

**ENGINEERING STANDARD**  
**FOR**  
**FIRE STATIONS**

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## **0. INTRODUCTION**

This Standard is based on the requirements of a whole time fire service for attending outbreak of fires and other emergencies considered to be essential, while utilization of retained fire stations also has been discussed in isolated areas and plants.

## 1. SCOPE

This Standard covers the minimum requirements of fire station buildings for four categories as stated. Spaces for fire fighting training centers are specified in IPS-E-SF-540.

The fire station shall be built at a safe location away from any risk and as close as practicable to the fire control center and where personnel are available.

Types and sizes of fire stations are:

- a) Fire station for large size refinery, petrochemical or gas treating plants.
- b) Fire station for small or medium size same plants as (a) above.
- c) Local or plant fire stations or sub stations.
- d) Retained (unmanned) fire stations.

Category (a) will consist of safety and fire administration offices, central training facilities and fire station (whole-time).

Category (b) consists of safety and fire administration offices, fire and safety periodical training facilities and whole-time fire station.

Category (c) plant fire station (whole-time).

Category (d) retained (unmanned) fire stations. Located in such areas that when alarm is given selected fire fighters will report to the fire station.

### Note:

Size of fire station shall be specified by management of each project.

## 2. SOURCES

In preparation of this Standard, the following standards and publications have been considered:

### NFC (NFPA) ( NATIONAL FIRE CODE )

"Section 1 201 Chapter 15"

## 3. DEFINITIONS AND TERMINOLOGY

### Whole time fire station

Attended by professional fire fighters 24 h.

### Retained-unattended fire stations

Plant trained employees will only attend in major emergency cases.

## 4. UNITS

International system of units (SI) in accordance with IPS-E-GN-100 shall be used.

## 5. SPECIFICATIONS

### 5.1 Fire Station for Large Size Plants (Category "a")

#### 5.1.1 General

**5.1.1.1** Large size plants comprising of process, chemical and gas treating plants, production units, crude oil and refined product terminals (loading and off-loading), storage facilities shall have whole time fire fighters and a minimum of three fire trucks and three backup major fire auxiliary fire fighting trucks such as:

- a) 2 General purpose fire truck (crew of 5 men);
- b) 2 Major fire truck ( 2 men );
- c) 1 Dry powder extinguisher truck ( 1 man );
- d) 3 Auxiliary fire trucks (Back-up) 3 units unmanned;
- e) 1 Hydraulic platform;
- f) 1 Rescue tender;
- g) 1 Emergency ambulance;
- h) 1 "Car" for chief fire officer;
- i) 1 "Van" for shift fire officer;
- j) 1 "Van" for maintenance crew.

#### 5.1.2 Lay-out for vehicles

**5.1.2.1** The fire station shall provide parking accommodation for the required number of fire-fighting vehicles, foam trailers and movable/mobile equipment, etc. It shall be designed and located such that future expansion of minimum 25% will be possible.

**5.1.2.2** Large plant fire station parking should have a minimum of 6 bays.

**5.1.2.3** The vehicles should be able to enter and leave the station parking bays at both sides, front and rear of the fire station.

**5.1.2.4** If the fire station is located at an authorized primary road, consideration should be given to the installation of traffic lights, operable from, and indicating when vehicles are leaving, the fire station.

**5.1.2.5** The entrance and exits shall be closed by doors e.g rolling shutters, counter weight, etc. designed for fast opening and constructed in such a way that the vehicles would be able to drive through without delay.

**5.1.2.6** Open parking (in fire stations without doors) may be considered when climatic conditions allow, but a disadvantage will be entry of unauthorized persons.

**5.1.2.7** In locations where freezing can occur, the parking places shall be protected accordingly.

**5.1.2.8** Each parking bay shall be equipped with an electrical connection and cable for batters charging, and when required for heater in the engine cooling system of the vehicle the plugs to be pulled out of the sockets, when the fire truck drives away.

**5.1.2.9** The height above the parking places, including doors shall not be less than 5 m. A free space of 1.5 m should be available between each vehicle, between vehicle and wall and all doors. the width of vehicle is approximately 2.5 m.

**5.1.2.10** The length of a parking place should be based on the length of the longest fire-fighting vehicle pulling a mobile water, foam monitor which may be approximately 11 m.

**5.1.2.11** An inspection pit shall be available in the maintenance area of the fire station.

**5.1.2.12** Parking area shall be equipped with compressed air supply for pressurizing the brakes of the trucks when required.

### **5.1.3 Work shop-office and other facilities**

The following facilities shall be available:

**5.1.3.1** Workshop laboratory containing work bench, fixed drilling, grinding machines with fire extinguishers testing equipment and tools for testing and servicing of other equipment such as breathing and emergency equipment.

**5.1.3.2** Storage for spare parts.

**5.1.3.3** Fire extinguishers filling station.

**5.1.3.4** Rooms for storage of CO<sub>2</sub> and N<sub>2</sub> and transfer charging compressor. An air compressor shall also be provided in a separate room for charging cylinders of breathing apparatus .

**5.1.3.5** A fire fighting instruction room equipped with a black board-slide projector-vidio and other audio visual media with screen. Sized for about 30 people. Alternatively where safety and fire training center is available, the training center shall be used for such purpose.

**5.1.3.6** Office accommodation for chief fire officer or head of safety and fire and staff administration shall suit the requirements.

**5.1.3.7** Lockers, rest room, dining room and other facilities for fire service personnel shall be provided.

**5.1.3.8** A control room with communication facilities and fire alarm annunciator incorporating with panels shall be provided.

**5.1.3.9** Provision of storage and loading for foam compound.

**5.1.3.10** Hydrant(s) with a fresh water supply and facilities for flushing out of the piping systems of the fire-fighting vehicles shall be provided at the rear of the fire station together with hose cleaning equipment.

**5.1.3.11** All fire station buildings shall be provided with air conditioning systems.

**5.1.3.12** Drying room for drying fire hoses, clothing and other equipment.

## **5.2 Fire Station for Medium or Small Size Plants**

### **5.2.1 General**

**5.2.1.1** Depending on availability on site, fixed or portable fire fighting equipment, for medium or small size plant fire station of 24 hours manned with 5 number of fire trucks and trailers, are the minimum requirements.

### **5.2.2 Types of trucks and number of crews**

- a) General purpose fire truck 1 unit (crew of 5 men).
- b) Major fire truck 1 unit (crew of 2 men).
- c) Auxiliary fire trucks and trailer 3 units unmanned. Inspection, checking and testing of fire extinguishers and emergency equipment, 2 day workers.
- e.g. In fire stations such as, NIOC distribution depots, NIGC gas stations, etc.

### 5.2.3 Lay-out for vehicles

**5.2.3.1** The fire station shall be provided with parking accommodation for the required number of fire fighting trucks and trailers.

Design of parking place of 5 bays including future expansion should be considered.

**5.2.3.2** The following building spaces are required:

- a) Offices for fire master and his staff.
- b) Work bench , fire extinguishers and emergency equipment testing and servicing facilities.
- c) CO<sub>2</sub>, N<sub>2</sub> transfer charging unit and air compressor.
- d) Training room for 20 men.
- e) Accommodation for rest room, locker room, dining room and etc.
- f) Store room.
- g) Control room.
- h) Fire fighting training ground.

**5.2.4** Other facilities should be provided as follows:

**5.2.4.1** Alarm annunciator and communication system.

**5.2.4.2** Visual aids for training.

**5.2.4.3** Connections and cable for charging batteries together with heater in the engine cooling system for all fire trucks where required.

**5.2.4.4** Fire fighters outfit for assigned assisting crew if selected from plant workers or staff.

**5.2.4.5** Provisions for storage and loading of foam compound.

**5.2.4.6** Fire water hydrant with hose washing and cleaning rack.

## 5.3 General Sub-fire Stations

**5.3.1** For an extra large plant or any fire risk area away from main fire station, a sub fire station is required.

Truck and crew shall attend to fight the fire before the main Fire Brigade's trucks and crews take over on arrival.

### 5.3.2 Parking bays

The building should consist of 2 parking bays one of them with inspection pit, two fire trucks, 1 unit of general purpose and 1 unit of major fire trucks with total of 6 men as stand-by and the third unit as spare.

**5.3.2.1** The following are the station requirements:

- a) Parking bays shall be equipped with connections for battery chargers and engine heating system where required.
- b) The bays shall be of 11 m in length 4.5 m wide and not less than 5 m in height.
- c) Locker room, a work bench , hose cleaning and washing rack, rest room, dining room and drying room.
- d) Communication and alarm annunciator panels.
- e) Store room for fire equipment and foam liquid compound.
- f) Fire water hydrant with fire hose washing and cleaning facility.

## **5.4 Retained Fire Stations**

**5.4.1** Retained fire stations applies to those stations having three bays with 2 fire trucks selected for major emergencies and the manpower of 2 drivers for each shift.

**5.4.2** In an outbreak of fire when the alarm is sounded the appropriate fire truck will be driven by available drivers reported for duties and retained selected trained personnel will be picked up on their way to the site of fire.

**5.4.3** Retained fire stations can be totally unmanned. In that case available trained fire men will attend the fire station when alarm has been given.

The crew and the truck will proceed to the scene of fire.

**5.4.4** This system is entirely for major emergency cases. However assistance shall be given when needed.

**5.4.5** Unmanned retained stations should be locked and will be opened only by means of main fire station personnel or the keys left with selected persons. Retained personnel will usually report to the station for checking and inspection of fire equipment once a week.

**5.4.6** Requirements for this type of station are as follows:

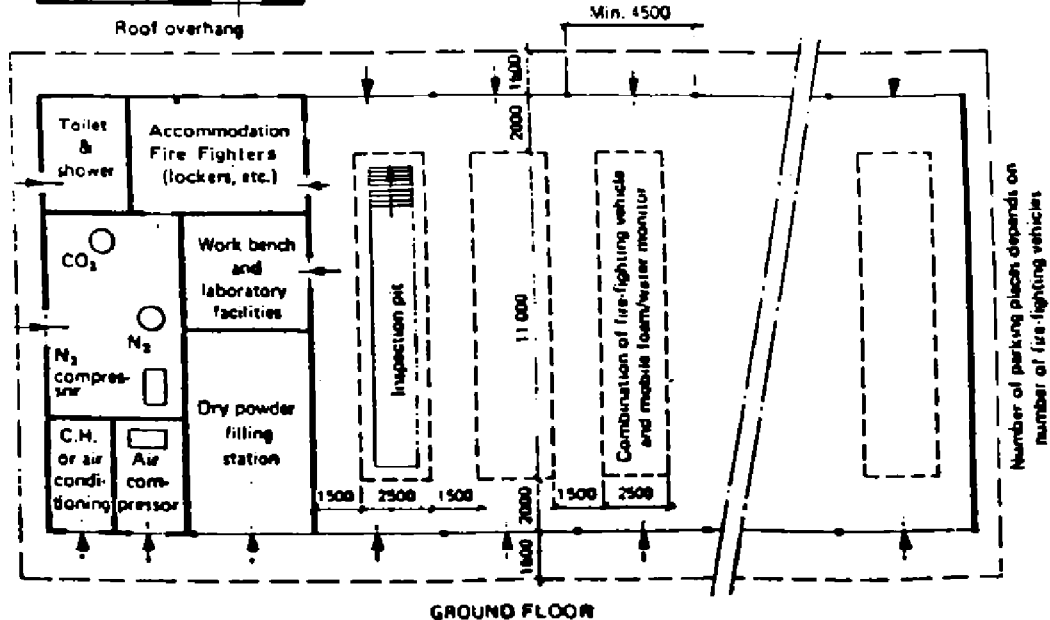
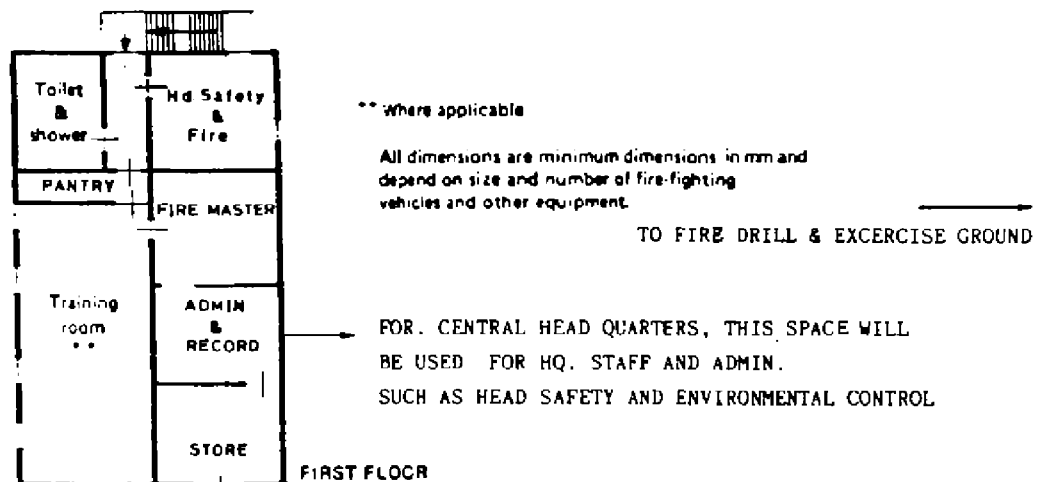
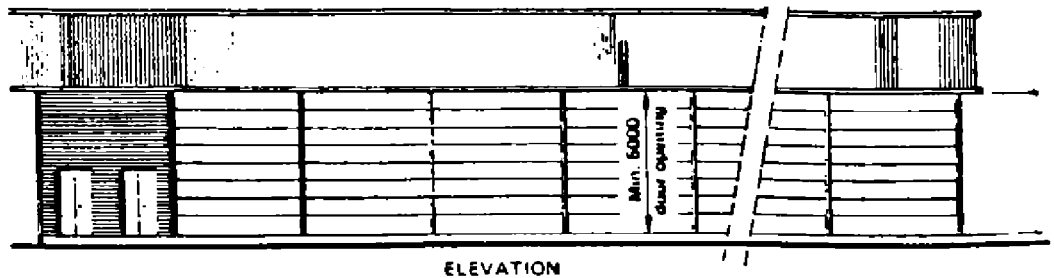
- a) Locker room for outfits.
- b) Direct communication with main fire station.
- c) Alarm annunciator.
- d) Store room.
- e) Hose wash and cleaning facility.
- f) Office.
- g) Work bench.

## **APPENDICES**

### **APPENDIX A TYPICAL LAY-OUT OF FIRE STATION FOR**

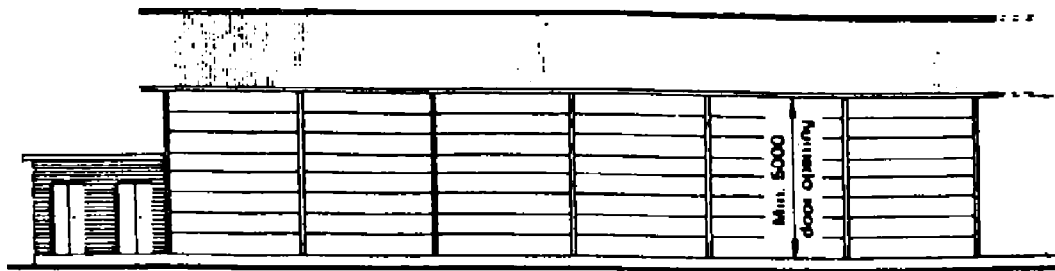


## LARGE-SIZE REFINERY



## APPENDIX B

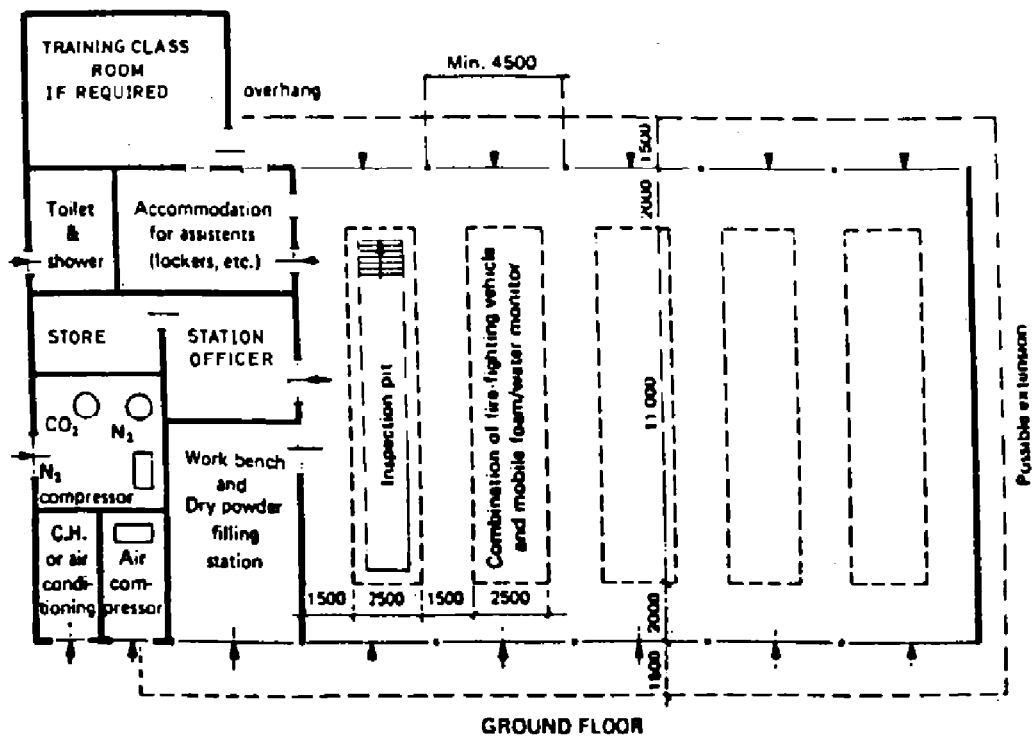
### TYPICAL LAY-OUT OF FIRE STATION FOR SMALL OR MEDIUM-SIZE PLANT



ELEVATION

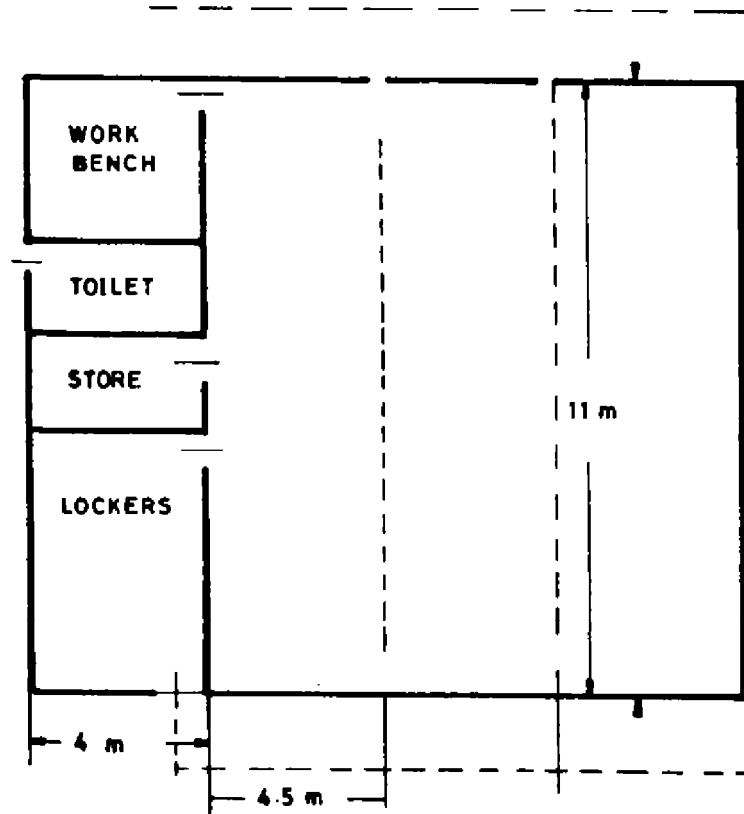
All dimensions are minimum dimensions depend on size and number of fire-fighting vehicles and other equipment.

For small and medium-size refinery, the fire chief will be located in the main office.



APPENDIX C

**TYPICAL LAY-OUT OF SUB AND RETAINED FIRE STATIONS**



**TYPICAL LAY-OUT OF SUB AND  
RETAINED FIRE STATIONS**

