Arab Republic of Egypt
Ministry of Housing, Utilities, and Urban Communities
Housing and Building National Research Center

Egyptian Code

For Design Bases and Execution Requirements for Protecting Facilities from Fire Hazards

Requirements for Enhancing and Securing Existing Industrial and Storage Buildings and Facilities to Protect Them from Fire Hazards

Arab Republic of Egypt
Ministry of Housing, Utilities, and Urban Communities
Housing and Building National Research Center

Permanent Committee For
Egyptian Code for Design bases and Execution Requirements for Protecting Facilities from Fire Hazards

Requirements for Enhancing and Securing Existing Industrial and Storage Buildings and Facilities to Protect Them from Fire Hazards

2024

Arab Republic of Egypt
Ministry of Housing, Utilities, and Urban Communities
Office of the Minister

Postal Code: 11311

Minister of Housing, Utilities, and Urban Communities Decree No. (1236) of 2024

- After reviewing Law No. 1 of 1964 regarding design bases and execution requirements for construction works. After reviewing Presidential Decrees No. 14063 of 2005 concerning the reorganization of the Housing and Building National Research Center and its executive regulations.
- And after reviewing Presidential Decree No. 258 of 2024 regarding the formation of the government.
- And after reviewing the Minister of Housing, Utilities, and Urban Communities Decree No. 221 of 2024 regarding the reformation of the Permanent Committee for preparing the Egyptian Code for Design Bases and Execution Requirements for Fire Hazards.
- And after reviewing the Chairman of the Housing and Building National Research Center Board Decree No. 127 of 2024 regarding the formation of a committee to prepare requirements for upgrading industrial facilities to protect them from fire hazards.
- And after reviewing the Chairman of the Housing and Building National Research Center Board Decree No. 130 of 2024 regarding the formation of a committee to study and propose solutions for improving fire protection in industrial facilities.
- And after reviewing the Chairman of the Housing and Building National Research Center Board Decree No. 151 of 2024 assigning the committee formed by Decree No. 130 of 2024 to review and make the necessary amendments and approve the draft prepared by the committee formed by Decree No. 127 of 2024.
- And after the memorandum submitted by Prof. Dr. / Chairman of the Housing and Building National Research Center regarding the work on requirements for upgrading and securing existing industrial and storage buildings to protect them from fire hazards.

It is decided:

(Article One)

The requirements for upgrading and securing existing industrial and storage buildings and facilities to protect them from fire hazards attached to this Decree shall be applied.

(Article Two)

The Housing and Building National Research Center shall be responsible for publish these requirements and explaining them.

(Article Three)

This Decree shall be published in the Egyptian Official Gazette and shall take effect the day following its publication, and the concerned authorities shall implement it.

Legal Advisor to the Minister: Nasser Reda

Minister of Housing, Utilities, and Urban Communities
Eng. Sherif El-Sherbini

Issued on 20/10/2024

Preface

Due to the rapid developments in the field of urban planning and construction witnessed recently in Egypt, it became essential for Egypt to establish and develop Design Bases and execution requirements to ensure the safety of citizens and preserve the country's real estate assets.

From this perspective, and in affirmation of the role of the **Housing and Building National Research Center**, affiliated to the Ministry of Housing, Utilities, and Urban Communities, **Presidential Decree No. 63 of 2005** was issued regarding the reorganization of the Housing and Building National Research Center. One of its provisions defines the Center's responsibilities, including preparing, issuing, and updating codes, work item specifications, and technical specifications that align with global trends, suit local conditions, and fulfill state policies for directing investment in construction and building projects.

In line with the Center's role in developing the construction and building sector, it prepared the Center's research and strategic plan, aiming to provide scientific, practical, and applicable solutions to address challenges facing various sectors. Codes are continuously updated according to emerging local and global developments and based on expertise gained from application conditions.

In light of presidential directives concerning the urgent plan to advance Egyptian industry, the Housing and Building National Research Center issued a special code for industrial facilities in coordination with the **Industrial Development Authority (IDA)**.

Referring to the Decree of His Excellency Prof. Dr. / Minister of Housing, Utilities, and Urban Communities No. 221 of 2024 regarding the reformation of the Permanent Committee for preparing the Egyptian Code for Design Bases and Execution Requirements for the Protection of Facilities from Fire Hazards, the Chairman of the Housing and Building National Research Center issued **Decree No. 127 of 2024** to form a committee to prepare requirements for upgrading industrial facilities to protect them from fire hazards, and **Decree No. 130 of 2024** to form a committee to study and propose solutions for improving the fire protection of existing industrial facilities. The committee was tasked with reviewing and making the necessary amendments to the draft prepared by the committee formed under Decree No. 127 of 2024, and it has completed the preparation of the requirements.
Accordingly, His Excellency Eng. / Minister of Housing, Utilities, and Urban Communities issued **Decree No. 1736 of 2024** regarding the adoption of these requirements.

Chairman of the Board
Housing and Building National Research Center
(Signature)
Prof. Dr. Mohamed Masoud El-Sadawy

Preamble

Protecting industrial facilities from fire is a vital priority to ensure the safety of lives, property, and the surrounding environment. Due to the nature of activities carried out in industrial facilities, which may involve the use of flammable materials or the generation of high heat, the likelihood of fires is significant. Therefore, the implementation of effective fire protection systems is essential to minimize potential risks, ensure the continuity of operations in a safe environment, protect workers' lives, and preserve real estate assets.

Fire protection in industrial facilities is not an individual responsibility; it requires the combined efforts of management, workers, and safety experts to ensure the application of the highest safety standards and to reduce potential losses in the event of a fire.

The requirements for upgrading and securing existing industrial and storage buildings to protect them from fire hazards are fundamental elements to ensure the safety of existing industrial and storage facilities and the effective application of fire protection systems. These requirements are organized into five main sections:

1. **Chapter One (General):** Covers scope, application, exemptions, classification of hazard levels, and definitions.
2. **Chapter Two:** General requirements.
3. **Chapter Three (Firefighting Systems Requirements):** Includes basic and general requirements for protecting existing industrial and storage facilities from fire hazards, taking into account that these facilities are already constructed and no substantial modifications to the building structure are feasible.
4. **Chapter Four (Fire Detection, Alarm, and Electrical Installations Requirements).**
5. **Chapter Five (Special Requirements):** Covers the requirements for suitable extinguishing media according to fire classification types and Exit distances.

These requirements were issued in collaboration with the relevant authorities, namely: **Housing and Building National Research Center**, **Industrial Development Authority (IDA)**, **Federation of Egyptian Industries**,
and other experts in the field.

Chairman of the Permanent Committee
for the Egyptian Code for Fire Protection of Facilities
(Signature)
Prof. Dr. Tarek Mohamed Baha El-Din

Table of Contents

Chapter One

General Provisions

1- Scope and Application

1-1-1 These requirements specify the minimum standards necessary to enhance the efficiency and ensure the safety of existing industrial and storage buildings and facilities, in order to protect them and their occupants from fire hazards.

1-1-2 These requirements shall apply to all industrial and storage facilities—whether standalone or located within an industrial zone—that existed prior to the publication date of Ministerial Decree No. 1236 of 2024, which put these requirements into effect in the official gazette.

1-1-3 For facilities that have previously obtained approvals from Civil Protection DeChapterments, such approvals shall remain valid, and no additional requirements shall be imposed unless a modification or addition is made that results in an increase in the occupancy load or the hazard level.

2- Exemptions

2-1-1 Activities classified as hazard category (RISK-3) with a floor area up to **250 m²** and with the floor level of the highest floor not exceeding **5 meters** shall be exempted from these requirements.

2-1-2 Activities classified as hazard category (RISK-3) with a floor area greater than **250 m²** and up to **400 m²**, and with the floor level of the highest floor not exceeding **5 meters**, shall be exempted from the requirements related to fire pumps and water storage tanks, **provided that** natural ventilation and manual fire alarm requirements are met. Fire protection systems shall be connected to the public water network, and a booster pump shall be provided to raise the pressure to **4 bar**.

3- Classification of Hazard Levels at Premises

Industrial and storage activities shall be classified according to the fire load per square meter into hazard levels **(Risk), (Risk -2), and (Risk -3)**, in accordance with the classification issued for coded industrial activities adopted by the Industrial Development Authority – Ministry of Industry, under Ministerial Decree No. **1137 of 2024**, as follows:

3-1-1 High-Hazard Premises (High Risk -1)

This group includes all factories, workshops, and storage facilities where the fire load exceeds **100 kg per square meter** of combustible materials, or where the combustion of their contents generates heat not less than **2 megawatts per square meter** of occupancy area.

3-1-2 Medium-Hazard Premises (High Risk -2)

This group includes all factories, workshops, and storage facilities where the fire load does not exceed **100 kg** and is not less than **50 kg per square meter** of combustible materials, or where the combustion of their contents generates heat not exceeding **2 megawatts** and not less than **1 megawatt per square meter** of occupancy area.

3-1-3 Low-Hazard Premises (High Risk -3)

This group includes all factories, workshops, and storage facilities where the fire load does not exceed **50 kg per square meter** of combustible materials, or where the combustion of their contents generates heat not exceeding **1 megawatt per square meter** of occupancy area

1–4 Definitions

1–4–1 Occupancy:
The actual or intended use of a building or any Chapter thereof.

1–4–2 Total Occupant Load:
The maximum number of persons expected to be present within a building, a floor, or a specific area of that floor.

1–4–3 Fire Barrier:
A construction element that acts as a barrier against fire spread. It may be required to provide a specific fire-resistance rating, or no rating may be required depending on the case.

1–4–4 Fire Resistance of an Element:
The period of time during which a construction element is capable of performing its intended functions when exposed to fire, defined by the duration it can withstand fire and resist the passage of flames, hot gases, and similar hazards under standard fire-test conditions.

1–4–5 Fire-Rated Doors:
Doors manufactured from materials that do not deteriorate under exposure to flames or heat and do not transmit them, for a specified duration of time.

1–4–6 Factory or Warehouse Area:
The actual built-up area of the factory or warehouse, not the overall plot area (i.e., the net occupancy area).

1–4–7 Fire Load:
The total combustible content within a room or within a given area, including furniture, flooring, ceilings, combustible Chapteritions, and other materials.
The fire load is an indicator of the potential severity of the fire and is expressed as the amount of heat released per unit area, or as the equivalent mass of wood that would produce the same amount of heat per unit area when burned

Chapter Two
General Requirements
2-1 Basic Requirements:
1.1.2 **Availability of the structural safety of the facility.**
2.1.2 **Availability of escape routes.**
3.1.2 **Availability of access points for fire-fighting vehicles.**
4.1.2 **Safety of electrical connections**: (lighting – industrial equipment power supply – electrical panels, etc.).
5.1.2 **Availability of fire-fighting, alarm, and manual extinguishing systems.**

2-2 Manual Fire Extinguishers:

- Industrial and storage buildings shall be equipped with **manual fire extinguishers**:
    - 6 kg powder, 9-gallon foam, or 6-liter CO_2, with the extinguishing agent selected according to the type of activity and its contents.
    - Fire extinguishers must comply with local or international standards.

2-2-1 Requirements for Group (RISK-1) Buildings:

- Each fire extinguisher shall cover:
    - A 7-meter radius in open areas.
    - 14 meters along longitudinal corridors.
- Minimum of two extinguishers per floor.

2-2-2 Requirements for Group (RISK-2) Buildings:

- Each fire extinguisher shall cover:
    - A 9-meter radius in open areas.
    - 18 meters along longitudinal corridors.
- Minimum of two extinguishers per floor.

2-2-3 Requirements for Group (RISK-3) Buildings:

- Each fire extinguisher shall cover:
    - An 11-meter radius in open areas.
    - 22 meters along longitudinal corridors.
- Minimum of two extinguishers per floor.

2-2-4 Special-Purpose Areas:

- Shall be equipped with larger extinguishers: 12 kg / 25 kg powder, 9-gallon foam, or 10 kg CO_2, according to each 25 m^2 area and its multiples (e.g., boilers, generators, etc.).

2-2-5 Additional Requirements:

- Sub-distribution electrical panels installed within or mounted on Chapteritions must be secured with suitable manual fire extinguishers, and the panels must be tightly closed.
- Manual fire extinguishers weighing no more than 20 kg shall be installed so that the top of the extinguisher does not exceed 1.5 meters above the floor.
- Manual fire extinguishers weighing more than 20 kg (except wheeled extinguishers) shall be installed so that the top of the extinguisher does not exceed 1 meter above the floor.
- Under no circumstances shall the distance between the bottom of the extinguisher and the floor be less than 10 cm

- Portable fire extinguishers shall be visible and clearly identified. Access to them shall not be obstructed, and means must be provided to indicate the location of each extinguisher.
  Manual fire extinguishers shall be protected from damage due to impacts, vibrations, or environmental conditions.

2-3 Common Fire-Fighting System:

1.3.2 Several industrial or storage facilities may **share a common fire-fighting system** (tanks – pumps – fire-fighting network separate from the water supply network), regardless of whether they are owned by one or more entities.

2.3.2 When using shared fire-fighting networks, they **shall be designed with hydraulic calculations** according to the requirements listed in Tables (2, 3, 4), so as to provide the required protection for the industrial facility with the highest risk level and the farthest areas to be protected.

3.3.2 **Responsibility for operation and maintenance** of shared fire-fighting networks must be clearly defined.

4.3.2 **Design and implementation** shall be carried out under the supervision of a specialized consulting engineer.

2-4 Fire-Fighting Pumps:

1.4.2 Fire-fighting pumps and their engines shall consist of either:

- A single pump fed from two electricity sources or powered by a liquid-fueled engine,
- Or two pumps as specified in Tables (2, 3, 4).

2.4.2 If the capacity of the main pump exceeds 250 gallons per minute, a **jockey pump** with a capacity of 2–5% of the main pump shall be added to maintain water pressure.

3.4.2 Pumps, engines, and their control panels **must be specifically designed for fire-fighting purposes**, and the following are permitted:

- Imported pumps, provided that their documentation includes a certificate of origin and a valid test certificate from an accredited laboratory in the country of origin.
- Locally manufactured, assembled, or imported pumps, provided that they are tested and a valid test certificate is issued by a specialized testing laboratory in the Arab Republic of Egypt.
- A certificate from a licensed professional engineer confirming suitability for this purpose must also be provided.

4.4.2 **Horizontal Split – End Suction – In-Line (Case) pumps and engines** may be used, provided that the required flow and pressure of 4.5 bar at the farthest point are achieved.

5.4.2 The suction level of fire-fighting pumps shall not exceed the floor level of the fire water tank. If this is not feasible, a preparation tank shall be provided.

2-5 Compliance with Protection Requirements According to Material Safety Data Sheets (MSDS):

- Instructions for storage, extinguishing, and other precautions **shall be applied for each material or group of materials** according to their type and quantity in all industrial and storage activities. All materials used or stored in the facility **shall be identified, classified, and their quantities determined** according to their Material Safety Data Sheet (MSDS) before planning for fire safety measures.

2-6 Separation Between Different Premises

2-6-1
Heterogeneous stored materials shall be segregated from one another.

2-6-2
Materials classified as having special hazards shall be separated from other Premises within a fire-rated enclosure or by maintaining a safe distance of not less than 4 meters, and shall be protected by an appropriate extinguishing system in accordance with the requirements and the Material Safety Data Sheet (MSDS) of the materials used.

2-7 Ventilation and Smoke Exhaust Systems

2-7-1 Natural Systems

Adequate natural ventilation shall be provided for industrial facilities of all classifications. The ventilation openings shall be naturally driven, uniformly distributed, and with a total area not less than 10% of the floor area of each industrial facility floor.
The openings shall be located at a height not less than 2.5 meters above the floor level.
These openings shall be considered a source for smoke exhaust, provided that compensating air is available through exterior-facing doors having a total area equal to 5% of the floor area of that floor.

2-7-2 Mechanical Systems

If existing facilities are unable to meet the natural ventilation requirements, mechanical ventilation systems shall be used, with an environmental ventilation rate of not less than **3 liters per second per square meter** (approximately **6.5 cubic feet per minute per square meter**) of the floor area for all industrial classifications.

For fire smoke exhaust, **metal (steel) fans** shall be used and installed at the highest feasible elevation according to the floor height.
The discharge rates of these fans shall comply with **Table (1)**, and compensating air shall be provided through exterior-facing doors with a total area of not less than **7.5%** of the floor area of the floor.

Environmental ventilation fans may be used as Chapter of the mechanical smoke exhaust system, provided that all their components are metallic (steel).
The minimum smoke exhaust discharge rates shall be as indicated in **Table (1)**.

Table (1): Smoke exhaust fan discharge rates according to ceiling height and hazard level

Ceiling height of the Floor:	**Smoke Exhaust Rate** **Liters per second per square meter (cubic feet per minute per square meter)**		
	Risk	**High risk -2**	**High risk -3**
Up to 3.5 meters	**4.00(8.50)**	**3.00(6.50)**	**2.50(5.50)**
From 3.5 to 6.0 meters	**5.75(12.25)**	**4.75(10.25)**	**4.00(8.50)**
From 6.0 to 12.0 meters	**7.00(14.75)**	**6.00(12.75)**	**5.00(10.75)**

Chapter Three

Requirements for Firefighting Systems**

- **Tables (2), (3), and (4) set out the firefighting system requirements for industrial and storage facilities classified under hazard levels (RISK-1), (RISK-2), and (RISK-3), respectively.**
- **These requirements do not apply to industrial facilities for petroleum products, petrochemical manufacturing facilities, or industrial activities requiring open sprinkler systems (water/foam). Such facilities shall comply with the requirements of the Egyptian Code for Design Principles and Execution Requirements for Fire Protection of Buildings and Facilities.**

Table (2): Firefighting Technical Requirements for Rectifying the Conditions of Existing Industrial Facilities — Classification (Risk)

Not applicable to industrial facilities for petroleum products, petrochemical manufacturing facilities, or industrial activities that require open sprinkler systems (water/foam)

Item	Requirement	Area Classification Statement (1)							Notes
		<=150 m2	>1502م High risk<=300 M2	>3002م High Risk<=900 m2	>900م 2High risk<=2400 m2	>24002مHigh risk <=3600 m2	>3600 m2 high risk <=480 m2	> 2400 m2	
1	Pump Discharge and Capacity (gallons per minute)	150	250	400	500	750	750	Not less than the requirements of the hydraulic calculations	
2	Automatic Sprinklers	Not Required	Not Required	Required	Required	Required	Required		
3	Manual Firefighting (hoses and hose reels)	Hose Reels (1)	Hose Reels (1)	Hose Reels 1"+1.5"	Hose Reels 1"+1.5"	Hose Reels 1"+2.5"	Hose Reels 1"+2.5"		
4	Diameter of Pipes and Risers	2"	2"	3"	3"	4"	4"		
5	Fire Pump Set Performance Description	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel		The electric pump operates on two separate power source

									s
6	**Initial Firefighting Duration (minute)**	**30**	**30**	**45**	**45**	**60**	**60**		
7	**Water Tank Capacity (m^3)**	**16**	**30**	**70**	**90**	**170**	**170**		
8	**Type of Tank (Elevated / Ground / Undergroun d)**	**Any of them**	**Any of them**	**Any of them**	**Any of them**	**Any of them**	**Any of them**		

Notes

- The electric pump operates on **two separate power sources**.
- If the depth of the facility or industrial building exceeds **60 meters**, or if the height of the upper floor exceeds **12 meters**, a **firefighter Siamese connection (2 × 2.5 inches)** shall be provided.
- In case of storing **combustible production materials** inside the manufacturing hall with an area exceeding **150 m^2** (combined or divided) and a height not exceeding **4 meters**, an **automatic sprinkler system** shall be provided. The pump capacity indicated in the table shall be increased by **250 gallons/minute**, and the water tank capacity shall be increased by **25%**.
- In case of storing **flammable production liquids** (e.g., gasoline, alcohol, thinner) inside the manufacturing hall in quantities exceeding **250 liters** (combined or divided), an **automatic sprinkler system** shall be provided. The pump capacity indicated in the table shall be increased by **250 gallons/minute**, and the water tank capacity shall be increased by **25%**.
- **(1)** The total area shall be calculated if there are no fire separations between floors. If fire separations exist between floors, the area shall be calculated based on the **floor area of each floor**

Table (3): Firefighting Technical Requirements for Rectifying the Conditions of Existing Industrial Facilities — Classification (High risk-2)

Item	Requirement	Area Classification Statement (1)							Notes
		≤ 200 m²	> 200 m² and ≤ 400 m²	> 400 m² and ≤ 900 m²	> 900 m² and ≤ 2400 m²	> 2400 m² and ≤ 3600 m²	> 3600 m² and ≤ 4800 m²	> 4800 m²	
1	Pump Discharge and Capacity (gallons per minute)	100	200	250	300	400	500	Not less than the requirements of the hydraulic calculations	
2	Automatic Sprinklers	Not required	Not required	Not required	Not required	required	required		
3	Manual Firefighting (hoses and hose reels)	Hose Reels (1)	Hose Reels (1)	Hose Reel 1" + 1.5	Hose Reel 1" + 1.5	Hose Reel 1" + 2.5	Hose Reel 1" + 2.5		
4	Diameter of Pipes and Risers	2"	2"	3"	3"	4"	4"		
5	Fire Pump Set Performance Description	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel	Electric or Diesel		The electric pump operates on two separate power sources
6	Initial Firefighting Duration (minutes)	30	30	45	45	45	45		
7	Water Tank Capacity (m³)	12	25	45	60	75	85		
8	Type of Tank (Elevated / Ground / Underground)	Any of them	Any of them	Any of them	Any of them	Any of them	Any of them		

- In case combustible production materials are stored inside the manufacturing hall area exceeding 150 m² (combined or divided) with a height not exceeding 4 meters, an automatic sprinkler system shall be provided. The pump capacity indicated in the table shall be increased by 200 gallons/minute, and the water tank capacity shall be increased by 25%.

- In case flammable production liquids (e.g., gasoline, alcohol, thinner) are stored inside the manufacturing hall in quantities exceeding 250 liters (combined or divided), an automatic sprinkler system shall be provided. The pump capacity indicated in the table shall be increased by 200 gallons/minute, and the water tank capacity shall be increased by 25%.

- If the industrial facility depth exceeds 60 meters, or if the height of the upper floor exceeds 12 meters, a firefighter Siamese connection (2.5 × 3 inches) shall be provided.

- The total area shall be calculated if there are no fire separations between floors; if fire separations exist between floors, the area shall be calculated based on the floor area of each floor.

Chapter Four

Requirements for Fire Detection and Alarm Systems and Electrical Installations**

4-1 Fire Detection and Alarm System

A fire detection and alarm system shall be provided according to the total floor areas of the facility as follows:

a. Manual Alarm Point

- Consists of a break-glass unit and 1 siren with a dedicated visual flasher for alarm on each floor, for facilities with areas from 400 m² to 600 m².

b. Conventional Automatic Detection and Alarm System

- For facilities with areas greater than 600 m² up to 3,600 m², with confirmation of the presence of a siren with a visual flasher on the exterior facade of the building to indicate the presence of a fire.

c. Addressable Automatic Detection and Alarm System

- For facilities with areas larger than 3,600 m², with confirmation of the presence of a siren with a visual flasher on the exterior facade(s) of the building to indicate the presence of a fire.

d. Control Panel Location

- The control panel shall be located in a place easily accessible or immediately identifiable by firefighters upon entering the building.

4-2 Electrical Installations

A certificate from a consulting electrical engineer shall be provided to verify the safety and integrity of the electrical installations in the facility, specifically regarding the following:

a. Electrical Panels

- Regarding manufacturing, components, and internal connections.

b. Circuit Breakers

- Capacity and compatibility with loads and short-circuit currents.

c. Cable Cross-Sections

- Compatibility with the electrical loads.

d. Earthing System

- Availability of a proper grounding network.

e. Ingress Protection (IP)

- Adequate protection rating for all electrical equipment (lighting fixtures, power outlets, light switches, etc.) installed in wet or exposed locations.

f. Transformer and Electrical Rooms

- Adequate space, height, ventilation, accessibility, and ability to bring in/out equipment and panels for maintenance

Exit Lighting Fixtures

- Exit lights equipped with rechargeable batteries (operating for 2 hours) shall be provided above each door used as an escape route.
- This applies to facilities classified under hazard levels (RISK-1), (RISK-2), as well as low-hazard facilities (RISK-3) with areas exceeding 1,000 m^2.

4-4 Securing Electrical Panels

- A localized extinguishing system shall be provided in the following cases (if applicable):

a. Main medium-voltage electrical panels.

b. Three-phase main electrical panels for transformers located in main electrical rooms.

c. Three-phase electrical panels installed on the floor in corridors or rooms not designated for electrical panels.

- For three-phase electrical panels embedded or wall-mounted, panels shall be securely closed to prevent tampering. In this case, it is sufficient to provide one 6-kg CO_2 fire extinguisher next to the panels, or 2 kg if there is only one panel.

4-5 Securing Indoor Dry-Type Transformer Rooms

a. A proper ventilation system shall be provided to prevent excessive temperature rise.

b. Fire-resistance rating of the room walls shall be observed.

c. Provide one 6-liter CO_2 fire extinguisher and one 6-kg multipurpose dry powder fire extinguisher.

4-6 Securing Indoor Oil-Type Transformer Rooms

a. A proper ventilation system shall be provided to prevent excessive temperature rise, with a means to close ventilation openings in case of fire.

b. Fire-resistance rating of the room walls shall be observed.

c. An automatic extinguishing system using a suitable inert gas (total flooding) shall be provided for transformers with a capacity exceeding 500 kVA.

d. A localized extinguishing system or a 6-kg handheld fire extinguisher shall be provided for transformers with a capacity of 500 kVA.

Chapter Five

Special Requirements

5-1 Suitable Extinguishing Media According to Fire Classification Categories

Table (5) shows the suitable extinguishing media according to the fire classification categories.

Table (5): Suitable Extinguishing Media According to Fire Classification Categories

Category Type	Description	Suitable Extinguishing Media
Category A	Fires Involving Ordinary Combustible Solids, Such as Wood, Fabric, Paper, Rubber, and Many Other Plastics	They shall be protected in accordance with the requirements specified in Tables (4, 3, 2), according to the occupancy hazard level
Category B	Fires Involving Flammable Liquids, Including All Petroleum Products, Solvents, Paints, Chemicals, and Combustible Gases	They shall be protected by a foam system or by using an appropriate extinguishing gas, with CO_2 used when no personnel are present
Category C	Fires Caused by Electrical Equipment and Photocopying/Printing Machines	They shall be protected using an appropriate extinguishing gas or Dry Powder
Category D	es Involving Combustible Metals, such as Magnesium, Titanium, Zirconium, Sodium, Lithium, and Potassium	They shall be protected using a type of Dry Chemical
Category E	Fires Resulting from Cooking Appliances Due to Combustion of Cooking Media Such as Vegetable Oils, Animal Fats, and Others	They shall be protected using an appropriate type of Wet Chemical

5-2 Exit Distances

In industrial facilities where production lines require undivided longitudinal distances, the Exit distance may be increased to 60 meters under the following conditions:

a. The industrial facilities shall be of medium or low hazard (RISK-2, RISK-3).
b. The number of exits in the manufacturing hall shall be at least two (2).
c. The actual occupancy shall not exceed 1 person per 10 linear meters on one side of the production line, with a maximum of 75 persons in the manufacturing hall.
d. Production lines shall be on the same level

Name	Position/Organization
Prof. Dr. Mohamed Masoud El-Saadawi	Chairman of the Board, Housing and Building National Research Center – Chairman
Prof. Dr. Tarek Mohamed Bahaa El-Din	Vice Chairman of the Board, Housing and Building National Research Center – Secretary
Prof. Dr. Ahmed Ahmed Medhat	Housing and Building National Research Center – Member
Prof. Dr. Ahmed Gamal Mohamed El-Gohary	Expert – Member
Brig. Gen. Ahmed Khattab	General Directorate of Civil Protection – Member
Major General Osama Ibrahim Shaaban	General Authority for Industrial Development – Member
Mr. Amir El-Prince Awad	General Authority for Industrial Development – Member
Captain Khaled Metwally	General Directorate of Civil Protection – Member
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