

- Item No. 1
- (a) Supplying, installation, testing and commissioning of electric driven terrace Booster pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace Pump)
  - (b) Horizontal type, centrifugal pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal as required.
  - (c) Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class 'F' insulation, conforming to IS-12615: 2018.
  - (d) M.S. fabricated common base plate, coupling, coupling guard, foundation bolts etc. as required.
  - (e) Suitable cement concrete foundation duly plastered and with anti vibration pads. 450 lpm at 35 m Head



## 1. Centrifugal Pump

Providing horizontal type centrifugal pump conforming to IS 12469:2019 having:

- Cast Iron Pump Casing
- Bronze Impeller dynamically balanced
- Stainless Steel Shaft
- Mechanical Seal suitable for continuous duty
- Suitable suction & delivery connections
- Low noise and vibration operation
- Suitable for clear water application

Description	Requirement
Type	Horizontal Centrifugal Pump
Capacity	450 LPM
Head	35 Metres
Operation	Automatic
Liquid	Clear Water
Mounting	Horizontal Foot Mounted

## 2. Electric Motor

Providing suitable squirrel cage induction motor conforming to IS 12615:2018 having:

- TEFC (Totally Enclosed Fan Cooled) construction
- 415 Volts, 3 Phase, 50 Hz AC Supply
- IP-55 Protection

- Class “F” Insulation
  - Horizontal foot mounted type
  - Continuous duty rating
  - Suitable HP for required hydraulic duty
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### **3. Base Frame & Accessories**

Providing and fixing:

- M.S. fabricated common base plate
- Flexible coupling
- Coupling guard
- Foundation bolts, nuts & washers
- Anti-vibration pads
- Alignment of pump & motor

Complete as required.

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### **4. Foundation Work**

Providing suitable cement concrete foundation duly plastered including:

- PCC foundation block
  - Grouting below base frame
  - Anti-vibration mounting pads
  - Proper alignment and leveling
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### **5. Testing & Commissioning**

Including:

- Hydraulic testing
- Alignment checking
- Trial run
- Insulation resistance testing
- Checking discharge & head
- Complete commissioning for satisfactory operation

### **Supplying, Installation, Testing & Commissioning of Terrace Booster Pump Set**

Supplying, installation, testing and commissioning of electrically operated terrace booster pumping set conforming to relevant IS standards, suitable for automatic operation, complete in all respects, consisting of the following:

- Horizontal type centrifugal pump having cast iron body, bronze impeller, stainless steel shaft and mechanical seal, conforming to IS 12469:2019, suitable for discharge capacity of **450 LPM at 35 metre head**.
- Suitable squirrel cage induction motor, TEFC type, suitable for operation on 415 Volts, 3 Phase, 50 Hz AC supply, with IP-55 degree of protection, horizontal foot mounted construction, Class “F” insulation, conforming to IS 12615:2018, of suitable HP rating for the above duty condition.
- M.S. fabricated common base frame including flexible coupling, coupling guard, foundation bolts, nuts, washers etc. complete.
- Providing suitable cement concrete foundation duly plastered including anti-vibration pads.
- Including all accessories required for proper installation, alignment, testing and commissioning of the complete pumping set.

**Pump Capacity:** 450 Litres Per Minute

**Head:** 35 Metres

**Unit:** Each Set

- Item No. 2      Fabrication, Supply, Installation, testing & commissioning of Electrical Control Panel of cubical construction, floor/Wall mounted type, fabricated out of 1.6 mm thick CRCA sheet, hinged lockable doors, dust and vermin proof, powder coated of approved shade, having switchgears and accessories, mountings and internal wiring, earth terminals, numbering etc. complete in all respect, suitable for Terrace Booster pump complete as per specification with in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz AC supply with enclosure protection class IP 42 as required in one cubical construction panel with fully automatic Star/Delta/ Dual starter suitable for 10 HP pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, pressure switch for local/ remote, auto / manual /OFF operation.



## 1. Panel Construction

Providing cubical type floor/wall mounted Electrical Control Panel fabricated from:

- 1.6 mm thick CRCA sheet steel
- Dust and vermin proof construction
- Hinged and lockable doors
- Powder coated finish of approved shade after seven tank treatment process
- Suitable gland plates
- Removable covers wherever required
- Cable alley and wire management arrangement
- Front accessibility for operation and maintenance

Panel suitable for operation on:

Parameter	Requirement
Voltage	415 Volts
Phase	3 Phase
Frequency	50 Hz

Enclosure Protection IP-42

## 2. Incoming & Outgoing Arrangement

The panel shall be complete with:

- Incoming MCCB/SFU/Isolator
- Outgoing feeder for terrace booster pump
- Copper busbar system with color coding
- Control MCB/Fuse units
- Indicating lamps
- Selector switches
- Push buttons
- Voltmeter/Ammeter as required
- Neutral and earth bars
- Ferruling and identification numbering
- Internal copper control wiring

Complete in all respects.

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### 3. Starter & Protection System

Providing fully automatic Star-Delta / Dual Starter suitable for:

- 10 HP pump motor
- Automatic and manual operation
- Electrical and mechanical interlocking
- Timer arrangement
- Thermal overload protection
- Short circuit protection
- Current sensing type single phasing preventer
- Dry run / phase failure protection

Complete with contactors, timers, relays and all accessories.

### 4. Automation & Controls

Providing following operational controls:

- Auto / Manual / OFF selector switch
- Local / Remote selector switch
- Pressure switch for automatic operation
- Start/Stop push buttons
- LED indications for:
  - Power ON
  - Pump Running
  - Trip
  - Phase Failure

Suitable for fully automatic operation of terrace booster pumping system.

### 5. Testing & Commissioning

The work shall include:

- Factory inspection
- Insulation resistance test
- Continuity test
- Functional operation test
- Trial run of complete system
- Automatic operation testing
- Earthing verification
- Complete commissioning

as required for satisfactory operation.

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### Mode of Measurement

The item shall be measured on **Number Basis (Each)**.

The rate shall include:

- Fabrication of panel
- Powder coating
- Supply of all switchgears and accessories
- Copper busbars
- Internal wiring and control wiring
- Star-delta/dual starter
- Protection relays
- Pressure switch
- Selector switches and indication lamps
- Earthing terminals
- Ferruling and identification tags
- All hardware and mounting accessories
- Transportation
- Installation

- Testing and commissioning
- All labour, tools, tackles and consumables

Nothing extra shall be paid for minor accessories and items required for complete functioning of the panel.

- Item No. 3      Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required. 150 mm width X 50 mm depth X 1.6 mm thickness



## Detailed Technical Specification

### 1. Cable Tray

Supplying perforated Hot Dip Galvanised Iron Cable Tray manufactured from mild steel sheet and hot dip galvanised after fabrication having:

- Width : 150 mm
- Depth : 50 mm
- Thickness : 1.6 mm
- Perforation not more than 17.5%
- Galvanisation thickness not less than 50 microns
- Returned edges for rigidity
- Smooth finished edges
- Factory fabricated sections

The cable tray shall be suitable for supporting power/control cables and installed as per approved routing.

#### Cable Tray Details

Description	Specification
Type	Perforated GI Cable Tray
Width	150 mm
Depth	50 mm
Thickness	1.6 mm
Finish	Hot Dip Galvanised
Galvanisation Thickness	Minimum 50 Microns

### 2. Suspension Arrangement

The tray shall be installed in convenient sections and suspended from ceiling using:

- Two numbers GI suspenders
- Suitable size GI angle support
- Threaded rods/hangers
- GI bolts, nuts and washers
- Fasteners and clamps
- Coupler plates/connectors for jointing

Complete as required.

### 3. Installation

The work shall include:

- Alignment and levelling
- Cutting and bending wherever required
- Jointing of tray sections
- Proper support spacing
- Earthing continuity arrangement
- Fixing complete in line and level

Complete as required for satisfactory installation.

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### 4. Testing & Inspection

Including:

- Visual inspection
- Alignment checking
- Support rigidity verification
- Galvanisation inspection
- Earthing continuity checking

Complete as required.

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### Mode of Measurement

The cable tray shall be measured in **running metres** along the centre line of installed tray.

The rate shall include:

- Supply of perforated GI cable tray
- Hot dip galvanisation
- All bends, reducers and accessories
- GI suspenders and supports
- GI angles
- Connectors/coupler plates
- Nuts, bolts, washers and fasteners
- Cutting, drilling and fixing
- Suspension arrangement
- Labour, tools and tackles
- Installation and testing

Nothing extra shall be paid for joints, hardware, clamps and minor accessories required for complete installation.

Item No. 4	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables. (F) 3 core 6 Sq. mm -For Terrace Booster Pump
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## Detailed Technical Specification

### Material

1. Cable shall be:
  1. XLPE insulated.
  2. PVC sheathed.
  3. Armoured.
  4. Aluminium conductor, stranded.
  5. 1100 Volt grade.
  6. ISI marked and conforming to:
    1. IS:7098 (Part-I) latest revision.
    2. IS:8130 for conductors.
    3. IS:5831 for PVC sheath.
2. Conductor:
  1. Stranded aluminium conductor.
  2. Cross-sectional area: **6 sq.mm.**
  3. Number of cores: **3 Core.**
3. Armour:
  1. Galvanized steel strip/wire armour as applicable.

### Installation

1. Cable shall be:
  1. Fixed on wall/ceiling using approved GI/MS saddles, clamps and fasteners at suitable intervals.
  2. Or drawn through existing conduit, pipe or trench as directed.
2. Cable route shall be properly dressed and secured.
3. Bending radius shall conform to manufacturer's recommendations.
4. Cable ends shall be protected against moisture ingress during installation.

### Testing

After installation the cable shall be tested for:

- Continuity.
- Insulation resistance using approved megger.
- Phase sequence (where applicable).
- Functional operation of the Terrace Booster Pump.

### Completion

The rate shall include:

- Supply of cable.
  - Transportation.
  - Loading and unloading.
  - Labour for laying and fixing.
  - Clamps, saddles, screws and hardware.
  - Testing and commissioning.
  - All tools, plants and incidental charges.
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## Mode of Measurement

### Unit

Running Metre (Rmt.)

### Measurement

1. Measurement shall be made along the actual route of the cable installed.



2. Length shall be measured from:
  - Supply point/DB/MCCB end
  - Up to the Terrace Booster Pump starter/control panel or motor termination point.
3. No separate measurement shall be made for:
  - Clamps.
  - Saddles.
  - Fasteners.
  - Identification tags.
  - Testing and commissioning.
4. No extra payment shall be made for:
  - Bends.
  - Vertical rises.
  - Short loops required for termination.
  - Labour for drawing through existing conduit/trench.
5. Cable glands, lugs and end terminations, if required, shall be measured and paid separately under relevant BOQ items unless specifically included in the item description.

#### **Rate Includes**

- Supply of cable.
- Laying and fixing.
- Clamping and dressing.
- Pulling through existing pipe/trench.
- Testing and commissioning.
- All labour, tools, tackles and consumables.

**Unit of Payment:** Running Metre (Rmt.) of completed and accepted work.

Item No. 4      Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables. (F) 3 core 6 Sq. mm -For Terrace Booster Pump

### **Detailed Technical Specification**

#### **Material**

4. Cable shall be:
  1. XLPE insulated.
  2. PVC sheathed.
  3. Armoured.
  4. Aluminium conductor, stranded.
  5. 1100 Volt grade.
  6. ISI marked and conforming to:
    1. IS:7098 (Part-I) latest revision.
    2. IS:8130 for conductors.
    3. IS:5831 for PVC sheath.
5. Conductor:
  1. Stranded aluminium conductor.
  2. Cross-sectional area: **6 sq.mm.**

3. Number of cores: **3 Core.**
6. Armour:
  1. Galvanized steel strip/wire armour as applicable.

## Installation

5. Cable shall be:
  2. Fixed on wall/ceiling using approved GI/MS saddles, clamps and fasteners at suitable intervals.
  3. Or drawn through existing conduit, pipe or trench as directed.
6. Cable route shall be properly dressed and secured.
7. Bending radius shall conform to manufacturer's recommendations.
8. Cable ends shall be protected against moisture ingress during installation.

## Testing

After installation the cable shall be tested for:

- Continuity.
- Insulation resistance using approved megger.
- Phase sequence (where applicable).
- Functional operation of the Terrace Booster Pump.

## Completion

The rate shall include:

- Supply of cable.
- Transportation.
- Loading and unloading.
- Labour for laying and fixing.
- Clamps, saddles, screws and hardware.
- Testing and commissioning.
- All tools, plants and incidental charges.

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# Mode of Measurement

## Unit

**Running Metre (Rmt.)**

## Measurement

6. Measurement shall be made along the actual route of the cable installed.
7. Length shall be measured from:
  - Supply point/DB/MCCB end
  - Up to the Terrace Booster Pump starter/control panel or motor termination point.
8. No separate measurement shall be made for:
  - Clamps.
  - Saddles.
  - Fasteners.
  - Identification tags.
  - Testing and commissioning.
9. No extra payment shall be made for:
  - Bends.
  - Vertical rises.
  - Short loops required for termination.
  - Labour for drawing through existing conduit/trench.
10. Cable glands, lugs and end terminations, if required, shall be measured and paid separately under relevant BOQ items unless specifically included in the item description.

#### Rate Includes

- Supply of cable.
- Laying and fixing.
- Clamping and dressing.
- Pulling through existing pipe/trench.
- Testing and commissioning.
- All labour, tools, tackles and consumables.

**Unit of Payment:** Running Metre (Rmt.) of completed and accepted work.

Item No. 5      Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed. (d) 1.50 Sq.mm 2 core round PVC sheathed



## Detailed Technical Specification

### 1. Cable Specification

Providing flexible PVC insulated, multi-strand, multi-core copper conductor cable conforming to relevant IS standards and ISI marked having:

- Voltage Grade : 1.1 KV
- Conductor : Multi-strand electrolytic copper
- Insulation : PVC insulated
- Sheathing : PVC outer sheathed
- Flexible type round cable
- Flame retardant PVC insulation
- ISI marked

Suitable for control wiring, power connection and allied electrical works.

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### Cable Details

Description	Specification
Cable Type	Flexible PVC Copper Cable
Voltage Grade	1.1 KV
Conductor	Multi-strand Copper
Core	2 Core
Size	1.50 Sq.mm
Type	Round PVC Sheathed
Marking	ISI Marked

### 2. Installation

The cable shall be erected:

- On wall/ceiling surface
- Through conduit/trunking/casing as directed
- Properly dressed and fixed
- With necessary clips, clamps and saddles
- Maintaining proper bending radius

Complete as required.

### 3. Accessories Included

The work shall include:

- Necessary fixing hardware
- Clamps, saddles and clips
- Ferruling and identification
- Jointing and dressing
- Testing and commissioning

Complete in all respects.

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### 4. Testing

Including:

- Insulation resistance testing
- Continuity test
- Phase identification

- Functional testing

Complete as required.

### Mode of Measurement

The cable shall be measured in **running metres** along the actual route of installation.

The rate shall include:

- Supply of cable
- Transportation
- Laying and fixing
- Necessary clamps and saddles
- Labour, tools and tackles
- Testing and commissioning

Nothing extra shall be paid for wastage, bends, cutting or minor fixing accessories.

- Item No. 6      Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required. Double Compression gland for Booster Pump 2 or 3C X 6 sq. mm (19mm)

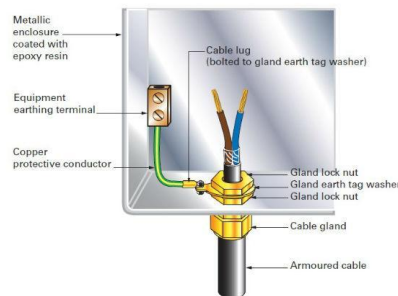


FIG 1 Terminating the armouring of an swa cable to metallic enclosures

### Detailed Technical Specification

#### 1. Scope of Work

Providing and making cable end termination complete with:

- Double compression brass gland
- Aluminium crimping type cable lugs
- Gland earth tag
- PVC insulation tape
- Ferruling and identification
- Necessary hardware and accessories

Suitable for PVC/XLPE insulated aluminium conductor armoured cable of 1.1 KV grade.

### Cable Termination Details

Description	Specification
Cable Type	PVC/XLPE Armoured Aluminium Cable
Voltage Grade	1.1 KV
Cable Size	2 Core / 3 Core × 6 Sq.mm
Gland Type	Double Compression Brass Gland

<b>Description</b>	<b>Specification</b>
Gland Size	19 mm
Lug Type	Aluminium Crimping Lug

## **2. Installation**

The work shall include:

- Removing outer sheath carefully
- Proper armour clamping
- Crimping of aluminium lugs using suitable crimping tool
- Fixing gland with lock nut and earth tag
- Insulation of exposed conductors
- Proper dressing and tightening

Complete in all respects.

## **3. Testing**

Including:

- Continuity checking
- Tightness verification
- Insulation resistance testing
- Phase identification

Complete as required.

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## **Mode of Measurement**

The item shall be measured on **Number Basis**.

One unit shall consist of one complete cable end termination.

The rate shall include:

- Double compression brass gland
- Aluminium lugs
- Crimping
- Ferruling
- Gland accessories
- Hardware
- Labour and tools
- Testing and commissioning

Nothing extra shall be paid for insulation tape, hardware, ferrules or minor accessories.

Item No. 7      Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required 25 mm

### **1.0 Materials**

G.I. B Class medium duty pipe conforming to IS: 1239 (25 mm dia.) and IS: 3589 (upto 25 mm dia. and above) with latest amendments in random length of 4 to 7 mt. (b) 25 mm dia min. and above shall be required of standard make.

### **2.0 Workmanship**

- 2.1 G.I. B Class medium duty pipe of 25 mm dia. and above shall be used for bore required as directed by Engineer-in-charge.
- 2.2 The 25 mm dia. G.I. B Class Medium duty pipe should be lowered by the contractor in overburden strata. The joining of pipes if required will be carried out by Contractor as desired by the Engineer in charge. Necessary jointing materials, steel banded plates etc. should be provided by the contractor at extra cost is not available with Department.

### **3.0 Mode of Measurement & Payment**

The item shall be measured in running meter.

The rate shall be for a unit of running **meter**.

- Item No. 8 Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required 50 mm

The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required 50 mm**

- Item No. 9 Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required 40 mm

The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required 40 mm**

Item No. 10 Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 80 mm

The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 80 mm**

Item No. 11 Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 100 mm

The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 100 mm**

Item No. 12 Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 150 mm

The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing, laying, testing & commissioning of 'B' class Medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required. 150 mm**



Item 13	No.	Providing laying, testing & commissioning of 'B' class Medium duty GI Pipe conforming to IS 1239/Class -II of IS: 3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. in ground including welding & providing, anticorrosive treatment with coaltar/asphalt tape as per IS 10221, etc. of following sizes complete as required. 150mm
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The work shall be executed as per specification of **Item No. 7** except for the item is work of **Providing laying, testing & commissioning of 'B' class Medium duty GI Pipe conforming to IS 1239/Class -II of IS: 3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. in ground including welding & providing, anticorrosive treatment with coaltar/asphalt tape as per IS 10221, etc. of following sizes complete as required. 150mm**

Item 14	No.	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal/SS seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS: 13095 of following sizes as required: 100 mm dia
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#### **Butterfly valve as per I.S: 780 & 2906/1984.**

#### **1.0 GENERAL**

The contractor shall be covering manufacturing, supplying and delivery of:

Butterfly valve conforming to IS: 2906-1984 & IS: 780-1984 or its latest revision (Specification for butterfly valves (150 mm size) with ISI certification.

#### **2.0 STANDARDS**

The C.I. butterfly valves to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance with and conforming to Indian standard specifications as given below with ISI certification mark on each butterfly valves.

#### **3.0 TEMPERATURE VARIATION**

All butterfly valves manufactured, supplied and delivered shall be subjected to drinking water under variable temperature condition ranging from 4<sup>0</sup> to 45<sup>0</sup> C.

#### **4.0 MARKING**

The legible and in deniable marking upon each valve shall indicate the following:

- (1) ISI certification mark on each butterfly valve only.
- (2) Manufacture's brand name and/or trade mark.
- (3) Size of valve and nominal pressure of valve.
- (4) Serial number of cast.
- (5) Serial number in punch

- (6) Where a valve has been tested for only open and test, it should be marked '0' distinctly and permanently.
- (7) Any other important matter that the manufacturer deems fit to be inscribed embossed.

## **5.0 TEST CERTIFICATE**

- 5.1 The contractor shall always provide manufacture's test certificate in accordance with every batch/ lot as valves so manufactured and supplied.
- 5.2 The contractor shall also produce in addition to manufacture's test certificate the inspection certificate issued by the authorized person /agency appointed by Engineer/board for the same purpose. The inspection charges of the authorized person/agency as fixed by G.W.S.S.B shall have to be borne by the contractor and the necessary payment to the inspecting agency shall be paid by the contractor as per the terms and condition of G.W.S.S.B.

## **6.0 NOMINAL PRESSURE**

- 6.1 Butterfly valves shall be designed by nominal pressure (PN) defined as the maximum permissible gauge working pressure in Mpa as "PN-II" ( Mpa= 10 kgf/m<sup>2</sup> approx)  
The nominal size shall refer to the nominal bore at any point, shall not be less than the nominal size required.

## **7.0 MATERIAL:**

- 7.1 The materials for the different component parts of the butterfly valve shall confirm to requirements given in Table.

Materials for components parts of butterfly valve

Sr. No.	Component	Material	Ref. to	Grade of designation
1	Body, bonnet wedge stuffing box, gland thrust plate, cap.	Grey cast iron	210-FG 1978(1)	
2	Steam	High tensile brass	320-1962(2)	Ally 1 of 2
3	Wedge nut	Leaded tin bronze	318-1962(3)	2
4	Body seat ring, wedge facing ring	Leaded tin bronze	318-1962(3)	2
5	Bolts	Carbon steel	1367-1967(4)	Class 4.6
6	Nuts	Carbon steel	1367-1967(4)	Class 4
7	Bonnet gasket	Compressed fiber Board	2712-1971(5)	C
8	Gland packing	Jute & hemp	5414-1969(6)	--

- (1) Specification for grey iron castings (third revision).

- (2) Specification for high tensile brass rods and sections (revised).
- (3) Specification for leaded tin bronze ingots and casting (revised).
- (4) Specification for technical supply condition threaded fasteners (first revision)
- (5) Specification for compressed asbestos fiber jointing (first revision)
- (6) Specification for gland packing, jute and hemp.

## **8.0 MANUFACTURE**

Butterfly valve bodies for 80 mm to 900 mm size valves shall be provided with double flanged ends connection.

## **9.0 FLANGES**

The flanges and their dimensions of drilling shall be in accordance with part IV and VI of I.S. 1538 (Part I to XXII) 1976 (Specification for cast iron fittings for pressure pipes for water gas and sewage) or its latest revision.

## **10.0 MODE OF MEASUREMENT AND PAYMENT**

The payment shall be paid after completion of whole item as mentioned in price bid on unit of **No.** basis as per relevant dia. of the item of the schedule.

Item 15	No. Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal/SS seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS: 13095 of following sizes as required: 150 mm dia
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The work shall be executed as per specification of **Item No. 14** except for the item is work of **Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal/SS seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS: 13095 of following sizes as required: 150 mm dia**

Item 16	No. Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required: 100 mm dia
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## **Materials:**

The C.I. Dual plate type Check Valve class PN1.6 rating shall be specified make and with IS specifications. All working parts shall be S.S. Non Return Valve shall be cast iron double flange with cast iron body.

## **Workmanship:**

The C.I. Dual plate type Check Valve class PN1.6 rating should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

### **Mode of Measurement and Payment:**

Measurement shall be taken on **Set.** basis of completed item. Rate shall be for a unit of one **Set.**

Item No. Providing, installation, testing and commissioning of stainless steel Y-strainer 17 fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange. 100mm dia

### **1. Y-Strainer Construction**

Providing Y-Type Strainer fabricated from:

- Stainless Steel Sheet Grade SS-304
- Sheet thickness : 1.6 mm
- Perforated screen with 3 mm diameter holes
- Stainless steel flanged ends
- Removable screen arrangement for cleaning
- Leak proof construction

Suitable for filtration of suspended particles in water pipeline system.

Strainer Details

Description	Specification
Type	Y-Strainer
Material	Stainless Steel SS-304
Sheet Thickness	1.6 mm
Hole Diameter	3 mm
Connection Type	Flanged
Diameter	100 mm

### **2. Installation**

The work shall include:

- Fixing in pipeline
- Alignment with pipe line
- Necessary nuts, bolts, gaskets
- Proper support arrangement
- Leak proof jointing
- Cleaning and flushing before commissioning

Complete in all respects.

### **3. Testing & Commissioning**

Including:

- Hydrostatic testing
- Leak testing
- Cleaning of strainer element
- Functional flow testing
- Complete commissioning

as required for satisfactory performance.

---

### **Mode of Measurement**

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of SS Y-strainer
- Stainless steel perforated screen
- Flanges
- Nuts, bolts and gaskets
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories required for complete installation.

Item No. 18	Providing and Fixing 25 mm dia. Air valve of Raising Main Line. For Air Release including supply, installing, testing and commissioning etc. complete as directed by Engineer in charge.
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### **Materials:**

The body of Gun Metal Air Release Valve is cast iron to BS 1452 Gr. 200 and body liner is Nitrile Rubber with SG Iron / SS disc.

### **Workmanship:**

The Air Release Valve should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

### **Mode of Measurement and Payment:**

Measurement shall be taken on **Number** basis of completed item. Rate shall be for a unit of one number.

Item No. 19	S. I. T. C. in position approved make Forged Brass Ball valves having Body, Ball & stem bonnet in forged brass. Lever, washer & Nut in Carbon steel. Gland packing & body seat ring in PTFE (Teflon) seal with female BSP threads. Tested to a pressure not less than 20Kg/Sq.cm with all accessories etc. Complete as per direction of the Engineer-in-
----------------	--

Charge.25mm Dia



### 1. Valve Construction

Providing approved make forged brass ball valve having:

- Body, ball and stem bonnet made of forged brass
- Lever handle, washer and nut made of carbon steel
- PTFE (Teflon) gland packing
- PTFE body seat rings
- Female BSP threaded ends
- Quarter turn operation
- Full bore / standard bore as approved
- Leak proof construction

Valve suitable for water supply system.

Valve Details

Description	Specification
Type	Forged Brass Ball Valve
Size	25 mm Dia
End Connection	Female BSP Threaded
Body Material	Forged Brass
Seat Material	PTFE (Teflon)
Test Pressure	Minimum 20 Kg/Sq.cm

### 2. Installation

The work shall include:

- Fixing in pipeline
- Proper alignment
- Thread sealing with PTFE tape/sealant
- Tightening and leak proof joints
- Necessary fittings and accessories
- Functional operation checking

Complete in all respects.

### 3. Testing & Commissioning

Including:

- Hydrostatic pressure testing
- Leakage testing
- Operational checking
- Functional testing after installation

Complete as required.

---

## Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of forged brass ball valve
- All accessories and fittings
- PTFE tape/sealant
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor consumables and accessories required for complete installation.

Item No. 20      Supplying installing testing & commissioning of 100 mm dia. Pressure Gauge 1% Accuracy direct bottom 3/8" BSP connection in brass socket & Range 0 to 16 Kg/Cm<sup>2</sup> etc. necessary as directed by Engineer in Charge.

### 1. Pressure Gauge Construction

Providing approved make pressure gauge having:

- Dial size : 100 mm diameter
- Accuracy :  $\pm 1\%$
- Direct bottom connection
- 3/8" BSP threaded brass socket connection
- Stainless steel / powder coated steel casing
- Clear acrylic / glass window
- Black graduated dial markings
- Suitable for water pressure applications

Complete with all accessories required for proper installation.

---

### Pressure Gauge Details

Description	Specification
Dial Size	100 mm Dia
Accuracy	1%
Connection Type	Direct Bottom
Connection Size	3/8" BSP
Socket Material	Brass
Pressure Range	0 to 16 Kg/Cm <sup>2</sup>

### 2. Installation

The work shall include:

- Fixing on pipeline/pump manifold
- Necessary nipple, elbow or fittings if required
- Proper alignment for visibility
- Leak proof threaded connection using PTFE tape/sealant

- Vibration free mounting arrangement
- Complete in all respects.

### 3. Testing & Commissioning

Including:

- Calibration verification
- Leak testing
- Functional pressure indication checking
- Complete commissioning

as required for satisfactory operation.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of pressure gauge
- Brass socket connection
- Necessary fittings/accessories
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for thread seal tape, minor fittings and consumables required for complete installation.

Item No. 21 Providing and Installation SS 304 male to male siphon tube size 3/8 inch dia for pressure gauge.

### 1. Syphon Tube Construction

Providing syphon tube manufactured from:

- Stainless Steel Grade SS-304
- Heavy duty seamless tubing
- Male to male threaded ends
- Suitable for pressure gauge installation
- Corrosion resistant construction
- Suitable for water/steam/pressure applications

Complete with necessary fittings and accessories.

Syphon Tube Details

Description	Specification
Material	Stainless Steel SS-304
Type	Male to Male Syphon Tube



<b>Description</b>	<b>Specification</b>
Size	3/8 Inch Dia
Connection	Threaded
Application	Pressure Gauge Connection

## **2. Installation**

The work shall include:

- Fixing between pressure line and pressure gauge
- Proper alignment
- Thread sealing using PTFE tape/sealant
- Leak proof threaded joints
- Necessary nipples/adaptors if required

Complete in all respects.

## **3. Testing & Commissioning**

Including:

- Leak testing
- Pressure testing
- Functional checking with pressure gauge
- Complete commissioning

as required.

---

## **Mode of Measurement**

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of SS-304 syphon tube
- Threaded fittings/accessories
- Installation
- PTFE tape/sealant
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories and consumables required for complete installation.

Item No.	Providing and Fixing pressure switch in M.S./GI Pipe line including connection etc. as required.
22	

## **1. Pressure Switch Construction**

Providing approved make pressure switch suitable for automatic control of pumping system having:

- Adjustable pressure setting
- Differential pressure adjustment
- Electrical contact mechanism
- Threaded inlet connection
- Rugged housing suitable for industrial use
- Suitable for water line applications

Complete with all accessories required for satisfactory operation.

Pressure Switch Details

Description	Specification
Type	Adjustable Pressure Switch
Application	Water Pipeline / Booster Pump
Mounting	On M.S./G.I. Pipeline
Connection Type	Threaded
Operation	Automatic Pressure Control

## 2. Installation

The work shall include:

- Fixing on M.S./G.I. pipeline
- Providing necessary socket/nipple/reducer if required
- Proper sealing using PTFE tape/sealant
- Leak proof connection
- Electrical connection coordination with control panel
- Setting and calibration of cut-in and cut-out pressure

Complete in all respects.

## 3. Testing & Commissioning

Including:

- Leak testing
- Calibration and setting
- Functional testing
- Automatic operation checking
- Complete commissioning

as required for satisfactory operation.

---

## Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of pressure switch
- Necessary fittings and accessories
- Fixing on pipeline

- Thread sealant/PTFE tape
- Calibration and setting
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor fittings, consumables and accessories required for complete installation.

Item No. 23 Providing and Installation SS 304 male to male syphon tube size 1/4 inch dia for pressure switch.

### 1. Syphon Tube Construction

Providing syphon tube manufactured from:

- Stainless Steel Grade SS-304
- Heavy duty seamless tubing
- Male to male threaded ends
- Corrosion resistant construction
- Suitable for pressure switch installation
- Suitable for water/pressure applications

Complete with all necessary accessories.

Syphon Tube Details

Description	Specification
Material	Stainless Steel SS-304
Type	Male to Male Syphon Tube
Size	1/4 Inch Dia
Connection	Threaded
Application	Pressure Switch Connection

### 2. Installation

The work shall include:

- Fixing between pressure line and pressure switch
- Proper alignment
- Thread sealing using PTFE tape/sealant
- Leak proof threaded joints
- Necessary nipples/adaptors if required

Complete in all respects.

### 3. Testing & Commissioning

Including:

- Leak testing
- Pressure testing
- Functional checking with pressure switch
- Complete commissioning

as required.

---

### **Mode of Measurement**

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of SS-304 syphon tube
- Threaded fittings/accessories
- Installation
- PTFE tape/sealant
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories and consumables required for complete installation.

Item No.      Structural steel work in single section, fixed with or without connecting  
24              plate, including cutting, hoisting, fixing in position and applying a  
                 priming coat of approved steel primer all complete.

### **1. Scope of Work**

Providing structural steel work in single sections such as:

- Angles
- Channels
- Flats
- Tees
- Beams
- Plates
- Hollow sections

fabricated and fixed in position complete as required.

The work shall include:

- Cutting
- Drilling
- Welding
- Grinding
- Hoisting
- Aligning
- Erection and fixing

Complete in all respects.

### **2. Fabrication & Erection**

The work shall include:

- Fabrication as per approved drawings
- Providing connecting plates wherever required
- Bolting and welding
- Proper alignment and leveling
- Hoisting and erection at all heights
- Temporary supports during erection

Complete as required.

### **3. Surface Preparation & Primer**

Providing and applying:

- Surface cleaning by wire brushing/scraping
- One coat of approved steel primer

on all exposed steel surfaces before erection or after fabrication as directed.

#### **4. Included Accessories**

The rate shall include:

- Welding rods
- Bolts, nuts and washers
- Connecting plates
- Cleats and stiffeners
- Temporary supports
- Lifting arrangements
- Primer application

Complete as required.

---

#### **Mode of Measurement**

Structural steel work shall be measured in **Kilograms (Kg)** based on finished weight of fabricated and erected steel work.

The weight shall include:

- Plates
- Angles
- Channels
- Flats
- Welding material
- Cleats and stiffeners

The rate shall include:

- Supply of steel
- Fabrication
- Cutting and welding
- Hoisting and erection
- Primer coat
- Bolts, nuts and washers
- Labour, tools and tackles

Nothing extra shall be paid for cutting wastage, overlaps, temporary supports or minor fasteners.

Item	No.	Supply Installation Testing and commissioning 4 layer PVC water tank as directed by EIC.
25		

#### **General**

This work shall consist of furnishing and placing providing and fixing I.S.I. mark PVC water tank with necessary G.I. fittings of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

##### **1.0 MATERIAL**

##### **1.1 PVC WATER TANK**

PVC Water tank of specified capacity and of I.S.I. mark of approved in liters of approved make and quality equivalent to syntax product.

Net capacity shall be net volume of water stored between the lowest level of overflow and lowest specified level.

#### 1.2 **NIPPLE**

Galvanize pipe nipple shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

#### 1.3 **BALL VALVE**

Ball valve shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

#### 1.4 **CONNECTIONS**

Connection shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

### 2.0 **WORKMANSHIP**

2.1 Tank shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code. The material of tank and lead and fittings which may come in contact of water should be such that it does not impart any taste, colour or odour. It does not have any toxic effect and it does not contaminate the water. Thereby making it unpotable.

2.2 The tank shall be fixed properly in a level position and making all required necessary correction like inlet outlet flushing overflow and air vent. Tank shall be satisfying the standards of public health.

### 3.0 **MODE OF MEASUREMENT AND PAYMENT**

3.1 The unit rate of **PVC Water tank** shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing and fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing **PVC water tank** work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications, they shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of PVC Water tank shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

3.2 The **PVC water tank** work shall be measured for its **volume** to specified capacity to those specified on plan or as directed. The rate shall be for a unit of **one liter basis**.

3.3 The payment will be made on **liter** basis of the finished work.

Item	No.	Supplying and fixing of fire brigade connection of cast iron body with gun
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- 26 metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required:  
2 Way FB



### 1. Fire Brigade Connection Construction

Providing approved make Fire Brigade Connection consisting of:

- Heavy duty cast iron body
- Two-way inlet arrangement
- Gun metal male instantaneous inlet couplings
- Blank caps with chains
- Non-return arrangement wherever applicable
- Suitable for M.S. pipe connection
- Weather resistant construction

The fire brigade connection shall conform to IS:904.

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### Fire Brigade Connection Details

Description	Specification
Type	Fire Brigade Inlet Connection
Configuration	2-Way
Body Material	Cast Iron
Coupling Material	Gun Metal
Standard	IS:904
Connection	Suitable for M.S. Pipe

### 2. Installation

The work shall include:

- Fixing at approved location
- Connection to M.S. pipeline
- Proper alignment and support
- Necessary nuts, bolts, gaskets and fittings
- Leak proof jointing
- Painting/touch-up if required

Complete in all respects.

### 3. Testing & Commissioning

Including:

- Hydrostatic testing
- Leakage testing
- Functional checking with coupling
- Complete commissioning

as required for satisfactory performance.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of complete Fire Brigade Connection
- Gun metal couplings
- Caps and chains
- Necessary fittings and accessories
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories and consumables required for complete installation.

Item No. 27 Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal/SS seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS: 13095 of following sizes as required: 150 mm dia

The work shall be executed as per specification of **Item No. 14** except for the item is work of **Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal/SS seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS: 13095 of following sizes as required: 150 mm dia**

Item No. 28 Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required: Single Headed Stainless Steel

## **General**

This work shall consist of providing of 63mm dia. I.S.I. mark S.S. Single Control Fire Hydrant Valve of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

### **1.0 Material**

- 1.0 S.S. Single Control Fire Hydrant Valve
- 1.1 S.S. Single Control Fire Hydrant Valve of specified 63 mm dia. nominal bore shall conform to IS:5290 Type-A. The S.S. Single Control Fire Hydrant Valve shall be best Indian make and quality.
- 1.2 S.S. Single Control Fire Hydrant Valve shall be chromium polished of best quality and shall be ISI marked.
- 1.3 It shall be as per standard specification of Fire Safety work.

### **2.0 Mode of Measurement & Payment**

- 2.1 The unit rate of S.S. Single Control Fire Hydrant Valve shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as



directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing S.S. Single Control Fire Hydrant Valve work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate of S.S. Single Control Fire Hydrant Valve shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

- 2.2 The S.S. Single Control Fire Hydrant Valve shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.
- 2.3 The payment shall be made on Set basis of the finished work.

Item 29	No.	Supplying & fixing 63 mm dia. Stainless Steel (Grade 304) short branch pipe with 20 mm nominal internal diameter size nozzle conforming , to IS:903 suitable for instantaneous connection to interconnect hose pipe coupling as required: (18.18.2) Stainless Steel (Grade 304)
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➤ **SHORT BRANCH PIPE**

63mm dia. Branch pipe of 63mm dia. should be as per IS : 903 and Test Pressure of 21 Kgf/cm<sup>2</sup>. Branch pipe shall be of S.S. with nozzle as approved by engineer in charge and jet spray type of bore diameter less than 16mm.

➤ **MODE OF MEASUREMENT AND PAYMENT**

The Rate shall be for unit of one Number.

Item 30	No.	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required: (18.16.2) Stainless Steel (Grade 304)
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**General**

This work shall consist of providing of I.S.I. mark Fire Hose pipe (as per IS : 636 Type-A) of 63 mm dia. of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

**1.0 Material**

- 1.0 **Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia.**

- 1.1 **Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia.** nominal bore shall conform to I.S. 781-1977. The 2 x 15 Mtr. long I.S.I. mark 63mm dia. Fire hose pipe shall be best Indian make and quality.
- 1.2 Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia. shall be chromium polished of best quality and shall be ISI marked.
- 1.3 It shall be as per standard specification of Fire Safety work.

## **2.0 Mode of Measurement & Payment**

- 2.1 The unit rate of Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia. shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia. work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate of Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia. shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.
- 2.2 The Fire Hose pipe (as per IS : 636 TYPE-A) of 63 mm dia. shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.
- 2.3 The payment shall be made on **Set** basis of the finished work.

- |            |   |
|------------|---|
| Item<br>31 | No. Supply Installing Testing & Commissioning of M. S. 18 guage hose box to accommodate of 2-Nos 15-Mtrs. Length Hose Box pipe & 1 No. of branch pipe with Nozzle, With necessary fabrication support and joints and 3 mm glass shutter including powder coating etc. complete as directed by engineer in charge. |
|------------|---|



## **Detailed Technical Specification**

### **1. Hose Box Construction**

Providing approved make M.S. Hose Box fabricated from:

- 18 gauge mild steel sheet
- Front door with 3 mm thick glass shutter
- Hinged lockable door arrangement
- Powder coated finish of approved shade
- Suitable ventilation slots
- Smooth finished edges

Suitable to accommodate:

- 2 Nos. × 15 metre fire hose pipes
- 1 No. branch pipe with nozzle

Complete in all respects.

Hose Box Details

Description	Specification
Material	Mild Steel
Sheet Thickness	18 Gauge
Front Panel	3 mm Glass Shutter
Finish	Powder Coated
Capacity	2 Hose Pipes + 1 Branch Pipe

## 2. Installation

The work shall include:

- Wall/floor mounting as directed
- Necessary fabrication support arrangement
- Brackets, clamps and fasteners
- Alignment and leveling
- Jointing and fixing accessories
- Touch-up painting if required

Complete as required.

## 3. Testing & Commissioning

Including:

- Inspection of door operation
- Checking support rigidity
- Verification of accommodation space
- Complete installation checking

as required.

---

## Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of M.S. hose box
- Glass shutter

- Powder coating
- Fabrication supports
- Fasteners and fixing accessories
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories and consumables required for complete installation.

Item No. 32 Supply Installing Testing & Commissioning of M. S. 18 guage hose box to accommodate of 2-Nos 15-Mtrs. Length Hose Box pipe & 1 No. of branch pipe with Nozzle, With necessary fabrication support and joints and 3 mm glass shutter including powder coating etc. complete as directed by engineer in charge.



## Detailed Technical Specification

### 1. Hose Reel Construction

Providing approved make First Aid Hose Reel of M.S. construction, spray painted in Post Office Red colour, conforming to IS:884 complete with:

- Swinging type hose reel drum
- Wall mounting brackets
- Hose guide arrangement
- Smooth manual operation
- Corrosion resistant finish

Complete in all respects.

---

### Hose Reel Details

Description	Specification
Type	First Aid Hose Reel
Standard	IS:884
Construction	Mild Steel
Finish	Post Office Red Paint
Mounting	Wall Mounted

### 2. Hose Pipe

Providing:

- 25 mm nominal internal diameter thermoplastic hose
- Textile reinforced Type-2 hose
- Conforming to IS:12585
- Flexible and suitable for fire fighting application

Complete as required.

---

### **3. Valve & Nozzle**

Providing:

- 25 mm nominal internal diameter gun metal globe valve
- Hose reel nozzle suitable for jet/spray operation
- Gun metal stop valve for inlet connection

Complete with all fittings and accessories.

### **4. Connection Arrangement**

Including:

- Connection from riser/main pipeline
- 25 mm dia M.S. pipe connection
- Socket fittings
- Necessary clamps, supports and accessories
- Leak proof joints

Complete as required.

### **5. Testing & Commissioning**

Including:

- Hydrostatic testing
- Hose pressure testing
- Nozzle operation testing
- Leakage testing
- Functional trial

Complete as required for satisfactory operation.

---

### **Mode of Measurement**

The item shall be measured on **Number Basis**.

The rate shall include:

- Hose reel drum
- Thermoplastic hose
- Gun metal globe valve
- Nozzle
- Stop valve
- M.S. pipe connection
- Wall brackets and supports
- Painting
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for fittings, clamps, sockets and minor accessories required for complete installation.

Item No. Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 Deg C with required accessories : Pendent Sprinkler



### Detailed Technical Specification

#### 1. Sprinkler Construction

Providing approved make quartzoid bulb type pendent sprinkler having:

- Nominal size : 15 mm dia
- Pendent type deflector arrangement
- Quartzoid glass bulb heat sensitive element
- Temperature rating : 68°C
- Forged brass / chrome plated body
- Standard spray pattern
- Leak proof construction

Suitable for automatic fire suppression system.

---

#### Sprinkler Details

Description	Specification
Type	Pendent Sprinkler
Nominal Size	15 mm Dia
Bulb Type	Quartzoid Glass Bulb
Temperature Rating	68°C
Mounting	Pendent Type
Application	Automatic Fire Sprinkler System

#### 2. Installation

The work shall include:

- Fixing in sprinkler pipe network
- Necessary fittings and thread sealing
- Proper alignment and level
- Ceiling mounting arrangement
- Leak proof threaded connections
- Protection during installation

Complete as required.

#### 3. Testing & Commissioning

Including:

- Hydrostatic testing
- Leak testing

- Alignment verification
  - Functional checking
  - Complete commissioning
- as required for satisfactory operation.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of sprinkler head
- Required fittings and accessories
- Thread seal tape/sealant
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor fittings and consumables required for complete installation.

Item	No.	Supplying & fixing 6 Kg. Capacity ABC Dry Chemical powder Stored Pressure type fire Extinguisher As per I.S-15683 having ISI marked Etc. complete as Directed by Engineer In Charge.
34		



### Detailed Technical Specification

#### 1. Fire Extinguisher Construction

Providing approved make ABC Dry Chemical Powder Stored Pressure Type Fire Extinguisher having:

- Capacity : 6 Kg
- Stored pressure type
- Mild steel / alloy steel cylinder
- Internal and external anti-corrosive coating
- Squeeze grip operating valve
- Flexible discharge hose and nozzle
- Pressure gauge indication

- Wall mounting bracket

Suitable for Class A, B & C fires.

The extinguisher shall conform to IS:15683 and shall be ISI marked.

---

### Fire Extinguisher Details

Description	Specification
Type	ABC Dry Chemical Powder
Capacity	6 Kg
Operation	Stored Pressure Type
Standard	IS:15683
Marking	ISI Marked
Mounting	Wall Mounted

### 2. Installation

The work shall include:

- Fixing on wall with suitable bracket/clamp
- Proper positioning as directed
- Identification labeling
- Accessibility arrangement
- Complete mounting accessories

Complete in all respects.

### 3. Testing & Commissioning

Including:

- Visual inspection
- Pressure gauge checking
- Hose and nozzle checking
- Verification of ISI marking
- Functional readiness inspection

Complete as required.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of fire extinguisher
- Wall mounting bracket/clamps
- Fixing accessories
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for minor accessories and consumables required for complete installation.

Item No. Supply & installation ISI marked (IS:15683) Fire Extinguisher, Carbon-di-oxide type



- 35 capacity 4.5 Kgs. flat base including valve, discharge hose of not less than 10mm dia., 1M long and complete in all respects including initial fill with CO<sub>2</sub> gas conforming to IS:307-1966 filled to a filling rate of not more than 0.667 and wall suspension bracket. (LMR) etc completed as directed EIC.



### Detailed Technical Specification

#### 1. Fire Extinguisher Construction

Providing approved make Carbon-di-oxide type fire extinguisher conforming to IS:15683 having:

- Capacity : 4.5 Kg
- Flat base type cylinder
- High pressure seamless steel cylinder
- Valve assembly with safety arrangement
- Discharge hose minimum 10 mm dia and 1 metre long
- Discharge horn/nozzle
- Wall suspension bracket
- Corrosion resistant painted finish

Suitable for electrical and flammable liquid fire protection.

---

#### Fire Extinguisher Details

Description	Specification
Type	Carbon-di-oxide (CO <sub>2</sub> )
Capacity	4.5 Kg
Standard	IS:15683
Gas Filling Standard	IS:307-1966
Hose Size	Minimum 10 mm Dia
Hose Length	1 Metre
Mounting	Wall Suspension Bracket

#### 2. Gas Filling Requirement

The extinguisher shall be:

- Initially filled with CO<sub>2</sub> gas conforming to IS:307-1966
- Filled to filling ratio not exceeding 0.667
- Factory tested and sealed

Complete in all respects.

---

#### 3. Installation

The work shall include:

- Wall mounting using suspension bracket
- Proper positioning as directed by Engineer-in-Charge
- Accessibility arrangement
- Identification labeling
- Necessary fixing hardware

Complete as required.

#### 4. Testing & Commissioning

Including:

- Visual inspection
- Weight verification
- Leakage checking
- Hose and valve inspection
- Readiness verification

Complete as required.

---

#### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of CO<sub>2</sub> fire extinguisher
- Initial gas filling
- Hose and discharge horn
- Wall mounting bracket
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for fixing accessories and minor consumables required for complete installation.

Item 36	No.	Providing and Fixing Remote Push Button Switch for Main Fire Pump on All floors for operation of Fire Pump including control wiring 3 core x 1.5 Sq.mm copper armoured with all required fittings and accessories with all labour and materials as directed by Engineer in charge.
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#### Detailed Technical Specification

##### 1. Remote Push Button Station

Providing approved make Remote Push Button Switch suitable for remote operation of main fire pump having:

- Push button type operation

- Metallic / FR enclosure
- Red colour emergency type station
- Suitable engraved identification plate
- Flush/surface mounting arrangement
- Suitable for all floor installation

Complete in all respects.

---

### Push Button Details

Description	Specification
Type	Remote Push Button Switch
Application	Main Fire Pump Operation
Mounting	Flush / Surface Mounted
Installation Location	All Floors
Operation	Manual Remote Start

### 2. Control Wiring

Providing and laying:

- 3 Core  $\times$  1.5 Sq.mm copper conductor armoured cable
- PVC insulated and PVC sheathed
- Suitable for control wiring
- Complete with glands, lugs and ferruling

Cable shall be laid through conduit/tray/wall surface as directed.

### 3. Installation

The work shall include:

- Fixing push button station
- Control wiring from push button to fire pump panel
- Necessary conduit/tray routing coordination
- Cable gland and termination
- Identification ferrules
- Testing of operation

Complete as required.

### 4. Testing & Commissioning

Including:

- Continuity testing
- Insulation resistance testing
- Functional operation test
- Remote pump start verification
- Complete commissioning

as required for satisfactory operation.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of remote push button station
- 3 Core  $\times$  1.5 Sq.mm copper armoured cable
- Glands and lugs
- Wiring and termination
- Fixing accessories
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for ferrules, hardware and minor accessories required for complete installation.

- Item No. 37 Supplying, installation, testing & commissioning Conventional sector panel suitable for following zones, complete with visual indications for short circuit fault, open circuit fault, fire condition and all other standard facilities as per IS:2189 with mimic diagram for all area/zone covered, complete with all connections,interconnections as required. 10 Zone



## Detailed Technical Specification

### 1. Fire Alarm Control Panel

Providing approved make microprocessor based Conventional Fire Alarm Control Panel suitable for 10 zones having:

- Wall mounted metal enclosure
- Zone-wise fire indication
- Zone-wise fault indication
- System healthy indication
- Audio-visual alarm indication
- Built-in power supply and battery charger
- Main and standby power arrangement
- Reset, acknowledge, silence and lamp test functions

Complete in all respects conforming to IS:2189.

### Panel Details

Description	Specification
Type	Conventional Fire Alarm Control Panel
Capacity	10 Zone
Standard	IS:2189
Mounting	Wall Mounted
Operation	Microprocessor Based

### 2. Indications & Features

The panel shall provide visual/audio indications for:

- Fire condition
- Open circuit fault
- Short circuit fault
- Zone fault
- AC power failure
- Battery low condition

- System ON condition

The panel shall also include:

- Zone mimic diagram for all protected areas
- Hooter/buzzer arrangement
- Zone isolation facility
- Fuse/MCB protection

Complete as required.

### 3. Installation

The work shall include:

- Mounting of panel
- Power supply connection
- Interconnection wiring
- Earthing arrangement
- Connection with detectors, MCPs and hooters
- Ferruling and identification
- Complete wiring termination

Complete in all respects.

### 4. Testing & Commissioning

Including:

- Insulation resistance test
- Loop testing
- Detector and MCP simulation testing
- Audio visual alarm testing
- Battery backup testing
- Complete commissioning

as required for satisfactory operation.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of 10 zone conventional fire alarm panel
- Mimic diagram
- Internal battery charger
- Indications and controls
- Mounting accessories
- Wiring terminations/interconnections
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for ferrules, labels, hardware and minor accessories required for complete installation.

Item 38	No. Supplying, installation, testing & commissioning of Conventional type smoke detector with built in LED and mounting base complete with all connections etc. as required.
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## Detailed Technical Specification

### 1. Smoke Detector Construction

Providing approved make conventional type smoke detector suitable for fire alarm system having:

- Built-in LED indication for activation
- Photoelectric / optical smoke sensing chamber
- Low profile aesthetic design
- High sensitivity smoke detection
- Mounting base suitable for ceiling installation
- Compatibility with conventional fire alarm panel

Complete in all respects.

---

### Smoke Detector Details

Description	Specification
Type	Conventional Smoke Detector
Indication	Built-in LED
Mounting	Ceiling Mounted
Base	Detector Mounting Base Included
Application	Fire Alarm Detection System

### 2. Installation

The work shall include:

- Fixing detector with mounting base
- Ceiling/wall mounting as required
- Connection to fire alarm loop
- Proper identification and addressing
- Necessary fixing accessories
- Alignment and positioning

Complete as required.

### 3. Testing & Commissioning

Including:

- Continuity testing
- Detector response testing
- LED indication verification
- Integration with fire alarm panel
- Functional smoke simulation test

Complete as required for satisfactory operation.

---

## Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of smoke detector
- Detector mounting base
- Fixing accessories
- Wiring termination
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for screws, connectors and minor consumables required for complete installation.

Item No. 39 Supplying, installation, testing & commissioning of Conventional type manual call box of ABS type in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc. as required.



## Detailed Technical Specification

### 1. Manual Call Box Construction

Providing approved make conventional type Manual Call Point (MCP) manufactured from:

- High quality ABS body
- Surface/recess mounting type
- Break glass arrangement
- Push button/manual activation mechanism
- Stainless steel chain and hammer assembly
- LED indication wherever applicable
- Suitable for fire alarm system integration

Complete in all respects.

---

### Manual Call Box Details

Description	Specification
Type	Conventional Manual Call Box
Material	ABS Body
Mounting	Surface / Recess Mounted

Description	Specification
Activation	Break Glass / Push Button
Accessories	SS Chain & Hammer Assembly

## 2. Installation

The work shall include:

- Surface/recess mounting
- Wiring connection to fire alarm loop
- Fixing of hammer and chain assembly
- Proper identification labeling
- Necessary fixing accessories
- Alignment and positioning

Complete as required.

## 3. Testing & Commissioning

Including:

- Continuity testing
- Activation testing
- Alarm response verification
- Panel integration testing
- Functional checking

Complete as required for satisfactory operation.

---

## Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of manual call box
- Glass and push button arrangement
- Stainless steel chain and hammer assembly
- Mounting accessories
- Wiring termination
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for screws, connectors and minor consumables required for complete installation.

Item	No.	Supplying, installation, testing & commissioning of Conventional type fire alarm
40		sounder, mounted in A.B.S. box etc. complete as required.



## Detailed Technical Specification

### 1. Fire Alarm Sounder Construction

Providing approved make conventional type fire alarm sounder having:



- Electronic hooter/sounder type
- Mounted in high quality ABS enclosure
- High audible output suitable for indoor installation
- Low power consumption
- Continuous/intermittent tone operation
- Suitable for operation with conventional fire alarm system

Complete in all respects.

---

### Sounder Details

Description	Specification
Type	Conventional Fire Alarm Sounder
Enclosure	ABS Box
Mounting	Wall/Ceiling Mounted
Operation	Electronic Audible Alarm
Application	Fire Alarm System

### 2. Installation

The work shall include:

- Mounting on wall/ceiling
- Wiring connection to fire alarm panel
- Necessary fixing accessories
- Proper alignment and positioning
- Identification labeling

Complete as required.

### 3. Testing & Commissioning

Including:

- Continuity testing
- Audible alarm testing
- Integration with fire alarm panel
- Functional operation checking
- Complete commissioning

as required for satisfactory performance.

---

### Mode of Measurement

The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of fire alarm sounder
- ABS enclosure
- Mounting accessories
- Wiring termination
- Installation
- Testing and commissioning
- Labour, tools and tackles

Nothing extra shall be paid for screws, connectors and minor consumables required for complete installation.

Item No. Providing, Fixing & installation PVC 100 x 100 mm junction box for smoke detector including fixing in ceiling with all labour & materials as directed by engineer in charge.



### Detailed Technical Specification

#### 1. Junction Box Construction

Providing approved quality PVC junction box having:

- Size : 100 mm × 100 mm
- Heavy duty PVC construction
- Suitable for smoke detector wiring connections
- Removable cover arrangement
- Smooth finished edges
- Adequate space for cable termination
- Suitable for concealed/surface installation

Complete in all respects.

---

#### Junction Box Details

Description	Specification
Material	PVC
Size	100 mm × 100 mm
Application	Smoke Detector Wiring
Mounting	Ceiling Mounted
Type	Junction Box with Cover

#### 2. Installation

The work shall include:

- Fixing in ceiling/wall
- Proper alignment and leveling
- Cable entry arrangement
- Necessary screws, fasteners and fixing hardware
- Coordination with detector mounting position

Complete as required.

### 3. Testing & Inspection

Including:

- Checking of mounting rigidity
- Inspection of wiring space
- Verification of cover fixing
- Coordination with smoke detector installation

Complete as required.

---

### Mode of Measurement

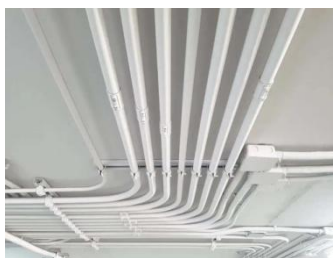
The item shall be measured on **Number Basis**.

The rate shall include:

- Supply of PVC junction box
- Cover plate
- Screws and fixing accessories
- Installation
- Labour, tools and tackles

Nothing extra shall be paid for minor hardware and consumables required for complete installation.

Item	No.	Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size
42		complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed.



### Detailed Technical Specification

#### 1. PVC Conduit Pipe

Providing approved make ISI marked medium class rigid PVC conduit pipe suitable for electrical/fire alarm wiring installation having:

- Heavy duty rigid PVC construction
- Medium class conduit
- Smooth inner and outer surface
- Moisture and corrosion resistant
- Suitable for surface/concealed installation
- ISI marked conduit pipe

Complete as required.

---

### Conduit Pipe Details

Description	Specification
Type	Rigid PVC Conduit Pipe
Class	Medium Class
Marking	ISI Marked
Installation	Surface / Concealed
Application	Electrical / Fire Alarm Wiring

### 2. Installation

The conduit shall be erected:

- On wall/ceiling surface or concealed in wall/ceiling
- Fixed with saddles/clamps at regular intervals
- Using approved PVC fittings and junction boxes
- Jointed with adhesive solution
- Properly aligned and supported

Complete in approved manner as directed.

### 3. Accessories Included

The work shall include:

- PVC bends
- Couplers
- Junction boxes
- Inspection boxes
- Saddles/clamps
- Adhesive solution
- Fasteners and hardware

Complete in all respects.

---

### 4. Testing & Inspection

Including:

- Alignment checking
- Proper fixing verification
- Inspection of joints
- Checking conduit continuity/path clearance

Complete as required.

---

### Mode of Measurement

The conduit pipe shall be measured in **Running Meters (RM)** along the actual route of installation.

The rate shall include:

- Supply of PVC conduit pipe
- PVC fittings and junction boxes
- Adhesive solution
- Saddles and clamps
- Fasteners and accessories
- Cutting and fixing
- Labour, tools and tackles

Nothing extra shall be paid for bends, couplers, clamps and minor accessories required for complete installation.

- Item No. 43 Design, Supply & Installation of Safety Signage approved make made of zinc sulphide based glow in the dark rigid sheet with high luminous property enclosed in a transparent weather proof U/V stabilized plastic pasted on 3mm thick Foam sheet for making signage For All Floor etc. completed as directed by engineer in charge.



### Detailed Technical Specification

#### 1. Safety Signage Construction

Providing approved make safety signage manufactured from:

- Zinc sulphide based glow in dark rigid sheet
- High luminous photoluminescent property
- Transparent weather proof UV stabilized plastic protective layer
- Mounted/pasted on 3 mm thick foam sheet backing
- Smooth finished edges
- Fade resistant and durable finish

Suitable for indoor fire safety and emergency guidance applications.

---

#### Signage Details

Description	Specification
Type	Glow in Dark Safety Signage
Base Material	Zinc Sulphide Rigid Sheet
Protection Layer	UV Stabilized Transparent Plastic
Backing Material	3 mm Foam Sheet
Property	Photoluminescent / High Glow

#### 2. Scope of Work

The work shall include:

- Designing artwork/layout
- Manufacturing of signage
- Printing/symbol marking
- Cutting and finishing
- Installation at designated locations on all floors
- Necessary fixing arrangement

Complete in all respects.

---

#### 3. Installation

The work shall include:

- Wall/ceiling fixing
- Proper alignment and leveling
- Adhesive/screw fixing arrangement
- Installation at approved locations
- Cleaning after installation

Complete as directed by Engineer-in-Charge.

#### 4. Typical Signage Applications

Suitable for:

- Fire Exit Signs
- Staircase Signs
- Fire Extinguisher Location Signs
- Hose Reel Signs
- Assembly Point Signs
- Directional/Evacuation Signs
- Emergency Escape Route Signs

Complete as required.

---

### Mode of Measurement

The item shall be measured on **Square Centimetre / Square Decimetre / Number Basis** as specified in BOQ description.

Generally measured on **Number Basis** for complete signage unit.

The rate shall include:

- Design and artwork
- Glow sheet material
- UV stabilized protective layer
- Foam sheet backing
- Printing and finishing
- Installation and fixing
- Adhesives/fasteners
- Labour, tools and tackles

Nothing extra shall be paid for cutting, lettering, symbols and minor accessories required for complete installation.

Item 44	No. Cutting hole by mechanical means of 25 to 150 mm dia (or more as per site situation) in slab / beam throughout the thickness including finishing the same with cement mortar 1:3 as directed by Engineer in charge.
------------	---

### Detailed Technical Specification

#### 1. Scope of Work

Providing hole cutting by mechanical means in:

- RCC slabs
- RCC beams
- Concrete members

for passage of pipes, conduits, sleeves or services complete as required.

The hole diameter shall be:

- 25 mm to 150 mm dia
- Or larger diameter as per site requirement and approval

Complete in all respects.

#### 2. Method of Cutting

The work shall be carried out using:

- Mechanical core cutting machine
- Diamond core drill/cutter
- Rotary cutting equipment

The work shall ensure:

- Minimum vibration
- Neat circular opening
- No damage to surrounding structure
- Smooth finished edges

Complete as directed by Engineer-in-Charge.

### 3. Finishing Work

The work shall include:

- Cleaning of cut surfaces
- Removal of debris
- Finishing edges with cement mortar 1:3
- Making good damaged portions if any

Complete in all respects.

### 4. Precautions

The contractor shall ensure:

- Structural safety during cutting
- Avoidance of reinforcement damage as far as possible
- Proper barricading and safety measures
- Removal and disposal of debris

Complete as required.

---

### Mode of Measurement

The item shall be measured on **Number Basis** according to diameter range and location.

The rate shall include:

- Mechanical cutting equipment
- Labour and supervision
- Core cutting operation
- Finishing with cement mortar 1:3
- Debris removal and disposal
- Tools and tackles

Nothing extra shall be paid for scaffolding, water usage or minor repair works required for completion.

Item No. Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.  
45

### Detailed Technical Specification

#### 1. Material Specification

Providing approved quality Hot Dip Galvanised Iron Strip/Wire manufactured from mild steel and hot dip galvanised for corrosion protection.

The material shall be:

- Uniformly galvanised
- Free from rust and surface defects
- Suitable for electrical/earthing/support applications

Wire size shall be:

- 8 SWG to 16 SWG

as specified.

---

### GI Wire / Strip Details

#### Description Specification

## **Description Specification**

Material Mild Steel

Finish Hot Dip Galvanised

Size Range 8 SWG to 16 SWG

Application Earthing / Support / Binding

## **2. Installation**

The work shall include:

- Straightening and cutting
- Erection/fixing in position
- Necessary clamps, saddles or supports
- Binding/jointing wherever required
- Proper alignment and tensioning

Complete in all respects.

## **3. Application Areas**

Suitable for:

- Earthing connections
- Cable support work
- Binding and support arrangement
- Electrical installation works
- Fire fighting installation support

Complete as required.

---

## **Mode of Measurement**

The item shall be measured in **Running Metres (RM)** along the actual erected length.

The rate shall include:

- Supply of GI strip/wire
- Cutting and straightening
- Fixing and erection
- Clamps/supports
- Labour, tools and tackles

Nothing extra shall be paid for overlaps, binding wire and minor accessories required for complete installation.

Item No.	Providing & Making cage made from 1mm thick MS Plate including opening shutter as per requirement as per size of pump including all fitting i.e. hinges &
46	



handles etc. Cage shall be fix properly with anchor bolt in such away that it have provision to maintain the pump on requirement asdirected by engineer incharge with all laboured and materials etc. complete with two coats of oil painting inside and outside surface of cage.

## Detailed Technical Specification

### Materials

1. MS Plate:
  1. Minimum thickness: **1.0 mm**.
  2. Conforming to relevant IS specifications.
2. Frame:
  1. MS angle, flat, square tube or suitable structural section as required for rigidity.
3. Hardware:
  1. MS/SS hinges.
  2. Handles.
  3. Locking arrangement/hasp and staple.
  4. Nuts, bolts and washers.
4. Anchor Fasteners:
  1. Approved make.
  2. Suitable size and capacity for secure fixing.

### Fabrication

1. Cage dimensions shall be as per actual pump size and site requirements.
2. All joints shall be continuously welded and properly finished.
3. Sharp edges shall be rounded and smooth.
4. Opening shutter/door shall provide sufficient access for maintenance.
5. Cage shall be robust enough to withstand normal operational conditions.

### Painting

1. Surface preparation by cleaning and removal of rust, oil and scale.
2. One coat of approved metal primer.
3. Two coats of synthetic enamel/oil paint on:
  1. External surfaces.
  2. Internal surfaces.
4. Colour as approved by Engineer-in-Charge.

---

## Mode of Measurement

### Unit

**Kilogram (Kg)** *(Preferred for fabricated steel work)*

**OR**

**Each (No.)** *(When a complete cage is specified for a particular pump)*

---

### Measurement (When Paid by Weight)

1. Net weight of fabricated MS cage shall be measured based on actual fabricated steel used.
  2. Weight shall include:
    1. MS sheets.
    2. Structural frame members.
    3. Doors/shutters.
    4. Stiffeners.
  3. Weight of paint shall not be measured separately.
  4. Hinges, handles, anchor bolts and other accessories shall be deemed included in the rate.
- 

### Measurement (When Paid Per Number)

1. One complete installed cage for one pump shall constitute one unit.
2. No separate payment shall be made for:
  1. Hinges.
  2. Handles.
  3. Locking arrangement.
  4. Welding.
  5. Anchor bolts.
  6. Primer and painting.
  7. Transportation.
  8. Labour and erection.

Item    No.    Cutting Jointing of 150mm Dia to Existing Pumping system including engaging

47 skilled labour & skilled supervisor for testing of all fire system on site with operating pump/panel in consultation with nominated fire consultant. The testing should be done in the presence of PWD authority with required pressure of 3.5 KG pressure at farthest point.

### **Detailed Technical Specification**

#### **1. Scope of Work**

The work shall include:

- Cutting into existing 150 mm dia fire fighting pipeline
- Jointing and integration with new/existing pumping system
- Necessary dismantling and re-fixing
- Alignment and leak proof connection
- Coordination with operational fire system

Complete in all respects.

#### **2. Skilled Labour & Supervision**

Providing:

- Skilled technicians
- Skilled supervisor
- Fire system operator
- Testing manpower

for complete testing and commissioning activities.

All works shall be carried out in consultation with nominated fire consultant and as directed by PWD authority.

#### **3. Testing & Commissioning**

The work shall include complete testing of:

- Fire pumps
- Electrical control panel
- Hydrant system
- Hose reel system
- Sprinkler network
- Pressure maintenance system

The testing shall ensure:

- Required pressure of 3.5 Kg/cm<sup>2</sup> at farthest point
- Leak proof operation
- Functional operation of complete fire fighting system
- Satisfactory operation under working conditions

Testing shall be conducted in presence of:

- PWD authority
- Nominated fire consultant
- Site engineer/representative

Complete as required.

#### **4. Included Works**

The rate shall include:

- Cutting and jointing
- Temporary shutdown coordination
- Welding/flanging/gasketing
- Labour and supervision
- Testing equipment
- Pressure testing
- Trial runs
- Documentation support

Complete in all respects.

---

### **Mode of Measurement**

The item shall be measured on **Job Basis / Lump Sum Basis** for complete work.

The rate shall include:

- Cutting and jointing of 150 mm dia pipeline
- Skilled labour and supervisor
- Testing and commissioning
- Pump and panel operation
- Coordination with fire consultant and PWD authority
- Tools, tackles and consumables

Nothing extra shall be paid for repeated testing, temporary arrangements or minor materials required for successful commissioning.

Item No. 48 Getting Fire FSPA( Fire Safety plan Approval) & FSC ( Fire Safety Certificate) with required Professional & Administrative Charges for Fire Fighting System. All the required documents pertaining to FSPA & FSC will be prepared by contractor except fire drawing will be given by the client/Architect. The required any Govt levies for FSPA/FSC will be born by the Company/Client.

### **1. Scope of Work**

The work shall include obtaining:

- FSPA (Fire Safety Plan Approval)
- FSC (Fire Safety Certificate)

from concerned Fire Department/Authority for the installed fire fighting system.

### **2. Contractor's Scope**

The contractor shall:

- Prepare all required documentation
- Compile technical details of installed systems
- Prepare application forms and compliance documents
- Coordinate with Fire Department officials
- Attend inspections and site visits
- Provide professional and administrative assistance
- Carry out liaison work till approval/certificate issuance

Complete as required.

### **3. Documents by Client/Architect**

The following shall be provided by Client/Architect:

- Approved fire fighting drawings
- Architectural drawings if required
- Any ownership/legal documents required by authority

### **4. Exclusions**

The following shall be borne separately by Client/Company:

- Government fees

- Statutory levies
- Approval charges payable to authority
- Any penalty/legal fee imposed by authorities

Only professional and administrative service charges shall be included in contractor's scope.

---

## **5. Coordination & Compliance**

The contractor shall coordinate for:

- Fire system inspection
- Demonstration/testing of fire fighting system
- Compliance rectifications if any within installation scope
- Submission of compliance reports/documents

Complete till receipt of approval/certificate.

---

## **Mode of Measurement**

The item shall be measured on **Job Basis / Lump Sum Basis** for complete work.

The rate shall include:

- Professional consultancy charges
- Documentation preparation
- Administrative and liaison work
- Site coordination
- Inspection assistance
- Submission and follow-up activities

Nothing extra shall be paid for repeated visits, document revisions or coordination work required for obtaining approvals.

Government fees/statutory levies shall be paid separately by Client/Company.