Extinguisher

Question: 19

Explain different type fire extinguisher.

Or

Explain dry powder type fire extinguisher for preventing electrical fire.

[CSVTU May 2017]

Or

Explain firefighting to extinguish electrical fire using dry powder type fire extinguisher.

[CSVTU May 2016]

Ans. **Fire extinguishers :** Where possible these should be supported by brackets firmly fixed to the wall at a convenient height at all fire point.

Alongside each extinguisher an instruction plate should be displayed which gives details of operation and the type of fire for which the extinguisher is suitable.

Types of firefighting equipments : There are six basic types of extinguisher in common use.

Fig. Fire extinguishers

1. **Hose reels :** These provide best method of fire aid fire-fighting for A-class fires. They consist of 25.4 m of length having 63 mm dia. of reinforced rubber tubing connected to a pressurised water supply with a shut off nozzle attached to the end of the hose.

It is essential that this type of extinguisher is maintained in the correct operating position during use. When it is reversed from this position, the gas generated will escape through the nozzle leaving the water in the container. This type of extinguisher is unsuitable for petrol, oil, spirit and electrical fires. It can extinguish fire with a distance of 10 m.

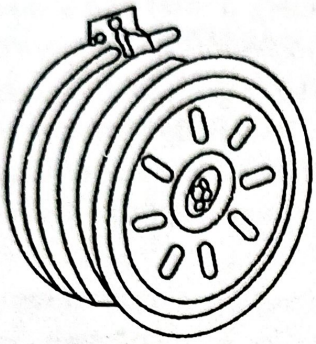

Fig. Hose reels

2. **Carbon dioxide extinguisher :** This type of extinguisher is used for fighting the fire in cotton, cloth or wood etc. It consists of a container filled with aqueous solution of Sodium bicarbonate ($NaHCO_3$) . A sealed glass bottle filled with dilute Sulphuric Acid is placed in the Sodium Bicarbonate solution in such a way that it can be broken up by a gentle push on the screw fitted over it. When Sulphuric Acid comes in contact with Sodium Bicarbonate, it produces Carbon Dioxide gas and water mixture.

$$H_2SO_4 + 2NaHCO_3 \longrightarrow 2CO_2 + 2H_2O + Na_2SO_4$$

The shower of Carbon Dioxide gas and water extinguishes the fire quickly. Carbon dioxide gas cuts the supply of oxygen to the fire and water reduces the temperature of burning goods. This instrument is also known as Soda-Acid extinguisher.

Carbon Dioxide filled extinguishers are the most suitable type for class A fires and must not be used on either class B or class C fires. It can extinguish fire which is upto about 15 m away from the fire extinguisher.

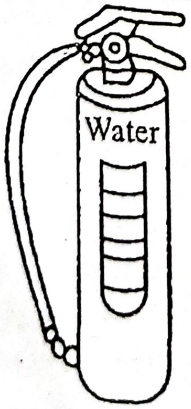

Fig. CO_2 filled fire extinguisher

3. **Carbon-tetra chloride (C.T.C.) extinguisher :** This is the most effective and cleanest type extinguisher for putting out electrical fires. The carbon-tetra-chloride is an insulator, therefore, it can be used on live equipment without any danger of shock and moreover it will not damage any electrical equipment.

   This type of extinguisher consists of a container filled with carbon-tetra-chloride (CCl_4). When CCl_4 solution is sprayed over the fire with the help of compressor, then liquid carbon particles being heavy in weight get deposited over burning goods and cover them all around. Thus the supply of oxygen is cut down and the fire is extinguished. CTC extinguisher may be operated by means of a plunger lever trigger or by opening a valve.

   Uses : This type of extinguisher is very useful in extinguishing fire in electric cables etc.

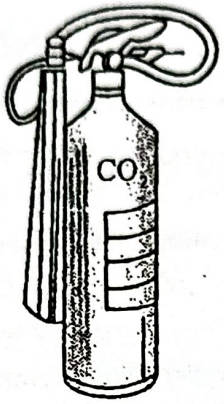

Fig. CTC fire extinguisher

4. **Halogen extinguishers :** These extinguishers may be filled with chloro-bremo ethane, bromo-difluromethane. They may be either gas cartridge or stored pressure type. Halogen extinguishers are used mainly because of their effectiveness in readily extinguishing small fires involving burning liquids. The chemicals used are electrically non-conductive to electrical equipments.

   Uses : It is most suitable for electrical fires.

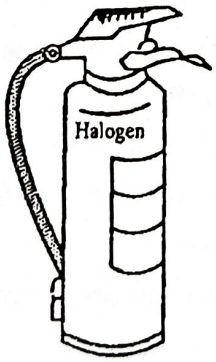

Fig. Halogen extinguisher

5. ***Dry powder extinguishers :*** *This type of Extinguishers filled with dry powder may be of the gas cartridge* or stored pressure type. They are similar in appearance to their water filled counterparts and have the same method of operation. The main distinguishing feature is the fan shaped nozzle.

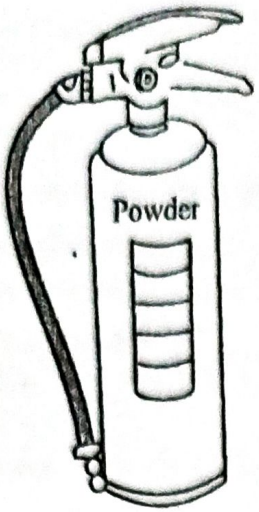

Fig. Dry powder extinguisher

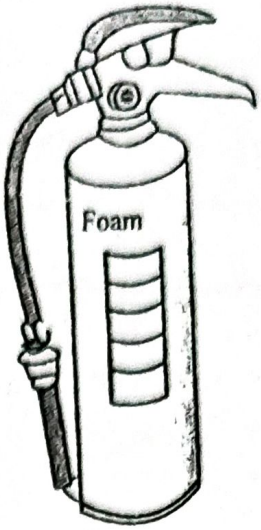

Fig. Foam fire extinguisher

6. **Chemical foam extinguishers :** Foam extinguishers may be stored pressure or gas cartridge. The chemicals used are aluminium sulphate and bicarbonate of soda and some special chemicals, kept in separate compartment as solution. The dry chemicals are supplied in tins by the maker of the equipment.

They are most suitable for use on flammable liquid fires such as petrol, oil, grease and fats, where the risk of re-ignition is high. They are not suitable for running liquid fires and must not be used on fires where electrical equipment is involved. The liquid is issued under pressure as foam which can be directed as far as 3 m away.

□□□

5.4 Various Types of Hot-Line Operations

Question 11

Explain various types of hot line operation. [CSVTU Dec 2014]

Or

What are various types of hot line operations? Give case study also. [CSVTU May 2014]

Ans. In general, there are three methods of live-line working which help workers avoid the considerable hazards of live line working. In various ways, they all serve to prevent current flowing from the live equipment through the worker.

1. **Hot stick or live line tool :** Hot sticks are used in live line work by having the worker remain at a specified distance from the live parts and carry out the work by means of an insulating stick. Tools can be attached to the stick, allowing work to be performed with the worker himself safely away from the live conductors.
2. **Insulating gloves or rubber gloves :** A live line worker is electrically protected by insulating gloves and other insulating equipment, and carries out the work in direct mechanical contact with live parts.
3. **Barehand or potential :** The barehanded approach has a live line worker performing the work in direct electric contact with live parts. Before contact, the worker's body is raised to the same electric potential as the live parts, and then held there by electric connection, while maintaining suitable isolation from the surroundings which are at different potentials, like the ground, other people or trees. Because the worker and the work are at the same potential, no current flows through the worker.
4. **Unearthed or de-energised :** Some organizations additionally consider working on unearthed de-energised equipment to be another form of live-line working. This is because the line might become inadvertently charged (e.g. through a back-charged transformer, possibly as a result of an improperly connected, inadequately isolated emergency generator at a customer facility), or inductively coupled from an adjacent in-service line. To prevent this, the line is first grounded via a clamp known as a bond or drain earth. Once this is in place, further work is not considered to be live-line working.