

FIRE FIGHTING SPECIFICATIONS

3.0 Fire Fighting:

3.1 Codes and Standards

- 1) IS 1239 - 1979 ERW Mild Steel Tubes & Tubular and fittings upto 150 NB.
- 2) IS 3589 - 1981 ERW steel pipes for gas, water and sewerage over 150NB.
- 3) IS 1984 Copper alloy gate, globe and check valves.
- 4) IS 1537- 1976 Vertically cast iron double flanged pipes
- 5) IS 7181- 1986 Horizontally cast iron double flanged pipes
- 6 IS 7634 Code of practice for plastic pipe work for portable water supplies.

Pipes & Fittings:

Pipes shall conform to the following schedule:

NB	Pipe (mm)		Material
	Min.OD	Thickness	
25	33.3	4.05	ERW Heavy class mild steel tube to IS-1239-79 Part I
40	47.9	4.05	
50	59.7	4.50	
65	75.3	4.50	
80	88.0	4.85	
100	113.1	5.40	

150	163.9	5.40	ERW pipes to IS 3589-1981
200	219.1	6.00	
250	273.0	6.00	
300	323.9	6.00	
350	355.6	7.00	
450	406.4	7.00	

All pipes shall be factory fabricated.

All pipes shall be new and from standard manufacturers.

All bends upto 65 mm NB shall be hydraulically formed with a minimum R/D of three unless space restrictions inhibit, in which case long radius elbows may be used with the approval of the Engineer-in-charge. For sizes upto 40 mm NB, socket weld fittings shall be used. For larger sizes upto 150-mm dia butt welding wrought steel fittings to BS 1965 and matching with the straight pipe wall thickness shall be used. In the case of larger sizes, the bends shall be fabricated from the same stock of pipe and in at least 4 sections with a radius equal to + / - 1.5 times the diameter. Branch connections to pipes upto 100 dia shall be through suitable weldable fittings. In higher sizes, the branch pipe shall be set - on type made with a suitable profile cutting of the main and branch pipes.

Flanges shall be slip-on carbon steel with plain faces conforming to IS 6392-1971. Flange shall be rated for 1.0 N/mm² or twice the system pressure whichever is higher and drilled to suit the equipment or valve flange if already drilled. All bolts & nuts shall be carbon steel and gasket 3-mm fiber reinforced PTFE.

All pipe joints shall be welded except where flange joints are specified. Pipes upto 40 mm NB shall use socket-weld fittings with fillet welding and larger sizes use butt-welding type single V 35 deg weld preparation. Flange joints shall be provided at the following positions

- i) Pair of flanges for isolation of equipment
- ii) Mating flanges for equipment flange connections
- iii) Mating flanges for valves, strainers as the case may be
- iv) Pair of flanges at every 30 m continuous run of piping

Valves:

All valves and the flanges shall be suitable for 2.0 N/mm² cold non-shock working pressures or twice system pressure whichever is high.

Valves upto 50 mm NB shall be full bore ball valves with forged body and polished hard chrome plated ball with PTFE seal.

Higher size valves shall be butterfly type. Butterfly valves shall have a fine grain cast iron body with mirror smooth finished cast steel disc and spindle of stainless steel AISI 410. The valve shall be of wafer-type and should be fitted with two slip on type pipe flanges. The valve shall have an easily replaceable molded EPDM sleeve which shall bring about 100 % tight shut off at the design working pressure. Shaft bottom shall have an axial bearing.

Supports & Clamps:

Pipe supports shall be standard factory made galvanised systems or fabricated from steel structural galvanised after fabrication. Supports shall be spaced as follows:

Size	Horizontal	Vertical
Upto 15 mm	1.25 m	1.8 m
20 to 25 mm	2.00 m	2.5 m
32 to 125 mm	2.50 m	3.0 m
150 & over	3.00 m	3.0 m

Additional supports shall be provided at the bends, at heavy fittings like valves, near equipment and as directed by the Engineer-in-charge. Pipe hangers shall be from galvanised structural steel, steel inserts in concrete or anchor fasteners, wall brackets or floor supports as decided by the Engineer-in-charge depending upon the location of the support. Hangers shall not be secured to light weight roof, wall, false ceiling or any other member which is not structurally meant for such loading. Hangers from structural steel shall be from suitably designed clamps or attachments and in no case should drilling or punching of such steel members be allowed. All pipe supports shall be capable of being adjusted in height to the tune of 50mm. All supports suspenders and hangers shall be galvanised after fabrication.

Pipe clamps shall be specially fabricated fittings for pipes. All clamps shall be of galvanised mild steel. Clamps shall take into account pipe movement owing to temperature variations & anchors, and in no case shall the clamping arrangement induce stresses beyond the safe load limits of the pipe under fully filled conditions.

Vertical pipe risers shall be supported at each floor and in addition, the riser shall have a duck-foot support at the lowest point.

All pipe joints shall be welded except where flange joints are specified. Pipes upto 40 mm NB shall use socket-weld fittings with fillet welding and larger sizes use butt-welding type single V 35 deg weld preparation. Flange joints shall be provided at the following positions:

- i) Pair of flanges for isolation of equipment
- ii) Mating flanges for equipment flange connections
- iii) Mating flanges for valves, strainers as the case may be

Where valves, strainers, NR valves adjoin, there is no need for additional matting flanges and valve flanges may be used to mate with the other valves, strainers etc.

All supports and clamps for sprinkler piping shall be flexible to allow for vibration and movement of the pipe during discharges. All such support systems shall be clearly shown on shop drawings.

Pipe Installation:

In - building

All pipes shall be of approved make and best quality without rust marks. Pipes and fittings shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc. Pipes and fittings shall be fixed truly vertical / horizontal or in slopes as required in a neat workman like manner. Pipes shall be securely fixed to walls and ceilings by suitable supports at intervals specified.

All in building pipes shall be heavy quality galvanised steel tubes to Is 1239 using malleable or wrought steel heavy duty screwed or weldable fittings. All welded joints shall be painted with zinc rich paint. Flanged joints shall be provided to mate with valves and other equipment or at every 40m run of straight pipe for maintenance and repair. All flanges shall be slip on type and rated for 2.0 N/mm² or twice the system pressure and shall have 3mm reinforced Teflon gasket.

Sprinkler piping shall be supported using slings or clevis type hangers so as to take the vibrations during sprinkler discharges. Floor tapping from vertical risers shall be through a union or a flanged joint. Similarly flow switches shall have unions or flanges on both sides.

All pipes shall be adequately supported from ceiling or walls through structural supports fabricated from steel structural e.g. rods, channels, angles and flats generally as shown on drawings. Fasteners shall be shear type anchor fasteners in concrete walls and ceilings and wrought steel

spikes of atleast 75mm long in brick walls. All pipes supports shall be painted with 1 coat of red oxide primer and two coats of black enamel paint. Pipe supports shall be as follows:

Upto	50 mm	nominal bore	1.75m
	63 mm to 100 mm	nominal bore	2.0 m
Over	100 mm	nominal bore	2.5 m

External

Pipes buried underground shall be galvanised or ungalvanised heavy duty steel tubes or corrosion by wrapping with "pypcoat" as per manufacturer's specification. Fittings shall be weldable wrought iron fittings suitable for butt-welding and 10% of the welded joints shall be radio-graphically tested and found in order. The welded joints shall be random selected for testing in consultation with the Engineer. All flanges shall be slip-on welded flanges rated for 2.0w / sq.mm to Is 6392 and have a 3mm fibre-reinforced Teflon gasket.

Underground mains shall be laid not less than 750 mm below the ground level and shall be atleast 2m away from the building face and supported on concrete pedestals at every 3.5 m and held on with galvanised iron clamps. Concrete thrust anchors shall be provided at all bends and tees as shown on drawing and as directed. All excavation for pipe laying shall be carried out with sufficient width for making proper joints. Backfilling shall be done only after the piping is hydro-statically pressure tested. Piping shall be constantly kept clean till tested.

Underground M S Pipes shall be wrapped with 'Pypcoat' or equivalent polymer based corrosion protection tape. The pipe shall be wire brushed to remove milscale and an approved primer applied at 250gm/sqm. The tape is spirally wound, after coating becomes tacky, with an over lap of 15mm and themofused with the pipe including the overlap.

All valves shall be housed in brick masonry chambers over 150mm cement concrete (1:3:6) foundation. The brick walls of the chamber shall be

plastered inside and outside with 20mm cement sand plaster 1:4 with a floating coat of neat cement. Chambers shall be 650 x 650 mm clear for depths upto 900 mm and 1000 x 1000 mm for depths beyond. Each chamber shall have a cast iron surface box approved by the local Fire Brigade.

Painting:

All exposed piping for firefighting shall be distinctly painted 'Fire Red' shade 536 to IS:5-1978. Pipes shall first receive two coats of red oxide primer uniformly applied and two coats of oil paint applied thereafter. All pipes supports shall be painted black.

Testing & commissioning:

All piping after installation shall be tested for a hydrostatic test pressure of 20 Kg/Sqcm maintained for 24 hours. All joints and valves shall be checked for leaks and rectified and retested. During testing all valves except drain & air valves shall be kept fully open.

Hydrant system shall be tested by opening all top most hydrants and record pump starting. Likewise test the top most hose reels and record starting of Jockey pumps.

Sprinklers shall be tested by opening the farthest branch valve and record pump starting. Similarly the drain connection shall be cracked open to record jockey pump starting.

Hydrant and jockey pumps shall be started through pressure switches and records. All tests shall be witnessed by the project engineer and recorded. Test results shall form part of the handing over documents.

Tests shall also conducted as required by the Fire Office and readings recorded.

SPRINKLER SYSTEM

Scope of work

The scope of work shall cover supply, installation, testing and commissioning of the sprinkler system covering the following:

- 1) Sprinkler pumps, electric driven as shown in the equipment schedule.
- 2) Jockey pumps
- 3) Installation valve/s with motor-gong.
- 4) Sprinklers
- 5) Sprinkler piping
- 6) Branch flow switches and tamper switches connected to the building fire alarm system

Standards

The sprinkler installation shall conform to and meet with the requirements set out by the following:

- 1) IS 1648-1961 Code of practice for fire safety of buildings.
- 2) Guide lines for Automatic sprinkler Installation - Tariff Advisory Committee rules.
- 3) Local Fire Brigade and Fire Engineering Authorities.

Pumps

The sprinkler pump shall be single or double suction centrifugal type with split casing/ end suction or multistage and direct driven by electric motor or diesel engine as specified. The pump rating and performance shall conform to the Equipment Schedule and meet the TAC duty requirements.

Pump shall have a bronze impeller and pump casing shall be of close grained cast iron. The shaft sleeve shall be brass or S.S 304 and the trim shall be brass or bronze.

Pump shall be capable of delivering 150 % of the rated capacity at 65 % of the rated head and the no-delivery head shall be not more than 120 % of the rated delivery head for horizontal pumps and 140% for vertical turbine

pumps. The pump casing shall withstand 1.5 times the no-delivery pressure or 2 times of the duty pressure whichever is higher.

The pump shall be electrically driven with direct flexible coupling.

The electric drive motor shall be squirrel cage induction conforming to IS 328-1978 and rated for continuous duty (S1). Motor shall have not less than class B insulation and minimum enclosure of IP22. The starter shall be air cooled fully automatic star delta or auto transformer type. Starters shall conform to IS 8544 and rated for AC-3 duty conditions.

Drive Motor rating shall be based on the largest of the following:

- 1) Rated pump discharge at rated head
- 2) 150 % of rated discharge @ 65 % of rated head
- 3) Maximum power absorbed by the pump in its operating range i.e. no-delivery to free discharge.

Jockey Pump

Jockey pump shall be similar to the sprinkler pump but need not have split casing.

Accessories

The sprinkler and jockey pump shall be complete with the following accessories:

- i. Suction and discharge eccentric reducers & flexible.
- ii. pump coupling & guard
- iii. Common base frame, fabricated mild steel or cast iron.
- iv. suction and discharge isolation

Installation Valve

The sprinkler system shall incorporate one or more (as shown on drawings) installation valve assemblies comprising:

- i. A main gate valve
- ii. IN and out pressure gauges
- iii. Test connection of adequate size with valve and orifice plate with pressure connections.
- iv. Water motor and gong with necessary piping, isolating valve and strainer and drain.

The installation valve shall be straight through type suitable for wet pipe sprinkler systems. Valves shall be of cast iron with gun metal internals and suitable for vertical or horizontal installation. The valve clack shall be of cast gun metal with neoprene seal and retaining ring and shall incorporate a suitable non-return device to compensate for pressure fluctuations which should not mal-operate the clack. The gun metal internals shall provide for smooth waterways for:

- i. Water valve through a retard chamber
- ii. Test connection and drain

There shall be two pressure gauges, one for the mains side and another for the installation side. Each gauge shall have pressure damping brass piping with gun metal gauge and drain.

A test connection of adequate size as shown on drawings or as approved shall be provided with a shut-off gate valve, an orifice plate with pressure connections. The discharge from the test connection outlet shall be led to the nearest sump or drain as shown on drawings or as directed.

The mains water motor and gong shall preferably be of cast gun metal body and internals. The valve shall have an associated gun metal gate valve, strainer preceding the water motor. The water motor and gong shall be located on the discharge lead as directed.

Flow switches shall be as specified under 'Fire Hydrant System'. Tamper switches shall be provided for tap off valves as shown on drawings.

Sprinklers shall be temperature-sensitive glass-bulb actuated type and be standard products from an established firm of repute and standing and approved by an appropriate authority for fire fighting duty.

All sprinklers shall be brass castings polished chrome or white (polyester) unless stated otherwise and rated for 12.0 bar and factory tested for 34.0 bar. Sprinklers shall be pendant or side wall type as specified and shown on drawings. All sprinklers shall be provided with an adjustable escutcheon finished same as the sprinkler head. Wherever shown and specified, sprinklers shall be recessed type.

Temperature classification of sprinklers in each space shall be as shown on the drawings. Sprinklers shall be selected for the coverage shown on the drawings and ordinarily be 15/10 mm with K factor of 115 (metric). Wherever the specified sprinkler is not adequate, the tenderer may offer appropriate size required.

Piping

All piping shall be mild steel heavy class as specified under "Piping for Fire Fighting". Necessary line flushing valves shall be provided as shown on drawings or as required to.

Testing

The entire sprinkler piping shall be tested, with the sprinklers in position, to a hydrostatic test pressure of 8.0 kg/sqcm for a period of 48 hours at the end of which there shall be no loss in pressure.

Test valves in each sprinkler installation shall be opened (with temporary drain connection) and the following observations recorded:

- i. Start-up of jockey pump
- ii. Start-up of sprinkler pump
- iii. Operation of water motor gong
- iv. Operation of flow switches in the appropriate branch.
- v. Alarm for the standby pump when the sprinkler main pump is deliberately kept off electrically.

All branches shall be so tested and witnessed and attested by the Engineer-in-charge. All the operating tests shall be carried out in the presence of any local authority, Fire Brigade or Insurance Company.

PAINTING:

All surfaces to be painted shall be thoroughly cleaned with wire brush to remove completely rust and other extraneous substances. Over the cleaned surfaces one coat of red oxide primer shall be applied completely covering the exposed surfaces. The finish coat of painting shall be applied one day after the prime coat, after ensuring that the paint is dry. The second coat shall be done before the installation is handed over and after approval to do so from the Project Manager. Hydrant line and Sprinklers Fire Red

FIRE HYDRANT SYSTEM

Scope of work:

The scope of work shall cover supply, installation, testing and commissioning of the fire hydrant system covering the following:

- 1) Fire pumps, electric as shown in the equipment schedule and drawings.
- 2) Booster pumps at terrace or jockey pump, electric driven as shown in the equipment schedule and drawings.
- 3) Starters & isolators for the pumpsets.
- 4) Hydrant mains, external ring and yard hydrants.
- 5) Wet risers in the building as specified and shown on drawings.
- 6) Landing valves, hose reels, hose cabinets etc.
- 7) Fire brigade breaching, siamese connections and connections to pumps and appliances.

Standards:

The fire hydrant installation shall conform to and meet with the requirements set out by the following:

- 1) IS : 1648 - 1961 Code of practice for fire safety of buildings (General) Fire Fighting Equipment and its maintenance.
- 2) IS : 3844 - 1989 Code of practice for installation of internal fire hydrant in multi-storeyed building.

- 3) Compliance with the local fire brigade and the fire enforcing authorities.

Fire Pump:

The fire pump shall be single or double suction centrifugal type with split casing / end suction or multi stage and direct driven by electric motor or diesel engine as specified. The pump rating and performance shall conform to the Equipment Schedule and meet the TAC duty requirements.

Pump shall have a bronze impeller and pump casing shall be of close grained cast iron. The shaft sleeve shall be brass or S.S 304 and the trim shall be brass or bronze.

Pump shall be capable of delivering 150 % of the rated capacity at 65 % of the rated head and the no-delivery head shall be not more than 120 % of the rated delivery head for horizontal pumps and 140% for vertical turbine pumps. The pump casing shall withstand 1.5 times the no-delivery pressure or 2 times of the duty pressure whichever is higher.

The pump shall be either electrically driven or diesel driven with direct flexible coupling.

The electric drive motor shall be squirrel cage induction conforming to IS 325 - 1978 and rated for continuous duty (S1). Motor shall have not less than class B insulation and minimum enclosure of IP22. The starter shall be air cooled fully automatic star delta or auto transformer type. Starters shall conform to IS 8544 and rated for AC-3 duty conditions.

Drive Motor rating shall be based on the largest of the following :

- i. Rated pump discharge at rated head

- ii. 150 % of rated discharge @ 65 % of rated head
- iii. Maximum power absorbed by the pump in its operating range i.e. no-delivery to free discharge.

The diesel engine shall be naturally aspirated (non-turbocharged) and electrically started. The engine shall have a speed governor to regulate the rated rpm within 5 % of its rated speed. The engine shall be complete with starting batteries full-wave selenium rectifier charger, isolator, leads, mounting frame etc. Engine rating shall be same as for the electric motor.

Pumps and prime movers shall be truly aligned by suitable instruments. Record of such alignment shall be recorded in the handing over documents. Contractor shall provide necessary test certificates, performance curves of all the pumps

All the pumps shall be provided with approved type of Mechanical seals.

On the suction and delivery lines, double flanged reinforced neoprene flexible connectors shall be provided. Connectors shall be suitable for maximum working pressure of each pipe line on which it is mounted and tested to a test pressure of 1.5 times the operating pressure.

Accessories:

The fire and jockey pumps shall be complete with the following accessories:

- 1) suction and discharge eccentric reducers and flexibles.
- 2) pump coupling guard.
- 3) common base frame, fabricated mild steel or cast iron.

Each pump shall have independent set of pressure switches. The pressure switch shall be snap action SP DT switch rated 10A @ 220 V operated through a stainless steel diaphragm. The switch shall have a pointer for manual adjustment of set point, and all electrical connections shall be terminated in a screwed terminal connector. The entire unit shall be

encased in a cold drawn steel enclosure. The diaphragm shall be designed for a maximum operating pressure of the system. Each pressure switch shall be provided with a pressure gauge in parallel as shown on the drawings and all gauges and pressure switches shall be mounted in an instrument panel with necessary control piping and drainage facility.

Flow switches shall be paddle type SPDT snap acting contacts rated 10 A @ 220 V. The paddle shall be made of either brass or phosphor bronze terminated in a screwed terminal connector. The entire unit shall be encased in cold drawn steel enclosure and the maximum operating pressure of the parts in contact with the liquid shall be consistent with the system pressure.

System Operation and Control Panels

The fire pump shall be started automatically on loss of pressure and the operation sequence of the booster and fire pumps shall be as follows:

- i. Booster or jockey pump shall start when the system pressure drops by 0.35 Kg/cm² and stop when the system pressure is re-established.
- ii. The fire pump shall start when the system pressure drops by 1.0 Kg/cm² and shall continue to run till manually switched off.
- iii. Booster/jockey and fire pump starting shall be indicated on the panel with a red indication lamp. It should also be indicated on the MFACP.

The motor starters (direct on line or star-delta) shall consist of electrically actuated contactors. The starter shall be complete with ON-OFF push buttons, timers and auxiliary contacts and shall be fully automatic. There shall be an indicating lamp with each of the pumps and an ammeter and selector switch with the fire pumps. Fire pump starting shall be annunciated through the MFACP. A remote start stop facility shall be provided in the Fire Control Room.

The starter along with isolator shall be housed in a 14 SWG M.S box duly rust inhibited through a process of degreasing and phosphating.

All cabling to and from the pumps to starter and control switch shall be carried out through armoured PVC (FRLS) cables of approved makes. Cables shall be laid in accordance with section "M V CABLING". The pump motors and panels shall be double earthed in accordance with IS 3043-1966

Hydrants shall be provided internally and externally as shown on the drawings. Internal hydrants shall be provided at each landing of an escape staircase and additionally depending on the floor area as shown on drawings. Landing valve shall be single headed gun metal valve with 1-63 mm dia outlets and 100 mm inlet conforming to IS 5290-1969. Landing valve shall have flanged inlet and instantaneous type outlets and mounted at 1.0 m above the floor level. Instantaneous outlets for fire hydrants shall be of standard pattern approved and suitable for 63 mm dia fire brigade hoses. Wherever necessary, pressure reducing orifices shall be provided so as to limit the pressure to 3.5 kg/sqcm or any other rating as required by the local fire brigade.

Each landing valve shall have a hose reel cabinet of 1800 x 900 x 450 mm housing or as shown on drawings or as approved.

- i) Landing valve with single 63 mm dia capped outlets and one 100 mm inlet.
- ii) First-aid hose reel with 30 m long 20 mm dia high pressure dunlop hose & 20 mm dia ball valve.
- iii) 2-15 m long 63 mm dia canvas hoses reinforced rubber lined wire wound with instantaneous couplings.
- iv) One copper branch pipe with bronze rings to take the nozzles at one end and fit into the instantaneous coupling at the other.

v) One leaded-tin-bronze nozzle of 25 mm dia.

The first aid hose shall conform to IS 884-1969 and be wound on a heavy duty circular hose reel with a cast iron bracket. The hose shall be permanently connected on one end to the standpipe through a 20 mm ball valve with necessary hose adapter and a gun metal nozzle at the other end. The reel shall swing out by 270°.

Canvas hoses shall be in two lengths of 15.0 m each, of reinforced rubber lined wire wound canvas type with instantaneous couplings, neatly rolled into bundles and held in position with steel brackets. Canvas hoses shall be tested and certified by the manufacturers, to withstand an internal water pressure of not less than 35 kg/sqcm without bursting. The hose shall also withstand a working pressure of 7 kg/sqcm without leakage or undue sweating.

The hose cabinet shall be fabricated from 2 mm mild steel sheet duly rust inhibited through a process of degreasing and phosphating. The cabinet shall have double flap hinged doors with 4 mm clear glass and shall have necessary openings for riser main and brackets for all internals. The cabinet shall receive two coats of red oxide primer both inside and outside before two after coats of final paint of approved colour shade. The design and size of the cabinet shall be got approved before fabrication.

External Hydrants shall be stand post type over-ground unless shown otherwise. All external hydrants shall be single or twin headed oblique valves with 80mm or 100mm inlet connection. Hydrants shall be located at least 2 m away from and within 15 m from the building wall.

Each hydrant shall be provided with a hose cabinet containing 2 x 15 m 63 dia flax canvas or controlled percolation hoses with couplings. Wherever shown, the cabinet may contain a branch pipe and nozzle. The cabinet shall be 900 x 600 x 400 fabricated out of 2 mm mild steel sheet duly rust

inhibited through a process of degreasing, phosphating etc. The cabinet shall receive two coats of red oxide primer, inside and outside, before 2 coats of final painting of approved shade. The cabinet shall be wall-mounted or free standing with its own steel legs depending on the site conditions.

A fire service connection to the fire tank and a fire service inlet to the hydrant main shall be provided. These connections shall consist of one or two twin-headed 63mm dia gunmetal oblique outlets enclosed in a 2mm thick sheet steel painted box on a suitable stand and 150dia outlet. Service inlet to the hydrant main shall have a 150dia non-return valve.

Testing & Commissioning

All hydrant piping shall be tested for a hydrostatic test pressure of 20 kg/sqcm or 1.5 times the working pressure (whichever is less) for a period of 24 hours at the end of which there shall be no loss in pressure.

The booster & fire pump starting and stopping shall be tested by opening the test valve and record the following:

- 1) Booster pump start / stop
 - System pressure at start up : kg/sqcm
 - stop : kg/sqcm
 - Time elapsed from start to stop = seconds

- 2) Hydrant Pump start
 - System pressure at start up : kg/sqcm

 - Maintained system pressure while discharging the landing valve at the highest point.
 - i) pump end : kg/sqcm
 - ii) highest outlet : kg/sqcm
 - iii) intermediate points : kg/sqcm

All the operating tests shall be carried out in the presence of any local authority, Fire Brigade or Insurance Co.

Makes or Materials

All materials and equipment used shall be approved products of the Tariff Advisory Committee and ISI stamped. The list of makes of materials below is indicative of the quality standards expected.

EQUIPMENT DATA

- 1.0 **PUMPS** Hydrant Sprinkler
- 1.1 Make
- 1.2 Type & Speed (rpm)
- 1.3 Discharge (1) lpm @ mWg
(2) lpm @ mWg
[150% of (1)]
(3) Zero lpm @ mWg
- 1.4 No delivery Head
- 1.5 Drive Motor (direct drive)
 - i) Make
 - ii) Type
 - iii) KW input @ 1.3 (1)
KW input @ 1.3 (2)
KW input maximum
 - iv) KW rating of motor
 - v) Enclosure
- 2.0 **JOCKEY PUMP**
- 2.1 Make, Type & Speed
- 2.2 Discharge lpm @ mWg
- 2.3 Drive Motor Make, Type, Speed & Enclosure
- 2.4 KW input @ 2.2

2.5 Starter Type, Make & Enclosure

3.0 **PRESSURE SWITCHES**

3.1 Make

3.2 Ampere rating amps @ 220V

4.0 **PRESSURE GAUGES**

4.1 Make

4.2 Diameter mm

4.3 Range (Kg/sqcm)

5.0 **AIR VESSELS**

5.1 Size dia mm

5.2 Height mm

5.3 Sheet Thickness mm

Pendant Upright Sidewall

6.0 **SPRINKLERS**

6.1 Type

6.2 Temp. rating oC

6.3 Make

6.4 Size mm/mm

6.5 Rate of flow @ _____bar
 @ _____bar

6.6 Coverage

- a) Standard (m)
- b) Extended (m)

7.0 **INSTALLATION VALVE**

7.1 Type

7.2 Make

- 7.3 Diameter mm
- 7.4 Max. Time to (min.)
operate alarm valve

8.0 FIRE DOOR DETAILS

8.1 MATERIAL

Door Frames and Leaves are made from Galvanized Steel.

8.2 DOOR LEAVES

Constructed from 1.0 MM thick galvanized steel sheet press formed to provide a 48MM thick fully flush, double skin door shell with seamless welding joints at stile edges. Internal Reinforcements are provided at top, Bottom and Stile Edges for Fire Rating. The internal construction of the door is a specially designed Honeycomb structure with reinforcement at top, bottom and stile surrounds. The internal construction of the door varies with the degree of Fire Rating as tested. For doors having overall height in the excess of 2300mm the shutters shall essentially have double latching.

8.3 DOOR FRAMES

Produced from 1.6 MM thick galvanized steel sheet press formed to single rebate profile of size 100 x 57MM (+/- 0.3MM) with a maximum bending radius of 1.4 MM. Frames may be fixed on plastered openings with the help of Metallic Expansion shield with counter sunk screw. Door Frames are supplied to knock-down form with butt joints for bolted assembly at site.

8.4 VISION GLASS

Fire Rated Vision Glass with 6 MM thick clear glass can be provided for a maximum of 2 hours fire rating. The Vision Glass can be provided in 380 MM dia, Rectangular in standard dimensions of 200 MM x 300 MM.

8.5 FINISH

The door frames and door shutters are primed with Zinc-Phosphate Stoving Primer and finished with Polyurethane Paint of approved shade (60-80 microns).

8.6 IRONMONGERYHINGES

Stainless Steel Ball Bearing Butt Hinges (Dorma) 100 x 75x 3 MM thick are fixed flush to the frame & shutter.

8.7 LOCK

Shaft Lock, Mortice Lock with Lever Handles, Dead Lock, Baby Latch etc. (As per specifications).

8.8 Door Closer

TS-73 with std arm (Dorma) / As per specifications.

8.9 Concealed Flush Bolts (For Double Shutter Doors)

300 mm long for Doors Upto 2100 mm ht. and 600 mm long for Doors up to 2400 mm ht.

Makes of Materials:

The following makes of materials are listed as conforming to the specifications.

Sr. No	Description	Makes and material
1	Hydrant, sprinkler & booster pumps	Mather Platt, Beacon, Kirloskar
2	Hydrant valves with Branch pipe with Nozzle	Mather Platt, Minimax , Newage, Shah Bogilal
3	Rubber lined hose reel	Dunlop
4	Canvas Hose	Jayashree, Newage, CRC
5	GI Pipe	Tata, Jindal
6	Valves	Leader, Zoloto, Audco
7	Pressure switch	Indfos/ Switzer/ Danfoss
8	Hose couplings	Mather Platt, Minimax , Newage
9	Pressure Gauge	H Guru / Fiebig/ Danfoss/
10	Hose Reel	Eversafe/ Tyco / Minimax / Newage/ Vilas Engineering
11	Fire Extinguisher	Safex/ Minimax /Vintex
12	Air Release Valve	Leader / Hawa / Shah Bogilal
13	Cables	Polycab, Finolex / Universal
14	Electric Motors	Kirloskar / Siemens / ABB
15	Fire doors	Shakti-Hormann/ MPP technologies, Radiant

Scope of work:-

Vendor will appoint the MEP consultant and provide the required deliverables as follows:-

- 1) Prepare the complete layout of services and get approved from the client.
- 2) **Note - Kindly take the prior approval from client of any material before delivery on site. Material should as per the list of approved makes or equivalent to them.**