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	<b>Fire Fighting Equipments</b>		Rev. : 2 P/HSE/069

## 1.0 SCOPE

1.1 The procedure shall be applicable to POSCO Maharashtra Steel Pvt Ltd.

## 2.0 PURPOSE

2.1 To lay down a procedure for proper operation of fire fighting equipments by all people.

## 3.0 RESPONSIBILITY

3.1 All department HOD/Section leader should responsible for Security (misuse, theft etc,)

3.2 Safety Manager for checking and Maintenance.

3.3 HOD & TL - HSE for approval.

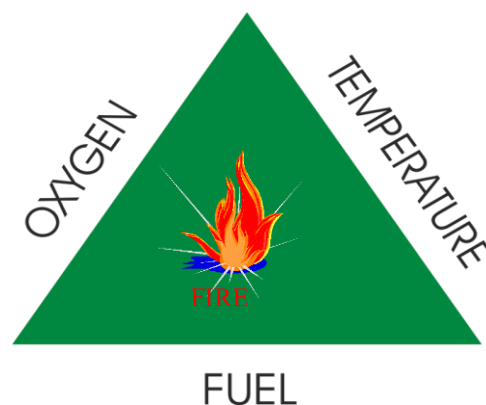
## 4.0 ACCOUNTABILITY

4.1 Director- All Line.

## 5.0 PROCEDURE

### DEFINITION:

**FIRE:** Fire is nothing but a fuel, Heat & Oxygen. It is also called as Fire Triangle.



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To extinguish fire following fire fighting equipments are used.


## 5.1 FIRE FIGHTING EQUIPMENTS

**The following fire fighting equipments are available in the organization.**

- 5.1.1 Fire Extinguishers
- 5.1.2 Sand
- 5.1.3 Hydrant System
- 5.1.4 Co2 Flooding System
- 5.1.5 Fire Alarm System

### 5.1.1 FIRE EXTINGUISHERS

- 5.1.1.1 Portable fire extinguishers are mainly called as first aid equipment to extinguish fire
- 5.1.1.2 It is used for small fire only.
- 5.1.1.3 It is easy to shift from one place to another place.
- 5.1.1.4 Selections of fire extinguishers depend upon type of fire.
- 5.1.1.5 At POSCO Maharashtra, we have different types of fire extinguishers which are placed at vital locations in plant.
- 5.1.1.6 Monthly servicing shall be done to maintain good working condition.
- 5.1.1.7 Hydraulic testing done once in a 5 year.
- 5.1.1.8 Do not keep any obstacles in front of any fire extinguishers to access easily during any emergency.

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#### 5.1.1.8 Types Of Fire Extinguishers & Correct Use

Type of fire	Contents / Type of extinguisher	Material Type
A Class	ABC	Paper, cloth etc.
B Class	Foam, ABC, Co2	Flammable liquids.
C Class	ABC, CO <sub>2</sub>	Flammable gases.
D Class	ABC	Flammable solid metals ,sodium etc.

#### 5.1.1.9 Classification of fire.

Class A -Fire involving solid materials usually of an organic nature.

Class B – Fire involving flammable liquid & liquefiable solids.

Class C – Fire involving flammable gases.

Class D – Fire involving metal.

#### 5.1.1.10 The extinguishers available in the organization in along with their capacities

#### 5.1.1.11 DCP / ABC Extinguisher Operating Instructions:

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- 5.1.1.11.1 Select the appropriate type of fire extinguisher.
- 5.1.1.11.2 Check label and carry extinguisher to vicinity of fire.
- 5.1.1.11.3 Remove the ring pin by pulling.
- 5.1.1.11.4 Squeeze discharge lever.
- 5.1.1.11.5 Direct discharge nozzle at base of fire.
- 5.1.1.11.6 Be sure all fire is out before stopping discharge.
- 5.1.1.11.7 Back away from extinguished fire.
- 5.1.1.11.8 Report to HSE Dept. as soon as possible about the fire and the need for extinguisher recharge.



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#### 5.1.1.12 P.A.S.S. SYSTEM FOR FIRE EXTINGUISHER OPERATING

5.1.1.12.1 PULL... Pull the pin. This will also break the tamper seal.

5.1.1.12.2 AIM... Aim low, pointing the extinguisher nozzle (or its horn or hose) at the base of the fire.

**Note: Do not touch the plastic discharge horn on CO2 extinguishers, it gets very cold and may damage skin.**

5.1.1.12.3 SQUEEZE... Squeeze the handle to release the extinguishing agent.

5.1.1.12.4 SWEEP... Sweep from side to side at the base of the fire until it appears to be out. Watch the area. If the fire re-ignites, repeat steps 2 - 4

If you have the slightest doubt about your ability to fight a fire....EVACUATE IMMEDIATELY!

5.1.1.13 Precautions should be taken while operating fire extinguishers

5.1.1.13.1 Choose correct extinguisher as per fire.

5.1.1.13.2 While breaking of gas cartridge, keep safe distance from your mouth.

5.1.1.13.3 Squeeze hose grip, before breaking of gas cartridge.

5.1.1.13.4 See wind direction (Wind Sock) and take safe position from fire.

5.1.1.13.5 Wear necessary protective equipment while extinguishing the fire.

#### 5.2 Sand buckets:

Sand buckets are provided with dry sand for contain the spillage of materials. Sand buckets are provided with stand at various places. It is to be ensure that the sand in the bucket in dry and proper particle size. Each sand bucket stand contains 3 buckets.

#### 5.3 SERVICING AND MAINTENANCE

5.3.1 All fire extinguishers & hydrant system are maintained by monthly physical inspection by concerned person as per POSCO MH Fire System Management

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Guideline Standard. If any damage found about any part, that is highlighted to section leader & immediately action to be taken with replacing that part or total extinguisher by that Dept.

5.3.2 All fire extinguishers are externally serviced by external agency on Monthly basis. A Third party person who is authorized by the MIDC fire Dept. (A Third party is licenses agency approved by **Maharashtra Fire Service.**)

## 5.4 Check points during servicing

### 5.4.1 DCP type fire Extinguishers

- 5.4.1.1 Quality & quantity of dry powder
- 5.4.1.2 Weight of CO<sub>2</sub> gas cartridges
- 5.4.1.3 Functioning of plunger
- 5.4.1.4 Any blockage to siphoning tube
- 5.4.1.5 Any blockage in hose & hose grip
- 5.4.1.6 Vent hole should be free.
- 5.4.1.7 Inner & outer container damage
- 5.4.1.8 Safety clip is ok or not
- 5.4.1.9 (Trolley mounted extinguishers) wheel are working properly

### 5.4.2 Carbon dioxide type fire extinguishers

- 5.4.2.1 Weight of fire extinguishers without hose
- 5.4.2.2 Hose pipe & horn condition
- 5.4.2.3 Safety clip at position
- 5.4.2.4 Trolley wheel is working properly

### 5.4.3 ABC Type fire extinguishers

- 5.4.3.1 Blockage & condition of hose
- 5.4.3.2 Pressure is up to mark
- 5.4.3.3 Safety clip
  - 5.4.3.4 Operating valve condition
  - 5.4.3.5 Any externally damage

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#### **5.4.4 Mechanical foam type fire extinguisher**

5.4.4.1 Level of Mechanical foam

5.4.4.2 Weight of CO<sub>2</sub> cartridge

5.4.4.3 Blockage in siphoning tube

5.4.4.4 Plunger operation.

5.4.4.5 Cleaning of vent hole if blockage

5.4.4.6 Discharge hose condition with nozzle

5.4.4.7 Safety clip


5.4.4.8 (Trolley mounted extinguishers) wheel are working properly

After externally servicing completed, that agency gives report to us & accordingly Fire person will be filled-up history report in history card with details including replaced any part during servicing

ABC are hydraulically tested after each of Five years, Foam are hydraulically tested after each of three years & CO<sub>2</sub> fire extinguishers after each of 5 years by competent person and next due date for hydraulic testing mentioned on the extinguisher with history card.

**6.0 CO<sub>2</sub> Flooding system** – means a set of equipment's like CO<sub>2</sub> cylinders in a separate isolated room, Control panels ,Fire alarms, solenoid valves & smoke and heat detector signal system for operation of CO<sub>2</sub> cylinder in automatic/manual mode.

**6.1 CO<sub>2</sub> Flooding system operating principle** - Carbon dioxide gas has properties and advantages that no other extinguishing agent offers. It is fast in action, effectively stops difficult fires, is non-damaging to the equipment and non-conducting. CO<sub>2</sub> (Carbon Dioxide) gas has a high ratio of expansion, which facilitates rapid discharge and allows three-dimensional penetration of the entire hazard area quickly. CO<sub>2</sub> extinguishes a fire by reducing the oxygen content of the protected area below the point where it can support combustion. Due to the extreme density of the CO<sub>2</sub>, it quickly and effectively permeates the protected hazard area and suppresses the fire.

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Rapid expansion of CO<sub>2</sub> reduces the ambient temperature in the protected hazard area, which aids in the extinguishing process and retards re-ignition. CO<sub>2</sub> has no residual cleanup associated with its use as a fire-suppressing agent. When it is properly ventilated, the gas escapes to atmosphere after the fire has been extinguished. is electrically non-conductive and does not normally damage sensitive electronic equipment.

#### **6.1.1 Operation of CO<sub>2</sub> Flooding system-**

System is designed for High pressure CO<sub>2</sub> Suppression system.

Each CO<sub>2</sub> Cylinder is having holding capacity of 45 kg gas and provided with needle valve and connected with flexible hose to the manifold. The signal from smoke detectors is responded at main control panel.

All the sensors should be compatible with fire alarm panel

Operation of system is in automatic mode based on signals from cross linked smoke & heat detector.

If signal from cross linked smoke & heat detector is given to control panel, system first give alarm for evacuation of operating peoples from electrical rooms. CO<sub>2</sub> Flooding system starts within 40 seconds.


System works with zone wise operation.

If only heat detector activate then only fire alarm operated but system t not operated until signal from cross zone smoke detector to control panel. This designed for to avoid malfunctioning of system.

Provision of operation in auto & manual mode

**6.2 CO<sub>2</sub> Flooding system application** – Electrical control rooms including transformers, electric switch yards and other electrical systems.



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**7.0 Fire Alarm System** - An automatic **fire alarm system** is designed to detect the unwanted presence of fire by monitoring environmental changes associated with combustion. In general, a fire alarm system is classified as either automatically actuated, manually actuated, or both. Automatic fire alarm systems are intended to notify the building occupants to evacuate in the event of a fire or other emergency, report the event to an off-premises location in order to summon emergency services, and to prepare the structure and associated systems to control the spread of fire and smoke.

**7.1 Smoke detector** - A **smoke detector** is a device that detects smoke typically as an indicator of fire. Commercial, industrial, and mass residential devices issue a signal to a fire alarm system. Most smoke detectors work either by optical detection (photoelectric) or by physical process (ionization), while others use both detection methods to increase sensitivity to smoke. Sensitive alarms can be used to detect. Smoke detectors in large commercial, industrial, and residential buildings are usually powered by a central fire alarm system, which is powered by the building power with a battery backup. However, in many single family detached and smaller multiple family housings, a smoke alarm is often powered only by a single disposable battery.

**7.2 Heat Detector** - A **heat detector** is a fire alarm device designed to respond when the converted thermal energy of a fire increases the temperature of a heat sensitive element. The thermal mass and conductivity of the element regulate the rate flow of heat into the element. All heat detectors have this thermal lag.

**7.3 Manual Call Points** - A fire alarm pull station is an active fire protection device, usually wall-mounted, that, when activated, initiates an alarm on a fire alarm system. In its simplest form, the user activates the alarm by pulling the handle down, which completes a circuit and locks the handle in the activated position, sending an alarm to the fire alarm control panel after operation, some fire alarm pull stations must be restored to the ready position using a special tool or key in order to deactivate the alarm sequence and return the system to normal.

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## 8.1 Components of Fire Hydrant system –

### 8.1.1 Fire Water Tank – Capacity 400 M<sup>3</sup>

Fire Hydrant pumps and its function-

Fire hydrant system is always pressurized in an automatic mode of operation and designed to at least 3.5 kg/cm<sup>2</sup> pressure at hydrant end.

**8.1.2 Jockey Pump-** This pump is designed to maintain hydrant line pressure. If hydrant line pressure is decreased below 5.0 kg/cm<sup>2</sup> due to opening of hydrant valve or other way of release pressure then jockey pump starts first and maintain hydrant line pressure 6.0 Kg/cm<sup>2</sup>. it stops automatically after maintaining pressure at set pressure. **Used as a pressure boosting inside the hydrant line in between 5.0 Kg/cm<sup>2</sup> to 6.0 Kg/cm<sup>2</sup>.** Capacity - 76 m<sup>3</sup>/hr Head: 55 m

**8.1.3 Electric Main Hydrant Pump-** Used as a main hydrant pump, which kept hydrant line pressurized at 7.5Kg/cm<sup>2</sup>. Pressure setting: ON: 4.5Kg/cm<sup>2</sup>, OFF:7.5 Kg/cm<sup>2</sup>, Flow: 270 m<sup>3</sup>/hr ,Head: 75 m. Working: Auto- ON & OFF or Manual- ON & OFF.

**8.1.4 Electric Standby Hydrant pump-** Used as standby if main hydrant pump not in working condition, which kept hydrant line pressurized at 7.5Kg/cm<sup>2</sup>. Pressure setting: ON: 4.5Kg/cm<sup>2</sup>, OFF:7.5 Kg/cm<sup>2</sup>, Flow: 270 m<sup>3</sup>/hr ,Head: 75 m. Working: Auto- ON & OFF or Manual- ON & OFF

**8.1.5 Diesel Pump for main Hydrant system –** Used at the time of Power failure and used when there is pressure drop across the Hydrant line even though all pumps are running. Pressure setting: ON: 5.0 Kg/cm<sup>2</sup>, OFF: 6.0 Kg/cm<sup>2</sup>.Working: Auto- ON & Manual- OFF.

**8.1.6 Diesel Tank-** for operation of diesel pump, Capacity - 150 Liter.

**8.1.7 Fire Hydrant pipeline network with Fire hydrant posts –** Total 98 hydrant points are installed in CGL operation facility and dormitory.

**8.1.8 Check list for operation of Fire Hydrant System- Attached Fire System Management Guideline P/HSE/050**

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### 8.1.9 Details of fire Hydrant pump & Locations of Fire Hydrant Post – Mention in Fire System Management Guideline P/HSE/050

**9 Fire Sprinkler System** - A **fire sprinkler system** is an active fire protection measure, consisting of a water supply system, providing adequate pressure and flow rate to a water distribution piping system, onto which fire sprinklers are connected. It is basically used in large commercial, industrial buildings & plant cellar rooms, pits.

#### 9.1 Components of Fire Sprinkler System

**9.1.1 Jockey Pump**- This pump is designed to maintain sprinkler line pressure. Used as a pressure boosting inside the hydrant line in between 3.2 Kg/cm<sup>2</sup> to 4.0 Kg/cm<sup>2</sup>. Capacity-16 m<sup>3</sup>/hr, Head: 35 m, Pressure setting: ON: 3.2 Kg/cm<sup>2</sup>, OFF: 4.0 Kg/cm<sup>2</sup>.


**9.1.2 Sprinkler Electric Main Pump**- used as main electric sprinkler pump during operation of system. Pressure setting: ON: 2~3 Kg/cm<sup>2</sup>, OFF: 4.5 Kg/cm<sup>2</sup> , working auto on & off / manual on & off.

**9.1.3 Electric Stand By Sprinkler Pump**- used as standby main electric sprinkler pump if main pump not an operation. Pressure setting: ON: 2~3 Kg/cm<sup>2</sup>, OFF: 4.5 Kg/cm<sup>2</sup>, working auto on & off / manual on & off.

**9.1.4 Diesel Pump for sprinkler system**- Used at the time of Power failure and when there is pressure drop across the sprinkler line even though all pumps are running. Pressure setting: ON: 2 Kg/cm<sup>2</sup>, OFF- Manually.

**9.1.5 Diesel Tank**- for operation of diesel pump, Capacity - 150 Liter.

**9.2.6 Check list for operation of Fire sprinkler System**- **Attached Fire System Management Guideline P/HSE/050**

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Water Tank Capacity		
1	CGL	400 M <sup>3</sup>
2	CRM	500 M <sup>3</sup>
3	ACL	350 M <sup>3</sup>
4	CGL Dormitory	350 M <sup>3</sup>
Total		1600 M <sup>3</sup>

## REVISION SUMMARY

Version Number	Effective Date	Reason for Revision
00	23-01-2012	New Procedure adapted
01	19.06.2012	Responsibility Changed
02	07.08.2025	Fire Fighting System Information Added. Responsibility Changed

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