

Factory and Warehouse Safety Guidelines

Industrial Facility Definition

Industrial facilities are buildings or parts of buildings designated for industrial purposes, including assembly, mixing, and packaging operations.

Fire Hazard Classification

Moderate Hazard Facilities

Factories that manufacture or assemble non-combustible materials, or materials that burn at a moderate rate and emit noticeable smoke but no toxic fumes or explosions.

High Hazard Facilities

Factories dealing with highly flammable materials that produce toxic fumes or explosions when burning.

Common Workplace Industrial Hazards

Fire Hazards

Fire risks arise from electrical faults, fuel and oil leaks, and the presence of flammable materials in the facility.

Toxicity Hazards

Exposure to carbon dioxide and cyanogen compounds can affect body organs and cause serious health issues.

Irritants and Asphyxiants

Substances like sulfur gases, ozone, and hydrogen sulfide cause respiratory inflammation and breathing difficulties.

Insufficient Lighting

Poor natural or artificial lighting creates safety risks for workers performing tasks.

Falling Hazards

Workers face risks of falling from heights or being struck by falling objects in industrial environments.

Explosion Risks

Chemical reactions or failures in boilers and pressure vessels can lead to dangerous explosions.

Volatile Substances

Acids, alkalis, ammonia, chlorine, and acetone cause mucous membrane irritation upon exposure.

Poor Airflow

Inadequate air movement or excessive airflow creates uncomfortable and potentially hazardous working conditions.

Noise Hazards

High noise levels, ultrasonic sounds, and vibration affect worker health and safety.

Machinery Hazards

Moving equipment, sharp tools, and rough surfaces present injury risks to workers.

Preventive Safety Guidelines in Factories

General Facility Maintenance

Maintain clean facilities at all times. Properly dispose of harmful materials and waste according to safety protocols.

Fire Prevention Measures

Keep heating devices and open flames away from flammable materials. Install fire detection and suppression systems throughout the facility. Provide adequate emergency exits that are clearly marked and accessible.

Worker Training Requirements

Train all workers on proper fire extinguisher use. Provide instruction on first aid procedures. Conduct regular evacuation plan drills to ensure workers know emergency procedures.

Gas Cylinder Safety

For facilities handling gas cylinders, follow these requirements:

- Label gas types clearly on all cylinders
- Use mechanical handling aids to move cylinders

- Store cylinders upright at all times
- Keep oxygen cylinders away from flammable and oxidizing substances

Personal Protective Equipment

Provide appropriate personal protective equipment based on work type:

- Work suit
- Safety boots
- Hard hat
- Gloves
- Safety goggles and face shield
- Safety harness
- Respirators and masks
- Safety lamps
- Ear protection

Building Code Compliance

Comply with the Saudi Building Code requirements in all factories and warehouses.

Emergency Exits

Exit Definition

Emergency exits provide one or more safe paths for occupants to exit from any point in the building directly outside or to a safe area away from fire.

Exit Specifications

Doors must be easy to open and should open in the direction of escape. All doors must be fire-resistant and smoke-resistant. Provide a minimum of two exits that are located far apart. Exit capacity must match the number of building occupants.

Corridor Specifications

Corridors must be protected from fire and smoke. Width must be sufficient to handle foot traffic efficiently. Layout must allow easy access to exits. Install fire-rated barrier doors if corridors are longer than thirty meters or connect major and minor pathways. Mark non-fixed corridors with reflective paint for visibility.

Final Exit Requirements

All escape routes must ultimately lead to a final exit that opens directly to the outside.

Distance Calculations for Industrial Buildings

Direct Distance Within Room

- Moderate hazard: Maximum fifteen meters on ground floor, maximum ten meters in basement
- High hazard: Maximum seven and a half meters on both ground floor and basement

Travel Distance to Protected Stairs or Exits

- Moderate hazard: Maximum forty meters on ground floor, maximum twenty meters in basement
- High hazard: Maximum twenty meters on ground floor, maximum ten meters in basement

Fire Prevention Engineering Services

Ventilation Systems

Provide ventilation systems according to global standards approved by Civil Defense.

Emergency Lighting and Signs

Install illuminated exit signs in all areas. Provide emergency lighting in all basements and escape routes.

Backup Power

Provide backup power for all high-hazard industrial buildings.

Fire-Rated Doors

Install automatic fire-rated doors according to fire protection codes. Firefighting elevators are not mandatory but may be required based on building specifications.

Firefighting and Alarm Equipment

Portable Fire Extinguishers

Portable fire extinguishers are required on all floors without exception.

Fixed Installation Systems

Rubber Hose Reels

Fixed rubber hose reel systems are required on every floor.

Dry Risers

Required for buildings with one ground floor plus three upper floors with height under twenty-eight meters, or buildings with two floors over one thousand square meters total area.

Wet Risers

Required if building height exceeds twenty-eight meters or floors exceed two levels with more than one thousand square meters per floor.

External Hydrant Network

Required in high-hazard factories for external firefighting access.

Automatic Systems

Automatic Water Sprinklers

Required in all industrial buildings. Moderate hazard buildings may be exempted based on assessment.

Alternative Suppression Systems

Needed in special hazard zones where water is unsuitable for firefighting.

Fire Alarm Systems

Manual Alarm Network

Required on all floors throughout the facility.

Automatic Alarm Network

Required in moderate-hazard industrial buildings for early fire detection.

Warehouse Building Safety

Warehouse Definition

Warehouse buildings are structures or parts of structures designated for storing raw materials, manufactured products, or semi-manufactured products. These buildings may be standalone or part of a larger facility used for manufacturing or sales operations.

Fire Hazard Classification in Warehouses

Low Hazard - Class A

Warehouses storing non-combustible materials with little to no fire risk, such as construction materials, machinery, and spare parts.

Moderate Hazard - Class B

Warehouses storing materials that burn at a moderate rate or emit noticeable smoke but do not produce toxic fumes or explosions. This includes combustible materials or non-combustible items packaged with flammable materials like heavy cardboard, plastic or foam pellets, and wood shavings.

High Hazard - Class C

Warehouses storing highly flammable materials, toxic fume-producing items, explosive substances, or hazardous chemicals. This category includes flammable gases and liquids, loose wood, paper, fibers, foam plastics, and similar substances.

Common Causes of Warehouse Fires

Warehouse fires commonly result from:

- Electrical short circuits
- Vandalism or tampering
- Heat sources
- Stove or burner ignition
- Fuel leaks
- Spontaneous combustion
- Natural phenomena including lightning and extreme heat
- Chemical reactions
- Waste accumulation

Safety Guidelines During Warehouse Construction

Building Materials

All warehouse facilities must be built using non-combustible materials.

Lighting and Ventilation

Proper lighting and ventilation openings must be provided throughout the warehouse.

Electrical Standards

All electrical installations and equipment must meet high technical standards.

Fire Protection Systems

Install fire alarm and firefighting systems suitable for the warehouse size and type of stored materials.

Fire-Rated Partitions

Doors and openings in fire-rated partitions must be made of fire-resistant materials.

Building Code Requirements

All requirements of the Saudi Building Code must be applied during construction.

Safety Guidelines During Storage Operations

Material Classification

Materials must be classified according to their nature and properties. Follow the handling and storage instructions labeled on packages. Flammable items must be stored in cool areas away from heat sources.

Organization and Cleanliness

Cleanliness and proper organization must be maintained at all times. Clearly mark stacking areas on the floor. Avoid overloading the warehouse beyond its designed capacity.

Stacking Requirements

Stacks must not reach the ceiling. A minimum gap of three feet (approximately one meter) must be maintained between the top of the stacks and the ceiling. Keep stacks away from light fixtures.

Storage Platform Requirements

Stored items must be placed on metal racks or pallets and never directly on the floor.

Smoking Prohibition

Smoking is strictly prohibited inside warehouses. Clear warning signs must be displayed in visible locations.

Access Equipment

Safe ladders must be provided for accessing stored items. Appropriate personal protective equipment must be available for workers according to the nature of the tasks.

Warehouse Aisles and Exits Requirements

Warehouse Aisles

General conditions must be met for warehouse aisles. Main aisles must be no less than two meters wide. Secondary aisles must be no less than one and a half meters wide under all circumstances.

If storage areas are not fixed and aisles are unclear, reflective paint must be used to mark aisles and define storage and work zones clearly.

Aisles between storage areas must be organized and clearly marked to lead directly to the exterior of the building.

Emergency Exits

The number of emergency exits must follow general safety standards. A minimum of two exits must be provided, located at opposite ends of the warehouse and on the external wall. Each exit must lead directly outside.

All exits must lead either directly outside or to a protected staircase or passageway that is isolated from the rest of the building by a fire-resistant separation.

Final Exit

All escape routes must ultimately lead to a final exit that opens directly to the outside.

Escape Distance Calculations in Warehouse Buildings

Direct Distance Within Section

Low or Medium Hazard Warehouses

Maximum direct distance is fifteen meters on ground floor and ten meters in basement.

High Hazard Warehouses

Maximum direct distance is seven and a half meters on both ground floor and basement.

Travel Distance to Protected Staircase or Exit

Low Hazard

Ground floor: less than or equal to forty meters. Basement: less than or equal to twenty meters.

Medium Hazard

Ground floor: less than or equal to thirty meters. Basement: less than or equal to fifteen meters.

High Hazard

Ground floor: less than or equal to twenty meters. Basement: less than or equal to ten meters.

Firefighting and Alarm Equipment in Warehouses

Manual Firefighting Equipment

Handheld fire extinguishers are required on every floor and under all circumstances.

Fixed Systems

Rubber Hose Reel Networks

Required on all floors without exception.

Standpipe Systems

Dry standpipes are not required in warehouses. Wet standpipes are not required in warehouses.

External Hydrant Networks

Only required in high-hazard warehouses for external firefighting operations.

Automatic Fixed Systems

Automatic Water Sprinkler Systems

Required in basements of medium or high hazard warehouses for fire suppression.

Automatic Alternative-Agent Sprinkler Systems

Required in special hazard areas where water cannot be used for firefighting. These systems use non-water agents appropriate for the materials stored.

Fire Alarm Equipment

Manual Alarm Systems

Must be available on all floors and in all situations for emergency notification.

Automatic Alarm Systems

Required in all medium and high hazard warehouses. Also required in any high-risk area within low hazard warehouses for early fire detection.

Electrical Safety in Industrial Settings

Electrical Hazard Risks

Electric Shock Hazards

Electric shock occurs when a person comes into contact with live exposed wires or conductive surfaces.

Direct shock involves touching a bare live wire or inserting metal objects into sockets. This is the most dangerous type of electrical contact.

Indirect shock occurs without directly touching wires. Examples include touching the metal body of an old washing machine or refrigerator, or a faucet connected to an electrically faulty water heater.

Effects of Electric Shock on the Human Body

Electric shock can cause painful electric shock that results in temporary muscle paralysis. A strong backward push may cause the person to collide with a wall, fall from a height, or hit the ground hard. Difficulty breathing and heart palpitations may occur. Fainting or death can result from severe shocks. Severe burns on the body, possibly third-degree burns, cause damage to tissues, muscles, and skin.

Electrical Fire Risks

Electrical fires are among the most significant causes of loss in industrial facilities, resulting in heavy material and human casualties. Statistics show many fire incidents were caused by electrical reasons such as electrical short circuits, overloaded sockets, faulty wiring, or the use of poorly manufactured products that do not comply with specifications and standards.

Main Causes of Electrical Fires

Poor-Quality Electrical Products

Use of poor-quality electrical products and devices that do not meet local or international specifications and standards.

Poor Electrical Wiring and Installations

Running electrical cables across doors, windows, or under carpets. Using cables with inappropriate sizes for the electrical load passing through them. Loose or poorly

connected wire ends in sockets, switches, and circuit breakers cause electrical sparks leading to serious problems. Lack of regular inspection and maintenance of wiring and electrical devices. Overloading sockets by connecting multiple devices to a single outlet. Failure to properly ground the metal parts of electrical appliances increases the risk of electric shock.

Lack of Knowledge and Negligence

Touching electrical devices or switches with wet hands. Forcefully unplugging wires from sockets. Not cutting off power during maintenance work. Not disconnecting power when leaving the facility for extended periods. Lack of care when using electrical tools in wet areas.

Neglect of Preventive Maintenance

Failing to repair or replace damaged electrical devices and products. Not regularly checking electrical loads to ensure they match circuit breakers and wiring. Skipping periodic inspections of wiring and devices. Ignoring sparks coming from electrical installations like sockets and switches.

How to Avoid Electrical Hazards

Product Selection

Choose electrical products carefully from reputable companies known for quality and good after-sales service.

Dimmer Switch Usage

Do not connect dimmer switches to a large number of lamps exceeding their wattage rating. Avoid using dimmers with energy-saving lamps, ceiling fans, or certain LED bulbs not designed for dimmers.

Professional Repairs

Never attempt to fix electrical faults yourself unless you are qualified. Hire only certified technicians for electrical work.

Proper Connections

Ensure a tight fit between plugs and sockets to prevent sparking that can lead to fires.

Load Management

Avoid operating multiple devices on a single socket or extension that cannot handle the total electrical load. For example, do not run an iron and vacuum cleaner simultaneously on one socket.

Heat Monitoring

Monitor for unusual heat on electrical components such as distribution panels, sockets, and switches. Overheating indicates a problem that should not be ignored.

Appropriate Equipment

Avoid running high-power devices on small or inadequate plugs or extension cords. For example, do not use a large oven with a small extension cord.

Insulation Inspection

Regularly inspect wire insulation, especially outdoors. Ensure there are no cracks or damage to the insulation.

Noise Detection

Listen for buzzing or sparking noises from electrical products like sockets. These sounds serve as early warnings for damage or faults. Investigate and replace components as necessary.

Outdoor Equipment

Use electrical products suitable for outdoor use, including rainproof sockets and panels, to prevent electric shock or electrical fires.

Outdoor Socket Maintenance

Frequently check outdoor sockets as they are more prone to damage and cracks, especially if unsuitable for outdoor conditions.

Complete Disconnection

Always unplug electrical appliances completely after use rather than just turning them off. This prevents electrical hazards to workers and property.

Ventilation for Electrical Devices

Place electrical devices such as transformers and chargers in well-ventilated areas away from flammable materials including paper, curtains, and carpets. Do not cover these devices to avoid overheating that may cause fire.

Component Replacement

When replacing electrical components including sockets, switches, breakers, and fuses, ensure replacements match the electrical ratings. Do not rely solely on physical appearance.

Voltage Verification

Confirm the voltage rating of any device matches your facility voltage (either 220V or 110V) to prevent electrical fires.

Distribution Panel Requirements

Ensure the electrical distribution panel has enough space to avoid overheating due to wiring congestion. Confirm wire sizes correspond to their circuit breakers. Lighting circuits require minimum two and a half square millimeter wiring. Socket circuits require minimum four-square millimeter wiring. High-load circuits such as for machinery require recommended minimum six square millimeter wiring. These values may vary depending on engineering calculations.

Shock Protection Devices

To reduce electric shock risks, use Residual Current Breakers with Overcurrent protection, especially in wet areas. These devices cut power instantly if shock is detected.

Extension Cord Ratings

Check current (Ampere) or power (Watt) ratings on extension cords before use to avoid overloading. For example, a fifteen-hundred-watt extension used with a twenty-five-hundred-watt heater may melt and cause fire.

Grounding System

Ensure your facility has a good and effective grounding system to protect people and property by discharging hazardous electrical charges safely to the earth. Ground wires are usually green or green-yellow and connected to sockets and the main panel.

Lightning Protection

Install lightning arrestors on roofs in mountainous regions prone to thunderstorms. Avoid going to high places, trees, or poles during storms, as tall objects attract lightning carrying high electric energy that can cause severe burns and destruction.

Seasonal Demand Awareness

Be cautious about seasonal electricity demand surges, especially in summer or winter months.

Technical Standards Compliance

Adhere to approved technical standards in all wiring and electrical installations. Comply with Civil Defense regulations and the Saudi Building Code during construction and operations.

Regular Preventive Maintenance

Perform regular preventive maintenance on electrical installations to identify and address issues before they become hazards.

Emergency Response Procedures in Factory Incidents

Immediate Actions When Discovering a Fire

Step One: Confirm the Presence of Fire

Verify that a fire has actually occurred before taking further action.

Step Two: Activate the Fire Alarm

Immediately activate the fire alarm system to alert all facility occupants.

Step Three: Notify Civil Defense

Contact Civil Defense immediately at 998 or the Unified Emergency Center at 911 to ensure timely response and control of the incident.

Step Four: Evacuate At-Risk Personnel

Evacuate all individuals at risk within the factory premises immediately.

Step Five: Proceed to Assembly Point

All workers must proceed to the predetermined assembly point in an orderly manner.

Step Six: Account for All Personnel

Take attendance and verify the safety of all workers at the assembly point.

Step Seven: Clear Access Routes

The facility guard must clear vehicles and obstacles around the building and be stationed visibly to assist arriving Civil Defense teams.

Step Eight: Handover to Civil Defense

Upon Civil Defense arrival, provide complete situation details, including information about trapped or missing persons.

Fire Response Actions

If Fire Can Be Controlled

Use appropriate fire extinguisher if the fire is in its early stages. Direct the extinguishing agent toward the base of the fire. Ensure your own safety remains the priority at all times.

If Fire Cannot Be Controlled

Do not attempt to fight the fire. Evacuate immediately and ensure all personnel have left the area. Wait for Civil Defense teams at the designated assembly point.

Electrical Fire Response

Immediate Power Disconnection

If safe to do so, disconnect electrical power from the main source immediately.

Never Use Water on Electrical Fires

Do not use water to extinguish electrical fires as this may cause electric shock or spread the fire.

Use Appropriate Extinguishers

Use carbon dioxide or dry powder extinguishers specifically designed for electrical fires.

Gas Leak Response

If You Smell Gas in the Facility

Do not use lighters or any sources of sparks. Do not turn on any lights or electrical switches. Close the gas valve tightly if it is safe to do so. Ventilate the area by slowly opening windows and doors. Evacuate all personnel from the area until the gas smell disappears.

In Case of Fire Caused by Gas Leak

Close the gas valve if it is safe to do so. Evacuate the facility with all personnel immediately. Call Civil Defense at 998 or the Unified Emergency Center at 911. Never go back into the facility to retrieve documents or any belongings.

Oil Fire Response

Immediate Actions

Turn off the heat source immediately. Do not move the container or equipment. Do not pour water on the burning oil as it may worsen the fire.

Extinguishing the Fire

Cover the burning container with a metal lid or larger pot to cut off the oxygen supply. Alternatively, use a certified fire blanket to smother the flames. Contact Civil Defense immediately if the fire cannot be extinguished safely.

Chemical Spill or Exposure Response

Personal Safety First

Avoid inhaling or directly touching chemicals. If contact occurs, avoid rubbing eyes or placing hands in the mouth. Wash hands and affected areas thoroughly with soap and water immediately.

Facility Response

Evacuate the affected area if the spill is large or hazardous. Ventilate the area if safe to do so. Contact Civil Defense for assistance with hazardous material incidents.

Electric Shock Response

Rescuing a Person from Electric Shock

Immediately disconnect the electrical power from the main source. Do not pull the victim away from the source using bare hands. Ensure your hands and feet are insulated. Avoid direct contact with the victim until power is disconnected. Provide first aid once it is safe to do so. Call emergency services such as the Red Crescent or transport the victim to the hospital if possible.

Evacuation Procedures

Follow Designated Routes

Use marked evacuation routes and follow guiding signs to safely reach the assembly point. Do not use elevators during evacuations. Use stairs for evacuation at all times.

Orderly Evacuation

Proceed to the assembly point while avoiding pushing or crowding. Help coworkers who need assistance in a manner that ensures your own safety. Stay calm and follow instructions from facility safety officers.

Assembly Point Protocol

Once at the assembly point, remain there until attendance is taken and further instructions are provided. Do not leave the assembly point or attempt to re-enter the facility until authorized personnel give clearance.

General Safety Principles During Incidents

Stay Calm

Maintain composure to make rational decisions and assist others effectively.

Do Not Re-Enter the Facility

Never go back into a facility affected by fire, gas leak, or other emergency to retrieve money, documents, or belongings.

Follow Official Instructions

Listen to and follow directions from facility safety officers, supervisors, and Civil Defense personnel.

Report Hazards

Immediately notify management of any accident witnessed or malfunction observed in facility equipment or systems.

Incident Reporting After Worker Injury

Immediate Actions After Assisting Injured Workers

After providing assistance to injured workers, a formal incident report must be filed to document the event and ensure proper follow-up procedures.

Required Report Information

The worker who discovered or assisted the injured personnel must file a complete incident report that includes the following information:

Personal Identification

Include the identification number of the person filing the report.

Incident Date and Time

Record the exact date when the incident occurred.

Injured Personnel Information

List the identification numbers of all injured workers involved in the incident.

Equipment Identification

Document the identification number or designation of the equipment involved in the incident.

Report Filing Procedure

The report must be submitted to the appropriate facility management or safety officer immediately after the injured workers have been assisted and their immediate safety needs addressed. This documentation ensures proper investigation of the incident and helps prevent similar occurrences in the future.