fifty centimetres) from the road level.

Special Requirements:

The general requirements and specifications issued by the authority concerned with agricultural affairs shall be followed with respect to the establishment of cow pens, horse stables, poultry farms and such other animal and agricultural production activities as well as the conditions related to the reclamation of irrigation and drainage canals and removing palm trees.

The requirements of the Urban Planning and Development Authority

7. General Conditions

7.1 The requirements set forth in this Edict shall be applicable to the land for which general and detailed plans have been prepared and approved taking into consideration the following:

7.1.1 Development shall be permitted in the green belt areas in accordance with the approved classification plans for these areas.

7.1.2 Land areas and properties with areas of less than 60 square meters (sixty square meters) shall be permitted to be developed at the rate of one residential units for each floor while complying with the heights prescribed for each development area.

7.1.3 Development shall not be permitted in open areas except upon obtaining the planning approval of the suitability of the site for the proposed development for the projects of a special nature by the General Directorate of Urban Planning in co-ordination with the concerned authorities including the areas open to the following:

a. Land areas that contain natural wealth or sources of marine life.

b. Quarries.

c. Waterways, plateaus or valleys.

d. Archaeological and historical landmarks.

e. Burial mounds.

f. Land areas intended for special uses.

g. Land areas intended for future development extensions.

h. Undeveloped onshore areas.

i. Offshore areas.

j. Land areas surrounding poultry farms according to the specifications approved by the authority concerned with agricultural affairs.

7.1.4. In the case of properties overlooking main roads on which it is not permitted to open vehicle entrances, it is permitted to make entrances to foot paths only in cases that do not pose any threat to the traffic safety of pedestrians in coordination with the directorate concerned at the Ministry of Works.

7.2 Areas of Social Services and Public Utilities Projects:

Approved general and detailed development plans or plans for determination of development projects for educational, health, sports, social, religious, cultural, recreational, tourist and public utilities projects and similar projects shall be permitted in the areas designed for public services and utilities subject to obtaining a planning approval for the suitability of the site for the proposed development from the General Directorate of Urban Planning in addition to determination of the Zoning Regulations for Construction of each project as part of the planning approval thereof. The above shall take place in co-ordination with the concerned authorities.

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7.3 Areas of Projects of a Special Nature:

There shall be determined in the development plans in the Kingdom areas that may be allocated for projects of a special nature, provided that a planning approval shall be obtained from Zoning Regulations for Construction as required by the nature of each project. Development projects of a special nature shall be permitted after obtaining the planning approval of the suitability of the site for development for each project from the General Directorate of Urban Planning. Meanwhile, co-ordination shall take place with the authorities concerned with development, utilities, services and roads. Further, such authorities may request the owner to submit a preliminary study of the effects of the proposed uses for construction applicable in the area, road network, utilities, environmental studies and public services, provided that the General Directorate of Urban Planning shall be furnished with recommendations from such authorities within 30 days from the date of receiving the approval request. The Minister concerned with Municipalities Affairs and Agriculture shall issue an order concerning the zoning and development conditions according to the nature of each project, in accordance with article (20) of the Law for Regulation of Building.

Relevant Committees:

Subject to the provisions of the Development Planning Law referred to the Minister concerned with Municipalities Affairs and Agriculture shall issue orders concerning the formation the following committees:

1. Facades Committee: This is a committee comprising representatives of the authorities concerned with development which may lay down the rules that contribute to the development of the existing facades and coordination between the new building facades and enhancing the architectural and constructional style of the different development areas.

2. Special Nature Project Review Committee: This is a technical consulting committee to review projects of a special nature and the requirements related to areas with distinguished development nature and the projects that are not subject to the approved Zoning Regulations for Construction with representation by authorities concerned with development, utilities, services and roads. The Committee may request from the owners of the aforesaid projects to prepare any technical and economic studies related to the direct social, development, economic, environmental and traffic effects for setting up of such projects.

Development on the Borders of the Main Roads:

Subject to the provisions of the Development Planning Law referred to, development shall be permitted on the borders of main roads according to the general and detailed development plans approved by the Minister concerned with Municipalities and Agriculture Affairs that determine the development area designated for each, provided that the building recession shall be on the building line indicated in such plans or ministerial orders. These plans and ministerial orders shall determine the depth of permitted building measures from the centre of the road and determination of the Zoning Regulations for Construction on such roads. Car parks must be provided in areas of front recessions where the building recession is at a distance of 5 meters (five meters) from the front border of the land, for all properties overlooking approved commercial roads, with the exception of:

1. Buildings and properties for which applications for new building licenses are submitted, and which overlook approved commercial roads within an existing area in which the percentage of buildings without

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front recessions is more than 50% (fifty percent) of the total length of the commercial road, in order to unify the building line in these areas.

2. Buildings and properties for which applications for building licenses are submitted and which overlook approved commercial roads which have been designed with the provision of car parks (longitudinal, lateral or inclined) within the road boundary, in order to unify the building line in this area.
3. Buildings and properties for which applications for building licenses are submitted and which overlook approved commercial roads where it is not permitted to open entrances for cars thereon for planning reasons or for traffic safety requirements. Building is permitted on the front border of the land unless there is an approved regulation line for the road on which there must be a recession. In case of lands overlooking two streets, there must be a recession from the side on which car entrances are permitted to be opened at a distance of 5 meters (five meters) from the land border, to be used as car parks. Car parks must be provided for buildings and installations to which no specific reference is made herein, in accordance with the following table.

S	Uses	Parking Standards
1	Hotels	Car park space per each 3 hotel rooms. car park space per each flat apartment 150 sq. m, 2 for Greater than 150 sq. m. 1 car park space per each room with kitchenette. Car park space per 50 sq. Ill restaurants. Car park space per 25 sq. m halls and ballrooms. Car park space per 50 sq. m shops and offices. The administration offices, recreation center, business center and services (kitchen & corridor) which use of the Hotel are exempted from providing car park.
2	Restaurants	4 Car spaces / 100 SQM.
3	Private Hospitals	5 Car spaces / 100 SQM.
4	Clinics	4 Car spaces for each doctor
5	Private Universities and Institutes	1 Car space / 4 students
6	Private School	2 Car spaces /class room
7	Nurseries and Kindergartens	1 Car space / 150 sq. m
8	Banks	5 Car spaces I 100 sq. in
9	Supermarket	5 Car spaces I 100 sq. in
10	Car showrooms	1.5 Car spaces I 100 sq. in

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S	Uses	Parking Standards
11	Sport Activities	1 Car space / 50 sq. m
12	Offices	1 Car space / 70 sq. m
13	Friday Mosque	1 Car space / 50 sq. m
13	Friday Mosque	1 Car space / 50 sq. m
14	Museum	1.5 Car space / 100 sq. m
15	Cinema	1 Car space / 5 seats
16	Library	1 Car space / 100 sq. m
17	Petrol Station	Car spaces / Petrol Station + additional activities parking if any
18	Stores or Warehouse	No Car park space required because loading and unloading is an immediate process
19	Multi-Purpose Hall	1 Car space / 25 sq. m
20	Malls	1 Car space / 50 sq. m

Additional Floors may be added to the existing buildings in Investment Building Areas (A, B, C & D) in accordance to their recessions, subject to the following requirements:

1. An adequate number of car parks must be provided with the addition in accordance with the provisions hereof.
2. The specified building percentage for the area must not be exceeded.
3. All the remaining regulatory requirements for construction in the area must apply.
4. Obtaining a certificate carrying “Addition to the Building” from two category “A” approved Consultant Engineering Offices.

Provisions of this order shall be applicable to applications for addition to the existing buildings, and shall not apply to new buildings or those that are demolished and reconstructed. The Minister concerned with Municipalities Affairs and Agriculture shall submit all the cases to which no reference is made and cases that require amendments to these requirements to the Ministerial committee for Public Utilities, to issue the necessary recommendations concerning them.

Chapter 2

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Municipalities Affairs

Table of Contents

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Municipalities Affairs

1. Laws and Regulations

The decision of the head of the Central Municipal Authority for issuing the executive regulations of the Decree by law No. (13) concerning the building regulations.

Decree by law No. (13) of 1977 for issuing the law of building regulations.

Decision No. (76) of 2018 for issuing the regulatory requirements applicable to residential projects;

2. Requirements

(According to the executive regulations of Decree by law No. (13) of 1977 concerning the building Regulations)

1. Heights

1.1 The following general rules shall be applicable to the heights of the buildings:

1. The heights shall be measured in front of the middle of the building facade for each facade from the pavement surface level; otherwise, it shall be measured from the level of the road surface to the roof of the last floor.
2. If the road boundaries are not parallel, the height will be one and half times the average distance between one of the roads in front of the building facade and vertical to the same.
3. If the building is located at the intersection of two roads of different widths, the height of the front part overlooking the road with the least width, may reach the maximum allowable height for the wider road. The maximum allowable height shall be at 30 meters from the intersection of the two roads.
4. If the building is located on two parallel roads of different widths, the height of the front part, overlooking the road with the least width, may reach maximum allowable height of the wider road. This will be if the façade is within a height not exceeding 30 meters of the road of the wider front. The height of the building shall be calculated, if its depth exceeds the same, according to the rule of the narrow road width.
5. If the building is located on the road and another road intersects with it and is vertical on its facade, the height allowed in this case shall be similar to the height of the buildings located on the same road.
6. If the building is located behind the road boundary at any distance, its height shall be considered as if it is located on a road that exceeds its width with such distance provided that the distance is not less than (1.20) meters.
7. It is allowed to exceed the heights outlined in the above - mentioned paragraphs for the stairwells, the room of the elevator machines, water tanks or air conditioners with 7 meters provided that the use is limited to such purposes.

   In places of worship and governmental and municipal buildings, it is also allowed to exceed the mentioned heights for domes, towers and minarets subject to a prior authorization.

1.2 Internal heights:

The minimum internal height within any building shall be according to the following:

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In Commercial Buildings:	Basement	2.2 meters
	Attic	2.2 meters
	Shops and stores	3.6 meters
	Offices	3.75 meters
In Residential Buildings:	Basement	3.2 meters
	Residential rooms	2.75 meters
In Industrial Buildings:	Basements	2.7 meters
	Factory	3.6 meters
	Attic	2.5 meters

2. Areas (Spacing)

The minimum area of the residential room is	9 square meters
The minimum area of the kitchen is	5 square meters
The minimum area of the bathroom is	3 square meters
The minimum area of the toilet is	1.5 square meters

2.1 In the residential buildings, the minimum width of pathways is 1 meter. In the commercial, industrial and public buildings, the minimum width of pathways is 1.5 meters.

2.2 The depth of the residential room that is illuminated from one side may not exceed three times of its net height.

2.3 If the room is illuminated and ventilated from one side under a balcony or a roof, the depth of the room shall be calculated from the facade of the balcony or the roof.

2.4 The total area of the windows of the room may not be less than (1/12) of its area

3. Stairways:

3.1 Each building comprising more than one floor and its floor area does not exceed (600) square meters or (1800) square meters for the whole building must be equipped with one main stairway at least. If the area exceeds (600) but not exceeding 1200 square meters per floor or exceeds (1800 but not exceeding 3600) square meters for the building as a whole, an additional stairway shall be added for each similar increase, taking into account the regulations of General Directorate of Civil Defence and reducing the area of garages.

3.2 The minimum width of the main stairway in the residential buildings shall be 1 meter. However, in the commercial and public buildings, it shall be 1.5 meters. The minimum width of the landing shall be at least equal to the width of the stairs.

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3.3 The maximum height of one stair step in a residential building shall be (17) centimetre. In the service stairs, it shall be (19) centimetre.

3.4 The minimum net space between the stair and the ceiling shall be 2.20 meters.

3.5 The main stairs are determined according to the following rule: (Twice the height of the stair x width of the stair = from (60/64) centimetre)

3.6 The maximum number of continuous stairs in one flight shall be 15 steps. If the situation requires the continuity of stairs, there will be a landing between the two flights and no stairs shall be extended beyond the limits of the property.

3.7 In buildings of which height is more than 15 meters, electrical elevators must be installed from the floor to the last floor.

3.8 This shall be in accordance with the specifications determined by the technical departments and the General Directorate of Civil Defence, so that, the one stairway shall be replaced by one elevator leaving at least one stairway in each building.

3.9 An elevator shall be added if the building exceeds four floors.

3.10 The ventilation and lighting of the stairways shall be sufficiently provided by openings and windows connected directly to the outside air or to skylights.

3.11 One emergency stairway must be installed in any building in which the area of each floor exceeds one thousand square meters or three thousand square meters for the entire building. An additional stairway shall be installed for each similar increase. However, the stairway may not be spiral. The minimum width of the stairway shall be 80 centimetre and the maximum height of the stair shall be 20 centimetre.

3.12 The emergency stairway may not be replaced with electric elevators.

3.13 The emergency stairway shall be of non-flammable materials and must lead directly to the outside or to a corridor free from obstacles.

3.14 The stairs used for special industrial purposes, minarets and towers shall be excluded from the above – mentioned rules.

4. Decorative extensions

4.1 It is permitted to make decorative extensions that may not exceed (15) centimetre from the construction line of the ground floor.

5. Uncovered and Covered Balconies – Towers

5.1 Terraces and enclosed balconies may be constructed along the facade of the building according to the following conditions:

a. The balcony shall be on the first floor and above.

b. The balcony shall be 4.5 meters at least above the pavement surface level.

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c. The maximum extension from the ground limit shall be (10%) of the width of the street and may not exceed one meter.

d. The uncovered balconies may not exceed half of the length of the façade.

5.2 In the case of the two adjacent façades, the balconies, projections or windows may not be constructed at less than (1.50) meters from the property boundaries. If the two façades form an angle that is less than 180 degrees, the above - mentioned distance may not be less than 2 meters calculated from the middle of the angle.

6. Voids

6.1 The minimum dimensions of the smallest of the internal voids on which the residential rooms overlook may not be less than a quarter of the maximum height, measured from the window of the ground floor provided that it may not be less than 2.5 meters and the area shall not be less than:

a. 10 square meters if the height does not exceed 12 meters.

b. 12.5 square meters if the height exceeds 12 meters.

6.2 The minimum dimensions of the voids on which the kitchens, bathrooms, toilets and stairways overlook may not be less than the following:

a. 2 meters wide and an area of 6 square meters if the height does not exceed (12) meters.

b. 2.5 wide and an area of 10 square meters if the height is from (12 to 24) meters.

c. 2.5 meters wide and an area of (12.5) square meters if the height exceeds 24 meters.

6.3 All voids may not be provided with ground exits to ensure their maintenance and to meet any other requirements such as fire protection.

6.4 The dimensions of the voids connected to the outside air from one side, on which the residential rooms overlook, may not be less than a quarter of the height of the highest facade. Such distance may not be less than (2.5) meters.

6.5 The provisions of such voids shall be applicable to spaces adjacent to the walls provided that they must be connected to the external air from one side or more.

6.6 If the residential rooms or any of the facilities have one window in more than one wall, one of the windows overlooking the road or the voids must meet the above – mentioned requirements.

6.7 In all the above – mentioned cases, as well as in the facades of the building overlooking the public or private road, recessions (holes or pockets) may be made for lighting and ventilation of residential rooms or other facility if it is not possible to open a window on the road or the voids. In such case, the recession depth may not exceed twice its minimum width and the window shall be directly adjacent to the road or void.

6.8 Other uncovered balconies may be built for such recessions subject to the half of its minimum width

6.9 No void shall be covered, whether closed or not, in any manner of coverage. However, uncovered balconies may be built in the recessions within a quarter of its depth, provided that the projection thereof may not exceed 60 centimetres.

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6.10 The owners of the adjacent properties may agree to construct common void where all the requirements stated in these regulations are met. However, such voids may be separated with barriers that do not prevent light or air and the height thereof may not exceed three meters. The basis of such barrier may not exceed 1.8 meters.

6.11 The contract concluded for such agreement must be registered with the department of real estate registry.

7. Pergolas:

7.1 Pergolas may be established on the roofs and in all areas subject to the following rules:

a. The total area of the pergola may not exceed one third of the roof area on which the pergola is established.

b. The roof covered by the pergola must be built and the space may not be less than 50 % of its total area.

7.2 The pergolas may be constructed on the land and in the empty spaces on the buildings subject to the conditions of clause (b) of the above – mentioned provided that the total covered area under the pergola may not exceed five percent of the area of the land.

8. Mezzanine/ Attic:

8.1 A mezzanine/ attic may be constructed for shops in commercial areas (determined to be warehouses) and residential areas with commercial facades subject to the following conditions:

a. The maximum area of the mezzanine/ attic shall be (50%) of the shop area.

b. The minimum free height of the mezzanine/ attic may not be less than (2.15) meters and the free height of the shop under the mezzanine/ attic may not be less than (2.35) meters.

c. The use of the mezzanine/ attic shall be determined subject to the direct service of the shop itself. The only entry to the mezzanine shall be from the shop and no entry may be made to it from outside.

d. The means of natural ventilation and light must be sufficient. `

e. The mezzanine/ attic may not extend to exceed the limits of the horizontal projection of the shop.

f. Additional stairs to the mezzanine/ attic shall be installed inside the shop if the mezzanine area exceeds one hundred square meters.

9. Other:

9.1 No facilities may be constructed on empty setbacks areas.

9.2 The natural or mechanical ventilation, light, sewage and insulation must be sufficient in each basement subject to the specifications to be determined by the concerned departments and authorities.

9.3 All who construct buildings should prepare temporary toilets for its workers subject to the determined health conditions. The number of such toilets must be proportionate with the number of workers, i.e. one toilet shall be allocated for 50 workers at least.

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9.4 All works of:

a. Sewage and sanitary plumping installations inside and outside the constructed buildings should be in accordance to the conditions and specifications determined by the Ministry of Works, Electricity and Water (Sanitary Department) as stated in Annex (A) concerning the sanitary conditions.

b. The water installations inside and outside the constructed buildings should be in accordance with the conditions and specifications determined by the Ministry of Works, Electricity and Water (Water Department) as outlined in Annex (B) concerning the water supply attached herewith.

c. The electrical installations inside and outside the constructed buildings should be in accordance with the conditions determined by the Ministry of Works, Electricity and Water (Electricity Department) as stated in Annex (C) concerning the electrical installation attached herewith.

d. Telephone installations inside and outside the established buildings shall be in accordance with the conditions and specifications determined by the Telephone Authority as stated in Annex (D) concerning telephone installations attached herewith.

e. The firefighting precautions required in buildings, as stated in Appendix (E) attached herewith.

9.5 It is a condition to obtain the approvals of:

a. Public health directorate in all buildings located in the industrial zones or for the purpose of industrial use.

b. Public fire department in all buildings, excluding the private residential buildings and buildings of which height does not exceed three floors.

9.6 It is required to:

a. The private residential buildings must be provided with a waste/ garbage complex within the limits of plot and the fencing.

b. The investment multi-storey buildings must be provided with a suitable means for collecting the waste/ garbage.

c. The commercial and industrial buildings must be provided with a waste/ garbage complex for serving the purposes of such buildings within the area of such buildings. as per the conditions and specifications under the municipal decisions concerning the disposal of waste/ garbage.

d. The residential units or offices in all multi-storey buildings should be provided with a number of mail boxes.

3. Annex (A): In terms of the sanitary conditions:

1. First: Flushing toilet:

a. The flushing toilet must be of a water barrier not less than three inches (75 mm) connected to the pipe.

b. The pipe should not be less than (4) inches.

c. The washing pipe should not be less than two inches.

d. All drainage pipes should be one meter over the surface barrier and shall be ended with a ventilator.

e. The welding of the pipes must be tightly made.

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2. Second: Toilet Ventilation:

The ventilation of the toilet should be by a window of which area is not less than (1/10) of the area of the toilet or by a mechanical centrifugal ventilator of at least three pneumatic changes per hour.

3. Third: Sewage Network:

a. The pipes should be made of a solid, soft and non-absorbing material, with waterproof coating to prevent water or gas leaks.

b. The diameter of pipes should not be less than four inches.

c. Pipes passing under buildings shall be made of lead-cast iron by lead and should be placed on a concrete base with a thickness of 6 inches (15 cm) at least. These pipes shall be wrapped by concrete of the same thickness of the base.

d. The drainage pipes should be designed with sufficient slopes for drainage.

e. In the case of direct connection to the manhole, the sewage shall be ventilated using a ventilation pipe with the diameter of 2 inches at least.

f. A manhole should be established at:

1. Every change in the diameter of the pipes.

2. Every change of direction.

3. Every change in the slope.

4. Every sudden change in the level.

5. Every change in the pipe type.

6. Every distance not exceeding (20) meters (7/65) in the pipes.

4. Fourth: Septic Tank:

4.1 In cases where it is necessary to provide a Septic tanks, the following is required:

a. It must be within the boundaries of the plot as far as possible from the main building.

b. It must be in an easily accessible position for cleaning, unloading and maintaining it.

c. It must be equipped with a ventilation pipe with a diameter is not less than three inches and one meter over the top of the surface or fence provided that its entrance and all openings shall be covered in a manner that prevents the entry of insects.

d. The settling time should not be less than (24) hours and the water depth shall not be less than (120) cm - four feet - and the tank shall be in terms of personal consumption and building type.

e. The tank exit shall be as far as possible from the entrance.

f. A tight cover must be installed on the entrance and exit to facilitate the cleaning process with the dimensions of (60 x 60 cm) - (2 x 2 feet).

g. The tank shall be watertight sealed (i.e. no water leaks to the surrounding land or vice versa).

h. It shall be implemented according to the form approved by the Directorate of Sanitary Engineering Planning and Projects at the Ministry of Works).

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5. Fifth Manhole:

5.1 In areas where it is not possible to connect the building to public sewage, the following procedures shall be taken:

a. The septic tank should connected to the Man hole.

b. The drainage ditch should be as far as possible from the septic tank, the main building and within the boundaries of the plot.

c. Design of Man hole shall be based on the water leakage to the ground.

d. The Man hole shall be as far as possible from any natural water source and shall not be less than (22) meters far.

6. Sixth: Special Cases:

6.1 Disposal of water discharge of commercial or industrial buildings such as car workshops, factories and restaurants shall be in accordance with the conditions specified by the Directorate of Sanitary Engineering Planning and Projects at the Ministry of Works.

4. Annex (B): In terms of connecting the water:

1. First: Supplying water connection:

1.1 The consumer should do the internal water connection to the borders of the land at a depth not less than 30 cm - one foot. The pipe should be wrapped with insulating material before burying to prevent damage. Moreover, a valve shall be installed at the point of connection.

2. Second: Installation of the Water tank:

2.1 A water tank should be placed at the top of the building subject to the following considerations, upon determining the volume of the tank so that consumption shall be met for 24 hours in case of water outage for any reason.

a. In terms of the capacity of the tank, the following points shall be taken into account:

1- The number of consumers.

2- Type of the building.

3- Number and types of the used sanitary equipment.

2.2 The following table should serve as a guide to facilitate the testing of the volume of the appropriate tank provided that the tank capacity may not be less than 100 gallons.

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Building Type	Average gallons and litres
House or flats	(30) gallons per person (137 litres)
Hotels	(30) gallons per person (137 litres)
Offices	(6) gallons per person (28 litres)
Restaurants	(2) gallons per person or meal (9 litres)
Schools	(5) gallons per person (23 litres)

b. The tank shall be provided with a float and a pipe for water overflow when the tank is overflowing and the diameter of the pipe is twice the diameter of the feeding pipe.

It shall be installed in a manner preventing pollution and entry of insects. It shall be placed in a position that is easy to see.

c. Sewage pipes from the tank shall be equipped with valves that can be closed when there is any defect in the distribution pipes in the buildings.

d. The tank should provided with a valve to be used for cleaning purposes, a tight cover and sufficient openings for ventilation provided that the complex is installed in a suitable way to prevent the pollution and the entry of insects.

3. Third: Usage of the Pumps:

3.1 Requirements of water connection from the pumps to the upper tank:

a. A ground tank should provided with pumps to lift water to the upper tank and distribute the water to be used in the building.

b. The volume of the ground tank should sufficient to feed the whole building.

c. The ground tank must be away from any source of pollution. All the fittings should be connected in such a way as to prevent contamination and the entry of insects.

4. Fourth: Each apartment must be provided with a pipe:

4.1 Each apartment or residential unit shall be provided with a individual pipe from the main pipe connected to the upper tank. The pipe shall be provided with a non-return valve.

5. Fifth: Preventing the contamination:

5.1 All fittings must be fixed in a healthy manner to prevent the risk of contamination from the reflux of the consumed water from sewage pipes to the water system inside and outside the building.

6. Sixth: Drinkable Water:

6.1 The consumers may install a branch for drinkable water from the pipe connected to the tank.

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5. Annex (C): Electrical Installations:

1. Main Conditions for connecting electricity to the new buildings:

1.1 If any building requires electricity, the owner shall submit an application request to the Electricity Distribution Directorate of the Electricity and Water Authority on the respective papers before carrying out the building process

1.2 The application must be accompanied by an accurate plan, to the satisfaction of the Electricity Distribution Directore, showing the correct location of the building. The Electricity Distribution Directorate may cancel this application, up to its absolute discretion, if the location of the building is not shown clearly and correctly.

1.3 A pipe of which diameter is 100 mm shall be provided to connect the location specified for the connection wires (service) to the public road.

1.4 If any building is located near an overhead electrical line, the minimum horizontal distances between the building and the line shall be as follows:

Low voltage cable	2 m
11 KV Line	5 m
33 KV Line	6 m
66 KV Line	7 m

1.5 The low voltage cable shall be excluded from the above if the height of the building exceeds the height of the cable. In such event, the above – mentioned distances shall be increased to the extent of the building height over the line height.

1.6 If it is required to provide a building with the voltage exceeding 100 KW, and if the Electricity Distribution Directorate finds it necessary to establish a sub-station for such provision; the owner of the building shall be under an obligation to provide the it for free, with a building or a room to contain the equipment and devices of such sub-station.

1.7 Such building or room must meet the following main requirements:

a. The internal dimensions thereof may not be less than 6 meters x 4 meters x 3 meters high.

b. It must be equipped with a door that is not less than two meters wide in addition to a car entrance from the public road. The width of both the entrance and the road may not be less than 3 meters.

c. The floor of such sub-station must contain channels and trenches according to the specifications of the Electricity Distribution Directorate, with a depth of 800 mm at least below the level of the floor.

d. The floor of the sub-station must be able to bear the weight of the equipment and devices as recommended by the Electricity Department (i.e. the station may carry equipment weighing up to 4000 kg).

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e. The sub-station must be ventilated by openings and windows with low beams according to the specifications set by the Electricity Distribution Directorate.

f. The sub-station shall be at ground level.

g. The position of the supply wires inside the switchbox must be parallel to the station with a channel for the passage of the cable connecting the two rooms.

h. The owner of the building shall obtain the approval of the Electricity Distribution Directorate before proceeding the works in the area for the location and design of the station building. The design of any concrete building, in particular, must be in accordance with the basic requirements of the station.

6. Annex (D): Requirements of Firefighting Services of the Buildings:

1. Means of Survival:

1.1 Each building must be equipped with means of survival including the fire exits of which number, size, design and method of construction must be appropriate in order for the occupants of the building reach a safe place when a fire occurs.

1.2 It shall be taken into account that the exits can be accessible at all times safely and effectively.

2. Conditions of building with single stairway (which could be used as means of escaping the fire):

2.1 For approving of the property with one (single) stairway in a building, the distance between any room and the stairway may not exceed 15 meters.

2.2 Nevertheless, in a building where only one entrance is allowed for one stairway, one of the following conditions shall be provided:

2.2.1 There must be balconies connected to the single stairway, which shall be built on the exterior elevation. or:

2.2.2 The staircase must have an additional landing to isolate the doors of the residential units. Accordingly, the entry to and exit from such additional landing shall be through a door that opens automatically. The isolation of such additional landing through a wall made of fire-resistant materials.

2.3 Such additional landing shall be provided with natural ventilation in case there are four or more floors, including the ground floor.

2.4 The rooms that open directly to such additional landing may not be used for storage and may not contain any flammable material.

3. Requirements of the multi - stairway buildings:

3.1 If the building has multiple stairways, the distance between two exits of means of survival on each floor may not exceed the following distances:

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3.1.1 65 meters in buildings allocated to be used as offices or shops.

3.1.2 20 meters in buildings allocated to be used for living and hotels.

4. Using non-flammable and fire-resistant materials in the building:

4.1 All stairways, landings and pathways, which form part of the fire exits, must be made of non-flammable and fire-resistant materials. Flammable materials may not be used to cover or paint these stairs, landings and pathways.

4.2 In general, any building must be constructed by using non-flammable materials. Reference must be made to the General Department of Civil Defence at of the Ministry of the Interior upon constructing a building of which use may make it more exposed to fire and, especially, if the building is made of steel.

5. Firefighting Equipment:

5.1 The firefighting equipment and requirements must be installed in the necessary places of the building as determined by the - General Department of Civil Defence at the Ministry of the Interior. Such department shall define the equipment type and requirements.

Firefighting Equipment:

This guideline is prepared to unify the concepts of regulatory requirements of construction by and between the capital secretariat and the municipalities. It forms an additional reference to the regulatory requirements for construction. Moreover, it is intended to identify, add and explain some of the provisions provided in the regulatory requirements for construction. This guideline was developed by the requirements standardization committee at the Ministry of Works, Municipalities Affairs and Urban Planning.

Annex (E): According to the guideline to unify the regulatory requirements (Edition No.: 1 for the year 2016)

About the guideline:

This guideline is prepared to unify the concepts of regulatory requirements of construction by and between the capital secretariat and the municipalities. It forms an additional reference to the regulatory requirements for construction. Moreover, it is intended to identify, add and explain some of the provisions provided in the regulatory requirements for construction. This guideline was developed by the requirements standardization committee at the Ministry of Works, Municipalities Affairs and Urban Planning.

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First: Unifying the definitions of concepts contained in Article (1) of Decision No. (28) of the first clause of 2009 concerning the Regulatory Requirements for Construction all over the Kingdom of Bahrain.		
	Definition	**What has been agreed upon**
1	Industrial zones	Words of (stores and warehouses) shall be added to the definition.
2	Appurtenances	The “external majlis” shall be removed from the definition of appurtenances. No entrances or windows may be opened to overlook the pathways or streets.
3	Flat	Studio style shall be included to the system of residential flats (apartments) in all categories.
4	Shop	15 SQM (3 x 5) shall be determined as the minimum area of the commercial shops overlooking the approved commercial streets. The shops located in the existing old markets and malls shall be excluded.
5	Residential Compund	The distance between any two buildings in the residential compounds in the residential area shall be 4 meters as the requirements of the requirements of residential garden compound.
6	Building Surfaces	Elevators, skylights, balconies, internal common pathways and all spaces resulting from unusable constructional elements, including the external walls, shall be excluded from the definition.
7	Mezzanine	The height of the beams shall not be calculated in the height approved for the shops and mezzanine (6 meters).
8	Car Parks	The dimensions of the car parks shall be approved as 2.5 x 5 m.
9	Service workshop	The word “commercial” shall be replaced with “service”.
10	Areas for Projects with a special Nature	The approval of H. H. Minister must be obtained for the applications for the areas for Projects with a Special Nature through the respective procedures.

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Second: Unifying the concepts of the regulatory requirements: Part 2, Chapter 1 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	Ch. Title	Reference to articles			Current Provisions of the regulatory requirements	Unified Concept
		Article No.	Article Title	Caluse No.		
Chapter 2: Areas of Residential Houses:	Private Residential Area - A	3	Building percentages	3	Additional building percentages not exceeding 15% (fifteen percent) of the land area shall be permitted to be built with a maximum area of 100 square meters (one hundred square meters) designated for the residence's utilities only. Building shall be permitted on the line of the side wall on one side only, provided that its height shall not be more than one floor with a maximum height of 4 meters (four meters) measured from the pavement level.	If the appurtenances are connected to the main building, it shall be allowed to be opened to the main building. The appurtenances may be built isolated from the villa provided that the titles contained in the regulatory requirements shall be complied with. The residential appurtenances shall not be allowed if the residential unit does not exist.

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Second: Unifying the concepts of the regulatory requirements: Part 2, Chapter 1 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	Ch. Title	Reference to articles			Current Provisions of the regulatory requirements	Unified Concept
		Article No.	Article Title	Caluse No.		
Chapter 2: Areas of Residential House	Private Residential Area - A			5	An external majlis with an area not exceeding 10% (ten percent) of the land area shall be permitted to be built. Its area shall not exceed 100 square meters (one hundred square meters) to be calculated from the approved building percentage. The majlis shall be built on the front border overlooking a street or road, provided that the length of the majlis and entrances to the car parks shall not exceed 40% (forty percent) of the length of the land's front. The building shall be permitted on the side border of a neighbour on one side only, provided that the majlis height shall not be more than one floor of a maximum height of 4 meters (four meters) measured from the pavement level.	The external entrances and windows of the external majlis may open to the street.
		6	Special Requirements	1	Connected villas shall be permitted to be built on one side or more or detached or both, provided that the share of each villa shall not be less than 200 square meters (two hundred square meters) of the land area.	

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Third: Unifying the concepts of the regulatory requirements: Part 2, Chapter 1 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	Ch. Title	Reference to articles			Current Provisions of the regulatory requirements	Unified Concept
		Article No.	Article Title	Caluse No.		
				2	The width of internal roads in residential compounds shall not be less than 8 meters (eight meters), provided that the recession of the villa's facade shall not be less than 5 meters (five meters) from the border of the internal road.	
				3	Building is permitted above covered car parks (garages) and residence's utilities, provided the building area does not exceed 50 square meters (fifty square meters) and with a height of one story not exceeding 4 meters (four meters).	
General Notes on the Residential House (a)		Appurtenances			The recessions of the pool shall not be calculated. If the pool is covered, the legal recessions must be complied with.	
		Designing the residential villas as flats until the same title			The system of residential flats shall not be allowed.	
		Guard's room			The guard's room and toilet may be added at the front façade of the residential villas of which area exceeds 1500 SQM.	

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Third: Unifying the concepts of the regulatory requirements: Part 2, Chapter 2 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	Ch. Title	Reference to articles			Current Provisions of the regulatory requirements	Unified Concept
		Article No.	Article Title	Caluse No.		
Chapter 2 – Areas of Residential Houses	Private Residential Area – B -	8	Building percentages	3	An additional building with a building percentages not exceeding 20% (twenty percent) of the land area shall be permitted to be built to be designated for building an external majlis and the residence's utilities only, provided that the height shall not be more than one floor and a height not exceeding the level of the ground floor ceiling. Building of the majlis shall be permitted on the line of the front border of the land overlooking a street or road, so that the total length of the majlis front and entrances to the car parks shall not be more than 40% (forty percent) of the length of the front of the land.	Appurtenances and external majlis may be constructed in the buildings of residential flats subject to the requirements.
				6	A basement shall be permitted to be built and its area shall not be calculated as part of the permitted building percentage	Not less than 70 % of the basement shall be used as car parks. The remaining area shall be used as services and utilities of the building if the building comprises residential flats. It is also possible to allow the residential uses without the need for providing car parks in the basement if the building is a villa.

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Third: Unifying the concepts of the regulatory requirements: Part 2, Chapter 2 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	**Ch. Title**	**Reference to articles**			**Current Provisions of the regulatory requirements**	**Unified Concept**
		Article No.	**Article Title**	**Caluse No.**		
Chapter 2 – Areas of Residential Houses	Private Residential Area – B -	11	Special Requirements	3	Building shall be permitted above covered car parks (garages) and the residence's utilities, provided that the built-up area above the car parks and utilities shall not be more than 50 square meters (fifty square meters). For one floor only with a height not exceeding 4 meters (four meters).	Appurtenances and external majlis may be constructed in the buildings of residential flats subject to the requirements.
				4	More than one housing unit may be permitted to be built on a plot of land in the form of connected housing units on one side or more or detached or both, provided that the share of each housing unit shall not be less than 150 square meters (one hundred and fifty square meters) of the land area subject to ensuring the availability of car parks at the rate of one car park per flat.	It is possible to construct appurtenances in the ground of floor for each residential unit without the need for gathering them in one side provided that a building area shall be allocated for each residential unit. Such allocated area may not exceed 50 square meters provided that the built area on the external boundaries of the property may not exceed 50 % linear meters.

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Third: Unifying the concepts of the regulatory requirements: Part 2, Chapter 2 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	**Ch. Title**	**Reference to articles**			**Current Provisions of the regulatory requirements**	**Unified Concept**
		Article No.	**Article Title**	**Caluse No.**		
Chapter 2 – Areas of Residential Houses	Private Residential Area – B -				In case the land is situated in a commercial or service road subject to the zoning requirements with respect to areas of 3-storey buildings. (Three stories) situated in commercial and service roads indicated in Article 58 Clause 3.	The following points shall be added: It is allowed to build on the two sides of the ground floor and the mezzanine to the depth of 30 meters subject to applying the rear recession along with the legal recessions in the repeated floors. It is allowed to transform the residential flats in the repeated floors into administrative flats subject to complying with the defined legal area (100 SQM) along with providing car parks subject to the requirements. It is allowed to build commercial shops as a mall provided that a pathway of which entrance from the commercial street is not less than 3 meters wide must be left between the shops. It is also conditioned that the commercial opening of such shops is made to the pathway and a car park shall be provided for each 5 SQM of the commercial use area.

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Fourth: Unifying the concepts of the regulatory requirements: Part 2, Chapter 4 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. No.	**Ch. Title**	**Reference to articles**			**Unified Concept**	**Current Provisions of the regulatory requirements**
		Article No.	**Article Title**	**Caluse No.**		
Connected Residential Area – B -	Chapter 4 – Area of Residential Houses	18	Building percentages	4	This clause shall be applied and Article 21 of the special requirements, clause 5 (C) shall be cancelled for the residential areas – Paragraph (3) – which contradicts to the same, where the width of the front elevation, excluded from the car parks, is defined to be 12 meters.	Upon building residential flats on a land overlooking a road connected to an approved road network, car parks must be provided at a rate of one park for each flat. The car park area shall not be calculated as a part of building percentage provided the following conditions are fulfilled: C. The length of the land facade on the road connected to the approved road network shall not be less than 8 meters (eight meters).
		21	Special requirements	2	The practical parks shall be provided subject to the number of the residential flats under the requirements of the area. The additional parks shall not be compensated. In case of the plots excluded from the condition of providing the car parks, the areas of the parks shall not be compensated if they are provided by the owner.	In case of providing car parks on the ground floor, they shall be compensated by giving permission to build on the fourth floor for an area equivalent to the area allocated for the car parks.

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Fourth: Unifying the concepts of the regulatory requirements: Part 2, Chapter 4 concerning the areas of residential houses subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. Title	**Ch. No.**	**Reference to articles**			**Unified Concept**	**Current Provisions of the regulatory requirements**
		Clause No.	**Article Title**	**Article No.**		
				3	The residential flats can be transformed into administrative flats subject to the legal area of the flats (i.e. 60 SQM). The requirements of the car parks shall be applied	In case the land is situated in a commercial or service road, a mezzanine shall be added but shall not be calculated as part of the building percentage and its area shall not be more than 70% (seventy percent) of the ground floor area.
				5	Article (21), clause (c – 5) of the residential areas, paragraph (2) concerning the exclusion of the lands of which area is less than 250 SQM shall be excluded from providing the car parks.	Car Parks: At least one car park must be provided in the event of construction of one residential unit (house) for lands connected to the existing road network situated on a road with a width of 6m (six meters) or more.
Applications for the earth supporting foundations: *) It is possible to allow submitting the applications of the earth supporting foundations subject to the following: - Obtaining the initial approval for the project. - The existence of a submitted final permit application (for studying the services).						

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Fifth: Unifying the concepts of the regulatory requirements: Part 3, Chapter 1 concerning the areas of apartment blocks subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.		
General notes on the areas of Investment Apartment Blocks:	Car parks of the shops	A car park shall be allocated for each shop or for each 50 SQM of the commercial use in the areas of the investment apartment blocks (a, b & c).
	Calculating the area of pathways in the malls	Calculating the area of pathways in the malls within the building percentage.
	Calculating the area of pathways in the investment buildings.	The pathways of which width is less than 3 meters or less shall not be calculated; however, what exceeds the same shall be calculated in the building percentage.
	Balconies	The areas of the balconies of which width is less than one and half meters shall not be calculated in the building percentage; however, what exceeds the same shall be calculated in the building percentage.
	Using part of the ground floor for the car parks.	The area allocated for the car parks in the ground floor shall not be calculated in the allowed height of the building subject to complying with the building percentage.

Sixth: Unifying the concepts of the regulatory requirements: Part 3, Chapter 7 concerning the areas of apartment blocks subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.

Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Areas of Apartment Blocks – 4 – 3 floors	Chapter 3: Areas of Apartment Blocks	54	Uses	-	Residential, commercial or administrative uses or all of them shall be allowed according to the plans defining the approved construction areas. If the area in which it is located in mixed including villas and residential apartments with more than 50 % subject to the attested undertaking not to claim for the requirements of the area in the future. In case of residential divisions. In the modern B3 areas, the residential villas shall be allowed subject to applying the requirements of the B3 area.	In case of applying for building a residential villa or a compound of residential units, it shall be allowed subject to the conditions of the private house (a) in the following cases:

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Seventh: Unifying the concepts of the regulatory requirements: Part 4, Chapter 8 concerning the areas of commercial showrooms subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Chapter 4: Areas of Apartment Blocks	Areas of Commercial Showrooms	65	Building percentages	8	Showrooms shall be permitted to be built with a depth not exceeding 100 meters (one hundred meters) measured from the approved planning line or depth of the property, whichever is less.	The commercial showrooms may be allowed to have repeated floors provided that car parks must be provided subject to the approved standards of the car parks under Article 114. One address for the showroom shall be given.

Eighth: Unifying the concepts of the regulatory requirements: Part 6, Chapter 3 concerning the areas of light industries subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Chapter 6 – Areas of Apartment Blocks	Areas of light industries	88	Uses	-	Light industries, workshops, stores, showrooms of the factory's products and workers' accommodations shall be allowed subject to plans showing the approved constructions areas.	The license may be issued for the commercial showroom individually. The area of the administrative offices shall be 70 SQM provided that a car park shall be available for each office. The area of the showroom may not be less than 100 SQM.

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Eighth: Unifying the concepts of the regulatory requirements: Part 6, Chapter 3 concerning the areas of light industries subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.

Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Chapter 6 – Areas of Apartment Blocks	Areas of light industries	89	Building percentage	5	The area of the workshop may not be less than 100 SQM (one hundred square meters.	The area of the store and the showroom may not be less than 100 SQM (one hundred square meters. The area of the office and the workers' accommodation unit may not be less than 70 SQM.
		91	Heights	1	The height of the building may not exceed 4 floors (four floors) i.e. the maximum height shall be 24 (twenty four) meters. However, the height can be increased in the cases required for the industrial fittings with special specifications after obtaining a planning approval for the same.	The total height may be used for the ground floor (24 meters).
		92	Special requirements		Car parks must be provided. The number of the car parks may not be less than one park every 200 (two hundred) SQM of the built surfaces. The required car parks must be provided in the ground floor, repeated floors, basement or all the same. It is also allowed to construct multi – floor parks subject to complying with the legal recessions set forth in clauses (1) and (2) of Article (90) of this decision. The car parks shall not be calculated in the allowed building percentage.	A car park shall be provided for each residential unit of the workers if the project comprises residential units for the workers.

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Ninth: Unifying the concepts of the regulatory requirements: Part 6, Chapter 5 concerning the service areas subject to the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Chapter 6 – Areas of Apartment Blocks	Service areas	99	Building percentages	5	The area of the workshop may not be less than 30 (thirty) square meters.	The area of the showroom may not be less than 30 SQM. The area of the office and the workers' residential unit may not be less than 70 meters or one unit in each floor.

Tenth: Unifying the concepts of the regulatory requirements: Part 8, general provisions, Article (112) of the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.						
Ch. Title	Ch. No.	Reference to articles			Unified Concept	Current Provisions of the regulatory requirements
		Clause No.	Article Title	Article No.		
Chapter 8 – General Provisions	General Provisions	112	Excluding the car parks	1	Cancel the car parks of the commercial shops (the front recession of 5 meter) only in the stipulated cases: In case the commercial street pass by more than one category, the total elevation of the properties shall not be calculated in the categories, which are not under an obligation to apply the recessions such as the Connected (B). Car parks must be provided for the apartments where one car park shall be provided for each apartment in the property.	The buildings and properties for which permit applications are submitted and overlook approved commercial streets in an existing area in which the building percentage exceeds without front recessions of 50 % (fifty percent) of the total length of the commercial street. This is to unify the building line in such areas.

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No.	Requirement	Concept
1	**Unifying the regulatory requirements of the capital secretariat and the municipalities: Chapter 8, Article (113) concerning the provision of car parks for the buildings and facilities, which are not included in this decision, under the Decision No. (2) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.**	**Hospitals:** 5 parks for each 100 SQM of the building surface including the pathways. **Clinics:** The medical centres shall be treated as clinics i.e. 4 parks shall be provided for each doctor. **Malls:** Additional car parks shall be added for the following uses: - Restaurants. - Supermarkets. - Cinemas.
2	**General recommendations concerning the standards of providing car parks for the buildings:**	The standards of providing the car parks to the buildings outlined in Chapter 8, Article (113) shall be complied with upon issuing the license of the commercial registry.
3	**Unifying the regulatory requirements of the capital secretariat and the municipalities: Chapter 8, Article (114) concerning the additions of floors to the apartment blocks existing in the investment buildings (A, B, C & D) of the Decision No. (28) / 2009 concerning the regulatory requirements of construction all over the Kingdom of Bahrain.**	Compliance with the application of Article 114 of the investment buildings (A, B, C & D). It shall be applied to the remaining categories provided that car parks shall be provided in the required number of addition only. It shall not be necessary to obtain the building certificate from two approved consulting offices of constructional works (class A).
4	**General notes:**	In case of building hotels: The percentage of appurtenances shall be calculated in the percentage of the building area. In case of adding to the existing buildings subject to different categories, the recessions shall be applied subject to the position of the existing property provided that the existing building must be verified to be free from violations.

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8. Annex (F): The regulatory requirements applicable to housing projects

1. General Provisions:

1.1 Definitions:

The following terms and expressions shall have the meanings ascribed to each one of them unless otherwise required by the context:

Housing Residential Projects of Type (A): refers to all housing projects of the houses built on plots with the area of 300 (three hundred) square meters or more and with the front façade of which length exceeds 15 (fifteen) meters.

Housing Residential Projects of Type (B): rrefers to all housing projects of the houses built on plots with the area of less than 300 (three hundred) square meters and with the front façade of which length is from 9.50 to 15 (nine meters and fifteen centimetres and fifteen) meters.

Housing Residential Projects of Type (C): refers to all residential projects of the houses built on plots with the area of less than 200 (two hundred) square meters and with the front façade of which length is less than 9.50 (nine meters and fifteen centimetres meters).

Usufruct Contract: refers to the contract by which the Ministry of Housing authorizes the beneficiary of the house to use the same until the full payment of the total value of the service. This shall be for the usufruct and meeting the other requirements. Thereafter, the title deed shall be transferred to the beneficiary under a final title deed. The usufruct may be cancelled in any of the cases stipulated in Article (10) of the Ministerial Decision No. (909) for the year 2015 concerning the housing regulations.

Title Deed: refers to the deed issued by the Survey and Land Registration Bureau proving the entitlement of the property.

Survey Certificate: refers to the technical plan approved by Survey and Land Registration Bureau showing the nature of the property or the unit, the dimensions, surrounding boundaries, area in which it is located and the area with an appropriate scale. Such certificate may not be used as a title deed.

Appurtenances: refers to the appurtenances serving the accommodation such as the external kitchen, guard's room, laundry room, stores and the like. Such appurtenances may be connected or separated from the main building.

Building Appurtenances: refers to the utilities serving a building (such as a residential, commercial or similar building) and include the watchman's room, gas cylinder room, substations for the building, utilities, stores and similar facilities situated whether connected to the main building or separate there from.

Built Surfaces: Built-up areas of all floors of a building or buildings situated within a plot of land measured from the outside of external walls or from the line dividing the common wall. Such built-up areas

Shall include the following:

A surface of all floors in the building's closed spaces including towers. - Spaces arising from constructional elements that may become habitable areas.

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All built spaces that have not been excluded when calculating the built spaces.

Building Percentage: The maximum percentage allowed for the total building surfaces in relation to the land area.

Front Recession: refers to the minimum distance between the property's boundary wall overlooking a road and the buildings unified line of the elevation overlooking it on the ground floor and all floors unless upper projections are allowed.

Side Recession: rrefers to the minimum distance between the property's boundary wall overlooking a side neighbouring property parallel to the front elevation and the buildings unified line of the elevation overlooking it, whether the neighbouring property is a plot of land, garden, empty space or walkway on the ground floor and all floors.

Rear Recession: refers to the minimum distance between the property's boundary wall overlooking a rear neighbouring property on the side opposite to the front elevation and buildings unified line of the elevation overlooking it, whether the neighbouring property is a plot of land, garden, empty space or walkway on the ground floor and all floors.

Building Height: The vertical dimension in front of a building's fa'ade overlooking a rear neighbouring property from the side which is opposite the front elevation and the building line of the facade overlooking it, whether the neighbouring property is a plot of land, garden, empty space or footpath. It is measured from the centre of the building's facade in case of sloping streets. The vertical dimension measurement shall not include parapets, domes and minarets in religious buildings, stairwells, lift machinery rooms, water tanks and air-conditioners, if any, where heights not exceeding 7 meters (Seven meters) are permitted above the roof of the upper floor.

Covered Car Parks (Garages): Areas intended as car parks provided with covers to protect vehicles from all external elements.

1.2 General Requirements:

1.1.2 The following general requirements shall apply to all residential projects of types (A), (B) and (C):

a. An application for construction or adding any building may not be submitted before the expiration of one year at least after signing the usufruct contract of the house.

b. In case of applying for the demolition and re-construction of the house, the regulatory requirements set forth in this decision shall be complied with.

c. Except for the cases for which no specific provision is stipulated in this decision, the concerned municipality shall issue the building permits according to the approved requirements in this decision without the need for referring to the Ministry of Housing.

d. The original covered car parks (garages) in the house may not be cancelled and the use thereof may not be changed.

e. No additional openings, such as doors or windows in the original elevation, may not be made. The original openings of the house may not be changed.

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f. No car park may be made outside the borders of the house.

g. No external majlis may be constructed in the area of the front recession.

h. The insulating layer of the neighbour's house may not be affected or damaged upon building on the original building. The beneficiary shall sign an undertaking to bear the liability for any damages that may occur to the neighbour's house because of the building process.

i. The shop drawings must be submitted in the following cases:

1. Any building affecting the front façade.
2. The applications for main constructional changes within the house such as removing walls or the bearing bridges. This shall be fifteen years after the date of signing the usufruct contract or the issuance of the title deed, whichever earlier.

3.1 Special Requirements:

1.3.1 Excluding from the requirements stipulated in this decision, in the following cases, the residential projects of types (A), (B) and (C) shall be allowed to:

a. Make an external door, window or an opening for the air-conditioner directly overlooking the pathway if they submit a final title deed or an approved survey certificate showing the existence of such pathway.

b. Make an additional car park on the side or back side of the house subject to the approval of the Ministry of Housing and the concerned service authority.

c. Place the pipes of sewage, heaters and split air-conditioners in the front side of the houses after making the architectural processes.

d. Complete the building of the balcony – if any – in case of connecting the additional building on the covered car parks (garages) in the original building.

e. Not to provide front recessions in case of demolition and reconstruction of the houses, which do not have any front recessions according to the original building.

1.4 Violations:

a. The concerned municipality shall take the proper legal procedures according to the provisions of the law of building regulation promulgated by the Decree by law No. (13) / 1977 concerning any violations of the provisions of this decision for all the houses of usufruct contract or title deeds.

b. Without prejudice to the terms of reference of the Municipality according to paragraph (a) of this article, the Ministry of Housing shall take the required procedures according to the housing regulations concerning the violations of such houses of the valid usufruct contracts only.

2. Residential Projects:

2.1 Residential Projects of Type (A):

2.1.1 Uses:

Building additions may be added to the residential projects of type (A) regulated hereunder provided that such additions shall be only for the residential purposes without any other uses such as apartments or shops.

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2.1.2 Building Percentages:

A house may be added to the original house subject to the following conditions:

a. The building percentage shall not be more 180 % (one hundred eighty percent) of the land area.

b. The built-up areaof any floor may not exceed 60 % (sixty percent) of the land area.

c. Appurtenances for the residence shall be permitted to be built on the roof of the building with an additional percentage not exeeding 30 % (thirty percent) of the roof area on the back side of the property. The appurtenances shall not be calculated in the allowed building percentage.

d. Additions may be allowed on the covered car parks (garages) and the appurtenances only in the first floor provided that they shall be calculated in the allowed building percentage. The building area may not exceed 50 SQM (fifty square meters) to the height of one floor not exceeding 4 meters (four meters). All appurtenances must be gathered on one side of the property.

2.1.3 Recessions:

a. **Front recession:** the original front recession of the house must be kept. However, the recession may be reduced to be 3 meters (three meters) fifteen years after the date of signing the usufruct contract or if the title deed is issued, whichever earlier. This shall be applicable to the cases where the original recession exceeds 3 meters (three meters). Furthermore, it shall be also allowed to make upper projections over the ground floor up to the maximum of 1.20 meters (one meter and twenty centimetres).

b. Side and rear recessions: the distance of the side and rear recessions shall be kept not less than 1.50 meters (one meter and fifty centimetres) except for the cases outlined in paragraph (b) of Article (10).

2.1.4 Heights:

a. The height of the building may not exceed 3 floors up to the maximum of 12 meters (twelve meters).

b. The height of the front, side and rear fence may not exceed 2.50 meter (two meters and fifty centimetres) from the level of the pavement. The solid part of the front wall may not exceed 2 (two) meters from the level of the pavement or the garden, whichever higher.

c. In case the wall of the fence is located on sloping land, stairs must be made onto the wall of the fence subject to the heights referred to in the above – mentioned paragraphs.

2.1.5 Elevation:

a. The elements of the architectural formation of the original elevation must be kept. The external colours of the added parts must be of the same colour of the original building (light colours) and must comply with the original elevation of the house.

b. The Ministry of Housing may issue a decision to change the layout of some residential projects subject to the requirements of the architectural layout of the residential projects and the surrounding areas.

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2.1.6 Building Additions:

a. Additions to the front elevation: two parallel car parks or vertical to the original car park may be added provided that the elevation of the parks may not exceed 6 (six) meters of the front elevation.

b. Additions to the side and rear recessions:

1. Appurtenances connected to the original house on the side or back may be added provided that:

a. A side or rear recession of not less than 1.50 meters (one meter and fifty centimetres) shall be left.

b. Fifteen years expire after the date of signing the usufruct contract or if the title deed is issued, whichever earlier.

2. Additional appurtenances separated from the original house may be added, without the need for the issuance of the title deed or the expiration of fifteen years after the date of signing the usufruct contract, provided that:

a. The addition shall be along the original car park of the house.

b. The recession between the appurtenances and the original house building may not be less than 1.20 meters (one meter and twenty centimetres).

2.2 Residential Projects of Type (B):

2.2.1 Uses:

Additions may be added to the residential projects of type (B) according to the provisions of this branch provided that such additions shall be for residential use only without any other uses such as apartments or commercial shops.

2.2.2 Building Percentage

It is allowed to add building to the original house subject to the following conditions:

a. The building percentage may not exceed 240 % (two hundred forty percent) of the land area.

b. The building surfaces of any floor may not exceed 80 % (eighty percent) of the land area.

c. It shall be allowed to add appurtenances on the roof not exceeding 30 % (thirty percent) of the roof area on the rear side of the property. The appurtenances shall not be calculated in the allowed building percentage.

d. It is allowed to make additions on the covered car parks (garages) and residential appurtenances only in the first floor provided that they shall be calculated in the allowed building percentage. The building percentage may not exceed 50 SQM (fifty square meters) with the height of one floor not exceeding 4 meters (four meters). All appurtenances must be gathered on one side of the property.

2.2.3 Recessions:

a. Front recession: the original front recession of the house must be kept. However, the recession may be reduced to be 3 meters (three meters) fifteen years after signing the usufruct contract or if the title deed is issued, whichever earlier. This shall be applicable to the cases where the original recession exceeds 3 meters (three meters). Additionally, upper projections over the ground floor may be made up to the maximum of 1.20 meters (one meter and twenty centimetres).

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b. Side and rear recessions: the distance of the side and rear recession must be kept not less than 1.50 meters (one meter and fifty centimetres) except for the cases outlined in paragraph (b) of Article (16).

2.2.4 Heights:

a. The height of the building may not exceed 3 floors up to the maximum of 12 meters (twelve meters).

b. The height of the front, side and rear fences may not exceed 2.50 meter (two meters and fifty centimetres) from the level of the pavement. The solid part of the front wall may not exceed 2 (two) meters from the level of the pavement or the garden, whichever higher.

c. In case the wall of the fence is located on sloping land, stairs must be made onto the wall of the fence subject to the heights referred to in the above – mentioned paragraphs.

2.2.5 Elevations:

a. The elements of the architectural formation of the original façade must be kept. The external colours of the added parts must be of the same colour of the original building (light colours) and must comply with the original elevation of the house.

b. The Ministry of Housing may issue a decision to change the layout of some residential projects subject to the requirements of the architectural layout of the residential projects and the surrounding areas.

2.2.6 Building Additions:

a. Additions to the front façade: Only one car park may be added if the length of the façade is 13 meters (thirteen meters) provided that the façade of the park may not exceed 6 (six) meters of the front façade.

b. Additions to the side and rear recessions:

1. Appurtenances connected to the original house on the side or back may be added provided that:

a. A side or rear recession of not less than 1.50 meters (one meter and fifty centimetres) shall be left.

b. Fifteen years expire after the date of signing the usufruct contract or if the title deed is issued, whichever earlier.

2. Additional appurtenances separated from the original house may be added, without the need for the issuance of the title deed or the expiration of fifteen years after the date of signing the usufruct contract, provided that:

a) The addition shall be along the original car park of the house.

b) The recession between the appurtenances and the original house building may not be less than 1.20 meters (one meter and twenty centimetres).

3. In building the additions, it is necessary to leave a distance between the original building and the appurtenances not less than 1.20 meters (one meter and twenty centimetres). However, it shall be allowed to get the two buildings side by side provided that the width of the front façade may not be less than 13 meters (thirteen meters). Ventilation skylights shall be provided in the area not less than 4 SQM (four square meters) and no side thereof may be less than 1.50 meters (one meter and fifty centimetres). The ventilation skylights shall not be calculated in the building percentage.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Municipalities Affairs

2.3 Residential Projects of Type (C):

2.3.2 Uses:

Additions may be added to the residential projects of type (C) according to the provisions of this branch provided that such additions shall be for residential use only without any other uses such as apartments or commercial shops.

2.3.3 Building Percentages:

It is allowed to add building to the existing original house subject to the following conditions:

a) The building percentage may not exceed 240 % (two hundred forty percent) of the land area.

b) The building surfaces of any floor may not exceed 80 % (eighty percent) of the land area.

c) It shall be allowed to add appurtenances on the roof not exceeding 30 % (thirty percent) of the roof area on the rear side of the property. The appurtenances shall not be calculated in the allowed building percentage.

d) It is allowed to make additions on the covered car parks (garages) and residential appurtenances only in the first floor provided that they shall be calculated in the allowed building percentage. The building percentage may not exceed 50 SQM (fifty square meters) with the height of one floor not exceeding 4 meters (four meters). All appurtenances must be gathered on one side of the property.

2.3.3 Recessions:

a) Front recession: the original front recession of the house must be kept. However, the recession may be reduced to be 3 meters (three meters) fifteen years after signing the usufruct contract or if the title deed is issued, whichever earlier. This shall be applicable to the cases where the original recession exceeds 3 meters (three meters). Additionally, upper projections over the ground floor may be made up to the maximum of 1.20 meters (one meter and twenty centimetres).

b) Side and rear recessions: the distance of the side and rear recession must be kept not less than 1.50 meters (one meter and fifty centimetres) except for the cases outlined in paragraph (b) of Article (22).

2.3.4 Heights:

a) The height of the building may not exceed 3 floors up to the maximum of 12 meters (twelve meters).

b) The height of the front, side and rear fences may not exceed 2.50 meter (two meters and fifty centimetres) from the level of the pavement. The solid part of the front wall may not exceed 2 (two) meters from the level of the pavement or the garden, whichever higher.

c) In case the wall of the fence is located on sloping land, stairs must be made onto the wall of the fence subject to the heights referred to in the above – mentioned paragraphs.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Municipalities Affairs

2.3.5 Elevation:

a) The elements of the architectural formation of the original façade must be kept. The external colours of the added parts must be of the same colour of the original building (light colours) and must comply with the original elevation of the house.

b) The Ministry of Housing may issue a decision to change the layout of some residential projects subject to the requirements of the architectural layout of the residential projects and the surrounding areas.

2.3.6 Building Additions:

a) Additions to the front façade: No car parks may be added to the front façade.

b) Additions to the side and rear recessions: It shall be allowed to build on the two side borders of the house provided that fifteen years expire after the date of signing the usufruct contract or the title deed is issued, whichever earlier. Ventilation skylights must be provided with the area not less than 4 SQM (four square meters) and no side thereof may be less than 1.50 meters (one meter and fifty centimetres). The ventilation skylights shall not be calculated in the building percentage. Appurtenances may be built on the rear side in all cases.

Chapter 3

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

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The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

1. General Introduction

Improving the quality of activities performed on properties requires thorough traffic impact studies as well as planning and designing safe, comfortable, and efficient roads that are commensurate with modern projects. Equally important, is having a long-term vision on the expected impact of traffic, as it will help in preserving the safety of citizens as well as control the frequency of accidents and levels of congestions.

Being in line with the Kingdom of Bahrain's Vision 2030, the requirements set below take into consideration all of the above as well as the various classifications and detailed mastplans of old and new.

2. Definitions

- **Road Curve:** Horizontal curvature and slope of the road.
- **Road slope:** Vertical topographic change leading to high or low Stopping Site Distance.
- **Crossroads:** The place of convergence, meeting or branching of more than a road. They have many forms (+, Y, T, O….etc.)
- **Stopping Sight Distance:** Is the safe distance for the driver's visibility when stopping at a junction to ensure safe operation of road crossing and avoiding accidents.
- **Reduced Level:** the height of a point above Datum (line) to which point levels on the ground's surface are attributed i.e. average of sea level.
- **Entrance Level:** the height of doors/ garages above the road level.
- **Strategic Roads:** highway roads and main junctions linking the external road networks with speed exceeding 70 Km /H and width more than 30 meters.
- **Improvement Roads:** roads and junctions linking towns and outside villages while separating blocks from each other. The speed thereof is less than 70 Km/ H and their width is less than 30 meters.
- **Roads of villages and old districts:** roads and passageways that could be designed for vehicles traveling at a speed less than 50 Km/ H and having a width less than 12.5 meters.
- **Roads located in modern residential areas and other areas:** roads that are within new subdivisions, approved and adopted by Urban Planning and Development Authority. The speed of these roads is less than 50 Km/H and width is between 10- 20 meters.
- **Paved roads:** Paved roads and streets that are included and implemented in the Road Development Program.
- **Unpaved roads:** Sand roads and streets that are not included in the Road Development Program.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

- **Real estate located in new islands and modern projects in waterfronts:** new islands that have classifications of various activities and have roads/streets/ junctions of different road type. Responsibility of such areas or roads is on the consultant developer office as the area master plan had been approved from all service authorities in an earlier stage.
- **Real estate located in industrial areas:** areas allocated for industrial and production purposes.
- **Traffic Impact Assessment (TIA):** used for assessing the traffic impact on big projects such as office buildings, business centres, major residential areas and multi-use investment projects when 500 vehicles will pass during critical peak hours in the morning, after noon and in the evening. The study shall include a road network on a scale wider than the project boundary. Also, it should inspect adequacy of all entrances (entries, exits, parking and service roads) and determine all needs required to develop the road network that is part of the Development Plan of Vision 2030.
- **Traffic Impact Statement (TIS):** This approach is undertaken for studying and stating the traffic impacts within the project boundary, where the number of travels during peak hours is less than 400 vehicles (i.e. between 100 and 400 vehicles). The study includes entry/exit mechanism and internal turning mechanism to comply with safety matters and engineering design standards in addition to providing adequate parking in the real estate in accordance with Bahrain parking regulation. Such parking shall not be at streets.

3. Laws and Regulations

- Ministerial Resolution No. (2) of 2000 regarding determining building lines on main roads.
- Decree No. (13) of 1977 for Issuing the Building Law.
- Decision No. (55) of 2016 regarding amendments on some regulatory requirements related to developments in different areas in the Kingdom under decision No. (28) of 2009.
- Law No. (39) of 2009 regarding possession of real estate for public interest.
- Decree No. (2) of 1996 regarding occupation of public roads and its Executive Schedule
- Engineering Design Guide for Roads in the Kingdom of Bahrain.
- Guideline to Roads for private residency.

4. Requirements

1. **Real estate located within strategic road projects:**

   1.1 Apply the requirements in accordance with the property classification set by the Urban Planning and Development Authority, and require their approval on the desired activity.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

1.2 Reservation of roads, streets and junctions are to be maintained in accordance with general detailed master plans and ministerial decrees.

1.3 All external bases and thresholds shall be within the boundary of the property.

1.4 Consult Road Affairs to ensure no impact by road reservation on the boundary of the property.

1.5 It is prohibited to open any entrances (doors/garages) on main roads and at curvatures and junctions directly. Consult Road Affairs in case of lack of alternatives, as well as to ensure presence of service roads within the boundary of the property or for the development of new service roads within the property.

1.6 Review report of Traffic Impact Study: TIA or TIS, if it is requested by Urban Planning and Development Authority and assure it is issued by a consultant engineering office adopted by the Authority.

1.7 Compliance with the comments of the Urban Planning and Development Authority and the Minister's directives, In case of a grievance letter submitted to the concerned Minister.

1.8 Consult Road Affairs after implementation of required cuts in sites, in order to examine the compensation.

2. Real estate located within Improvement road projects:

2.1 Apply the requirements in accordance with the property classification set by the Urban Planning and Development Authority, and require their approval on the desired activity.

2.2 Reservation of roads, streets and junctions are to be maintained in accordance with general detailed master plans and ministerial decrees.

2.3 All external bases and thresholds shall be within the boundary of the property.

2.4 Consult Road Affairs to ensure no impact by road reservation on the boundary of the property.

2.5 It is prohibited to open any entrances (doors/garages) on main roads and at curvatures and junctions directly. Consult Road Affairs in case of lack of alternatives, as well as to ensure presence of service roads within the boundary of the property or for the development of new service roads within the property.

2.6 Review report of Traffic Impact Study: TIA or TIS, if it is requested by Urban Planning and Development Authority and assure it is issued by a consultant engineering office adopted by the Authority.

2.7 Compliance with the comments of the Urban Planning and Development Authority and the Minister's directives, in case of a grievance letter submitted to the concerned Minister.

2.8 Consult Road Affairs after implementation of required cuts in sites in order to examine the compensation.

2.9 Straightness of building lines and width of pavements shall be maintained on street.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

3. Real estate located in villages and old districts:

3.1 Apply the requirements in accordance with the property classification set by the Urban Planning and Development Authority, and require their approval on the desired activity.

3.2 Reservation of roads, streets and junctions are to be maintained accessible and connected with main road network.

3.3 Width of pavements adjacent to the property (if existed) should be maintained not less than one meter and should be within the building line on the road.

3.4 Maintain the straightness of the building line on the road when required and in accordance to the requirements of: Bahrain Authority for Culture and Antiquities, Municipalities Affairs and Urban Development Directorate.

3.5 All external bases and thresholds shall be within the boundary of the property.

3.6 Level of garages and doors should be higher than the level of streets/paved roads by only 20 to 30 cm.

3.7 Consult Road Affairs in these cases: presence of existing asphalt within the property boundaries, presence of old regression “set-back” within the property boundaries, and when a cut is required within a recent survey certificate issued by the Survey and Land Registration Bureau.

3.8 Consult Roads Affairs in case of properties overlooking main junctions.

3.9 Apply corner splay cuts at junctions as per vision angle requirements in accordance with the standards of Road Affairs.

3.10 It is prohibited to build in the required vision angle estimated at a minimum of (one meter x one meter). This applies on the ground floor only.

3.11 Consult Road Affairs after implementation of required cuts in sites in order to examine the compensation.

3.12 It is prohibited to open any entrances (doors/garages) on main roads and at curvatures and junctions directly. Also, no access is allowed after the junction by one meter for pedestrians and two meters for vehicles (as minimum depends on the length of the property).

3.13 Review report of Traffic Impact Study: TIA or TIS, if it is requested by Urban Planning and Development Authority and assure it is issued by a consultant engineering office adopted by the Authority.

3.14 Compliance with the comments of the Urban Planning and Development Authority and the Minister’s directives, in case of a grievance letter submitted to the concerned Minister.

4. Real estate located in new residential areas and other areas which are approved in partition plans (unpaved roads):

4.1 Requirements are as stated in Clause (5) in respect of the paved roads provided that the following condition (Level of garages and doors shall be higher than the level of streets/ paved roads by only 20 to 30 cm.) and shall be replaced with the following condition:

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

4.2 An application should be submitted electronically via ministry of works electronic system (www.works.gov.bh) to obtain the level of the proposed road three weeks before the commencement of any work of establishing the project. All bases and thresholds shall be within the boundary of the property.

5. Real estates located in new residential areas and other areas which are approved in partition plans (paved roads):

5.1 Apply the requirements in accordance with the property classification set by the Urban Planning and Development Authority, and require their approval on the desired activity.

5.2 Roads, streets and junctions are to be maintained.

5.3 All external bases and thresholds shall be within the boundary of the property.

5.4 Level of garages and doors shall be higher than the level of streets/ paved roads by only 20 to 30 cm.

5.5 At the condition when the property is direct to a junction of minor roads, no direct access is allowed at the junction and at a distance from the junction equal one meter for pedestrians and three meters for vehicles (as minimum).

5.6 At the condition when the property is direct to junctions of major and minor roads, then no entrance should be open on the main roads, curvatures, nor junctions, and it should be from minor roads only and away of junction by one meter for pedestrians and three meters for vehicles (as minimum), otherwise Road Affairs must be consulted.

5.7 If the property is opposite to junctions, then entrances should be at the farthest point away from the middle of the junction. Residential apartments and shops are excluded from this rule.

5.8 Review report of Traffic Impact Study: TIA or TIS, if it is requested by Urban Planning and Development Authority and assure it is issued by a consultant engineering office adopted by the Authority.

5.9 Compliance with the comments of the Urban Planning and Development Authority and the Minister's directives, in case of a grievance letter submitted to the concerned Minister

6. Real estate located on new islands and modern projects in waterfronts (Financial Harbour/ Dilmunia/ Diyar Al Muharraq/ Durrat Al Bahrain/ Amwaj Islands/ Reef…etc.,):

6.1 Requirements of Road Affairs in the planning permits of the respective project must be adhered to.

6.2 The general detailed masterplan and the conditions specified for the respective classification, and the comments by the Urban Planning and Development Affairs must be adhered to.

6.3 It is prohibited to open any entrances to the main streets, curvatures and junctions and at a distance of 3 meters away of junction (as minimum). Entrance should be only on by-roads and service roads that are parallel to the main roads. In case of lack of alternatives, Road Affairs should be consulted

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Roads Planning and Design

6.4 Consult the project consultant to obtain road level.

6.5 All external bases and thresholds shall be within the boundary of the property.

6.6 Review report of Traffic Impact Study: TIA or TIS, if it is requested by Urban Planning and Development Authority and assure it is issued by a consultant engineering office adopted by the Authority.

6.7 Compliance with the comments of the Urban Planning and Development Authority and the Minister's directives, in case of a grievance letter submitted to the concerned Minister

7. Real estates located in industrial areas (Al Hidd/ South Alba/ Sitra/ Ma'ameer/ Mina Salman/ Hafira/ Dawar Sitra/ Farsia/ Al-Hesi/ Salmabad/ Arad and other areas) which are allocated for various categories of industrial and productive purposes

7.1 Adhere to the entrances which are officially determined in the Survey Certificate issued by Industrial Areas Directorate.

7.2 It is prohibited to open any entrances at the main roads, curvatures and Junctions. Road Affairs should be consulted in case of lack alternative roads.

7.3 The street width shall not be less than 15 meters.

7.4 Determining the street levels shall be subject to the Industrial Areas Department.

7.5 As for heavy industries, it is prohibited to open any entrances at junctions or adjacent to them at a minimum distance of (10-15) meters.

7.6 As for light industries, it is prohibited to open any entrances at the junctions or adjacent to them at a minimum distance (3-5) meters.

7.7 Compliance with the comments of the Urban Planning and Development Authority and the Minister's directives, in case of a grievance letter submitted to the concerned Minister.

Chapter 4

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

Table of Contents

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

1. Definitions

For the provisions of this regulation, the following words and phrases shall have the following meanings set out below, unless the context requires otherwise:

Surface water drainage System: facilities and works related to the surface water drainage, including pipe networks, auxiliary devices and installations.

Sewerage drainage system: facilities and works related to sewage water drainage and the associated waste materials, including pipe networks, auxiliary devices and installations.

Treated sewage effluent system: facilities and works related to transfer of treated sewage water, including pipe networks, auxiliary devices and installations.

Sewerage systems: include surface water drainage system, sewerage drainage system and treated sewage effluent system.

Septic tank: blind impervious tank (consisted of two chambers) made of concrete, solid brick or any other filtration or leakage resistance. Such tank shall be designed and implemented in accordance with technical specifications and standards allowing partial anaerobic degradation of organic materials in effluent.

Standards and specifications: Is the true criterion for determining the natural, chemical and biological components through which the quality of wastewater is determined.

Grease trap: a unit with special engineering design connected with internal sewerage extensions in commercial kitchens, restaurants, food factories, hotels…etc. Such unit separates food oil and grease from effluent before being discharged to public sewerage network.

Oil interceptor: A unit with special engineering design which is used for separating mineral grease and oil and from wastewater resulting from car wash and lubrication stations and oil factories before being discharged to public sewerage network.

Connecting pipe (Sanitation wastewater pipe): a pipe emerging from the last manhole in the building's private sewerage network to connect the public sewerage network.

2. Laws and Regulations

Law No. (33) of 2006 concerning sanitation and surface water drainage System

3. Conditions

1. Additional conditions of major investment projects and factories.

1.1 It is recommended to consult with the SEPPD before preparing the project designs in order to obtain information on the status of Sanitary Engineering Affairs services near the project area, and to assess the possibility of the connecting to the public sewerage network. In case of being received such details, the response of SEPPD shall be attached to the building permit application.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

1.2 The amount of domestic and industrial flows shall be calculated separately in accordance with the following:

a. Calculating the amount of industrial flows

The amount of industrial flows depends on the type of activity and the quantity of production of the facility. Therefore, the responsibility of calculating the amounts of the flow lies on the occupier, developer or owner).

b. Calculating the amount of household flows

The first step

Determining the population of the building permit proposal. As for residential units, population shall be estimated using the following formula:

Population = Number of residential units x Number of capita per housing unit

As for houses, the number of capita per housing unit is 6

As for apartments, the number of capita per housing unit is 4

The second step

Calculating the flows amount using the following equation:

Quantity of Flows (l/s) = Population x Amount of Flows/ 86400

For the per capita flows, please refer to Table 1 below.

S.	Quality of use	Amount of flow/ land uses [litre/ person/ day]			
		Household	Commercial	Guest/ resident	Other
1	Villas	182	-	-	-
2	Apartments	178	-	-	-
3	Hotels	220	-	-	-
4	Staff (Employees)	-	-	35	-
5	General school students	-	-	15	-
6	Technical school students	-	-	20	-
7	Hospitals	-	364	-	-
8	Visitors of hospitals and/ health centre	-	-	10	-
9	visitors of offices	-	-	5	-
10	workers' residence	-	91	-	-

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

S.	Quality of use	Amount of flow/ land uses [litre/ person/ day]			
		Household	Commercial	Guest/ resident	Other
11	Youth hostels	-	146	-	-
12	Restaurants	-	17	-	-
13	Grass/ bushes zone	-	-	-	0
14	Ground covered with small plants	-	-	-	0
15	Medium plants/ trees	-	-	-	0
16	Purification water in mosques	-	-	15	-
17	Carwash (Lifting System)	-	25	-	-
18	Carwash (Automatic System)	-	189	-	-

2. Sanitary drainage system conditions for buildings.

2.1 Areas served with public sewerage network

If there is possibility of connection to the public sewerage system, the following points are to be comply with on designing of the sewerage system for the building permit proposal:

2.1.1 Sewerage systems shall be constructed within the boundaries of the property

2.1.2 Only one pipe shall be equipped in order to be connected the public sewerage system at a maximum depth 30 cm from the existing road level in front of the property.

2.1.3 In case of adding a new construction within existing property, which is connected to public sewerage network, then the additional building shall be connected the existing ground floor internal sewers.

2.1.4 No more than one connection to the public sewerage system is permitted for each property, except with the approval of the Sanitary Engineering Affairs.

2.1.5 It is prohibited to change the number and location of connections approved in the building permit, before or during the implementation, without obtaining a written approval of SEPPD.

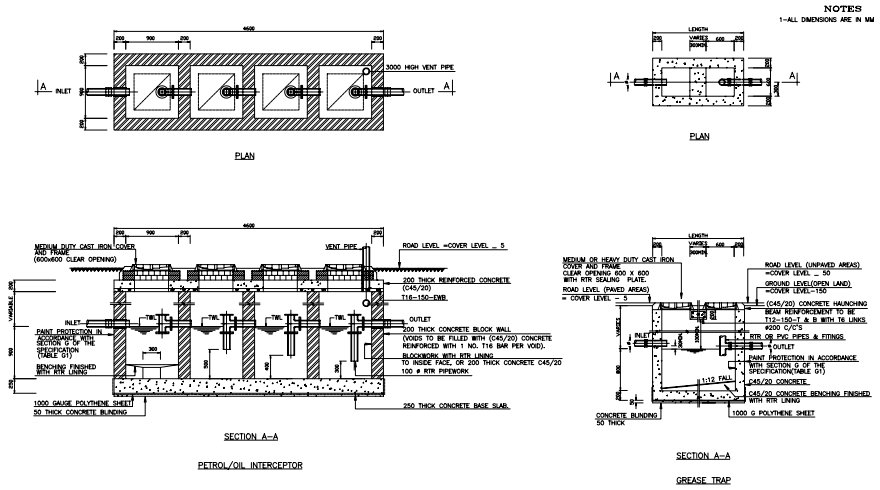
2.1.6 It is prohibited to discharge non-stagnant waters, such as swimming pool water, cooling systems water, etc. in to the internal sewerage system of the building permit proposal.

2.1.7 In case of having basement in building permit proposal, surface water drainage shall be separated from sewerage drainage, with both systems supply with a lift station at the basement, in order to lift water of both systems to surface water drainage system and sewerage system on the ground floor.

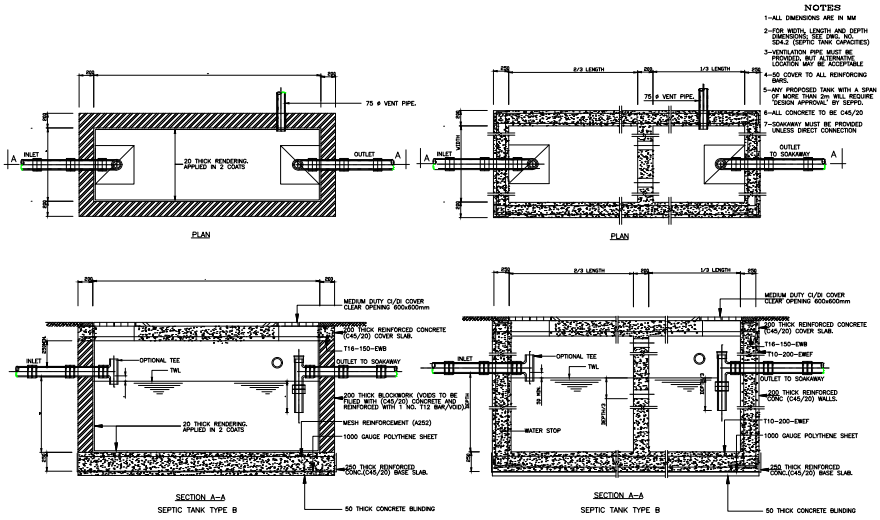
2.1.8 In case there are shops within building permit proposal, they should not be connected to the internal sewerage system, before the activities of the shops are determined, and the requirements of the sanitary sector related to the industrial discharge is obtain form Sanitary Engineering Affairs

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

2.1.9 Except or residential building, Grease Trap shall be constructed within the boundaries of the property for food processing units, such as restaurants, hotels and the like, in accordance to sanitary engineering affairs specifications shown in Figure (SD3.10), before the final connecting to the public sewerage network.



2.1.10 For factories oil and car wash stations, an oil inspector shall be constructed within the boundary of property in accordance with specifications of the sanitary engineering affairs shown in Figure (SD3.10), before the final connection to the public sewerage network.



Oil Inspector

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

2.1.11 It is not allowed to discharge the industrial drainage in the private sewerage network of the building permit proposal without obtaining an approval from sanitary engineering affairs. Such approval shall be granted only in the case of providing the appropriate equipment's for the pre-treatment of industrial discharge, which shall be included in the prescribed specifications and standards for the quality of the effluent, which are allowed to be discharged in public sewerage network. Inspection manhole shall be provided for sampling of industrial discharge by Sanitary Engineering Operation and Maintenance Directorate employees before mixing with the domestic discharge, in order to ensure that the owner of the facility has fulfilled the industrial discharge requirements of the sanitary engineering affairs. Upon operating of the facility, the owner shall contact the wastewater quality control group-Sanitary Engineering Operation and Maintenance Directorate, telephone number 17788145, to coordinate the sampling and ensuring compliance with the requirements of the industrial sanitary engineering affairs.

3. Sanitary engineering affairs conditions for industrial discharge

3.1 The effluent shall have a pH value of not be less than 6.0 and not more than 9.0.

3.2 The effluent salinity shall not exceed 6000 micro Siemens/ centimetre.

3.3 The effluent shall not, at any time, contain the following substances:

3.3.1 Calcium carbide.

3.3.2 Compounds, which are in the pure status or combination, produce in the sewers an Inflammable or toxic vapour

3.3.3 Chlorinated hydrocarbons or related compounds

3.3.4 Radioactive materials.

3.3.5 Volatile petroleum products.

3.4 Synthetic detergents shall not exceed 100 mg/l and to be at least 80% biodegradable in 24 hours..

3.5 Cyanide compounds: all related compounds shall not yield greater than 10 mg/l of of hydrogen Cyanide on acidification of the effluent.

3.6 Sulphides- shall not exceed 10 mg/l of effluent.

3.7 Sulfates- shall not exceed 1000 mg/l of effluent.

3.8 Tar and oil tar- shall not exceed 20 mg/l of effluent.

3.9 Floating oil and grease - shall not exceed 50 mg/l of effluent.

3.10 Emulsion oil and grease - shall not exceed 150 mg/l of effluent.

3.11 Suspended Solid materials - shall not exceed 500 mg/l of effluent.

3.12 Chemical Oxygen Demand - shall not exceed 500 mg/l of effluent.

3.13 Minerals Salts

Mineral (total)	
Cadmium (Cd)	shall not exceed 1 mg/l of effluent.
Chromium (Cr)	shall not exceed 5 mg/l of effluent.
Copper (Cu)	
Lead (Pb)	
Nickel (Ni)	

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

Mineral (total)	
Silver (Ag)	shall not exceed 5 mg/l of effluent.
Zinc (Zn)	
Copper (Cu)	
Arsenic (As)	
Mercury	shall not exceed 0,001 mg/l of effluent.

The total amount mentioned above shall not exceed 10 mg/l of effluent.

Zinc equivalent shall not exceed 30 mg/l of effluent.

Note: 1

The zinc equivalent is defined as the total concentration of milligrams per litre of the following after applying the toxicity factors.

Toxicity Factors Zinc (Zn) = 1 X

Copper (Cu) = 2 X

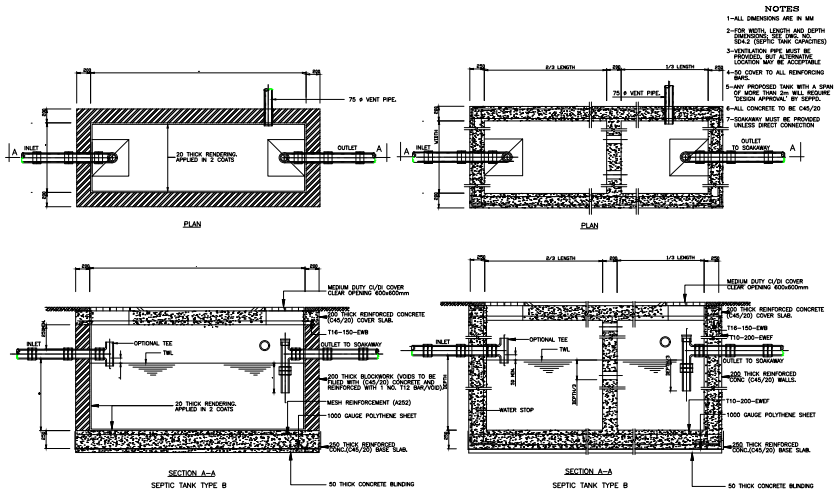
Nickel (Ni)= 8 X

Zinc equivalent = 1 x (Zn) + 2 x (Cu) + 8 x (Ni)

4. Areas not connected to the public sewerage system

4.1 In case of building permit proposal cannot be connected to the public sewerage network, the following points are to be comply with on designing the sewer system for the building permit proposal:

4.1.1 Septic tank shall be constructed within the boundaries of the property at a distance not exceeding 3 meters from the property to the opposite street. The capacity of the septic tank shall be commensurate with the amount of flows generated by the building permit proposal, and in accordance with the specifications of the sanitary engineering affairs stated in Figure SD 4.1.



Septic Tank

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

4.1.2 For building permit proposals, which does not commensurate with construction of septic tank due to the quantity and quality of resulting flows, An Alternative sewerage system shall be constructed with the limits of property in accordance with the nature of proposed building permit, where the responsivity of designing, building, operation and maintenance of this system lies with the owner.

4.1.3 In case of adding a building within existing property, which is not connected to public sewer network, then the additional building shall be connected to internal sewerage of the ground floor.

4.1.4 In case of having basement in building permit proposal, surface water drainage shall be separated from sewerage drainage system with both systems supply with a lift station at the basement, in order to lift water of both systems to surface water drainage system and sewerage water drainage on the ground floor.

4.1.5 Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc., should be separated from sewerage system.

5. General conditions for connecting to the public sewerage system

5.1 For ensuring the delivery service in public sewerage network on due time, deliver application shall be submitted through house connection unit, SEPPD, Salmabad, Tele. 17875424 or web-site (http:/www.e.gov.bh) after preparing sewage pipe and 6 months before the expected completion of construction works in the building, in addition to proving all the required document and technical information stated below:-

- Land deed.
- Survey certificate.
- Location Plan.
- A brief description of the project.
- Proposal of internal sewerage system.
- Number and type of occupants or users of the building, Table (1) can be used to determine the type of occupants or users of the building.
- Determining the activity of building permit request.
- Implementation program (expected time of commencement and finishing construction works).
- Quantity and type of discharge (domestic or industrial), for industrial discharge of chemicals and their concentrations.

5.2 If connection to the public sewerage network cannot be provided for any reason, a septic tank should be provided within the plot boundary. In case the septic tank does not suit type and quantity of discharge, a sanitary system that suite the nature of the development shall be provided, where design, construction, operation, protection and maintenance of this system is the owner responsibility.

6. Conditions of protection the networks and possessions of Sanitary Engineering Affairs

6.1 (Property owner/ Engineering Offices/ Contractor) shall ensure that there is no conflict between the existing services of sanitary engineering affairs and the property requesting building permit through field inspection at the site. In case of suspecting or ensuring that there are conflicts, house connection unit shall be reviewed- SEPPD- in Salmabad, Telephone number 17875424, from 07:30 am. to 12:00 pm.

6.2 House connection unit- SEPPD- shall be reviewed in Salmabad, Telephone number 17875424, at least ten days before commencing the demolition if the property is connected to public sewerage in order to submit the application of separating sewerage service. .

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

7. Factors affecting sanitary engineering affairs requirements to building permits

7.2 Factors affecting sanitary engineering affairs requirements are falling under the following categories:

7.2.1 Type of building permit requests which include:

- Building permit request of new buildings.
- Additional requests.
- Demolition.
- Fencing.

7.3 Possibility of connecting to the public sewerage system.

7.4 Type of discharge produced which includes the two following categories:

- Domestic
- Industrial and commercial

7.5 Protecting of sanitary engineering affairs networks and possessions.

8. Sanitary engineering affairs conditions in building permit applications.

Sanitary engineering affairs requirements in building permits are included in the following two main categories:

1. Building permit applications for new buildings
2. Building permit applications for fenced buildings

8.1 Applications for building permits of new buildings are included in the following four categories:

8.1.1 Building permit proposal needs to be connected to sewerage network. The property related to building permit proposal is equipped with a pipe for connection to the public sewerage network.

8.1.2 Building permit proposal needs to be connected to sewerage network. The property related to building permit proposal is not equipped with a pipe for connection to the public sewerage network and there is technical possibility to connect to public sewerage network.

8.1.3 Building permit proposal needs to be connected to sewerage network but there is not technical possibility of connecting it to public sewerage network.

8.1.4 Building permit proposal does not need to be connected to sewerage network.

9. Building permits for new buildings

9.1 Connection to the public sewerage system is needed and the plot is already connected

Domestic Discharge		
Building Permit Conditions	**Building permit requirements**	
Conditions no. 2, 4, 6,17, 18 & 19 of the building permit conditions list	Basement	Conditions no. 21 of the building permit conditions list is to be added
	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc.	Conditions no. 3 of the building permit conditions list is to be added
	Shops	Conditions no. 5 of the building permit conditions list is to be added

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

Commercial and Industrial Discharge			
Type of industrial activities	**Building Permit Conditions**	**Additional conditions in case the below mentioned utilities exist in the building permit proposal**	
Food processing units, such as restaurants, hotels and the like	Conditions no. 2, 4, 6,17, 18, 19 & 8 of the building permit conditions list	Basement	Conditions no. 21 of the building permit conditions list is to be added
Oil factories, car wash station and the like Factories in case of approving both domestic and industrial discharge	Conditions no. 2, 4, 6,17, 18, 19 & 10 of the building permit conditions list Conditions no. 2, 4, 6,17, 18, 19 & 11 of the building permit conditions list	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc.	Conditions no. 3 of the building permit conditions list is to be added
Factories in case of approving domestic discharge only	Conditions no. 2, 4, 6,17, 18, 19 & 23 of the building permit conditions list	Shops	Conditions no. 5 of the building permit conditions list is to be added

9.2 In case building permit proposal needs to be connected to sewerage network and the property is not equipped with a pipe for connection to the public sewerage network and it is not technically possibility to connect it to public sewerage network

Domestic discharge		
Add	**Building permit requirements**	
Conditions no. 1, 2, 4, 6, 18 & 19 of the building permit conditions list	Basement	Conditions no. 21 of the building permit conditions list is to be added
	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc.	Conditions no. 3 of the building permit conditions list is to be added
	Shops	Conditions no. 5 of the building permit conditions list is to be added

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

Commercial and Industrial Drainage			
Type of industrial activities	**Building Permit Conditions**	**Additional conditions in case the below mentioned utilities exist in the building permit proposal**	
Food processing units, such as restaurants, hotels and the like	Conditions no. 1, 2, 4, 6, 18, 19 & 8 of the building permit conditions list	Basement	Conditions no. 21 of the building permit conditions list is to be added
Oil factories, car wash station and the like Factories in case of approving both domestic and industrial discharge	Conditions no. 1, 2, 4, 6, 18, 19 & 10 of the building permit conditions list Conditions no. 1, 2, 4, 6, 18, 19 & 11 of the building permit conditions list	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc.	Conditions no. 3 of the building permit conditions list is to be added
Factories in case of approving domestic discharge only	Conditions no. 1, 2, 4, 6, 18, 19 & 23 of the building permit conditions list	Shops	Conditions no. 5 of the building permit conditions list is to be added

9.3 The building permit proposal need to be connected to sewerage network but there is no technical possibility to connect to public sewerage network

Commercial and Industrial Drainage		
Building Permit Conditions	**Additional conditions in case the below mentioned utilities exist in the building permit proposal**	
Conditions no. 4, 9, 18 & 19 of the building conditions list	Basement	Conditions no. 21 of the building conditions list is to be added
	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc.	Conditions no. 3 of the building conditions list is to be added

Domestic discharge		
Additional requirements if the facilities mentioned above are included in building permit proposal		**Building permit requirements**
Conditions no. 4, 9, 18 & 19 of the building conditions list	Basement	Conditions no. 21 of the building conditions list is to be added
	Drainage systems of the non-stagnant water, such as swimming pools, cooling systems, etc	Conditions no. 3 of the building conditions list is to be added

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

9.4 In case there is no need for the proposed building permit to connect to the public sewerage network, the building permit application shall be certified in accordance with the requirements of Articles 15, 18 and 19 of the list of building permit requirements.

10. Applications for fencing the properties

Permit building application shall be certified in accordance with requirements No. 12, 18 and 19 of building permit requirements..

11. Sanitary Engineering Affairs building permits conditions list

No.	Building Permits Conditions List
1	To ensure that the building will be connected to the public sewerage network in a timely manner, a request for connection should be submitted through the House Connection Unit _ Sanitary Engineering Planning & Projects Directorate at Salmabad, or the web site (www.e.gov.bh) after the installation of the sewerage connection pipes to the public sewerage system, and about 6 months before the expected completion date of construction works in the building, with bringing all required documents and technical information.
2	The approved numbers and locations of the connections shall not be changed prior to or during construction without the written approval of Sanitary Engineering Planning & Projects Directorate.
3	It is prohibited to discharge non-stagnant waters, such as swimming pool water, cooling systems water, etc. in to the internal sewerage system of the building permit proposal.
4	It is not allowed to discharge the rainwater of the above project into the internal sewerage network, and in order to discharge this water, a system must be built within the boundaries of the property that suit the nature of the project, where design, construction, operation, protection and maintenance of this system is the responsibility of the owner.
5	It is not allow to connect the commercial shops to the sewage network of the above project, and to connect these shops to the public sewerage system, Please refer to House Connection Unit _ Sanitary Engineering Planning & Projects Directorate at Salambad, after knowing the type of activities for the shops, to determine the conditions for commercial discharge.
6	If connection to the public sewerage network cannot be provided for any reason, a septic tank with soak pit should be provided within the plot boundary. In case the septic tank does not suit type and quantity of discharge, a sanitary system that suite the nature of the development must be provided, where design, construction, operation, protection and maintenance of this system is the owner responsibility.
7	Sewage plans were not granted, as there is a project in progress in this area, and to connect to the public sewerage network. Please refer to the House Connections Unit _Sanitary Engineering Planning & Projects Directorate at Salambad before proceeding with the construction works to study the possibility of connection.
8	A grease trap shall be provided prior to connection to the public sewerage system.
9	A septic tank with soak pit must be constructed within the boundaries of the property, and at a distance not exceeding 3 meters from the boundaries of the property overlooking the street, prior to the commencement of occupation, also the owner must provide the necessary tiles to be re-installed on the floors, after completion of the plot connection to the public sewerage system in the future.In case the septic tank does not suit type and quantity of discharge, a sanitary system that suite the nature of the development must be provided within the plot boundary, where design, construction, operation, protection and maintenance of this system is the owner responsibility.

The requirements of the Ministry of Works, Municipalities Affairs and Urban Planning - Directorate of Sanitary Engineering Planning and Projects

No.	Building Permits Conditions List.
10	Oil Interceptor shall be provided prior to connection to the sewerage system.
11	Appropriate equipment for the trade effluent pretreatment, shall be provided to meet the prescribed specifications and standards for the quality of the trade effluent permitted to be discharge in to the public sewerage system. In addition, inspection chamber should be provided, before trade effluent mix with domestic, for sampling by Sanitary Engineering Operation & Maintenance Directorate staffs, to ensure that the owner of the development complies with Sanitary Sector trade effluent conditions. The owner of the facility should contact the Treated Effluent Quality Control Group – Sanitary Engineering Operation and Maintenance Directorate, Tel. 17788145, when starting the operation of the development, for coordination on sampling and ensuring that the owner of the facility complies with Sanitary Sector trade effluent conditions.
12	No objection from fencing the plot only.
13	The same septic tank should be used, with no extension of pipes outside the boundaries of the property.
14	The proposed extension should be connected in to the existing ground floor internal sewers.
15	No sewerage connection is required, as no sanitary facilities are proposed in the building.
16	Contact House Connection Unit /Sanitary Engineering Planning & Projects Directorate at Salmabad 10 days prior to start of demolition.
17	Use the existing connection points.
18	The Sewage Planning and Projects Directorate has the right to revoke the license in case the licensee violates any of the license conditions.
19	Approval on building permit is considered to be valid for a period of two years from this date, therefore project owner shall reapply after the expiration of this period in order to renew project information and re-evaluate the application.
20	Sewage system plans are not granted, and please refer to the House Connection Unit_ Sanitary Engineering Planning and Projects Directorate at Salmabad before proceeding with construction works, to study the possibility of connection to the public sewerage system.
21	The storm water drainage system shall be separated from the sewage drainage system, and provide both systems in the basement with a lift station, to raise the water of both systems to the sewerage system and the storm water drainage system on the ground floor.
22	A sanitary system that suits the nature of the development should be constructed within the plot boundary, where design, construction, operation, protection, and maintenance of this system is the developer responsibility.
23	It is not allowed to discharge industrial discharge in to the public sewerage network
24	Others

Chapter 5

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

Table of Contents

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

1. Introduction

This part of the Code reviews EWA standard conditions and specifications as related to provision of electricity supply to Buildings, under the following main items, and will be highlighted in the issued Power Conditions Form of Building Permit, as applicable.

The main clauses of this part are as follows:

- Load criteria that defines the method of supplying the Building with Electricity, and how the Applicant will contribute to that.
- Controls and obligations by the Applicants with respect to:
  - General conditions,
  - Protection of EWA Networks and Buildings prior, during and after the constructions works of the building.
  - Technical specifications of the Load & Supply Arrangement at building / project.
  - Technical and specifications of the substations that applicants are obliged to build.
- To clarify the conditions of EWA Readiness to supply the electrical loads of the building / project.

All concerned; applicants, owners, developers, engineering offices and contractors should consult and take into considerations the conditions of this Code, starting at the planning and technical design stage of the Building/ Development.

2. Definitions

A

Additional Cost of Electricity: The cost calculated by multiplying the Extra Load (in kVA) by the rate of BD 55 /kVA

Applicant: A developer, an owner, a contractor and/or who represent them.

Approved Load: The electrical load applied by the Applicant, approved by EWA and indicated in the Power Conditions Form.

B

Building: One unit or a group of units within one plot.

Building Contractor: A contractor approved by the concerned authorities in the Kingdom of Bahrain and authorized to undertake constructions works, including structural and electrical works.

Building Installations: The internal electrical installation of the Building installed and operated by the Applicant, with the exception of the electrical switchgear at the main point of the supply.

C

Clearances: Permitted physical clearance between Building and EWA Networks / Buildings.

Complex: A set of housing units within one boundary and have Single Point of Connection.

Construction Area: The area of a Building and its surrounding found in the proximity of EWA's services and networks.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

CR: Customer Request, a request applied by a customer to change, to relocate or to remove the customer's service.

CRPEP: The Council for Regulating the Practice of Engineering Professions.

CSD Centers: EWA customer services centers distributed in different locations in the Kingdom of Bahrain.

CSD: Customer Services Directorate, EWA

Customer: Any natural or legal person to whom the Authority provides electricity and water services upon request.

Customer's Terminals/ Service Point: The connecting point of the customers' installations to EWA point of supply.

D

Developer: The owner of the property, whether natural or legal, benefits from infrastructure services

Development Infrastructure: Infrastructure within a development.

Development: Investment and real estate development projects and others.

DPS: Damage Preventive Section, EWA. DPS is mainly concerned with protecting EWA networks and buildings from damage.

E

EDD: Electricity Distribution Directorate, EWA.

Electrical Unit: Electrical load / power measured in 1 kVA.

ETD: Electricity Transmission Directorate, EWA

EWA Buildings: All EWA buildings including electricity and water substations, complex and other buildings

EWA Networks: All Overhead and Underground electricity and Water Networks of EWA.

EWA: Electricity & Water Authority in the Kingdome of Bahrain

Extra load: The difference between the Approved Load (in kVA) and the Initial Load (in kVA).

F

Form, Application for Power Conditions: An application form used by an authorized party to apply for Power Conditions.

Form, Application for Supply: A form used by an authorized party to apply for connecting to electricity supply

Form, Power Conditions: A form issued by EDD showing EDD and DPS conditions for issuing a Building Permit.

Form, Substation Declaration: A declaration form signed by the Applicant, through which he undertakes to build a substation as per EWA specifications and requirements and to execute it under EWA supervision.

G

GMTX: Ground Mounted Transformer

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

H

HV: High Voltage, voltage of the connection higher than the Medium Voltage.

I

Infrastructure: The main and sub networks of electricity, water, roads and sewerage, parking and landscape areas and other facilities and services, as covered by the Cabinet resolution(s) based on the recommendations of the Ministerial Committee.

Initial Cost of Infrastructure: The amount resulted from multiplying of the net area (m2) by 12 BD/m2.

Initial Load: The electrical Load calculated by multiplying the Net Area measured in (m2) by the rate of (0.12 kVA/m2) by.

Intake Substation: Distribution substation at 11 kV to connect one customer

K

KVA: Kilo Volt Ampere.

L

Load & Supply Arrangement: The arrangement undertaken by the Applicant in order to connect between the Building electrical load and EWA electrical supply.

Load Address: The address of the building or complex for which the Power Conditions have been issued.

LV: Low Voltage, voltage of the connection at 415 V (phase –phase voltage)

M

M: meter

Meters Group: A group of meters connected to EWA network through single point of supply service.

MOU: Memorandum of Understanding signed between EWA and a main Developer.

MTC Contractor: A contractor assigned by EWA to undertake EWA works as per Measured Term Contract (MTC)

MV: Medium Voltage, Voltage of the connection at 11000 V

N

Net Area: An area measured in (m2), to be constructed in accordance with the engineering drawings submitted with the application for building permit and complying with the conditions of the urban planning entities in Bahrain

P

P&SD: Planning & Studies Directorate, EWA.

Primary S/S: Transmission Substations receiving voltages at 33,66,220,400 kV.

Property: A place that is provided with electricity services and has a separate address. That includes fixed and mobile housing, commercial and industrial, farms, open lands and others.

Proposal: A project proposed by EWA to extend / lay network, build substation or all.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

R

Readiness: Readiness of EWA Network and Substations to supply the electrical load of the Building

S

S/S: A distribution substation which receives supply at a voltage of 11000 V and steps it down to 415 V.

S/S, Building type: A substation that is located within building or directly attached to a building.

S/S, Free building type: A substation that is free standing and not attached to the proposed development.

Service Corridors: EWA corridors of existing/proposed services and networks.

SLD: Electrical Single Line Diagram

SPOS: Single Point of Supply which connect a group of buildings to EWA network through single point.

T

Trial Hole: An inspection hole prepared by MTC contractor for inspection and confirming routes and dimensions of underground network.

3. Scope of application

These terms and conditions shall be applied to electrical loads included in two main categories:

- Electrical loads that equal or exceed 12,000 electrical unit under which the Developer pays the initial cost of property infrastructure in addition to additional cost of electricity, as appropriate.
- Electrical loads that equal or exceed 12,000 electrical units, under which the developer pays an amount of 5.5 Dinars for the net area required to be built in addition to other infrastructure services besides building electricity grids at his own expense and in accordance with the requirements of decision No. 13 of 2006.

This guide covers the following types of Applications for Power Conditions:

- Request for new electrical loads
- Request for additional
- Request for load adjustment
- Request for splitting/ merging of electrical load.
- Demand for Power Conditions with no electrical loads.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

4. Laws and Regulations

- Legislative Decree No. (1) of 1996, with respect to electricity and water
- Ministerial Decree No. (13) of 2006, with respect to the regulations of charges for the delivery of electricity and water services.
- Ministerial Decree No. (2) of 2010, with respect to the regulations for electrical installations.
- Ministerial Decree No. (25) of 2015, with respect to the cost collection of establishing and developing infrastructure in the reconstruction areas.
- Ministerial Decree No. (1) of 2005, with respect to the work regulations in the field of electrical wiring, and its amendments
- Ministerial Decree No. (11) of 2017 on the definition of categories and mechanisms for the collection of the cost of establishing and developing the infrastructure in the existing reconstruction areas and facilities.
- Law No. 51 of 2014, with respect to Regulating the Practice of Engineering Professions

5. Power Condition

1. Load Criteria for Electrical Supply:

The Applicants submit the required Electrical Loads of buildings, estimated in kW and EDD will convert it into kVA (Electrical Unit) after considering diversity factor. The following criteria take into consideration the value of loads in the Electrical Unit.

1.1 Applicant Obligation to Provide a S/S based on the Electrical Units of the Building

This section refers to the provisions of Ministerial Decree No. (13) of 2006, with respect to the regulation of charges for the delivery of electricity and water services, with highlight on the applicant's obligation to build and/ or to provide plot(s) of land to build substation.

The obligations are defined for the following types of buildings and facilities:

a. Domestic / Government (D)

b. Flats (F)

c. Non-Domestic (Low Voltage and Medium Voltage) (ND)

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

1.1.1 For Electrical Loads Not Exceed 12000 Electrical Units

Applicants are obliged to provide plot(s) of land and/ or to build substation as per the following table and Note 1:

	Building Type	L: Load Electrical Unit	Substation Type	Substation Capacity
1	All Types	L ≤ 340 *	-	-
2	All Types	340 < L < 900	Distr. S/S	1 no. 1000 kVA GMTX
3	All Types	900 ≤ L < 1350	Distr. S/S	1 no. 1500 kVA GMTX
4	All Types	1350 ≤ L < 1800	Distr. S/S	2 no. 1000 kVA GMTX
5	All Types	1800 ≤ L < 2700	Distr. S/S	2 no. 1500 kVA GMTX
6	All Types	2700 ≤ L ≤ 3500	Distr. S/S	3 no. 1500 kVA GMTX
7	D, F	3500 ≤ L < 4050	Distr. S/S	3 no. 1500 kVA GMTX
8	D, F	4050 ≤ L ≤ 5000	Distr. S/S	4 no. 1500 kVA GMTX
9	D, F	5000 < L ≤ 6000	Intake Substation	1 no. 3-panel
10	ND	3500 < L ≤ 6000	Intake Substation	1 no. 3-panel
11	All Types	6000 < L ≤ 12000	Intake Substation	2 no. 3-panels

* Note 1: In case load of a building is less than or equal 340 Electrical Unit but the network capacity is not sufficient to supply that load, Or there is no sufficient area to build a substation, EWA reserve its right to request the applicant to provide a plot of land to build a distribution substation, as applicable.

1.1.2 For Electrical Loads that Exceeds 12000 Electrical Units

a. The Developer has to provide, at his expense, a plot of land measured 45 meters x 45 meters, reserved to build a Primary S/S.

b. The applicant has to build, at his expense, a 66 kV Primary S/S in accordance with EWA specifications and under EWA supervision, in order to supply the required loads.

c. If the load exceeds 48000 Electrical Unit, the applicant is obliged to provide, at his expense, a plot of land measured 120 meters x 120 meters, to be reserved for building an additional 220 kV Primary S/S.

d. The Developer is obliged to construct, at his expense, the infrastructure of the developed area, including the electrical substations and network.

e. The Developer has to adhere to the technical terms and conditions of the MOU.

1.2 Capital Contribution and Infrastructure Fees Based on the Electrical Load

This section refers to the provisions of Ministerial Decree No. (13) of 2006, and the Ministerial Decree No. (11) of 2017 on the definition of categories and mechanisms for the collection of the cost of establishing and developing the infrastructure in the existing reconstruction areas and facilities.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

1.2.1 For Electrical Loads Less than 12000 Electrical Units

The Developer has to pay the Initial Cost of the property infrastructure, plus the Additional Cost of electricity, as applicable.

1.2.2 For Electrical Loads that equal or exceed 12000 Electrical Units

a. The Developer has to pay an amount equivalent to 5.5 Bahraini Dinars multiplied by the Net Area of the Building(s), against other infrastructure services.

b. The Developer has to comply with the technical terms and conditions of the MOU.

2. Classifications and Implementation of Power Conditions

Power Conditions fall under two main categories:

The First Category - Obligations by the Applicants with Respect to:

a. General Conditions.

b. Conditions for Protection of EWA Networks and Properties.

c. Technical conditions and specifications of the Load & Supply Arrangement at the Building/ Development.

d. Technical conditions and specifications of the substations that applicants are obliged to build.

The Second Category - Information on EWA Readiness to Supply the Electrical Loads of the Building / Project.

This category relates to the information provided by EWA in the Power conditions form to inform the applicant of the readiness of the network to supply the building with electricity.

Implementation of Power Conditions

- The terms and conditions in this manual are standard ones.
- The responsibility for complying with these requirements rests with all stakeholders including the concerned developer, current as well as future owners, consultants and contractors.
- These conditions and specifications must be observed and taken into consideration prior to the design stage of the Building / Development, during and after implementation.
- Number of conditions will be mentioned in the related Power Condition Form as well as the dated version of the manual published in the Official Gazette.
- Additional conditions, not mentioned in this manual might be raised and added in the Power Condition Form, as appropriate.

2.1 General Conditions

The General Conditions are applicable to all applications. They concern mainly with compliance of the Applicant with and validity of the Power Conditions, as well as the safety pre-cautions prior to the construction of the building / project.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

2.1.1 The Applicant should carefully read and adhere to all Power Conditions highlighted in the Power Conditions Form, during all stages of constructions and using the Building/ Development.

2.1.2 EWA reserves its rights Not-to-Supply the Load Address if Applicant not complying with the Power Conditions.

2.1.3 Original Power Conditions should be applied; any exemption of those Power Conditions should be approved by EWA which in turn should give the necessary justification for that exemption.

2.1.4 The latest Power Conditions will supersede all previous ones applied for the same Load Address.

2.1.5 The Applicant should appoint only consultants and contractors approved/ licensed by EWA and/or licensed by CRPEP.

2.1.6 The Applicant should use / install only electrical materials and equipment approved by EWA.

2.1.7 In the interest of safety, it is strictly prohibited to move or remove the service wires/cables/ wall boxes/meters by the Applicant, without prior official approval by EWA and under EWA supervision.

2.1.8 EWA will be taking all necessary legal actions towards all violators. Moreover in case of any negligence in applying the EWA Safety rules, the Applicant will take full responsibility regarding the personnel safety along with all relevant compensations requested due to damages resulting from that negligence.

2.1.9 In case of any violation, EWA will not be responsible for any delay in connecting the service to the building / project, as it was caused by that violation.

2.1.10 The Applicant should apply for Supply Connection at any of CSD Centres, 6 months earlier from the target date of the connection.

2.1.11 The Applicant should comply with EWA Regulations for Electrical Installations.

2.1.12 The Applicant should note the validation date of the Power Conditions Form.

2.2 Protection Conditions of EWA Networks and Properties

This section reviews the standard conditions determined by the DPS for the protection of property, buildings and networks of EWA and the required guarantees, as well as general safety requirements, which the applicants must abide by, before, during and after the construction of the building / project.

The relevant terms and conditions code will be indicated in the Power Conditions Form for the specific application, as provided in the Building Code published in Bahrain Gazette, as well as any other conditions, as applicable.

In the case of large investment projects, it is recommended to approach DPS for information on the status of EWA's networks in the proximity of the project area, before the design stage. If such information is obtained, DPS report must be attached with the Power Conditions Application Form.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

2.2.1 Prior to start of construction works on site, the Applicant should notify DPS of the Nominated Contractor, start date and work program on Fax No. 17727737.

2.2.2 The Applicant has to take into consideration, P&SD proposal to lay electricity transmission network in the vicinity of the plot, where building is proposed to be constructed.

2.2.3 The Applicant has to take into consideration, EDD proposal to lay electrical cables in the vicinity of the plot, where building is proposed to be constructed.

2.2.4 The Applicant has to take into consideration, EDD proposal to install street lighting network in the vicinity of the plot, where building is proposed to be constructed.

2.2.5 The Applicant has to take into consideration, EDD proposal to establish distribution substation and to lay cables in the vicinity of the plot, where building is proposed to be constructed.

2.2.6 The Applicant has to take into consideration, P&SD proposal to lay water transmission network in the vicinity of the plot, where building is proposed to be constructed.

2.2.7 The Applicant has to maintain EWA standard clearances between the Building and EWA Networks and Buildings.

2.2.8 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA MV (11kV) cable in conflict.

2.2.9 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA LV cable in conflict.

2.2.10 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA overhead lines in conflict.

2.2.11 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA services in conflict.

2.2.12 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA street lighting in conflict.

2.2.13 The Applicant should apply a CR at any of CSD Centers, in order to relocate EWA Substation in conflict.

2.2.14 The Applicant should apply a CR at any of CSD Centers, for disconnection and removal of existing services, prior to commencing of works, demolishing or dismantling of the existing structure/Kiosks.

2.2.15 The Applicant should manually excavate trial holes in consultation with/under direct supervision of DPS, to ascertain exact route/level of the existing underground services.

2.2.16 The Applicant has to submit a request for inspection/supervision by DPS through Fax No. 17727737, 2 days earlier the starting date.

2.2.17 The Applicant has to coordinate with EDD, TSS Group (17991957), in order to check the status of cable(s) within the property and confirmed if live or abandoned.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

2.2.18 The Applicant has to take into consideration that EDD has a service corridor spared to lay underground cables in road's reserve, adjacent to plot boundary.

2.2.19 The Applicant has to maintain two (2.0) meters Clearance from any 400 KV transmission underground circuit.

2.2.20 The Applicant has to maintain one and half (1.5) meters Clearance from any 220 KV transmission underground circuit.

2.2.21 The Applicant has to maintain one (1.0) meter clearance from any 66 kV/ 33 kV transmission underground circuit.

2.2.22 The Applicant has to maintain a minimum horizontal clearance of one (1.0) meter between near-edge of excavation for foundation footings of boundary pillars of boundary wall from the nearest electricity distribution network.

2.2.23 The Applicant has to ensure that no window opening is facing EWA Primary S/S / EWA's compound.

2.2.24 The Applicant has to ensure that foundation footings / piles / pile-caps are placed well and away from the reserved corridor of the existing / proposed electricity distribution network services.

2.2.25 The Applicant has to maintain a minimum of two and half (2.5) meters horizontal Clearance from water transmission corridor/ the nearest water transmission main-chamber-thrust block.

2.2.26 The Applicant has to coordinate with DPS on the Clearance requirement from the water transmission main to near-edge of excavation of the Building foundation. DPS should agree on those clearances.

2.2.27 The Applicant has to maintain a horizontal Clearance of one (1) meter, from electricity distribution substation of types: Free Building (FB); Package Unit Building (PB) type.

2.2.28 The Applicant has to maintain a horizontal Clearance of two (2) meters, from distribution, LV overhead network.

2.2.29 The Applicant has to maintain a horizontal Clearance of four (4) meters, from distribution, 11KV (MV) overhead network.

2.2.30 The Applicant has to maintain a horizontal Clearance of seven (7) meters, from 66 KV overhead networks.

2.2.31 The Applicant has to maintain a minimum of 300 mm vertical clearance from the bottom of the beam between the pillars and the nearest electricity distribution network.

2.2.32 No construction works are allowed on/above distribution substation of the types: Free Building; Building Package Unit; Package Unit.

2.2.33 In order to prevent slipping of the soil surrounding EWA services, the Applicant has to provide protective shuttering/sheet piling to EWA network, under DPS supervision.

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2.2.34 The Building Contractor should secure sheet piles inside the plot boundary with substantial bracing, as required. Contiguous piling to be done inside the line of the sheet piles, using rotary drilling only. All works, including dimensions of the arrangement to be agreed and supervised by DPS technician.

2.2.35 EWA reserves the right to request additional protection measures in the area of EWA network, as required. Costs for such protection to be borne by the Applicant. The Building Contractor should record all vibration due to piling works and submit it to DPS.

2.2.36 The Building Contractor should discuss with DPS the method of shuttering/trench support/de-watering process/removal of soil from excavated foundations, in the vicinity of existing EWA network. DPS representative should agree and supervise these arrangements on site.

2.2.37 Vibration required to consolidate the site foundation, should be carried-out with a static roller, not exceeding 10 tons D.W.

2.2.38 The Building Contractor should assign a specialized de-watering contractor, in order to ensure that no accumulation of water is adjacent to EWA Network/ Substation.

2.2.39 The Building Contractor should discuss and get DPS approval on site access/exit points for movement of construction traffic nearby EWA Network.

2.2.40 If access/exit points involve crossing of EWA corridors, the Applicant should assign MTC Contractor to provide protection to EWA underground services at the access/exit points, at the Applicant's cost and under direct supervision of DPS.

2.2.41 The Applicant/Building Contractor should provide, under approval and supervision of DPS, suitable barriers along the unprotected section of EWA service corridors, in order to prevent unauthorized access to the site.

2.2.42 The Building Contractor should discuss with DPS representative the sign board/crane and radius of movement at the site close to EWA overhead Network. DPS representative should approve these arrangements.

2.2.43 The Building Contractor should exercise caution while demolishing the existing structure/ operating of machinery, in the vicinity of EWA network.

2.2.44 The Building Contractor is obliged to cover existing electricity transmission network to ± 250 mm.

2.2.45 The Building Contractor should provide a minimum of 30 mm filler (seal-end) between EWA's boundary structure and adjoining compound wall/structure.

2.2.46 EWA imposes restriction on works in the vicinity of 400/220/66 KV transmission circuit, during summer peak period (between May and November).

2.2.47 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 250,000 (Two hundred fifty thousand) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction /or;

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2.2.48 Building Contractor has deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 500,000 (Five hundred thousand) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction/or;

2.2.49 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 1,500,000 (One million and five hundred thousand) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction /or;

2.2.50 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 2,000,000 (Two million) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction/or;

2.2.51 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 4,000,000 (Four million) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction /or;

2.2.52 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA ,in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 6,000,000 (Six million) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction /or;

2.2.53 Building Contractor has to deposit the cash insurance amount or a guarantee letter as determined by EWA, in addition to providing proof of Third Party Liability Insurance cover for a minimum of BD 7,000,000 (Seven million) Bahraini Dinars, in order to cover any damage or failure of EWA Network/ Substations in the working area, during the period of construction.

2.2.54 The Applicant has to provide a copy of Third Party Liability Insurance cover to DPS, in addition to a proof of the deposit amount of the cash insurance or a guarantee letter as determined by EWA , at least 5-working days in advance of site works commencement date.

2.2.55 The Applicant has to ensure that spoil / construction materials – machinery / temporary worksites / blinding fence / porta-cabins / cranes - foundation pads or sign boards are not placed over the existing E&W underground services or the reserved corridors. The Applicant should ensure that EWA and its agents are having 24-hours unhindered access, for routine/ emergency maintenance works.

2.2.56 EWA Power Conditions do not cover any other works like foot-path/paving blocks/landscaping work, proposed to be constructed by the developer outside the plot boundary. Any such works should be the subject of a wayleave, which is to be initiated through Central Planning Office/ Roads, Ministry of Works.

2.2.57 Prior to the clearance of DPS permission to proceed working on site located in the vicinity of EWA services, the Applicant has to sign an Undertaking Letter for guaranteeing safety of EWA services. (Undertaking Form is attached),

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2.3 Load & Supply Arrangement

This section reviews the standard conditions of the connecting point between the Building / Development and EWA supply, as applicable.

2.3.1 All meters of the Building/ Development shall be in one location and connected from Single Point of Supply.

2.3.2 In general, Main Electricity Board (Meters and Circuit Breaker / Cut-out) shall be on Boundary Wall facing main road, accessible to EWA staff for 24 hours.

2.3.3 Meter Board should be designed and fabricated in accordance with EWA specifications. A sample design is attached.

2.3.4 For security and safety requirements, when installing meters in a multi-storey building, the meter board and circuit breakers/cutouts must be placed inside a room with sufficient ventilation and cooling, isolated and away from the path of the residents and Fire Brigade.

2.3.5 In the case of multi-storey Building / Development, the Applicant should submit the Single Line Diagram of the installations for approval by EDD (Construction Section, Planning & Materials Section) Internal wiring and installations should comply with EWA Regulations for Electrical Installations and be approved by EDD before applying for Electricity Supply.

2.3.6 Power Condition is granted as agreed with the associated Planning Permission, approved previously, as applicable.

2.3.7 Power supply will be as per the MOU agreed upon by EWA and the Applicant.

2.3.8 All internal and external infrastructure works of the project are on the responsibility of the Applicant, as per the MOU.

2.3.9 Power supply shall be as per Power Supply Confirmation Form issued by the Main Developer.

2.3.10 The Applicant has to comply with the Term and Conditions of the 11 KV Consumers.

2.3.11 Before submitting an Application for Electricity Supply, the Applicant should submit the needed technical reports to EDD (Planning & Material Section), for their approval on Power Factor & Harmonics study of the applied load.

2.3.12 Before submitting an Application for Electricity Supply, the Applicant should apply the needed technical reports to EDD (Planning & Material Section) for their approval of Electrical Materials and Equipment installed in the Building.

2.3.13 As per the Declaration Form, Electricity Supply shall be provided only after a New Substation is constructed by the Applicant. The substation design should be approved by EDD Civil Section and executed under their supervision.

2.3.14 EWA has reserves its right to operate the substation that built by the applicant, as well to feed other customers without prior permission from the Applicant.

2.3.15 The Applicant should provide a plot of 45 mx 45 m for building a Primary S/S.

2.3.16 The Applicant should build a Primary S/S within the boundary of the Project.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

2.3.17 Electricity Supply shall be connected to the building from the Primary S/S located within the boundary of the Project.

2.3.18 Electricity Supply shall be provided through Underground Cable only.

2.3.19 Electricity Supply shall be provided without any change in the current cable or cut-out size, only Electricity Meter will be changed.

2.3.20 New loads will not be connected to the building, as per a documented confirmation by the applicant.

2.4 Technical Specifications and Conditions of the Substations

According to "Load Criteria for Electrical Supply," the applicant has to build a Distribution/ Primary S/S in order to feed the Approved Load.

This chapter reviews the technical conditions and specifications for constructing substations, as applicable

2.4.1 Special Conditions for building a Substation

1. Substation location to be shown in the "Ground Floor Plan" or "Site Development Plan", as applicable.
2) Substation door should open to a main public road with 5.0 m minimum width.
3. For safety and protection of the substation, the Applicant should avoid wet areas (toilets, kitchens, pump rooms, etc.), above or in the surrounding of the substation.
4. In case wet area is unavoidable above S/S, the Applicant should construct double slab, with a gap of minimum 1.0 m between the two slabs.
5. Building drawings should show cross-section of the S/S building and above.
6. For protection and safety, the applicant should avoid basement under S/S.
7. In case a basement is unavoidable under the S/S building, head room under S/S trench work should be a minimum of 2.5 m and the Applicant should show reinforcement details for floor and trenches bed.
8. Building columns / column projection are not allowed inside a S/S building.
9. Building columns should not obstruct routes of LV and MV cables.
10. The Applicant Switch room should have a minimum clear width of 2.0 m.
11. The Applicant Switch room should be attached to S/S, or away from the S/S with a maximum distance of 10 m. In case that arrangement not achievable, the Applicant should provide channels or trenches for passage of cables, with inspection rooms sized 1.2 m x 1.2 m every 15 meters. The approved arrangement should be documented in the engineering drawings of the Building / Development.
12. Sufficient ventilation to be provided for S/S. Ventilation proposal should be approved by EDD.
13. The Applicant is responsible to provide the official road level in front of S/S, from the Roads Directorate.

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

14. The Applicant should ensure that the top level of all foundation in substation area is 750 mm below existing road level.
15. The Applicant should ensure that services of other utilities are not passing within or under substation building.
16. The Applicant should submit all S/S's drawings including ventilation proposal, for EDD approval before start constructing the S/S building.
17. No construction works are allowed above substation building of types: Free Building / Package Unit.
18. Applicants and other parties are not allowed to use substation buildings for any other usage than those stated in the definitions.
19. Applicants and other parties are not allowed to change the design of substations building.
20. The Applicant has to comply with the standard sizes of substation building. If not achievable, the Applicant has to approach EDD, Civil Engineering Section and get their approval through an application of pre-consultation, before applying for the Building Permit stage.

2.4.2 Standard Specifications for Substation Buildings

According to the Load Criteria for Electrical Supply, the applicant must build the substation, while complying with the standard drawings and technical specifications mentioned in the "Power Conditions Form", and while adhering to the comments of EWA Civil Engineer, mentioned in the approved drawings.

The following is the list of standard Specifications of Substation Buildings to be mentioned in the "Power Conditions Form":

Ref. No.	Drawing Number	Substation Capacity and Type		S/S size in (m)	DOOR			No. of Exhaust Fan (ExF) / No. of (2 ton) Split Unit A\C
					No.	Size in (m)		
						W	H	
1	A/BA/647-R2	1 TX 1000KVA	Door on short side	4.8×7.6×3.0	1	2.4	2.5	1 ExF
2	A/BA/638-R2	1 TX 1000KVA	Standard	6.6×4.4×3.0	1	2.4	2.5	1 ExF
3	A/BA/670-R2	1 TX 1500KVA	Door on short side	5.2×7.6×3.3	1	2.4	2.5	2 ExF
4	A/BA/668-R3	1 TX 1500KVA	Standard	7.0×4.8×3.3	1	2.4	2.5	2 ExF
5	A/BA/644-R2	2 TX 1000KVA (2 No. L.V Boards)	Standard	10.9×5.5×3.0	2	2.4	2.5	2 ExF

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Ref. No.	Drawing Number	Substation Capacity and Type		S/S size in (m)	DOOR			No. of Exhaust Fan (ExF) / No. of (2 ton) Split Unit A\C
					No.	Size in (m)		
						W	H	
6	A/BA/711-R1	2 TX 1000/1500KVA (3 No. L.V Boards + ACB)	Door on short side	6.9×12.25×3.3	1	2.4	2.5	3 ExF
7	A/BA/730-R1	2 TX 1500KVA (3 No. L.V Boards + ACB)	Standard	12.0×6.0×3.3	2	2.4	2.5	4 ExF
8	A/BA/744	2 TX 1500KVA (4 No. L.V Boards)	Standard (Not rate in MTC)	12.0×8.0×3.3	2	2.4	2.5	4 ExF
9	A/BA/645-R2	3 TX 1000KVA (3 No. L.V Boards)	Standard	12.8×5.5×3.0	3	2.4	2.5	3 ExF
10	A/BA/727-R1	3 TX 1500KVA (3 No. L.V Boards + ACB)	Standard	14.0×6.0×3.3	3	2.4	2.5	5 ExF
11	A/BA/745	3 TX 1500KVA (6 No. L.V Boards)	Standard (Not rate in MTC)	17.2X8.0X3.3	3	2.4	2.5	5 ExF
12	A/BA/746	4 TX 1500KVA (4 No. ACB)	Standard (Not rate in MTC)	17.5X6.0X3.5	4	2.4	2.5	5 ExF
13	A/BA/726	2 TX 1500KVA (4 No. L.V Boards)	Double Story Building	(G.F): 7.9×5.9×3.6 (F.F): 7.9×5.9×3.0	1 1	2.4 3.4	2.5 2.7	3 ExF 1 ExF
14	A/BA/739-R1	11KV Intake (9 Panels)	Standard	11.4×8.0×4.0	2	2.4	2.88	6 A/C
15	A/BA/739-R1	11KV Intake (7 Panels)	Standard	10.0×8.0×4.0	2	2.4	2.88	4 A/C
16	A/BA/684-R1	11KV Intake (3 Panels)	Standard	6.0×8.0×4.0	1	2.4	2.88	3 A/C
17	1A/BA/687-R2	Package Building 1000 KVA	Standard	4.0×3.8×3.0	1	2.9	2.5	1 ExF
18	A/BA/741-R1	Package Building 1500 KVA	Standard	4.6×3.8×3.3	1	3.55	2.5	2 ExF
19	A/BA/656-R1	L.V. Switch room	Standard	Size: 2.2×2.3×3.0 (min) Size is determined by the size of Meter Board of the Building and the number of meters and ACB				

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

2.5 EWA Readiness to Supply

This section reviews the general criteria of EWA readiness to supply the approved load and will be stated in the “Power Conditions Form”, as applicable. The standard time associated with readiness is indicated in this Code.

2.5.1 List of Readiness Criteria

1. Supply depends on the network readiness at the time of the Application for Supply.
2. The Applicant should check with EWA, EDD, the status of the Network/ Distribution S/S / Primary S/S before applying for electricity supply.
3. Electricity Supply shall be available only after a New Primary S/S is constructed and energized within the Development.
4. Electricity Supply shall be available only after a New Primary S/S is constructed and energized in the nearby area.
5. Electricity Supply shall be available only after a New Distribution Substation, reserved to the related area, is constructed and energized.
6. Electricity Supply shall be available only after Reinforcement / Rearrangement of nearby 11 kV/ LV Network is completed.
7. Electricity Supply shall be available only after Uprating / Revitalization of related Distribution Substation is completed.
8. Electricity Supply shall be available only, after a Substation Plot is granted for EWA and a Substation, reserved to the related area, is constructed and energized.
9. Extension of network depends on grading / demarcation of approved service corridor.
10. Electricity Supply depends on the road condition/ readiness in the area.
11. Applicants for lands allocated through a Court Order, should approach EDD through an application of pre-consultation, in order to verify availability of electricity supply, before applying for Building Permit

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2.5.2 Average Durations for Readiness to Supply

Readiness of supply is associated with the readiness of the substations and networks as well as the readiness of the Building itself.

1. Readiness of the Substation constructed by EWA:

This period are defined by the following:

- The period required to possess a site to build the substation with the necessary permits. This period varies per areas and availability of locations for the substations.
- Construction of a Primary S/S building takes an average of 18 months.
- Construction of a Distribution S/S building takes an average of 6 months.
- Installing of electrical equipment inside the substation and connecting them to the network take an average of three weeks.
- Inspection and commissioning of the substation take an average of one week.

2. Readiness of EWA's Underground Network :

This period are defined by the following:

- Time period to get the permits for excavation work and it varies by the cable route(s).
- Time period for excavation the corridors of the underground network and laying the cables depends on the length of the network.
- Inspect and commissioning the network takes an average of about a week.

6. Attachments

- Form: Undertaking letter by the Applicant to Guarantee the Safety of EWA services.
- Form: Declaration for Substation.
- Meter board Specification.
- The Standard Drawings of Substation Buildings.

Appendix 1

Applicant Consent Form …

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

EWA
هيئة الكهرباء والماء
Electricity & Water Authority
Kingdom of Bahrain

إدارة الأمن الصناعي والسلامة
INDUSTRIAL SECURITY & SAFETY DIRECTORATE

UNDERTAKING **تعهد**

Building Permit No: رقم ترخيص البناء:

I, the undersigned, hereby undertake to guarantee the safety of Electricity & Water services in the area where I have been permitted to carry out the works as per the above building permit and I acknowledge I responsible for any damage that occurs to these services during the period of executing the mentioned work and if damage occurs, I undertake to bear the repair cost to the Electricity and Water Authority (EWA), and will indemnify EWA their contractors, agents and employees for any such damage and repair cost.

أنا الموقع أدناه أتعهد بسلامة شبكة هيئة الكهرباء والماء بالمنطقة المصرح لي بتنفيذ العمل فيها بموجب ترخيص البناء اعلاه، وانا اتحمل كافة المسؤولية عن اي تلف أو ضرر قد يلحق بشبكة هيئة الكهرباء والماء. كما اتعهد بدفع تكاليف اصلاح أي ضرر يحدث اثناء العمل لشبكة هيئة الكهرباء والماء.

Owner Name:_____ _____: اسم صاحب الطلب

Owner CPR:_____ _____: الرقم الشخصي

Signature:_____ _____: التوقيع

Date:_____ _____: التاريخ

Electricity Account:_____ _____: رقم حساب الكهرباء

Address : _____ _____: عنوان المراسلة

E-mail:_____ _____: البريد الإكتروني

www.mew.gov.bh

P.O. Box: 2, Tel.: (+973) 17998778, Fax : (+973) 17554950

ص.ب: ٢ – هاتف: ١٧٩٩٨٧٧٨ (٩٧٣+) – فاكس: ١٧٥٥٤٩٥٠ (٩٧٣+)

Appendix 2

Applicant's Consent Form …

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

To: Director, EDD — إلى: مدير إدارة توزيع الكهرباء

Subject: Declaration for Substation – الموضوع: تعهد خاص بمحطة كهرباء

رقم رخصة بناء Building Permit No.	رقم شروط الكهرباء Power Conditions No.

عنوان المبنى/ المشروع Building Address				
مبنى - Building	رقم العقار - Plot	طريق - Road	مجمع - Block	منطقة - Area

As per the process of getting EWA Power Conditions and Connection of Electricity Supply, I, the undersigned applicant, pledge the following:	ضمن إجراءات الحصول على شروط الكهرباء المذكورة أعلاه وبغرض توصيل الكهرباء للمبنى، أنا صاحب الطلب الموقع أدناه، أتعهد بالتالي:
1- To provide a plot for S/S, 2- To build Electrical S/S building, as per the standard conditions of the EWA "Electrical Guide",	1- توفير موقع 2- بناء محطة كهرباء بحسب الشروط القياسية الواردة في "**الدليل الكهربائي للمكاتب الهندسية والمقاولين**"
and the Standard Drawing No:	والرسومات القياسية رقم:
and number of Substation(s):	عدد المواقع / المحطات:
3- not impeding the entry of EWA employees and assigned contractors, to the station	3- عدم إعاقة دخول موظفي الهيئة والمقاولين المتعاقدين معها للمحطة
4- Not to use the station building for unauthorized purposes	4- عدم استخدام مبنى المحطة لأغراض أخرى غير مرخص بها
5- Not to tamper the station building or its surrounding area.	5- عدم العبث بمبنى المحطة أو إساءة استخدام المساحات البينية المحيطة بها
6- Not to object on EWA operations in the substation, including connecting of other customers.	6- عدم الاعتراض على قيام الهيئة بتشغيل المحطة وتوصيل مشتركين آخرين بالكهرباء.

Owner Name:	**اسم صاحب الطلب (المالك):**
Owner CPR:	**الرقم الشخصي:**
Signature (as on the CPR):	**التوقيع: (مطابق للبطاقة السكانية)**
Date:	**تاريخ:**

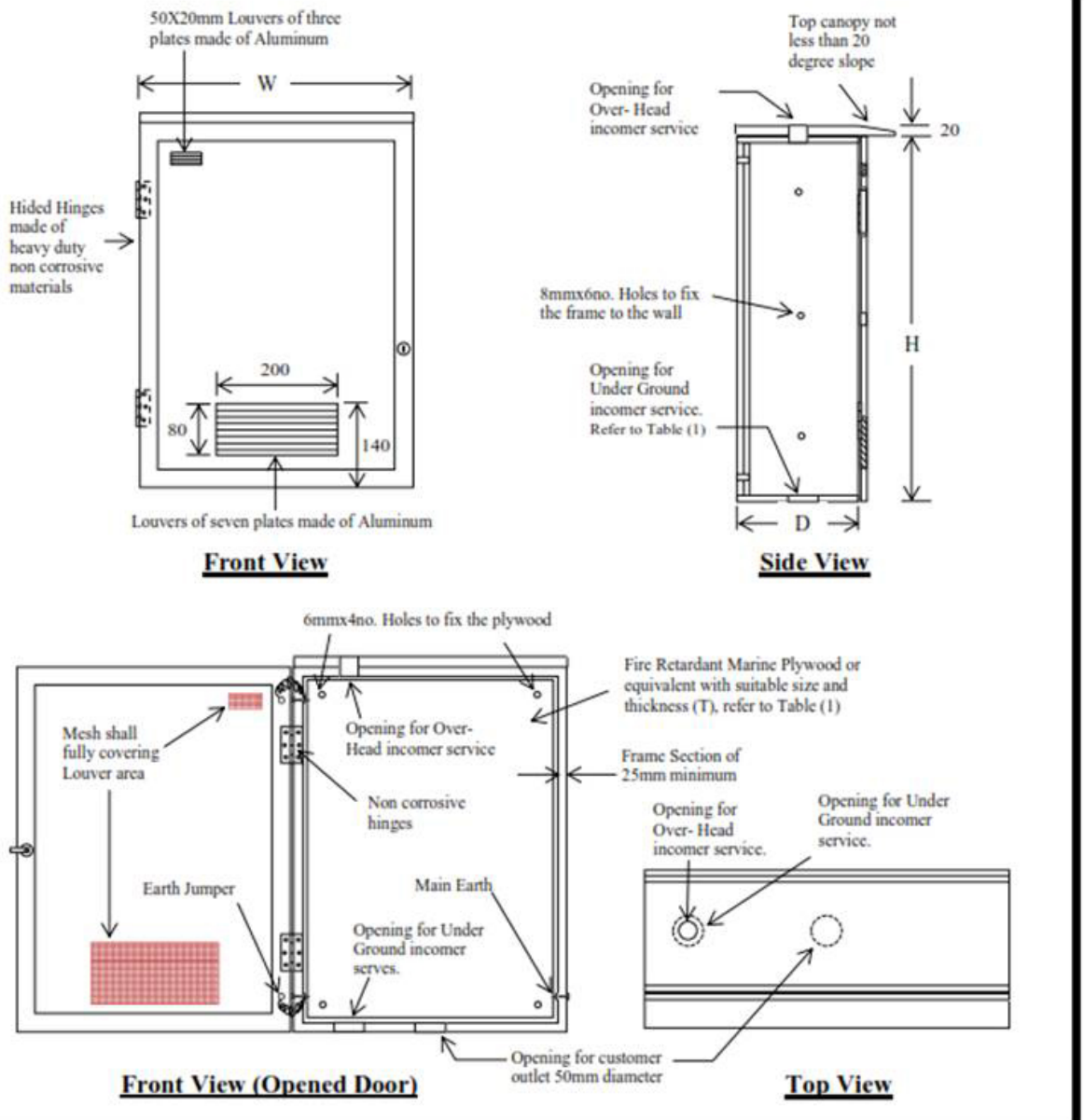
Appendix 3

Standard Form of Meter board

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate

KINGDOM OF BAHRAIN ELECTRICITY & WATER AUTHORITY ELECTRICITY DISTRIBUTION DIRECTORATE PLANNING AND MATERIALS SECTION	DESCRIPTION NO.: S-4246 B	PAGE 7 OF 7

KINGDOM OF BAHRAIN
ELECTRICITY AND WATER AUTHORITY
ELECTRICITY DISTRIBUTION DIRECTORATE

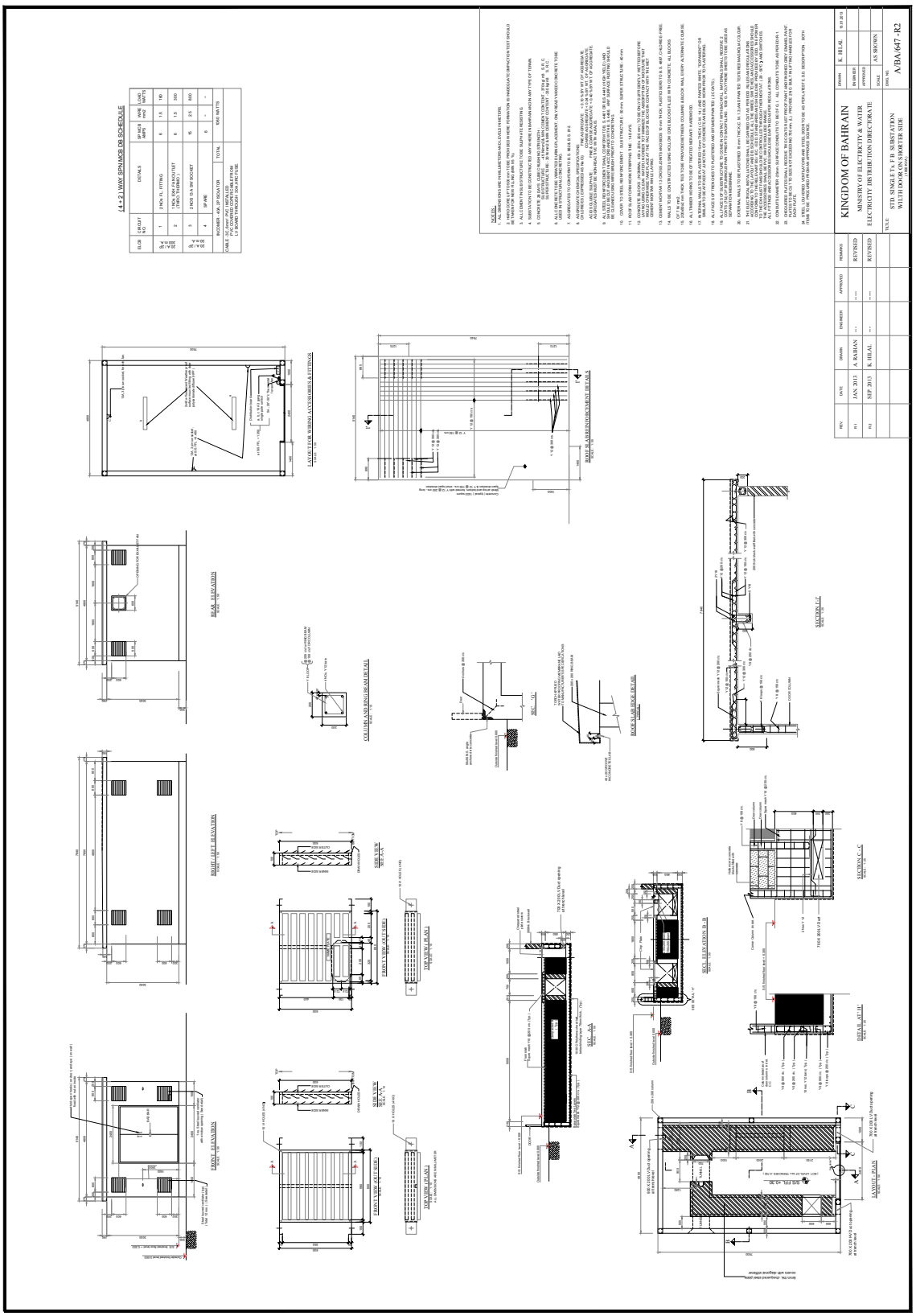


TITLE:	DOMSTIC METER CABINET

Appendix 4

Standard Form of Meter board

The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate



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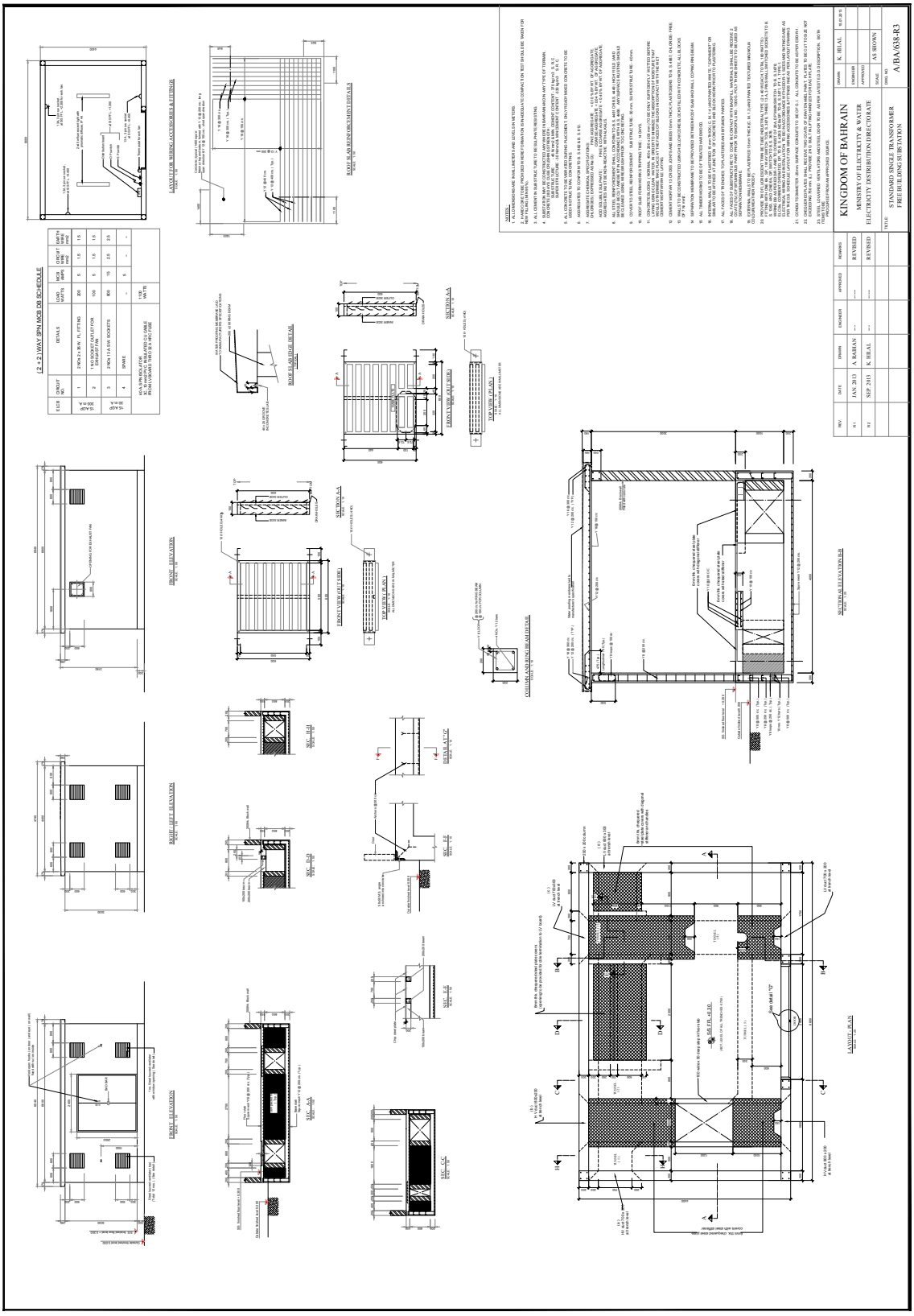
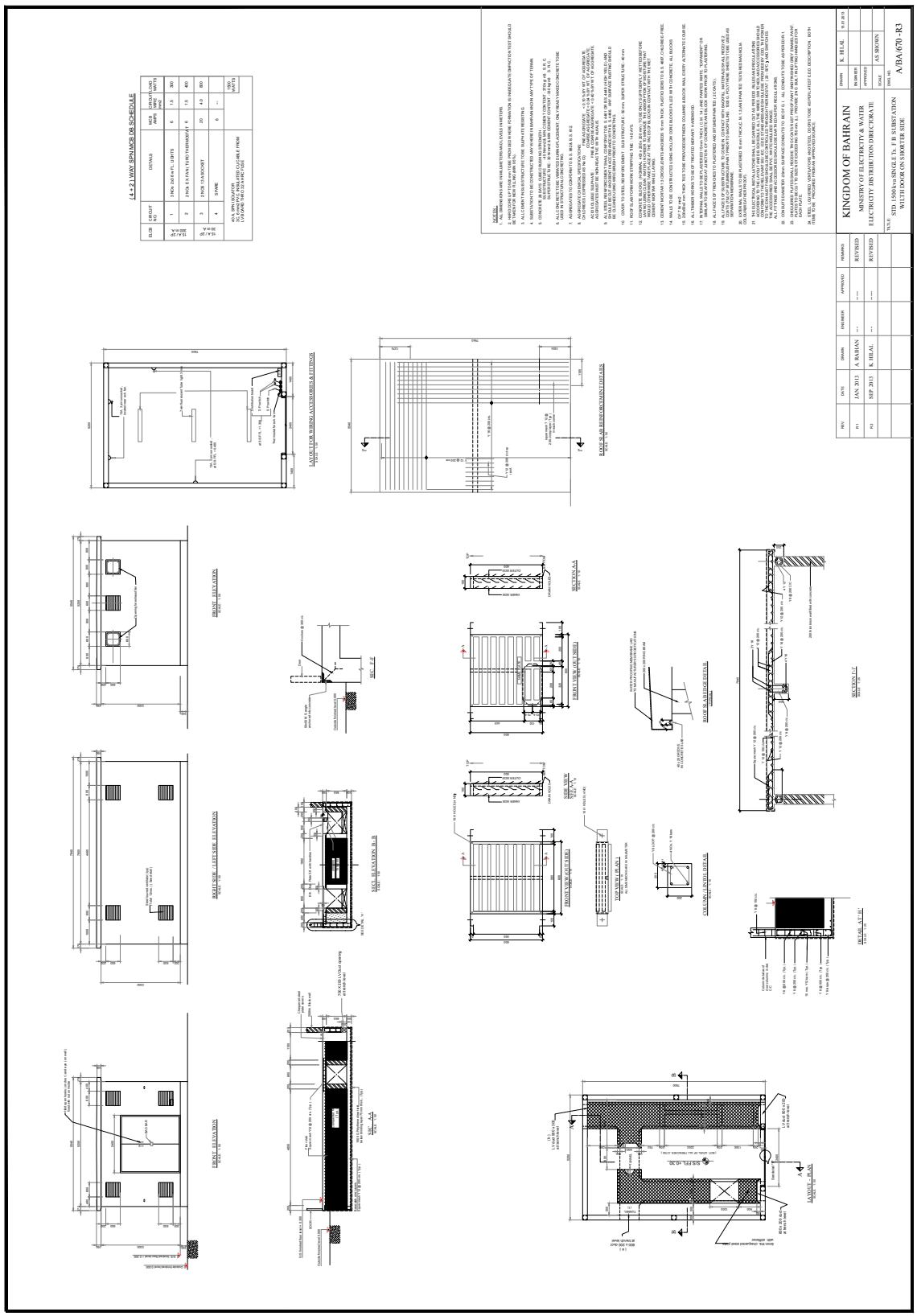


The requirements Electricity and Water Authority - Electricity Distribution Directorate Industrial Security and safety Directorate



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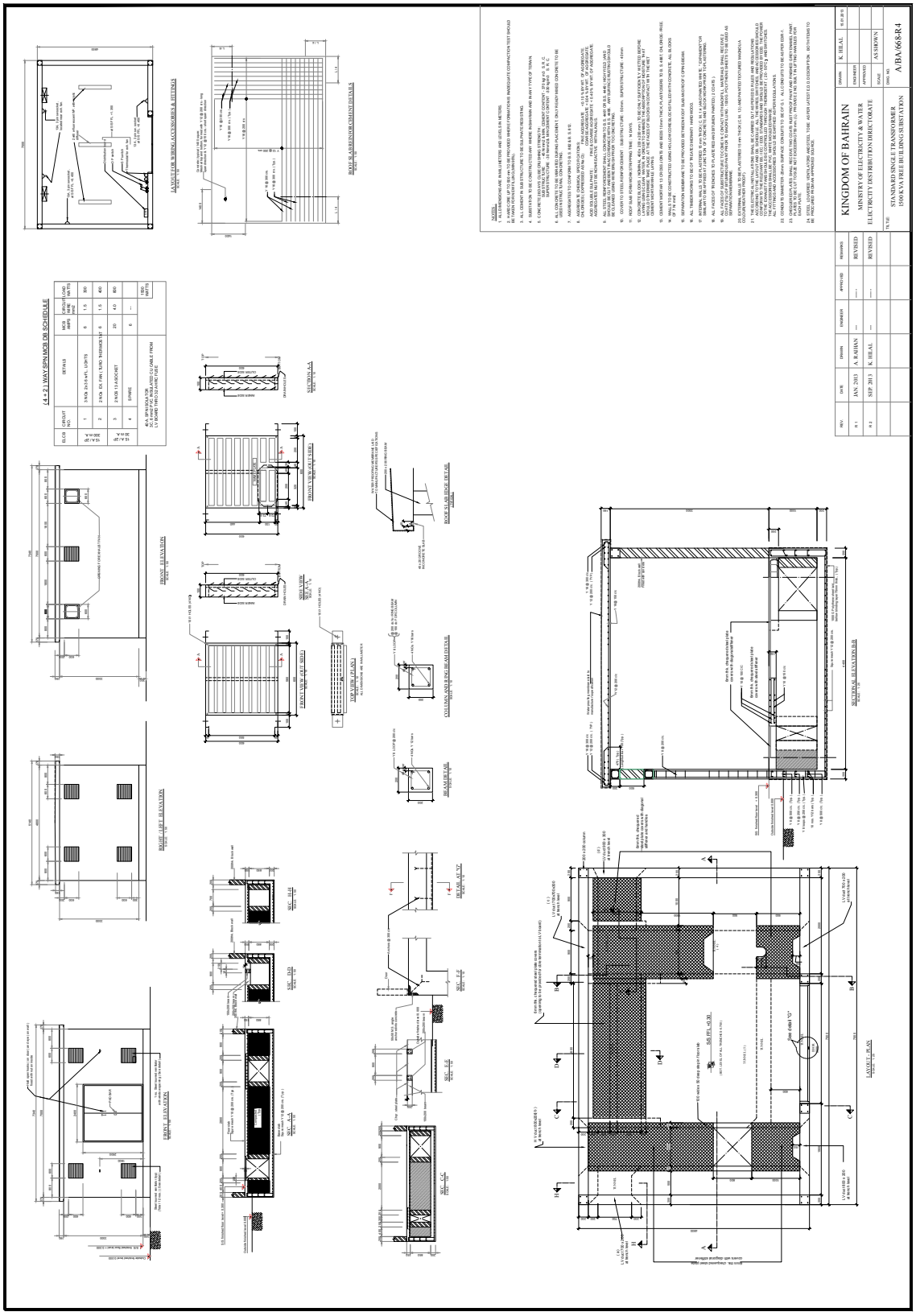

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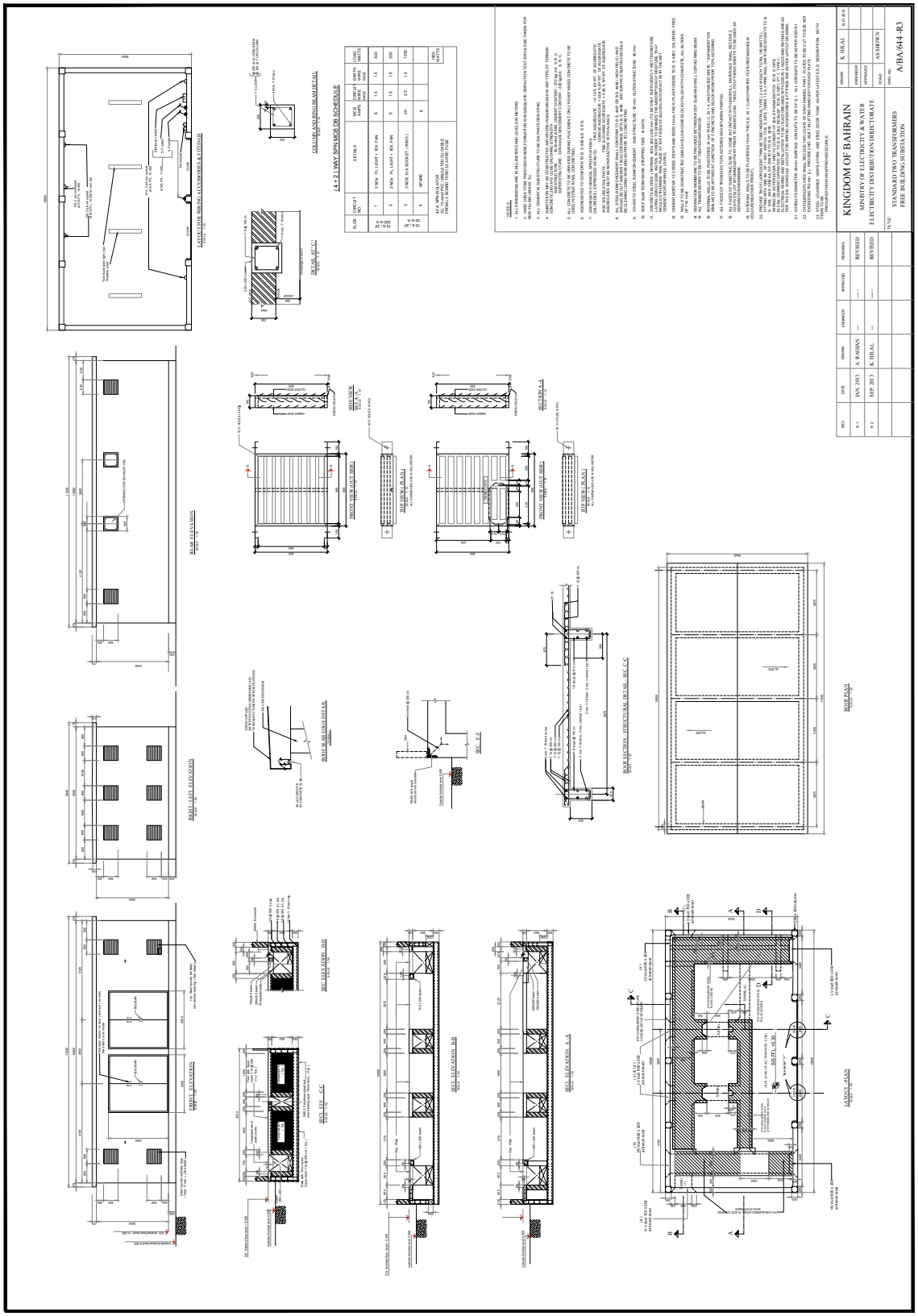

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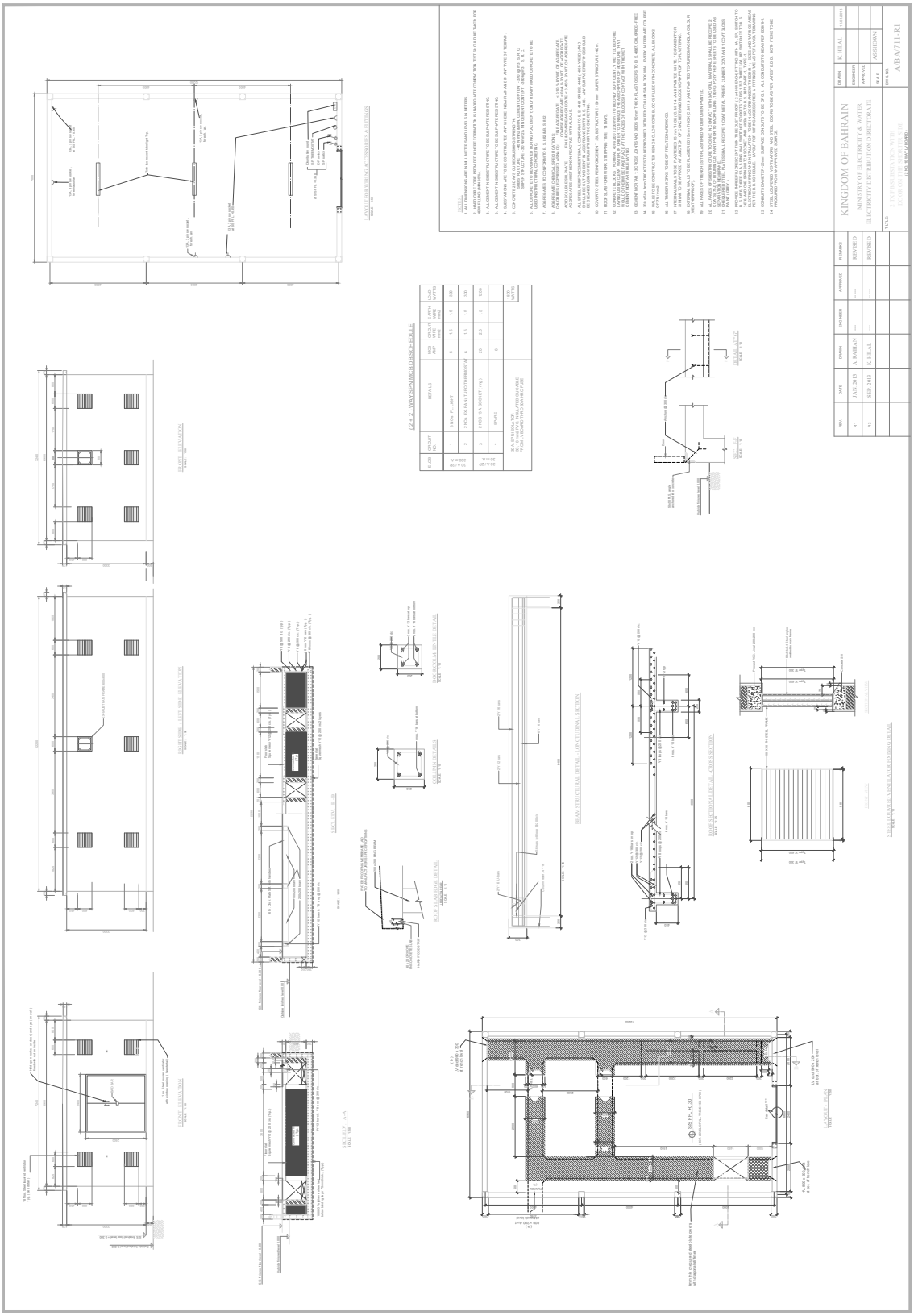

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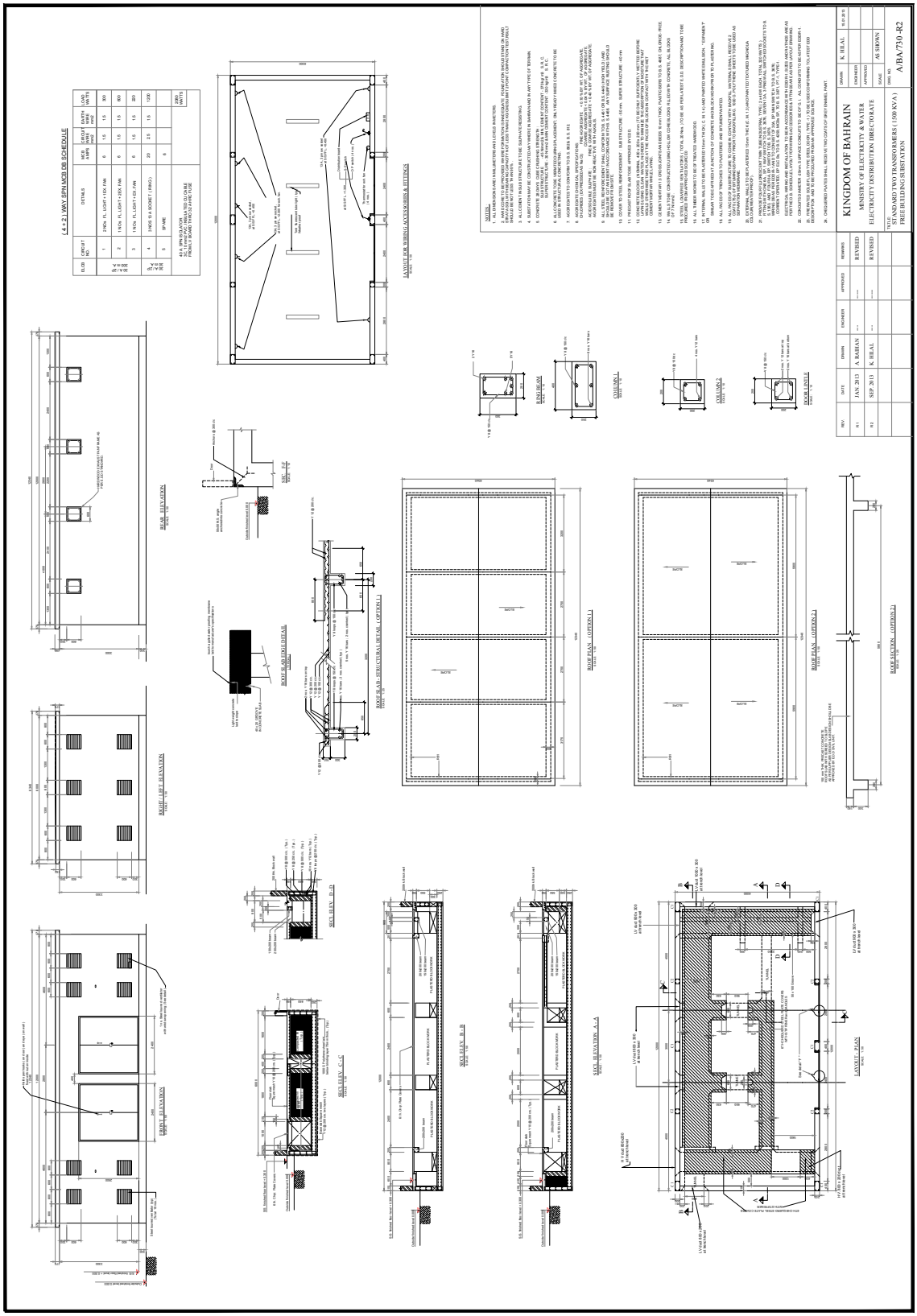

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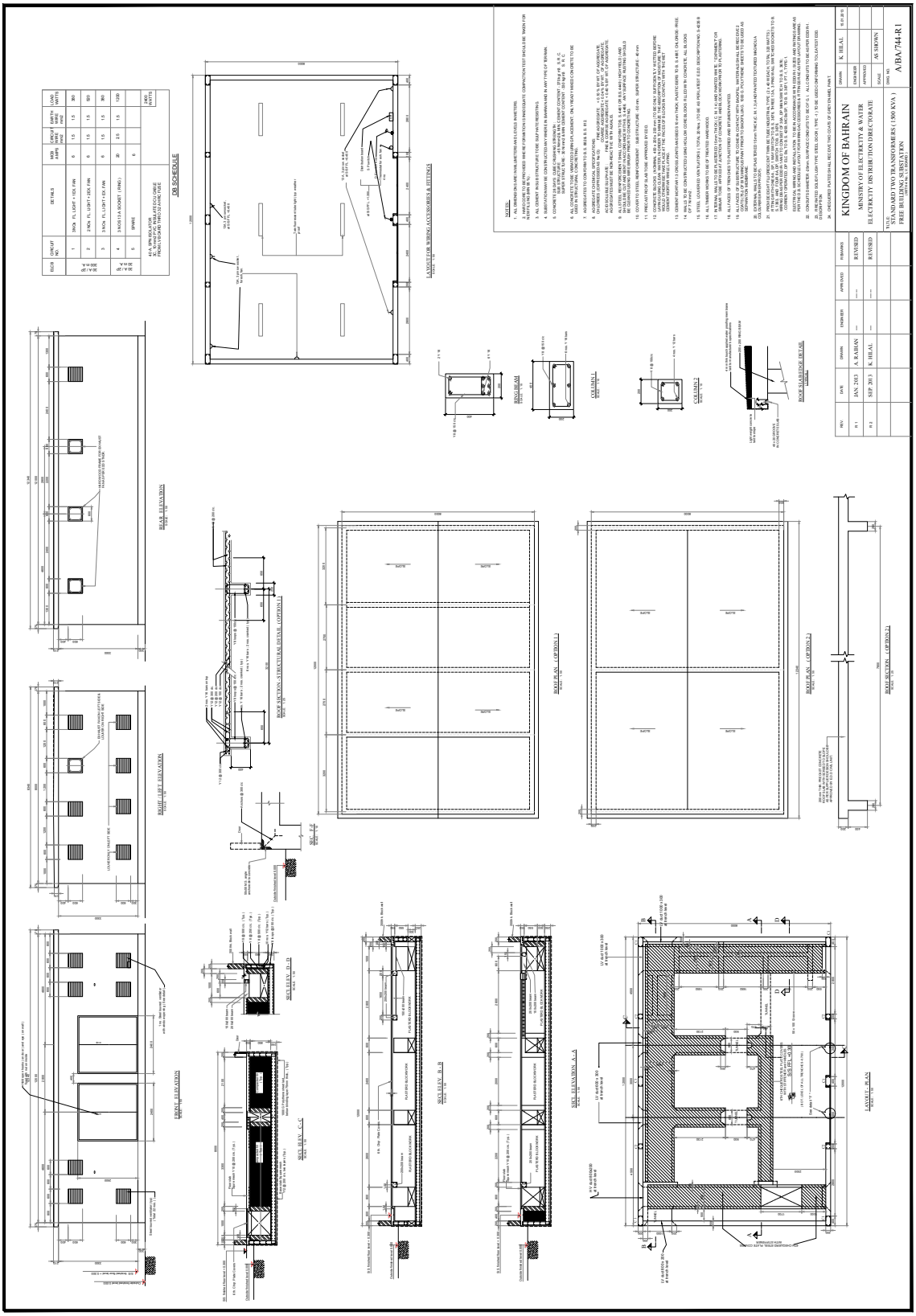

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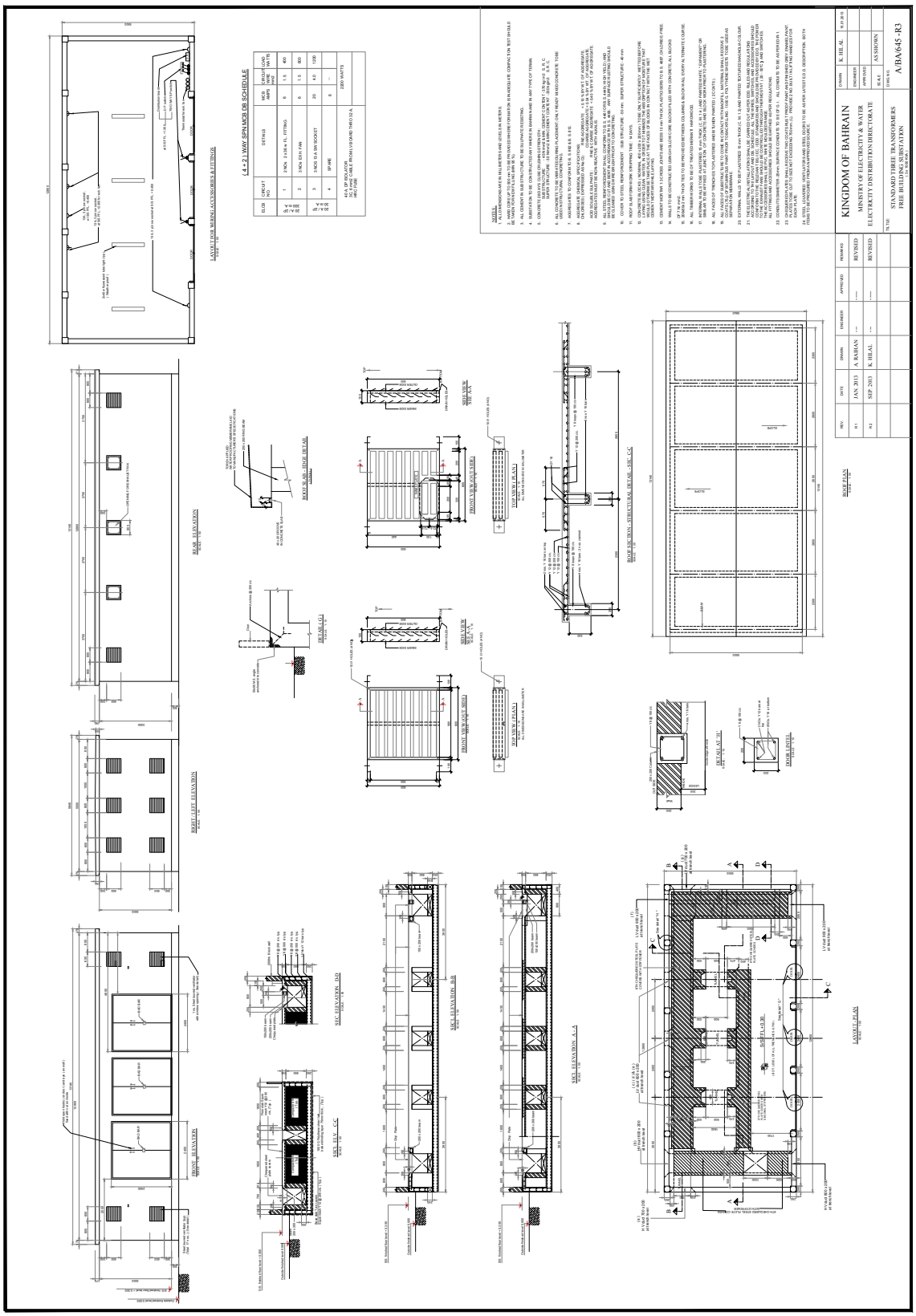

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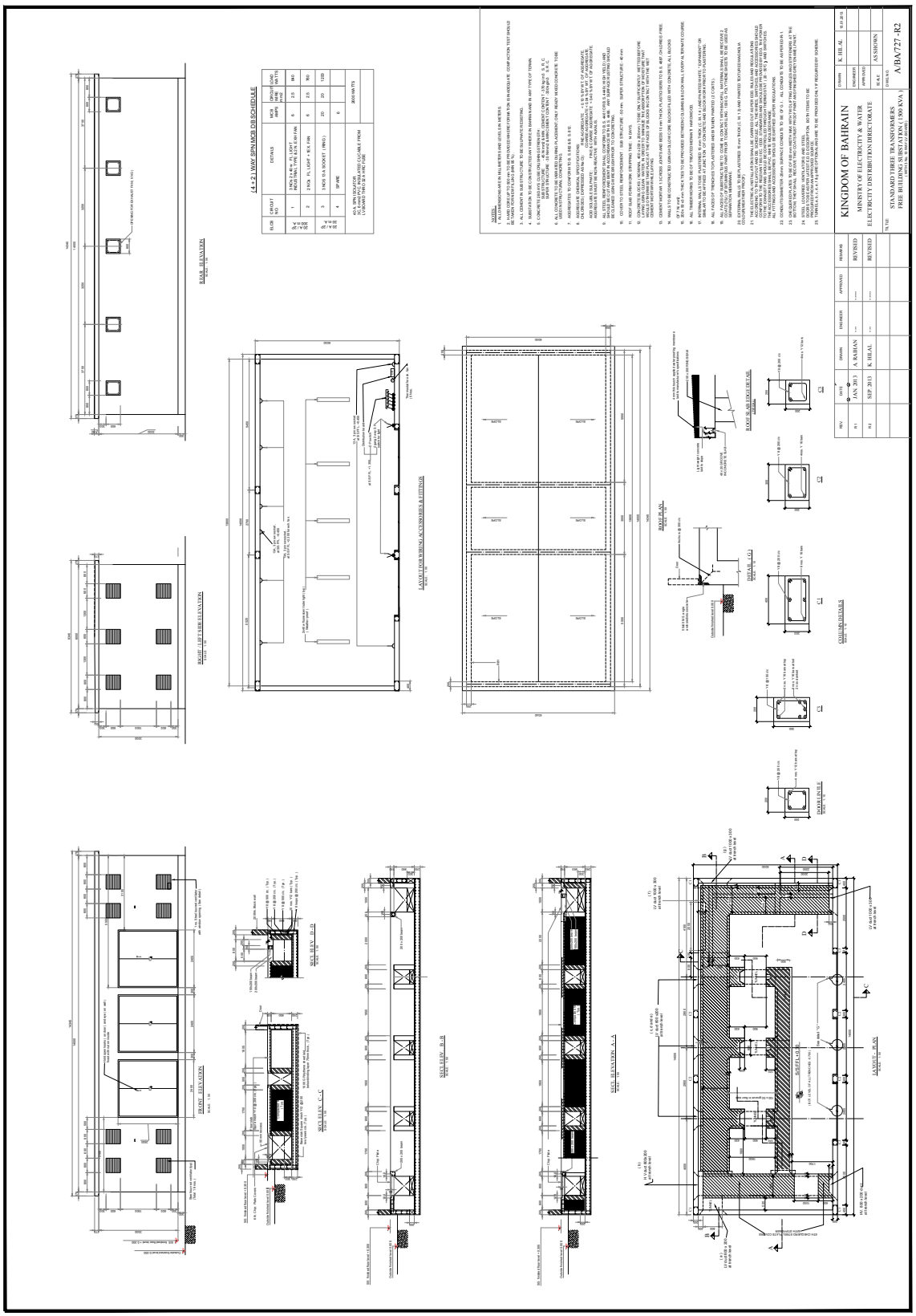

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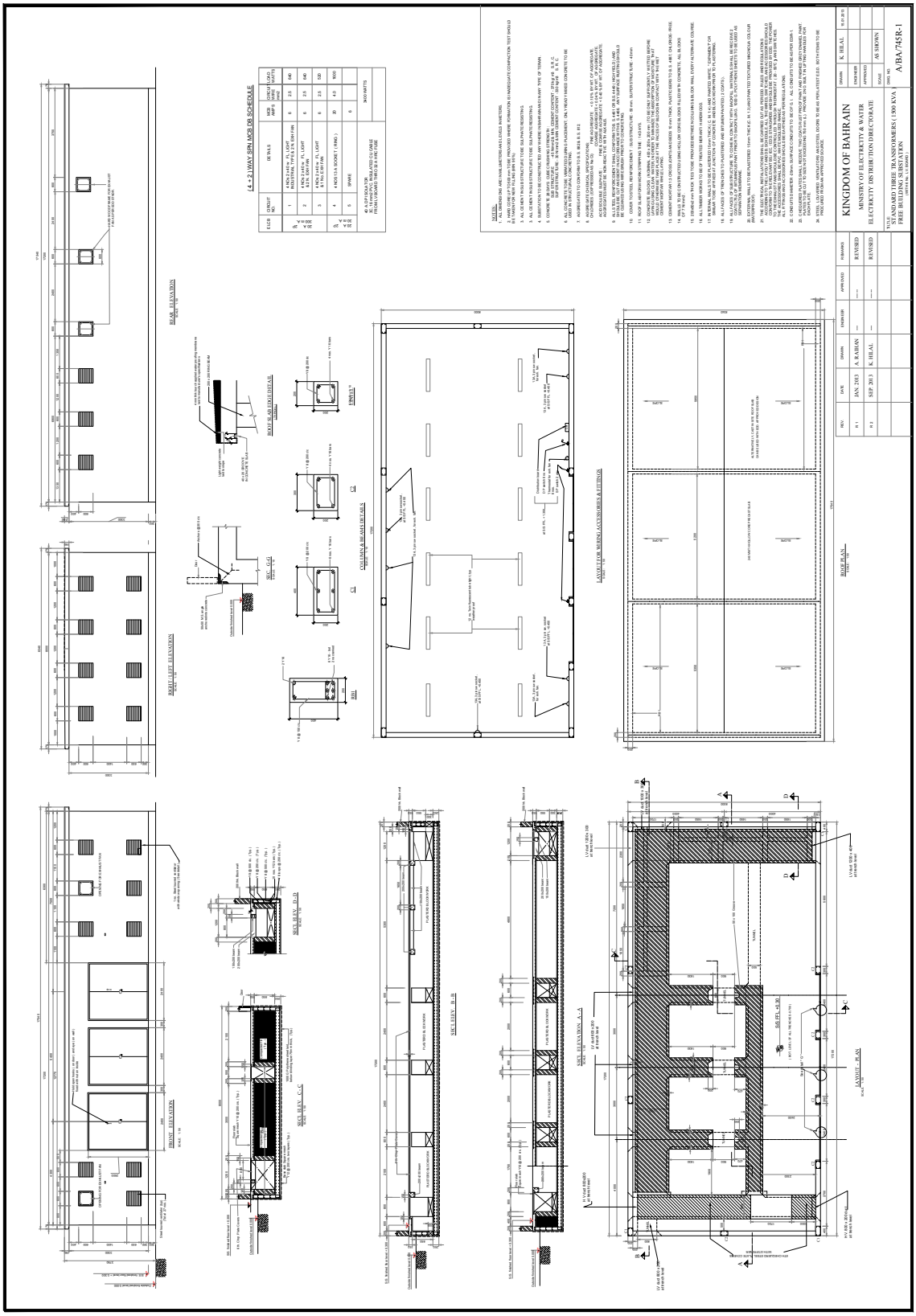

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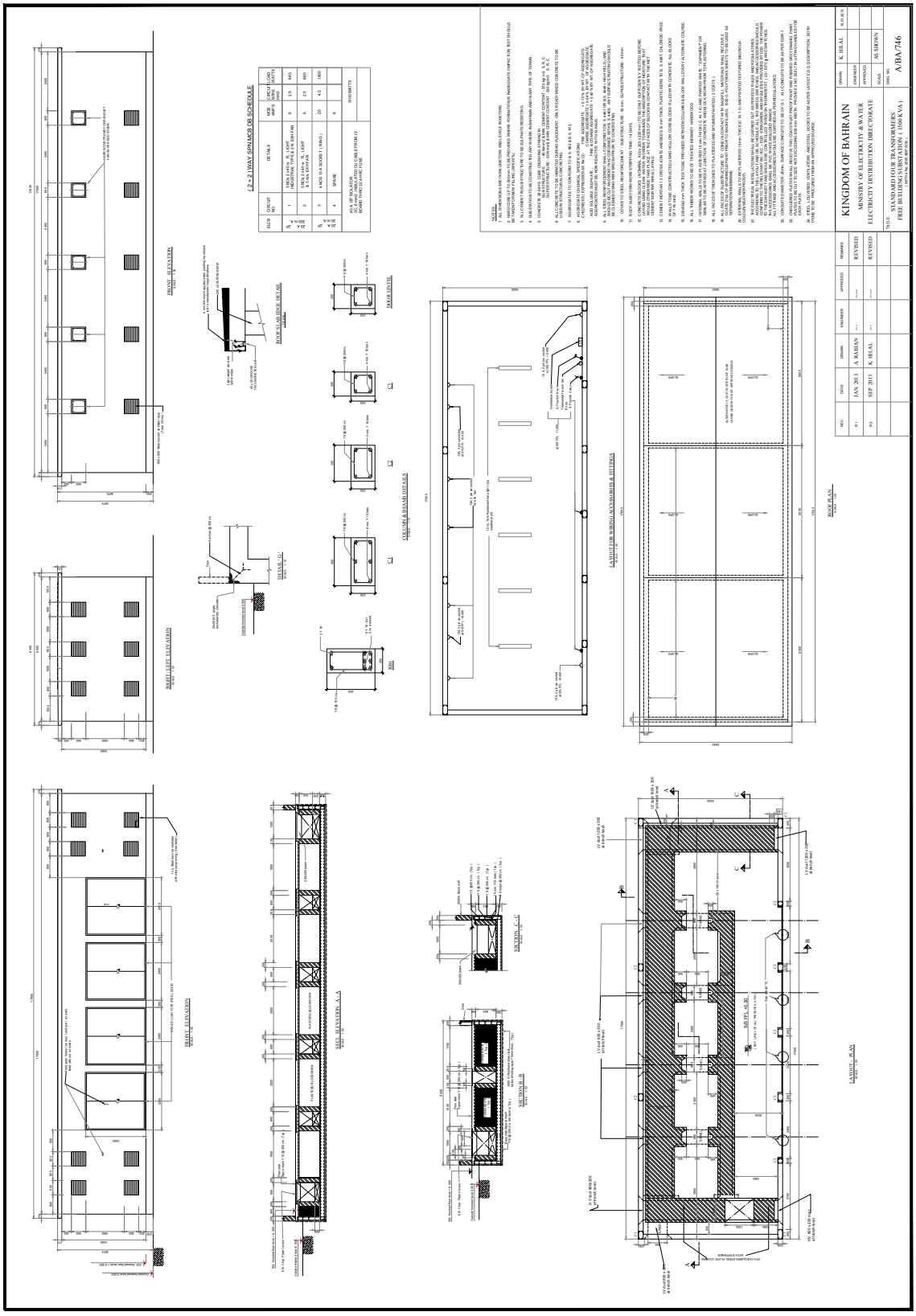

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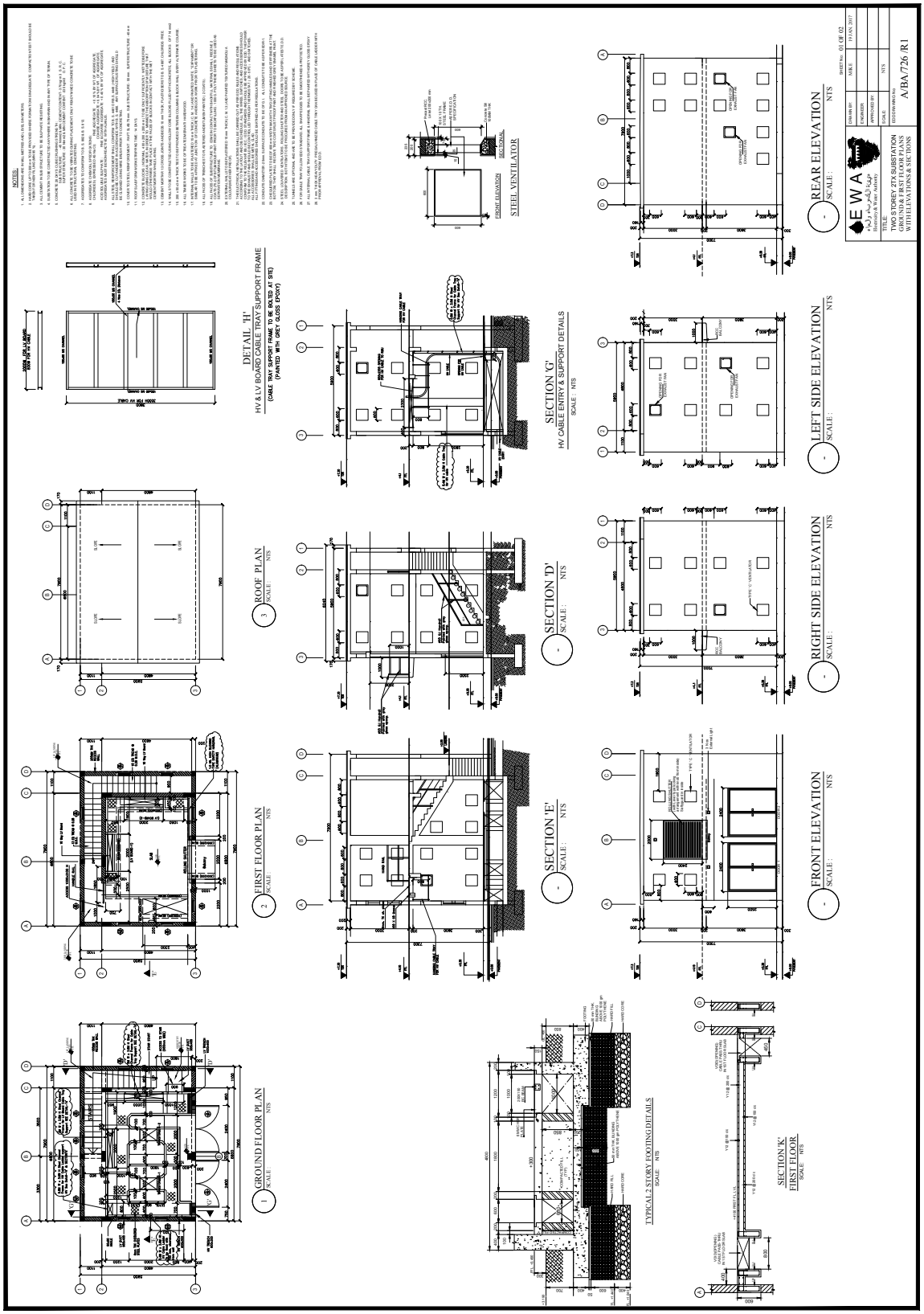

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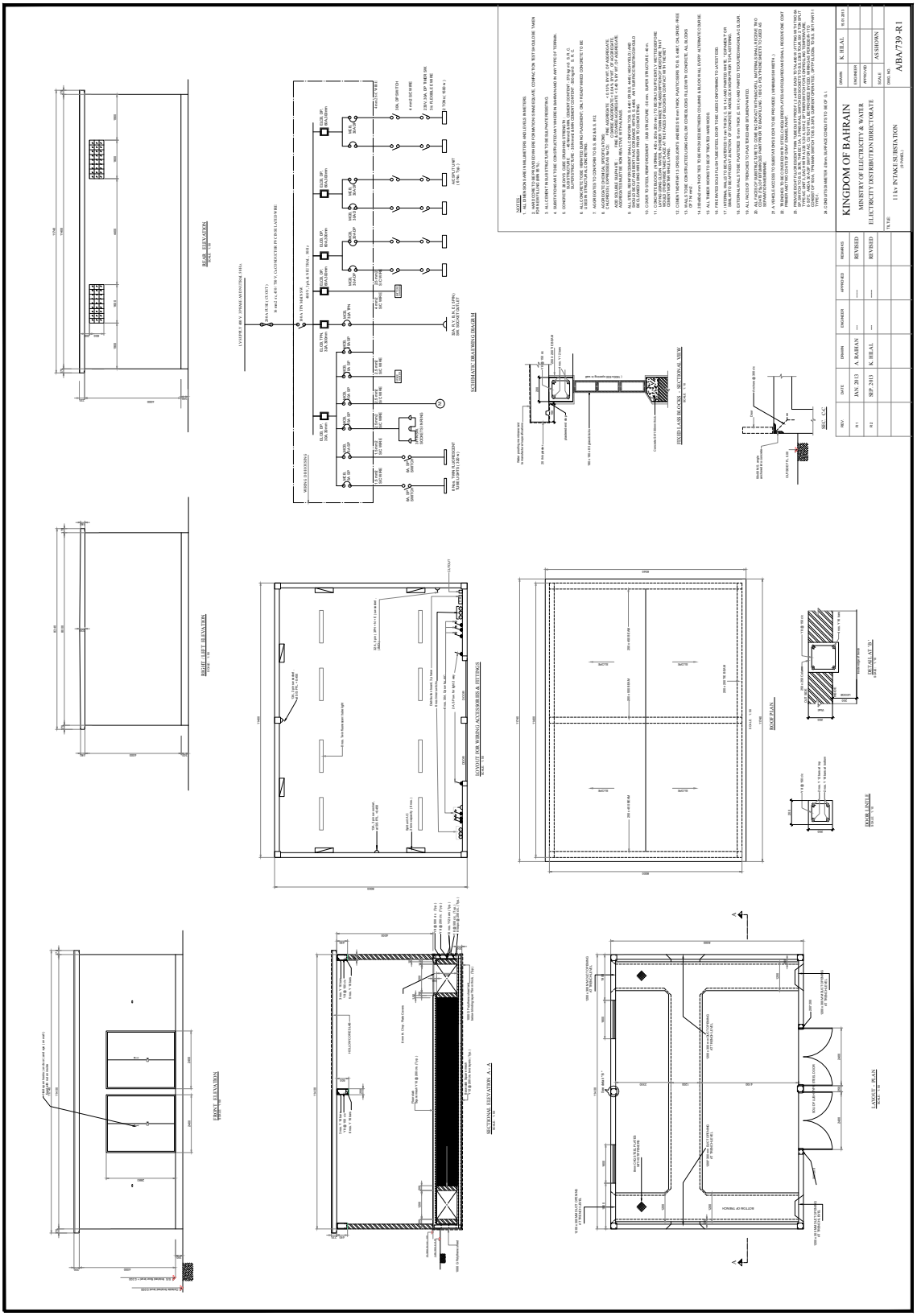

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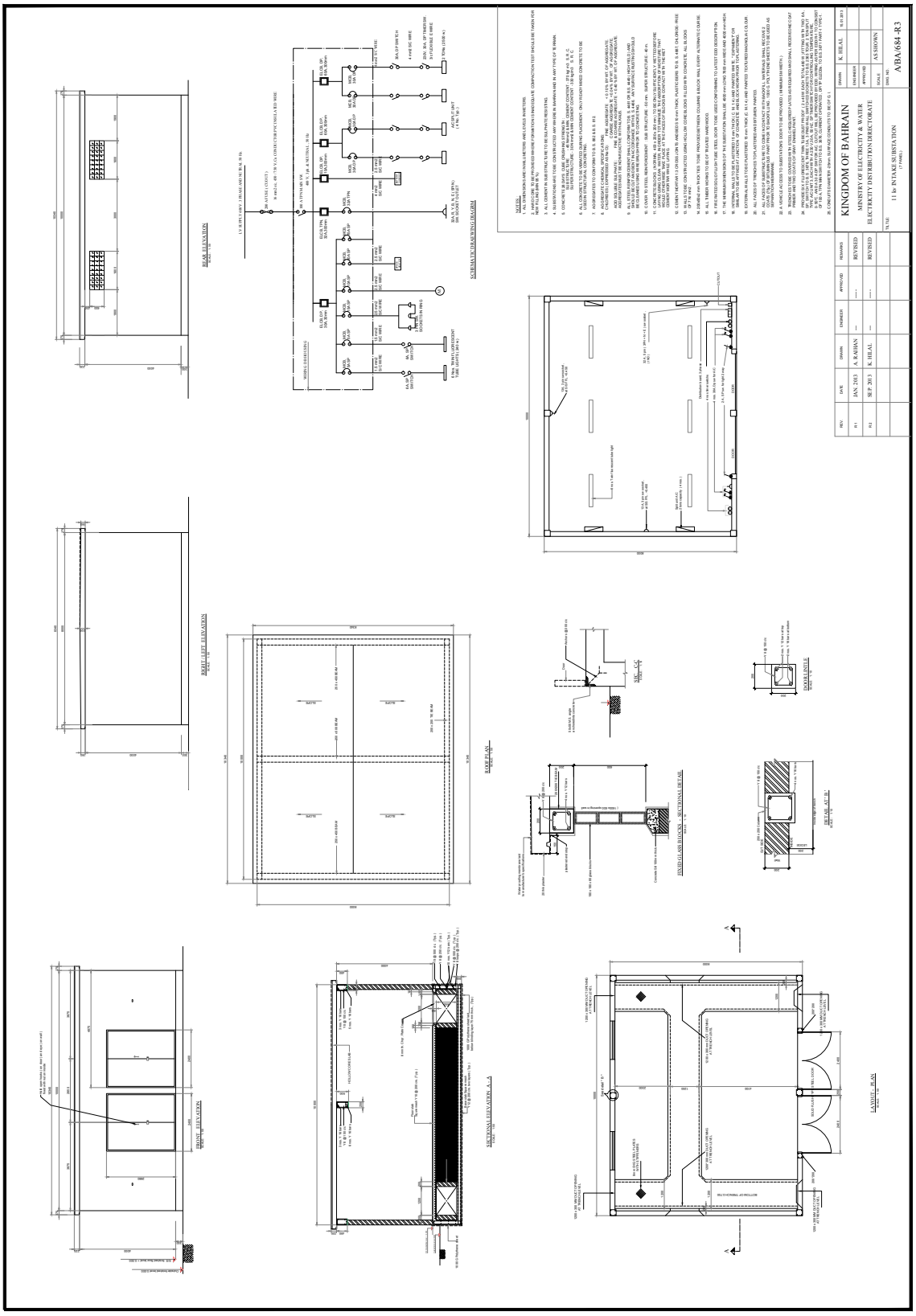

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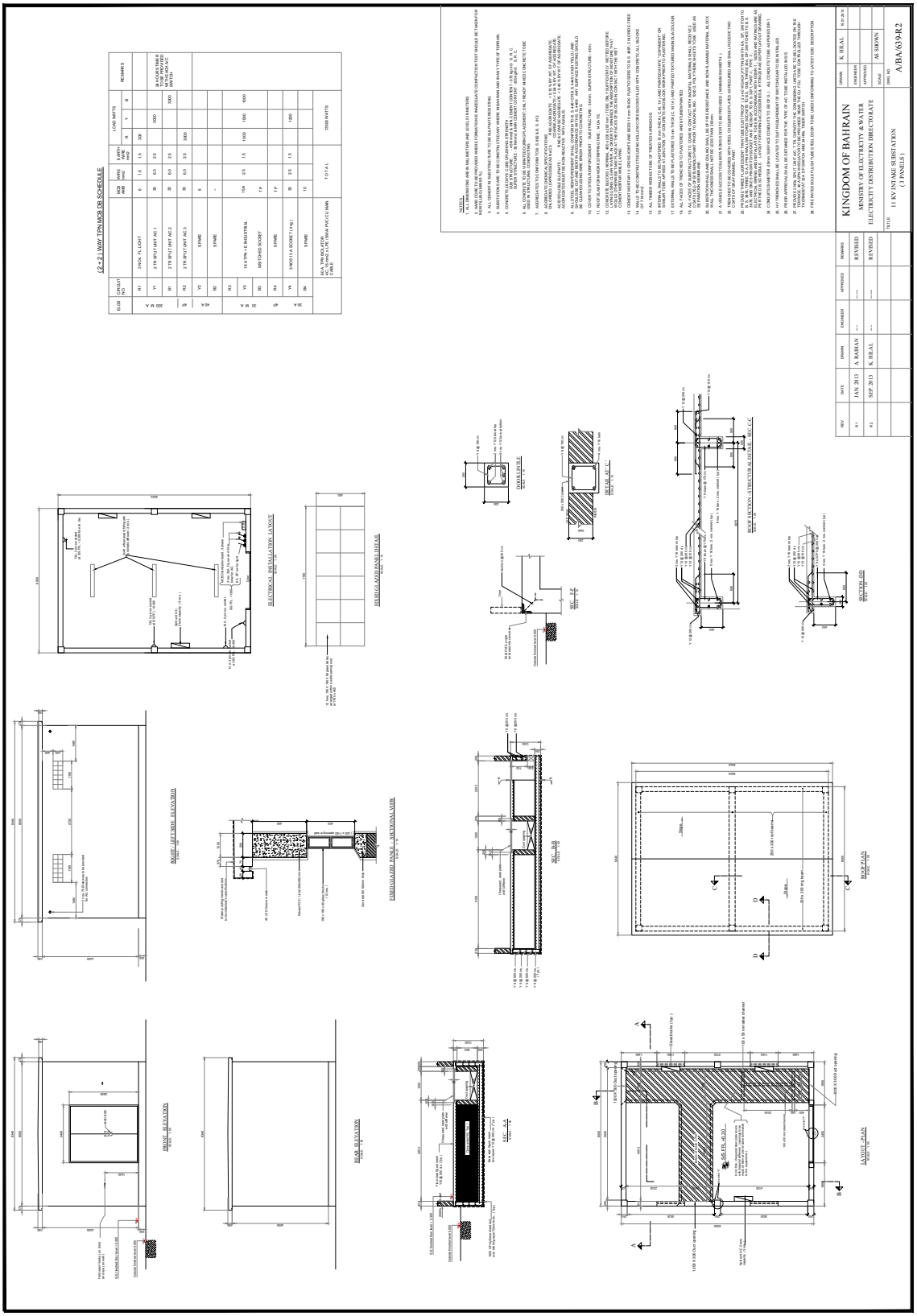

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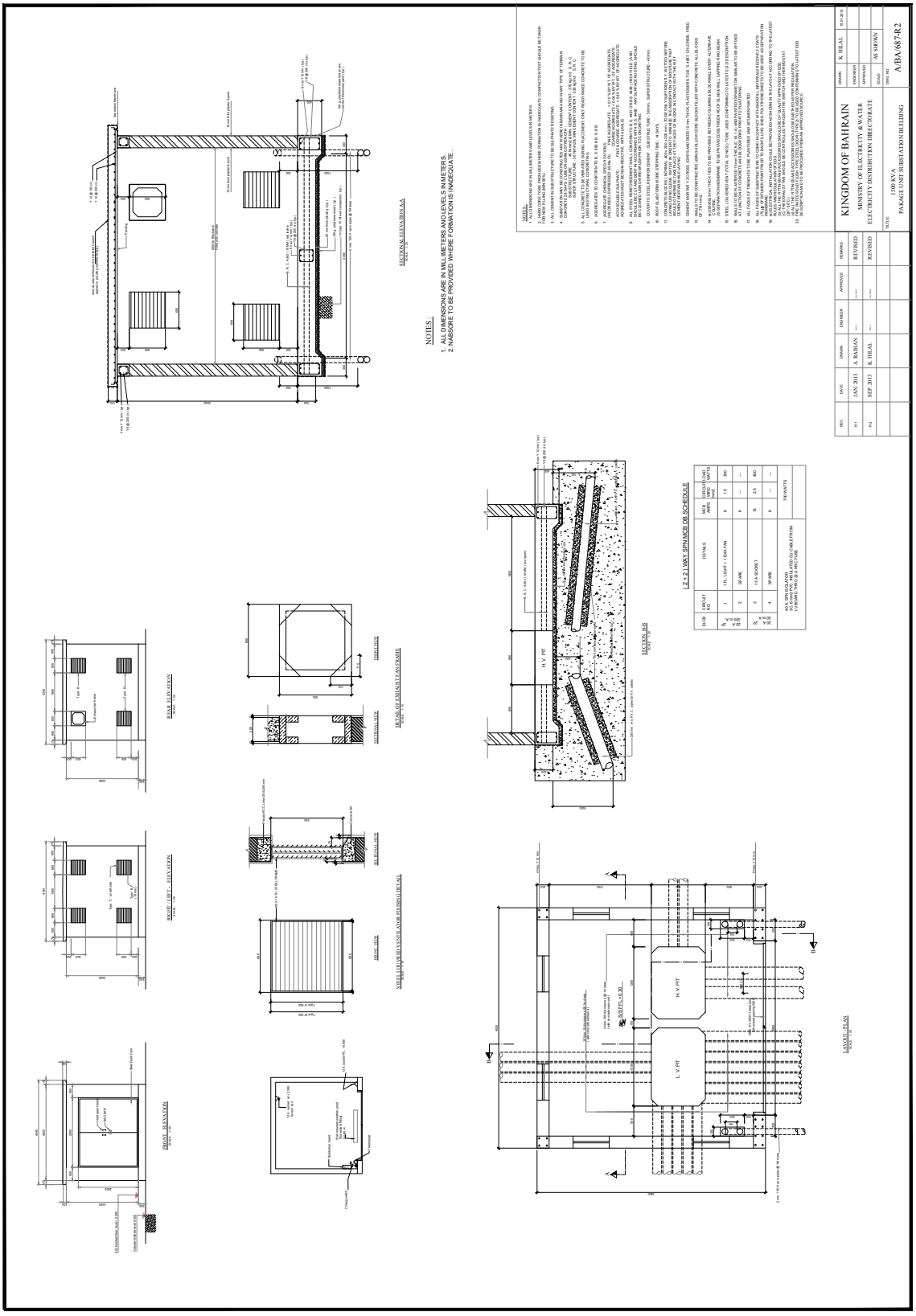

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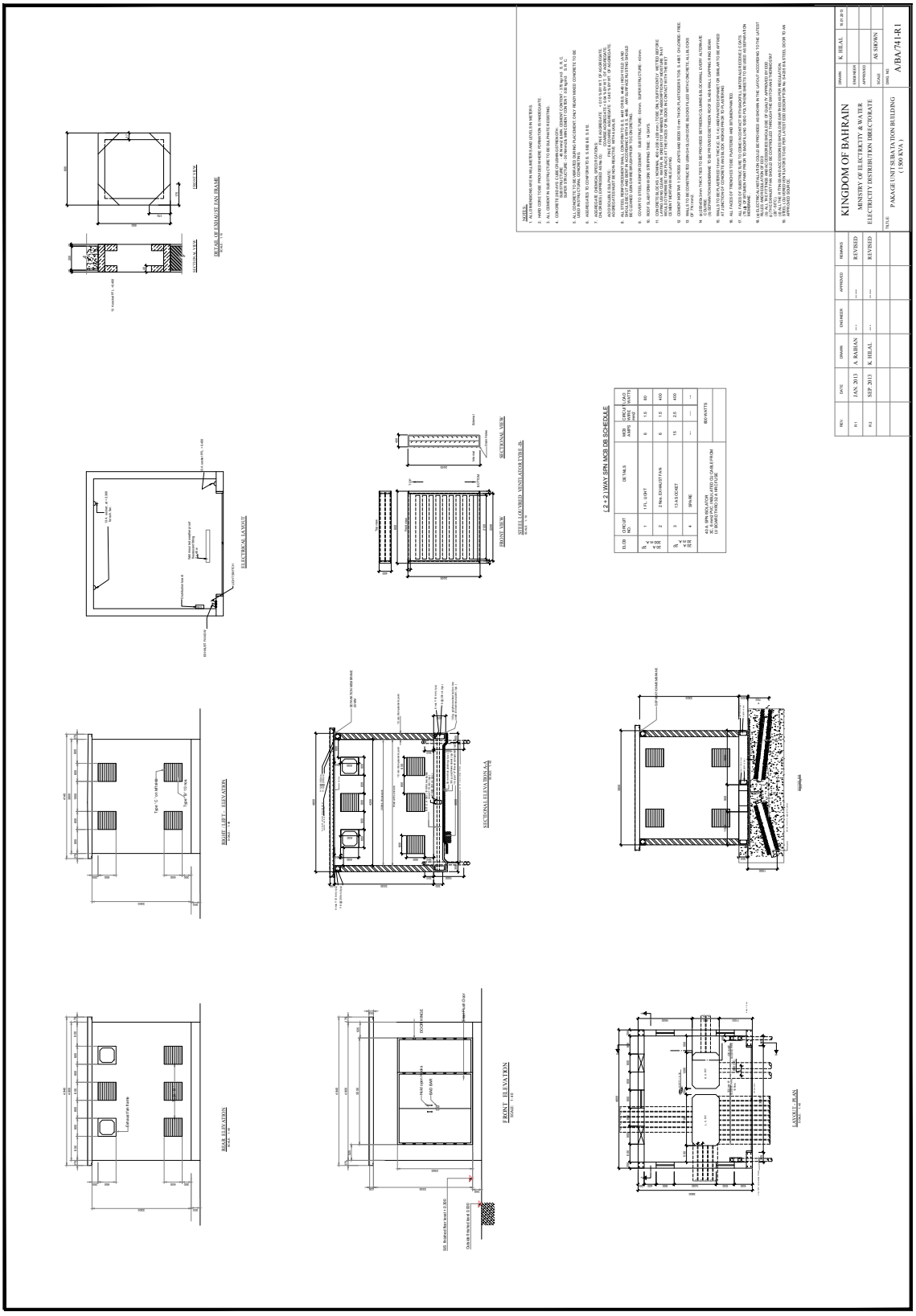

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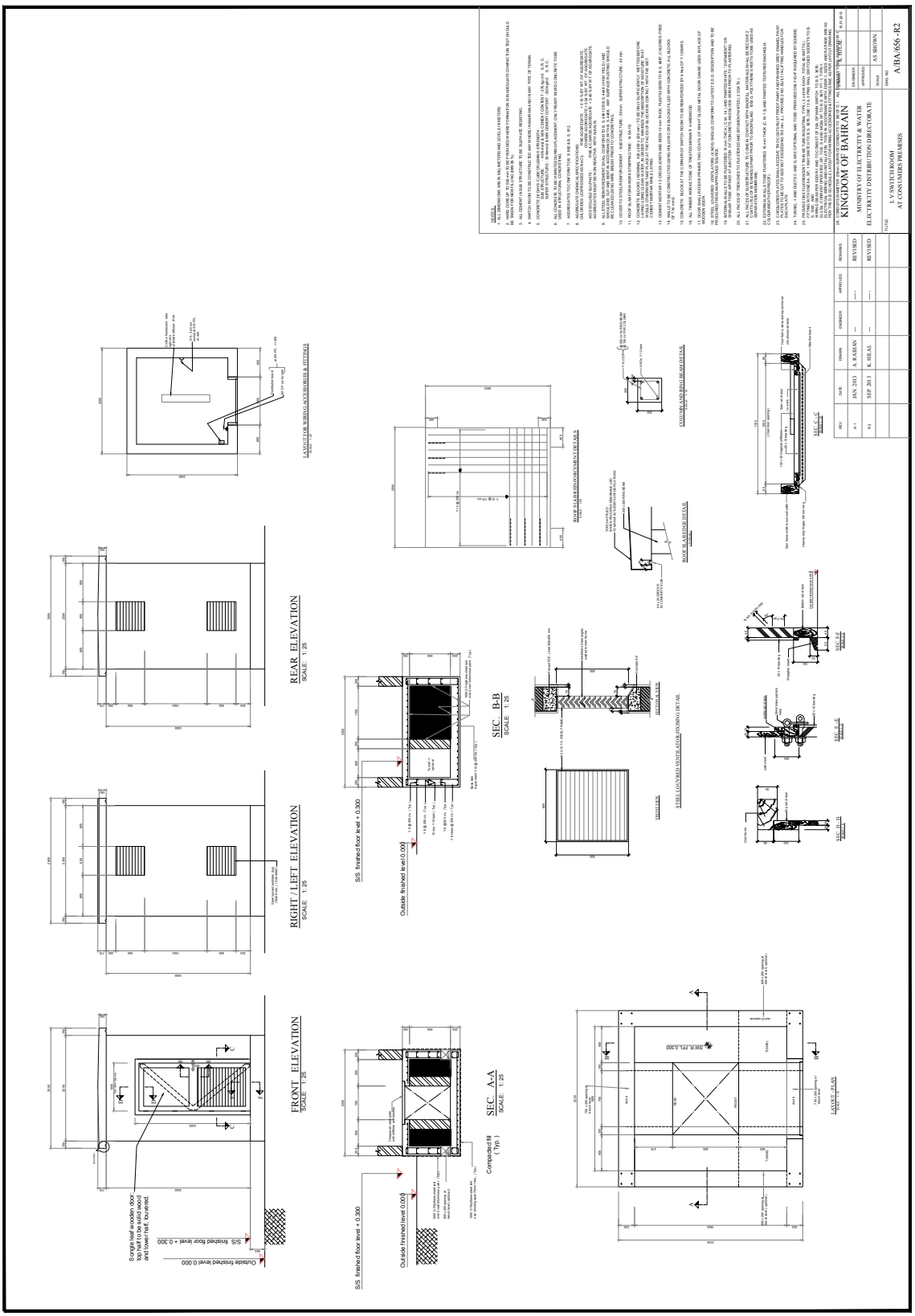


Chapter 6

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

Table of Contents

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

1. Definitions

In application of this system provisions, the following words and shall have the meanings ascribed thereto hereunder unless the context indicates otherwise.

Backflow: flow in a direction contrary to the intended normal direction of flow.

Backstphonage: backflow caused by the siphonage of liquid from a cistern or appliance into the pipe feeding it.

Boiler: the enclosed vessel in which water is heated by the direct application of heat.

Cistern: fixed container for holding water atmospheric pressure.

Combined feed and expansion cistern: a cistern for supplying water to a hot water system and which is also the cistern for discharge of vented hot water from that hot water system.

Connection pipe: the part of a service pipe which is vested in the WDD;

Cylinder: A cylindrical closed vessel capable of containing water under pressure greater than atmospheric pressure.

Domestic: relates to any supply or installation into mainly residential premises.

Distribution Pipe: any pipe (other than an overflow pipe or a flush pipe)conveying water from a storage cistern, or from a hot water apparatus supplied from a feed cistern, and under pressure from that cistern.

Discharge Pipe: any pipe conveying water from a cistern or pressure vessel to the point of use.

Dwelling: any property occupied for residential use..

Expansion Cistern: a cistern connected to a water heating system which accommodates the increase in volume of water in that system when it is heated from cold.

Feed Cistern: any storage cistern used for supplying cold water to a hot water apparatus, cylinder or tank.

Float Operated Valve: a valve, for controlling the flow of water into a cistern the valve being operated by the vertical movement of a float riding on the surface of the water.

Flushing Cistern: cistern provided with a device for discharging the stored water rapidly into a water closet pan or urinal.

Flush Pipe: a pipe for conveying water from a flushing cistern to a water closet pan or urinal basin.

Instantaneous water heater: an appliance in which water is immediately heated as it passes through the appliance.

Non-domestic: relates to any supply or installation to/in agricultural, industrial or commercial premises.

Primary Circuit: an assembly of pipes and fittings in which water circulates between a boiler or other water heater and primary heater inside a hot water storage vessel.

Primary Heater: a heater mounted inside a hot water storage vessel for the transfer of heat to the stored water from circulating hot water.

Premises: any property which receives a supply from WDD.

Service Pipe: any pipe for supplying water from main to any premises as is subject to water pressure from that main, or would be so subject but for the closing of some valve.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

Servicing Valve: The valve for shutting off the flow of water in a pipe connected to a water fitting to facilitate the maintenance or servicing of that fitting.

Spill Over Level: The level at which the water in a cistern or vessel will first spill over if the inflow exceeds the outflow through any outlet and any overflow pipe.

Stop Valve: A valve, other than a servicing valve, fitted in a pipeline for controlling or stopping at will, the flow of water.

Storage Cistern: any cistern storing water for subsequent use, other than a flushing cistern.

Supply Pipe: any type of service pipes as long as it is not connection pipe.

Tank: a non-cylindrical closed vessel capable of containing water under pressure greater than atmospheric pressure.

Unvented Primary Circuit: a non-cylindrical closed vessel capable of containing water under pressure greater than atmospheric pressure.

Vent Pipe: An air-exposed tube connected to the hot water network for ventilation of air or steam.

Vented Primary Circuit: a primary circuit which is provided with a vent Pipe.

Warning Pipe: an overflow pipe so fixed that its outlet, whether inside or outside the building, is in a conspicuous position where the discharge of water can be readily seen.

Washing Through: means a wash basin, wash trough or sink measuring internally more than 1.2 m over its longest or widest part, at which two or more persons can wash at the same time.

Water Supplied for Domestic Purposes: water supplied by the WDD for drinking, washing, cooking and sanitary purposes and includes watering a garden and washing vehicles kept for private use.

Water Fittings: Pipes (other than mains), taps, cocks, valves, ferules, meters, cisterns, baths, water closets, soil pans and other similar apparatus used in connection with the supply and use of water suitably marked to demonstrate compliance with standards that are internationally recognized and accepted.

WDD: Water Distribution Directorate.

EWCD: Electricity and Water Conservation Directorate.

Metering Complex: A water supply system for a set of meters from one supply line and each meter has its own storage meter

Manifold: is a system that consists of a group of meters which are supplied from one service line and each meter has its own storage tank.

2. Laws and Regulations

- Ministerial Decision no. 1 for year 2004 regarding Water Bylaws system
- Decree no. 1 for year 1996 for Electricity & Water
- Ministerial Decision no. 13 for year 2006 regarding connections fees for electricity & water services
- Ministerial Decision no. 7 for year 2004 regarding internal plumbing work regulation
- Ministerial Decision no. 3 for year 2015 regarding amendments for some clauses of the Internal plumbing work regulation

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

- Ministerial Decision no. 25 for year 2015 concerning cost recovery for construction and development of infrastructure in existing area
- Ministerial Decision no. 11 for year 2017 related to determination of categories and methods for the collection of cost recovery of construction and development of infrastructure in existing area with facilities
- Decree No. (51) of 2014 concerning organization of practicing engineering professions.

Requirements:

1. Water Regulation System Requirements

1. Ground Tank inlet level at a height of one meter (1 m) above the street level, and not more than thirty meter (30m) distance from the main meter.
2. All storage tanks should be accessible, white colour and under shade to avoid direct sun rays.
3. The ground water tank overflow line should be installed below the water inlet line by (3 – 5 cm).
4. Overflow water pipes should not be connected to the drainage, they must be in a visible location, where the discharge of water can be seen or noticed.
5. All water pipelines in the internal network should be open or installed in a sleeve (Pipe-in-Pipe) to facilitate easy repairing or replacing in case of water leaks.
6. Isolating valves must be installed on all water lines supplying all the utilities of the premises.
7. Safety valves should be installed in all water heaters. Hot and cold pipes should be thermally insulated. It is preferable to shorten the water pipe distance between the faucets and the water heater.
8. No illegal connection or direct pumping & intakes from the supply line.
9. An alarm system, which is either audible or visual, should be fixed in all underground or ground water tanks with a capacity of more than 10 m3. The alarm system should be activated when the water level reaches 50mm below the water tank inlet.
10. The volume of the flush tank should not exceed 6 litres with a dual-flushing mechanism and an isolating valve installed before the flush tank.
11. Urinals should be flushed only after use either manually or by electronic sensor.
12. The internal pipe lines in the network have to be hydraulically tested for 24 hours with a pressure of 150% times the internal pressure to ensure there is no leakage in the system.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

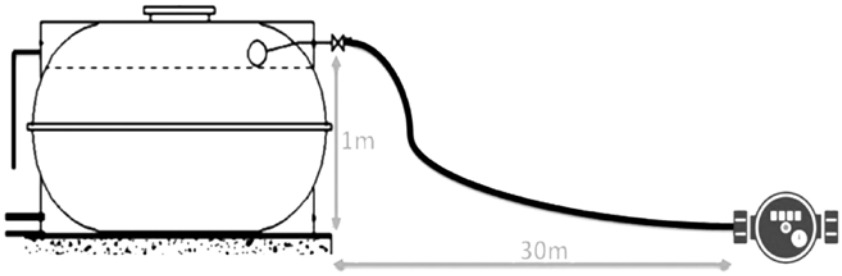
2. Garden Requirements

1. Size of the garden faucet must be 1/2 inch.
2. Use modern irrigation systems such as drip or sprinklers with timer.
3. Quantity of water consumed for irrigation: grass: one square meter = 10 liters / day and one tree = 10 liters / day.
4. Separate water tank to irrigate the garden, if it is large and the level of the garden tank will be higher than the level of the ground storage water tank by 0.5 meters.
5. All lines used for sprinklers, must be well routed and as much as possible, run through a sleeve to detect any leakage.

3. Internal Network (According to the technical guidelines for internal plumbing water systems)

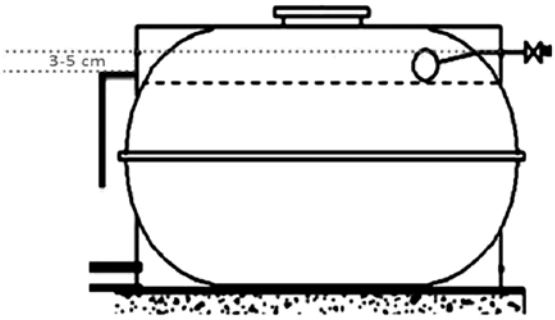
3-1 All plumbing materials must comply with the relevant British standards B.S. or equivalent.

3-2 The main domestic ground storage water tank must be provided on the ground level. The inlet of the water connection to the main ground storage tank must not exceed one-meter height. The ground storage tank should not be located more than 30 m from the water meter to ensure continuous water flow during the restricted hours.



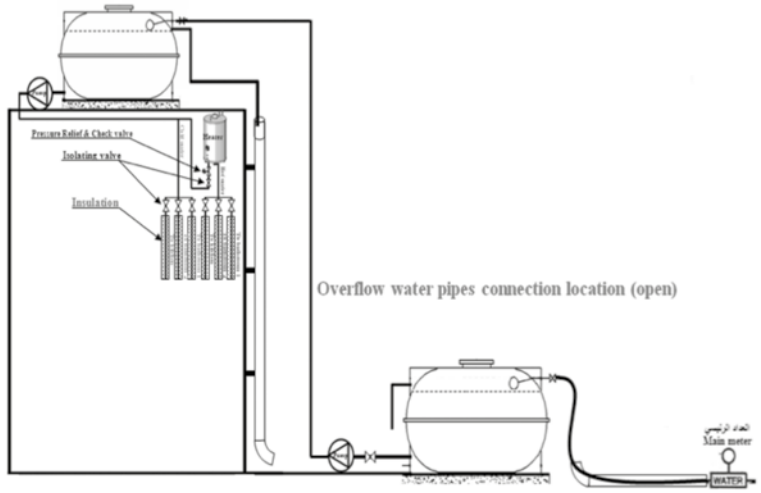
3-3 All storage tanks should be accessible, white color and under shade to avoid direct sun rays.

3-4 The ground water tank overflow line should be installed below the water inlet line by (3 – 5 cm).



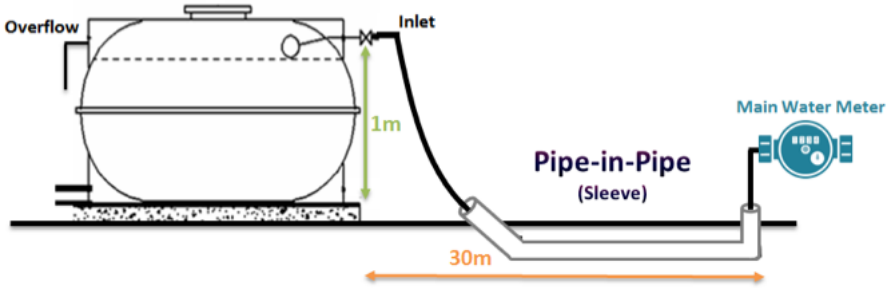
3-5 Overflow water pipes should not be connected to the drainage, they must be in a visible location, where the discharge of water can be seen or noticed.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)



3-6 An alarm system, which is either audible or visual, should be fixed in all underground or ground water tanks with a capacity of more than 10 m3. The alarm system should be activated when the water level reaches 50mm below the water tank inlet.

3-7 All water pipelines in the internal network should be open or installed in a sleeve (Pipe-in-Pipe) to facilitate easy repairing or replacing in case of water leaks.



3-8 Isolating valves must be installed on all water lines supplying all the utilities of the premises.

3-9 Safety valves should be installed in all water heaters. Hot and cold pipes should be thermally insulated. It is preferable to shorten the water pipe distance between the faucets and the water heater.

3-10 The internal pipe lines in the network have to be hydraulically tested for 24 hours with a pressure of 150% times the internal pressure to ensure there is no leakage in the system.

4. Water Appliances and Sanitary Wares Requirements

1. All plumbing materials must comply with the relevant British standards B.S. or equivalent.
2. Automatic sensor type mixers in public places must be considered.
3. It is advisable to use single-arm mixers (single lever) in normal domestic toilets.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

4. Urinals should be flushed only after use either manually or by electronic sensor.
5. Flow rate should not exceed the following values:

Maximum flow rate (liter / min)	Tool
Kitchen Washbasin / Handheld Faucet 	10
Hand wash Basin Faucet 	8
Pool Faucet (Bathtub) 	12
Shower nozzle 	10

5. Irrigation

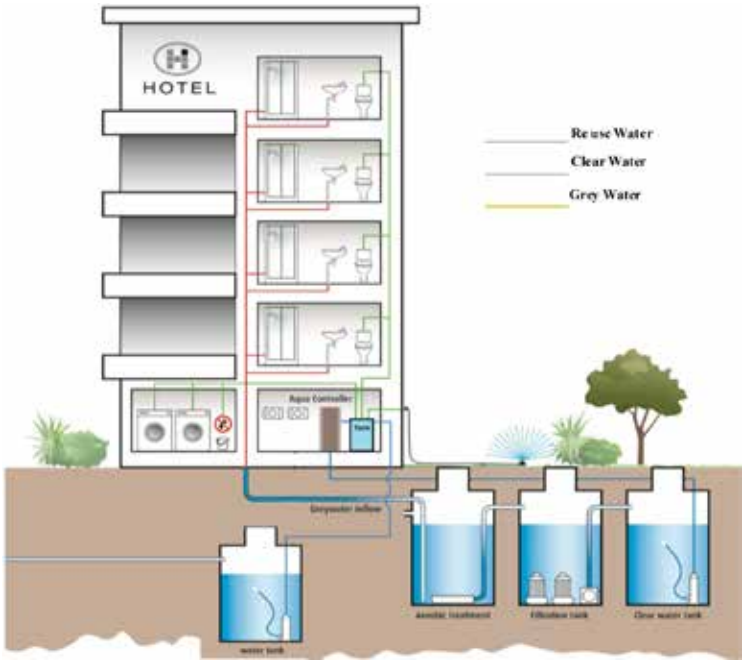
Although the Electricity & Water Authority (EWA) is not responsible for the supply of water for gardening/ irrigation purposes, EWA obliges the following:

1. The agriculture tank inlet has to be little higher than the main inlet of ground storage tank by 0.5m.
2. Modern Irrigation Systems (Drippings or Sprinklers with timers) should be provided in gardens.
3. Set the timer to run between 20 - 30 minutes, twice a day; early morning and late evening.
4. The total number of drippers connected in line with the timer must not exceed 90 for 30 trees.
5. It is advisable to choose low water consumption plants if you are planning for a new garden (Drought tolerance trees are preferable).
6. Lawn areas should be restricted in size to avoid high water consumption.
7. All lines used for sprinklers, must be well routed as much as possible, run through a sleeve to detect any leakage.
8. The size of the garden tap should not exceed ½" diameter.
9. Use the condenser drain water of the air conditioners directly to irrigate plants.
10. Use Grey water for Irrigation purposes after treatment and in line with IS/BS standards / W.H.O specifications.
11. Keep your filtration system as simple as possible.
12. Don't store grey water for more than 24 hours, install 3-way valve for switching between the grey-water system and the sewer/septic tank.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

6. Re-use of Water

1. In major projects such as industrial and commercial installations, grey water can be re-used for gardening and flushing purposes after suitable treatment and in line with International, British Standards and World Health Organization (WHO). To facilitate this, there should be two separate water supplies and two drainage systems with a standby fresh water supply in case of grey water supply periodic maintenance and outage due to technical defects.
2. It is preferable to re-use air conditioner drain water for irrigation directly.
3. It is advisable to use reject water from R.O. plants by diverting it to a separate ground tank and to be re-used for flushing, cleaning or irrigation etc.



The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

7. Water Meter Sites

General Requirements

7.1 Provision of service is depending on readiness of access roads in terms of level and demarcation

7.2 Location of meters shall be as specified by the Authority and shall into easy access for installation, reading, maintenance and inspection of the meters

7.3 Sufficient clearance shall be provided between the water pipe / meter and other services such electricity, sewerage and gas according to the approved practice and the technical guidelines.

7.4 If the customer desires to change the location of the meter, formal request shall be submitted to the customer service directorate.

7.6 The Arrangement required for installation of water meters, which vary according to the type of building and number of units must be strictly adhered according to the following details

Villas and Houses:

7.7 The Standard size of connection of water meter to the villa or house is half inch. The method of installing the meter shall be inside a cavity in the external side of permanent boundary wall according to the approved drawing by EWA.

7.8 In case there is a side wall of the building without front boundary wall , the meter arrangement shall be mounted on the side wall with a distance not more than one meter within the property line and the pipe passing through the private property shall be inside ducts.

7.9 In case there is no wall for the buildings, arrangement of the meter shall be constructed mounted on the structure of the building. The meter cannot be installed inside a cavity in the structure of the building.

Residential and Non-residential Fenced Compounds:

7.10 Arrangements shall be made to install manifold system on the external boundary wall of the property on the public road. The water meters cannot be installed separately for each unit inside the plot.

7.11 Ground & roof water tank shall be provided with separate water pipe for each unit. It is not allowed to install common tank for more than one unit.

7.12 Locations of manifold and ground water tank shall be distributed so that the distance between the meter and ground tank for each unit shall not exceed 30 meters.

7.13 For the multi-story buildings within gated compound, only main meter shall be installed for the building in the public road of the compound. No individual meters for units inside the building shall be installed unless written signed agreement between EWA and the developer.

7.14 The size of the manifold shall be one inch for compound with units not exceeding five. The size of manifold shall be two inches for the compound with units not more than 10. EWA shall decide number, sizes and locations of manifold for the compounds which having more than 10 units.

The requirements Electricity and Water Authority Water Distribution Directorate and Electricity and Water Conservation Directorate (Water Conservation Department)

Buildings Consisting of Several Residential and / or Non-residential Units

7.15 The location of the main meter shall be on the public road near the entrance of the building

7.16 A suitable location shall be arranged for individual meters of the units in the ground floor in one box including all the meters when possible. It is allowed upon approval of EWA the location of the meters distributed on each floor under condition that customer shall provide electronic water meters and all communication equipment for the meter data and automatic meter reading.

7.17 The pipe connected to the meters shall be numbered according to address cards of the units issued by Information & eGovernment Authority.

7.18. The internal plumbing and meter box shall be arranged according to the EWA approved drawings, so the water reaches the individual meters from the roof tank. The water shall be not pumped into individual meters of the units directly from the ground tank.

7.19. In case of shops requiring water services individually within the building, the internal plumping network of the building must be designed to include for future connections of water meter for each shops inside the meter box. No separate tapping will be provided for the shops from EWA main or service network.

7.20. For offices building with common water facilities, one main meter shall be installed at the entrance.

7.21 The owner of the building or the owners union shall bear the cost of difference in reading between the main meter of the building and the total readings of the individual meters readings of the same building.

7.22 In case of arrangements of individual meters for the building not prepared, EWA may install a main meter for the building at the entrance and the cost of monthly consumption shall be borne by the owner or the owners union with commercial tariff and without distributing the consumption on the units of the buildings.

7.23 For existing building that are with one main meter and the consumption is distributed equally to the units, if one or more of the customer desire to install a separate water meter for their unit (s), coordination must be arranged with the landlord or the owner association to make an internal plumbing network system to install individual meters for all units.

7.24 Deciding of the water connection size for the building is responsibility of EWA and it is based on the daily demand calculated by the project engineer. The method of calculation of daily water demand shall be as specified in the technical guidelines.

Non-residential Units or Installations

7.25 For non-residential buildings that have address cards for each unit with an address card for entrance, main meter together with individual meters can be installed.

7.26 For non-residential buildings without an address card for the entrance, arrangements shall be made for manifold system.

Water Storage Tank Capacity

7.27 The water storage capacity shall be provided for three days of daily demand. The storage tank must be distributed between ground and roof tanks. Preferably, the ground tank shall have twice the storage capacity of the roof tank.

Chapter 7

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

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The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

1. Introduction

Why Thermal Insulation is required for Buildings in Bahrain?

Energy is consumed in buildings for air-conditioning, lighting, cooking, cleaning, recreation … etc. Reports and studies, which were conducted in Bahrain, revealed that more than 65% of energy is consumed by air conditioning. The rate of energy consumption by air-conditioning is influenced by three main factors:-

1. Thermal performance of the building, which is affected by a number of factors, such as building form, building orientation, glazed surface areas, and thermophysical properties of building materials of the envelope of the building.
2. User's behavior in terms of controlling air-conditioning, lighting and other equipment.
3. General policy of the nation with respect to energy cost, building rules and regulations.

No doubt that the building form, building layout, building design and thermophysical properties of used building materials have considerable influence on the amount of energy needed for the provision of indoor thermal comfort requirements. Therefore it is the duty of architects and designers to conduct the required analytical studies, which lead to benefit from the climatic factors with the objective of reducing the need for air-conditioning and maximum utilization of natural lighting.

Studies revealed that the thermal characteristics of the building envelope are one of the main criteria, which determine the overall thermal performance. For this reason, a code for thermal insulation is introduced. The code deals with the thermal characteristics of roofs, external walls, and glazed surfaces with the objective of reducing heat flow through the building envelope. This is done through limiting of the U-value for roofs and external walls together with defining the type of glass for windows and openings. The use of insulation materials is regarded as the most effective with respect to reducing the rate of heat transfer from outside to inside during the hot summer, and from inside to outside during the cold winter.

Heat transfer to and from the building takes place through the following: -

1. Walls and roofs.
2. Widows and glazed surfaces.
3. Openings.

During summer, the amount of heat transfer through roofs and walls ranges between 60-70%. This amount of heat should be removed by air-conditioning. Therefore the use of insulation materials for roofs and walls is very essential for energy conservation. Thermal insulation has many advantages, such as: -

1. Reducing the energy consumption required for cooling and heating.
2. Reducing the capacity of air-conditioning equipment and hence reducing capital cost.
3. Protecting the building components from thermal stress as a result of expansion and contraction.
4. Reducing the electricity bill for consumers.
5. The provision of comfortable indoor thermal environment.
6. Protecting the surrounding environment from harmful gases emitted by electric power plants.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

Windows and glazed surfaces are considered as the weakest points with regard to heat transfer by conduction and radiation. Therefore, it is advisable to reduce the area of glazed surfaces, which are exposed to external climate and direct solar radiation and encourage the use of high performance glass and double-glazing.

2. Definitions:

Overall Thermal Transmittance (U-value) or Overall coefficient of heat transfer (U-factor): This is the overall rate of heat transfer through a section (wall or roof) per unit area and per unit temperature difference, expressed as W/(m^2.°K)

U-value is the reciprocal of the overall thermal resistance ($1/R_T$)

Overall thermal resistance (R_T): This is the sum of the thermal resistance of all material layers constituting the wall or roof section, and includes the thermal resistance of the outside and the inside air films in (h.ft2. oF)/Btu or (m^2.°K)/W. $R_T = (R_o+R_i+ R_1+R_2+---------+R_n)$

Ro is the thermal resistance of the outside air film & Ri is the thermal resistance of the inside air film. These values are given in the table below:

Section	Thermal resistance for adjacent air layer	
	Internal thermal resistance (R_i)	External thermal resistance (R_o)
Wall	0.121	0.059
Roof	0.166	0.059

R_1, R_2, --------- R_n are thermal resistance of materials constituting the wall or roof section.

Thermal resistance (R) of a material is the resistance to heat flow through a unit area of homogeneous material when there is a unit temperature difference between two surfaces and its unit of measurement is (m^2-°C/W).

Thermal resistance R of a material is calculated by dividing the thickness of the material by the thermal conductivity of the material (t/k) or by multiplying the thickness of the material by the thermal resistivity of the material.

Thermal conductivity (k) is the property of the material, which determines the heat flow by conduction through unit thickness of unit area of the material across a unit temperature gradient. Thermal conductivity is influenced by the density, the porosity, water contents, and specific heat of the material. The unit of measurement is (W/m-°C).

Thermal Resistivity (r): The reciprocal of the thermal conductivity (1/k) is the thermal resistivity of the material. It is the resistance to heat flow through unit thickness when there is a unit temperature difference between the two surfaces. The unit of measurement is m-°C/W.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

Cavity Thermal Resistance (R_c): It is the resistance of air in the cavity space to heat flow. It depends on the thickness of the cavity & the characteristics of the two surfaces enclosing the cavity. Following values could be used for thermal resistance of cavity:

For a cavity which is more than 5 mm thick (up to 20 mm) *(R_C) = 0.11 m^2-°C/W*

For a cavity which is more than 20 mm thick *(R_C) = 0.18 m^2-°C/W*

3. Laws and Regulations

A Ministerial Order (Order No. 8/1999) was issued in 1999 by H.E. The Minister of Housing & Municipality making it compulsory to provide thermal insulation in all buildings, which require air-conditioning, in Bahrain. The Order stipulates the following requirements:

A. Thermal insulation materials should be used for roofs and walls of all buildings which require air-conditioning according to the following:-

1. The overall thermal transmittance value (U-value) for the roof should not exceed 0.6 W/m^2-°C
2. The overall thermal transmittance value (U-value) for external walls should not exceed 0.75 W/m^2-°C.
3. High performance glass should be used for all buildings with more than three floors or if the area of the glazed surfaces ranges between 10-20% of the total external surface area of the building envelope. On the other hand, if the glazed area is more than 20%, double glazing should be used.

B. This regulation is applicable on all new buildings, which need air-conditioning, and for existing buildings that need to be reconstructed or refurbished. The order has been implemented for buildings above four floors.

To provide guidance to architects and engineers in Bahrain, a code of practice for thermal insulation in buildings was issued in both Arabic and English languages in 2006.

Building Thermal Insulation Order 63/2012:

As per order 63/2012, provisions of the order 8/1999 shall apply as well to all residential buildings, facilities, warehouses and stores that need cooling/air-conditioning. Accordingly buildings below 5 floors not covered earlier under thermal insulation order 8/1999 are now required to be provided with thermal insulation. This order has come effective on 1st September 2013.

Thermal Insulation Requirements

a. Thermal insulation shall be provided for all external walls including exposed columns, beams, stair cases and light wells/shafts. External walls of the building abutting adjoining building(s) if any shall also be insulated.

b. Thermal insulation shall be provided for the roof including swimming pool decks and stair cases/lift machine rooms.

c. Floors and walls of air-conditioned spaces exposed to non-air-conditioned spaces like car park/service areas in the building should be insulated.

d. Spandrel areas of curtain walls should be insulated.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

4. Implementation Procedures:

Buildings above four floors:

Procedures Implementation of Thermal insulation (over 4-story buildings)

Planning stage

- Obtain a building permit from the municipality
- Deliver the same to the Municipal OSS Office and obtain the approval of the EWA
- Fill up thermal insulation application form through engineering office
- Attach the required drawings and papers as per Annex 4-1
- Upon approval, an application number will be issued. In case of any change in the thermal insulation, owner, engineering office, etc.. an CR shall be provided.
- Shall be defined by the issued application number and the building permit number

Construction phase

- Send a follow-up notice to the EWA to request the inspection
- The EWA will contact the Engineering Office to schedule the inspection
- The EWA will conduct the inspection and approve the application of
- Please send a request to inspect the phases of the walls, ceilings and glass two weeks before the completion of the inspection
- The competent engineer must be present at the time scheduled for the site to conduct the inspection
- Follow-up forms of municipality supervision will be approved otherwise to correct the violations if any

Buildings up to four floors:

Procedures Implementation of Thermal insulation (up to 4-story buildings)

Planning stage

- Fill up the thermal insulation application form through engineering office and deliver
- Obtain a building permit from the municipality
- Attach the required drawings and papers as per Annex 4-1

Attach the required drawings and papers as per Annex 4-1

Construction phase

- The engineering office shall coordinate with the contractor and the owner for the inspection
- The engineering office to contact the contractor to schedule a date for inspection
- The engineering office to approve thermal insulation application
- Coordination shall be carried out to inspect all phases of walls, ceilings and glass before they are completed for inspection
- The competent engineer shall be present at the time schedule for the site to conduct the inspection
- In case of violations, the engineering office shall coordinate with the contractor and the owner to correct them

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

The process for thermal insulation implementation is given below:

First: Planning & Building Permit Stages: Engineering Office shall submit the following with Building Permit application

a. Detailed drawings indicating materials and methods used for the thermal insulation of the roofs and walls and external glazing.

b. Thermal Insulation Implementation Form (Appendix 1)

c. Required supporting documents as stipulated in clause 4.1 & 4.2 below.

d. An undertaking by the Engineering Office as per form (Appendix-11)

e. A copy of valid certificate to practice thermal insulation in buildings, issued by Electricity & Water Authority to the Engineering Office.

f. Municipality shall issue the building permit based on the above submissions by the Engineering Office.

Second: Construction Stage:

a. The engineering office shall supervise the implementation of thermal insulation in the building at all stages of construction and ensure the use of thermal insulation materials for walls and roofs and the type of glass are as per the TII Form and the conduct of insulation is done properly.

b. The engineering office shall submit, on completion of the building, a certificate confirming that the thermal insulation for the building has been implemented and fully comply with the requirements of the Thermal Insulation Order Nos. 63/2012 & 8/19999 (as per form –Appendix 12)

- **Records to be maintained by the Engineering Office for supervision of TII for each building:**

a. Copies of thermal insulation implementation forms and supporting documents submitted with BP application

b. Copies of thermal insulation implementation modifications approved

c. Copies of material approval forms for glass

d. Record of follow up notices & inspection reports as per format (Appendix-9)

e. Copies of violation notices issued to contractors

f. Record of violations & rectification of violations as per format (Appendix-10)

g. Copies of Final completion certificates issued

- **Auditing of Engineering Offices by EWA**

Electricity & Water Authority (EWA) shall carry out audit of Engineering Offices (E.O) registered with COEPP to qualify the E.O to implement Thermal Insulation Regulation as per ministerial order no: 63/2012.

- **The purpose of the auditing is to assess the following:**

a. Qualified staff is available for implementation of thermal insulation in buildings.

b. Compliance to regulations of thermal insulation in building design and implementation.

c. Proper supervision of thermal insulation in buildings during construction is done and documented.

d. The buildings are free of any significant violations regarding the implementation of thermal insulation.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

Significant violations will include engineering office issuing a completion certificate for the building confirming that the completed building fulfill all the requirements of thermal insulation, although there is no insulation in roof or walls or non-insulating materials/un-approved glass are used.

e. Significant violations are not repeated especially after guidance notes and prior warnings by Electricity & Water Authority.

- **Procedure for Auditing of Engineering Office by EWA:**

a. EWA to issue two weeks advance notice to Engineering Office with date/time/duration of proposed audit.

b. Random selection of projects that are in progress or completed.

c. Check the availability of qualified resources for proper conduct of thermal insulation in buildings as per regulations.

d. Examine the records being maintained and check their quality.

e. Examine at random thermal insulation forms & supporting documents submitted for the BP by Engineering Office to check whether the Engineering Office has covered all the requirements.

f. Site visits with the Engineer in charge to randomly selected projects and check the conduct of thermal insulation in selected buildings as per the approved TII Form.

On completion of periodic audit, Electricity & Water Authority will send the audit report to the engineering office. The audit report shall include audit findings and observations of EWA on the performance of the engineering office and the extent of its commitment in implementing the thermal insulation in buildings.

A certificate with limited validity shall be issued by Electricity & Water Authority to Engineering Office for practicing thermal insulation in buildings based on the results of the audit. Any major violation reported from the auditing process will disqualify the Engineering Office for practicing thermal insulation in buildings.

- **Submissions by Engineering Office**

4.1 Planning Stage

Required Submissions for Final Building Permit:

Required submissions	Remarks
1. Thermal Insulation Implementation Form (Appendix-A).	All the fields should be filled, signed by client & in-charge engineer, stamped and all pages should be numbered.
	If wall/roof insulation at other locations (such as shear walls, beams, columns, spandrel areas, swimming pool decks etc.) was different then separate U-Value calculation sheet with relevant data for each such locations should be included
2. Supporting documents for thermal resistivity/ thermal resistance values of materials used in U-Value calculations	Documents from manufacturer & test certificate from accredited Testing Laboratories.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

Required Documents	Notes
3. Calculation sheet for glass area as per prescribed format (Appendix-B).	
4. Calculation sheet for external surface area as per prescribed format.	
5. Performance data sheets from glass manufacturer for each type of glass	
6. Architectural plans for all floors	In the Architectural drawings dwf file, Types of doors, windows, curtain walls as per the schedule of doors/windows/curtain walls to be showed in all floor plans. The walls to be insulated should be highlighted.
7. Elevation drawings	In the Architectural drawings dwf file, horizontal & vertical dimensions, types of doors, windows, curtain walls to be showed in all elevations. Floor slabs & roofs to be insulated should be highlighted
8. Schedule of doors/windows/ curtain walls/sky lights.	Include the schedule in the Architectural drawings dwf file,
9. Cross section drawings for each type of roof & wall with thermal insulation details.	One cross section drawing corresponding to each U-value calculation sheet in the TII Form should be submitted. Include these cross section drawings in the Architectural drawings dwf file.
10. Layout of columns/beams & Schedule of columns/beams	To be Included in structural drawings dwf file

4.2 Construction Stage

1. Follow Up Notice as prescribed format	Copies of Building Permit and address card for the entrance of the building should be sent with the first follow up notice.
	If any violations in the implementation of thermal insulation were notified by EWCD, follow up notice should be sent when the rectification of such violation is being carried out.
2. Material Approval Form for Glass	Approval of EWA should be obtained for the glazing by submitting material approval form for glass (Appendix-E) with performance data for the glass from the manufacturer, certificates from glass supplier & Aluminum fabricator (as per prescribed format-Appendix F) and one sample for each type of glass before execution.
	Glass selection should be in accordance with Table (5.2) in the Code of Practice for thermal insulation in buildings

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

4.2 Construction Stage (Continued)

3. Thermal Insulation Implementation Modification Form:	If the Engineering Office wants to make any changes in the Approved TII Form such as change of insulation materials in walls/ roof, glass type, glass area etc., TII Modification Form should be submitted and approval obtained before incorporating any such changes in the building.
	Modification form should also be submitted for change of owner(s) & or Engineering office.
	Supporting documents required to be submitted, for each type of change proposed, are listed in the check list for TII Modification Form (Appendix-H).
4. Copies of delivery Notes for glass	Copies of Delivery Notes for glass from Manufacturer to local supplier & from local supplier to Aluminum Fabricator should be submitted at the time of glass inspection.
5. Copy of approved electrical load	Copy of approved electrical load from Electricity Distribution Directorate at the time of final stamping of Municipality construction follow up forms.

5. Requirements

5.1 Presentation of U-value Calculations:

5.1.1 U-value calculation for walls & roof should be presented in the prescribed TII Form (Appendix-A) and signed by the client and In-charge Engineer and shall have Engineering Office stamp & signature. Include only the U-value calculation sheets applicable for the building.

5.1.2 The thermal resistivity or thermal conductivity values in Table M-1 “Summary of Thermal Properties of Building Materials” given in 8 below may be used for calculating the thermal resistance.

5.1.3 For materials not included in the above table, use thermal resistivity or thermal conductivity values given by the manufacturers supported by test certificate from a testing laboratory and submit such supporting documents with the TII Form.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

5.2 Insulation Materials & Systems:

5.2.1 Wall Insulation:

Material/System	Merits	Demerits
a. Thermal Insulation Blocks / Panels Consist of: Cement block/panel thermally insulated by pieces of polystyrene boards. Lightweight block/panel (AAC)	• Light weight: saves costs in foundation, building structure, labour etc. • Easy to handle and time saving in construction. • Easy to inspect.	• Separate insulation required for exposed external columns & beams.
b. Cavity wall (double wall) filled with insulation: If the external wall is of double wall construction, thermal insulation can be provided in the cavity with insulating material such as rock wool, polystyrene etc. of appropriate thickness. The cavity should be water proof.	• More protection/life time to the thermal insulation materials	• Expensive. • Separate insulation required for exposed external columns & beams.
c. External Thermal Insulation Composite System: This system consists of fixing light thermal insulation board, (usually expanded polystyrene board using a special mortar on the external surface of walls), covering it with a reinforced glass fiber mesh and then finishing it with a thin layer of weather resistant plaster.	• Provides joint less thermal protection for the entire external wall including external columns/beams eliminating thermal-bridges.	• Expensive.
d. Walls with internal insulation: This system consists of fixing light thermal insulation board (usually expanded or extruded polystyrene board) on the internal surface of the wall and covering it with plaster or gypsum board.	• Provides joint less thermal protection for the entire external wall including external columns/beams eliminating thermal-bridges.	• Size of the rooms on the periphery of the building will be reduced to the extent of thickness of insulation board & plaster board.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

5.2.2 Roof Insulation:

Material/System	Merits	Demerits
a. Polyurethane Foam	• These applications also usually perform better since the liquid foam molds itself to all of the surfaces.	• Potential health effects that may result from exposures to the chemicals if proper precautions are not taken during the application.
b. Extruded Polystyrene-	• The Inverted Roof system protects the waterproofing membrane from extreme thermal stresses, high ultraviolet exposure & mechanical stresses	• Inverted Roof System with concrete screed requires provision of vent pipes over the separation layer on insulation boards.

5.2.3 Floor Slabs over/below Non A/C areas:

Material/System	Merits	Demerits
a. Soffit insulation with Polystyrene (extruded or expanded) covered with gypsum board	• Lower cost	• It is flammable and it is able to exhale toxic gases.
b. Soffit insulation with Rock wool covered with gypsum board	• Inflammable	• Expensive

Typical wall & roof construction details (cross sections) for the above insulation systems are given in Appendix.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

5.2.4 Glazing:

Glass Selection:

Glass selection should be in accordance with Table (5.2) in the Code of Practice for thermal insulation in buildings:

Glass type	Shading coefficient	Relative Heat Gain (RHG) W/m²	Percentage of transmitted light	U-Value W/m² °C	Remarks
Single Insulated	< 0.5	< 350	> 25%	< 5.1	Reflective glass with same specifications may be used
Double Insulated	< 0.44	< 220	> 27%	< 2.4	The induced color in outside pane can affect the properties.
Curtain Wall	< 0.25	< 160	> 18%	< 2.1	The more the curtain wall area, the stricter the specifications required.
Skylights & Roof Openings	< 0.25	< 185	> 15%	< 2	The tightening of the units is a crucial issue.

Single insulated glass may be used for doors/windows if the % of glass area with respect to the total surface area is less than 20%. If the % of glass area is more than 20% then double insulated glass has to be used for all doors/windows.

Need to Minimize Use of Glass:

Compared to most other building materials, glass has the least resistance to ambient heat transfer which takes place by means of absorption, conduction and re-radiation.. The following table shows the comparison of heat gains for a solid wall construction & different type glazing for an outdoor/indoor temperature difference of 15o C and solar heat gain factor of 693 W/m² for a west facing wall for 24o North Latitude at 4 pm in the month of August.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

Type of wall/ glazing	Stipulated Max. U-value (W/M^2 °C)	Stipulated Max. Shading Coeff. (SC)	Heat Gain due to Conduction (15*U) W/M^2	Solar Heat Gain (693*SC) W/M^2	Total Heat Gain W/M^2
Insulated solid wall	0.75	-	11.5		11.5
Insulated Single glass	5.1	0.5	76.5	346.5	423
Insulated Double glass	2.4	0.44	36	304.92	340.92
Insulated Curtain wall	2.1	0.25	31.5	173.25	204.75

The Heat Gain due to conduction alone in single glass is 6.6 times, for double insulated glass 3 times & in curtain wall glass is 2.7 times that for a solid insulated wall.

Considering solar heat gain, the total heat gain would be very high compared to insulated wall.

Therefore it is always advisable to limit the use of glazing and avoid large glass facades especially those exposed to direct solar radiation such as the west and southwest.

6. Common Violations/Omissions Noticed in Thermal Insulation Implementation:

1. Procedural violations

Type of breach	Action required from Engineering Office (E.O)
a. Non Submission of Follow up notices (FUN) for walls floor wise during progress of construction	Ensure that Follow up Notice is sent for each floor when intending to start thermal insulation and at least two week in advance before its completion.
b. Non submission of copies of Building Permit (BP) & Address Card with first Follow Up Notice	Submit copies of BP & address card for entrance of the building once only with first FUN. No need for address card of flats.
c. Non Submission of TII Modification Form for changes in approved TII Form	E.O. should send a copy of the approved TII form to the client & contractor and advise them not to change thermal insulation materials in walls, roof or glass without obtaining prior approval from EWA. E.O. should submit TII Modification Form & obtain approval before incorporating any changes. Keep a copy of the approved TII Form/TII Modification Form at the site.
d. Completing the building without submission of follow up notices & thermal insulation inspections.	This is a serious violation of the Code of Practice. E.O. should be vigilant and ensure the procedures for FUN are followed strictly.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

2. Violations in the Conduct of Thermal Insulation

Type of Violations	Action required from Engineering Office (E.O)
Violations in Walls Insulation:	
Violations related to use of Light Weight Blocks	
a.Use of ordinary mortar instead of glue or thin bed mortar for joints.	Ensure that only glue or thin bed mortar supplied by the Manufacturer is used.
b. Use of ordinary (uninsulated) blocks adjacent to window/door openings & columns instead of light weight blocks	Manufacturer's should be consulted on how to fix the window/door frames to the walls with light weight blocks and follow their instructions instead of using ordinary blocks.
c. Use of Ordinary (uninsulated) blocks for walls of light wells/shafts, external walls in G.F., balconies, walls behind louvers etc.	Walls of light wells/shafts open to sky and all external walls (even if they are in shaded areas like car parks, balconies, behind louvers) should be insulated. E.O. should instruct the contractor accordingly & use of ordinary blocks for the same should not be allowed.
Violations in Roof Insulation:	
Violations related to roof insulation with P.U. Foam	
a.Thickness of P.U. Foam less than the thickness given in the approved Thermal Insulation Implementation (TII) Form	Minimum thickness should not be less than what has been approved in the TII Form. E.O. should check the same before sending FUN for inspection.
b.Density of P.U. Foam is less than what was approved in the TII Form.	Specify the density of P.U. Foam to be the same as in the approved TII Form in the contract for water proofing and ensure its compliance.
c. Covering the P.U. Foam insulation with concrete screed before inspection	E.O. should send FUN at least two weeks in advance before the completion of roof insulation & ensure that P.U. Foam insulation is not covered with concrete screed before inspection.
Violations related to roof insulation with extruded polystyrene:	
d. Separation layer not provided	Geo-fabric separation layer is required to be provided between extruded polystyrene and stone ballast or concrete screed. E. O. should ensure the same before sending FUN for inspection.
e. Vent pipes not provided over separation layer	If concrete screed is to be provided over the extruded polystyrene, vent pipes @ one per 50 m^2 of roof area should be provided over the Geo-fabric separation layer. E.O. should ensure that vent pipes are in place at the time of inspection. No need for vent pipes if stone ballast or loosely laid paving tiles are used over separation layer.
f. Using expanded polystyrene instead of extruded polystyrene approved for roof insulation.	Expanded polystyrene is not accepted for roof insulation as its water absorption is more compared to extruded polystyrene.

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

2. Violations in the Conduct of Thermal Insulation (Continuation)

Type of Violations	Action required from Engineering Office (E.O)
Violations related to glazing:	
a. Glass installed is different from the approved glass (different air space, different type etc.)	Submit Material Approval Form for glass & obtain approval of EWA before change to avoid rejection.
b.Clear glass is used in G.F. instead of insulated glass approved.	Only insulated glass is to be used. Obtain prior approval of EWA for any deviation from the earlier approval.

7. Summary of thermal properties of building materials (table m-1)

No.	Material	Density	Thermal Resistivity	Thermal Conductivity
		Kg/m3	1/k	k
			m-^{o}C/W	W/m-^{o}C
1	Perltion concrete	300	13.3	0.075
2	Mortar	1800	1.3	0.75
3	Concrete screed	2200	0.69	1.45
4	Foamed concrete	400	6.6	0.15
5	Foamed concrete	800	4.3	0.23
6	Foamed concrete	1200	2.6	0.38
7	Reinforced concrete (1% steel)	2300	0.43	2.3
8	Reinforced concrete (2% steel)	2500	0.4	2.5
9	Tiles (ceramic)	2300	0.77	1.3
10	Rendering/plaster	1300	1.75	0.57
11	Granite	3650	0.381	2.65
12	Marble	2720	0.40	2.5
13	Gypsum board	950	6.3	0.16
14	Plaster board	900	4.0	0.25
15	Plywood	650	7.1	0.14
16	Hard wood	650	6.3	0.16
17	Soft wood	500	7.1	0.14

The requirements Electricity and Water Authority Electricity and Water Conservation Directorate (Thermal Insulation Department)

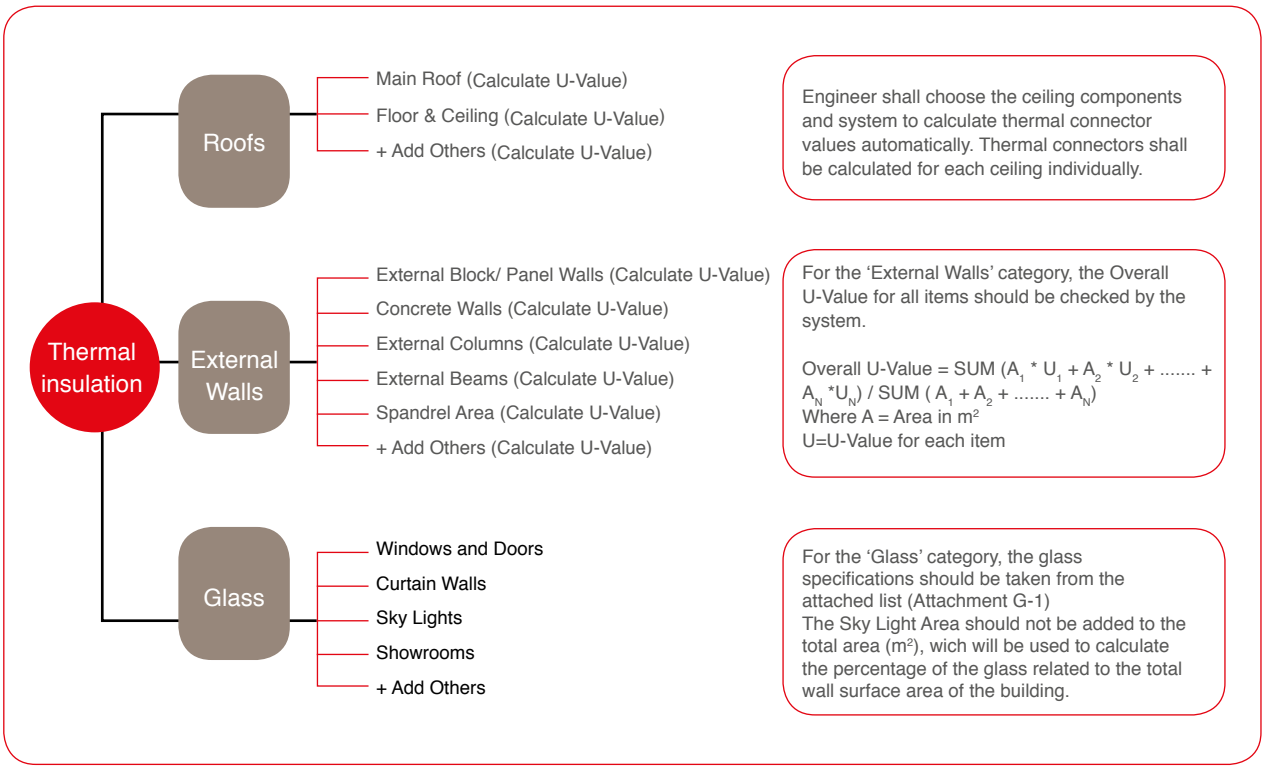
8. Automated BP Approval:

The Electricity & Water Authority has collaborated with the Information & eGovernment Authority of Kingdom of Bahrain to launch an electronic portal to automate the approval and granting of building permits through the internet.

The electronic service is designed to make the process of application and approval seamless and the building permit is granted immediately. All necessary databases of building materials are uploaded in the system and are kept up-to-date to streamline the process and replace the manual steps to process BP described earlier. The process may be summarized as follows:

1. Engineering office / user use the browser to log in the system using his / her assigned user id and password.
2. Navigate to the Thermal Insulation Section.
3. Commence the application process by selecting each part of the project individually: Roofs, Walls, and glazing.
4. Selects the materials to be used in each part selected in point 3 above.
5. The user specifies the necessary parameters of his design such as desired areas, orientations, etc.
6. U values, as well as other technical parameters, such as shading coefficients, etc. are calculated automatically. All other conditions relevant to thermal insulation are validated as well.

Once the process has been validated, BP is granted immediately without the need to upload or submit any T.I related attachment. The whole process is depicted briefly through the following layout.



Chapter 8

Requirements of the Ministry of Transportation and Telecommunications Civil Aviation Affairs

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Requirements of the Ministry of Transportation and Telecommunications Civil Aviation Affairs

1. Laws and Regulations

According to the Ministerial decree 21 of 2013 by the Ministry of Transportation and Telecommunication and the Civil Aviation Law No. 14 of 2013.

2. Requirements:

1. Preapproval from Bahrain Civil aviation is required to permit the building in the below areas;

1.1 **Outside CAA Fence:** Preapproval shall be obtained from Civil Aviation for the building/structure having height more than 147 mtr above mean sea level.

1.2 **Inside CAA Fence:** Preapproval shall be obtained from Civil Aviation for the building/structure having height more than 30 mtr above mean sea level.

1.3 **Take-off/Approach Path:** Preapproval shall be obtained from Civil Aviation for the building/structure within the Take-off/Approach Path.

2. Other requirements:

2.1 All the building/structure above 30mtr AMSL (Above mean sea level) shall be installed with aviation warning light as per Bahrain CAA standards.

2.2 Aviation light used for the installation shall be a Bahrain civil aviation certified product.

2.3 The applicant shall obtain prior Civil aviation's approval for the usage of tall construction crane/ equipment if the crane height is 30 mtr AMSL inside the CAA fence or 100mtr AMSL outside the CAA fence area.

2.4 Aviation warning lights shall be installed on the tall construction crane / equipment.

2.5 The Applicant shall submit WGS 84 co-ordinates of the highest point of the building for the building with height more than 30mtr inside CAA fence and height more than 100mtr outside CAA fence.

2.6 Lighting from the proposed building/site shall not create adverse effect to the Air navigational operation.

2.7 The development shall not provide any facility which may attract, breed birds.(Artificial lake, fishing Harbour etc.)

2.8 The development shall not have smoke producing or other impairment to visibility.

2.9 Storage of hazardous material / inflammable material in large quantity shall not be permitted in the take-off approach path.

Chapter 9

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

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Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

Requirements

1. Design Review and Building Permit Procedures

1.1 Development Control

Responsibility for ensuring that each development complies with these guidelines will rest with the IAOD who will retain the services of technical advisers to assist in evaluating submissions as required.

Final approval for individual building designs and layouts and for landscaping schemes will rest with the IAOD technical team.

Changes shall not be made to the MOICT approved design drawings without firstly seeking further approval from IAOD. Where unauthorized changes are made, the Ministry will not be in a position to issue an NOC until such offending structure or change is removed. This will definitely delay the connection of electricity.

Where a development is to be carried out in stages, an outline of the total development must be submitted to the IAOD engineers with the initial submission.

1.2 Design Review Procedures

Each development proposal will be reviewed, on the following general basis:-

1.2.1 The objective of the IAOD is to facilitate individual investors, entrepreneurs and existing tenants in as far as possible. To ensure that this objective can be met the plot tenants and consultants shall meet with the IAOD engineers to discuss and review plans and give guidance on the requirements on an informal basis prior to submission of initial building drawings to IAOD.

1.2.2 Prior to the preliminary allocation of lands, approval for the proposed development must be confirmed by the IAOD. The outline design submission will consist of plans, sections, elevations, and information on external materials, site plan showing roads, parking, utility layouts and connections to the Municipality network (if available) service areas and general landscaping.

1.2.3 Upon the preliminary allocation of land and prior to application for various licences and planning permissions a formal submission will be required for the following drawings in order to obtain the final approval from IAOD before applying for Building Permit.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

	Required Details to be submitted to MOICT for Building Permit Approval
1	Location plan based on the surveying certificate showing the specific Industrial Area and the location of the plot within the Industrial Area.
2	Plot Plan and Building Layout Complete with Building Footprint, Set back dimensions, Built Up Area Statistic, Car Parking and Landscaping Requirements and Provision – to include also any ground floor based External Tanks, Vessels or Services Buildings , Water Tanks, Guard Houses and Air Conditioning units.
3	Ground Floor Plan with grid lines.
4	Plan of each additional floor with grid lines.
5	Colored Perspective of Proposed Building.
6	Roof Plan Details.
7	Plant, Machinery & Equipment layout.
8	Longitudinal & Latitudinal Cross Sections.
9	Building Elevations for all sides clearly showing building finishes and material that will be used.
10	Plot Boundary Details and Cross Sections of all sides together with plot surface finish and storm water remediation.
11	Sewage Network Layout and Connections to Ministry of Works Network (if available).
12	Water Supply Network Layout and Connections to Electricity and Water Authority Network.
13	AC and other non-ground based equipment.

1.2.4 The Construction activities shall not commence until:

1	The full design submission and phasing has been agreed in writing by IAOD, specifically setting out the relevant drawings that shall form part of the agreement between the MOICT and the investor
2	Obtaining the Building Permit within the first 9 months from the lease agreement.
3	Construction program to be submitted to IAOD..

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

1.3 Municipality Requirements

All proposals for buildings and associated car parking and landscaping must comply with all Planning and Building Control Regulations in the area and administered by the local Municipality.

1.4 Qualified Architect/Engineer

Buildings must be designed and their construction supervised by a qualified Category A or B design consultant approved by the CRPEP.

1.5 Building Permit & Constructions Deadlines:

Based on the clause no.6 & no.7 of the Industrial Plot Lease agreement, the tenant shall get the building permit within a maximum period of nine (9) months from the handover date of the industrial plot. In such cases, this deadline is not applicable for sand washing activities.

The Tenant shall begin the construction within one (1) year from the handover date of the industrial plot. The Tenant shall complete the project within a maximum period of two (2) years from the handover date of the industrial plot.

If the tenant fears that, the deadline date will end without the completion of the required. A written justification must be sent to IAOD before 2 months of the deadline to explain the reasons of the delay and to provide a new revised program showing the expected date to complete the requirement.

1.6 Plot Zoning (In BIIP):

Development sites comprise the net areas available for development within BIIP, excluding the roads and public open spaces. The land under project is divided into six zones based on their location within the project site and their primary use. These zones and their permissible land use are, as shown on next table, the plot use map is available in a separate document.

2. Site Responsive Design

Before any development design is undertaken, a thorough investigation of the site and its context should be undertaken, so that the new development will respond in the most appropriate way. This will include an analysis of:

- Surrounding existing and future plot uses.
- Future road networks.
- Water front access on the site.
- Assessment of existing infrastructure utilities services underground. All existing site services and other easements, way leaves or rights of way must be identified prior to the commencement of design work.

Note:

Minimum distances from these services must be accounted for in the design. Available information relating to manholes and other services connections to link into the site services infrastructure system will be made available, but the individual site developer is responsible for the establishment of existing above and below ground services on its individual site.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

3. Access and Circulation

Objectives:

3.1.1 To provide safe, convenient and efficient access for all vehicles to and from industrial plots.

3.1.2 To minimize the impacts of traffic on surrounding plot uses.

3.1.3 To provide access and car parking arrangements that are logical and legible to visitors and employees.

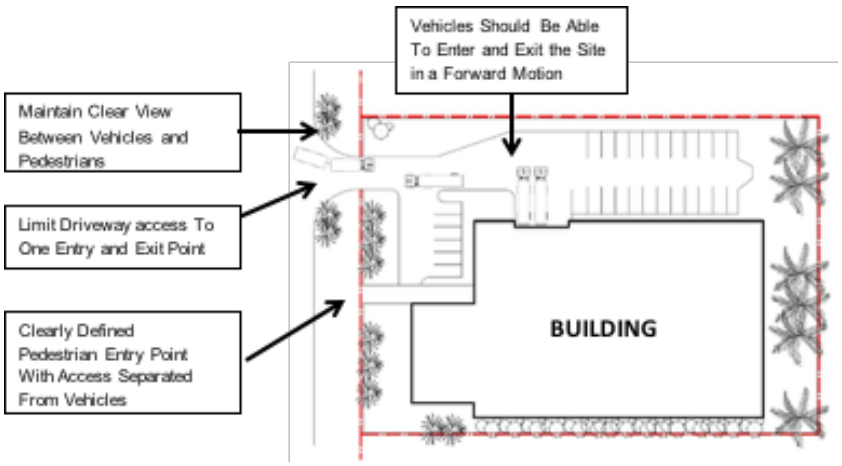
Guidelines:

3.2.1 Developments should be designed to allow all vehicle types to enter and exit the plot in a forward motion. This applies to all industrial plots regardless of plot size.

3.2.2 Locate vehicle access points to the industrial plot in a location that enables clear sight lines along the road enabling vehicles to enter and exit safely and efficiently.

3.2.3 Limit driveway crossovers to one entry and exit point for each industrial plot in order to minimize disruption to footpath and road. Additional road accesses may be permitted for large plots where a loop circulation network is required within the plot.

3.2.4 A Traffic Engineer's drawing should be provided to demonstrate that the Heavy vehicles can enter, exit and maneuver within the plot safely and efficiently, with minimal impact on the streets and surrounding plo



4. Utilities, loading and storage

Objectives:

4.1.1 To provide safe and efficient loading and servicing of industrial plots.

4.1.2 To minimize the visual impact of loading bays and service areas when viewed from the surrounding streets and other key viewing areas.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

Guidelines:

4.2.1 Loading areas should be located to the rear or side of the building away from the primary street frontage.

4.2.2 Where practical, integrate loading areas into the design of the building so that loading occurs internally. Where external loading areas are visible from the roads and other plots, they should be screened with landscaping or articulated built form.

4.2.3 Loading and servicing should occur with the vehicle completely contained within the plot. No part of the vehicle should extend into the public road reserve.

4.2.4 Loading and servicing should be designed to service a range of vehicle types.

4.2.5 Access to loading areas should be clearly separated from pedestrian and where practical separated from vehicle access routes.

4.2.6 Ensure storage and loading areas are or sufficient size and dimensions to avoid the use of car parks for temporary storage of goods. Using building setbacks for storage purposes is not permitted at any time.

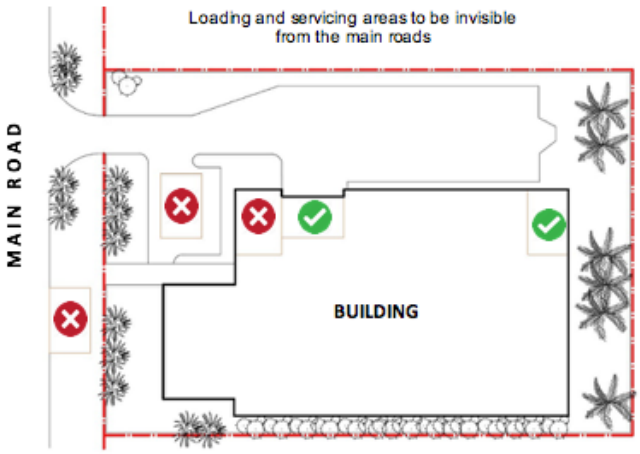
4.2.7 Loading areas should be clearly defined with line marking, designed to allow unobstructed vehicle access and provide appropriate turning areas.

4.2.8 Allow for sufficient and safe collection of waste materials.

4.2.9 Loading and unloading will not be permitted outside the plot boundary under any circumstance.

4.2.10 Parking of vehicles on the roads, pavements or service corridors shall not be permitted.

4.2.11 All external temporary storage shall be in containers or bunkers, which should be screened from view by the public and from the access road. Garbage/refuse containers and oil tanks must be concealed from public view. Screening may be by means of walls, banks or fencing combined with foliage and planting.



Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

5. Car parking layout and vehicular movement

Objectives:

5.1.1 To provide attractive industrial plots where parking is not a main element of the roads.

5.1.2 To provide landscaped car parks that integrate with the design of the plot and other roads.

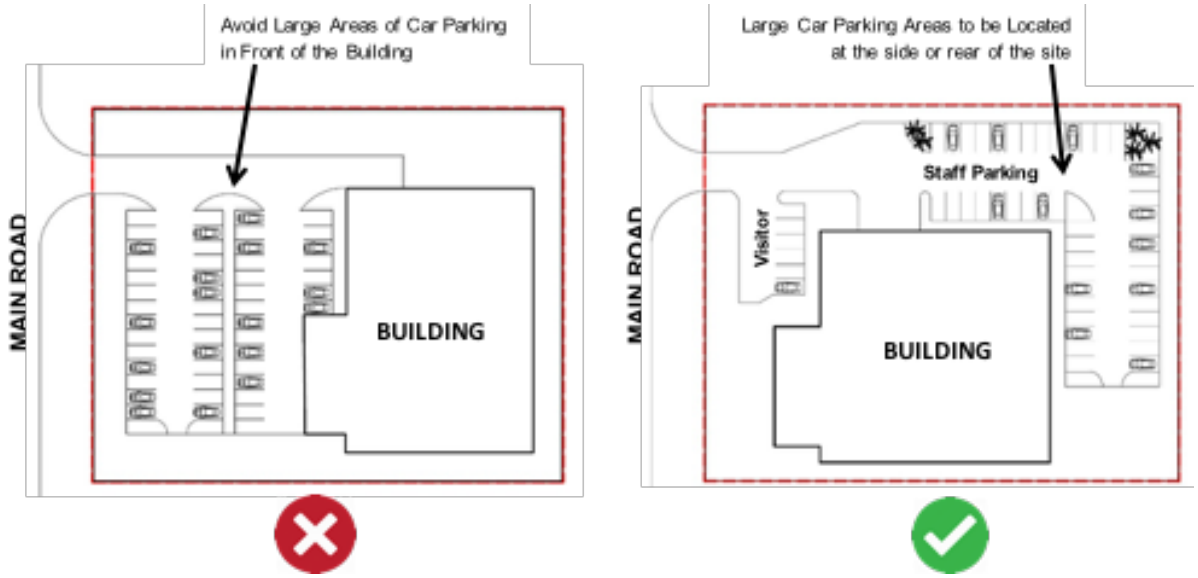
5.1.3 To provide safe and efficient access within car parks for all users.

Guidelines:

5.2.1 Car parking within the front setback of the site should be generally restricted to visitor parking.

5.2.2 Visitor spaces should be clearly distinguished with suitable signage or pavement markings and should be made permanently available for visitor use. Staff parking may be provided in the front setback if it can be demonstrated that sufficient car parks have been provided for visitors

5.2.3 Large expanses of car park of greater than 20 spaces should be located to the side or rear of the building, unless a justified exemption is required to the satisfaction of the responsible municipality



5.2.4 Car parking should be avoided within 3m of the front property boundary to allow sufficient space for landscaping.

5.2.5 Land uses which require the parking and regular movement of trucks should provide specific truck parking areas. This does not include truck movements within loading areas.

5.2.6 Clearly define pedestrian access between the car park and the entrance to the building.

5.2.7 Car parking spaces, loading docks and vehicle route directions should be permanently marked out on the pavement surface in accordance with the approved parking and access layout.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

5.2.8 Buildings should be designed to address car parking areas with windows and active uses such as entrances to provide passive surveillance.

5.2.9 Car and truck parking will not be permitted, under any circumstances, on the roadways or on the footpaths within the Industrial Areas.

5.2.10 All car and truck parking for any particular building shall be provided on the site allocated for that building. No parking shall be provided off site, with the exception of that included in a temporary remote car park if agreed.

5.2.11 In BIIP, there are two truck parks at the main truck entrances where trucks should be parked if immediate access to the individual plot is not available.

5.2.12 Generally, car parking should be screened by buildings and landscaping in order to reduce visual impact. The number of car or truck parking spaces for any development shall comply with Ministry and Municipality requirements. In general, this will amount to 1.5 spaces per 100m² for offices, and manufacturing.

5.2.13 Where car parking areas are in excess of 1,000m², they shall be broken up by intermittent planting or landscaped areas.

5.2.14 The parking of trucks on asphalt road areas is not permitted.

6. Building Heights & Setbacks

Objectives

6.1.1 To create cohesive roads that are characterized by consistent building setbacks.

6.1.2 To ensure the siting of buildings provides adequate space for landscaping.

6.1.3 To minimize impacts of overshadowing within the plot and on neighboring plots.

6.1.4 To comply with the safety requirement of the General Directorate of Civil Defence.

6.1.5 To ensure building heights are in line with the Implementation Regulations Law No 28 in the Kingdom of Bahrain.

6.1.6 To ensure building are appropriately scaled to maintain consistent views from surrounding areas.

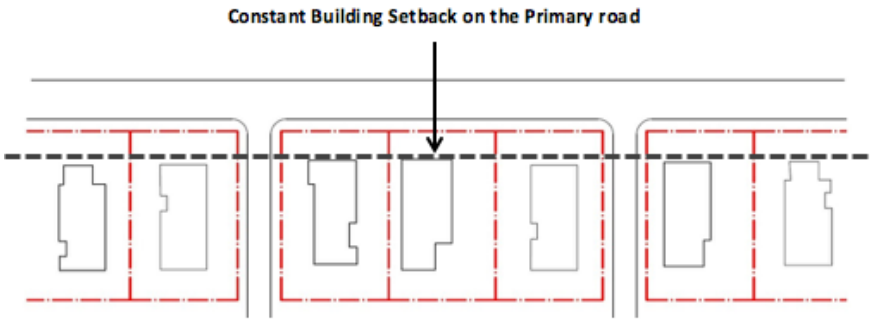
Guidelines:

6.2.1 Front building setbacks are to be consistent and not be used to store goods, materials or waste. Be noted that the front and side setbacks are differ in the industrial areas.

6.2.2 The building Setback for the primary roads is 6 meters minimum; while the setback in side roads is 4 meters minimum. However, BIIP considered as a special project, The building Setback for the primary roads is 15 meters minimum; while on the side is 6 meters minimum. A provision must be made as set out for trucks movement, parking, loading and unloading.

6.2.3 The height of the building is not to exceed 4 floors with a maximum of 24 meters. In special specifications industrial facilities, it allows to an increase in height of the building after the approval of the General Directorate of Urban Planning. The maximum foot print is 60% of the plot area while the minimum is 40%

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate



7. Building design and details

Objectives:

7.1.1 To provide practical building forms that meet the purpose of the industry.

7.1.2 The creation of a cohesive and unified architectural theme, with variations reflecting individual tenants' identity and their specific use.

7.1.3 To provide matched colors, materials and finishes within industrial areas.

7.1.4 To use building materials of high quality that will maintain their integrity and appearance.

Guidelines:

7.2.1 Buildings are to be of a responsive architectural style and reflect an industrial or commercial form of development. Avoid excessive detailing in elevations.

7.2.2 Office components are to utilize greater indication within elevations and a greater proportion of glass.

7.2.3 Buildings should provide a minimum of 30% glazing in the elevation that fronts the main road. Where this is not practical, it will need to be demonstrated that the front elevations contributes positively to the roads.

7.2.4 Utilize a mix of materials and colors particularly within the visible facades, to provide articulation to the buildings and visual interest to the street.

6.2.5 Materials should utilize muted, earthy tones or other colors approved by the concerned municipality. Avoid the use of bright, bold colors that are not compatible with the muted tones of the natural landscape. External finishes should be of low reflectivity to minimize glare and reflection to surrounding areas.

7.2.6 Where a building facade is greater than 40m long, a design break should be incorporated to enhance the visual effect.

7.2.7 External finishes should take in to consideration harsh climatic conditions of the region to maximize the aesthetical durability of the structure as well as to ensure climatic control within the building in order to minimize consumption of electricity and other energy resources.

7.2.8 Services features such as sanitary pipes, industrial piping, air-conditioning cut outs exhaust / air extract system etc. should be properly camouflaged especially on the important elevations.

8. Roof Forms

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

Objectives:

8.1.1 To provide uniformed roof forms that create visual continuity in the street.

8.1.2 To integrate the roof form into the overall design of the building.

8.1.3 To ensure roof forms reflect the existing road character and the industrial function of the building.

Guidelines:

8.2.1 Roof form should be designed to integrate with the existing roof forms in the industrial areas.

8.2.2 Roofs shall be flat but where a pitched roof is used a parapet/fascia must be provided to shield the slope plus any on-roof services

8.2.3 Building services which are located on the roof including air conditioning units, plant room, lift motor rooms, exhaust systems, rooftop car parking etc. are to be screened from adjoining roads and areas utilizing roof forms or parapets that integrate with the overall design of the building.

8.2.4 Incorporate natural lighting into the roof design for large span buildings.

8.2.5 In all cases, the visual impact of building mass in a particular location will be considered to ensure that skyline views are consistent.

9. Building signage

Objectives:

9.1.1 To provide for the identification of businesses in a way that maintains the character of the street and is designed to be compatible with visually sensitive areas.

9.1.2 To ensure signage is informative and coordinated in a way that enables customers to easily locate the facility and determine its services.

Guidelines:

9.2.1 Signage should be integrated into the design of buildings by forming a logical element of the front elevation and should be limited in numbers to avoid visual clutter and unnecessary repetition.

9.2.2 Freestanding signage should be avoided and will only be permitted if it can be demonstrated that signage on the building elevation will not provide effective business identification. If freestanding signage is permitted, it should integrate with the overall design of the site in terms of scale, form, landscaping and materials.

9.2.3 One identification sign not less than 4m long x 2m high for each occupant will be permitted on the exterior of the building, immediately adjacent to and to the side of the main entrance. This sign may not project above any roof or canopy or above the ground floor level.

9.2.4 Directional signage should be provided within plots to define entries and exits, staff and visitor parking, office /reception areas, and loading areas. Directional signage within the plot should be consistent in style and form.

9.2.5 No signs will be permitted on the roof, parapet or upper wall surfaces of any structure. The company name, logo and CR number may be incorporated into the lower part of the facade adjacent to the principal entrance.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

9.2.6 An appropriately scaled name sign may be permitted at the entrance from the road where a single client/tenant occupies the site. The sign shall be included in the original planning application. The sign shall not include any blinking or moving parts. No sign shall exceed 1.5m in height.

9.2.7 Flags or other special graphics will be subject to approval. All signage shall be subject to the approval of IAOD.

10. Plot boundary wall/fences

Objectives:

10.1.1 To ensure the front boundary treatment contributes positively to the appearance of the road and clearly define the public and leased plots.

10.1.2 To ensure fencing provides for adequate site security.

10.1.3 To ensure fencing is matched with the design of the building and landscaping.

10.1.4 To keep the erection of walls and/or fences throughout the Industrial Area to a minimum to preserve as open and boundary-free area environment as possible.

Guidelines:

10.2.1 The new allocated plots will not be permitted to build boundary wall only. The tenant shall include the proposed boundary wall together in the full set drawings for the proposed facility.

10.2.2 All fencing or boundary walls should have a high degree of transparency.

10.2.3 The following points to be considered during the design of boundary wall:

- Not exceed 2.2m in height.
- The tenant could utilize the landscaping to define the front property boundary.
- Allow clear views between the road and the business.
- Utilize materials and colors appropriate to the location, and building and landscape design.
- Avoid the use of high and/or solid structures / materials.
- Chain link or wooden fencing is not permitted under any circumstances.

10.2.4 In BIIP, the tenant shall keep the erection of walls and/or fences throughout the to a minimum to preserve as open and boundary-free a land environment as possible.

10.2.5 Provide landscaping around the fencing to soften the visual impact and avoid the use of razor or barbed wire fencing.

10.2.6 Services screening shall be opaque to minimum height of 3 meters and no element being screened shall project more than 3 meters above adjacent ground level.

10.2.7 All services screening shall blend in with general building and landscaping designs so as not to highlight itself.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

11. Lighting

Objectives:

11.1.1 To ensure lighting is adequate for the purposes of navigation for pedestrians and security.

11.1.2 To minimize the spill of light onto other and nearby Industrial plots.

Guidelines:

11.2.1 Lighting should be provided on site for the purposes of security and safe pedestrian access to buildings and car parks. It should be designed so that it does not negatively impact on the safety of road users.

11.2.2 Utilize sensor lighting where appropriate to reduce energy consumption and impacts on surrounding areas.

11.2.3 Soft lighting of the building exterior should be considered. The light source should not be visible and should complement the building design. Roadway, parking and service area lighting should be by means of free standing fixtures with cut-off lighting sources. The materials and color of the fixtures must be compatible with the building and landscaping and approved by the IOAD.

11.2.4 The color of the light source must be consistent throughout the development and the lamp type will be subject to approval of the IAOD.

12. Landscaping

Objectives:

12.1.1 To provide landscape design that enhance the characteristics and qualities of the particular site and industrial area.

12.1.2 To provide high quality landscaping within the front setback that enhances the setting of buildings in the street.

12.1.3 To provide low maintenance and drought tolerant landscaping.

12.1.4 Consider the use of Treated Sewage Effluent to irrigate the landscaping.

12.1.5 To ensure the ongoing maintenance of landscaped areas.

12.1.6 To ensure buildings are integrated with the landscape.

Guidelines:

12.2.1 Utilize planter boxes in locations where there is insufficient space to establish a landscaped area. Boxes should be integrated into the overall design of the building and landscape, and be of an adequate size to maintain plants.

12.2.2 Trees species should be carefully selected and sited so that the root systems and canopy do not impact negatively on assets within the road reserve or users of the road reserve.

12.2.3 Where a tenant fails to implement a landscaping scheme, IAOD Team may carry out the proposed landscaping and recover the costs of doing so from the tenant.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

12.2.4 Individual site landscaping must relate to the overall design of the public open space, roads and footpaths as already established. A minimum area equivalent to 20% of the plot at the Building Frontage shall be devoted to soft landscaping so as to provide visual relief both for the Building within and the Access Road.

12.2.5 Landscaping should be such as to soften the impact of car parking. Combination of both 'hard' and 'soft' landscaping may be used. Trees, shrubs and flowers shall be indigenous of the area and hard landscaping such as interlocking pavers and paving flags should reflect indigenous materials. Proper consideration should be given to economise and optimise the use of water while selecting the plant species.

12.2.6 Where permanent landscaping cannot be completed at the outset and if the latter stages of development are delayed for more than two years, landscaping shall be carried out on the relevant parts of the site in a temporary manner.

12.2.7 Where building development is carried out in stages, perimeter landscaping may be completed as part of an initial phase of the development. All other landscaping and car parking must be carried out in stages corresponding with the on-going development stages.

12.2.8 Any temporary or permanent landscaping, planting or seeding damaged or disturbed in any manner on the subject site (or other site) must be reinstated fully and promptly.

Important Considerations:

12.3.1 Landscape schemes for individual buildings shall be in harmony with the overall landscaping master plan for the Industrial Area. Where a company fails to comply with the above landscaping requirement, IAOD may carry out landscaping works on the site and charge the costs to the company.

12.3.2 IADD has responsibility for the maintenance of general/communal Industrial Areas including landscaping, internal roads and lighting. The cost of these services may be charged to Industrial Area's tenant companies on a pro rata basis proportionate to the area they occupy.

12.3.3 Maintenance of Individual Sites/Buildings-Individual companies, whether lessees or facility owners, shall be responsible for full maintenance of landscaping, roads and external fabric of building within their own sites.

12.3.4 Where a site/building is not satisfactorily maintained, IOAD may arrange for the appropriate maintenance work to be carried out and the costs charged to the company involved.

Part d construction stage

1. Access to the site

- During the construction period, contractors will require access and building works will be ongoing on site. A prescribed access route will be agreed with the individual plot developer. All contractors' vehicular visits to the building shall be efficient in time usage to deliver materials and to remove materials as soon as possible.
- No storage, even temporary, will be permitted outside of the plot without IAOD prior written agreement.
- A programme for the construction works shall be submitted to the IAOD prior to start on site of the works and revise programmes shall be issued as required.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

2. On-site construction

- Obligations to the IAOD begin at the commencement of the construction phase. Development contracts shall specifically provide for the following:
  - Appropriate boundary security.
  - Provision of waste and sanitary facilities.
  - Maintenance of industrial area roads and paths free from dust, mud, nuisance or hazard.
  - Protection of existing features.
  - Avoidance of spills or accidents.
  - Removal of excess construction spoil.
- All materials shall be placed entirely within the area of the individual plot unless otherwise agreed.
- All mixing of concrete, cement, sand or plaster shall be carried out off the industrial area. No mixing or depositing of materials will be allowed in roadways or any other areas. All necessary measures shall be taken to fully prevent penetration of liquid or slurry.
- The Contractor shall provide all necessary protection to all the estate roads, footpaths and landscaping. An inspection at completion of the works will be made by the Architect to ascertain the extent of any damage which shall be made good at the expense of the individual site developer. However regular cleaning of road ways adjacent to construction works shall be undertaken and the individual plot developer shall take all necessary measures to avoid nuisance to other parties during the construction period.
- All access ways, roadways, footpaths and landscaped areas external to the individual site shall be kept clear at all times.
- No parking of Contractor's vehicles will be allowed outside the construction site without written prior agreement of IAOD.
- The plot tenant shall liaise with IAOD to obtain details of all underground and over-ground services to the site including foul sewerage, surface water drainage, water, gas, telecoms and electricity.
- In cases where the individual plot, developer makes a temporary connection to the drainage network to dewater the site during construction. No such work shall be undertaken without firstly taking formal approval from the relevant authority. The plot tenant shall provide two-stage settlement tankage and safely locate delivery hose to the drainage network. The drain shall, if necessary, be cleared and rodded at the individual plot developer's expense from the site to the connection with the local sewer on completion of the work.
- The plot tenant shall store its rubbish in closed containers within the individual site or such other area after receiving prior written agreement from IAOD and to clear away the same at regular intervals.
- The site and buildings shall be completed to a finished clean and tidy state to comply with the approved construction drawings. In the event of the failure to achieve this within six months of practical completion the IAOD reserves the right to gain access to the individual site and complete the necessary rectification works at the expense of the individual site developer.
- The tenant shall ensure that the construction works are carried out with minimum disturbance to the public or other occupants of the industrial area.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

3. Insurance - (applicable in biip only)

- The plot tenant shall arrange insurance for the construction works as appropriate and thereafter shall arrange such insurances as it covenants so to do under the Lease/Purchase Agreement.
- Before commencement of the construction works, the plot tenant shall confirm in writing that it and its Contractors are insured with approved insurers in respect of the above.
- The plot tenant shall produce the certificate and policies for inspection, and evidence of payment of premium.

4. Alterations to the existing infrastructures

- The plot tenant shall not make any alterations to the industrial area Infrastructure or services.

5. Sings - boards

- For any construction works within the Industrial Area. The tenant shall fix a site signboard in the main access to the site.

This signboard shall include the followings (in order):

- Logo of the landlord (MOICT)
- Name of the Tenant
- Project Name
- Building Permit Number
- Construction Deadline date based on the lease agreement between the tenant and MOICT
- Name of the Main Contractor
- Name of the Sub Contractors

6. Appointment of contractor

- Prior to the commencement of works on site the plot tenant shall inform the IAOD in writing of the name and address of the Contractor, which is to include both the names of an office and site contact. The Contractor's foreman/supervisor must be on site when any tradesman/worker is working.

7. Construction rubbish

- Refuse and other materials set aside for removal from site shall be contained within the individual site in a closed bin or container, then removed by a route to be agreed with the IAOD and shall not be deposited into the drainage system or in any common area.
- The IAOD reserves the right to remove from the plot, in the interest of safety and cleanliness, any materials, plant or equipment at the individual plot developer's cost.

8. Fire precautions

- The burning of rubbish within the building or site during the construction period is strictly forbidden.
- All construction operations are to be arranged to ensure that they do not affect building works or completed buildings on other sites or in particular the individual site developer shall not damage or interfere with the Infrastructure Works or other site works.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

- If any work is necessary in the Industrial plot not within the boundaries of the individual site then before commencing such works the individual site developer must obtain the written approval of the IAOD.

9. Environmental factors

Processes or operations that are likely to produce any environmental hazard will not be permitted e.g.:

- Noxious odours, noisy or dangerous trades.
- Fumes
- Dust, smoke, heat, vibration, illuminations, glare, noise, odours, pollution in any form, electrical disturbance.
- Operations requiring drainage/effluent discharge above that already provided on the site may only be accepted after written approval from IOAD.
- Any operation which entails a discharge of gas, steam, smoke or similar by projects, may only be accepted after written approval from IOAD.
- Any operation that may overload floors on other structural parts of the premises.
- Any operation requiring the installation of machinery which may be noisy or cause undue vibrations or which shall be dangerous or a nuisance.
- Any operations that may obstruct any windows or other lights.
- Any other environmental hazard.

Note:

The protection of existing environmental conditions is a primary objective of the MOICT. In addition to conforming to local or relevant Environmental Agency requirements (current and future), developments will also be required to avoid the creation of nuisance to adjoining landowners or occupants (be they industrial, commercial or residential). It is a requirement of lease approvals that statutory environmental conditions are continually complied with.

10. Maintenance

IADD or the appropriate public utility services will be responsible for the maintenance of all 'public areas' including roads, public lighting, open landscaped areas and security. Where such costs are levied on IAOD they will passed onto the tenants as a service charge on a pro-rata basis.

Site occupiers will be responsible for the general maintenance and appearance of their site.

Maintenance requirements shall include:-

- Grass and pest control.
- Keeping hard landscaping clean and free from moss growth etc.
- Keeping footpaths and paved areas free from weed growth.
- Making good any damage to roads, parking areas, landscaping or site features caused as a result of activities of the owners, tenants or occupiers or the activities of their contractors, sub-contractors or visitors.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

- Prompt removal of all litter and waste.
- Maintaining external lighting and signs.
- Maintaining all external surfaces and paintwork and repairing all external damage to the building fabric.

Where a plot/building is not satisfactorily maintained, IOAD may arrange for the appropriate maintenance and recover the costs from the offending tenant.

11. Effluent

The following conditions shall apply to effluent discharge:

- Industrial effluent, if produced by the Company, shall be discharged to the foul sewer.
- The Company shall conform with the conditions of the issued local effluent discharge licence, if the Company has such a licence.
- The discharge of substances which are detrimental to the operation, maintenance and purification process of sewers and treatment works shall be prohibited.
- Where applicable the Company shall comply with the issued Environmental Agency License.

12. Wastes

The following conditions shall apply to the disposal of wastes:

- Wastes shall not be disposed of by open burning.
- All wastes and by products shall be collected and stored in a designated and controlled storage area(s) prior to ultimate disposal.
- Wastes preferably shall be collected for recycling/re use whenever feasible.
- Non reusable wastes shall be disposed of to a landfill site operated or licensed by the Local Municipality or other relevant authority.
- Any toxic chemical waste shall be disposed of in accordance with the local legal requirements. A record shall be kept of the types, quantities, date and manner of disposal of these wastes.
- All wastes shall be disposed of to the satisfaction of the competent planning / sanitary authority.

13. Atmospheric emissions

- Fuel oil and/or solid fuel heating or process units shall be operated smokelessly in accordance with control of atmospheric Pollution Regulations.
- No objectionable odours arising from plant operations shall be detectable beyond the site boundary.
- Airborne contaminants within buildings must be kept below threshold limit concentrations.
- The Company shall conform with the conditions of the issued local air emission licence. Where applicable, the Company shall comply with the issued relevant Environmental Protection Agency Licence.

Requirements of the Ministry of Industry, Commerce and Tourism Industrial Areas Operations Directorate

14. Bulk storage

- All oil storage tanks located above ground shall be provided with an adequately designed bund system complete with an impervious base; filling and off take points shall be located within the bund.
- Bulk chemical and/or bulk solvent storage tanks located above ground shall be provided with an adequately designed bund system with an impervious base; filling and off take points shall be located within the bund.
- Drums of chemicals/oils and/or solvents shall be stored in designated and secure storage areas. Storage areas shall be bunded or otherwise designed so that surface and ground waters cannot be contaminated by any spillages.
- LPG storage tanks, if present, shall be the required safe distance from the premises for the storage of liquefied petroleum gas at fixed installations.

15. Noise

- The Company should comply with regulations in line with appropriate Bahraini Legislation and Regulation.

16. Building completion

- The IAOD shall be advised prior to the individual plot developer's Contractor finally leaving the site.
- IAOD engineer will visit the facility to verify the construction drawings before issuing the NOC.
- Within 28 days of completion of the works the individual plot developers shall provide IAOD with two sets of as-built drawings to a scale of not less than 1:100 together with soft copy in CAD format.

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Table of Contents

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

1. Introduction

The requirements of the General Directorate of the Civil Defence that are related to the systems of fire fighting in the facilities are included in this manual. For more detailed requirements of fire fighting systems, you can refer to the following publications available at the General Directorate of the Civil Defence:

Extinguishing and alarm equipment requirements of GCC countries (Second Edition, 2006).

Preventive requirements of hazardous materials of GCC (Second Edition, 2012).

Summary of fire safety and protection conditions required to issue building permits

1. Doors (made of wood of 45 mm with automatic closer) which are fire resistant for half an hour.
2. Doors (made of wood of 55 mm with automatic closer) which are fire resistant for an hour.
3. Provide walls up to the ceiling of the floor that are fire resistant for two hours as per the requirements.
4. Provide doors that open to the outside and providing automatic opening mechanism as per the requirements.
5. Provide natural ventilation in:

a. Stairs (stair windows which can be opened, having a measurement of 1.5 square meters and are above the floor by not less than a meter).

b. The basement.

c. Parking lots.

d. All areas in the building.

6. Provide mechanical ventilation in:

a. Stairs (air pressure system).

b. Parking lots.

c. The basement.

d. Deep-ventilated areas.

7. Provide natural and mechanical ventilation.
8. Provide plastic panels for higher ventilation (the building roof).
9. Isolating the vertical and horizontal services area with fire resistant materials (ducting, pipes, air conditioning, openings and slip of waste).
10. The materials used for the mezzanine should be fire resistant.
11. Barriers are not permitted to be placed on windows from the outside in floors above the ground floor (except for schools).
12. Putting gas cylinders in a well-ventilated steel on the ground floor and the fittings should be made of copper or iron.
13. Provide electric ovens for open kitchens.

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14. Provide fire blanket for open kitchens.
15. The electricity meter should be outside the building.
16. Provide an elevator for Civil Defence men and providing emergency generator.
17. Provide emergency lamps and signs that indicate emergency exit.
18. Provide automatic alarm system.
19. Provide appropriate hand fire extinguishers.
20. Provide Fire Fighting System of the following type:

a. Dry tube system.
b. Wet tube system.

21. Provide smoke suction system.
22. Provide water hoses.
23. Provide water sprinkler system.
24. Recommendation: Connect the automatic alarm system to the Operations Chamber of the General Directorate of Civil Defence.
25. The requirements of the hazardous materials section shall apply with respect to the hazardous materials in the project.
26. Protecting the steel structures of the building with a fire resistant material (dipping or coating) for two hours.
27. The conditions for the protection and safety of the quality of the cladding should be take into account.

    Maps that illustrate compliance with the following points should be provided upon applying for a building permit (6, 7, 16, 17, 18, 19, 20, 21, 22 and 23).

Based on the Buildings Fire Prevention and Protection Requirements Guidebook

Definitions:

Automatic and private doors of escape means:

Automatic doors which are opened through light cell on being approached by somebody or through any other mean and also the doors which are opened or closed by automatic means.

Emergency lightening:

Lighting from independent electrical source from the main electrical current supply source. This lightening continue to lighten when the current is disconnected from the main supply source.

External fire spread:

Fire spread on the external façade of the building through the extension of flames from the windows and other openings or through the extended heat from the fire site to the neighboring buildings.

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Fire warning systems:

A group of devices which release audible or visible signals which attract the attention and operate automatically or manually when exposed to smoke or certain level of heat

Automatic Fixed Firefighting system and Equipment:

They are considered as fixed extensions network with distributed openings at the required locations to be protected and provided with continuous source of suitable extinguishing material. It is operated automatically by heat sensing arising from the fire or the smoke impact or by both means.

Fire proof door:

A door the frame of which and its all parts designed to present the passage of smoke or hot gases or flares when it is closed.

Coverage:

Open surfaces materials of the rooms walls, roofs and also includes partitions which can be folded or removed and glass fittings.

Automatic ventilation:

Disposal system of the smoke which depend on the use of suck up fans for driving away the smoke or any other gases from the hazard area.

Natural ventilation:

Disposal system of the smoke which depend on the natural movement of “hot air” for driving away the smoke or any other gases from the hazard area.

External wall:

The wall facing internal open area in the building or facing up to the road.

Internal wall:

The wall which divides the building internally into parts whether the wall is fixed or mobile.

Fire preventive wall:

A fire resistant barrier for specific period for limiting fire or vapors spread.

Critical minimum heat exposure level:

A feature through which the resistance of the finishing surfaces of the floors to the flames spread is classified. It is carried out through standard test technically based on the assumption that flames spread on the floors surfaces during actual fires depend on the level of heat exposure. Therefore the greater the heat exposure level at which the standard test criterions are achieved, the greater the tested material ability to resist the flames spread.

Fire spread preventive barriers:

Construction elements separating between fire spread preventive units

Staircase:

Vertical movement mean between the floors of the building.

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Flame Spread degree:

It is the rate at which flames spread to certain materials or installations of interior finishing materials of walls. It is the standard number that is derived from the noticing of the flame spread on the surface of a material or installation.

Fire resistance degree of materials:

The time a construction material/element withstands fire and resists flares and hot gases in the event they are exposed to maximum fire under the conditions set in maximum tests.

Evacuation period:

Allowed time for the occupants of the building (available at the fire site) to reach to a safe location from fire hazard.

Escape means (emergency exits):

The escape means are composed of safe path or more so that the occupants or the people available in the building could escape by moving from any point in the building directly to any safe hall or location from fire and also lead to outside the building where it is safe from fire hazard.

Basement (basements):

Part of the building located under the ground or protected vault from bombs

Roofs:

Part of the building Construction frame which separates two units horizontally. i.e. a cover of a unit and forms a roof to it.

Dry Firefighting water network:

Vertical pipes network installed in the building for firefighting purposes provided with fire men capable of driving the water and connected with fire hoses at certain points in the building and end ending with air release valve.

Moisture Firefighting water network:

Vertical pipes network installed in the building for firefighting purposes connected with compressed permanent water source provided with water hoses for firefighting at certain points in the building.

Capacity of escape means:

The capacity is estimated as the maximum number of people who could be available in the building or any part of it at any time

Non combustible materials:

Material which cannot be burnt and do not release susceptible gases or vapors to burning.

Hidden vacuum:

Gap or hollow within construction elements, i.e. the formed gap above suspended roof or below the last surface of the building, below the floor or behind the walls and alike.

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External fire extinguishing water hoses:

Fire extinguishing water supply system provided to enable fire men to control the fire. It is assumed that the external fire extinguishing water supply network hoses shall be independent from the building and neighboring other buildings water supply network.

Square:

Large area of land without separating roads between its parts.

Fire spread preventive units:

A section or sections of the building separated and surrounded with Construction barriers which prevent for specific period the movement of fire within the fire spread preventive unit and other parts of the building or the neighboring buildings

Fire hydrants (water mains):

They are underground extensions network with continuous water source supplying fire hydrants with water and used for fighting fire from outside by civil defense men.

Commercial buildings (offices):

Buildings or parts thereof whose occupants are not more than 50 persons at the same time, and are used for office purposes.

Commercial buildings (shops):

Buildings or parts thereof which are designated for public service.

Assembly buildings:

Allocated buildings for accommodating (50) persons or more for recreation, cultural, sports or presentation purposes

Education buildings:

The buildings or their parts which are allocated for education purposes and they accommodate (6) regular students with attendance not less than (12) hours per week such as kindergartens and preparatory, elementary, secondary schools, professional, applied institutions, colleges, universities and their alike.

Social care Buildings:

Buildings or parts thereof which are designated for provision of social care and which provide, at least, four beds for old persons, elderly or infants as in nurseries.

Health Care Buildings:

Buildings or parts thereof which are designated for provision of health services and which provide, at least, four beds for sick people. It is known that the persons who go to these places are unable to protect their lives due to their old age or because they suffer physical or mental illness. These buildings include recovery buildings along with ambulance and emergency buildings.

Health and social care buildings:

Buildings or their parts which are allocated for health, social care purposes and the occupant of which are

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unable to move or they are under deprivation of liberty with limited movement including hospitals, elderly caring premises, mental health facilities and prisons of all category types.

Residential buildings:

Buildings or their parts allocated for residences or stay overnight.

Private residential buildings:

Such as small villas (private residences) or private palaces: They are one family residence and include independent houses owned or occupied by one family. These houses could be of villa type (one floor) or two floors or three independent floors or houses with open balconies and also include constructed houses on commercial shops provided that they constitute private residences.

Industrial buildings:

They are the buildings or their parts which are allocated for industrial purposes or industrial purposes or industrial professions. They include various industrial establishments such as dairy establishments – furniture factories – central laundries – hazardous chemical materials laboratories – printing presses and industrial professions buildings and various industrial workshops.

Warehouse buildings:

They are the buildings or their parts designated for storage of raw materials and processed or half processed products. This type of buildings could be independent or part of processing or sales buildings

Industrial establishment's buildings:

The buildings or their pars designated for industrial purposes where the composition and mixing and wrapping operations are carried out.

Industrial professions buildings:

The buildings or their parts which are allocated for repairs operations

Open Field:

Open area such as courtyard.

Wastes accumulator:

Vertical corridor with the building length for disposing the wastes provided with appropriate openings in each floor.

Final exit:

Any corridor, path or exit mean from the building or ground floor or basement to the road or open field (open area) such as courtyard.

Chimney:

Vertical design constructed of materials which endure high temperature degrees for the disposal of the smoke and gases arising from fuel burning devices.

Movement distance:

The distance from the further point in the room or section to the exit or protected staircase from fire.

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Direct distance:

The shortest imaginary line inside the building connecting the farthest point and the exit.

Fixed Firefighting Equipment:

They are fixed network extensions out of which some are used for firefighting by normal occupants of the building and others are used by trained people such as special fighting teams or civil defense men

Manual firefighting equipment:

They are mobile manual equipment (preliminary fighting) which are used for firefighting at its initial stages by normal people available in the building

Movement rate in the escape means (emergency exits):

Is the exit of 40 persons per minute from wideness unit.

Corridor:

Joint path extending from the rooms or sections to a hall or staircase or exit.

Ramp (Ramps):

Any beveled corridor or path connecting two different heights levels and forms one of the escapes means (emergency exits).

Ramps:

They are beveled roads, the alternative of the stair in the movement from one level to another in escape means.

Light hole (holes):

A gap through which the light or air falls directly from the highest part until the ground floor of the building and accordingly enlightens the place and allows the air inside the building

Car Parking Buildings:

They are buildings used of the storage and parking of cars in continuous or temporary form and in this sense they are considered as attached to the warehouses buildings. Therefore, the general preventive requirements for protection from fire in warehouses buildings should apply in general to the car parking

Mezzanine:

Part of the floor on top the ground floor and mostly face up to it or a floor between two main floors

Foam and water system:

It is a pipe network distributed to the required areas to be protected provided with foam and water either mixed with each other or mixed before flowing on the burning surface.

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Dry chemical powder system:

It is a pipes network distributed to the required areas to be protected containers (as extinguishing material) pressurized by nitrogen gas or carbon dioxide which will be driven out on operation in the required area to be protected. The materials used in the extinguishing material normally include sodium bicarbonate or mono ammonium phosphates.

Closed finish:

The corridor or point from which the escape could take one direction only.

Wideness units:

A number of the necessary units for the exit of people in accordance with specified movement rate estimated as (40 persons per minute) in limited period determined in accordance with the type of hazard in the building and the extent of the availability of prevention requirements.

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part One

Fire Prevention and Protection Requirements for Buildings

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

1. Title

These regulations should be known as regulations of buildings fire prevention and protection requirements and referred to in this document as the regulations or these regulations.

2. Purpose

The purpose of these regulations is to determine the minimum level of prevention requirements necessary for the protection from fire in order to protect the life of the users of the buildings without hindering their daily use of these buildings.

3. Field

3.1 These regulations concerned with the life protection requirements from fire and its alike arising from emergency cases

3.2 These regulations take into consideration the panic status resulting from the buildings fire through requirements designated for eliminating the causes of such panic during emergency times.

3.3 Several aspects were taken into consideration during the preparation of these regulations the most important of which are the following:

3.3.1 Structural fire resistance.

3.3.2 Types and standards of fire protection.

3.3.3 Types of users of the building and their number

3.3.4 Types of activities practiced in the building.

3.4 The minimum level of requirements for designing escape means (exits) for the users of the building to other safe locations whether inside or outside the building.

3.5 It was observed that escape means are not the solely factor in life protection which the regulations handle. These regulations do not tackle all the factors such as awareness of the public which is considered as one of life protection factors.

3.6 The regulations do not take into consideration the prevention of normal personal incidents (such as falling on the ground) which are caused by lack of the building with regard to the safety means. The regulations concentrated on the protection of lives from fire as a basic requirement rather than protection of property.

3.7 These regulations are not building requirements regulations but can be used with building requirements regulations.

3.8 These regulations are not laid down to safeguard the life of those who by accident or intention set fire or become close to burning point.

4. Application Procedures

4.1 These regulations should apply to all buildings for which construction permits are issued after these regulations become valid.

4.2 It is not practical to apply these regulations on the existing buildings. In such case the civil defense may request additional equipment or as a substitute for some precautionary prevention measures required according to these regulations.

4.3 The civil defense on issuing the construction or operation permit may request additional equipment or as a substitute to some precautionary preventive measures required according to these regulations.

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4.4 Any additions to the existing building should be according to the requirements and conditions of these regulations.

4.5 If the building contains two or more activities or uses which are different in the degree of hazard and cannot be separated the requirements which are more concerned with the life protection shall be applied on the various activities and uses.

4.6 No requirement prescribed in these regulations prevents the designing or installation or use of better types of equipment for prevention and protection from fire or more number of emergency exists or any equipment which have positive impact on the protection of the life of the users of the building or the equipment which serve the same purpose prescribed in these regulations or superior equipment provided that the supporting documents and papers which prove the efficiency of the substitute shall be submitted to the civil defense for approval.

4.7 The systems, equipment and tools of prevention from fire of life from fire in the building should receive the required maintenance to ensure their permanent operation with high efficiency.

5. Operation and Use of the Building:

The building construction permits of which are issued after the validity of these regulations shall not be operated or used in whole or partial if not in compliance with these regulations.

The used buildings before the validity of these regulations may be used or operated provided that they meet two basic requirements as follows:

1. There is no real noticeable hazard which may affect the lives of the users of the building.
2. The classification of the building and the related activity remain without change. Any change in the building requires the application of the conditions and requirements of these regulations. As long as the escape means (emergency exits) are available and the protection systems from fire are operating normally the building may be used during the maintenance or amended by addition or deletion.

6. Designing Basics

6.1 The purpose of these regulations as mentioned earlier is centered around the protection of the users of the building without hindering their daily use of it. This goal is achieved through ensuring the application of the minimum level of requirements which can be summarized in the following considerations:

6.1.1 It should be taken into consideration that the Construction frame and the building shall be properly designed, well ordered, operated and maintained to avoid any hazard to the lives of the building users from fire, smoke, vaporization and panic in the event of emergencies, shall permit the evacuation of the users of the building during emergencies..

6.1.2 Ensuring that the building construction frame endures the fire impact during the building evacuation course in the event of emergencies.

6.1.3 Ensuring during the designing of the building and before the construction phase that the appropriate escape means (emergency exits) are available for each building or establishment in

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construction and it should be also taken into consideration the type of the building, its uses, its users and the type of fire prevention means which shall be made available..

6.1.4 Ensuring the availability of escape means (emergency exits) without relying on Firefighting means.

6.1.5 It is not always necessary to evacuate the building as a whole for rescue from fire. The building may include a horizontal evacuation area protected from the smoke or gas leak from other floors or parts of the building. These protected areas allow relative safety until the emergency case is ended.

6.1.6 Ensuring during the designing phase that the escape means are free from anything that may hinder their use. The doors opening direction in the designing and implementation are in compliance with the escape path.

6.1.7 Ensuring the placement of the guiding signs on the escape mean so that no confusion shall occur during the evacuation.

6.1.8 Ensuring the availability of satisfactory lightening and the suitable warning devices in the building and the vertical openings shall be isolated from other parts of the building.

6.1.10 Ensuring the availability of the minimum level of prevention requirements for protection from fire as indicated in these regulations.

6.1.10 Allowing the opportunity in the designing phase to provide more protective requirements conducive for continuation of the use of the building.

2. Buildings and Establishments classification:

2.1 Classification of buildings by two methods: in terms of the nature of use and in terms of the hazard of their contents.

2.1.1 Classification of the establishments in terms of the nature of use to the following groups:

2.1.1.1 Assemblies buildings

2.1.1.2 Educational buildings

2.1.1.3 Health and social care buildings

2.1.14 Residential buildings

2.1.1.5 Commercial buildings and public markets

2.1.1.6 Industrial establishments and industrial professions buildings

2.1.1.7 Warehouse and car parking buildings

2.1.1.8 Special nature buildings

2.1.2 Each one of these groups contain several types of buildings activities or assemblies closely related such as the following:

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2.1.2.1 Assembly buildings: Allocated buildings for accommodating (50) persons or more for recreation, cultural, sports or presentation purposes such as:

Worship premises	Courts
Lectures rooms	Meeting halls
Presentation halls	Banks venues
Museums and theaters	Major libraries
Sports clubs and covered playgrounds	

2.1.2.2 Education buildings:

The buildings or their parts which are allocated for education purposes and they accommodate (6) regular students with attendance not less than (12) hours per week such as kindergartens and preparatory, elementary, secondary schools, professional, applied institutions, colleges, universities and their alike.

2.1.2.3 Health and social care buildings:

Buildings or their parts which are allocated for health, social care purposes and the occupant of which are unable to move or they are under deprivation of liberty with limited movement including hospitals, elderly caring premises, mental health facilities and prisons of all category types.

2.1.2.4 Residential buildings:

Buildings or their parts allocated for residences or stay overnight.

The residential buildings are divided into several categories according to the type of use as follows:

2.1.2.4.1 Buildings composed of permanent residential units for one family (flats) such as investment residential buildings.

- Buildings composed of rooms or barrack rooms permanent individual or group residence such as residences of the students, employees, workers and barrack rooms of the soldiers and their alike.
- Buildings composed of rooms for temporary stay overnight with or without pay such as hotels, motels, guest houses, furnished flats and their alike.
- Residential buildings such as small villas or private palaces.

2.1.2.5 Commercial buildings and public markets:

Buildings or their parts which are allocated for serving the public “commercial shops” or the users of which are not exceeding (50) persons at one time and those allocated for office uses “offices” such as:

- Whole and retail sale shops
- Light professions services
- Commercial centers
- Tailoring and barber’s shops
- Business administration offices
- Small banks services
- Institution offices

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- Consultancy or engineering officer
- Company offices
- Real estate offices and their alike

2.1.2.6 Industrial establishments, buildings and industrial professions which include improvement operations such as:

- Dairy plants
- Furniture factories
- Various industrial shops
- Printing Presses
- Hazardous chemical materials laboratories
- Central laundries
- Industrial Handcrafts buildings
- Various industrial shops

2.1.2.7 Ware houses and car parking buildings:

Buildings or their parts which are allocated for raw materials, processed and half processed products storage purposes such as:

- Car parkings
- Horse stables
- Feed stores
- Food materials stores (refrigerators)

2.1.2.8 Special nature buildings:

Buildings composed of several and various types of the previously mentioned buildings such as towers and high buildings and basements (buildings underground surface).

2.1.3 Classification of the establishments in terms of the hazard of their contents into the following categories:

Hazard Level	Description
Light hazard	Buildings the contents of which are of weak burning nature to the extent that it is not possible for them to be of self ignition and therefore the potential hazard is represented in the panic status and over crowd in the exits during exposure to fire and smoke from external sources
Medium hazard	Buildings the contents of which can burn at medium speed or can release noticeable quantity of smoke but do not produce toxic vapors and do not result in explosions during burning
High hazard	Buildings the contents of which burn at high speed or produce toxic vapors or explosions.

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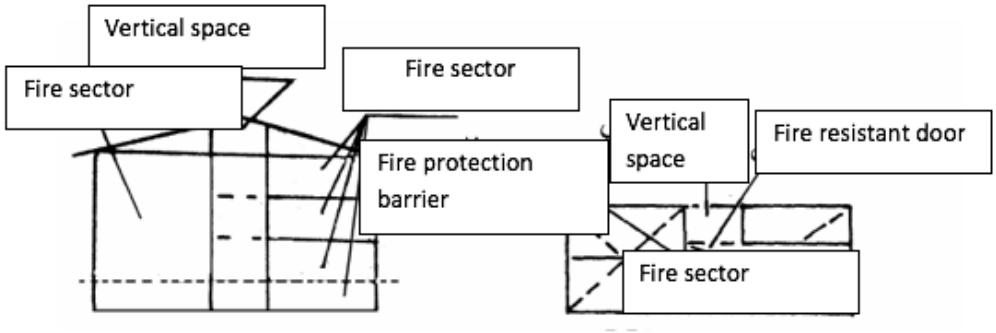

3. Documentary courses for construction and use permits:

3.1 The document courses for permits related to the establishments subject to the requirements of protection from fire in the buildings should be left to the organizing laws and regulations in each country of the council countries.

4. Designing, supervision and implementation

4.1 The organization of the designing, supervision and implementation process should be left to the prevailing laws and regulations in each one of the council countries.

5. Sites organization requirements for protection from fire

5.1 On submission of site plans with other plans for obtaining approval the construction requirements should be observed in addition to clarification of the project site and the important sites and neighboring buildings and the areas of their use and the names of the surrounding roads of the site mentioned.

5.2 The building concentration and its distance from the neighboring buildings should be determined by the approval of the civil defense.

In accordance with the nature of the use

5.3 The easy passage of civil defense vehicles and equipment to the nearest point of the building shall be taken into consideration. When the buildings are numerous such as complexes the following should be taken into consideration:

5.3.1 Availability of satisfactory internal roads

5.3.2 Easy passage of civil defense vehicles and equipment to the buildings

5.3.3 Availability of satisfactory inlets and outlets for the vehicles

5.3.4 Distribution of ground fire water mains hoses around the buildings

5.3.5 About 20% of the area of industrial zones should be left for utilization in firefighting operations and it shall be determined by the civil defense through the establishment of natural partitions between the buildings of the square or between the buildings of the square or between the buildings of the square and the neighboring buildings.

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5.4 Arrival of civil defense vehicles and equipment:

5.4.1 Satisfactory roads paths should be made available for the arrival of civil defense vehicles and the supporting equipment to the required distance from the building.

5.4.2 The suitable road or path for the passage of civil defense vehicles should meet the following requirements.

5.2.3.1 The road surface and covers of septic tanks should be endurable to the passage of various types of civil defense vehicles.

5.4.3 The required distance between the building boundaries and the nearest point which shall be reached by the civil defense vehicles should be calculated according to the type and size of the building as follows:

5.4.3.1 The distance in the buildings the height of which is not more than two floors and do not constitute any hazard should be more than 46m from any point in the ground floor of the building.

5.4.3.2 The distance in normal buildings composed of 3 – 4 floors the area of which is more than 139 square meters should not be more than 28m from any point in the ground floor of the building.

5.4.3.3 In the buildings which are provided with fire extinguishing water hoses network the distance from the staircase which contains Firefighting water hoses should not be more than 17m.

5.4.3.4 If the height of the building is more than four floors and the area of which is not more than 139 square meters or if the buildings are of industrial use the civil defense vehicles should reach to a distance of 5 – 6 m along one façade of the building. If the height of the building is more than the noted height the civil defense vehicles should reach to a distance of 5 – 6 m along two facades or more of the building according to the type and hazard of the fire and assessment of the civil defense.

5.5 Arrival of civil defense men:

5.5.1 One of the building designing requirement is to be provided with the means and facilities which enable the civil defense men to enter the building quite easily to perform the fighting and rescue works.

5.5.2 The barriers and hindrances should not be fitted on the windows of the external facades above the ground floor of the unless they can be easily opened and after obtaining special approval from the civil defense.

5.5.3 On the placement of firefighting equipment designated for assisting civil defense men such as Firefighting hoses and driving points in the ground floor the following should be observed.

5.5.3.1 The fire equipment designated for assisting civil defense men should be away from the fire hazard and the glasses and other scattered materials in the building as well as other hazards.

5.5.3.2 The designated firefighting equipment for assisting civil defense men should be distinguished with a clear and noticeable signal (red color).

5.5.3.3 It should be complied with the application requirements and the special specifications so that they reflect consistency with the various firefighting equipment.

5.5.4 If there is a requirement for a basement in the building (under ground level floor) there should be emergency openings (inlets and exits) in order to drive away the smoke or for fighting to assist the civil defense men and the following shall be taken into consideration:

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5.5.4.1 They should be in a clear location and easy to reach by the civil defense men.

5.5.4.2 Should be distinguished by the required guiding boards and the purpose for their existence should be mentioned.

5.5.4.3 Should be covered with materials which can be easily opened or broken by the civil defense men when necessary.

5.5.5 If the area of the site is more than 500 square meters another emergency entrance should be made available on the external fence to facilitate the arrival of the civil defense men.

5.5.6 A guiding plan within a frame should be placed at the main entrance of the building which indicates all details related to Firefighting requirements for assisting the civil defense men.

5.5.7 Suitable traffic guidance signals should be placed to prevent parking in the allocated parking and roads for the parking of civil defense vehicles and machinery.

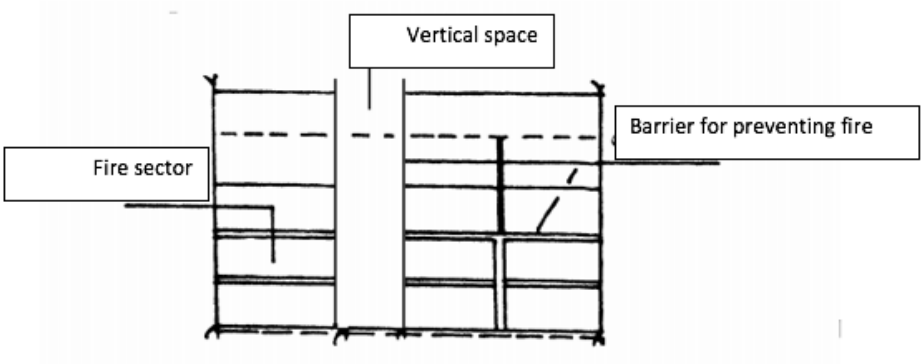
6. Construction requirements and building materials

6.1 Goal: The prevention requirements in Construction areas aim to provide safety of the Construction frame from the hazards so that it will lead to :

6.1.1 Resisting building collapse because of the fire

6.1.2 Fire control inside the building within minimum possible area and prevention of its movement from and to neighboring buildings

6.2 Construction classification of the building: The buildings are classified in terms of its Construction frame resistance to fire according to fire according to table no: 1.2



6.3 Building materials specifications:

7.3.1 The properties and composition of building materials used as construction elements in the building are determined according to the impact of fire on them.

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Classification of buildings as per their fire resistance ability

Building material	Type	Building fire resistance	Construction description	Examples
	First	3-4 hours	Construction from materials which are not susceptible to burning or of the required fire resistance degree.	Buildings constructed totally from concrete and cement bricks and may include iron elements in their frames offering the same required resistance degree
Non susceptible to burning.	Second	1-2 hours	Most of it is constructed of susceptible materials to burning and non resistant originally to burning but treated to provide the required degree of fire resistance.	Building constructed from iron frame and treated to provide certain degree of resistance such as hangers in industrial zones and storage areas and readymade buildings from materials with limited resistance to fire
	Third	Non resistant	Like the second type but the iron frame is not treated and therefore the building is non resistant	Such as hangers in industrial and storage areas where they are dominan
Susceptible to burning.	Fourth	1-2 hours	Construction of non susceptible materials to burning and resistant to fire originally and their frames contain susceptible materials to burning with limited resistant to fire.	Such as buildings constructed of a frame of concrete, cement bricks and some elements of wood (like frame roof) which are treated to provide limited resistance degree like sports and games halls building
	Fifth	Non resistant	Construction of susceptible materials to burning and resistant to fire or unknown materials.	Buildings not belonging to (1-4) types and the buildings which do not have a criterion for fire resistance.

7. Fire spread control

7.1 In order to control the fire size and confining it to a most limited area and preventing its spread inside the building or its movement to the neighboring buildings the preventive requirements should be made available to contain the fire spread.

7.1.1 The building or floor should be partitioned into separate sections called (preventive sections to fire spread).

7.2.1 The area or size should not exceed the permitted level in the table of partition of the buildings into preventive sections to fire spread. The design of the preventive sections to fire spread should be according to the table of the partition of buildings into preventive sections to fire spread.

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Partition of buildings into preventive sections to fire spread

No.	Use	Maximum		Remarks
		M^2	M^3	
1	Assemblies buildings - 7000	-	7000	
2	Educational buildings	2000	-	Each class is considered independent secondary fire section
3	Caretaking buildings	2000	-	Wings and clinics are considered independent secondary fire sections
4	Residential buildings	3000	-	Each independent residential unit is considered independent secondary fire section
5	Commercial shops	2000	-	Each rented unit is considered independent secondary fire section
6	Offices	3000	-	Each rented unit is considered independent secondary fire section
No.	**Use**	**Maximum**		**Remarks**
		M^2	**M^3**	
		For ground floor	**For basement or higher floors**	
7	Industrial Establishments – high hazard.	1000	500	Plants which process or collect or produce materials susceptible to burning - explosions - or produce toxic gases
8	Professions shops medium hazard	5000	1500	Plants which process, collect or produce non susceptible materials to burning or repairs workshops
9	Storage (a) lighthazard	5000	15000	Stores of non susceptible materials to burning
10	Storage (b) highhazard	1000	500	Stores which keep general hazard materials
11	Storage (c) high hazard	1000	500	Stores which keep general hazard materials
12	Car parking	5000	-	

7.3.1 Regardless of the indicated areas in the previous table 1.3, partition of the buildings into fire spread preventive units, each one of the following units should be considered independent fire section:

7.3.1.1 The floor in multi floors buildings.

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7.3.1.2 Area unit of different use as compared with the nature of the building use.

7.3.1.3 Vertical vacuum in the buildings such as staircase – ladder well and light holes.

7.3.1.4 Endorsed emergency exits in the building such as protected staircase hall and corridor.

7.3.1.5 Hazard areas such as places used for storing easily inflammable liquids and materials.

7.3.1.6 The bordering building to the neighbor boundaries should be considered as preventive unit to fire.

7.3.1.7 If the building is used for more than one purpose the allocated section for each purpose should be considered as fire preventive unit regardless of its area.

7.2 Fire spread preventive barriers:

2.1.1 The fire spread preventive units should be separated from each other by construction elements called (fire spread preventive barriers) constructed of non susceptible material to burning and contain the specified fire resistance degree in the table of minimum level of resistance degree in the frame elements of the building.

Table No. 1.4 Minimum level of resistance degree in the frame elements of the building

Construction elements			Buildings Classification				
			First	Second	Third	Fourth	Fifth
			Resistance degree by hours				
	Separating distance from neighboring building	Bearing	4	2	-	1	-
External walls	More than 15 M	Non bearing	-	-	-	-	-
	from 5-15 m	Bearing	4	5	-	5	-
	Separating distance from neighboring building	Non Bearing	1	-	-	1	-
	Less than 5 m	Bearing	2	2	1	2	1
Carrier construction frame			4	2	-	2	1
Carrier internal walls			3	2	-	2	1
Fixed internal sections			1	1	-	1	-
Encompassed vertical vacuum			2	2	1	2	-
Roof and floor tiles			2	2	1	2	-
Surface frame			2	1	-	1	-
Fire preventive barriers			According to table No. 1.5 and Chapter One requirements				

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7.5.2.2 When fire spread preventive units are fire barrier only the resistance should be according to the type of hazard in the sections which separate them in compliance with the table of the resistance degree of fire spread preventive barriers.

Table 1.5 Resistance degree of fire spread preventive barriers according to the hazard degree in the separating sections.

The figures indicate the resistance degree by hours	Hazard type in fire section (c)		
	Light	Medium	High
Hazard light	1	2	4
Type in fire medium	2	2	4
Section (a) high	4	4	4

7.3.2 The fire barriers should form actual integrated barrier which prevents the penetration of fire and smoke and continue to cover the whole section from wall to wall passing any vacuum behind or hollow within and from the floor to the roof according to the hidden vacuum requirement.

7.4.2.1 It is permitted to allow openings in fire preventive barriers according to these requirements:

7.4.2.2 If the openings are covered with doors or windows which are preventive to fire spread by the required degree.

7.4.2.3 The designated openings for passing the pipes should be confined to meet that purpose only and vacuum or gap around the pipes should be covered with fire preventive materials.

7.4.2.4 The existing openings in the barriers which have 4 hours resistance degree should not have an area exceeding 12 square meters each and a total width not exceeding 25% of the total length of the barrier. These measures will be doubled when the place is protected by automatic water sprayers' network in accordance with the approval of the civil defense.

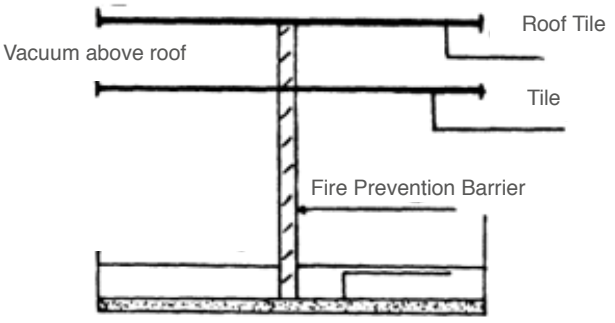

Figure 1.3

Fire Preventive barrier extending from the floor to the roof tile

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7.3 Hidden vacuum:

For completing the partition process of the building into fire sections for preventing fire movement, the following should be observed:

7.3.1 The partition should include all hidden vacuum behind or above or between or within the construction elements and the gaps should be covered.

7.3.2 The gap or hollow within the construction elements such as walls, roofs or floors at the end s and around the openings and at joining with the other construction elements should be covered with fire preventive materials with the exception of the gap within the walls constructed with insulated non susceptive materials to burning.

7.3.3 The confined gap behind the construction elements, i.e. the formed gap above suspended roof or below the last surface of the building, below the floor or behind the walls and alike should be partitioned by fire spread preventive barriers.

7.3.4 These gaps should be partitioned by fire preventive barriers as follows:

7.3.4.1 Should be divided into areas each one not exceeding zoom between barriers or areas not exceeding (150) square meters each between the suspended roof and the floor of the above floor and (300) square meters between the suspended roof and the last surface.

7.3.4.2 The following cases should be exempted from the previous requirements:

7.3.4.2.1 The gap above the suspended roof if it is not exceeding (1) m in height and Is not permissive for the entry of people.

7.3.4.2.2 The gap above the suspended roof is fire preventive element and not susceptible to dismantlement and installation and does not contain open materials the flame spread degree on their surface less than (10).

7.3.4.2.3 Protected gap with automatic water sprayer's network.

7.3.5 The arising gaps and hollows from the installations process of the building elements or their interference should be covered with filling materials preventive to fire in the form of paste in the following cases:

7.3.5.1 The gap which occur around the passage openings of the pipes, cables and their alike. The gap which occurs at the joining points of the construction elements such as the joining point of a wall and wall or the roof and surface……etc.

7.3.6 The hidden vacuum should be closed and divided by fire and smoke spread preventive barriers as follows:

7.3.6.1 In the gap the height of which is more than (1)m the barriers should have a fire resistance degree should have a fire resistance degree not less than half an hour at least.

7.3.6.3 Other than that the barriers could be of gypsum slabs and reinforced glass fixed in the form of metal frame and the likes.

7.3.6.4 The gypsum slabs or reinforced glass should be fixed in a durable manner which will not be effected or dismantled in the event of fire and also flexible so that their efficiency will not be affected by the expansion and shrinkage movement of the building.

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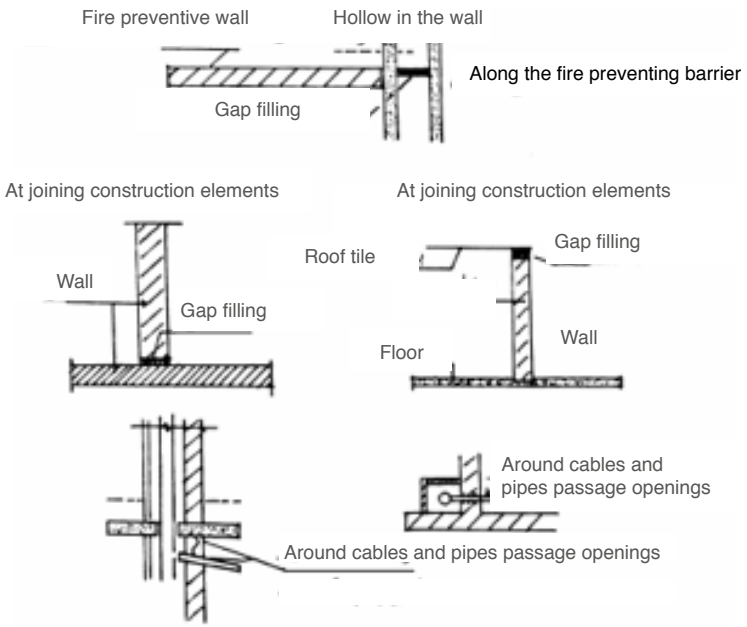

Figure 1.4

Filling the gaps and hollows within construction elements

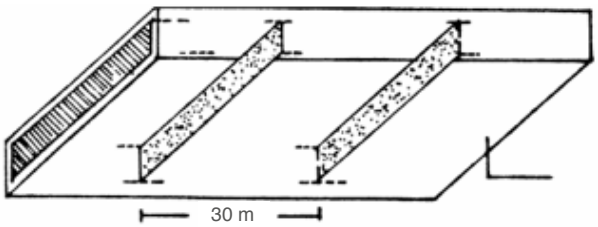

Figure 1.5

Partition of hidden hollows behind construction elements

7.4 External spread between fire sections:

7.4.1 As for the windows on external facades, the distance between two adjacent windows of two different fire sections at the same level should not be less than the following levels.

7.4.1.1 Half meter if they are on straight facade.

7.4.1.2 1.20m if they are on two facades in the form of angle.

7.4.1.3 3 meters in case of staircase window

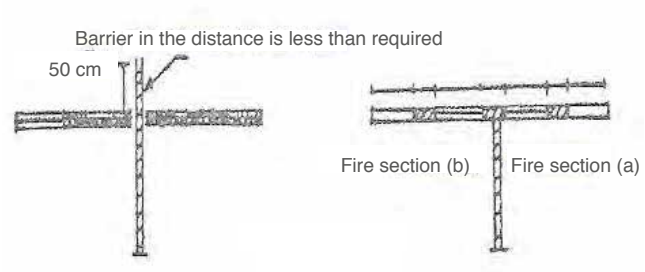

Figure 1.6 Fire movement prevention through two adjacent windows in the form of straight line

External spread between fire sections

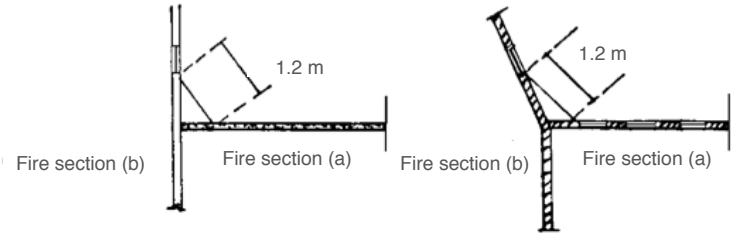

Figure 1.7 Fire movement prevention through two adjacent windows in the form of angle

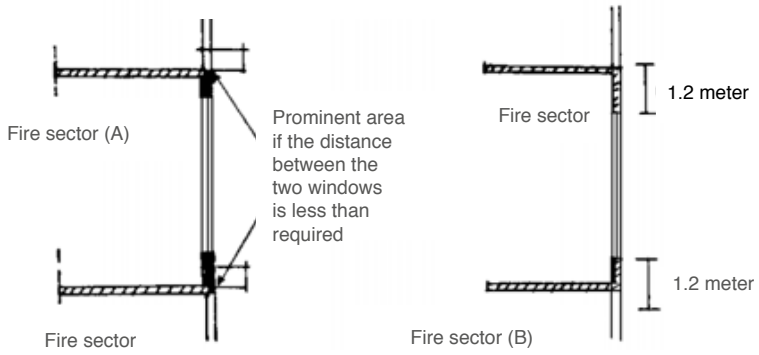

Figure 1.8 Vertical fire movement prevention on through facade

7.4.2 The vertical distance between the windows on the external façade should not be less than the following limits:

7.4.2.1 1.20m if they are on top each other

7.4.2.2 The distance may be less than 1,2m if they are separated from each other by a salient concrete shade through a distance of 0 .50m from the façade line.

7.5 Spread at surface level between the fire sections:

7.5.1 The fire preventive barrier should continue to extend penetrating the last roof vacuum and if the last roof is in the form of gable or truss it should extend to a distance of 0.5m above the joining point with the surface cover slabs level.

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7.5.2 In case there are differences in the height of the fire sections of the building the roof of the lower part should be as follows:

7.5.2.1 With fire resistance degree not less than one hour

7.5.2.2 No openings should be permitted in the roof of the lower part within a distance of 2.5m from the external wall of the upper section unless that wall is a noiseless without openings

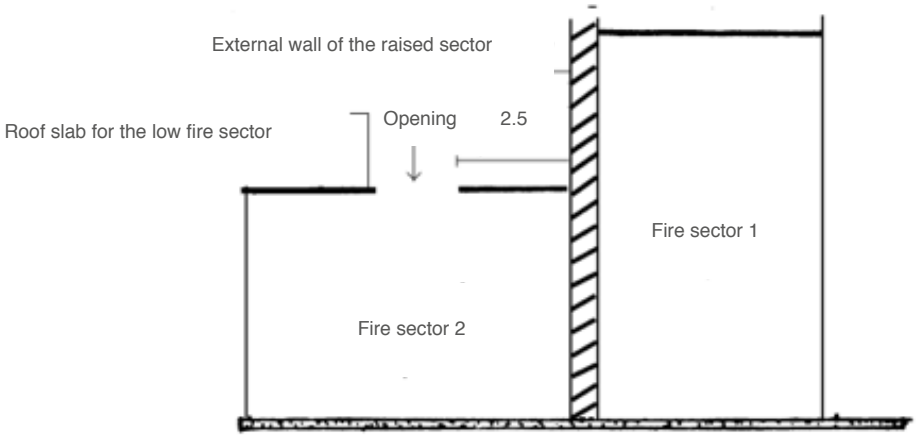

Figure 1.9 Fire movement between two fire sections with two different surface levels

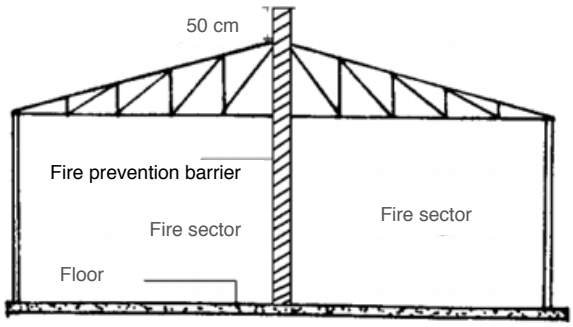

Figure 1.10

7.6 Fire spread between buildings:

7.6.1 For preventing fire spread between the buildings a satisfactory distance should be made available for preventing the fire spread between the buildings according to the external walls requirements with regard to the relationship with the opening area and the type of external casing and also according to table no. 1-6 the required distance between the buildings and the land boundaries (building boundaries). It should be also taken into consideration the details of table no. 1- 4 the minimum level of resistance of frame elements in the buildings and the table no. 1-5 the resistance degree of fire preventive barriers

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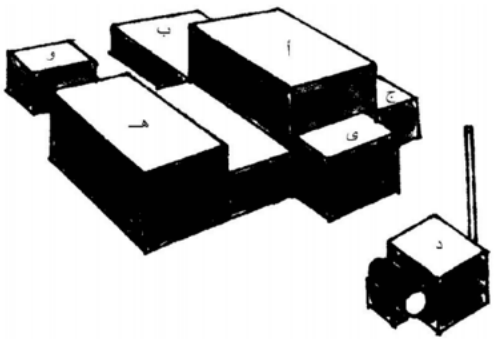
Figure 1.11

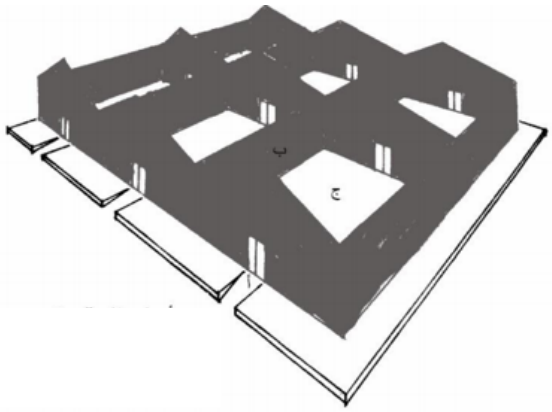
Fire Spread between buildings



(a) Muti use building, (b) Quick fire spread areas (potential), (c) Hazardous operations
(d) Boiler or paints room, (e) Warehouses, (f) Storage with special hazard,
(g) Valuable materials and equip ment.

Figure 1.12

Internal sections



(a) Fire resistant door
(b) Fire resistant separating wall
(c) Preventive unit for fire movement

Table No. 16 Required distance between the buildings and the land boundaries (building boundaries) according to the height of the building and the area of the openings on the external facades.

Area of the openings in relation to the area of facade	Building height in meters		
	8 m	8 - 24	24 above
Zero	Distance by meters		
Less than 50%	3	5	10
More than 50%	3	7.5	15
100%	3	7.5	15

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8. Construction requirements for building construction elements

The building frame is established by all its elements such as the walls, bridges, columns and floors….. etc which should be of non susceptible material to burning and with suitable fire resistance degree proportionate to the nature of use in accordance with fire resistance degree of building frame indicated in Table No. 1.7

Table 1.7: Required fire resistance degree for the building frame

Frame elements	Multi storey residential and commercial buildings	Industrial buildings and ware houses
Columns – bridges and roof tiles	2 hours	4 hours
External walls separating from neighbors or hazardous sections of the building	4 hours	4 hours
Internal walls or internal sections	2 hours	4 hours
Separating walls of the exit path (including stairway) and lift well and light holes and vertical and horizontal service waterways…..etc	-	-
Note: columns and bridges rate of firefighting can be increased as per Civil Defence opinion. In case of using the building for more than one purpose, firefighting level applies on the most hazardous usage.		

Note: columns and bridges fire resistance degree could be increased as per civil defense decision in case the building is used for more than one purpose i.e. application of the resistance degree to the use which is more hazardous.

8.2 If some frame elements are in iron form they should be wrapped by non susceptible material to burning and of fire impact resistance in consistence with the required degree to the frame itself.

8.3 If the roof frame is made of iron gable and based on iron columns and the external walls should be separated from the columns totally and in such case the connecting columns and bridges should be used so that the roof frame shall not be affected by the fire heat.

8.4 A wall should be constructed around each square forming fire preventive separating wall as prescribed in fire spread control according to the nature of the building use and the use of neighboring buildings or as per the recommendations of the civil defense.

8.5 If the external wall of the building is not the separating wall of the neighboring building and is at a distance not less than 3m it is preferred not to create any openings on it unless it is provided with a fire resistance door with similar resistance degree to the required degree to the wall itself.

8.6 The building should be partitioned into fire preventive units separated from each other by fire preventive walls or roofs which meet the specifications of frame elements as prescribed in fire spread control.

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8.7 If the building is located on the boundaries of the parallel square to the neighboring squares, this building should have an external wall which form separating wall from the buildings in the parallel squares as indicated in fire spread control.

8.8 Classification of internal finishing materials types:

8.8.1 The internal sections whether fixed or mobile type should be established of non susceptible material to burning and with appropriate fire resistance degree to the nature of use which is not less than one hour.

8.8.2 The flame spread degree on the material surface should not be less than (zero) in accordance with the recognized international standards.

8.8.3 Internal sections may be used (whether fixed or mobile) from susceptible materials to burning in certain cases at the discretion, of the civil defense and according to the following requirements:

8.8.3.1 It should not be at a location where firing could occur or crowds could exist or may form part of the escape path.

8.8.3.2 These materials should be placed in specific and isolated locations.

8.8.3.3 Their use should not contradict with the applicable preventive requirements of the building use.

8.8.3.4 The flame spread resistance degree on the surface should not be less than (20) in accordance with the recognzed international standard.

Table 8: Flame spread degrees for some building materials.

Materials		Flame speed degree
Roof	Noise reducing fiberglass	15-30 d.
	Noise reducing metal plates	10-25 d.
Walls	Aluminium plates with furnace point on one side	5-10 d.
	Cement asbestos	Zero d.
	Cement or clay bricks	Zero d.
	Gypsum plates covered by cartons on both sides	10-25 d.
Floors	Carpets or rugs	10-600 d.
	Concrete bedding, tile or marble	Zero d.
	Linoleum	190-300 d.
	Reinforced floor tiles with silken rocks	10-50 d.

Note: A complete list of fire spread degrees in building materials may be obtained by referring to building materials directory published by underwriters, Inc. Pfingsten Road, Northbrook, IL 60062.

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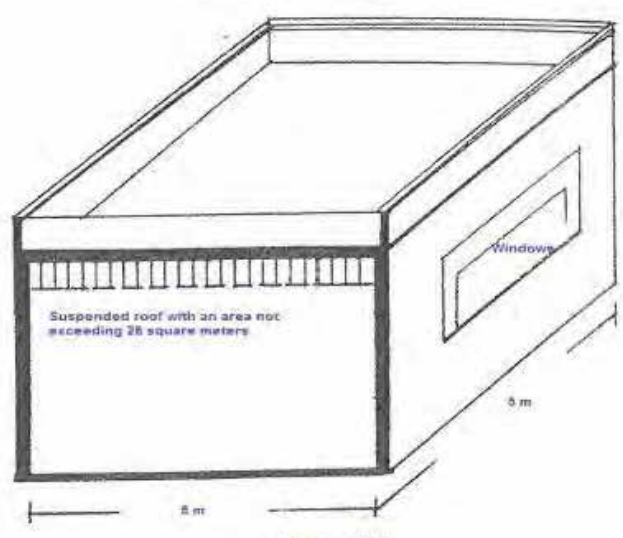

Figure 1.13

8.9 Suspended roofs (Artificial):

8.9.1 The roofs (slabs and frame) should be established of a non susceptible material to burning.

8.9.2 The suspended roofs may be constructed of a susceptible material to burning in certain cases according to the discretion of the civil defense and as per the following requirements:

8.9.2.1 Should not be at a location where fire could occur or crowds could exist or form a part of the escape path.

8.9.2.2 The total area should not exceed 28 square meters.

8.9.2.3 The roof should be separated from the neighboring roofs by raising the surrounding walls to the original roof

8.9.2.4 The construction method should not contradict with the applicable preventive requirements of the building use.

8.10 Wrapping pertaining to thermal or audio insulation or decorative wrapping:

8.10.1 The materials used for decoration and beautification or thermal or audio insulation should be fire resistant and of flame spread degree not less than zero.

8.10.2 In case the used materials are susceptible to burning it should be observed to treat such materials chemically or wrap them with delay paint to the burning so that they become flame spread resistant surface for a period not less than one hour.

8.10.3 Wood may be used for tiling the floor in certain cases which are left for the discretion of the civil defense in accordance with the following requirements.

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8.10.3.1 The wood should be of hard wood type.

8.10.3.2 Should be used at locations where there is no hazard of fire occurrence and no crowds exist and approved by the civil defense.

8.10.4 Susceptible materials to burning may be used for wrapping the walls in certain cases to be determined by the direction of the civil defense and in accordance with the following requirements:

8.10.4.1 They should not be at locations where fire could occur or crowds could be existing or form part of the escape mean.

8.10.4.2 The materials used should be fire resistant and of flame spread degree not less than zero and in case the materials used are susceptible to burning they should be chemically treated or wrapped with burning delay paint so that they become flame spread resistant surface for a period not less than one hour provided that they should be above the floor level by 76 cm. and fixed directly on the walls surface without vacuum behind.

8.11 Fire resistant doors

All existing openings on fire resistant separating walls should be provided with a fire resistant closing mean such as doors and windows etc. and with fire resistant degree equivalent to the required degree to the wall itself.

8.11.2 The door frame resistance should be of the same resistance degree required for the door itself.

8.11.3 The frame should be manufactured from a material which is non susceptive to burning if the required resistance degree for the door is 4 hours or more or its use purpose is to separate sections connected with classified sections as fire hazardous.

8.11.4 If the required resistance degree is one hour and the use purpose is at a normal location where there is no fire hazard the frame may be manufactured of susceptive material to burning (such as wood) provided that it is treated by one of the following methods:

8.11.4.1 It should be wrapped or lined with a material which is non susceptive to burning or painted with fire delay material.

8.11.4.2 It should be made of hardwood without any vacuum or holes and should be of the required resistance degree.

8.11.5 Glass plates fixed on the windows and doors should be of the required fire resistance degree equivalent to the door itself.

8.11.6 The fire resistant door should be provided with automatic closure mean and if it is necessary to keep the door open it should be provided with a closing mean which closes it automatically when fire occurs through thermal separation or through warning system.

8.11.7 A simple manual closing mean should be made available in addition to the automatic closure mean.

8.11.8 The international specifications should apply in case local specifications are not available for the assessment of the degree of doors fire resistance.

8.11.9 The fire delay materials should be approved by the civil defense.

8.11.10 When the requirements permit that the used materials in the wrapping could be less than (10) the following specifications should be observed:

8.11.10.1 Selection of burning intensity: 1:20

8.11.10.2 Selection of burning easiness: non easy burning materials.

8.11.10.3 Selection of smoke density: not more than (450) and do not produce toxic gases.

8.11.11 If the used material in wrapping is of wood type or of materials the degree of which is less than zero, they should be fixed directly on the wall or on directly fixed beams on the wall with a thickness not less than 2cm and width of 5cm provided that the gaps between the beams should be filled with materials not susceptible to burning.

8.11.12 In case that the wrapping materials are fitted on a frame which is far from the wall or roof as in suspended roofs the surface of the fitted plates from both sides should be of the required degree and fixed on a frame of non susceptive materials to burning. The back vacuum should be divided as indicated in Para 7.3.3 all confined vacuum behind construction elements should be divided by fire spread preventive barriers.

8.12 Iron construction frame

8.12.1 If the construction elements in the building are of iron type they should be treated to provide the required resistance degree to protect it from collapse because of the fire heat.

8.12.2 The protection process of iron construction elements is divided into the following methods:

Dipping the iron element within concrete cast, cement or clay bricks building and such protection by dipping should be according to the following requirements:

8.12.2.1 **Dipping:** dipping the columns by wrapping them by reinforced concrete cast, cement or clay bricks building or layer of cement content on a base of mesh reinforcement. The details of the thickness of wrapping should be approved by the civil defense after considering the required resistance degree.

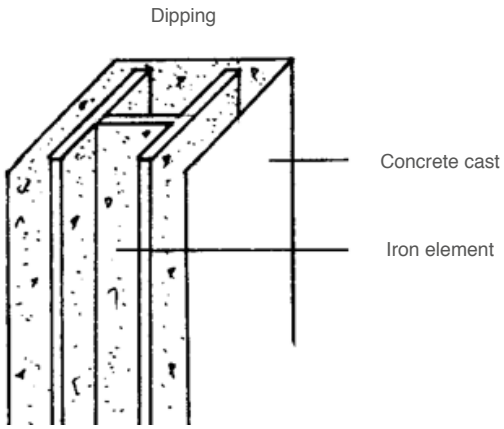
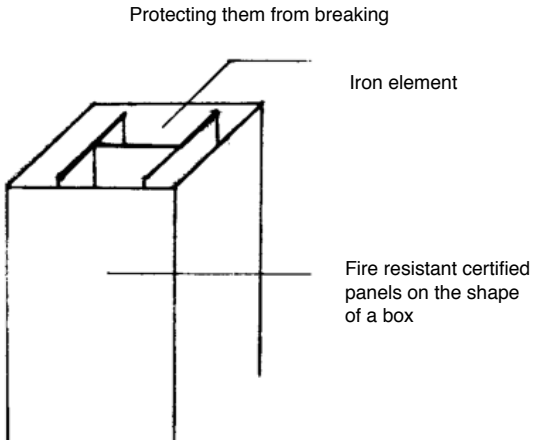


Figure 1.14

8.12.2.2 **Wrapping:** The iron element should be wrapped with endorsed plates resistant to burning in the form of a box. The protection through dipping process should be according to the following requirements:

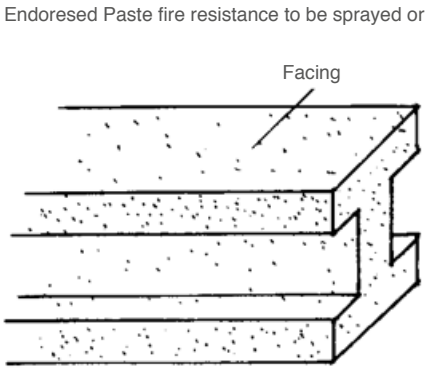
No services should be allowed to pass through the vacuum behind iron elements protection plates. When he width of the protection plates exceed (60) cm the installation should be on rigid base for

Figure 1.15



8.12.2.3 **Facing:** Facing the iron element with a layer of endorsed material fire resistant in the form of a paste which should be applied through spray method or facing. The protection process through facing should be according to the following requirements:

Figure 1.16



8.12.2.3.1 The protection process through facing method should be according to the manufacturer requirements and approved by the civil defense and it should be taken into consideration the calculation of thickness, the application method, conditions, the mixing ratio, the climatic conditions, and their relation to the application, storage and the validity of the material.

8.12.2.3.2 Preparation of the iron element i.e. cleaning, painting…etc.

8.12.2.3.4 The iron construction elements protection process should be as per the three mentioned methods in accordance with the recognized engineering principles and the specifications of the specialized institutions endorsed by the civil defense.

8.13 Plastic building materials:

8.13.1 For controlling the fire hazard arising from the use of plastic materials which have been increasingly in use in construction or inishing of the buildings, such materials should be subject to the control measures which reduce their hazard according to the following requirements .the plastic materials are divided into the following types:

8.13.1.1 First type: Porosity plastic materials which are divided into two types:

8.13.1.1.1 Solid plates: such as polystyrene and polyurethane which are used in the insulation, sections forming and surface cover….etc.

8.13.1.1.2 Flexible plates: Sponge type such as polythene which is used in decoration works

8.13.1.2 Fire delay paint should be added to the porosity plastic materials manufacturing mixture to be used in the buildings so that the plastic materials foam characteristics should be as follows:

8.13.1.2.1 Not easy to burn.

8.13.1.2.2 Flame spread degree exceeding (450).

8.13.1.2.3 Smoke toxin is not exceeding the one in the normal wood.

8.13.1.3 Second type: solid plastic materials: used in the form of coloured or transparent plates, used for covering light holes, basements and shades roofs.

8.13.2 Plastic materials as thermal insulation in the buildings:

8.13.2.1 The plastic materials are permitted to be used according to the following conditions:

8.13.2.1.1 Filler with thickness not exceeding (10) cm between two layers of bricks the thickness of each not exceeding (5) cm provided that the gap is filled.

8.13.2.1.2 It should be dipped within concrete cast the thickness of its cover should not be less than (5) cm in case being used as part of construction elements components such as internal sections or surface cover.

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8.13.2.1.3 It is permitted to use filler in non fire preventive doors provided that its thickness should not be more than (5) cm and flame spread degree is not exceeding (10).

8.13.2.2 They are permitted to be used inside the buildings whether for thermal insulation or as filler in the internal sections according to the following requirements:

8.13.2.2.1 The storey area should not exceed 200 square meters or the area of the sections not more than 100 square meters. The storey should be divided into five sections with a section area not exceeding 200 square meters if the storey area is more than that.

8.13.2.2.2 The thickness should not exceed 5cm.

9. General requirements of various building sections (basement, mezzanine, light holes …etc)

9.1 **Basements:** With regard to the basements it should be observed to provide fire prevention requirements and safety of the individuals in accordance with the nature of the use while taking into consideration the following requirements.

9.1.1 It should be observed to provide satisfactory ventilation and natural or artificial lighting in the basements.

9.1.2 All necessary precautions should be made to prevent the water leak to the basement and the basements floor s should be provided with the required means for water disposal in case the level with the neighboring water resources.

9.1.3 The staircase requirements and basements exits should be applied according to the prescribed items in the escape means and emergency exists chapter. The number of exists for each basement should not be less than two exits if its area is more than 150 square meters. The further point in the basement should not be away from the exit by more than 15m provided that one exit leads directly to outside.

9.1.4 If the exit of any basement leads to the entry of main stairs of the building all necessary precaution measures should be taken in the ground floor so that the basement stairs lead directly to outside without continuation to reach the higher stories.

9.1.5 Satisfactory natural ventilation should be made available to the basement in accordance with the nature of the use through using windows on the external wall of the building and they should be covered with thick mesh barrier if it can be opened or with reinforced glass if it is closed.

9.1.6 If satisfactory natural ventilation is not available other natural means should be provided for the disposal of smoke and other gases if fire occurs according to the following:

9.1.6.1 Creation of openings on top the external wall of the basement (or on its roof) facing the pavement or open areas of the ground floor such as the corridors and others measuring (90x90cm) to be covered with glazed bricks break easily when necessary during emergency cases or any other materials which the civil defense men can open or break easily when necessary during emergency cases.

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9.1.6.2 Development of a similar system such as chimney drain pattern for the disposal of smoke and suctioning it from the basement if fire occurs. This should be done through providing fresh air inlets near the basement floor and suction pipe on the roof to be connected with openings in the upper storey and covered as mentioned in previous Para.

9.1.6.3 The civil defense may accept and approve any other appropriate means for smoke suction proposed by the designing engineer provided that it meets the requirements.

9.1.7 The following requirements should be made available in the ventilation openings pertaining to basements:

9.1.7.1 Should be in a clear position which can be easily reached by the civil defense men

9.1.7.2 Should be distinguished with the necessary sign boards indicating the purpose of their existence

9.1.7.3 Should be covered with the materials which the civil defense men can easily open or break when necessary

9.2 Light Holes: With regards to light holes it should be observed to provide fire prevention requirements and individuals safety in accordance with the nature of use while taking into consideration the following requirements.

9.2.1 The facing windows to the light hole should be of fire resistant type specially if they are at a location where fire hazard exits such as kitchens and toilets and others or the prescribed requirements in the control of fire spread should be applied.

9.2.2 If the light hole is used as an outlet for the chimneys all facing openings should covered with fire resistant doors which are automatically closed. This should be done by approval from the civil defense in advance.

9.2.3 The upper opening of the light hole should be open with its edge surrounded by a wall the height of which should not be less than 1,5m at least from the surface level to form preventive barrier from falling down.

9.2.4 The light hole should not be used for exit during emergencies without the approval of the civil defense.

9.2.5 The light hole should not be used for wastes collection purposes or used as a room or store for the first floor or for any other purpose not designated for it.

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9.3 Mezzanine: It should be observed with regard to the mezzanine to provide fire prevention and individual safety requirements in accordance with the nature of the use while taking into consideration the following requirements:

9.3.1 It should have an open facade from the road side.

9.3.2 It should have satisfactory exits provided that one exit leads to the outside.

9.3.3 It should not form a hazard to the individual's safety

The mezzanine which is not connected with the ground floor (commercial shop) should be considered as normal floor and separate in multi storey buildings.

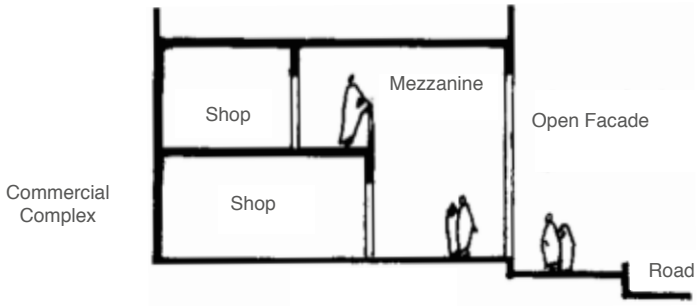

Figure 1.17

Explanatory drawing of Mezzanine

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Two

General requirements of Firefighting and warning systems

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General requirements of Firefighting and warning systems

1. **Goal -** Providing the buildings and establishments with Firefighting, warning and prevention systems in order to protect the buildings and their occupants from fire hazard by providing warning in advance so that the building could be evacuated and Firefighting is carried out in preliminary form by trained individuals or by automatic equipment to be followed by calling the civil defense teams for actual fighting and rescue if necessary.
2. **Application areas:** All buildings, establishments and shops are subject to the civil defense permit. Should be provided with Firefighting and warning, equipment and suitable prevention methods according to these requirements.
3. **Designing requirements:** Firefighting and warning and prevention systems should be designed and implemented according to the requirements of part two (engineering specifications of warning and Firefighting systems).
4. **Permit requirements:** Application of civil defense requirements in each country.
5. **Maintenance requirements:** The Firefighting and warning equipment and systems should receive regular periodical maintenance from specialized authority or recognized contractor in accordance with part two requirements.
6. **Training requirements:** The occupants of the building should be trained in the field for Firefighting and warning systems operation, use and inspection.
7. **Firefighting systems and equipment classification:** The Firefighting and warning systems and equipment are divided to the following main types:

   (a) Manual, fixed and automatic Firefighting systems and equipment

   (b) Manual and automatic fire warning systems

7.1 Manual firefighting equipment: They are mobile manual equipment (preliminary fighting) which are used for firefighting at its initial stages by normal people available in the building including:

(a) Various manual fire extinguishing equipment

(b) Manual water pumps.

(c) Sand and water containers.

(d) Special fire resistant blankets.

7.1.1 **Manual Fire Extinguishers:** Manual extinguishers are light annual means for extinguishing the fire at its initial stages and considered as preliminary firefighting equipment.

7.1.2 Manual Fire Extinguishers: Manual extinguishers are required in any building subject to the permit of the civil defense in accordance with prevention requirements in the buildings or any location where they performed activities require the approval of the civil defense.

7.1.3 The manual extinguishers should be of a recognized type by official permit from the civil defense.

7.1.4 The owner of the building or the site should keep the manual extinguishers in a proper condition to remain suitable for use when necessary through taking the required measures for the periodical inspection and maintenance by the recognized agent or by any technical authority approved by the civil defense.

7.1.5 The periodical inspection and maintenance should be in accordance with the manufacturer and civil defense instructions.

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7.2 Types of extinguishers: The manual extinguishers are divided to various types according to the extinguishing material type:

7.2.1 Water extinguishers: The extinguishers which contain water as Firefighting material and are divided into two types:

7.2.1.1 Water extinguishers by gas pressure: It is a filled cylinder with water through normal pressure. It also contains small cylinder pressed by carbon dioxide gas and when operated the pressed gas will drive the water powerfully through the opening.

7.2.1.2 Water extinguishers operating through pressure: A cylinder two thirds of which are filled with water and the rest with normal air or pressurized nitrogen gas and when operated the water is driven out powerfully by the preserved pressure.

7.2.2 Foam extinguishers: The extinguishers which provide liquid foam as fire extinguishing material and it is of two types:

7.2.2.1 Chemical Foam Extinguishers: The type which produces the foam by which produces the foam by chemical interaction and drives it out through the resulting pressure from the interaction.

7.2.2.2 Mechanical Foam Extinguishers: The type which produce the foam mechanically through mixing the foam materials liquid with water, air and drives them out through the pressurized carbon dioxide gas in small cylinder

7.2.3 Carbon Dioxide Gas Extinguishers: The extinguishers which contain carbon dioxide gas as extinguishing material. They are originally one type with different sizes only. The gas is kept in liquid condition by pressure and when operated the gas is driven out through the control valve on the upper part of the cylinder.

7.2.4 Dry Powder Extinguishers: The extinguishers which provide dry chemical powder as extinguishing material and they are of two types with regard to the operation method:

7.2.4.1 Extinguishers Operating through Gas Pressure: A type which drives the powder through carbon dioxide gas pressure kept in a small cylinder under pressure.

7.2.4.2 Extinguishers operating through preserved pressure a type which drive the powder through nitrogen gas pressure in the cylinder with the powder. The powder from chemical composition point of view includes several types the most important of which are the following:

(a) The powder the composition of which is dominated by sodium bicarbonate.

(b) The powder the composition of which is dominated by potassium bicarbonate.

(c) Multipurpose powder

(d) There are some types of power allocated for certain types of metal fire and are used only for special cases.

7.2.5 Evaporated liquids extinguishers (B.C.F.S): the extinguishers which provide different types of chemical liquids as fire extinguishing material. These liquids on colliding with the fire heat turn to dense heavy vapors which stop fire chemical interaction chain. This type of extinguishers will be prohibited internationally soon due to its impact on the environment.

7.3 How to select the suitable extinguishers: The fire is divided into (4) types as mentioned in the next Para 7.4.4 with the suitable manual extinguishers for them. Please review the tables from 2.1.2.3.

7.4 Types of fire and the suitable extinguishes for fighting them:

7.4.1 Fire type (a) includes normal solid materials of carbon origin such as papers, wood and clothes

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etc. The suitable extinguishers for this type are water extinguishers because of availability of cooling property in water and the easiness of water leak into the pores of the materials.

7.4.2 Fire type (b) which includes susceptible materials to burning, petroleum and chemical materials

7.4.2.1 **Foam extinguishers:** The foam liquid overflows the surface of the burning liquid and form a cover which block off the surface of the burning liquid from air oxygen and the foam is distinguished by remaining for a long time on the liquid surface which helps in preventing the return of burning. It should be noted that the foam is good electricity conductor.

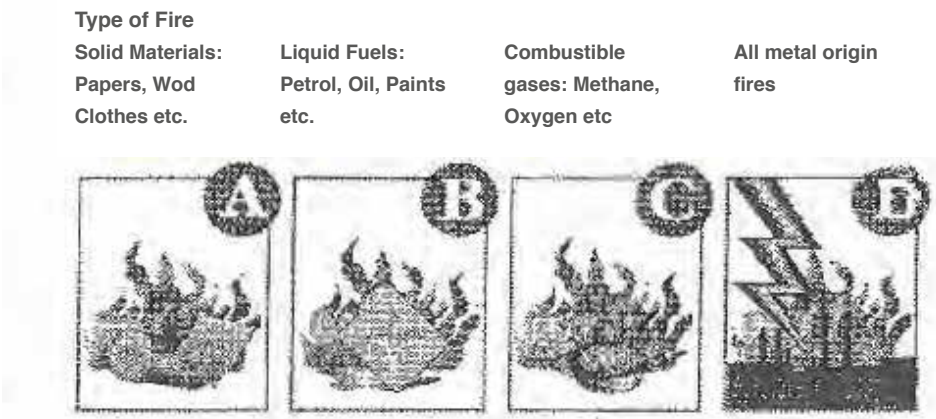
7.4.2.3 **Carbon dioxide gas extinguishers:** Like chemical powder extinguishers with the difference that carbon dioxide gas has no harmful impact on the assets such as other types of extinguishers like foam and powder extinguishers and it is also not electrical current conductor material.

7.4.2.4 **Liquid evaporates extinguishers:** As their packages are small they are used in small fire or in the motors which operate by liquid fuel and they are not electricity conductor's materials.

7.4.3 **Fire type (c)** - they are the fires which occur in electrical fittings and are fire which occur in electrical fittings and are fixed by the use of carbon dioxide and dry powder or evaporated liquid extinguishers. It is prohibited to use water or foam as they are electrical current conductors.

7.4.4 **Fire type (d)** - is the type of fire that occurs in the metals such as magnesium, titanium, sodium, potassium etc. for which special dry powder is used. There are some metals which require special powder. Director General of Civil Defense should be consulted in this regard and the prescribed instructions fixed on the extinguishers by the manufacturer should be followed. A type of dry powder has been developed to be used for fighting metals fire in the form of paste on contacting with the burning surface with a commercial name (Purplek)

Figure 2.1



7.5 General aspects of the distribution of manual fire extinguishers: In addition to what has been mentioned in the previous items and the attached table on selecting the suitable type of manual extinguishers the following should be taken into consideration.

7.5.1 The extinguishers at site should be operated by one method so that no confusion or hesitation could occur when these extinguishers are used in the event of fire.

7.5.2 At the sites where there is upper location or the ones which require control of the discharge (hurl) angle the extinguishers with hoses should be used.

7.5.3 A suitable type should be selected for the site in terms of hurl distance, type of hurl or discharge (current or drizzle)

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7.5.4 Selection of the type which shall be of a light reasonable weight and suitable for those who use it

7.5.5 It is always preferable to select the types which are easy to use and maintain and not complicated.

7.6 Distribution of manual Firefighting extinguishers:

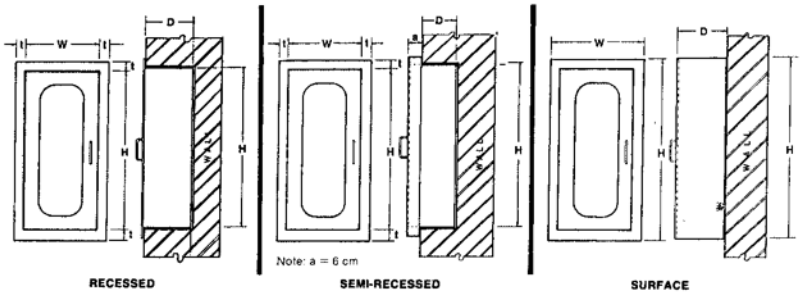
7.6.1 Generally unless it is otherwise prescribed the extinguishers should be distributed in suitable locations not further from each other by more than (20) m and the number of extinguisher for each 200 square meters or two extinguishers for each floor with regard to water extinguishers. As for the combustible liquids extinguishers they should be determined in accordance with the area of the combustible liquids surface as indicated in the attached table. Other than that the extinguishers should be distributed in the suitable locations as recommended by the civil defense and the following should be observed in general:

- The extinguishers should be kept in a store or cavity in the wall with a door to protect it from climatic conditions and manipulation.
- They may also be hanged openly on the wall in some cases which are approved by the civil defense where they are safe.

7.6.2 Openly hanged extinguishers on the wall should be fixed on a hook with a height of (1) m from the ground surface.

The required sign boards should be installed to indicate the location of the extinguishers along with the necessary instructions of use and warning.

Figure 2.2



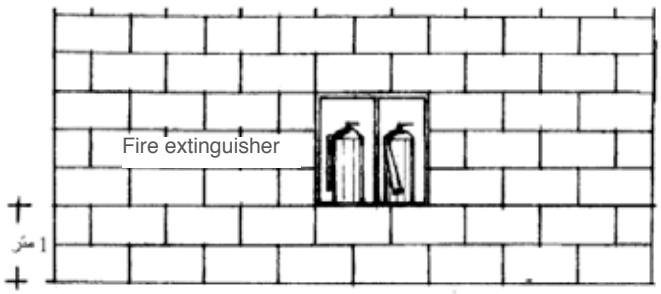
7.6.3 The selection of the extinguishers location should be in a suitable place with easy access means.

7.6.3.1 They should be nearer to the exits or the staircase.

7.6.3.2 They should not be further than each other by more than 20m.

7.6.3.3 They should be of (1) m height from the ground level.

Figure 2.3



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7.6.4 It should be observed to take into consideration the climate conditions of the location in terms of heat, moisture, cooling, corrosion and their impact on the extinguishers and their contents.

7.6.5 The number of required extinguishers are determined as water extinguisher two gallons capacity or their equivalent for each 2000 square meters provided that the number should not be less than one extinguisher for each floor with regard to normal fire type (a) as per Table No. 1.1

7.6.6 The number of extinguishers required for fire type (b), the combustible liquids, chemical, and petroleum materials in accordance with Table No. 2.2

Table no. 2.1 Selection and Distribution Method Table of Extinguishers of fire type (a)

Fire type	Suitable Extinguishers	Remarks	Type of Extinguishers	Capacity of Extinguisher	Extinguisher hurl distance	Approximate total weight	Number of required extinguishers for each	
							100 m	floor
Fire type (a) Normal Solid Materials like papers, wood, clothes etc.	**Water:** The impact of the extinguishing material on such solid materials depends on the cooling property. Water is distinguished with better cooling property as compared with other extinguishers. Therefore it is preferred to be used for fighting this type of fire. If these materials are not cooled satisfactorily they will burn again. In addition to that the water penetrates the fire quickly.	Water is good electricity conductor and therefore should not be used for fighting electrical fires	Pressurized water and gas	9 litre, 2 gallons	10 m, 30 feet	10 - 18 Kg 33 - 40 pound	1	2
			Water preserved by pressure				1	2

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Table no. 2-2: Selection and Distribution Method Table of Extinguishers of fire type (b)

Fire type	Suitable Extinguishers	Remarks	Type of Extinguishers	Capacity of Extinguisher	Extinguisher hurl distance	Approximate total weight	Coverage area per Extinguisher	
Fires type (B) Combustible liquids and petroleum and chemical materials	(1) Foam: Fires are damped by the form which forms a cover over the burning liquid. Such cover remains after formation for some time enough to cool the liquid and stop reburning. Therefore, foam extinguisher is specially suitable for fighting liquid fires such as fuel tanks, oil heaters, linen seeds heaters and varnish boilers	It is difficult to form a cover of foam on hot liquid and it becomes impossible if the liquid is running on vertical surface. The liquids which flow on tiles or horizontal surface may extend to greater area than the capacity of the extinguisher and there are some liquids like alcohol has the power to destroy the cover formed by the extinguisher and make it ineffective. The foam is a good electricity conductor and should not be used in electrical fires	Automatic foam - Mechanical Foam	9 liters 2 gallons	8 m^2 23 ft..	15-18 kg. 33-40 pound	15 m^2 5 ft	
			Mechanical foam Chemical foam				1	2

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Table no. 2-2: Selection and Distribution Method Table of Extinguishers of fire type (b)

Fires Type	Proper Extinguishers	Remarks	Extinguisher Type	Extinguisher Capacity	Extinguisher Injection Distance	Approximate gross weight	Coverage Space for one Extinguisher
Fire type (b) Combustible liquids Such as petroleum and chemical liquids	(2) Dry Powder The powder is the best extinguishers used for fighting combustible liquids fires. The powder dampen the spread of flames on the liquid surface quickly and preferred to be used instead of foam specially in the cases where the fire could extend to the neighboring materials before the foam can be formed on them. The dry powder is not a good electricity conductor and can be used with confidence.	The properties of the dry powder are limited and cannot prevent reburning after stopping the driving of foam. Its effect also is weaker than the foam effect in case of liquid fires inside the tanks as the liquids are heated considerably due to the burning for some time or because of operations process	Dry powder extinguisher of various types	2 kg. 4.5 pounds 3 kg. 7 pounds 9 kg 20 pounds	3 m 10 ft. 5 m 15 ft. 7 m 20 ft	4 kg 10 ponds 9 kg. 18 pounds 20 pounds	1 m^2 10 sq. ft. 11.5 m^2 15 ft. 4 m^2 40 sq. ft.

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Table no. 2-2: Selection and Distribution Method of Fire Extinguishers Type (B)

Fire type	Suitable Extinguishers	Remarks	Type of Extinguishers	Capacity of Extinguisher	Extinguisher hurl distance	Approximate total weight	Coverage area per Extinguisher
Fires type (B) Combustible liquids such as chemical and petroleum liquids and materials	(4) Evaporated Liquids: Can dampen fire flames quickly and specially suitable for fighting very small fires as the used extinguishers are of small in size relative and they are used mainly for fighting firs of the motors operated by petrol and oil and they are not good electrical conductor.	They should not be used or kept in closed areas or any places where the inhalation of vapors and gases arising from the burning is possible. It is recommended not to use bromide as it is very toxic.	Evaporated liquids extinguisher (C.B.M.B.C. F)	2 kg. 6 Pounds	7 m 20 ft	1/2 Liter 1/8 gallon	1.3 m^2

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Table no. 2-3: Selection distribution method of fire extinguishers type (c – d) table

Fire type	Suitable extinguishers	Remarks
Fire type (c) electrical or electronic equipment.	Carbon dioxide Dry powder Evaporated liquids	Carbon dioxide, dry powder and evaporated liquids: These materials are considered the best for fighting electrical fires, water, and foam extinguishers should not be used for this purpose to avoid electrical with the exception of cases where it is possible to disconnect the electrical current since water is the best Firefighting material. In case of fires which include oils or liquids it is better to use other extinguishing means. Carbon dioxide extinguishers are considered the best extinguishers for electrical fires due to their light weight
Fires type (d) combustible Metals.	Dry chemical powder	Dry chemical powder: There is no dry powder type which is suitable for all metal fires but there is special powder for each combustible metals. Therefore it is essential to comply with the fixed instructions on the extinguishers by the manufacturers and the civil defense should be consulted on selection of suitable extinguishers for the metal fires. Important note: It should be noted that there is a considerable health hazard if a suitable type of extinguishers is not properly selected for metal fires fighting.

7.7 Fixed Firefighting Equipment

They are fixed network extensions out of which some are used for firefighting by normal occupants of the building and others are used by trained people such as special fighting teams or civil defense men. They are divided to the following in terms of operation.

7.7.1 Fixed Firefighting Equipment

They are simple means for firefighting at initial stages only by the building occupants themselves without previous training requirement. Each hose is a rubber hose of 25mm diameter (one inch) rolled up on fixed pulley on a wall and kept inside metal box connected directly with the water supply network and ready for use immediately after pulling the hose.

7.7.1.1 The pulley rubber hose is formed of the following:

(1) Network (2) Pulley (3) Hose and its connections (4) Water source (5) Dry vertical pipes:

7.7.2 Dry vertical Pipes

They are fixed water free network extensions which include driving point for water pumping from outside the building and fire mains openings distributed at the required places in the building and used for assisting civil defense men in water driving and using it for upper floors.

7.7.2.1 The dry vertical pipes network in the buildings is formed of the following:

1. Vertical pipe which supply water to openings
2. Driving point at the lower part of the network for pumping by the civil defense (inlet).
3. Fire water mains in the floors (outlet).

7.7.2.2 Dry vertical pipes are required in the following buildings and cases:

1. Buildings composed of (5) floors and more including ground floor or buildings of (18) m height or more.
2. Building s composed of two floors if the floor area is more than 1000square meters.
3. Buildings which form hazard to the life or contents as per the discretion of the civil defense.

7.7.3 Moisture vertical pipes:

Fixed network extensions with continuous water source which supply water to Firefighting openings (outlet) distributed at the required locations in the building and used by civil defense men or by trained people for Firefighting in the building.

7.7.3.1 The Moisture vertical pipes network are formed of the following:

1. Vertical pipe which supply the openings with water
2. Water resources
3. Pumps
4. Hoses and their connections
5. Driving point or opening

7.7.2.3 The moisture vertical pipes are required in the following buildings and cases:

7.7.3.3 The height of the building which is more than 28 m.

7.7.3.4 The height of the building which is more than 30 m. from the ground floor level to the floor of the last storey.

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7.7.4 Form Driving network:

It is a fixed pipes network used for driving water mixture and the foam material and enabling it to reach and normally used for storage or use of liquid fuels. The mixture of water and foam material flow in the form of bubbles operating as insulating curtain to the burning surface from outside oxygen whereas the water carries out the cooling process.

7.7.5 Fire hydrants (water mains):

They are underground extensions network with continuous water source supplying fire hydrants with water and used for fighting fire from outside by civil defense men.

7.7.5.1 Fire hydrants are required in the following cases:

1. At all public roads in the cities.
2. Outside the buildings provided with moisture vertical pipes network as complementary part.
3. At the roads and courts of main establishments with special hazard such as the air and sea ports and major companies and assembly buildings etc.

7.7.5.2 Fire hydrants are formed of the following:

1. Pipes network which provide water
2. Water sources
3. Water mains

7.7.5.3 Firefighting water mains are divided into two sections:

- Vertical Firefighting water mains on the ground
- Underground Firefighting water mains

7.7.5 Vertical firefighting water mains on the ground

1. They are considered as fixed vertical pipe connected at lower part with the supplying network and provided with an opening or more (mains) at the upper part. Each opening (main) is provided with a cover tied to a chain.
2. The vertical pipe diameter depends on the number of openings (mains) and their use and the quantity of driven water from them and it should not be less than 4 inches and each main shall not be less than 25 inches.
3. Beside each main a valve should be placed within inspection hole as per the specifications and requirements determined by civil defense.

7.7.5.3.2 Underground firefighting water mains:

A pipe which includes a valve and ends up with an opening (main) and a cover tied to a chain in accordance with the civil defense specifications. The Firefighting mains should be kept in inspection hole as per the specifications and requirements of civil defense.

7.8 Automatic fixed Firefighting systems and equipment:

They are considered as fixed extensions network with distributed openings at the required locations to be protected and provided with continuous source of suitable extinguishing material. It is operated automatically by heat sensing arising from the fire or the smoke impact or by both means.

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7.8.1 Automatic Firefighting water sprayers system:

Over head pipes network distributed to the required places to be protected .they are provided with water suitable water source in terms of quantity and pressure so that the water is driven through closed sprayers openings (moisture sprayers). They open automatically through heat impact or the water is driven through openings covering the whole area. They also can be opened automatically through assisting warning mean.

7.8.1.1 The automatic water sprayers network should be designed, implemented and maintained in accordance with the specifications and requirements of (part two) or civil defense directory

7.8.1.2 On designing water sprayers network it should be observed to take into consideration the fire hazard type with regard to the contents whether it is high, medium or light in accordance with the specifications and requirements of part two or the civil defense directory

7.8.2 Automatic firefighting water sprayers system types:

1. Moisture network.
2. Dry network.
3. In advance operated moisture network.
4. Full flood network.
5. Fitted network.

7.8.2.1 Moisture network Firefighting water sprayers. A network pressurized by water so that it can be driven through closed sprayers head openings which are opened by heat impact.

7.8.2.2 Dry network Firefighting water sprayers.

Similar to the moisture network in terms of extensions but pressurized by air and water. Due to the air pressure the valve is opened automatically and the air leaks through the sprayers had openings which open by heat impact and the water is driven out accordingly.

7.8.2.3 In advance operated moisture network:

Similar to the moisture network in terms of extensions with the water stopped by the valve and provided with assisting warning network either aerial or electrical which is operated by heat impact to open the valve the drive the water though the sprayers openings.

7.8.2.4 Full flood network :

Similar network to moisture network in terms of extensions but the sprayers' heads are all opened and cover the whole area with flood on operation of the system.

7.8.2.5 Fitted network:

Joint system combining in advance operated moisture network and dry network.

7.8.3 Halon system:

It is pipes network distributed. It is provided with cylinders containing halon gas (as extinguishing material) pressurized by nitrogen which is driven out on operation to protect the required area. The specifications are prescribed in civil defense directory. This system will be prohibited internationally due to its impact on environment.

7.8.4 Carbon dioxide system:

It is pipes network distributed to the required areas to be protected and provided with carbon dioxide cylinders (as extinguishing material) which are driven out on operation in the required area to be protected. The specifications are prescribed in civil defense directory

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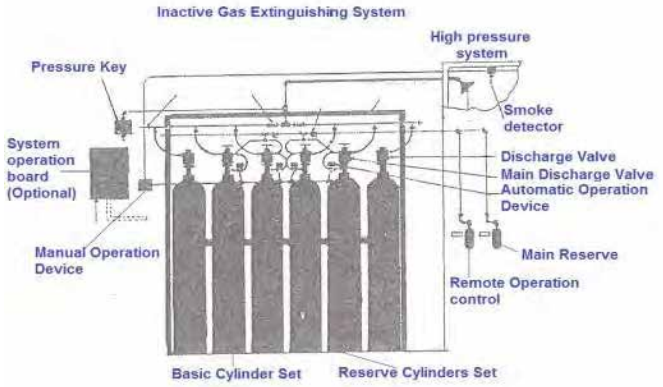
FIGURE 2.4



7.8.5 Dry chemical powder system:

It is a pipes network distributed to the required areas to be protected containers (as extinguishing material) pressurized by nitrogen gas or carbon dioxide which will be driven out on operation in the required area to be protected. The materials used in the extinguishing material normally include sodium bicarbonate or mono ammonium phosphates.

7.8.5.1 Dry chemical powder systems types:

The dry chemical powder systems are divided to the following types with regard to the coverage method:

1. Full flood system: The system which cover the size of the place or the whole room.

2. Partial flood system: The system which covers limited part in the building or place.

7.8 The dry chemical powder systems are operated as follows:

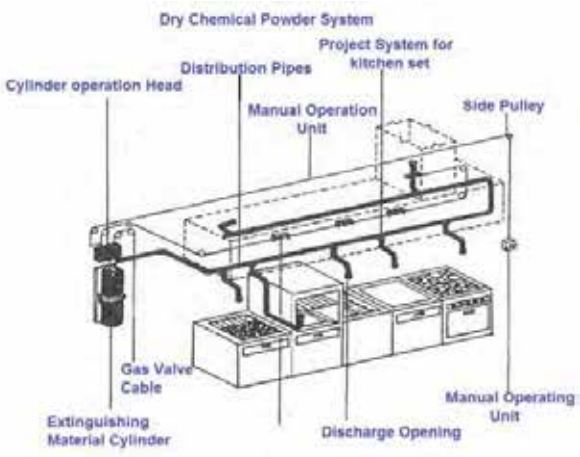
1. Automatic operation: through fire detective devices which open the valve of the powder containers.

2. Electrical Manual Operation: through manual electrical switch performs the role of fire detective devices.

3. Mechanical manual operation: Through mechanical manual operation tools

7.8.5.3 Designing: The dry chemical powder systems should be designed and implemented and maintained in accordance with the civil defense directory requirements and specifications.

FIGURE 2.5



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7.8.6 Foam and water system:

It is a pipe network distributed to the required areas to be protected provided with foam and water either mixed with each other or mixed before flowing on the burning surface

This mixture flows in the form of bubbles which constitute an insulating curtain to the burning surface from the oxygen whereas the water performs the cooling process

7.8.6.1 Foam types from extension point of view:

(1) Low extension (2) Medium extension (3) High extension

7.8.6.2 Foam Firefighting systems are divided in terms of performance method to the following types: (1) Fixed networks system (2) Generation system (concerned with the foam system).

7.8.6.3 The foam Firefighting systems are operated as follows:

1. Automatic operation: Through fire detective devices or through warning board for operating the pumps or other means for driving the mixture
2. Mechanical manual operation: Through the opening of the foam valve or the mixing systems
3. Electrical manual operation: Through the operating the pumps or other means such as electrical files for opening the blocking off devices
4. Remote control system: Through in advance programming with television camera

7.8.6.4 Designing:

The Firefighting systems should be designed and implemented and maintained in accordance with the specifications and requirements of (part two) or civil defense directory

7.8.7 Automatic fixed units (Modeler Extinguisher):

Single extinguishing units fixed at the required locations to be protected. They operate automatically by driving out their contents of extinguishing material when fire occurs.

7.8.7.1 The distribution, size and type should be suitable for protecting the sites according to the civil defense requirements.

7.8.7.2 The units should be in accordance with the international specifications recognized by the civil defense.

7.8.7.3 The units should receive regular periodical maintenance service by maintenance contractor recognized by civil defense.

Figure 2.6

Automatic fixed firefighter units

Modeler Extinguisher

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7.9 Fire warning systems: Fire warning systems are divided into two main types:

(1) Manual warning system (2) Automatic warning system

7.9.1 **Manual warning system:** is a device which operates manually through keys (calling points) distributed to certain locations and operates through electrical current. They are of two types:

1 Calling points operated manually by breaking the glazed cover.

2 Calling points operated manually through turning special key.

10.4.3.1 The manual warning system is composed of:

(1) Pressure button (glazed cover or key) (2) Warning bell (3) Control board

7.9.2 **Automatic warning system:** A device operates through electrical power for sensing fire hazard and providing warning. It is composed of the following:

(1) Fire detectives (smoke, flame, heat etc) (2) Warning bell (3) Control board

7.9.2.2 The automatic warning system operates through oneof the following means:

1. Through connected tools with automatic fire equipment or with central air conditioning system
2. Through sensitive tools (detectives) which are affected by heat impact.
3. Through sensitive tools (detectives) which are affected by smoke impact.
4. Through sensitive tools (detectives) affected by the flames infrared rays
5. Mechanical warning device (bell) which operates through pressure arising from the automatic sprayers system
6. Fire warning system and its type should be in accordance with the building type and its use purpose and as per the specifications of the civil defense.

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Three

General requirements for escape means (emergency exits)

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General requirements of escape means

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1. Escape means components:

1.1 The buildings and establishments and shops should be provided with suitable escape means in order to create an outlet or exit for evacuating the occupants and users of the buildings and moving them away from fire area to protect them from incidents and the life from fire.

1.2 The escape means are composed of safe path or more so that the occupants or the people available in the building could escape by moving from any point in the building directly to any safe hall or location from fire and also lead to outside the building where it is safe from fire hazard.

1.3 Escape means are composed of (emergency exits) different parts such as corridors, stairs, halls, bridges, ramps, doors and exits etc forming together integrated unit which include (emergency exits) escape means.

2. Application of escape means requirements:

2.1 All buildings and establishments and shops which are subject to the civil defense permits should be provided with Firefighting and warning systems and suitable prevention in accordance with these requirements.

2.2 It should be prohibited to introduce any change or addition to the building which breaches these requirements and the nature of the building use should not be changed unless the escape means are changed to suit the new use requirements.

2.3 The civil defense should preserve the right to add any requirements it may consider appropriate for exceptional cases which are not covered or viewed as of unnatural fire hazard.

3. Escape means requirements:

3.1 The escape mean path should not in any case pass through a room or a place which can be closed and it should not pass near any location where fire hazard exists unless it is separated by fire spread preventive barrier.

3.2 If escape means path continue to below final exit level (as the continuation of staircase to the basement case) the continuation should be disconnected through fire spread preventive wall so that the escape path will not lead by mistake to the basement or any hazardous location.

3.3 Satisfactory signal boards and arrows should be fixed on the exits path which indicates the path direction. If the path is crossed by a door leading to a hazardous location or closed end a clear warning board should be placed on such door.

3.4 The escape mean should not be covered with any material combustible to burning or could cause slippery or stumbling.

3.5 It should be prohibited to place or install any type of furniture items, barriers, equipment, anything fixed mobile which may reduce the wideness of the escape mean or obstruct its use.

3.6 The escape mean should remain always in a suitable condition for use providing the highest capacity for escape and should not be used for any other purposes than the one designated for it.

3.7 Preventive barriers should be fixed for protection from falling in escape means paths, such as on the empty parts of the stairs, bridges or higher edges surfaces. And other glass plates and their alike are not considered as preventive barriers.

3.8 Satisfactory natural or mechanical ventilation should be provided to the exit path:

Satisfactory natural or artificial lightening should be provided to the exit path in the crowded buildings, high buildings or public buildings such as hotels, cinema premises and factories in addition to reserve source for providing electrical current in case of disconnection and the reserve lightening should include signal boards and indicative arrows to the escape means.

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3.9 The responsibility of provision and maintenance of Firefighting and warning systems inside the buildings should be assigned to the owner and the tenant should be responsible of removing the obstructions from the escape corridors and keeping the Firefighting and warning systems in the rented part to him.

4. Escape means designing principles:

4.1 Movement distance:

4.1.1 The security and exit paths should be coordinated so that the movement distance between any point and the nearest exit in the floor should not exceed the prescribed distance in the following table no: 3 -1 unless it is otherwise prescribed in the buildings preventive requirements in accordance with use purpose.

Table 3.1: Movement distance to the various locations in the buildings

Type of location	Direction of movement	
	15 m	40 m
Open location	10 m	30 m
Divided location	10 m	30 m
Divided location through corridor	10 m	30 m
Internal fire sectors less than 50 m^2	unlimited	unlimited
Internal fire sectors more than 150 m^2(less than 50 persons)	Not permitted	30 m
Internal fire sectors more than 150 m^2 (more than 50 persons)	Not permitted	30 m
Protected corridor	10 m	30 m

4.1.2 The distance should be measured on the pivot line of the actual escape path from distanced point of (30 cm) from the farthest point in the building until the middle of final exist or the safe part of the escape mean which leads to the final exit.

4.1.3 In independent rooms or flats the distance should be measured from their entrance provided that their depth is not more than (15 m) and their occupation should not exceed the specified number according to the buildings preventive requirements as per the use of purpose.

4.1.4 The maximum level of movement distance in protected corridor for reaching the nearest exit (either other fire section or protected stairs) should not exceed 30 m.

4.1.5 The locations where easily burning or combustible materials are manufactured, handled or stored the indicated figures in Table No. 3.1 should be multiplied by 0.5 for obtaining the movement distance.

4.1.6 Unfamiliar establishments to individuals or those which they cannot move on them by themselves:

1. The movement should not be permitted to be in one direction (closed end).
2. The indicated movement distance in Table No.3.1should be multiplied by 0.75

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4.1.7 The movement distance may be increased by 50% if automatic sprayers and fire detective systems are available and the increase should not exceed 25% as for the open areas.

4.1.8 As for the buildings the height of which is more than five floors (ground + 4) or the buildings of which the floor area is more than 2500 m2 should be provided with fire warning systems distinguished with clear operation signs and instructions.

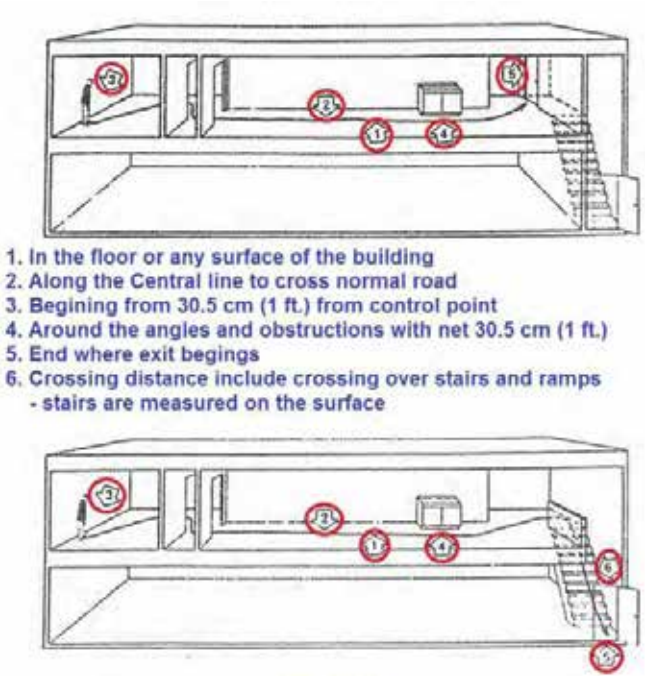

Figure 3.2 Measuring of Movement Distance

4.1.9 Closed end in escape mean path:

4.1.9.1 It is measured by the same movement distance method from the farthest point to the middle of the exit or from the farthest point to the starting point to two different escape paths provided that the distance should not be more than 7.5 m.

4.1.10 Direct distance: The shortest imaginary line inside the building connecting the farthest point and the exit.

4.1.11 If it is impossible to measure the movement distance on designing due to lack of satisfactory information about nature of use an imaginary line should be assumed to be called direct distance which is the shortest line inside the building connecting the farthest point with the exit regardless of any obstructions and such line is estimated on the bases that the movement distance is 1,5 the direct distance.

4.2 Capacity of escape means:

4.4.1 The capacity is estimated as the maximum number of people who could be available in the building or any part of it at any time provided that the number should not be less than the specified number in Table No. 3.2

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Table 3.2: Minimum level of the width of the escape means Minimum level of net width of escape means (by meters)

	Number of persons				
Doors and corridors	100	150	200	250	300
	0.80	0.85	1	1.25	1.5
	0.75	1	1.30	1.65	3

4.4.2 The escape means width should be calculated as per the previous table on the bases of the number of people who will use it in the emergency event. It is preferred that the width of the exists and escape means should not be less than 100 cm.

4.4.3 The completion method may be used to for calculating the confined figures between 100-300 persons from the occupants of the building for reaching the minimum net width of escape means in the floor by meters.

4.4.4 In the event that more than 300 persons of the building occupants are existing the net width should be increased by 0,05m for each additional 10 persons who use the corridors and 8 persons who use the stairs.

4.4.5 In repeated floors the maximum number of persons in one floor only should be taken into consideration. For the assessment of the wideness of the exits which should not be less than the wideness of (emergency exits) the main escape means which lead to the final exits.

4.4.6 If the number exceeds 1000 persons an additional exit should be made available with 152cm width for each additional 500 persons. The width of the stairs and carpets should be equal at all stages until the final exit. As for the cases which are not mentioned in the table the civil defense shall determine the reasonable measures in accordance with each design requirements.

4.3 The height of (emergency exits) escapes means:

Escape means should be designed so that net height for each part of them is not less than 2,2m.

4.4 Wideness of escape means:

4.4.1 In accordance with table no.3-2 so that the escape means wideness will be satisfactory for discharging the existing persons in the building. The width is measured by net vacuum at the narrowest point in any part of the escape means components.

4.4.2 When escape means (emergency exits) from upper and lower floors (basement) meet at medium floor the wideness beginning from the joining point until the final exit should not be less than their total wideness.

4.4.3 The wideness of the exits is related to the evacuation time of the building and the number of the occupants. The evacuation time differs from one building to another in accordance with the prevention requirements in the building. The Table No. 3.3 shows the estimates of buildings evacuation times.

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Table 3.3: Buildings evacuation time during fire

Type of building	Proposed evacuation	Direction of the Movement
Buildings provided with fire prevention requirements and there is no fire hazard.	3 m	Three minutes
Buildings provided with fire prevention requirements but there is fire hazard.	2.5 m	Two minutes and half
Buildings provided with fire prevention requirements and there is fire hazard or buildings provided with fire prevention requirements and there is high fire hazard.	2 m	Two minutes

Table 3.4: Estimates of the number of the building occupants

No	Description of the building	Area by square meters for each person (m^2/person)	Number of persons per square meter (m^2/person)
1	**House of one family**	-	-
2	**Residential flats building**	-	-
3	**Hotels buildings**		
	Hotel rooms	15.00	0.07
	Restaurants	4.00	0.25
	Meeting rooms	1.00	0.15
4	**Commercial shops (marketing centers)**	0.75	1.33
	Central markets	2.00	0.50
	Small commercial shops	-	-
5	**School buildings**	3.00	0.30
6	**Assemblies building**		
	Presentation halls	1.50	0.67
	Conferences halls	1.00	1.00
	Exhibition halls	7.00	0.15
7	**Health care buildings**		
	Hospital wards	15.00	0.07
	Elderly care buildings	15.00	0.07
8	**Car parking buildings**	15.00	0.07
9	**Industry buildings**	10.00	0.10
10	**Warehouses buildings**	-	-

Important note: The number of the occupants of the building on the bases of their actual number if fixed chairs is available.

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4.4.4 **Movement rate in the escape means (emergency exits):** Is the exit of 40 persons per minute from wideness unit.

4.4.5 **Wideness units:** A number of the necessary units for the exit of people in accordance with specified movement rate estimated as (40 persons per minute) in limited period determined in accordance with the type of hazard in the building and the extent of the availability of prevention requirements.

Example: How many wideness units are required for the exit of 480 persons during evacuation time of 3 minutes?

Answer: 480 ÷ (40 x 3) = 4 wideness units.

Mathematical equation for calculating the number of the required wideness units:

$$\text{Number of wideness units} = \frac{\text{Number of people in the building}}{\text{Movement flow rate x evacuation time in minutes.}}$$

4.5 **Number of escape means** (emergency exits) are the minimum number of exit openings required for the exit of persons in accordance with specific movement flow rate estimated as 40 persons per minute in limited period of time.

Example (1): How many escape means exits (emergency exit openings) required for the exit of 480 persons from building within 3 minutes?

Answer: (Number of wideness units ÷ 4) + 1 = (4÷4) + 1 = 2.

Example (2): How many escape means exits (emergency exits openings) required for building which needs exits of (8) wideness units?

Answer: (Number of wideness units ÷ 4 + 1 = (8 ÷ 4) + 1 = 3.

Mathematical equation for calculating required number of (emergency exits openings) escape means exit:

Number of (emergency exits openings) escape means exits = Number of wideness units + 1 ÷ 4

Table 3.5: Required exit numbers for limited number of persons

Number of persons	Number of exits	Net minimum width of the exit.
Maximum 200 persons	2	90 cm
Maximum 300 persons	2	122 cm
Maximum 500 persons	2	152 cm
Maximum 750 persons	3	152 cm
Maximum 1000 persons	4	152 cm

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4.5.1 The number of exits should in accordance with the preventive requirements of buildings as per the type of use and with the exception of the permitted cases all buildings and establishments should have at least two exits which are independent and distant from each other and both lead directly to the outside area.

4.5.2 On calculating the required number of exists it should be taken into consideration that one of them may be out of because of fire impact and accordingly the remaining exits should be satisfactory to absorb the maximum number of people available in the building at any time. The distribution and area requirements should also be taken into consideration which shall be left to the discretion of the civil defense.

4.6 Distribution of escape means (emergency exits): The distribution of escape means should be organized to provide the best possible coverage to the whole area.

4.6.1 The escape means should be distributed to the utmost parts of the building to avoid the availability of closed ends as much as possible and the distance of the closed ends should not exceed by all means the permitted limit as prescribed in the buildings preventive requirements as per the type of use.

4.6.2 The escape means (emergency exits) should be distributed in a manner that keeps them distant from each other so that they will not all together become out of operation because of the fire impact. The minimum distance limit between two exits at one location is calculated by the following two methods.

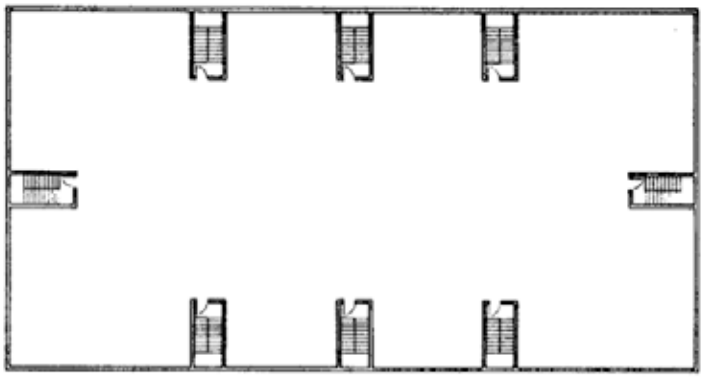
(a) The joining point angle of the two exits with any point on the location not less than 45 degree.

(b) The distance between the two exits not less than half string of the location.

4.6.3 On dividing the floor to more than one tenant or user the escape means should be easily accessible by the existing persons in all sections of that floor at one time.

Figure No. 3.3

Distribution of Ecape Means



Eight Exits, Horizontal exit for VIP persons. It required to provide important exit destiny

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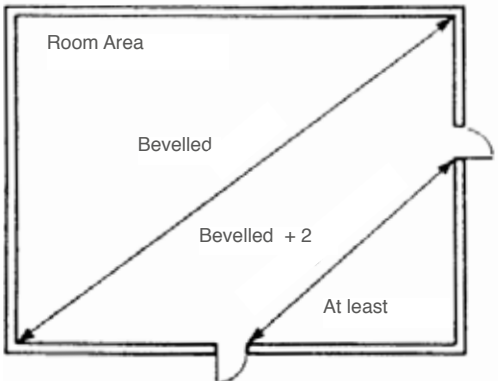
Figure No. 3.4

Minimum Distance half mile



- Joining point angle of two exits with any point in the location not less than 45 degree

- The distance between the two exits not less than half string o the location

5. General requirements of escape

5.1 Building materials: The escape means should be constructed from non combustible materials with suitable fire resistant degree as one of the building frame elements.

5.1.1 The building materials of escape means fire resistant degree should not be less than one hour for the buildings which do not exceed three floors and two hours for the buildings which exceed those floors.

5.2 Protection from fire and smoke hazard: The escape means should be separated from other parts of the building for protection of them from fire spread preventive barriers made of non combustible materials with suitable fire resistance degree.

5.3 Protection of the existing openings in the separating walls by fire and smoke spread preventive doors in accordance with these requirements. The number of such openings should be confined to the necessary ones only for entry and exit.

5.4 Internal finishing of escape means: The used materials in the internal finishing of the escape means should be non combustible nature as much as possible and of the type which does not increase the burning and fire hazard in any way. They should also be of very low degree of flame spread on their surfaces (zero degree).

6. Escape means lightening: All parts of escape means should be provided with satisfactory natural or artificial lightening.

6.1 In case of artificial lightening with electrical current it should be in accordance with the specifications of the Ministry of Electricity and from a reliable source.

6.2 The lightening should be distributed to all parts of escape means so that if anyone is out of operation it will not lead to the spread of darkness or lack of visibility at any point along the escape mean.

6.3 The lightening should be continuous as long as it is required and in the required lightening degree which is not less than 10 lux units on ground surface.

7. Emergency lightening of escape means: Should be provided to all parts of escape means on the stoppage of the normal lightening in accordance with these conditions and specifications or those recommended by the civil defense.

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7.1 The escape means emergency lightening should be provided with emergency electrical current source apart from the main source so that it will be satisfactory to operate for at least two hours or according to the civil defense requirements.

7.2 The emergency lighting operates automatically on disconnection of the main source with a time interval not exceeding 10 seconds or it may be operating continuously.

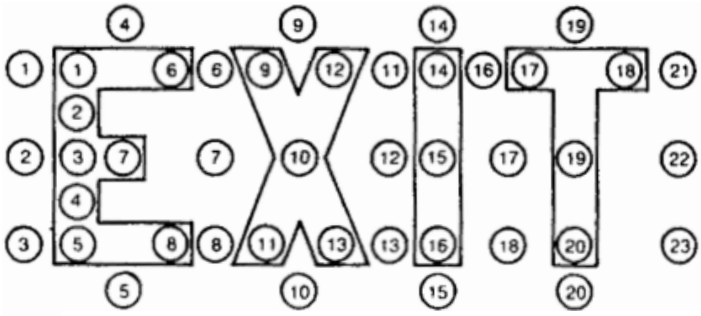
7.3 In case of the use of continuous current (batteries) as supply source of emergency light, it should be integrated and recognized in accordance with part two specifications or civil defense specifications.

7.4 In the permitted cases as prescribed in the buildings preventive requirements according to the type of use, the emergency lighting may be through independent electrical light, which receives electrical supply from normal source and of automatically charging nature so that it operates immediately on current supply disconnection for two hours at least provide that it is recognized by the civil defense

8 Guiding signals of escape means: The escape means should be provided with the required guiding signals to be placed on the suitable locations in accordance with the buildings preventive requirements as per the type of use in order to acquaint with the escape means and their directions and to advise about any instructions related to the escape in particular and safety in general.

Figure No. 3.5

Guiding Signal Indicates Exit path



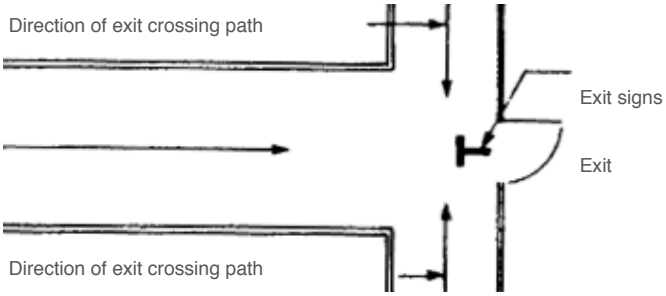
Clearance of signals visivility is determined by the measurement of the severity of lighting of round positions

8.1 These signals should have suitable size, explanation, code and color in accordance with civil defense technical specifications in order to appear clearly, distinguished and different from the neighboring signs in terms of lightening, finishing, color or decoration, should not be permitted to place any fittings or lightening which form obstruction to their visibility or attract more attention than them.

8.2 Exit sign should be placed on the exit directly and a sign of exit and an arrow to indicate the escape mean path when the exit, path is clear or visible such as the turning points and angels so that there is no point in the path which is distant from the sign by more than 30m.

Figure No. 3.6

Some fixing locations of Guiding Signals



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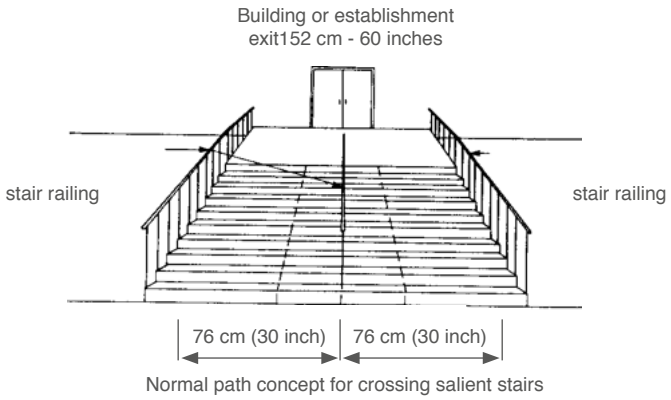
8.3 In accordance with buildings preventive requirements as per the type of use, the guiding signals should be lightened by the same normal lightening source and also the emergency lightening. The lightening degree should not be less than 55 electrical units (watt) on the surface of the signal.

8.4 As for each door, corridor or stair which is recognized as part of the escape mean but due to its location may lead to a confusion or escape to unsafe position should receive another signal written on it the actual use purpose (such as to the basement) or storage room)…. Etc

9. Protection from falling during the use of escape means: Barriers should be fitted for protection from falling (such as railing) on all empty utmost parts edges of the escape means components and other part of the building which is accessible by people such as the surface and light hole edge and main vacuums on the surface, halls, corridor edge etc.

Figure No. 3.7

Railing for protection from falling on stairs



9.1 Barriers should be installed on one side of the stairs the width of which is less than 120cm and on both sides if the width exceeds that.

9.2 If the stairs width is more than 180cm an additional railing should be installed in the middle and in such a case the stairs is considered as divided into two independent sections both of them are subject to the stairs width requirements.

9.3 The height of the protective barriers from falling should not be less than 90 cm in the internal parts and 120cm in the internal parts of the building.

9.4 The glass should not be considered as protective barrier from falling in any way and wherever glass plates are available on facades or window vacuums additional protection barriers from falling should be installed according to these requirements.

9.5 In case there is a difference in the floor level exceeding 18cm or more than one single stair preventive barriers should be installed for protection from falling to be made of non combustible materials.

9.5.1 Preventive barriers for protection from falling should be designed and fixed in firm and solid form which can bear horizontal or vertical pressure and properly implemented so that they will not cause any injury to the body organs or be attached to the clothes part when contacted.

9.5.2 The vacuum in the barriers should not exceed 10cm to avoid any opportunity of stuffing body organs and the bars should be designed in a proper form so that they will not assist the children to climb them

9.5.3 On fixing a barrier on stair side from the wall direction a vacuum should be left between the handle and the wall not less than 4cm.

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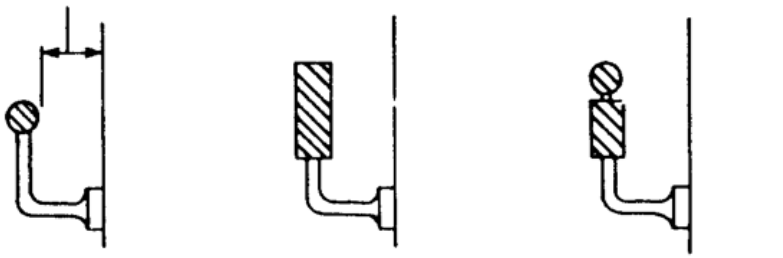
Figure No. 3.8
Permitted Vaccum between the railing handle and the wall not less than 4 cm.



Example 1: accepted Example 2: accepted Example 3: accepted

10. Escape means doors: These requirements apply to all doors components including the frames, shutters and tools if they are part of the escape means.

10.1 If the escape doors are fire and smoke preventive at the same time they should be subject to the preventive requirements prescribed in construction preventive precautionary chapter in addition to these requirements.

10.2 Door width is the net width when the door shutter is fully open.

10.3 Floor level of escape means: The ground level in escape means on both sides of the door should be equal to a distance not less than the width of the door itself.

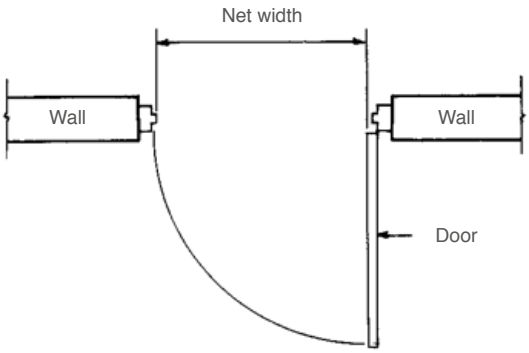
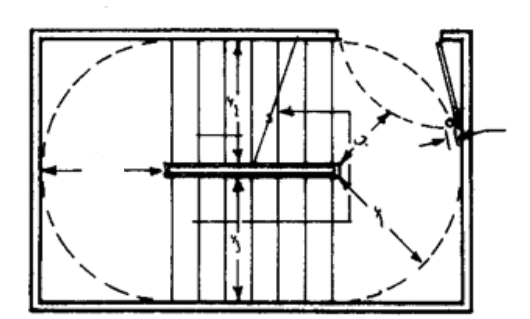


Figure 3.9 Measurement of door net width



(a) required width (b) Atleast half width of (a)

Figure 3.10: Stairs internal draw showing required distance in new buildings

10.4 Organization of escape means doors movement:

10.4.1 The emergency doors should open in the direction of the escape path.

10.4.2 The required effort for opening the door fully should not exceed (23 kg. on the door handle)

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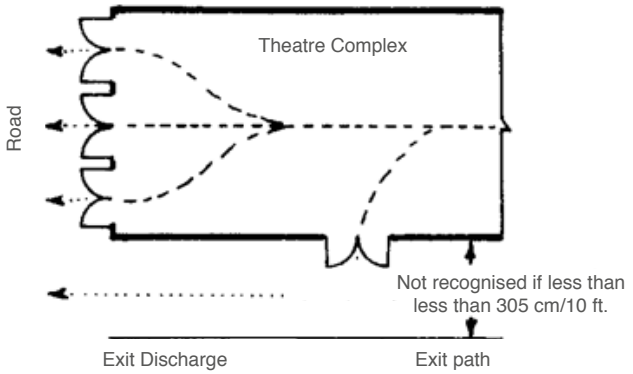
Figure No. 3.11

Opening of emergency door



10.4.3 The door shutter movement should not affect the wideness of the escape means parts or obstruct the use of the escape means in general.

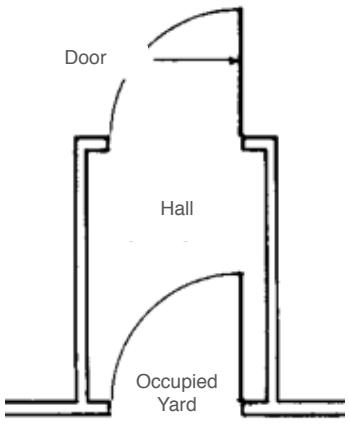
10.4.3.1 The door shutter movement should not be less than the stair width or stair or corridor wideness or any part of escape means components by more than half the required width.

10.4.3.2 If the door opens in the direction of the corridor it should open by 180 degree angle so that it will not appear by more than 15cm from the wall front.

10.4.3.3 In case there are no consecutive doors as in the staircase wideness or insulating wideness the distance between the axils of the two doors should not be less than 1,5m or between the shutters movement than 1m.

Figure No. 3.12

Stair Doors



10.4.3.4 All tools and lockers which form the doors specially bearing joint articulation should be of non combustive materials and with melting degree not less than 800 degree.

10.4.3.5 The lockers and closing tools should be of a type which does not require the use of a key or special knowledge to open them.

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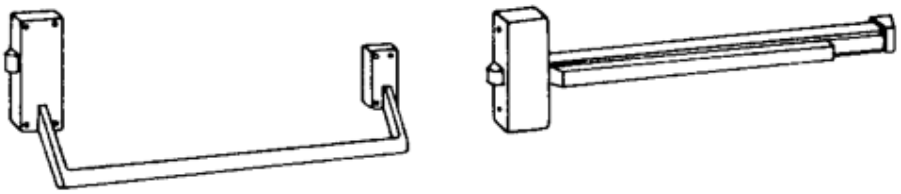


Automatic Clousure of Emergency Doors through pushing

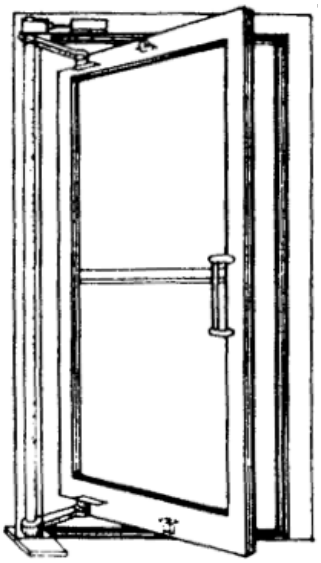
Figure 3.13 Two types of Emergency Door Opening Bars (Panic Bar)

10.4.3.6 When it is required to keep the door in escape means path closed for preventing fire and smoke spread or for any other reason it should be provided with self automatic closure device of recognized type and with a suitable power which closes the door completely after opening.

10.4.3.7 When the use necessitates to keep fire preventive escape door open automatic closure means should be made available.

Figure 3.14

Fitted door with Automatic Menas



Balanced door

10.5 Opening means of escape means doors: In accordance with buildings preventive requirements as per the type of use the escape (exit) doors should be provided with quick opening means which open the doors to the outside area in emergency cases to be recognized by the civil defense (panic bar).

10.5.1 This mean should be a bar or a board or connecting rod the moving part of which shall not be less than 75cm and the height from ground level not more than 10cm.

10.5.2 Such means should not be fitted with any lockers or tools which may obstruct or prevent the opening of the doors during emergency.

10.6 Automatic and private doors of escape means: Automatic doors which are opened through light cell on being approached by somebody or through any other mean and also the doors which are opened or closed by automatic means. Such doors should be provided when closing and opening mean when automatic means are not operational.

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10.7 **Roller doors** are not accepted as part of escape means and if they are available they should be beside recognized types of doors according to the requirements.

10.8 **On limiting the movement** of the occupants of the building with regard to the use of the escape means for security purposes or other reasons the necessary actions should be taken to facilitate the use of escape means immediately in the emergencies.

10.8.1 If it is necessary to close escape doors the key should be kept in closed tin with glazed cover to fixed on top the door for use during the emergency. If this is not possible each case should be considered separately with the civil defense in order to arrange the suitable measurements.

10.8.2 On the occasion of the placement of barriers, ropes or chains for controlling the access due to organization or tickets sale purposes such barriers should be easy to remove immediately in the event of emergency or should not be in a position which may obstruct or prevent the use of escape means doors. As in the case of seesaw doors in both directions and in internal rooms doors an opening should be created on the door to be covered with transparent reinforced glass to enable visibility so that the height of the glass plate is at the same level of normal visibility (150 – 170 cm) and in case of disabled people (100 cm).

11. Escape means Corridors: In the event that it is not possible to reach the exit directly and easily due to designing requirements, safe and easy corridors should be provided to lead directly to the exits and without closed ends. If this is not possible the distance of the closed end should not be more than 7.5m.

11.1 The corridors should be in accordance with general requirements as part of the escape means components in addition to these requirements.

11.2 The corridors should be protected from fire and smoke hazard and such protection may be through readymade sections which have the required resistance degree when the building is provided with automatic water sprayer's network or when special requirements permit that.

11.3 The width of the corridors should be satisfactory to absorb the persons who use them so that it should not be less than the width of the exit they lead to and not less by all means than 50cm in the main corridors inside the flats.

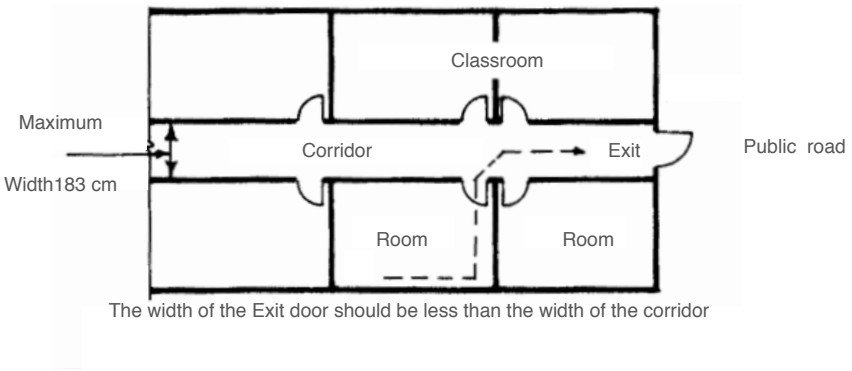

Figure 3.15: Width of Escape Corridors

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11.4 The corridors should be distributed in a manner that enables every person to reach all exits in the floor easily, freely and in more than one direction. It is also preferred to organize these corridors to facilitate the reach to other remaining exits if one becomes non operational due to the fire impact.

11.5 Resistant smoke preventive doors should be fitted in the corridors which automatically close in accordance with preventive precautionary requirements in construction areas in the following cases:

11.5.1 When the corridor length exceed (30m)

11.5.2 At the joining point of the main corridors with the sub – corridors.

11.5.3 At any point as the protection from smoke hazard requires.

11.6 In case there is a difference in the corridors floor levels stair or a ramp should be provided for movement from one level to another. If the difference is less than 45cm a ramp should be used instead of stair.

12. Internal stair: Internal stair forms an important part of the escape means as it is located in a well which vertically penetrate the building.

12.1 The escape stair should be constructed of non combustible materials and isolated from other parts of the building through fire resistant doors and walls for a period not less than one hour and easily lead directly to the exit or to empty obstructions free hall which also lead to the exit.

12.2 The floor of all stair parts should be solid and non slippery and without holes.

12.3 Preventive barriers from falling should be installed according to protection from falling requirements.

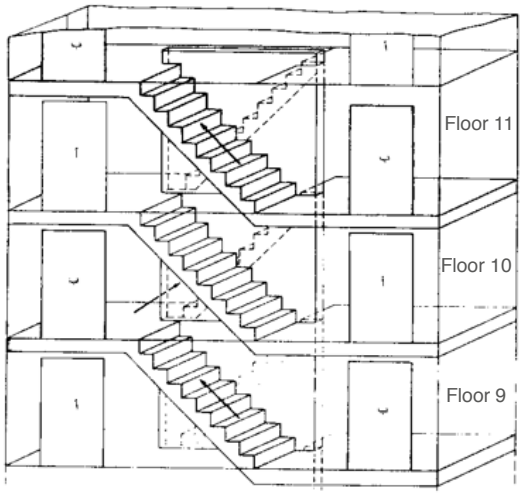

Figure 3.16:

Internal stair is important part of the escape exits

13. Internal stair: Internal stair forms an important part of the escape means as it is located in a well which vertically penetrate the building.

13.1 Stair width is the net distance between the front of the rail or the other wall.

13.2 The stair width should be satisfactory to absorb the occupants of the building in accordance with the buildings preventive requirements as per the type of use and the minimum level table of the width of escape means - Table No. 3.2

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13.3 Completion method may be used for calculating the confined figures between 100 – 300 persons of the building occupants for reaching the minimum level of net width of the escape means by meters in the floor as mentioned in Para 5.2.3

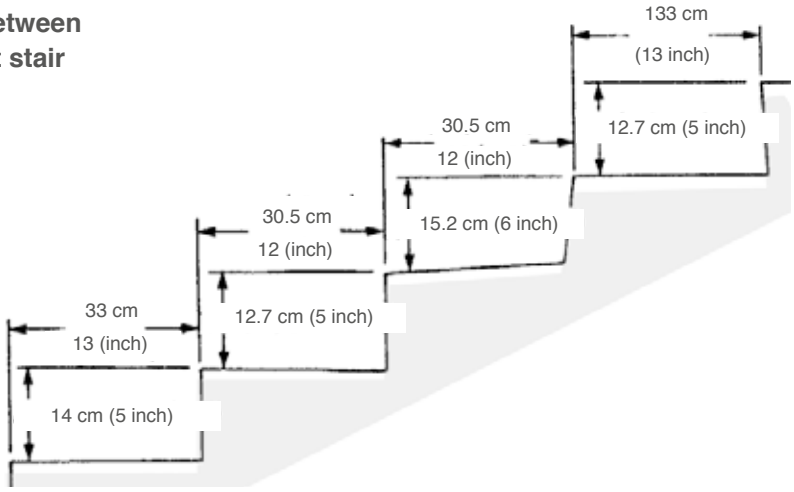
13.4 In case there are more than 300 persons of the building occupants the net width should be increased by 0.05m for each additional 10 persons for using the corridors and 8 persons for using the stair as mentioned in Para 5.2.4.

13.5 If the number exceeds 1000 persons an additional exit should be made available with a width of 152cm for each additional 500 persons. The width of the stair and carpets should be equal at all stages until the final exit.

13.6 The depth of the flat stair should not be less than 28cm and the height of the upright one should range between 15 – 18 cm. the relationship between the stair width and its height remains governed by the following equation: (2 x height + width = 60 – 65) cm.

Figure 3.17:

Relationship between upright and flat stair



13.7 The stairs should be organized in a group of sets each not exceeding (14) stairs and not less than (3) stairs and ends with a platform.

13.8 The platform width should not be less than the width of the stair itself

13.9 The group of consecutive stairs in each set should be equal in the depth and height without any difference exceeding 10mm between the highest and the lowest height or stair depth in the sets groups.

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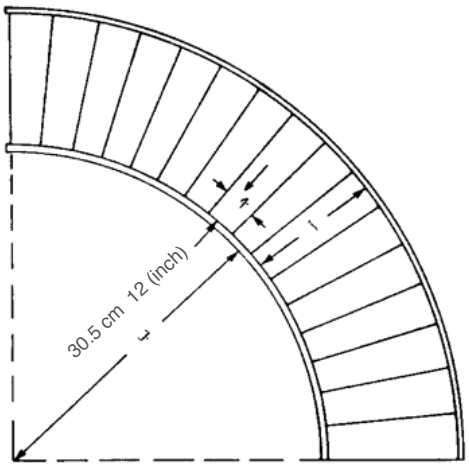
Figure 3.18:

Use of faned curved stairs



Curved stairs- meausre (b) should not be less than double measure (a) Measure (c) should not be less than 27.9 cm (11 inch)

13.10 Fan shaped curved stairs may be used provided that the minimum width level should not be less than 25cm and the distance from the curve center to the beginning of the stair curve from the center direction should not be less than double the stair width.

14. Protection of escape means stairs from fire and smoke: The stairs should be provided with the general requirements for protection from fire and smoke in accordance with the preventive requirements in construction areas in addition to these requirements.

14.1 In the buildings the height of which is not exceeding six floors or those prescribed in the preventive requirements of buildings as per the type of use the stairs well should be separated from the building through insulated yard constructed in accordance with the stair itself requirements in terms of construction, ventilation and doors etc. so that double protection is provided to the stair.

14.2 It is preferred to keep the fire equipment in the insulating yard to ensure that they are placed in a protected position from fire hazard and can be used by fire extinguishing men as a beginning point for Firefighting.

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15. Ventilation of escape means stairs: The staircase as the only escape mean in the repeated floors should be provided with satisfactory ventilation for discharging the smoke on leaking to the staircase well.

15.1 Ventilation may be provided through natural means as in the following cases:

15.1.1 Susceptive windows to opening on the external wall of the building with an area not less than 1.5 m2 in each floor.

15.1.2 Permanent opening in the roof of stairs well with an area equal to 5% of the area of stairs well floor and not less than 1m2 or a susceptive window to opening by recognized manual mean which can be easily operated from ground floor through one motion.

15.1.3 In the buildings where it is not permitted to establish the stair on the external wall of the building the ventilation doors may face special light hole designed for this purpose which should not contain any services that could cause fire hazard.

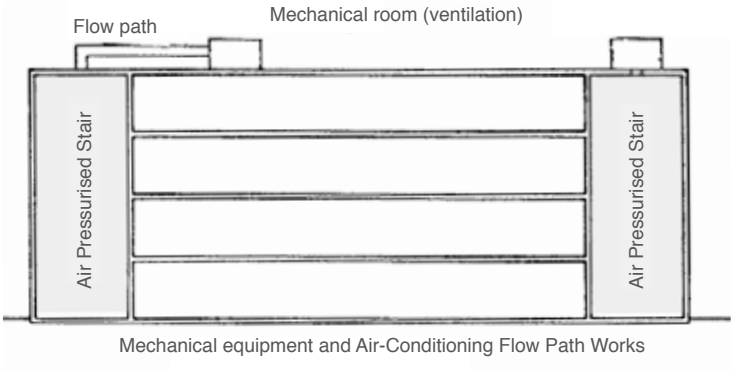
15.1.4 Under any circumstances when it becomes necessary to keep the ventilation windows closed for any reason the windows should be susceptive to opening by the civil defense men during emergency through easily operated manual means by single motion. Such means should be placed in recognized salient positions such as the entrance and distinguished with guiding signal (written on it manual ventilation key).

15.2 Ventilation may be through mechanical means in the permitted buildings according to the preventive requirements of buildings as per the type of use.

15.2.1 The stair could be protected by pressure increase system rather than ventilation systems in order to keep them free of smoke. The pressure increase system should be designed in accordance with the recognized specifications.

Figure 3.19:

Air Pressurised Stair



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16. Distribution of escape means stairs: With the exception of the cases where the preventive requirements of buildings as per the type of use permit the stair should be on external walls of the buildings to avoid the creation of closed ends. As for single stair buildings the stair should be on the external wall of the building.

16.1 The stair should not continue from upper floors to the basement. The basement should have an independent stair. In the case where it is not possible to construct such independent stair the continuation should be in the ground floor through fire spread preventive barrier which rise to the roof. The entry to the basement should be directly from outside.

16.2 Guiding signals should be fixed inside stair well to indicate the floors numbers.

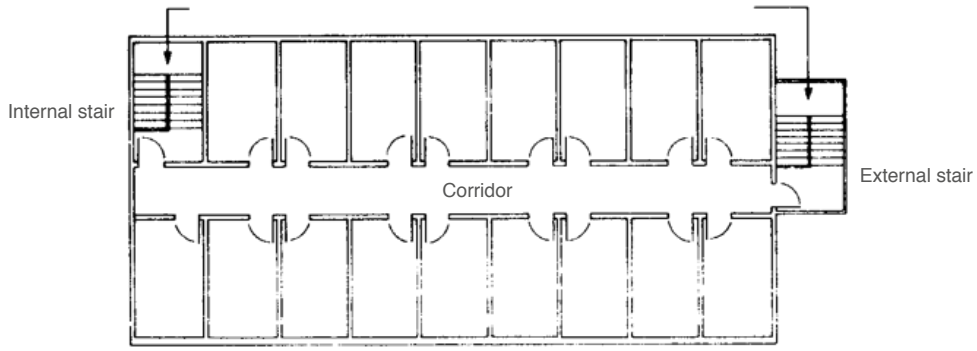

Figure 3.20: Relationship of stairs with the building

17. External stair: When the external stair is considered as part of the escape means it should be consistent with the internal stair requirements in addition to these requirements with the exception of fire protection requirements.

17.1 In certain special cases where the civil defense permits the external stair may be constructed of metal frame provided that it is treated for protection from climate factors.

17.2 The external stair should be separated from the building by constructed walls from non combustible materials with the required fire resistant degree and the facing openings to the stair should be covered with fire preventive doors of automatic closure type and windows of fire resistant reinforced glasses per the following:

17.2.1 Within a distance of 3m horizontally, vertically and in-depth.

17.2.2 There is no need for such construction in the last floor if the stair is not extended to the surface.

17.3 Guiding signals should be placed on the stair doors for indicating the floor number to which they lead.

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18. Bridges, halls and external corridors: When the bridges, halls and external corridors constitute part of the escape means the external stair requirements and these requirements should apply.

18.1 The height of the sides of openings facing the halls, bridges or external corridors should not be less than 2m and they should be constructed of bricks or concrete.

18.2 The width should be satisfactory to absorb the persons who use them provided that it should not be less than 1,5m.

19. Ramps: They are beveled roads, the alternative of the stair in the movement from one level to another in escape means. The prescribed stair requirements in general in addition to these requirements should apply.

19.1 The floors should be firm, coarse and non slippery

19.2 The bevel percentage should be the same in all ramp parts.

19.3 The platform should be used on changing path direction.

19.4 The ramps percentage should not exceed 1:10.

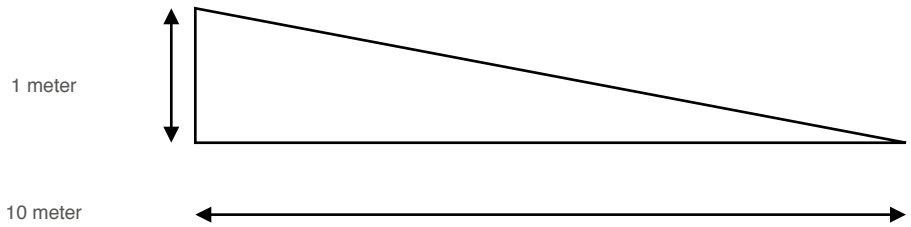

Figure 3.2.1: Ramps percentage 1:10

20. Final exit of escape means: The escape mean should end at final exit that leads to outside part of the building or to the high way.

20.1 In the cases where special requirements permit 50% of the escape means at the most may end at positions inside the building with similar level to the final exit (ground floor normally) provided that the following is observed:

20.1.1 The movement from the end of the path such as the lower part of the stair to the final exit should be easy, clear and without any obstructions and distance should not exceed 15m

20.1.2 Provision of automatic water sprayers network.

20.2 The escape mean path may end at the surface if all escape means requirements are met so that another easy and safe path is made available which leads to the high way.

20.3 The wideness of the exit or the final exits should be satisfactory for discharging the existing persons in the building and should not by all means be less than the wideness of the escape paths which lead to them.

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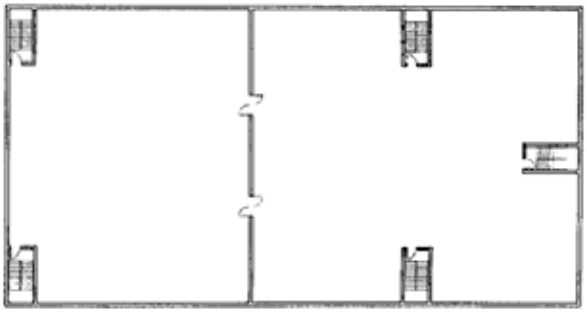
21. Vertical escape means exits: Vertical escape mean is the one which leads to a safe point inside or outside the building and provides safe shelter for the people who are exposed to fire hazard.

Figure 3.2.1:

Horizontal escape means exits



Three Stairs to be used for two vertical exits

21.1 If both sides are considered safe positions another exit on the opposite direction so that safety is secured for all parts is secured for all parts with the suitable guiding signals.

21.2 The temporary exits should be alternative to the half of the original exits in the building at the most provided that the distance requirement is met and the temporary exits should include at least one stair which leads to the final exit.

21.3 The area of the safety place should be satisfactory to absorb the maximum number of people assumed to be in both sides on the basis of 0,3m2 per person.

21.4 The safety place may be outside the building in a neighboring building, bridge or corridor which leads on their part the high way in accordance with the general escape means requirements.

21.5 The safety places to which the temporary exits lead should be attached to one user or tenant only with the exception of special cases which are approved by the civil defense.

21.6 Under any circumstances no lockers should be installed on temporary exits or any other mean which prevent their use at any time.

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22. Private escape means: They are spiral stair ways, fixed upright ladders ,fixed beveled ladders and automatic emergency stairs.

22.1 Private escape means may be permitted to use in accordance with these requirements in the following cases:

22.1.1 Upright buildings where it is not possible to implement suitable escape means in accordance with the necessary requirements.

22.1.2 In limited cases and for serving limited persons such as machinery rooms and stair room on the surface, towers, factories … etc.

22.1.3 The private escape means may be one of the prescribed means in these requirements or any other means recognized by the civil defense.

22.2 The spiral stairway is permitted to be used for serving (5) persons at the most and in three floors only provided that the following specifications are met:

22.2.1 Diameter not less than 1,5m.

22.2.2 Stairway width not less than 19cm at a distant point of 30 cm from the center.

22.2.3 Single stair height should not exceed 25cm with height field of 2m.

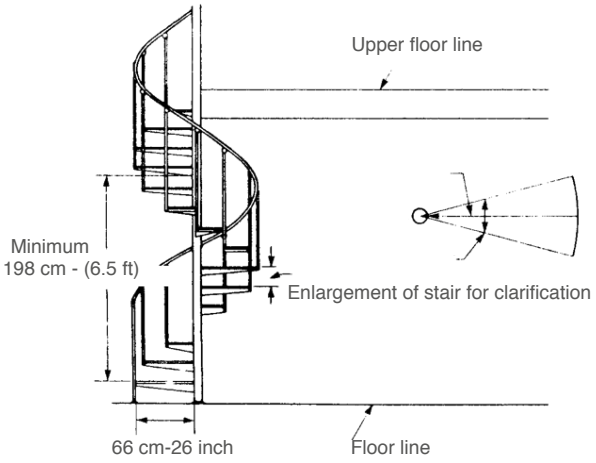

Figure 3.23: Spiral Stairway

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22.3 **Fixed upright ladder:** It is permitted to use fixed upright ladder on the wall in exceptional cases for serving few number of persons working on the site only provided that a barrier is installed on its both sides which extends for one meter distance over the surface level where the ladder ends. If the ladder height is more than 9 m it should be totally covered with grid barrier for protection from falling.

22.4 **Fixed beveled ladder:** The fixed beveled ladder may be permitted to be used provided that the bevel angle with horizon is not exceeding 60 degree and the stairs width is not less than 13cm and the distance between them not exceeding 20cm. all these means should be constructed from non combustible materials which are treated for protection from corrosion and climatic factors and they should be firm, stable and connected firmly with the building.

22.5 **Automatic emergency stair:** In the cases where the civil defense permits the automatic emergency stair may be used which operates automatically provided that it is a recognized type by the civil defense.

23. External windows: It is prohibited to fix the barriers and obstructions on the windows of the external facades on the ground floor of the building unless they are easy to open and in accordance with special approval from the civil defense.

23.1 On the use of external windows as emergency exits their openings should be of satisfactory wideness for easy exit of people.

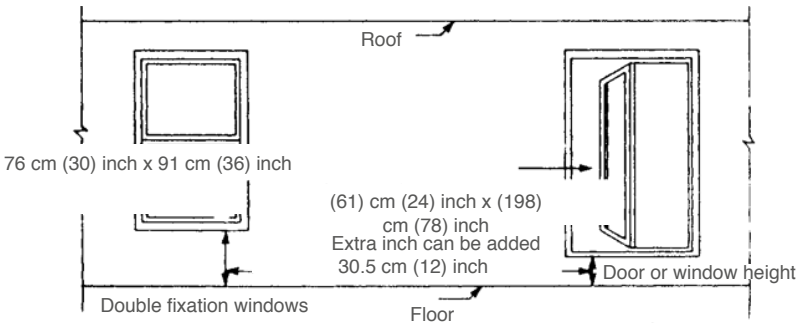

Figure 3.24:

External Facades window

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Four

General Requirements of Engineering Services

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

1. The designing of the central air conditioning system include satisfactory precautionary for preventing fire and smoke spread through air conditioning channels in accordance with these conditions.

1.1 On selection of the site of external air sources for air conditioning system it should be observed that they should not be neighboring places or sources which can be exposed to fire hazard.

1.2 It is preferred to distribute air conditioning channels into decentralization form, i.e. to be distributed in independent sections each covers part of the building. As for the exposed locations to fire hazard such the kitchens and toilets separate air conditioning devices should be provided for them.

1.3 The civil defense may request in special cases the installation of emergency key on the air conditioning device at the right time for serving the civil defense men.

1.4 The buildings with closed facades due to air conditioning designing reasons should be provided with

1.5 Special windows or openings in these facades to enable civil defense men to discharge the smoke in the building when fire occurs.

1.6 The main channels of the air conditioning system should pass through vertical or horizontal corridors constructed of non combustible materials as fire preventive unit. There also should be suitable openings with fire preventive doors for facilitating the maintenance process.

1.7 When the air conditioning channels penetrate the fire preventive walls or roofs in the building they should be of the same fire resistance degree as the walls and automatically closed by melting connection impact at temperature degree ranging between 68 -84 centigrade.

1.8 The channels of central ventilation and air conditioning system should be provided with smoke detectors which operate automatically and stop the operation of the whole system on detecting the smoke and operate at the same time sucking fans for discharging the smoke from the building

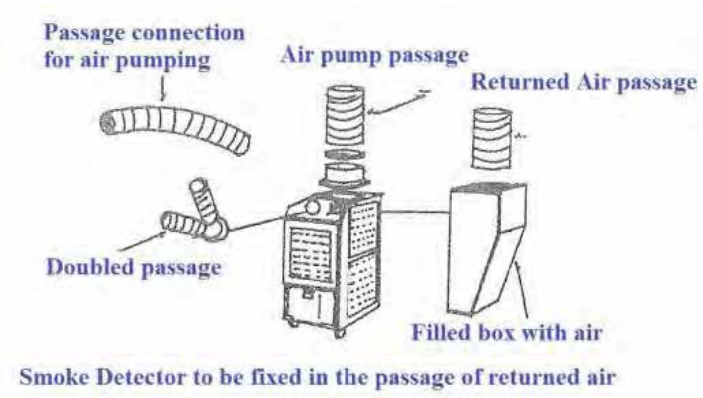

Figure 4.1: Smoke detector to be fixed in the passage of returned air

1.9 The insulating materials used in the wrapping of air channels both inside and outside should be of non combustible type with thickness not less than 3cm. combustible materials should not be used.

1.10 Air conditioning channels may be wrapped with combustible material in special cases to be determined by the discretion of the civil defense provided that the following is taken into consideration.

1.10.1 The distance should be short.

1.10.2 They should pass through corridors constructed of non combustible materials.

1.10.3 Flexible connections of air channels should meet the following requirements.

1.10.3.1 Should be of fire resistance material for at least half an hour.

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1.10.3.2 Should not generate heavy smoke on burning.

1.10.3.3 Should not exceed a length of 25cm if they are at the beginning of the channels near air driving fans.

1.10.3.4 If they are at the end of the channels their length should not exceed 4m and should not penetrate fire preventive wall or roof and should be placed in a location where fire hazard could occur such as kitchens.

1.11 In case the central air conditioning system is used for heating in addition to cooling it should be observed to comply with the preventive requirements of boilers and storage and burning of liquid fuel.

2. Electrical extensions:

2.1 The specifications of electrical extensions should be in accordance with the specifications of the Ministry of Electricity.

2.2 The electrical extensions and fittings should be proper in general so that they do not constitute a direct or indirect reason for fire and the network should be provided with electrical shock preventive device which operates automatically through ground connection or any mean recognized by the Ministry of Electricity

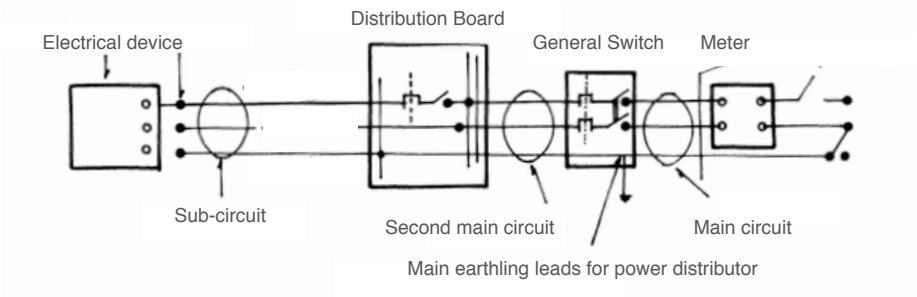

Figure 4.2 Main Earthly Terminal of subscriber

2.3 The cables with firm connections should be extended through preventive pipes which do not allow any manipulation.

2.4 Open electrical extensions are accepted only in limited cases and for short distance not exceeding 3m provided that they are fixed and without any connections.

2.5 The connections which supply the devices and equipment with the current should be inside preventive, flexible and firm pipes.

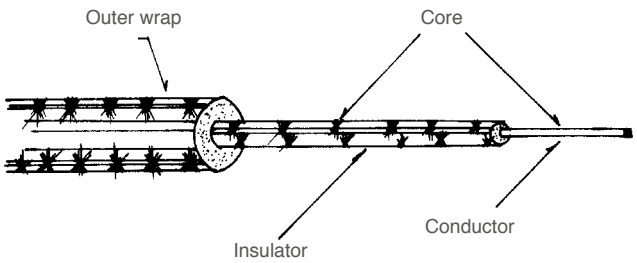

Figure 4.3: Online Cable

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2.6 The extensions and existing electrical devices in the locations which are used for storage of powders, liquid or combustible gases should be of flame preventive type and firmly closed so that no electrical spark arises on operation and no gas leak inside the fittings such as the keys above 1,5 m on ground level.

2.7 The light bulbs at the storage locations should be with preventive cover made of grid and glass which form separation preventing the movement of heat through radiation to the combustible materials.

2.8 If electrical generator exits in the building it should be kept in a room specially constructed for this purpose from fire resistant materials for a period not less than (4) hours and isolated from the building as independent fire preventive unit which meet the following requirements:

2.8.1 Its entry directly from outside

2.8.2 Any existing openings in these units should not be connected with any section in the building.

2.8.3 A pit under the generator should be allocated for the collection of oil in case of leakage so that it becomes easy to discharge and clean.

2.8.4 It is preferred that the oil used for cooling is of non combustible type.

2.8.5 The room should be provided with separate ventilation.

2.8.6 Provision of the required safety equipment in accordance with the civil defense requirements.

2.9 The keys and sub - distribution boards should be placed in salient and easily accessible locations.

2.10 The main key and main distribution board should be placed in suitable location approved by the civil defense provided that:

2.10.1 It is adjacent to the main entrances.

2.10.2 It is preferred to be in isolated room from the building and opened directly.

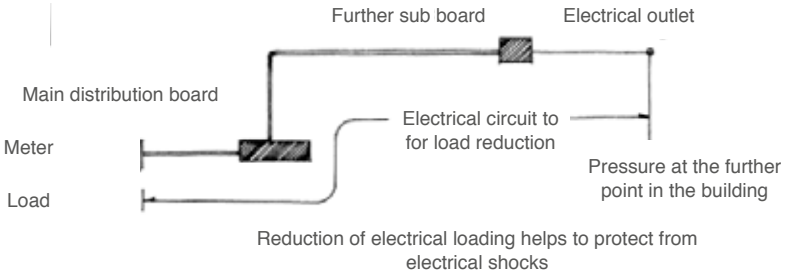

Figure 4.4:

2.11 The indicative distinguished boards and guiding instructions should be placed on main and sub – key locations explaining the field and use purpose.

2.12 The illuminant advertisement: High pressure illuminant advertisements fixed on the facades and surfaces should be provided with circuit breaker key to be installed in a suitable location which does not allow any misuse and should be covered with glazed plate which can be broken for use by the civil defense men during emergency.

2.13 Necessary measures should be provided for protection from electricity through leaking electrical loads to the ground. These measures include placement of lighting preventive device in high buildings in accordance with civil defense and Ministry of Electricity requirements.

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3. Waste collection and disposal:

3.1 The waste collection room should be constructed from non combustible materials with fire resistance degree not less than 4 hours provided that its door is also of similar fire resistance degree and closes automatically.

3.2 Waste transportation pipe should be established within the floors from non combustible material and should pass through separated vacuum from other parts of the building by fire resistant walls.

3.3 The waste room and the vertical pipe in major important buildings should be provided with automatic and manual means for closing the pipe in case of emergency and in accordance with the civil defense recommendations.

3.4 The pipe should be made of non combustible material and of fire resistance degree of 2 hours at least.

3.5 The pipe opening which receive the waste from the floors should be closed by fire and smoke preventive doors which close automatically.

4. Steam and hot water boilers:

4.1 The vapor and hot water boilers should be installed, used and maintained in accordance with the standard Gulf specifications " principles and requirements of steam and hot water boilers inspection and selection" inclusive of all parts and special requirements prescribed by the civil defense.

4.2 The location of boilers room is preferred to be facing the external wall of the building and if this is not possible it should be observed on selection of the location that the direction of the explosion discharge should be towards the least damage location.

4.3 The boilers room should be constructed from fire resistant materials with resistance degree not less than 4 hours.

4.4 The entrance to the boilers room should be directly from outside and if this is not possible it should be observed that the room will not constitute any fire hazard to the main exit path in the building.

4.5 The boiler room door should be of fire resistant type for a period not less than 4 hours and automatically closed. Distinguishing sign should be fixed on this door.

4.6 Satisfactory natural ventilation should be provided to the boiler room in accordance with the ventilation and smoke discharge requirements.

4.7 Electrical extensions should be of special flame preventive type.

5. Mobile electrical lifts:

5.1 Each mobile lift requires study by the civil defense separately

5.2 On fixing mobile lifts it should be observed to prevent fire smoke spread through the existing openings on these lifts.

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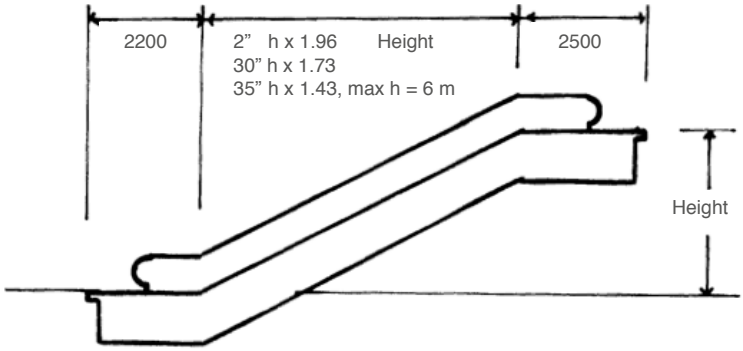

Figure 4.6: Mobile lift measure

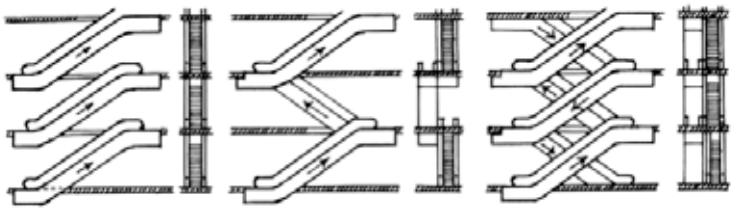

Figure 4.7: Explanatory Mobile Lift Drawing

6. Electrical lifts:

6.1 The electrical lifts should be installed, used and maintained in accordance with Gulf standard specifications pertaining to electrical lifts for people, goods and the requirements issued by the civil defense.

6.2 It is totally prohibited to over load the lifts by more than the authorized load.

6.3 All lifts should come back to the ground floor and open their doors in case of fire event.

6.4 Fire lift:

6.4.1 When the height of the building exceeds 28m one lift or more should be allocated for the use of civil defense men.

6.4.2 Special key should be provided to the fire lift in order to control lift during the emergency. It should be kept in a closed tin fixed on the wall and covered with glass cover distinguished with clear sign and placed in a suitable location in the ground floor.

6.4.3 It is appropriate to supply the fire lift with the current from other source than the source which supply the building with the electrical current so that it will be operating even if the electrical current is disconnected during emergencies.

6.5 Lift Well:

6.5.1 The lift well and the equipment and transformers room should be built from fire resistant materials with a resistance degree not less than two hours.

6.5.2 The lift well should be protected from the vertical fire and smoke movement to other floors.

6.5.3 The lift well in the floors should face a separated yard from the building by walls and doors which are preventive to spreading of fire and close automatically.

6.5.4 The lift well may be permitted to exist in the stair well as long as prevention requirements for protection from fire are made available.

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6.5.5 The lift well should not form part of the ventilation system in the building.

6.5.6 Satisfactory ventilation should be made available for discharging the smoke in the event of fire incident in the lift well.

6.5.7 It is totally prohibited to use the lift well for any other purpose other than lift fittings.

6.5.8 It is prohibited to create any openings on the lift well other than the allocated doors for the lift.

6.5.9 It is prohibited to cover or paint the internal walls of the lift well with non fire resistant materials.

6.5.10 A copy of the key of the external door of the lift well should be handed over to the civil defense.

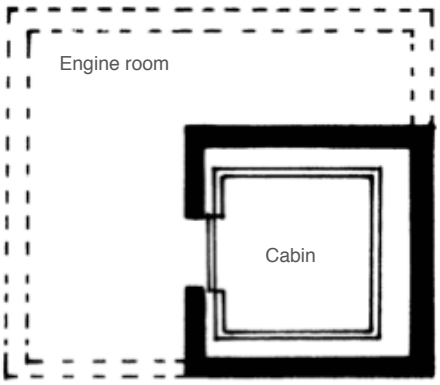

Figure 4.8: Cabinet explanatory draw

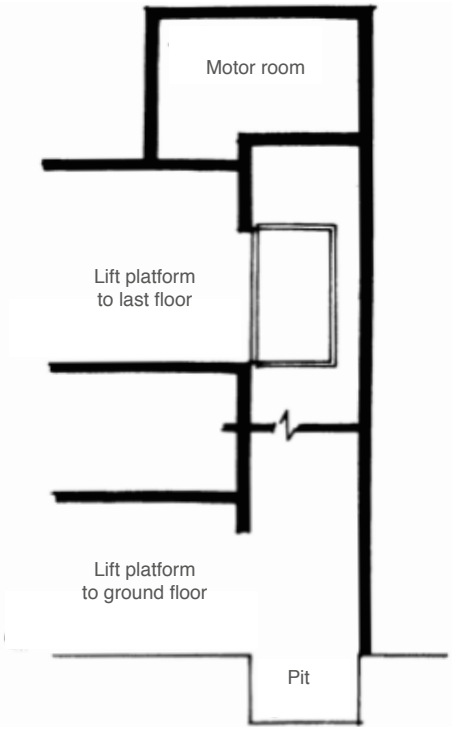

Figure 4.9: Lift vertical section

6.6 Lift Motors room:

6.6.1 The lift motors room should be constructed from non combustible materials in accordance with Gulf standard specifications" electrical lifts for individuals and goods"

6.6.2 It is prohibited to allow the existence of any openings between the lift motors room and the lift well with the exception of the openings designated for the ropes and other necessary extensions.

6.6.3 Satisfactory ventilation and lightening should be provided to the motors room.

6.6.4 If the building stair does not reach to the motors room level stable and proper stair should be provided from non combustible materials.

6.6.5 Barriers should be installed for protection from falling around surface edges or existing openings in the path of motors room.

6.6.6 A box should be fixed in the motors room with reinforced glass cover for keeping the manual tools and equipment such as the keys, operation tools, rope extension, fixing tools, the key of the external door of the lift well and any other tools and equipment pertaining to the operation and light maintenance of the lift.

6.7 Lift cabin:

6.7.1 The cabin frame and internal covers and paint should be of non combustible materials.

6.7.2 Internal door should be provided to the individuals lift cabin so that it will not operate before it is closed to prevent stuffing the users' organs or their clothes between the cabin and the lift well wall.

6.7.3 The roof of the lift cabin should be provided with an opening for rescue purpose satisfactory for the entrance or exit of one person in accordance with Gulf standard specifications, " Electrical lifts for individuals and goods".

6.7.4 The cabin should be provided with ventilation fan suitable for the size and capacity of the lift.

6.7.5 The individual lifts should be provided with guiding boards which include:

6.7.5.1 A board indicating that children under fourteen years of age are not allowed to use the lift on their own without being accompanied with an adult person.

6.7.5.2 A board indicating that smoking is not permitted inside the lift cabin.

6.7.5.3 A board indicating the permitted load of the lift and the maximum number of the users.

6.7.5.4 Placement of distinguishing signs on the keys of cabin buttons indicating the type of use.

6.7.5.5 A board indicating the name of the agent and his telephone number and the responsible authority of the maintenance and its emergency telephone numbers.

6.8 Lift Supply with Electrical Current:

6.8.1 The electrical current lines which supply the lift with the power and light should be provided with special main switch (other than the existing switch in the motor room) at the main switches of the building.

6.8.2 The electrical current lines are connected with special electrical circuit not linked with any other services other than the lift.

6.8.3 Special sign should be placed to indicate the electrical switches of the lift.

6.9 Periodical maintenance and inspection of the lifts.

6.9.1 After lift installation it should be inspected and approved by specialized and technically authorized agent who is recognized by the civil defense as per the Gulf standard requirements.

6.9.2 Each lift should receive regular service covering periodical maintenance works from experienced agents in lift s maintenance works recognized by civil defense.

6.9.3 The periodical maintenance and repair works and their dates records should be kept in the lift motors room.

6.9.4 The responsible authority of periodical maintenance works is also responsible of meetings repairs requirements when the lift is not operational and its services should be available throughout the day (24 hours).

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6.9.5 The responsible authority of the periodical maintenance and the entrusted agent with the inspection should notify the official responsible authority immediately in the following cases.

6.9.5.1 On formulation or cancellation of lift maintenance contract.

6.9.5.2 When the inspector notices any defect that may affect the safety of lift users.

6.9.5.3 When the building owner refuses to implement the required maintenance works.

6.9.6 The civil defense is the arbitrator for the settlement of the disputes that may arise between the relevant parties in this regard or the violations that may occur to these requirements.

6.9.7 The building owner should take the necessary action for securing the safety of the lift.

6.9.8 A responsible person such as the guard of the building or lift operator should be trained on lift operation in the normal conditions and how to act during emergencies and out of work incidents and to notify the authorized maintenance agent and to report to the civil defense in the event that they refuse to comply with the maintenance request.

7. Liquid fuel tanks:

7.1 The liquid fuel tank should be buried under the ground and if that is not possible it should be kept in an independent room from the building and should be provided with fire protection requirements including:

7.2 The design of the connecting pipes with fuel and oil burning equipment in general in accordance with the recognized specifications by the countries of Gulf co operative council for Arabian Gulf countries.

7.3 The tank should be stable and firm and does not permit any leakage or filtration.

7.4 The liquid fuel supply pipes should be made of firm and durable pipes which do not permit leakage.

7.5 Liquid fuel supply network should be provided the necessary valves for closure at suitable locations so that they become easily accessible and indicated by distinguished signs the most important of which are:

7.5.1 Main closure valve at the beginning of the line at the tank.

7.5.2 Main closure valve at fuel burning device.

7.5.3 Automatic valve operates by heat impact to be installed outside fuel burning device room so that fuel supply to the burning device will be stopped on fire incident which operates through melting connection or any other suitable mean. In addition to that other manual closure mean should be provided to be used in the event the automatic valve becomes non operative.

7.6 The design of fuel burning device should provide fire preventive means on operation.

7.7 The extensions or their path should not be constructed adjacent to any heat source.

8. Liquid fuel tank room:

8.1 Stable fuel tank should be kept in special room constructed from fire resistant materials and with resistance degree not less than 4 hours and it is preferred to bury the tank under the ground.

8.2 Satisfactory natural ventilation should be made available to the liquid fuel tank room at the upper and lower part levels of the room so that it will drive out the vapors outside the building.

8.3 It is preferred that the room will be facing the external wall of the building.

8.4 The fuel tank room should be distant from boiler room in order to prevent heat movement to it.

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8.5 Electrical extensions should be of special flame preventive type.

8.6 The room door should be of fire resistant type with resistance degree not less than 4 hours and automatically closed with distinguished sign fixed on it.

8.7 A sill should be constructed at the door with suitable height so that it will form with the walls satisfactory basin for withholding the stored liquid quantity with 10% increase.

9. Gaseous fuel tank

9.1 The extension and storage and burning of gaseous fuel should be in accordance with the specifications and requirements pertaining to central gas system and the civil defense requirements in general.

9.2 The extensions and gas supply pipes should be painted in yellow color.

9.3 The gaseous gas fuel extensions network should be provided with main closure valve to be outside the building if the source is from the main gas pipelines in the city and at the beginning of the line if the source is normal gas cylinders.

9.4 The gas pipe line network should be provided with sub – closure valves at the beginning and end of each flexible connection in the building.

9.5 The gaseous fuel use locations should be provided with sensing devices for liquid fuel vapors and gases.

9.6 The main and sub – closure valves should at easily accessible locations which are approved by the civil defense and distinguished by clear and remarkable signs.

9.7 The gas pipes and their path should not be constructed adjacent to any heat source.

10. Cooking or heating vapors discharge chimneys:

10.1 The furnaces and burners and their alike such as cooking and heating equipment should be provided with smoke exits which lead to the outside area.

10.2 The chimneys should be made of non combustible materials and with satisfactory fire resistance degree.

10.3 If the chimneys location is inside the building the internal surface should be arranged for facilitating the removal process of accumulated carbon and any other precipitations.

10.4 If the chimney is of metal plates, its thickness should be satisfactory and the chimney connections should be fixed firmly and it should be fixed on surrounding walls by durable tension cables.

10.5 The chimney should be provided with openings for cleaning and inspections. These openings should be with suitable measures in accordance with the nature of the location especially at the curves.

10.6 The height of the chimney over the highest point in the building should be one meter and 3 meters over the height point of the surrounding buildings within a circle with half diameter of 23m.

10.7 The chimney should not be connected close to combustible materials.

11. Ventilation and smoke discharge: The ventilation and smoke discharge is addressed for the sake of prevention from fire as follows:

- Ventilation for smoke discharge in order to secure the safety of the individuals and protect the building
- Ventilation for driving away combustible vapors and gases and powders.
- Ventilation for smoke discharge in order to assist the civil defense men in controlling the fire incident.

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11.1 Ventilation for safety of individuals: Satisfactory ventilation should be provided in the exit path and in any part of the building where people may meet.

11.2 Ventilation for controlling fire incident: Satisfactory ventilation should be provided for driving away combustible vapors, gases or powders so that their concentration in the air will not reach burning or explosion degree. This ventilation means are as follows:

11.2.1 Pumping or providing local ventilation means at the various locations used for storage, operating the liquid burning devices or burning gases.

11.2.2 Pumping or providing local ventilation means to the mechanical equipment and vapors as per their preventive requirements.

11.2.3 Mechanical ventilation when the natural ventilation is not satisfactory or not efficient.

11.3 The natural or mechanical ventilation process should be integrated so that it will secure the required efficiency for renewal of air in the location within certain period of time based on the size of the location and type of use and the contents and in accordance with the preventive requirements of fire incident. The concerned engineer should submit the required study in this regard

11.4 Natural or mechanical ventilation should be provided in all buildings and establishments.

11.5 The ventilation is carried out through openings in the upper roof which remain opened permanently and if it is necessary to close them they should be fitted to be susceptible to opening in the event of fire incident by any one of the following means or any other mean approved by civil defense.

11.5.1 Automatically: through melting connection or warning system.

11.5.2 Manually: through easy manual mean to be placed at suitable height from ground level in easily accessible location to be approved by civil defense.

11.5.3 Openings coverage: through plates made of quick melting material by the impact of the heat arising from fire incident in special cases to be determined by the civil defense.

11.5.4 The ventilation system calculation should be in accordance with the international systems and the civil defense requirements.

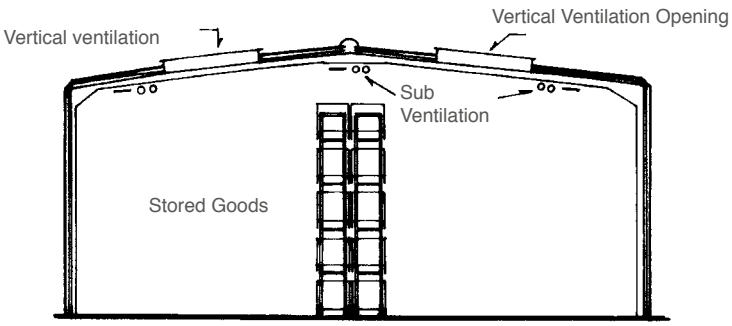

Figure 4.10:

Storage warehouse

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12. Fire Protection requirement for central system of liquidated gas fuel used in the buildings: Include gas extensions from tank or cylinder or small gas station meter to the consumer unlike mobile cylinders which are transported each time for filling.

12.1 Assessment of the size of central fuel gas:

12.1.1 The size of the tank is estimated on the basis of the highest gas with drawl per hour and the quantity of the required storage in addition to the area of location where the tank will be placed in accordance with the security and safety requirements.

$$\text{Size of the tank in liters} = \frac{\text{Consumption quantity in pounds per month} \times 1.5}{0.7 \times 1.272}$$

As 70% of the utilized size of the tank = 0.7

(Maximum use is 58% of the tank size)

One liter of liquidated gas petroleum = 1.272 pound.

12.2 Selection of the size of central gas fuel tank:

12.2.1 The tank size selection is usually done as per the estimation and comparison with the manufactured sizes which range between 380 – 880 liters for residential projects and up to 500 liters for commercial projects. It is preferred that the size of the tank will be satisfactory for (6) weeks i.e. one month and a half in order to secure gas supply with more safety and without disconnection to the consumer.

12.3 Specifications of central gas fuel tank and its fittings:

12.3.1 The tank should be made in accordance with standard international specifications. The tank should be provided with the necessary fittings on a yard which permits the filling and use of the gas with complete safety. Such fittings should be under closed cover if the tank is at a fence less location.

12.3.2 The central gas fuel tank contains the following fittings:

12.3.2.1 Gas level watch

12.3.2.2 Small valve (1.5 mm or less) for monitoring the highest level on filling.

12.3.2.3 Closure valves on the connected lines with the tank. i.e. the filling and use lines with the addition of withdrawal monitoring valve on gas fuel line.

12.3.2.4 Relief valve which should be of internal or external type provided that the relief is carried out at the rate of one cubic meter per minute.

12.3.2.5 Monitoring valve on filling line if the filling point is above the tank surface. If the filling point is at the end of connected with the tank a second monitoring valve should be placed at the end of the line.

12.3.2.6 Gas level watch allows the opportunity to the consumer to know the percentage of the liquid gas level.

12.3.2.7 First grade pressure organizer on use line which provides the gas with the appropriate pressure for the consumer. There is also a closure valve between the tank and pressure organizer when necessary. The valve has a red color key.

12.4 Selection of the site of central gas fuel tank:

12.4.1 The tank under any circumstances should not be surrounded by anything at a distance of 60 cm.

12.4.2 Any opening at any beginning should be at a distance from the tank wall not less than 1.5 m.

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12.4.3 The distance from the tank wall to the ownership end line should not be less than 1.5m and this distance may be 60cm if there is a wall at the end of ownership line.

12.4.4 The distance from the tank wall to the point where combustible materials are existing should not be less than 3 m.

12.4.5 The distance from the tank wall to the burning point should not be less than 3 m.

12.4.6 The distance from the tank wall to the high way should not be less than 1,5m provided that a distance not less than 3m should be kept from the tank fittings.

12.4.7 The distance from the tank fittings to the electrical equipment should not be less than 3 m if they are of non acceptable type to be used in susceptible mean to burning.

12.4.8 The distance from the tank fittings to the non protected ground openings should not be less than 3 m.

12.4.9 The distance from the tank wall to the filling tank should not be less than 1.5m.

12.4.10 The separating distance between the tanks should not be less than 60cm

12.4.11 The civil defense on issuing the permit for the construction or operation may request suitable preventive alternative to the selection of central gas fuel tank location

Figure 4.11:

Explanatory Gas Tank drawing

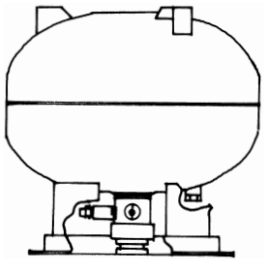
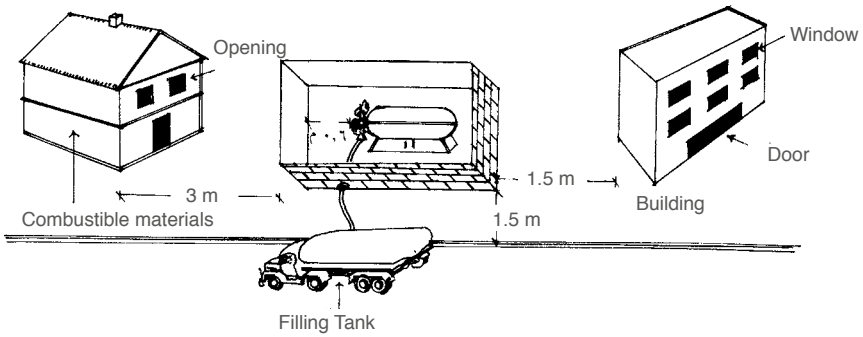


Figure 4.12:

Gas Fuel Tank Location



12.5 Central gas fuel tank fence:

12.5.1 It should not be permitted to build more than two walls and the height of each wall should be suitable so that the horizontal distance for any gas leak will not be less than the previously mentioned distances.

12.6 Prevention requirements on the use of cylinders (mobile liquidated gas):

12.6.1 The station should be composed of two cylinders over regulator change. If the station is to supply several types of use, the number of cylinders should not be less than four or six big size types while selecting the suitable size for the regulator. The most used ones are (100 pound) and (50 pound) capacity as for the operation of normal cookers.

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12.7 Mobile liquidated gas cylinders storage:

12.7.1 The cylinders should be placed in vertical position and should be stable so that it will not require more protection. The distance between the cylinders and any opening in the building should not be less than 1m and the heads of the cylinders and the regulator should be of less weight than the windows line by 30cm.

12.8 Mobile liquidated gas cylinders regulator:

12.8.1 The connected regulator with the cylinders through special hoses reduces the pressure to 37mmb. If the regulator power is 4kg/hr at one stage, or to 1.5 mmb. if the regulator is of higher size up to (40 kg/hour). The regulator should reduce the pressure to 37mmb. in the second stage.

12.8.2 When the operating cylinders become free of gas the regulator withdraws gas from reserve cylinders and isolates the empty cylinders.

12.9 Supply of liquidated petroleum gas from central network:

12.9.1 For supplying two locations or more from one tank a meter should be installed with the second pressure regulator at each consumption point. The gas should be distributed to the consumption point by pressure regulator which begins immediately after the tank. Each location should also be provided with second pressure regulator which includes several safety devices.

12.9.2 One of the second pressure regulators is the provision of safety inside the building through monitoring the withdrawal and the normal pressure. Therefore it performs the role of monitoring valve which closes the gas automatically whenever the pressure is changed from the normal level. If it becomes defective it should be re operated under the supervision of specialized technician to ensure the safety of the extensions.

12.10 Prevention requirements in liquidated petroleum gas supply pipes (extensions):

12.10.1 **Materials:**

12.10.1.1 The pipes should be of good quality type from iron or copper (with operation pressure 4b) and should be manufactured in accordance with the recognized international specifications.

12.10.1.2 The distribution should be in copper or iron pipes and the selection should be based on the size and light pressure (28 - 37 or 50 mmb. operation pressure). For example if its intended to provide short distance extensions including cookers the proper selection will be to choose copper pipes (3/8 or ½ inch) manufactured in accordance with the standard specifications.

12.10.1.3 This should be for the internal extensions which operate through light pressure.

12.10.1.4 Galvanized iron pipes also may be used for internal extensions which operate through light pressure for industrial and commercial projects and also domestic projects.

12.10.2 Prevention requirements for liquidated petroleum gas supply pipes:

12.10.2.1 The internal lines installation should apparent at high, low level, hung on the roof level or under the ground.

12.10.2.2 The pipes may be installed in readymade canals on the ground which should be protected from corrosion by the protective tape.

12.10.2.3 The pipes may be also tightened on the building wall at a high or low level until the consumption point.

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12.10.2.4 In case of penetrating the wall especially the two fold one the pipe should pass upright through protective pipe of greater size. The wall width should be estimated without any welding. The gas pipe should be fitted in the protective pipe in a manner which secures that the gas will not second pipe or from the latter to the wall or the ground. The gap between the two pipes should be filled with flabby materials and provided with barrier at the utmost parts.

12.10.2.5 Regardless of the gas pipe passage form it should be accurately tightened and tied to the wall.

12.10.2.6 In case that the gas pipe is placed directly in a ditch, its gravel free flatten depth should not be less than (50cm) so that the pipe protection will not be affected.

12.10.3 Prevention requirements in the selection of the site of liquidated petroleum gas supply pipes:

12.10.3.1 If the liquidated petroleum gas supply pipes are under the ground, the distance which separates the gas pipe from other services lines should not be less than the following:

12.10.3.1.1 30cm from petroleum, water and sewerage lines.

12.10.3.1.2 20 cm from electrical cables.

12.10.3.1.3 10cm from any other lines.

12.10.3.3 If the liquidated petroleum gas supply pipes are apparent the distance which separate the gas pipe from other service lines should not be less than the following:

12.10.3.3.1 3cm if it is parallel to electrical line, steam or hot water line.

12.10.3.3.2 1 cm if it is crossing electrical line, steam or hot water line.

12.10.3.3.3 If the pipe is buried under ground or in a wall, the distance of the pipe from the final surface should not be less than 1cm.

12.10.4 Prevention requirements of connection of burners with the liquidated petroleum gas pipes:

12.10.4.1 The burners should be connected with copper or iron pipes and bolt should be fitted to facilitate the dismantling and fastening in future.

12.10.4.2 Rubber hoses may be used after the second regulator of the low pressure provided that the length of the hose should not exceed 6 feet (180cm).

12.10.4.3 A valve should be provided to each gas device which shall be close to it to facilitate isolation and disconnection without interrupting gas supply to other units. This valve should be in accordance with recognized specifications.

12.11 General prevention precautionary for protection from fire in the central liquidated petroleum gas system:

12.11.1 The civil defense should be notified about the precautionary means against fire at the designing stage of the project and during implementation stages and after operational stage.

12.11.2 All extensions of the central gas system should be exposed to trials with the suitable pressure to ensure that they are fully accurate and free of any defects or short comings before operating them with gas.

12.11.3 Provision of the appropriate warning and extinguishing systems for the liquidated petroleum gas and placing them in strategic and close locations to the gas station.

12.11.4 Placement of warning boards for the safety of the surrounding area of the tank such as no smoking, signs of gas tank and location of combustible materials etc.

12.11.5 The internal kitchens should be provided with warning devices against gas leakage. These devices should automatically disconnect the gas supply in the event of the leakage.

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Five

Prevention and protection requirements from fire in assembly buildings

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1 Definition of assembly buildings:

1.1 They are the designated building or their parts for the assembly of (50) persons or more for the creation, cultural, sports, presentation purpose such as:

- Worship halls
- Courts
- Lectures halls
- Meeting halls
- Presentation halls
- Banks halls
- MuseumS and theater
- Main Libraries
- Sports clubs
- Covered play grounds

1.2 Assembly buildings are divided in terms of absorption to the following categories:

1.2.1 Category (a) buildings include more than 1000 persons.

1.2.2 Category (b) buildings include between 300 – 1000 persons.

1.2.3 Category (c) buildings include between 50 – 300 persons.

2. Fire hazard: Fire hazard classification in the buildings: Assembly as of light hazard

3 Construction requirements:

3.1 Preventive precautionary requirements should be applied in engineering fields in general for securing the safety of construction frame from fire hazard.

3.2 The validity of buildings from construction point of view for use purpose by assembly should be determined in accordance with table no. 1.2 buildings classification in terms of fire resistance.

4. Multipurpose use:

4.1 In case the assembly building is used for other purposes or the assembly forms a part of buildings which are used for other purpose they should be separated from each other to constitute a fire section provided with independent escape means.

4.2 The buildings of (a) category or their parts should not be sharing any other type of use with the exception of the attached or connected uses with the assembly nature such as restaurants, cafeterias etc. As for the other cases they should be studied each one separately and the civil defense will take the proper decision in this regard.

5. Fire spread control: General requirements for preventive precautionary should be applied in engineering fields in addition to these requirements:

5.1 Various sections in the assembly building should be separated from each other and each should be considered as separate fire section such as the public hall, theatre, waiting hall, dressing room, actors and decoration room. The multipurpose use location also should be separated.

5.2 Vertical spread: Each floor is considered independent fire section. In case there is atrium special requirements should apply.

5.3 External spread: The preventive precautionary requirements in engineering fields should apply with regard to the distance between the buildings and external walls.

5.4 Arrival of civil defense machinery: It should be made easy for the arrival of civil defense machinery and equipment to the assembly buildings.

5.4.1 A road or path should be made available to reach the surrounding area of the assembly buildings. So that the civil defense machinery can reach to two facades of the building at least to be facing the main entrance of the building

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5.4.2 Designated parking locations should be made available for the machinery and vehicles of the civil defense around the building in accordance with the site organization requirements.

6. Escape means (emergency exits):

6.1 The general requirements of escape means should be applied in addition to these requirements.

6.1.1 The escape means from the assembly hall should be totally independent from other sections in buildings of category (a) and (b) such as theaters, actor's room, stores, workshops etc. which should be provided with totally independent escape means leading directly to the outside area.

6.1.2 All escape means should be protected from fire as fire section constructed of non combustible materials with fire resistance degree not less than one hour and fire preventive doors for one hour which close automatically.

6.1.3 In all buildings of (a) and (b) category the access to the exit or stair should be through protected space from fire in accordance with the requirements.

6.2 Absorption capacity: the absorption is estimated in accordance with the contents of escape means chapter table no: 3 -4 and the number of seats should be taken into consideration if they are independent such as restaurants each use should be calculated separately.

6.3 Wideness: Measure of escape means width should be calculated on the basis of the persons who use them as indicated in escape means chapter.

6.4 Movement distance: The movement distance from any point to reach the final exit or protected stair should not exceed the below mentioned figures:

6.4.1 The movement distance from any point to the final exit or protected stair in the hall with comfortable seats (20m).

6.4.2 The movement distance from any point to the final exit or protected stair in the hall with normal seats (15m).

6.4.3 The movement distance from any point to the stair or protected exit in open multi – purpose hall (30m).

6.5 Direct distance from any point to the exit or protected stair in small halls (15m) provided that its capacity should not exceed (30) persons.

6.5.1 Direct distance from any point to the exit or protected stair in the attached rooms or sections to the theater (7.5m).

6.5.2 In the open large multipurpose halls such as exhibition halls and celebration halls the direct distance may exceed (30m) provided that the stairs and exits are distributed around the building and the distance between them is not more than (60m).

6.6 Corridors: The general requirements for corridors in addition to these conditions should apply:

6.6.1 The corridors should be organized and properly leveled so that they lead directly to the exits.

6.6.2 Graded corridors should be provided with rail in accordance with the requirements.

6.6.3 The width of the corridors should be satisfactory to absorb the flow of the persons who use them provided that it should not be less than (2 m) for main corridors and (1.5) for sub corridors.

6.7 Exits: The general requirements of exits should be provided as indicated in escape means chapter.

6.7.1 The number of exits should be in accordance with the general requirements and the attached sections such as theater stage, actor's rooms, the staff work shop etc. the following Table No. 5.1 1 indicates the number of exits for public halls in the cinema, theater and lectures halls.

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Table No. 5.1 Number of exits for public halls in cinema and theater premises

Type of seats	Number of persons	Number of exits	Width of exit
	3000	4	According to the number of persons
Normal	600-1000	3	
	50-300	2	
Comfortable	-	2	18cm

6.7.2 The hall exists should be independent from the rest of sections especially the theater and lead directly to the outside area.

6.8 **Stair way:** General requirements of escape means should apply in addition to these requirements.

6.8.1 The number of stairs should not be less than two for each floor.

6.8.2 The stair should be protected and separated from the building by isolation space which is protected from fire and leads directly to the outside.

6.8.3 The width of the stair should be satisfactory for the people who use it and should not be less than the total width of the corridors which lead to it.

6.8.4 In case it is permitted to use the assembly halls in the upper or lower floors of the building the stair should with greater width and the platform with large area for resting.

6.9 **Final exit:** Under all circumstances the escape means should lead to a final exit which guide directly to the outside.

6.9.1 In the buildings or their parts of category (c) half of the escape means may end at a location inside the building if general requirements for escape means are met.

7. Firefighting and warning Equipment: The preventive precautionary should be provided in accordance with the general requirements of engineering services.

7.1 Firefighting, warning equipment and engineering services should be provided for protection from fire in the assembly buildings.

7.2 The Firefighting and warning equipment should be in accordance with part two requirements in terms of designing and implementation and maintenance.

7.3 On issuing the permit civil defense may request additional equipment as alternative for the required preventive precautionary.

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Table No. 5.2 Firefighting equipment for assembly buildings according to the Category, height and construction classification

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	More than 4 floors and with height less than 30 m or two floors with total area exceeding 1000 m.
	c	Moisture hydrants network.	With height more than 30m or more than two floors with area exceeding 1000 m^2 per floor.
	d	External hydrants network.	According to the size of the building
3	**Automatic systems**		
	a	Automatic network for firefighting water sprayers.	As per Table No. 5.3 requirements of Firefighting water sprayers for assembly buildings.
	b	Automatic network for other materials sprayers.	Special hazard locations where it is not possible to use water.
4	**Fire warning systems**		
	a	Manual warning network.	In multipurpose halls and corridors.
	b	Automatic warning network.	All floors

Table No. 5.3 Requirements of sprinklers for fire-fighting within assembly buildings

According to category, high and structure classification

Category	Number of persons	Floor	Construction classification	Sprayers requirements
A	**More than 1000 persons**	Basement	All types	Required
		Ground to 3rd floor	First type	Not required
		Fourth to upper	All types	Required
B	**300- 1000 persons**	Basement	All types	Required
		Ground and second only	First and second only	Not required
C	**50- 300 persons**	Basement	All types	Required
		Ground and first floor only	First, 2nd and 4th	Not required
		Ground only	5th floor temporarily	Required

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8. Engineering services: It should be complied with the contents of engineering services chapter and items of Table No. 5.4

8.1 Ventilation in the theater area: It should be observed to provide a ventilation system in accordance with the international specifications to b approved by the civil defense in the civil defense in the theater area.

8.2 The civil defense may request additional equipment or as alternative to the other preventive requirements.

Table No. 5.4: Engineering services for prevention of Fire in assembly buildings

S. No.		Type	Required cases
1	**First prevention engineering services:**		
	(i)	Ventilation system.	As per the international specifications approved by the civil defense.
	(ii)	Illuminated guidance signs.	Basement and escape means (exits)
	(iii)	Emergency lightening network.	Basement and escape means.
	(iv)	Electricity reserve source.	If the height is more than 6 floors or 20m whichever is less.
	(v)	Fire lift	If the height I exceeding 6 floors or 20 M whichever is less
	(vi)	Automatic Fire doors	In accordance with the preventive requirements in the engineering areas

9. Special preventive requirements:

9.1 As for the cinema and theater premises each case should be studied separately in order to recommend the appropriate requirements. The American (N.F.P.A 101) requirements or the international specifications may be used as a reference for further details in addition to these requirements:

9.1.1 Seats: Fixing of the seats should be organized as follows:

9.1.1 **Measures:**

9.1.1.1 Net distance between seats rows (0cm) of normal type

9.1.1.2 Net distance between comfortable seats rows (50cm) if the number of seats is (25) or less

9.1.1.3 Net distance between comfortable seats rows (60cm) if the number of seats is more than 45 seats.

9.1.2 **Number of seats:**

9.1.2.1 Number of seats in each row should be (4) at least.

9.1.2.2 Number of seats in each row (7) at most when they face one corridor for normal type.

9.1.2.3 Number of seats (14) for each row at most when they fall two corridors

9.1.2.4 Number of comfortable seats per row (100) at most when they face two corridors

9.1.2.5 The number of seats of normal type may be increased per row to (11) seats facing one corridor if the distance between the seats is increased by 25mm for each seat.

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9.1.3 **Fixing:**

9.1.3.1 The seats should be fixed on the ground firmly in all designated halls for the public such as the cinema and theater and lecture halls.

9.1.3.2 In other cases where it is not possible to fix the seats permanently alternative measures should be taken such as:

9.1.3.2.1 Tightening the seats with each other in groups not less than 4 seats per group and each case should be studied separately.

9.1.4 **Floor:**

9.1.4.1 Slope angle of ground surface at the base should exceed (35) degree.

9.1.4.2 In multipurpose halls which can be used as exhibition halls preventive requirements in commercial buildings should be applied in addition to these requirements:

9.2 The exhibition areas should be organized so that organized corridors should be maintained according to these requirements.

9.2.1 The shelves and stands should be made of non combustible materials.

9.2.2 Suitable guidance signs and firefighting equipment should be made available.

9.2.3 The civil defense should be consulted in the event of temporary or seasonal exhibitions for obtaining the appropriate advice and preventive recommendations.

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Part Six

Prevention and protection requirements from fire in education buildings

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1. **Definition of education buildings:** They are the designated buildings or their parts for education purposes which accommodate (6) regular students with attendance rate not less than 4 hours per day and not less than 12 hours per week such as kindergartens and school (preparatory, elementary, secondary, colleges etc)

1.2 As for specialized schools for educating the disabled (students of special needs) each case should be studied separately for recommending the appropriate additional requirements.

2. Construction requirements:

2.1 The preventive precautionary requirements in engineering areas in general should be applied for securing safety for the construction frame from fire incident.

2.2 The validity of buildings from construction point of view for use for education purposes should be determined in accordance with Table 1.2 classification of buildings in terms of fire resistance and the following Table 6.1 suitability of buildings from construction point of view for use education purposes.

Table No. 6.1: Validity of buildings from construction point of view for use for education purposes in accordance with area, height and classification.

Construction classification	Area and height.
First type	Suitable for all cases
Second and fourth type	Suitable for buildings with height not exceeding two floors
Third and fifth type	Temporary buildings not exceeding one class area and in accordance with special requirements.

2.3 The following requirements should be observed in determining the location of study classes in a building:

2.3.1 Study classes for children below elementary level should not be in a basement or above the ground level.

2.3.2 The elementary study classes should not be in a floor higher than first floor.

2.3.3 The study classes in school may be in a basement provided that stair or exit should be provided on external wall leads directly to the outside and to be protected with automatic water sprayer network.

2.3.4 All study classes should be directly facing the external façade of the building.

3. Mixed use:

3.1 In case the education building forms a part of buildings of other use they should be separated from each other to constitute independent fire section with independent escape means.

3.2 Mixed use which may contain high fire hazard or industrial purpose should not be permitted.

3.3 Designated parts for buildings or their parts allocated for other purposes should be separated from each other.

3.4 The buildings or their designated parts for other purposes than education should be treated in accordance with their type of use.

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4. **Fire spread control:** General requirements for preventive precautionary in engineering area should apply in addition to these requirements.

4.1 Horizontal spread: The fire section area should not exceed 2000m2 and there should be space separating various areas of use.

4.1.1 Various areas of use should be separated from each other and each one should be considered separate fire section.

4.1.2 Hazard sites or locations should be separated.

4.1.3 Each study class should be considered as secondary independent fire section.

4.2 Vertical spread: Vertical spread control requirements should apply with regard to the preventive requirements for residential buildings.

4.3 External spread: The external spread control requirements should apply with regard to the preventive requirements of residential buildings.

4.4 Arrival of civil defense machinery: The arrival of civil defense machinery should be made easy to the education buildings.

5. Escape means: (exits)

5.1 General requirements of escape means should apply in addition to these requirements.

5.2 **Absorption capacity:** The absorption is estimated in accordance with the escape means chapter – table no: 3 - 4 and as for other uses locations each in accordance with its type of use nature.

5.3 **Wideness:** The width of the escape means should be calculated on the basis of the number of persons who use them as indicated in escape means chapter.

5.4 **Movement distance:** The movement distance from any point to the final exit or protected stair should not be less than the figures indicated in table 6.2

5.5 The direct distance from any point inside the classes to the exit or the protected stair should not exceed 15m and not more than 10 m in the basement.

Table No. 6.2: Calculation of movement distance and direct distance to education buildings

Location	Distance by meters	Floor	Cases and remarks
Direct distance	15	Ground	-
Inside study class	10	Basement	-
Movement distance	15	Basement	In case of more than one exit
From class door or exit	20	Other floors	Internal corridors
Or protected stair	30	Other floors	External corridors.

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5.6 The general corridors requirements should be provided as indicated in escape means chapter in addition to these requirements.

5.6.1 The corridors should be organized and smoothly leveled so that they lead directly to outside.

5.6.2 The graded corridors should be provided with rail in accordance with the requirements.

5.6.3 The corridors width should be satisfactory for absorption of the people who use them provided that it should not be and 1.5m for sub-corridors.

5.6.4 Corridors should be external as much as possible. If this is not possible they may be internal provided that they are constructed in accordance with the preventive precautionary requirements in construction areas.

5.6.5 Corridors inside the study classes should not be less than 1,10m per corridor which serves two rows of seats and (90 cm) for the one which serves one row.

5.6.6 Any seat should not be distant from the internal corridor by more than a distance of six seats.

5.7 Exits: The general exits requirements of exits as prescribed in escape means chapter should be provided.

5.7.1 All exits should lead directly to outside or to protected stair or corridor from fire and isolated from the building by isolating space.

5.7.2 The number of exits should be in accordance with the general requirements provided that they will not be less than two distant exits to utmost building parts and on the external wall each leading to outside.

5.7.3 Each class should be provided by two distant exits leading to outside or to protected corridor leading to two exits in the following cases:

5.7.3.1 If the class absorption capacity exceeds (50) students

5.7.3.2 If the class absorption exceeds (30) child (kindergarten)

5.7.3.3 If the class area exceeds (90m2) or its depth (15m)

5.7.4 The allocated windows for ventilation should be of an area not less than (0,5m2) (50cm) width x 60cm height) and the step height from tile surface (110cm) so that it can be used rescue works. They should be easily opened from inside without a need for special tools or lockers.

5.8 Ramps: Ramps should be provided in education buildings for use by the disabled.

5.9 Stair way: The general escape means requirements should apply in addition to these requirements.

5.9.1 The number of stairs should not be less than two for each floor distant at utmost parts of the building and on the external wall leading directly to outside.

5.9.2 The stair should be protected and separated from the building by isolating space which is protected from fire and leads directly to outside.

5.9.3 The width of the stair should be satisfactory for the number of people who use them and should not be less than the total width of the corridors which lead to it.

5.9.4 In the event that the assembly halls in the upper or lower floors of the building are permitted to be used the width should be greater and the platform with a large area for resting.

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5.10 **Final exit**: Under any circumstances all escape means should lead to a final exit which leads directly to outside.

5.10.1 Other sections with other types of use in education buildings should be treated in accordance with their special requirements or the higher ones whichever is with more prevention capacity.

6. Firefighting and warning equipment:

6.1 Manual warning device should be installed in multi – purpose halls and management corridors and closed classes corridors at all levels with the exception of open classes.

6.2 Automatic warning device should be installed in multipurpose hall, workshop, laboratory, library, stores and also in the locations of special hazard and the air conditioning path and basement at all stages.

6.3 General warning means (in the form of whistle or bell) should be installed so that it could be heard in all parts of the school and with distinguished voice or verbal messages operated by the management.

6.4 The Firefighting and warning equipment should be in terms of designing, implementation and maintenance in accordance with the requirements of part two or civil defense directory.

6.5 The civil defense on issuing the permit may request additional equipment as alternative of some required preventive precautionary measures

Table No. 6.3 Firefighting equipment for education buildings

As per the category, height and construction classification

S. No.	Type		Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	More than 3 floors and with height less than 30m or two floors with total area exceeding 1000m^2
	c	Moisture hydrants network.	With height more than 30m or more than two floors with area exceeding 1000m^2 per floor
	d	External hydrants network.	In the yards of the universities and high colleges
3	**Automatic fixed system.**		
	a	Automatic network for Firefighting fire sprayers	Basement, higher floors exceeding 4th floor, constructed buildings of third and fifth type
	b	Automatic network for other materials sprayers.	Special hazard locations where water cannot be used
4	**Fire warning equipment: Manual warning network**		In multipurpose halls, management halls, closed classes, corridors at all levels with the exception of open classes corridors
	a	Automatic warning network	In the workshops, laboratories, library, multipurpose halls along with manual warning, special hazard locations, air conditioning path and basement

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Table No. (6-4): Distribution of fire warning equipment in education buildings

Education level	System type	Corridors of closed classes	Hall	Laboratory	Work shop	library	Management corridors	Remarks
Kindergarten	Manual	*	*				*	General warning system (like whistle or bells at least) should be installed to be heard in all parts of the school with distinguish voice or verbal messages operated by the management
			*					
Elementary	Manual		*					
	Automatic		*					
Intermediate	Manual		*					
	Automatic		*	*	*	*		
Intermediate	Manual		*				*	
	Automatic		*	*	*	*		

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Table No. (6-5): Engineering Services Pertaining to Prevention from Fire in Education Buildings

S. No.		Type	Required cases
1	**Engineering services for prevention from fire in education buildings:**		
	1	Ventilation system.	As per the information specifications approved by the civil defense.
	2	Illuminated guidance signs.	Basement and escape means
	3	Emergency lightening network.	Basement and escape means.
	4	Electricity reserve source.	Universities
	5	Fire lift	If the height is more than 6 floors or 20m whichever is less
	6	Automatic Fire doors	In accordance with prevention requirements in engineering area

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Part Seven

Prevention and Protection Requirements from Fire in Caretaking Buildings

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1. Definition of caretaking buildings:

They are the designated buildings or their parts for health or social caretaking purposes the occupant of which are unable to move or because of the withholding impact they become movement limited persons. These include the hospitals and elder people caretaking buildings and nurseries and social care premises, psychological clinics and prisons.

1.1. **Health care buildings:** The buildings or their parts which are designated for providing health services and arrange not less than 4 beds for hospitalization of the sick persons. It is understood that the people who consult these places are unable to protect themselves due to the old age or infected by physical or mental diseases. These places also include recovery, ambulance and emergency buildings.

1.2. **Social care buildings:** They are buildings or their parts which are designated for providing social care. They provide at least 4 beds for serving disabled, elder people or the children as in nursery buildings.

1.3. **Social rehabilitation buildings (prison):** The buildings where the prisoners who are detained for more than one day (24 hours) live and they are considered unable to rescue themselves and their life in the event of fire as they cannot escape or get out. They include the prisons of all types, sizes and detention rooms.

2. Fire hazard: Fire hazard in social care buildings is classified as light hazard.

3. Construction requirements:

3.1 Preventive precautionary requirements in engineering areas should apply in general to provide safety for the construction frame from fire hazard.

3.2 The validity of buildings from construction point of view for use of social care should be determined according to Table No. 1.2 classification of buildings in terms of fire resistance and Table 7.1 validity of buildings from construction point of view for use for social care.

Table 7.1: Validity of Buildings from Construction point of view for use for Social Care

Construction classification	Area and height
First and Second type	More than two floors
First, Second and Fourth	Two floors
All types, fifth type temporarily and special requirements	One floor

3.3 It should be taken into consideration to comply with other competent authorities requirements and the civil defense should co ordinate in this regard with the Ministry of Health as for health care buildings and with Ministry of social affairs as for the social affairs as for the social rehabilitation buildings.

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4. Mixed uses:

4.1 If the social care buildings form a part of buildings form a part of buildings used for other purpose they should be separated to constitute independent fire section with independent escape means.

4.2 The mixed use should not be of a type that may cause high fire hazard or involve industrial purpose.

4.3 The designated buildings or their parts for other purposes should be separated from each other.

4.4 The escape means allocated for the social care buildings or their parts should be independent and separated from other parts and lead directly to outside.

5. Fire spread control: The general requirements of preventive precautionary in engineering areas should be applied in addition to these requirements.

5.1 Horizontal spread: The fire section area should not exceed 2000m2

5.1.1 Use areas other than education should be separated and each should be considered independent fire section.

5.1.2 The areas and locations of hazard should be separated.

5.1.3 Any floor or part of floor used for treatment, sleeping or its capacity is exceeding (50) persons or its side is more than 45m should be considered secondary independent fire section.

5.2 Vertical spread: Vertical spread control requirements in preventive requirements for residential buildings should apply.

5.2.1 The vertical vacuum as light holes and stair way and lift well should be separated from the building by fire preventive walls and doors.

5.2.2 The medium vacuum (Atrium) is exempted in case the following requirements are met:

5.2.2.1 The dimensions of the medium vacuum should not be less than (6m).

5.2.2.2 Provision of automatic Firefighting water sprayers network or a system for preventing vertical fire and smoke spread to be approved by civil defense.

5.2.2.3 Provision of overhead ventilation (recognized).

5.3 External spread: External spread control requirements of preventive requirements in residential buildings should apply.

5.4 Arrival of extinguishing machinery and equipment access to the caretaking buildings should be made easy.

6. Escape means:

6.1 General requirements of escape means should be applied in addition to these requirements.

6.2 Absorption capacity: The absorption should be estimated as per escape means chapter Table 3.4. As for other uses locations the capacity should be determined in accordance with the nature of their use:

6.3 Wideness: The width of escape means is measured on the basis of the number of persons who use them as indicated in escape means chapter provided that the main corridors width should not be less than (240cm) under any circumstances.

6.4 Movement distance: The movement distance from any point to the final exit or protected stair should not exceed the indicated figures in Table No.7.2

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6.5 The direct distance from any point inside sleeping rooms or wards to the exit or protected stair should not exceed 15m and not more than 10m in the basement.

Table 7-2: Calculation of Moving and Direct Distances for the Care Buildings

Location	Distance by Meters	Floor	Remarks
Direct distance inside sleeping rooms and wards	15	Ground	-
Movement distance from the door of sleeping rooms or wards to the exit or protected stair.	20	20	Due to the exits of more than one exit and the internal corridors.
Closed End	7,5	7.5	In closed end case

6.6 General requirements of corridors should be provided as indicated in escape means chapter provided that the width of main corridors should not be less than (240m) under any circumstances.

6.7 Exits: The general requirements of exits should be provided as indicated in escape means chapter.

6.7.1 Each floor should be provided with two distant exits.

6.7.2 The number of exits should be in accordance with the general requirements provided that they should not be less than two distant exits at utmost parts of the building and on external wall leading to the outside area.

6.7.3 All exits should lead directly to the outside or to protected stair or corridor from fire and separated from the building by isolating space.

6.7.4 Each sleeping room or ward should be provided with two distant exits leading to the outside or to a protected corridor leading to two exits in the following cases.

6.7.4.1 If the movement distance exceeds the indicated figures in the above mentioned table

6.7.4.2 If the movement distance exceeds 90m.

6.7.4.3 If the area of the sleeping room or ward exceeds 230m^2.

6.8 Ramps: Ramps should be provided in caretaking buildings in accordance with the general requirements of escape means and as per caretaking building use conditions in co ordination with the competent authorities.

6.9 Stair way: The general requirements of escape means should apply in addition to these requirements.

6.9.1 The number of stairs should not be less than two for each floor to be distant and on external wall each leading directly to outside.

6.9.2 The stair way should be protected and separated from the building by fire protected isolation space which lead directly to outside.

6.10 Horizontal exits: Temporary refuge area should be provided in all caretaking buildings which exceed two floors or the area of their floor exceeds 2000m2.

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6.10.1 With the exception of the allocated floors or sections for sleeping 50% of the escape means may end in safe location inside the building.

6.11 Final exit: Under any circumstances all escape means should lead to exit which leads directly to outside.

6.11.1 As for sections of other type of use their special requirements should apply or any higher requirements with further prevention capacity.

6.11.2 Lockers may be used in health care premises for mental disorder persons and social care buildings for prisoners or detainees provided that there should be permanent guarding or supervision throughout the day hours which allow the evacuation of the building users to other safe locations during emergency.

7. Fire fighting and warning equipment: The preventive precautionary in engineering area should be applied in addition to the indicated requirements in table 7.3

7.1 The fire fighting and warning equipment should be in terms of designing, implementation and maintenance in accordance with the requirements of part two or civil defense directory.

Table No. (7-3) Firefighting and Warning Equipment as per Category Height and Construction Classification

S. No.	Type		Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	More than 3 floors with height less than 28m or two floors with total area exceeding 100m^2
	c	Moisture hydrants network.	With height less than 28m or more than two floors with area exceeding 1000m^2 per floor
	d	External hydrants network.	As per the size of the building.
3	**Automatic fixed system.**		
	a	Automatic fire fighting water sprayers network	Basement, sleeping wards if the building exceeds two floors and type three and five buildings
	b	Automatic other materials sprayers network	Locations with special hazard where water cannot be used
4	**Fire warning equipment**		**In all floors**
	a	Manual warning network.	
	b	Automatic warning network.	In sleeping rooms, wards and corridors and in special hazard locations and air conditioning path and basement.

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8. Engineering services: It should be complied with the contents of engineering services chapter with concentration on Table 7.4

8.1 In civil defense may request additional equipment or as alternative to some preventive requirements.

8.2 The alternative of the required equipment in psychological health care buildings and social are premises related to nurseries and social rehabilitation (prisons) buildings should be determined in coordination with the competent civil defense.

Table (7-4) Engineering Services pertaining to Fire Prevention in Caretaking Buildings

Sl No.	Type	Required cases
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and emergency exits
3	**Emergency lightening network**	Basement and emergency exits
4	**Electrical reserve source**	All care taking buildings
5	**Fire lift**	If the height exceeds 6 floors or 20 m whichever is lesser
6	**Automatic Fire Doors**	As per preventive precautionary in engineering areas

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Part Eight

Prevention and Protection Requirements from Fire in Residential Buildings

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1 The residential buildings are divided in terms of the type of use to two types:

1.1 **Collective residential buildings:** Such as flats, barracks and hotels

1.2 **Special or private residential buildings:** Such as small villas (private residences) or private palaces.

First: Preventive Conditions for Communal Residential Buildings:

1.1 **Definition of collective residential buildings:** The buildings or their parts which are allocated for neighboring residence.

1.1.1 Collective residential buildings are divided in terms of use purpose to three categories as follows:

1.1.1.1 Category (a), buildings formed of permanent residential units for one family (flats) such as the investment residential buildings.

Category (b) – buildings formed of rooms or four barracks for permanent collective residences of the students, employees, labours and the soldiers.

Category (c) – buildings formed of rooms for temporary stay overnight by payment or without payment such as hotels, motels, hospitality premises, furnished flats etc.

2. Fire hazard: The fire hazard in residential buildings is classified as light hazard.

3. Construction requirements:

3.1 The preventive precautionary requirements in engineering areas in general should be applied to provide safety to the construction frame from fire hazard.

3.2 The validity of the building from construction point of view for use for residential purposes should be determined in accordance with table 1.2 classification of buildings in terms of fire resistance and table 8.1. Validity of buildings from construction point of view for use for residential purposes.

3.3 Residence in the basement is totally prohibited with the exception of the special cases approved by the civil defense and additional exit should be provided in addition to automatic water sprayers' network and any other equipment requested by the civil defense should be also provided.

Table (8-1): Validity of Buildings from Construction point of view for Use for Residential Purposes.

Construction classification	Suitable Uses
First and Second Types Only	Category buildings formed of permanent residential units for one family (flats) such as investment residential buildings
First and Second Type Only	Category (b) buildings formed of rooms or barracks for individual or collective residence such as students and employees residences and soldiers' barracks
All types and the first type temporarily and with special requirements.	Category (c) – buildings formed of temporary stay overnight rooms with or without payment such as hotels, motels and furnished flats

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4. Joint use:

4.1 The joint use should not be of the type which contains high fire hazard or industrial purpose.

4.2 Join use of light hazard type may permitted such as commercial shops, offices etc provided that the escape means should be independent and integrated preventive precautionary for each part of the building should be provided in accordance with the type of use.

4.3 In case the residential buildings constitute part of the buildings with other form of use they should be separated to be independent fire section provided with independent escape means.

4.4 The designated parts for the buildings or their allocated parts for other attached purposes should be separated from each other.

4.5 The escape means of residential buildings should be independent and separated from other parts and lead directly to outside.

5. Fire Spread Control: The general requirements of preventive precautionary in engineering areas should apply in addition to these requirements.

5.1 **Horizontal spread:** The area of the fire sector should not exceed 3000m2.

5.1.1 The residential units should be separated from each other and each should be considered independent fire sector.

5.1.2 Fire preventive barrier or door should be made available if the corridor exceeds 30m and at joining point of corridors.

5.2 Vertical spread:

5.2.1 The vertical vacuum such as light holes and stair way and lift well should be separated from the building through fire preventive walls and doors.

5.2.2 The medium vacuum (Atrium) should be exempted if the following requirements are met:

5.2.2.1 The vacuum dimensions are not less than 6m.

5.2.2.2 Provision of automatic fire fighting water sprayers' network or a system for preventing the spread of fire and smoke vertically to be approved by civil defense.

5.3 External spread: The preventive construction precautionary should be applied with regard to the distance and materials for controlling external fire spread.

5.4 Arrival of civil defense machinery: It should be made easy for the civil defense machinery to reach the residential buildings.

6. Escape means (emergency exits)

6.1 General requirements of escape means should be applied in addition to these requirements.

6.2 **Absorption capacity:** The absorption capacity should be estimated as indicated in escape means chapter table no: 3 -4. As for other uses locations their absorption capacity should be determined in accordance with the nature of their use.

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6.3 **Wideness:** The width of escape means should be calculated on the basis of the persons who use them as indicated in escape means chapter.

6.4 **Movement distance:** Movement distance from any point to the final exit or protected stair way should not exceed the prescribed figures in table 8.2

6.5 Direct distance from any point inside the rooms to the exit or protected stair way should not exceed 15m and not more than 10m in the basement..

Table 8-2 Calculation of Moving and Direct Distances for Residential Buildings

Location	Distance by meters	Floor	Cases and remarks
Direct distance inside the residential apartment	10	Basement	---
	15	Higher floors	Buildings category (A)
	10	Higher floors	Buildings category (B - C)
Moving distance from door of the residential apartment to the exit or protected staircase	20	Basement	If there are more than one exit.
Protected stair way	30	Other floors	---
Closed End	5	Basement	In case of closed end
	7.5	Any floor	In case of closed end

6.6 **Corridors:** General requirements of corridors should be provided as indicated in escape means chapter.

6.6.1 The width of main corridors should not be less than (150cm) and sub-corridors not less than (120cm) in buildings such as investment residential buildings.

6.6.2 The width of main corridors should not be less than (220 cm) and sub – corridors should not be less than (120cm) in residential buildings category (b) formed of rooms or barracks for permanent individual or collective residence such as students, employees, labours residence and soldiers barracks.

6.6.3 The width of main corridors should not be less than (200cm) and sub – corridors should not be less than (120cm) for the buildings category (c) formed of rooms for temporary stay overnight with or without payment such as hotels, motels, hospitality premises and furnished flats.

6.7 **Exits:** General requirements of exits should be provided as indicated in escape means chapter.

6.7.1 All exits should lead directly to outside or to protected stairway or corridor from fire and separated from the building by isolation space.

6.7.2 Emergency exit should be provided to the second floor in the flat (villa type) which leads to the corridor or the main stairway of the building.

6.7.3 Additional exit should be provided for each residential unit or room which leads to the outside or

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to protected corridor if the distance exceeds the prescribed figure in table 8 -2. 6.8 Ramps: it is preferred to provide ramps in residential buildings (for ground floor) in accordance with the general requirements of escape means to be used by the disabled.

6.8 **Ramps:** it is preferred to provide ramps in residential buildings (for ground floor) in accordance with the general requirements of escape means to be used by the disabled.

6.9 **Stairway:** The general requirements of escape means in addition to these requirements should apply.

6.9.1 The stair way should be protected and separated from the building by isolation space protected from fire and leads directly to outside.

6.9.2 The number of stairs should not be less than two for each floor distant and utmost parts of the building and on external wall each leads directly to outside .

6.9.3 In special cases where the civil defense permits for residential buildings category (a) – formed of permanent residential units for one family (flats) with commercial facades such as investment residential buildings only one stair way may be provided in accordance with the following requirements and the building system requirements.

6.9.3.1 The number of floors should not exceed (6) floors excluding ground floor.

6.9.3.2 The stair way of the residential part should be totally independent and separated from the commercial part stair way in the building.

6.9.3.3 The area of each floor should not exceed (600m2) and total floors area should not exceed (1800m2) and the total area should be calculated according to the building system.

6.10 **Horizontal exits:** The general requirements of escape means should be applied

6.10.1 Temporary horizontal refuge area should be provided in residential buildings category (b) – buildings formed of rooms or barracks for individual or collective residence such as students, employee, labour s residence and soldiers barrack in which the area of the floor exceeds (3000m2).

6.11 **Final exit:** Under any circumstances all escape means should lead to final exit which leads directly to outside.

6.11.1 As for the sections which involve other types of use in residential buildings their special requirements should apply.

7. Fire fighting and warning equipment: The preventive precautionary in engineering areas should be provided in accordance with the general requirements of engineering services in addition to the indicated requirements in table 8.3 (a), 8.3 (b) and 8.3 (c)

7.1 The fire fighting and warning equipment should be in terms of designing and implementation and maintenance in accordance with the requirements of part two or the civil defense directory.

7.2 The Civil Defense may request additional equipment or alternative to some required preventive precautionary in accordance with the requirements.

7.3 The motels and furnished flats buildings allocated for temporary stay overnight without full hotel services with height not exceeding (6) floors should be treated as open buildings category (a).

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Table (8-3) A: Firefighting equipment for residential buildings

Category (A) Buildings formed of permanent residential units for one family (flats) as per the category, height and construction classification.

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	In collective residence buildings or with height more than 30m
	b	Dry hydrants network	More than 3 floors and with height less than 30m or two floors with area not exceeding 1000m^2
	c	Moisture hydrants network.	Height more than 30m or the area of the floor exceeds 1000m^2
	d	External hydrants network.	For complexes only
3	**Automatic fixed system.**		
	a	Automatic fire fighting water sprayers network	Basement – partial coverage of all high buildings and complexes specially escape means and type (3) and (5) buildings and specified locations as per automatic fire fighting systems requirements.
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		**In all floors**
	a	Manual warning network.	In all floors of the buildings the height of which exceeds 30m and complexes
	b	Automatic warning network.	In all floors of high buildings, corridors and in special hazard locations, air conditioning path and basement

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Table (8-3) B: Firefighting equipment for residential buildings

Category (B) Buildings formed of barracks for permanent individual or collective residence as per the category – height and construction classification.

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	Higher than 3 floors and with height less than 30m or two floors with area not exceeding 1000m^2
	c	Moisture hydrants network.	With height more than 30m or the area of the floor exceeds 1000m^2
	d	External hydrants network.	Complexes only
3	**Automatic fixed system.**		
	a	Automatic fire fighting water sprayers network	Basement – all floors of high buildings and complexes specially escape means and buildings of 3rd and fifth type and designated locations as per automatic
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		**In all floors**
	a	Manual warning network.	All floors
	b	Automatic warning network.	All floors especially those without fire extinguishing water sprayers, corridors, special hazard locations and air conditioning path.

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Table (8-3) C: Firefighting equipment for residential buildings

Category (C) Buildings formed of rooms for temporary stay overnight such as hotels and furnished flats.

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	Higher than 3 floors and with height less than 30m or two floors with area not exceeding 1000m2
	c	Moisture hydrants network.	With height more than 30m or the area of the floor exceeds 1000m^2
	d	External hydrants network.	Complexes only
3	**Fixed automatic systems**		
	a	Automatic fire fighting water sprayers network	Basement – all floors especially escape means and specified locations as per automatic fire fighting systems requirements
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		**In all floors**
	a	Manual warning network.	
	b	Automatic warning network.	All floors and special hazard locations and air conditioning path and basement

8. **Engineering services:** It should be complied with the contents of engineering services chapter with concentration on Table 8.4 (a) and 8.4 (b) and 8.4 (c).

8.1 The civil defense may request additional equipment or as alternative to other preventive requirements.

8.2 Motels and buildings of furnished flats allocated for temporary stay overnight without full hotel services and with height not exceeding 6 floors should be treated as residential buildings category (a)Table 8-4 A: Engineering services for protection from fire in residential buildings Category (A).

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Table (8-4) A: Engineering services for protection from fire in residential buildings

Category (a) – buildings formed of permanent residential units for one family (Flats) as per category – height and construction classification

Sl No.	Type	Required cases
1	**Engineering services pertaining to prevention from fire:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and escape means.
3	**Emergency lightening network**	Basement and escape means.
4	**Electrical reserve source**	High buildings and complexes and buildings which require fire lift.
5	**Fire lift**	If the height exceeds 6 floors or 20m whichever is lesser.
6	**Automatic Fire Doors**	As per preventive requirements in engineering areas

Table 8-4 B: Engineering services for protection from fire in residential buildings

Category (B) Buildings formed of rooms or barracks for permanent individual or collective residence.

Sl No.	Type	Required cases
1	**Engineering services for prevention of fire:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and escape means.
3	**Emergency lightening network**	
4	**Electrical reserve source**	High buildings and buildings which require lift
5	**Fire lift**	If the height exceeds 6 floors or 20m whichever is lesser.
6	**Automatic Fire Doors**	As per preventive requirements in engineering areas

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Table 8-4 C: Engineering Services of Fire Prevention for Residential Buildings

Category (C) Buildings formed of temporary stay overnight such as hotels and furnished flats.

Sl No.	Type	Required cases
1	**Engineering services for prevention of fire:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and escape means
3	**Emergency lightening network**	Basement and escape means
4	**Electrical reserve source**	High buildings and complexes and buildings which require fire lift
5	**Fire lift**	If the height exceeds 6 floors or 20m whichever is lesser.
6	**Automatic Fire Doors**	As per preventive requirements in engineering areas

Second: Preventive requirements of private residential buildings Small villas or private palaces:

1.1. **Definition of private residential buildings:** Small villas or private palaces

1.1.2 They are one family residence and include independent houses owned or occupied by one family. These houses could be of villa type (one floor) or two floors or three independent floors or houses with open balconies and also include constructed houses on commercial shops provided that they constitute private residences.

2. **Fire hazard:** The fire hazard in residential buildings is classified as of light hazard type.

3. **Construction requirements:** The fire resistance degree of construction frame, external walls, bridge and roofs of the floors should not be less than one hour.buildings, the resistance of such wall shall not be less than the highest requirements for each.

4. **Fire spread control:**

4.1 **Horizontal spread:** It is preferred that the fire resistance of the doors of the rooms and wings in the buildings of a family should not be less than 45 minutes.

4.2 **Vertical spread:** It is preferred that the vertical openings should be separated from other parts of the house by fire preventive wall with fire resistance degree not less than one hour and doors opening resistance not less than 45 minutes.

4.3 **External spread:** The buildings of one family should be separated from each other with fire preventive walls with fire resistance not less than one hour.

4.3.1 If the family house joins a different type of building by fire preventive wall, the fire resistance degree of such wall should not be less than one hour.

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4.4 **Arrival of civil defense machinery:** Civil defense machinery should be provided with easy access to the residential buildings.

4.4.1 The extinguishing teams should be enabled to approach the houses with extinguishing water hoses attached to fire hydrants or water supply tank.

5. **Escape means:**

5.1 **Exits:** It is preferred that each private residential unit should be provided with two exits at least which lead to a safe place.

5.5.1 One of the exits could be a rescue opening or balcony accessible to the civil defense men besides the exit or the main door of the house.

5.2 **Stair way:** Whenever a house is constructed on commercial shops the stair should lead to the outside of the shops. If the stair passes through the isolated and surrounded with a wall with a resistance degree not less than one hour.

5.3 **Final exit:** Under all circumstances all escape means should lead to a final exit which leads directly to outside.

6. **Fire fighting and warning equipment:** The preventive precautionary in engineering services should be provided in accordance with the general requirements of engineering services in addition to the indicated requirements in table 8.3 (a), 8.3 (b) and 8.3 (c).

6.1 It is preferred to provide manual fire extinguishers in the kitchens and at the end of corridors leading to exits.

6.2 It is preferred to install uni-function fire detectors or fire warning system.

7. **Engineering services:**

7.1 The electrical connections should be implemented according to the specifications of the competent authorities such the Ministry of Electricity.

8. **Application:**

8.1 The application of the requirements pertaining to fire prevention in private residences (small villas or private palaces) should be left to the member countries in accordance with their prevailing systems.

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Nine

Preventive requirements for protection from fire in Commercial buildings and public markets.

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1. **Definition:** The commercial buildings are divided in terms of the type of use to two types:

1.1 **Category (a):** Commercial shops: buildings or their parts which are allocated for serving the public such as:

- Whole and retail sale shops
- Commercial centers.
- Central markets.

Light occupations services.

(a) Tailoring and barber's shops

(b) Photography and its alike.

1.2 Category (b): offices : the buildings or their parts of which the users number does not exceed 50 persons at one time and designated for the following offices uses such as:

- Business management offices.
- Institutions offices.
- Consultative and engineering offices
- Small banks.
- Companies offices.
- Real estate offices.

2. **Fire hazard:** The fire hazard is classified in commercial buildings in accordance with the category.

2.1 Fire hazard in commercial buildings category (a) – commercial shops is classified as medium hazard.

2.2 Fire hazard in commercial buildings category (b) – offices is classified as light hazard.

2.3 Fire hazard in mixed commercial buildings as medium hazard.

3. **Construction requirements:**

3.1 The requirements of chapter one should be provided to secure the safety of construction frame from fire hazard.

3.2 The validity of buildings from construction point of view for use as commercial buildings as per Table No. 1.2 classification of buildings in terms of fire resistance and Table No. 9.1 validity of buildings from construction point of view for use as commercial buildings

Table (9-1): Validity of buildings from construction point of view for uses as commercial buildings as per area, height and construction classification

Construction classification	Area and height
First and second type only	With height exceeding 3 floors or an area more than 3000m^2
All types with the exception of the fifth type	With height exceeding two floors or an area less than 3000m^2
All types and fifth type temporarily with special requirements	One floor or an area less than 300m^2

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4. Mixed use:

4.1 In case the commercial buildings constitute part of buildings of other use or use for the purposes of categories (a) and (b) the uses should be separated from each other so that each one will form independent fire section which has its independent escape means.

4.2 The mixed use should not be of a type which contains fire hazard or industrial purpose.

9.4.3 The preventive requirements of residential buildings should be applied in case the commercial buildings are used for residential purpose as the case in investment residential buildings with commercial facades.

5. File spread control: The general preventive precautionary in engineering areas should be applied in addition to these requirements.

5.1 Horizontal spread: Fire section area should not exceed the following:

5.1.1 **Category (a)** commercial shops: the fire section area should not exceed 2000m2 and each leased unit should be considered independent secondary fire section.

5.1.2 **Category (b)** – offices, the fire section area should not exceed 3000m2 and each leased unit should be considered as independent secondary fire section.

5.2 Vertical spread: Vertical spread control requirements in the residential buildings preventive requirements should be applied.

5.2.1 Each floor should be considered independent fire section.

5.2.2 The vertical vacuum should be separated in accordance with the preventive precautionary requirements in engineering area with the exception of atrium if the following requirements are met:

5.2.2.1 The height of the atrium should not be more than 3 floors (basement, ground, mezzanine)

5.2.2.2 All floors of commercial shops should be protected by automatic fire fighting water sprayers' network and approved mechanical or natural ventilation means on top of the vacuum.

5.2.3 The atrium may extend to other floors of the building if the following requirements are met:

5.2.3.1 The dimensions of atrium should not be less than 6 m.

5.2.3.2 Automatic fire fighting water sprayers' network should be provided to operate as a curtain around the atrium and a system for prevention of vertical fire and smoke spread to be approved by civil defense.

5.2.3.3 Over head ventilation system to be approved by civil defense.

5.3 External spread: The requirements of external spread control in residential buildings preventive requirements should be applied

5.4 Arrival of civil defense machinery: The civil defense machinery should be provided with easy access to the commercial buildings.

6. Escape Means

6.1 General requirements of escape means should be applied in addition to these requirements

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6.2 **Absorption Capacity:** The absorption capacity should be calculated as indicated in escape means chapter Table 3.4 and as for other se locations it should be calculated in accordance with the nature o fuse in these locations.

6.3 **Wideness:** The width of escape mean should be measured on the basis of the people who use them as indicated in escape means chapter.

6.4 **Movement Distance**: The movement distance from any point to the final exit or protected stair should not be less than the indicated figures in Table 9.2.

Table 9-2 Calculation of Moving and Direct Distances for the Commercial Buildings

Site	Distance by m	Maximum number of persons	Floor	Case & remarks
Direct distance inside commercial shop or office	15	30	Ground	Independent and not connected with basement or mezzanine
	15	10	Basement	Independent shop and connected with escape means
	10	10	Basement	The shop connected with ground floor
	15	30	Mezzanine	Independent and connected with the building
	10	15	Mezzanine	Connected with ground floor
	15	30	All floors	In case of the office
Direct distance from further point in the floor to the stair door	12	-	All floors	In case of medium stair in commercial buildings offices
Movement distance from shop or office door to protected stair door or final exit	20	-	Basement	When exits in more directions are available
	30	-	All floors	When exits in more directions are available
	7.5	-	All floors	In closed ends

6.5 **Corridors:** General corridors requirements should be provide as indicated in escape means chapter in addition to these requirements.

6.5.1 The corridors should be organized and smoothly leveled so that they lead directly to the outside.

6.5.2 Graded corridors should be provided with railing according to the requirements.

6.5.3 The width of the corridors should be satisfactory for absorption of the people who use them provided that it should not be less than 2 m in commercial buildings category (a) – commercial shops and not less than 1.5 m. in commercial buildings category (b) offices.

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6.6 **Exits:** The general requirements of exits as indicated in escape means chapter should be provided.

6.6.1 All exits should lead directly to outside or to stair or protected corridor from fire and separated from the building by isolation space.

6.6.2 The ground exit should be independent from the basement and mezzanine exits.

6.6.3 The number of exits should be in accordance with the general requirements provided that they should be not less than two distant exits at the utmost parts of the building on external wall and each lead directly to outside.

6.6.4 One exit may be accepted in commercial buildings – category (b) – offices after obtaining the approval of the civil defense if the following requirements are met:

6.6.4.1 The direct distance inside the office should not exceed 15 m.

6.6.4.2 The movement distance from the office door to the final exit or protected stair should not exceed 30 m.

6.6.4.3 The movement distance to the closed ends should not exceed 7.5 m

6.6.4.4 Other escape means requirements should be provided especially stairway.

6.6.5 Additional floor may be added to the commercial shop formed of 3 levels (basement, ground and mezzanine) when additional independent exit is provide in ground floor leading directly to outside or to the protected corridor in the building.

6.7 **Ramps:** Ramps should be providing in commercial buildings to be used by the disabled.

6.8 **Stairway:** The general requirements of escape means should be applied in addition to these requirements

6.8.1 The number of stairs should not be less than two stairs for each floor, distant from each other at utmost parts of the building on external wall each leads directly to outside.

6.8.2 The stair should be protected and separated from the building by isolation space protected from fir and leads directly to outside.

6.8.3 The descending stair from first floor ascending one from the basement should lead directly to outside or to a point not distant by more than 3 m from outside in the commercial shop which is formed of (basement, ground floor) or (ground, mezzanine) or (basement, ground, mezzanine, first floor)

6.8.4 One stair may be accepted in the commercial buildings after obtaining the approval of civil defense if the following requirements are met:

6.8.4.1 The distance and absorption capacity requirement should be met.

6.8.4.2 The building height should not exceed level including ground floor and mezzanine in commercial buildings category (a) – commercial shops or mixed ones ((a) and (b).

6.8.4.3 The building height should not exceed 5 floors above ground level including ground floor and mezzanine in commercial buildings category (b), offices only.

6.8.4.4 If the area dose not exceeds 600 m2 per floor and 1800 m2 total areas of the floors including ground and mezzanine and services if available.

6.8.4.5 The only one stair should be protected from fire hazard and on external wall of the building with isolation space protected as per the general requirements

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6.8.5 Open internal stair should not be considered as one of the emergency exits in commercial buildings category (b), offices.

6.8.5.1 The stair may be internal if the following requirements are met:

6.8.5.2 Provision of general requirements of stairway especially with regard to the movement distance and ventilation and lightening.

6.8.5.3 Provision of protected isolation space

6.8.5.4 Separation of the stair and the isolation space by fire and smoke spread preventive walls and doors

6.8.5.5 Separation of stairs totally and should not be connected with each other through one corridor so that they will not be out of operation by fire impact.

6.8.5.6 If there is internal corridor it should continue in circular manner and smoke preventive doors shall be provided in the corridor so that they will separate it into sections as per the number of stairs.

6.9 **Horizontal exits:** A temporary refuge area should be provide in high commercial buildings or buildings with considerable areas which exceeds 3000 m2 per floor

6.9.1 50% of the escape means may end at safe location inside the building.

6.10 **Final exit:** Under any circumstances all escape means should lead to a final exit which lead directly to outside.

6.10.1 Sections with other use type in commercial buildings and public markets should be subject to the application of their special requirements or whichever is of more prevention capacity.

7. **Firefighting and warning equipment:** The preventive precautionary of engineering services should be provided in accordance with the general requirements of engineering services in addition to the indicated requirements in Table 9.3 (a) and 9.3 (b)

7.1 The preventive requirements of residential buildings should be applied when the commercial buildings are used for residential purpose as in investment residential buildings with commercial facades.

7.2 The Firefighting and warning equipment should be in terms of designing and implementation and maintenance in accordance with part two requirements or civil defense directory.

7.3 The civil defense may request addition equipment or as alternative to some other required preventive precautionary

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Table (9-3) A: Firefighting equipment and warning systems for commercial buildings

Category (A) – Shops as per Category – height and construction classification:

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	More than 3 floors and with height less than 28 m or two floors with area more than 1000 m^2
	c	Moisture hydrants network.	With height more than 28 m or the area of floor is more than 1000 m^2
	d	External hydrants network.	Complexes only
3	**Automatic fixed systems**		
	a	Automatic firefighting water sprayers network	All floors with full coverage
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		
	a	Manual warning network.	All floors
	b	Automatic warning network.	All floors in high buildings and special hazard locations and air conditioning path and basement

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Table 9-3 B: Firefighting Equipment and Alarm Systems for Commercial Buildings

Category (B) Offices as per Category – height and construction classification:

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	Higher than (3) floors and with height less than 28 m or two floors with area exceeding 1000 m^2
	c	Moisture hydrants network.	With height more than 28 m or where the floor area is more than 1000 m^2
	d	External hydrants network.	Complexes only
3	**Automatic fixed systems**		
	a	Firefighting water sprayers network	Basement – all floors of high buildings and complexes and escape means and 3rd and fifth type buildings and specified locations as per Firefighting systems requirement
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		
	a	Manual warning network.	All floors
	b	Automatic warning network.	All floors in high buildings and special hazard locations and air conditioning path and basement

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8. **Engineering Services:** It should be complied with the contents of engineering services chapter with concentration on Table 9.4 (a) and 9.4 (b)

8.1 The preventive requirements of residential buildings should apply when the commercial buildings are used for residence purpose.

8.2 The civil defense may request additional equipment or as alternative to source other preventive requirements.

Table(9-4) A: Engineering services pertaining to fire prevention in Commercial buildings

Category (A) according to the category, height, and structural classification

Sl No.	Type	Required cases
1	**Engineering services pertaining to fire prevention**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	All floors
3	**Emergency lightening network**	All floors
4	**Electrical reserve source**	High buildings and complexes and buildings which require fire lift
5	**Fire lift**	If height exceeds 6 floors or 20 m whichever is lesser
6	**Automatic Fire Doors**	As per preventive precautionary in engineering areas

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9. Special preventive requirements:

9.1 As for the shops and central markets and their alike the requirements of this chapter in addition to the following requirements should apply:

9.9.1.1 At least half of the exits should end at the highway and away from the accountant barrier.

9.2 As for the shops and central markets and their alike the requirements of this chapter in addition to the following requirements should apply:

9.3 The shop should be separated from the store by a wall or fire preventive door.

9.4 The sub corridors which separate between exhibition areas should be with width not less than (1.5 m) and main corridors not less than (2 m) and organized in a clear and easy manner and lead directly to outside without any difficulty.

9.5 The public corridor leading to the exit at the accountant barrier should be less than (1 m)

9.6 The barriers and shelves of presentation should be organized so that they will not obstruct escape means or block the visibility of the guidance signs.

9.6.1 The store is protected by barrier and fire preventive door as per the requirements.

9.6.2 The number of exits passing through the shop should not exceed half of the number of required exits for the shop.

9.6.3 There should be a protected corridor from fire hazard leading directly to outside or protection of the store by automatic water sprayers' network.

Chapter 10

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Part Ten

Prevention and protection requirements from fire in industrial buildings

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1. **Definition of industrial buildings:** They are the buildings or their parts which are allocated for industrial purposes or industrial purposes or industrial professions. They include various industrial establishments such as dairy establishments – furniture factories – central laundries – hazardous chemical materials laboratories – printing presses and industrial professions buildings and various industrial workshops.

1.1. **Industrial establishment's buildings:** the buildings or their pars designated for industrial purposes where the composition and mixing and wrapping operations are carried out.

1.2. **Industrial professions buildings:** The buildings or their parts which are allocated for repairs operations

2. **Fire hazard:** the fire hazard in industrial buildings is classified in accordance with the type of processing operations which are performed in these buildings as per het following:

2.1 **Medium hazard:** they are the factories which manufacture or collect or produce non combustible materials or those the contents of which burn with medium spread speed or remarkable quantity of smoke emission but do not produce poisonous vapours or cause explosions on burning as indicated in table 1.1 the general preventive requirements for protection from five in the buildings.

2.2 **High hazard:** the factories which process or collect or produce combustible materials or the contents of which burn at high speed or produce poisonous vapors or explosions as indicated in table 1.1 the general preventive requirements for protection from fire in the buildings.

3. **Constructive Requirements:**

3.1 The requirements of chapter one should apply for securing the safety of construction frame from fire hazard.

3.2 The validity of the buildings from construction point of view for use for industrial purposes should be in accordance with Table 1.2 classification of buildings in terms of fire resistance and Table 10.1 suitability of buildings from construction point of view for use for industrial purposes.

Table (10-1) Validity of buildings from construction point of view of ruse for industrial purposes as per the risk degree of their operations

Construction Classification	Risk Degree
First and Second only	High risk buildings
All types and fifth type temporarily and as per special requirements	Medium risk buildings

4. **Mixed Use:**

4.1 In case the industrial buildings and establishments or professions shops form part of other buildings with other use type they should be separated from each other so that each forms independent fire section with independent escape means.

4.2 The parts of the buildings which are allocated for other use than industrial should be treated in accordance with their type of use.

4.3 The allocated parts of the buildings or their parts which are designated for other use should be separated from each other.

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5. **Fire spread control:** The general requirements of preventive precautionary in engineering areas should apply in addition to these requirements.

5.1 **Horizontal Spread:** The fire section area should not exceed the specified figure in Table 10.2 and in case the division is not possible due to the nature of the processing the civil defense may decide the alternative precautions as per the requirement.

5.1.1 The basement should be protected by firefighting water sprayers network if its area exceeds 150

Table (10-2): Space of Fire Sector in the Industrial Buildings according to hazard of operations

Industrial buildings risk	Areas of fire section in square meters as per the floor	
	Ground Floor	Basement and Upper Floors
Medium Risk Buildings	5000 m^2	1500 m^2
	1000m^2	500 m^2

5.2 **Vertical Spread:** The preventive precautionary requirements in engineering areas should be applied.

5.2.1 If the buildings are multi-floor building each floor should be considered independent fire section.

5.3 **External Spread:** The preventive precautionary requirements in engineering areas should apply.

5.3.1 The external walls at the boundary with the neighbor should be constructed of concrete and bricks.

5.4 **Arrival of civil defense machinery:** The civil defense machinery should have easy access to the industrial buildings

6. **Escape Means:**

6.1 The general requirements of escape means should be applied in addition to these requirements.

6.2 **Absorption Capacity** – The absorption capacity should be in accordance with the contents of escape means chapter table 3.4. As for other use locations the absorption should be determined in accordance with the nature of use.

6.3 **Wideness:** The width of the escape mean should be calculated on the basis of the number of people who use it as indicated in escape means chapter provided that the width of the main corridors in industrial buildings should not be less than (2 m) and the sub-corridors not less than (1.5 m) under any circumstances.

6.4 **Movement Distance:** The movement distance from any point to the final exit or to the protected stair should not exceed the indicated figures in table 10.3.

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Table (10-3): Calculation of movement distance and direct distance of the industrial buildings

Location	Risk Type	Floor	
		Ground	Basement
Direct distance within the section	Medium	15	10
	High	7.5	7.5
Movement distance to the exit or protected stair	Medium	40	20
	High	20	10
Closed End	Medium	7.5	7.5
	High	Not allowed	Not allowed

6.5 **Corridors:** General requirements of corridors should be provided as indicated in escape mean chapter provided that the width of the main corridors should not be less than (12 m) and sub corridors not less than (1.5m).

6.5.1 If the processing areas are not stable and the corridors are not clear the corridors should be planned with reflective paint to show the corridors clearly and the work or storage area.

6.6 **Exits**: The general requirements of exits should be provided as indicated in escape means chapter.

6.6.1 Each floor should be provided with two distant exits

6.6.2 The number of exits should be in accordance with the general requirements provided that they should not be less than two distant exits at the utmost parts of the building on the external wall and lead to the outside.

6.6.3 All exits should lead directly to outside or protected stair or corridor from fire and separated from the building by isolation space.

6.6.4 In the industrial buildings with medium risk degree one exit may be accepted after obtaining the approval of civil defense if the following requirements are met.

6.6.4.1 The depth of the direct distance inside the section should not exceed 15 m.

6.6.4.2 The movement distance from the door of the section to the final exit or protected stair should not exceed 30 m.

6.6.4.3 The movement distance to the closed ends should not exceed 7.5 m

6.6.4.4 Other escape means requirements should be provided especially the stairway.

6.7 **Stairway:** The general escape means requirements should apply in addition to these requirements

6.7.1 The number of stairs per floor should not be less than two distant stairs at the utmost parts of the building on the external wall and lead directly to outside.

6.7.2 The stair should be protected and separated from the building by isolation space protected from fire and leads directly to outside.

6.7.3 The civil defense may accept one stair in industrial buildings with medium risk degree if all preventive requirements of industrial buildings are satisfied.

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6.8 **Final Exit:** Under any circumstances all escape means should lead to final exit which leads directly to outside.

6.9 Other sections with other type of use in industrial buildings with high risk degree should be treated in accordance with their special requirements or whichever is of more prevention capacity.

7. **Firefighting and warning equipment:** The preventive precautionary in engineering areas should be provided in accordance with the general requirements of engineering services in addition to the indicated requirements in Table 10.4

7.1 The Firefighting and warning equipment should be in terms of designing and implementation and maintenance complying with the requirements of part two or civil defense directory.

7.2 The Firefighting methods differ as the industrial operations and the materials used in the processing also differ. Accordingly the required Firefighting and warning equipment differ from one factory to another. Table No. 10.4 indicates the minimum level of requirements and the civil defense may request additional equipment as they consider necessary.

7.3 The Civil defense on issuing the permit may request additional equipment or as alternative to some other preventive precautionary requirements.

Table (10-4) Firefighting Equipment for Industrial Buildings according to the Category, Height, and Constructive Classification

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors
2	**Fixed installations**		
	a	Rubber hoses network	All floors
	b	Dry hydrants network	More than 3 floors and with the height less than 28m or two floors with total areas exceeding 1000m^2
	c	Moisture hydrants network.	With height more than 28 m. or more than two floors with areas exceeding 1000 m^2 per floor
	d	External hydrants network.	In high risk industrial establishments
3	**Automatic fixed systems**		
	a	Automatic firefighting water sprayers network	In all industrial buildings and the civil defense may exempt the buildings with medium risk degree
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		
	a	Manual warning network.	All floors
	b	Automatic warning network.	In high risk degree industrial establishment or high risk locations in industrial buildings with medium risk degree

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8. **Engineering Services:** It should be complied with the contents of engineering services chapter with concentration on table 10.5.

8.1 The civil defense may request additional equipment or as alternative to some other preventive requirements.

Table (10-5): Engineering Services of Fire Prevention in Industrial Buildings

Sl No.	Type	Required cases
1	**Engineering services of fire prevention:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and escape means
3	**Emergency lightening network**	Basement and escape means
4	**Electrical reserve source**	All high risk industrial building
5	**Fire lift**	Not required
6	**Automatic Fire Doors**	As per preventive precautionary in engineering areas

Chapter 10

Requirements of the Ministry of Interior Affairs General Directorate of Civil Defence

Part Eleven

Prevention and Protection requirements from fire in the Warehouses buildings and car parking

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1. Definition of warehouse buildings:

1.1 They are the buildings or their parts designated for storage of raw materials and processed or half processed products. This type of buildings could be independent or part of processing or sales buildings

1.2 The warehouses buildings are divided in terms of their risk degree to the following categories:

1.2.1 **Category (a):** light hazard buildings where noncombustible materials are stored such as building materials and devices and spare parts.

1.2.2 **Category (b):** Buildings with medium risk degree where combustible materials or noncombustible materials wrapped with combustible materials are stored such as thick cartons or plastic or foam covers or sawdust.. etc.

1.2.3 **Category (c):** Buildings with high risk degree where hazardous material are stored in general and combustible gases and liquids and very susceptible materials to burning such as wood and papers and loose fibers and also foam plastic.. etc.

2. Fire Hazard: The fire hazard in warehouses buildings is classified in accordance with the storage operations type which is carried out in these buildings as follows:

2.1 **Light Hazard Category (a):** they are the building so the warehouses the contents of which are of low burning nature as indicated in Table 1. General preventive requirements for buildings chapter such as noncombustible materials such as building materials and spare parts etc.

2.1.2 **Medium hazard category (b):** they are the buildings of the warehouses the contents of which burn with medium spread speed or from which remarkable smoke could emit but without producing poisonous vapours or causing explosions on burning as indicated in Table 1.1 general preventive requirements in buildings chapter such as the warehouses where combustible materials or noncombustible materials wrapped with combustible materials are stored such as thick cartons and plastic or foam bubbles and sawdust .. etc.

2.2 **High Hazard Category (c):** they are the warehouse buildings, the contents of which burn at high speed or produce poisonous vapours or explosions as indicated in Table 1.1 general preventive requirements in buildings chapter or they are the buildings where hazardous materials are stored in general and combustible gases and liquids and very susceptible materials to burning such as wood and papers and loose fibers and foam plastic.

3. Construction Requirements:

3.1 The requirements of chapter one should be provided to secure safety of construction frame from fire.

3.2 The validity of buildings from construction point of view for use for storage purposes should be determined in accordance with Table No. 2.1 – buildings classification in terms of their fire resistance degree and Table 11.1 suitability of buildings from construction point of view for use for storage purpose.

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Table (11-1): Validity of buildings from construction point of view for use for Storage purpose as per the risk degree of their contents

Construction classifications	Risk degree
First and second type only	High risk buildings
First, second, and third types with special requirements	Medium risk buildings
All types and fifth type temporarily and with special requirements	Light-risk buildings

4. Mixed use:

4.1 If the warehouse buildings form part of buildings with other type of use they should be separated so that each one will constitute independent fire section with independent escape means. 3

4.2 The parts of the buildings which are allocated for other use than storage should be treated in accordance with the nature of their use.

4.3 The designated parts for buildings or their

5. Fire Spread Control: The general preventive requirements in engineering areas should be applied in addition to these requirements.

5.1 Horizontal spread: The areas of fire section should not exceed the indicated figures in Table 11.2

5.1.1 The basement should be protected by the provision Firefighting water sprayers network if its area exceeds (150 m2)

5.1.2 Different uses should be separated from each other regardless of the area.

5.1.3 The special risk locations should be separated from each other regardless of the area

Table (11-2): Fire section area in warehouses buildings as per their contents risk

Risk type in warehouses buildings	Area of fire section in squire meter as per floor	
	Ground Floor	Basement and Upper Floors
Light risk	5000 m^2	
	3000 m^2	
	1000 m^2	

5.2 External Spread: The preventive precautionary requirements in engineering areas should apply.

5.2.1 The external walls on the boundary with neighbor should be constructed form concrete and bricks.

5.2.2 Arrival of civil defense machinery. The civil defense

6. Escape Means:

6.1 The general requirements of escape means should be applied in addition to these requirements.

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6.2 **Absorption Capacity:** The absorption capacity should be estimated in accordance with the contents of escape means chapter Table 3.4 and as for other use locations the capacity should be determined in accordance with the nature of their use.

6.3 **Wideness:** The width of the escape mean should be measured on the basis of the number of people who use it. As indicated in escape means chapter provided that the width of main corridors in the warehouses buildings should not be less than (2 m) and in sub corridors should not be less than (1.5m) under any circumstances.

6.4 **Movement distance:** The movement distance from any point to the final exit or to the protected stair should not be less than the indicated figures in Table 11.3.

Table (11-3): Calculation of movement distance and direct distance in Warehouses buildings

Location	Type of Risk	Floor	
		Ground	Basement
Direct distance in the section	Light or Medium	15	10
	High	7.5	7.5
Movement distance to the exit or protected stair	Medium	30	15
Closed End	High	20	10
	Light or Medium	7.5	7.5
	High	Not permitted	Not permitted

6.5 **Corridors**: The general requirements of corridors as indicated in escape means chapter should be provide, provide that the width of the main corridors should not be less than (2m) and the sub corridors not less than (1.5m) – under any circumstances

6.5.1 If the storage locations are not stable and the corridors are not clear the corridors should be planned with reflective paint to show the corridors and the storage and work areas.

6.5.2 The corridors between the storage locations should be clear and organized so that they lead to the outside.

6.6 **Exits:** The general requirements of exits should be provided as indicated in escape means chapter

6.6.1 The number of exits should be in accordance with the general requirements provided that they should not be less than two distant exits at the utmost parts of the building on the external wall and each lead to the outside.

6.6.2 All exit should lead directly to the outside or to a protected stair or corridor from fire and isolated from the building by isolation space

6.6.3 One stair may be accepted in warehouses buildings with light risk degree or medium risk degree after obtaining the approval of civil defense if the following requirements are met.

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6.6.3.1 The depth or direct distance inside the section should not exceed 15 m.

6.6.3.2 The movement distance from the door of the section to the final exit or protected stair should not exceed 30 m.

6.6.3.3 The movement distance to closed ends should not exceed 7.5m

6.6.3.4 Other escape means requirements should be made available.

6.7 Stairway: The general requirements of escape means should apply in addition to these requirements

6.7.1 The number of stairs should not be less than two stairs per floor, distant and at utmost parts of the building on external wall and each leads to outside directly.

6.7.2 The stair should be protected and separated from the building by isolation space protected from fire and leads directly to outside.

6.8 Final Exit: Under all circumstances all escape means should lead to a final exit which leads to outside directly.

6.9 The sections in warehouses buildings with other types of use should be treated in accordance with their special prevention requirements or whichever is of more prevention capacity.

7. Firefighting and warning Equipment: The preventive precautionary equipments in engineering areas should be provided in accordance with the general requirements or engineering services in addition to the requirements in Table 11.4

7.1 The Firefighting and warning equipment should be in terms of designing and implementation and maintenance in accordance with the requirements of part two or civil defense directory

7.2 The civil defense may request additional equipment or as alternative to some other preventive requirements.

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Table (11-4) Firefighting equipment for warehouses buildings and car parking as per category and height and construction classification

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors and cases
2	**Fixed installations**		
	a	Rubber hoses network	All floors and cases
	b	Dry hydrants network	Not required
	c	Moisture hydrants network.	Not required
	d	External hydrants network.	In high risk and warehouse buildings
3	**Automatic fixed systems**		
	a	Automatic firefighting water sprayers	Basement and high and medium risk warehouses buildings
	b	Automatic other materials sprayers	Special hazard locations
4	**Fire warning equipment**		
	a	Manual warning network.	In all floor and cases
	b	Automatic warning network.	In medium or high risk warehouses and high risk locations in light risk warehouses

8. Engineering Services: it should be complied with the contents of the engineering services chapter with concentration on Table 11.5.

8.1 The civil defense may request additional equipment or as alternative to some other preventive requirements.

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Table (11-5): Engineering services pertaining to prevention of fire in warehouses buildings and car parking

Sl No.	Type	Required cases
1	**Engineering services of fire prevention:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illumination guidance signs**	Basement and escape means
3	**Emergency lighting network**	Basement and escape means
4	**Electrical reserve source**	Not required
5	**Fire lift**	Not required
6	**Automatic Fire Doors**	In accordance with the preventive precautions in engineering areas

9. Special Preventive requirements for car parking

9.1 Definition of car parking buildings:

.9.1.1 They are buildings used of the storage and parking of cars in continuous or temporary form and in this sense they are considered as attached to the warehouses buildings. Therefore, the general preventive requirements for protection from fire in warehouses buildings should apply in general to the car parking in addition to these requirements.

9.1.2 The car parking are divided from architectural point of view to the following categories:

Category (a): Open sided buildings in which cars are driven to the parking location and to the exit.

Category (b): Closed side buildings in which cars are driven to their parking locations and to the exit

Category (c): Buildings where cars are driven to their location and to the exit point automatically.

9.2 Fire Hazard: The fire hazard in car parking buildings are classified as medium risk as indicated in Table 1.1 general preventive requirements for buildings chapter.

9.3 Ramps for car parking underground:

9.3.1 The ramps are not considered as escape means unless part of it is allocated for this purpose to be protected by a protective barrier and satisfies the general requirements of escape means

9.3.2 Ramp percentage from and to the basement should not exceed (1:10) and two ramps at least should be provided preferred to be distant and on two directions facing each other and if this is not possible the civil defense should decided the appropriate action.

9.3.3 **Floor**: necessary bending should be made on the basement floor which leads to water or oils collection channels so that they can be discharged through discharge openings and general sewerage system as per engineering principles.

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9.4 Side Wall:

9.4.1 The side windows facing the highway should be covered with reinforced glass or thick mesh grid to prevent the entry of the wastes and cigarette residuals.

9.4.2 If the sides of the car parking are open by not less than 25% percentage of the area of external wall of the building and on two facing directions this parking should be considered as an open one and accordingly there will be no need for automatic Firefighting water sprayers.

9.5 Firefighting and warning equipment: The preventive precautionary requirements as per the general requirements of engineering services should be applied in addition to these requirements.

9.5.1 The Firefighting and warning equipment should be in terms of designing and implementation and maintenance in accordance with the requirements of part two or the directory of the civil defense.

9.5.2 It should not be permitted to carry out any construction or install any equipment for storage or supply of fuel in the building according to private requirements.

9.5.3 The civil defense may request additional or equipment or as alternative to some other requirements.

Table (11-6) Firefighting equipment and warning systems in car parking buildings as per category and height and construction classification

S. No.		Type	Required cases
1	**Manual extinguishing equipment:**		
	a	Manual extinguishers	All floors and cases
2	**Fixed installations**		
	a	Rubber hoses network	All floors and cases
	b	Dry hydrants network	Not required
	c	Moisture hydrants network.	Not required
	d	External hydrants network.	Inside the fence of major projects
3	**Automatic fixed systems**		
	a	Automatic firefighting water sprayers network	Car parking underground (basement) with closed sides
	b	Automatic other materials sprayers network	Special hazard locations where water cannot be used
4	**Fire warning equipment**		
	a	Manual warning network.	In all floor and cases
	b	Automatic warning network.	In car parking with closed sides

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11.9.6 **Engineering Services:** it should be complied with the contents of engineering services chapter with concentration on table 11.7

11.9.6.1 Ventilation and smoke discharge

11.9.6.1.1 Natural or mechanical appropriate ventilation should be provided in accordance with the international specifications approved by the civil defence

11.9.6.1.2 The mechanical ventilation in the basement should be separated from any other system in the building and should be designed to operate

Table (11-7): Engineering Services of Fire Prevention in Warehouse Buildings and Park

Sl No.	Type	Required cases
1	**Engineering Services for prevention of fire:**	
1	**Ventilation System**	As per the international specifications approved by civil defense
2	**Illuminated guidance signs**	Basement and all floors
3	**Emergency lighting network**	Basement and all floors
4	**Electrical reserve source**	Required in closed car parking building
5	**Fire lift**	Buildings which do not exceed four floors height
6	**Automatic Fire Doors**	As per the preventive precautionary in engineering areas