**SECTION D 10 – External Firefighting Works**

**TECHNICAL SPECIFICATIONS**

### C.1 General Requirement

1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install electrically operated and diesel engine driven pumps as required by the drawings and specified hereinafter or given in the schedule of quantities.

1.2 Without restricting to the generality of the foregoing, the pumps and ancillary equipment shall include the following: -

a) Electrically operated and diesel engine driven pumps with motors, base plates and accessories.

b) Alarm system with all accessories wiring and connections

c) Pressure gauges with isolation valves & piping,

d) M.S. pipes, valves, suction strainers, delivery and suction headers & accessories.

e) Foundations, vibration eliminator pads and foundation bolts.

1.3 Pumps shall be installed true to level on suitable concrete foundations. Base plate shall be firmly fixed by foundation bolts properly grouted in the concrete foundations.

1.4 Pumps and motors shall be truly aligned by suitable instruments.

1.5 All pump connections shall be standard flanged type with appropriate number of bolts. In case of non-standard flanges companion flanges shall be provided with the pumps.

1.6 Manufacturer's instructions regarding installation, connections and commissioning shall be followed with respect to all pumps and accessories.

1.7 Contractor shall provide necessary test certificates and performance charts with NPSH requirement of the pumps from the manufacturer. The Contractor shall provide facilities to the Engineer – in – charge or their authorised representative for inspection of equipment during manufacturing and also to witness various tests at the manufacturer’s works without any cost to the DPLs.

1.8 Each pump shall be provided with a 150 mm dia pressure gauge, isolation cock and connecting piping, bleed and block valve.

1.9 Adequate vibration eliminating pad and connectors for each pump shall be provided.

1.10 The Contractor shall submit with this tender a list of recommended spare parts for two years of normal operation and quote the prices for the same.

|  |  |
| --- | --- |
| **2.0**  2.1 | **Standard**  The equipment and pipes covered in this specification shall comply with following latest Indian Standards  IS: 903 - 1993 Suction hose couplings branch pipe, nozzles  IS:636-1988 Non-percolating flexible firefighting delivery hose  IS: 15683 Portable fire extinguishers  IS: 8423: 1977 Controlled percolating hose for fire fighting  IS 13039:1991 Code of practice for provision and maintenance of external hydrant system  Nation Building Code 2016 PART IV  NFPA  Local Fire Authority |

### C.3 Fire brigade connections

As per the design requirements submitted and approved by Owner/PMC, separate gunmetal 2-3 way collecting head Fire brigade connection conforming to (IS:904-1965) each with two or three 63 mm instantaneous type inlets with built in check valves and 150 mm dia inlet/outlet connected to the fire main as given in BOQ shall be provided. Both shall be installed on a stand post and provided with horizontal C.I. reflux valve and location to be approved by Engineer – in – charge. Etched gunmetal label plates with 80 mm high letters shall be fixed along with necessary enclose cabinet. The plates should be firmly fixed to the FB connection and any support system.

Instantaneous outlets for fire hydrants shall be of standard pattern approved and suitable for fire brigade hoses.

Each hose box shall be conspicuously painted with the letters "FIRE HOSE".

### C.4 External Fire Water Tank Underground Static Tank.

The contractor will provide Pump Room and Under Ground Water Tank of designed capacity as per the project requirements for static fire water storage tank for Firefighting System. All tank shall be made of RCC tank as required.

### C.5 External Fire Pumping System

**C.5.1 Pumping Sets**

1. Pumping sets shall be single stage horizontal centrifugal single outlet with cast iron body and bronze dynamically balanced impellers **confirming to IS:1520**. Connecting shaft shall be stainless steel with bronze sleeve and grease lubricated bearings.
2. Pumps shall be connected to the drive by means of spacer type love joy couplings which shall be individually balanced dynamically and statically.
3. The coupling joining the prime movers with the pump shall be provided with a sheet metal guard.
4. Pumps shall be provided with approved type of mechanical seals.
5. Pumps shall be capable of delivering not less than 150% of the rated capacity of water at a head of not less than 65% of the rated head. The shut off head shall not exceed 120% of the rated head.
6. The pump shall meet the requirements of the Tariff Advisory Committee and the unit shall be design proven in fire protection services.

### C.5.2 Electric driven pumps

1. Electrically driven pumps shall be provided with totally enclosed fan cooled induction motors. For fire pumps the motors should be rated not to draw starting current more than 3 times normal running current.
2. Motors for fire protection pumps shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge and shall be designed for continuous full load duty and shall be design proven in similar service.
3. Motors shall be wound for class B insulation and winding shall be vacuum impregnated with heat and moisture resistant varnish glass fibre insulated.
4. Motors for fire pumps shall meet all requirements and specifications of the Tariff Advisory Committee.
5. Motors shall be suitable for 415 ±10% volts,2900 rpm’ 3 phase 50 cycles a/c supply and shall be designed for 380C ambient temperature. **Motors shall conform to I.S. 325.**
6. Motors shall be designed for two start system.
7. Motors shall be capable of handling the required starting torque of the pumps.
8. Contractor shall provide inbuilt heating arrangements for the motors for main pumps to ensure that motor windings shall remain dry.
9. Speed of the motor shall be compatible with the speed of the pump.

### C.5.3 Air Vessel

1. One air vessel fabricated from 10 mm M.S. plate with dished ends and suitable supporting legs shall be provided. Air vessel shall be provided with a 100 mm dia. flanged connection from pump, one 25 mm dia. drain with valve, one gunmetal water level gauge and 15 mm sockets for pressure switches. The vessel shall be 450 mm dia x 2000 mm high and tested to 20 kg/sq. cm pressure.
2. The fire pumps shall operate on drop of pressure in the mains as given in para 7 below. The pump operating sequence shall be arranged in a manner to start the pump automatically but should be stopped manually by starter push buttons only.

### C.5.4 Operating conditions for fire pumps.

Cut in Cut out

1. Operating pressure <----------------- 7.5 kg/cm2 -------->7.5 Kg/cm2
2. Jockey pump 7.0 kg/cm2 7.5 kg/cm2
3. Fire Electric Pump 6.5 kg/cm2  manual
4. Diesel engine driven pump 6.0 kg/cm2  manual

**Notes:**

a) Jockey pump shall start and stop through pressure switch automatically.

b) Jockey pump shall stop when main pump starts.

c) Main pump shall start automatically on fall of pressure but stopping shall be manual.

### C.5.5 Vibration Eliminators

On all suction and delivery lines double flanged reinforced neoprene flexible pipe connectors shall be provided. Connectors should be suitable for a working pressure of each pump and tested to the test pressure given in the relevant head. Length of the connector shall be as per manufactures details.

### C.5.7 Pre-commissioning

On completion of the installation of all pumps, piping, valves, pipe connections, and water level controlling devices the contractor shall proceed as follows: -

**A Fire protection system:**

1. Check all hydrant valves and close if any valve is open. Also check that all suction and delivery connections are properly made.
2. Test run and check rotation of each motor and correct the same if required.

**B Pipe work**

1. Check all clamps, supports and hangers provided for the pipes.
2. Fill up pipes with water and apply hydrostatic pressure to the system as given in the relevant section of the specifications. If any leakage is found, rectify the same and retest the pipes.

### C.5.8 Commissioning & testing

1. **Fire hydrant system, Sprinkler System, Pumps**

1 Pressurise the fire hydrant system by running the main fire pump and after attaining the required pressure shutoff the pump.

2 Open by-pass valve and allow the pressure to drop in the system. Check that the jockey pump cuts-in and cuts out at the pre-set pressures. If necessary, adjust the pressure switch for the jockey pump. Close bye-pass valve.

3 Open hydrant valve and allow the water to flow into the fire water tank in order to avoid wastage of water. The main fire pump should cut-in at the pre-set pressure and should not cut out automatically on reaching the normal line pressure. The main fire pump should stop only by manual push button. However, the jockey pump should cut-out as soon as the main pump starts.

4 Switch off the main fire pump and test check the diesel engine driven pump in the same manner as the electrically driven pump.

5 When the fire pumps have been checked for satisfactory working on automatic controls, open fire hydrant valves simultaneously and allow the hose pipes to discharge water into the fire tank to avoid wastage. The electrically driven pump should run continuously for eight hours so that its performance can be checked.

6 Check each landing valve, male and female couplings and branch pipes for compatibility with each other. Any fitting which is found to be incompatible and does not fit into the other properly shall be replaced by the contractor. Landing valves shall also be checked by opening and closing under pressure.

1. **Handing over**

1. All commissioning and testing shall be done by the contractor to the complete satisfaction of the Owner/PMC, and the job handed over to the Engineer – in – charge, or his authorised representative.

2. Contractor shall also handover, to the Owner/PMC, all maintenance & operation manuals and all other items as per the terms of the contract.

### C.6 External Fire Hydrant System

**C.6.1** **External hydrants**

1. Contractor shall provide stand post type external hydrants. The hydrants shall be controlled by a cast iron sluice valve installed in underground lockable chambers. Hydrants shall have instantaneous type 63 mm dia outlets. The hydrants valve shall be single outlet conform to I.S.5290 with C.I duck foot bend and flanged riser of required height to bring the hydrant to correct level above ground.
2. Contractor shall provide for each external fire hydrant two numbers of 63 mm dia. 15 m long controlled percolation type hose pipes with gunmetal male and female instantaneous type couplings machine wound with G.I. wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with M.S. Certification), gunmetal branch pipe with nozzle to I.S. 903.Each hose box shall be conspicuously painted with the letters "FIRE HOSE".

**C.6.2 Branch Pipe**

The branch pipe shall be constructed from gun metal alloy to IS: 903 and finished to a smooth polish. The branch pipe shall be able to give straight stream and shall be BS marked. The branch pipe shall be tested to 20 Kg/cm2 pressure. The inlet bore shall be 63mm dia for quick coupling joint to the Hose and the nozzle side shall be 20mm dia.

### C.7 Piping works

### C.7.1 General:

1. All materials shall be new of the best quality conforming to the specifications and subject to the approval of the Engineer – in – charge.
2. Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
3. Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
4. Pipes shall be securely fixed to walls, and ceilings by suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for RCC ceilings and walls.
5. Valves and other appurtenances shall be so located that they are easily accessible for operations, repairs and maintenance.
6. The rules and regulations of Local Fire Authority as per the statutory regulations applicable for obtaining the occupation certificate from the Local Development / Fire Authority.
7. Drawings issued with the tenders are schematic and indicate the concept. Contractor shall make his shop drawings on basis of Architectural and Interior design drawings issued by the Engineer-in-Charge. Work will be executed only as per approved shop drawings.

### C.7.2 Pipes

All pipes within and outside the building in exposed locations and shafts including connections buried under floor shall be M.S. pipes confirming to IS: 1239 Heavy Class

### C.7.3 Pipe Fittings

Pipes and fittings means tees, elbows, couplings, flanges, reducers etc. and all such connecting devices that are needed to complete the piping work in its totality.

Screwed fittings shall be approved type malleable or cast iron with reinforced ring on all edges of the fittings suitable for screwed joints.

Grooved Victaulic Fittings above 50 mm shall be cast of ductile iron conforming to ASTM A-536, Grade 65-45-12 (Firelock®), forged steel conforming to ASTM A-234, Grade WPB 0.375" wall (9,53 mm wall), or fabricated from Std. Wt. Carbon Steel pipe conforming to ASTM A-53, Type F, E or S, Grade B. Fittings provided with an alkyd enamel finish or hot dip galvanized to ASTM A-153

Forged steel fittings of approved type with "V" groove for welded joints.

Fabricated fittings shall be not being permitted for pipe diameters 50 mm and below. When used, they shall be fabricated, welded and inspected in workshops whose welding procedures have been approved by the TAC as per TAC rule 4102 for applicable to hydrant System under the supervision of Engineer – in – charge. For "T" connections, pipes shall be drilled and reamed. Cutting by gas or electrical welding will not be accepted.

### C.7.4 Jointing

1. **Screwed (50 mm dia pipes and below)**

Joint for black steel pipes and fittings shall be metal to metal thread joints. A small amount of red lead may be used for lubrication and rust prevention. Joints shall not be welded or caulked.

1. **Grooved (65 mm dia. and above)**

Joints between M.S. pipes and fittings shall be with Victaulic Grooved method.

**Victaulic Mechanical Couplings for Joining Carbon Steel Pipe**

Victaulic Mechanical Couplings: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A- 449 and A-183, minimum tensile strength 110,000 psi (758450 kPa) as provided standard Victaulic

**iii.** Rigid Type:

1) “Installation Ready” rigid joints shall be Victaulic Firelock® EZ Style 009H and Style 107H which are designed for direct “stab” installation onto grooved pipe without prior disassembly of the coupling. Housings shall be cast with offsetting, angle-pattern bolt pads.

2) Standard rigid joints shall be Victaulic Style 005 (Firelock® 005) or 07 (Zero-Flex®). Housings shall be cast with offsetting, angle pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13.

3) Rigid couplings shall require visual pad-to-pad verification of complete installation. Tongue and recess type couplings which require the use of a torque wrench to achieve the exact required gap between housings are not permitted.

**iv.**  Flexible Type: Use in seismic areas where required by NFPA 13.

1) “Installation Ready” rigid joints shall be Victaulic Style 177 QuickVic™, in sizes 2”(DN50) through 6”(DN150), which shall be designed for direct “stab” installation onto grooved pipe without prior disassembly of the coupling. .

2) Standard flexible couplings shall be Victaulic Style 004, 75, or 77

Flange Adapters: For use with grooved end pipe and fittings, for mating to ANSI Class 125 / 150 flanges. Victaulic Style 741 or 744. For mating to ANSI Class 300 flanges use Victaulic Style 743

Victaulic Hole-Cut Branch Outlets:

A Bolted Branch Outlet:

1. Branch reductions on 2"(DN50) through 8"(DN200) header piping. Bolted branch outlets shall be manufactured from ductile iron conforming to ASTM A-536, Grade 65-45-12, with synthetic rubber gasket, and heat treated carbon steel zinc plated bolts and nuts conforming to physical properties of ASTM A-183. Victaulic Style 920 / 920N.

2. Header connections for sprinklers, drop nipples, sprigs, gauges, and drains on 1-1/4” through 2-1/2” header piping. Outlets shall be manufactured from ductile iron conforming to ASTM A-536, Grade 65-45-12, with synthetic rubber gasket, and heat treated carbon steel zinc plated bolts and nuts conforming to physical properties of ASTM A-183. Victaulic Firelock Outlet Tee Style 922.

B. Strapless Outlet:

1/2"(DN15) or 3/4"(DN20) NPT outlet on 4" (DN100) and larger header sizes rated for 300 PSI (2065 kPa). Victaulic Style 923.

**v. Flanged**

1. Flanged joints shall be provided on:
2. Straight runs not exceeding 30 m on pipe lines 80 mm dia and above.
3. Both ends of any fabricated fittings e.g. bend tees etc. of 65 mm dia or larger diameter.
4. For jointing all types of valves, appurtenances, pumps, connections with other type of pipes, to water tanks and other places necessary and required as per good engineering practice.
5. Flanges shall be as per I.S. with appropriate number of G.I. nuts and bolts, 3 mm insertion neoprene gasket complete.

**vi. Unions**

Approved type of dismountable unions on pipes lines 65 mm and below in similar places as specified for flanges.

### C.7.5 Excavation

1. Excavation for pipe lines shall be in open trenches to levels and grades shown on the drawings or as required at site. Pipe lines shall be buried to a minimum depth of 1.2 meter or as shown on drawings.
2. Wherever required contractor shall support all trenches or adjoining structures with adequate timber supports.
3. On completion of testing and pipe protection, trenches shall be refilled with excavated earth in 15 cms layers and consolidated.
4. Contractor shall dispose of all surplus earth within a lead of 200 m or as directed by Engineer – in – charge.

### C.7.8 Anchor Thrust Blocks

1. Contractor shall provide suitably designed anchor blocks in cement concrete to encounter excess thrust due to water hammer & high pressure.
2. Thrust blocks shall be provided at all bends & tees & such other location as determined by the Engineer – in – charge.
3. Exact location, design, size and mix of the concrete block shall be approved by the Engineer – in – charge prior to execution of work.

### C.8 Valves

**C.8.1** **Gunmetal Valves**

1. Valves 65 mm dia & below shall be heavy gunmetal full way valves or globe valves conforming to I.S. 778-1971 class II with female screwed ends. Valves shall be carry I.S. certifications mark.
2. All valves shall be approved by the Engineer – in – charge before they are allowed to be used on work.

**C.8.2 Butterfly Valves/Sluice Valves**

UL/FM Global approved, 300 psi (2065 kPa), grooved ends, polyphenylene sulphide (PPS) coated ductile iron body (ASTM A-536, Grade 65-45-12). Ductile iron disc, synthetic rubber encapsulated suited for the intended service, with integrally cast stem. Complete with weatherproof actuator and pre-wired supervisory switches. Victaulic Series 705 Firelock® or Series 707 FireLock® developed for fire pump metering test lines per NFPA 20 and rooftop test units

A 1. 2-1/2”(DN65) through 12”(DN300) Sizes OS&Y Gate Valves: 250 psi (1725 kPa), grooved ends. Ductile iron body conforming to ASTM A-536, cast iron yoke and hand wheel conforming to ASTM A-126-B; EPDM coated ASTM A-126-B cast iron disc; ASTM B16 brass rising stem; flanged and epoxy coated cast iron bonnet; EPDM O-ring stem seals and body gasket. Victaulic Series 771

A 2. 2-1/2”(DN65) through 12”(DN300) Sizes NRS Gate Valves: 250 psi (1375 kPa), grooved ends. Ductile iron body conforming to ATSM A-536, bronze mounted; EPDM coated ASTM A-126-B cast iron disc; ASTM B- 16 brass non-rising stem; flanged and epoxy coated cast iron bonnet; EPDM o-ring stem steals and body gasket. Victaulic Series 772

**C.8.3** **Non-return valves (Check Valves)**

2"(DN50) through 3"(DN75) Sizes Spring Assisted: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, non-slam tilting disc, stainless steel disc and spring, brass shaft, 365 psi (2517 kPa). Victaulic Series 717H.

4”(DN100) through 12”(DN300) Sizes Spring Assisted: Black enamel coated ductile iron body, ASTM A-536, Grade 65-45-12, elastomer encapsulated ductile iron disc suitable for intended service, stainless steel spring and shaft, welded-in nickel seat, 250 psi (1725 kPa). Victaulic Series 717. Designed to accept a riser check kit. Victaulic Series 717R.

**C.8.4** **Air valves**

25 mm dia screwed inlet cast iron single acting air valve conforming to IS: 14845, shall be provided on all high points in the system or as shown on drawings.

**C.8.5** **Orifice Flanges**

Orifice flanges fabricated from 6 mm thick stainless-steel plate shall be provided to reduce pressure on individual hydrants to restrict the operating pressure to 3.5 kg/cm2 and allow a discharge of 560 lpm. The contractor shall submit design of the orifice flanges for approval before installation.

**C.8.6** **Drain Valve**

50 mm dia black steel pipe conforming to IS: 1239 (heavy class) with 50 mm gunmetal full way valve shall be provided for draining any water in the system in low pockets.

**C.8.7** **Pressure Gauge**

Pressure gauge conforming to IS 3624-1987 shall be provided near all connections to hydrant system and where required. Pressure gauge shall be 100 mm dia gunmetal Bourden type with gunmetal isolation cock, tapping and connecting pipe and nipple. The gauge shall be installed at appropriate level and height for easy readability.

### C.9 Hydrant/valve chambers

**C.9.1** Contractor shall provide suitable brick masonry chambers in cement mortar 1:5 (1 cement: 5 coarse sand) on cement concrete foundations 150 mm thick 1:5:10 mix (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size) 15 mm thick cement plaster inside and outside finished with a floating coat of neat cement inside with cast iron surface box approved by fire brigade including excavation, back filling complete.

**C.9.2** Valve chambers shall be of following size: -

for depths 100 cms and beyond 120x120 cms.

### C.10 Branch Pipe

The branch pipe shall be constructed from gun metal alloy to IS: 903 and finished to a smooth polish. The branch pipe shall be able to give straight stream and shall be BS marked. The branch pipe shall be tested to 20 Kg/cm2 pressure. The inlet bore shall be 63mm dia for quick coupling joint to the Hose and the nozzle side shall be 20mm dia.

### C.11 Pipe protection

1. All pipes above ground and in exposed locations shall be painted with one coat of zinc chromate primer and two or more coats of synthetic enamel paint of approved shade.
2. Pipes in chase or buried underground shall be painted with two coats of zinc chromate primer and wrapped with one layer of 4 mm thick PYPKOAT multilayer sheet as per standard manufacturer's specifications.

### C.12 Pipe Supports

1. All pipe clamps and supports shall be galvanised steel. When fabricated from M.S. steel sections, the supports shall be factory galvanised before use at site. Welding of galvanised clamps and supports will not be permitted.
2. Pipes shall be hung by means of expandable anchor fastener of approved make and design (Dash Fasteners or equivalent). The hangers and clamps shall be fastened by means of galvanised nuts and bolts. The size/diameter of the anchor fastener and the clamp shall be suitable to carry the weight of water filled pipe and dead load normally encounter.

## C.13 Pipe Spacing Table

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | <----------------------- Pipe commercial | | | | | dia |  | -------🡪 |
| S.No. | **Pipes & Position** | 15/20 | 20/25 | 32/40 | 50 | 75/80 | 100/110 | 150/160 | 200 |
|  |  |  |  |  |  |  |  |  |  |
| 1 | **Vertical** |  |  |  |  |  |  |  |  |
| 1.1 | GI /MS | 2.4 | 2.4 | 3 | 3.6 | 4.5 | 4.5 | 5.4 | 5.4 |
| 1.2 | CI Pipes IS 1729/3989 | x | x | <------------------------- 3 m --------------- | | | | ----------- | -------🡪 |
| 1.3 | CI Heavy Duty IS 1536 | x | x | <---------------------- 3.6 m -------------- | | | | ----------- | --------🡪 |
| 1.4 | uPVC SWR Systems | x | x | 0.5 | 0.7 | 0.9 | 0.9 | 1.0 |  |
| 1.5 | uPVC Water Supply |  |  |  |  |  |  |  |  |
| 1.6 | Polybutylene | <--- As per manufacturer’s Recommendations | | | | | ----------- | ---------- | --------🡪 |
|  |  |  |  |  |  |  |  |  |  |
| 1 | **Horizontal** |  |  |  |  |  |  |  |  |
| 1.1 | GI /MS | 2.0 | 2.0 | 2.4 | 3.0 | 3.6 | 4.0 | 4.5 | 4.5 |
| 1.2 | CI Pipes IS 1729/3989 |  |  | <------------ 3 m ------------------> | | | |  |  |
| 1.3 | CI Heavy Duty IS 1536 |  |  |  |  | 3.0 | 3.6 | 3.6 | 4.5 |
| 1.4 | uPVC SWR Systems |  |  |  | 1.2 | 1.8 | 1.8 | 1.8 |  |
| 1.5 | uPVC Water Supply |  |  |  |  |  |  |  |  |
| 1.6 | Polybutylene | <-As per manufacturer's recommendations---> | | | | |  |  |  |

## C.14 Testing

All piping in the system shall be tested to a hydrostatic pressure of 1.5 times the working pressure or 14 kg/sq.cm (whichever is more) without drop in pressure for at-least 2 hours.

Rectify all leakages, make adjustments and retest as required and directed.

All test should be done as per relative IS Code.

## C.15 Fire protection system for Utility services areas - Substation, AC plant room, Plumbing plant room, STP, HT metering room

### C.15.1 General Requirement

1. Work under this section shall consist of furnishing all labour, material, appliances and equipment necessary and required to install fire extinguishing hand appliances.
2. Without restricting to the generality of the foregoing the work shall consist of the following: -
3. Installation of fully charged and tested fire extinguishing hand appliances CO2 water, CO2 gas, ABC dry chemical powder type conforming to IS:15683 as required by these specifications and/drawings
4. Fire extinguishers shall conform to the following Indian Standard Specifications and shall be with ISI approved stamp as revised and amended up to date: -
5. Fire extinguishers shall be installed as per Indian Standard "Code of Practice for Selection, Installation and Maintenance of Portable First Aid Appliances" I.S.2190-1962.
6. Hand appliances shall be installed in readily accessible locations with the appliance brackets fixed to wall by suitable anchor fasteners.
7. Each appliance shall be provided with an inspection card indicating the date of inspection, testing, change of charge and other relevant data.
8. All appliances shall be fixed in a true workmanlike manner truly vertical and at correct locations.
9. Gas flooding system shall be provided in transformer and LT room