

Item 1 :

Fire Fighting Fire Pump Room & Accessories Supplying, Installation, Testing and commissioning of Electric driven Main Fire Hydrant pump suitable for automatic operation and consisting of following: Horizontal type, centrifugal End Suction pump of cast iron body & CI impeller , gland packing to ensure a minimum pressure of 3.5 kg / sq.cm. at highest and farthest outlet at specified flow of 1120 LPM @ 60M. head with M.S. fabricated common base plate, coupling, coupling guard, foundation bolts etc. as required

Pump Characteristics

Type of Pump

- Horizontal End Suction Centrifugal Pump.
- Single-stage, back pull-out design suitable for firefighting duty.
- Capable of continuous operation under firefighting conditions.

Pump Construction

- Pump casing/body made of high-grade **Cast Iron (CI)**.
- Impeller made of dynamically balanced **Cast Iron (CI)**.
- Stainless steel shaft of adequate diameter.
- Renewable wearing rings wherever applicable.
- Gland packing/mechanical sealing arrangement suitable for continuous operation without leakage.

Performance Requirements

- **Pump Capacity:** 1120 Litres Per Minute (LPM)
- **Total Head:** 60 Metres
- **Minimum Residual Pressure:** 3.5 kg/cm² at the highest and hydraulically farthest hydrant outlet.
- Pump performance shall conform to relevant IS standards and manufacturer's performance curves.

Electric Motor

- Suitable TEFC squirrel cage induction motor.
- Continuous duty, IP-55 protection or higher.
- Suitable for 415 Volts $\pm 10\%$, 3 Phase, 50 Hz AC supply.
- Class-F insulation or higher.
- Motor rating shall be adequate to drive the pump continuously at the specified duty point.

Base Frame & Coupling

- Pump and motor shall be mounted on a common **M.S. fabricated base frame**.
- Flexible coupling with coupling guard shall be provided between pump and motor.
- Base frame shall be properly aligned and finished with anti-corrosive paint.

Accessories

The pump set shall be complete with:

- Flexible coupling.
- Coupling guard.
- Foundation bolts.
- Anti-vibration pads (where specified).
- Air release valve.
- Pressure gauge.
- Vacuum gauge.
- Necessary flanges and gaskets.
- Fasteners and fixing accessories.
- Earthing connection arrangements.

Foundation & Installation

- Pump set shall be installed on RCC foundation provided by others or as specified.
- Alignment between motor and pump shall be checked and corrected before commissioning.
- Foundation bolts shall be properly grouted and secured.
- Necessary vibration-free installation shall be ensured.

Testing & Commissioning

- Hydrostatic and performance testing shall be carried out after installation.
- Pump shall be tested at rated capacity and head.
- Flow rate, pressure, vibration level, and motor current shall be checked and recorded.
- Automatic operation and control functions shall be demonstrated successfully.
- Complete commissioning shall be carried out in the presence of the Engineer-in-Charge.

Standards

Equipment shall comply with the latest editions of:

- IS 1520
- IS 9079
- IS 9137
- IS 325
- NBC (National Building Code)
- TAC (Tariff Advisory Committee) Guidelines
- Relevant Fire Safety Regulations

Workmanship Requirements

- Pump shall operate smoothly without abnormal vibration or noise.
- Installation shall ensure proper accessibility for operation and maintenance.
- All components shall be properly aligned, painted, protected, and securely fixed.
- Entire system shall be leak-proof and ready for firefighting operation.

Scope Includes

The item includes cost of **pump, electric motor, base frame, coupling, coupling guard, foundation bolts, gauges, accessories, erection, alignment, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, wiring between motor and starter (if specified), painting, documentation, performance testing, and all incidental charges** required for complete installation and commissioning.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete pump sets supplied, installed, tested, and commissioned.

Payment shall be made for the **fully functional and commissioned fire hydrant pump set**, including all accessories and fittings complete in all respects.

All final decisions regarding make, performance, testing parameters, compliance with fire safety standards, and quality of materials shall be as approved by the Engineer-in-Charge and Fire Safety Authorities.

Item 2 :

Supplying, Installation, Testing and commissioning of Jockey Pump 10.8M³/hour @70M Head. Horizontal Centrifugal End Suction. with M.S. fabricated common base plate, coupling, coupling guard, foundation bolts etc. as required

The **Jockey Pump** shall be an **electrically driven horizontal centrifugal end-suction type** pump having a rated capacity of **10.8 m³/hour at 70 metres head**, suitable for maintaining pressure in the fire-fighting system and for automatic operation.

The pump casing shall be of **cast iron** of approved quality, with **non-corrosive metal impeller** and other wetted parts suitable for fire-fighting service. The pump shall be provided with a **mechanical seal** to ensure leak-free and reliable operation. The pump shall be driven by an electric motor suitable for **415 Volts, 3 Phase, 50 Hz A.C. supply**, adequately rated for continuous duty and compatible with automatic starting and stopping through pressure control.

The pump and motor shall be mounted on a **M.S. fabricated common base plate**, complete with **flexible coupling, coupling guard, foundation bolts**, nuts, washers, and all required accessories. The base plate shall be rigid and suitable for proper alignment. The pump set shall be installed on a suitable concrete foundation and aligned accurately to ensure smooth, vibration-free operation.

After installation, the jockey pump shall be tested for **rated discharge, head, and automatic operation**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**. Manufacturer's test certificates and performance data shall be submitted before final acceptance.

All materials and workmanship shall conform to relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**.

Mode of Measurement: Set

Measurement & Payment: Payment shall be made **per Nos** after satisfactory supply, installation, testing, commissioning, and approval by the Engineer-in-Charge.

Item 3 :

Supplying, Installation, Testing and commissioning of Diesel Engine driven Main Fire Hydrant pump suitable for automatic operation and consisting of following: Horizontal type, centrifugal End Suction pump of cast iron body & CI impeller , gland packing to ensure a minimum pressure of 3.5 kg / sq.cm. at highest and farthest outlet at specified flow of 1120 LPM @ 60M. head with M.S. fabricated common base plate, coupling, coupling guard, foundation bolts etc. as required

Pump Characteristics

Type of Pump

- Horizontal End Suction Centrifugal Pump.
- Single-stage centrifugal pump suitable for continuous firefighting duty.
- Back pull-out design for ease of maintenance.

Pump Construction

- Pump casing/body made of high-grade **Cast Iron (CI)**.
- Impeller made of dynamically balanced **Cast Iron (CI)**.
- Stainless steel shaft of adequate size.
- Gland packing/mechanical sealing arrangement to prevent leakage.
- Renewable wearing rings wherever applicable.

Performance Requirements

- **Pump Capacity:** 1120 Litres Per Minute (LPM)
- **Total Head:** 60 Metres
- **Minimum Residual Pressure:** 3.5 kg/cm² at the highest and hydraulically farthest hydrant outlet.
- Performance shall be certified by the manufacturer and conform to relevant fire-fighting standards.

Diesel Engine

- Water-cooled or radiator-cooled diesel engine specifically designed for fire pump applications.
- Suitable BHP rating to drive the pump continuously at the specified duty point.
- Capable of automatic and manual starting.
- Engine speed matched with pump performance requirements.
- Equipped with:
 - Electric starting system
 - Battery charging alternator
 - Heavy-duty batteries with leads and terminals
 - Fuel tank with sufficient capacity for minimum operation as per fire norms
 - Fuel piping and accessories
 - Exhaust silencer with piping
 - Instrument panel with gauges and indicators

Base Frame & Coupling

- Pump and diesel engine shall be mounted on a common **M.S. fabricated base frame**.
- Flexible coupling shall be provided between pump and engine.
- Coupling shall be protected with a heavy-duty coupling guard.
- Base frame shall be treated with anti-corrosive primer and paint.

Control & Automation

- Automatic operation through pressure sensing arrangement.
- Automatic starting of diesel engine upon pressure drop in hydrant system.
- Manual starting and stopping provision.
- Engine protection system for:
 - Low lubricating oil pressure
 - High engine temperature
 - Over-speed protection
 - Battery charging indication

Accessories

The complete pump set shall include:

- Flexible coupling.
- Coupling guard.
- Foundation bolts.
- Pressure gauge.
- Vacuum gauge.
- Air release valve.
- Fuel tank and fuel piping.
- Batteries and battery charger.
- Exhaust silencer with piping.
- Anti-vibration pads (if specified).
- Necessary flanges, gaskets, nuts, bolts, and fasteners.
- Earthing arrangements.

Foundation & Installation

- Pump set shall be installed on RCC foundation.
- Proper alignment between pump and diesel engine shall be ensured.
- Foundation bolts shall be properly grouted and secured.
- Vibration-free installation shall be achieved.

Testing & Commissioning

- Pump set shall be tested at rated capacity and head.

- Complete performance testing shall be carried out.
- Automatic start operation shall be demonstrated.
- Flow, pressure, engine RPM, fuel system, alarms, and safety devices shall be tested.
- Commissioning shall be carried out in the presence of the Engineer-in-Charge.

Applicable Standards

The equipment and installation shall conform to:

- IS 1520
- IS 9079
- IS 9137
- NBC (National Building Code)
- TAC (Tariff Advisory Committee) Guidelines
- Relevant Fire Safety Regulations
- Manufacturer's standards and recommendations

Workmanship Requirements

- Pump and engine shall operate smoothly without abnormal vibration, overheating, or noise.
- Entire installation shall be leak-proof and easily accessible for maintenance.
- All equipment shall be properly painted, protected, aligned, and securely fixed.
- The complete system shall be fully operational and ready for emergency firefighting use.

Scope Includes

The item includes cost of **centrifugal pump, diesel engine, fuel tank, batteries, battery charger, control system, base frame, coupling, coupling guard, gauges, accessories, installation, alignment, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, painting, documentation, performance testing, and all incidental charges** necessary for complete installation and successful commissioning.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete diesel engine driven fire hydrant pump sets supplied, installed, tested, and commissioned.

Payment shall be made for the **fully operational and commissioned diesel engine driven fire hydrant pump set**, including all accessories, automation features, and testing complete in all respects.

All final decisions regarding make, performance, testing parameters, compliance with fire safety standards, and quality of materials shall be as approved by the Engineer-in-Charge and Fire Safety Authorities.

Item 4 :

Supplying, Installing and fixing Diesel Engine (Pump) 130AH 24M Genset Battery relevant to the required capacity.

Materials

Battery

- Battery shall be **130 Ah capacity, 24 Volt DC** suitable for diesel engine starting applications.
- Battery shall be heavy-duty automotive/industrial type specifically designed for fire pump diesel engine service.
- Battery shall be maintenance-free (SMF) or low-maintenance lead-acid type of approved make.
- Battery shall conform to relevant IS specifications and manufacturer's standards.

Battery Set

- Battery bank shall consist of required number of cells/batteries connected in series to provide **24 Volt DC output**.
- Capacity shall be adequate for repeated starting of the diesel engine and operation of associated controls.

Accessories

The battery installation shall include:

- Heavy-duty battery stand/rack with anti-corrosive finish.
- Interconnecting cables.
- Battery terminal connectors.
- Terminal covers.
- Battery clamps and hold-down arrangements.
- Necessary nuts, bolts, washers, and fixing accessories.
- Identification labels and warning signs.

Installation

- Batteries shall be installed in the designated location near the diesel engine control panel.
- Battery terminals shall be properly connected with suitably sized copper cables.
- Polarity shall be checked before energization.
- Batteries shall be securely mounted to prevent movement during operation.

Testing & Commissioning

- Battery voltage and charging condition shall be checked before commissioning.
- Starting performance of diesel engine shall be demonstrated.

- Terminal connections shall be checked for proper contact and voltage drop.
- Complete battery system shall be tested under operating conditions.

Workmanship Requirements

- Batteries shall be free from physical damage, leakage, cracks, or manufacturing defects.
- All terminals shall be clean, properly tightened, and protected against corrosion.
- Installation shall be neat, safe, and easily accessible for maintenance.
- Battery system shall ensure reliable starting of the diesel engine under all operating conditions.

Scope Includes

The item includes cost of **130 Ah, 24 Volt battery set, battery stand, cables, connectors, clamps, fixing accessories, installation, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete battery sets supplied, installed, tested, and commissioned.

Payment shall be made for the **fully installed and operational battery set**, including all accessories, cables, and fixing arrangements complete in all respects.

All final decisions regarding make, capacity, installation details, workmanship, and quality of materials shall be as approved by the Engineer-in-Charge.

Item 5 :

Supplying, Installing and fixing of Diesel Engine (Pump) fuel Storage tank No Diesel is in scope

Materials

Fuel Storage Tank

- Fuel storage tank shall be fabricated from **M.S. plate of suitable thickness** conforming to relevant IS specifications or factory-manufactured approved fuel tank.
- Capacity shall be suitable for the diesel engine fire pump requirement and as approved by the Engineer-in-Charge.
- Tank shall be leak-proof, structurally sound, and suitable for storage of High-Speed Diesel (HSD).

Tank Accessories

The fuel tank shall be complete with:

- Lockable filling cap.
- Fuel level indicator/gauge.
- Vent pipe with weatherproof cap.
- Drain valve at bottom.
- Inspection cover/manhole where required.
- Fuel outlet connection.
- Overflow connection (if required).
- Supporting saddles/brackets.
- Isolation valves and necessary fittings.

Support Structure

- Tank shall be installed on suitable M.S. supports, saddles, or RCC platform as specified.
- Necessary anchor bolts, clamps, brackets, and fixing arrangements shall be provided.
- Tank shall be properly aligned and secured.

Painting & Protection

- Internal and external surfaces shall be cleaned and treated.
- One coat of approved metal primer and two coats of synthetic enamel paint shall be applied externally.
- Tank shall be protected against corrosion and weathering.

Installation

- Tank shall be installed at the designated location.
- Necessary fuel supply and return piping connections up to the diesel engine shall be provided wherever specified.

- All joints shall be leak-proof and properly secured.
- Proper accessibility for inspection, maintenance, and refueling shall be ensured.

Testing & Commissioning

- Tank shall be hydraulically tested or checked for leakage before commissioning.
- All fittings, valves, and connections shall be tested for satisfactory operation.
- Complete installation shall be checked and approved before commissioning.

Exclusions

- **Supply and filling of diesel fuel is not included in this item and shall be measured and paid separately or provided by the department.**

Workmanship Requirements

- Tank installation shall be rigid, stable, and leak-proof.
- All fittings and accessories shall be properly installed and functional.
- Work shall conform to applicable fire safety requirements and approved drawings.
- Entire system shall be ready for connection and operation with the diesel engine fire pump.

Scope Includes

The item includes cost of **fuel storage tank, support structure, fittings, valves, level indicator, vent pipe, drain arrangement, painting, fixing accessories, installation, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete fuel storage tank units supplied, installed, tested, and commissioned.

Payment shall be made for the **fully installed and operational fuel storage tank**, including all accessories and fittings complete in all respects.

Note: Supply of diesel fuel is specifically excluded from the scope of this item.

All final decisions regarding tank capacity, make, installation details, workmanship, and quality of materials shall be as approved by the Engineer-in-Charge.

Item 6 :

Supplying, Installing and fixing & Wrapping of Exhaust pipe with Insulation. it should be bigger then diesel discharge line. 80 MM Dia Pipe

Materials

Exhaust Pipe

- Exhaust pipe shall be manufactured from **heavy-duty Mild Steel (M.S.) seamless/ERW pipe** of suitable thickness capable of withstanding high exhaust gas temperatures.
- Pipe diameter shall be **80 mm nominal bore** or larger as recommended by the diesel engine manufacturer to ensure unrestricted exhaust gas flow.
- Pipe shall be free from dents, cracks, corrosion, and manufacturing defects.

Pipe Fittings

- Necessary bends, elbows, reducers, flanges, clamps, expansion joints (where required), supports, and accessories shall be provided.
- All fittings shall be suitable for high-temperature exhaust service.

Thermal Insulation

- Exhaust pipe shall be fully wrapped with approved high-temperature thermal insulation material such as:
 - Ceramic fibre insulation, or
 - Mineral wool/rock wool insulation of approved density and thickness.
- Insulation thickness shall not be less than **50 mm** or as recommended by the engine manufacturer.
- Insulation shall be covered with **aluminium cladding sheet (minimum 24 SWG)** or approved protective outer covering.
- Joints in insulation and cladding shall be properly sealed and secured.

Installation

- Exhaust pipe shall be installed from diesel engine exhaust outlet up to the designated discharge point.
- Proper slope shall be maintained to avoid accumulation of condensate.
- Adequate supports, hangers, clamps, and anchor arrangements shall be provided.
- Exhaust outlet shall be located at a safe height and position as per fire safety requirements.
- Rain cap or bird screen shall be provided at the outlet wherever required.

Painting

- Exposed M.S. portions and supports shall receive:
 - One coat of approved metal primer.
 - Two coats of heat-resistant synthetic enamel paint of approved shade.

Testing & Commissioning

- Complete exhaust system shall be checked for leakage, vibration, and proper support.
- Engine shall be operated under load conditions to verify satisfactory exhaust gas discharge.
- Insulation effectiveness and integrity of supports shall be verified.

Workmanship Requirements

- Exhaust system shall be rigid, properly aligned, and vibration-free.
- Insulation shall be continuous and securely wrapped without gaps.
- Installation shall ensure safe operation and protection against heat radiation.
- Entire system shall comply with diesel engine manufacturer's recommendations and fire safety requirements.

Scope Includes

The item includes cost of **80 mm dia M.S. exhaust pipe, bends, flanges, clamps, supports, hangers, insulation material, aluminium cladding, fixing accessories, welding, painting, installation, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, scaffolding, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Running Metres (Rmt)** of exhaust pipe installed and insulated, measured along the centre line of the pipe.

Payment shall be made for the **fully installed and insulated exhaust pipe system**, including all fittings, supports, insulation, cladding, and accessories complete in all respects. No separate payment shall be made for bends, clamps, supports, insulation joints, or incidental operations.

Item 7 :

Supplying, Installation, Testing and commissioning of cubical type floor mounted power cum Fire Pump control panel complete with suitable switch gear, bus bars, relays, contractors, indicating lamps, fuses, instruments manual isolator & auxillary switch including connections complete as required.(Contractor should submit GA Drawing for approval before deliver the Panel at Site)

The **Fire Pump Control Panel** shall be a **cubical type, floor-mounted, power-cum-control panel**, suitable for controlling and monitoring fire-fighting pumps and associated equipment. The panel shall be fabricated from **sheet steel of adequate thickness**, rigidly constructed, dust protected, and finished with approved powder-coated paint.

The panel shall be complete with all required **switchgear and control components**, including **incoming isolator, MCCB/MCB, contactors, relays, bus bars, fuses, indicating lamps, selector switches, push buttons, measuring instruments**, manual isolator, and auxiliary switches, all of approved make and suitable for the electrical ratings of the connected fire pumps.

The control panel shall be designed for **415 Volts, 3 Phase, 50 Hz A.C. supply**, suitable for continuous operation and automatic/manual control of fire pumps. Proper interlocking, protection, and indication shall be provided to ensure safe and reliable operation. Internal wiring shall be neatly laid, ferruled, and terminated on suitable terminal blocks.

The panel shall be provided with necessary **power and control wiring connections**, earthing terminals, cable entry arrangement, and gland plates, complete in all respects. All components shall be arranged for easy access, operation, inspection, and maintenance.

The contractor shall submit **General Arrangement (GA) drawings**, schematic diagrams, and technical details of the panel for approval of the **Engineer-in-Charge** prior to fabrication and delivery of the panel at site.

After installation, the panel shall be tested for correct functioning of all controls, protections, indications, and interlocks. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**. Manufacturer's test certificates and operation manuals shall be submitted before final acceptance.

All materials and workmanship shall conform to relevant **Indian Standards**, electrical safety codes, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**.

Mode of Measurement: Set

Measurement & Payment: Payment shall be made per set after satisfactory supply, installation, testing, commissioning, and approval by the Engineer-in-Charge.

Item 8 :

Providing, fixing, testing and commissioning below Caballing work for Fire Pumps (Only from Panel to Pumps) 3 C X 35 Sqmm Alluminium Armoured

Providing, fixing, testing, and commissioning of power cabling for fire pumps, limited to panel-to-pump connections only, using 3 Core × 35 sq.mm Aluminium Armoured Cable, complete in all respects, as per approved drawings, relevant Indian Standards, fire safety requirements, manufacturer's specifications, and directions of the Engineer-in-Charge.

The cable shall be of approved make with aluminium conductor, suitable insulation, inner sheath, steel wire armouring, and outer protective sheath, rated for the required voltage and current carrying capacity of the fire pumps. All cables shall be new, unused, and of latest manufacture.

The cable shall be laid, dressed, and fixed neatly on walls, ceilings, cable trays, or in conduits as directed, including supply and fixing of cable trays, saddles, clamps, supports, bends, glands, lugs, ferrules, and all necessary accessories. Proper identification tags shall be provided at both ends of the cable.

Cable termination shall be carried out using suitable compression glands and aluminium lugs, properly crimped and insulated. Adequate earthing continuity shall be ensured for armouring. All workmanship shall be neat and secure to allow safe operation and maintenance.

After installation, the cable shall be tested for continuity, insulation resistance, and correctness of connections. Testing and commissioning shall be carried out to the satisfaction of the Engineer-in-Charge.

All materials and workmanship shall comply with relevant IS Codes, electrical safety norms, and fire-fighting system requirements.

Mode of Measurement: Running Metre

Measurement & Payment: Payment shall be made on actual measured length of cable laid, after satisfactory installation, testing, commissioning, and approval by the Engineer-in-Charge.

Item 9 :

Providing, fixing, testing and commissioning below Caballing work for Fire Pumps (Only from Panel to Pumps) 3 C X 16 Sqmm Alluminium Armoured

Same as Item no. 8 only size of cable is 3C X 16 Sqmm Instead of 3C X 35 Sqmm

Item 10 :

Providing, fixing, testing and commissioning below Caballing work for Fire Pumps (Only from Panel to Pumps) 2 C X 1.5 Sqmm Copper Armoured.

Same as Item no. 8 only size of cable is 2C X 1.5 Sqmm Instead of 3C X 35 Sqmm

Item 11 :

Providing, fixing, testing and commissioning below Caballing work for Fire Pumps (Only from Panel to Pumps) Perforated G.I. sheet cable tray Cable Tray .300 X 300 X 50mm.

The cable tray shall be manufactured from **heavy gauge galvanized iron sheet**, perforated type, with smooth edges, uniform perforations, and adequate rigidity to support the fire pump power cables. The tray shall be suitable for indoor installation and resistant to corrosion. All trays, bends, tees, reducers, couplers, and accessories shall be of matching material and finish.

The cable tray shall be fixed on walls, ceilings, or floors using **MS/GI supports, brackets, hangers, clamps, anchor fasteners, nuts and bolts**, as required to ensure proper alignment and load-bearing capacity. Spacing of supports shall be adequate to prevent sagging. Proper continuity bonding shall be ensured throughout the tray system.

After installation, the tray alignment, fixing, and continuity shall be checked and approved. The work shall be completed in a neat and workmanlike manner to allow safe laying and maintenance of fire pump cables.

All materials and workmanship shall conform to relevant **IS Codes**, electrical installation practices, fire safety norms, and directions of the **Engineer-in-Charge**.

Mode of Measurement: Running Metre

Measurement & Payment: Payment shall be made on actual measured length of cable tray installed, after satisfactory completion and approval by the Engineer-in-Charge.

Item 12 :

Providing, fixing, testing and commissioning below Caballing work for Fire Pumps (Only from Panel to Pumps) Perforated G.I.sheet cable tray Cable Tray .150 X 150 X 50mm.

Same as Item no. 11 only size of cable tray is 150 x 150 x 50 mm Instead of 300 x 300 x 50 mm

Item 13 :

Providing, fixing, testing and commissioning G.I. Earthing strips of 50MM x 6MM thick, strip shall be run on floor / ceiling / walls, from the equipment to the nearest Earth pit with necessary accessories as required. (Earth pit shall be executed by other agencies).

Materials

G.I. Earthing Strip

- Earthing conductor shall consist of **Hot Dip Galvanized Iron (G.I.) Strip** of size **50 mm wide × 6 mm thick**.
- The strip shall be free from cracks, laminations, rust, and manufacturing defects.
- Galvanization shall conform to relevant IS standards and provide adequate corrosion resistance.

Accessories

- G.I. clamps, saddles, spacers, cleats, nuts, bolts, washers, and fixing accessories.
- Approved lugs, connectors, and jointing materials wherever required.
- Protective sleeves and coverings at locations vulnerable to mechanical damage.

Installation

- Earthing strip shall be laid from the equipment body/frame to the nearest earth pit location.
- Routing shall be carried out along floors, walls, ceilings, trenches, cable trays, or structural members as required.
- Earthing strip shall be fixed neatly and securely using approved clamps and saddles at regular intervals.
- Bends shall be made with proper radius without causing damage to the strip.
- All joints shall be electrically and mechanically sound.

Connections

- Earthing strip shall be connected to equipment using approved bolts, nuts, lugs, and terminals.
- Connections shall be cleaned properly to ensure low resistance contact.
- All joints and terminations shall be protected against corrosion.

Testing

- Continuity of the earthing conductor shall be checked after installation.
- Earth continuity and resistance measurements shall be carried out as required.
- The entire earthing system shall be tested and commissioned to the satisfaction of the Engineer-in-Charge.

Exclusions

- **Construction of earth pit, earth electrode, and associated civil works are not included in this item and shall be executed by other agencies.**

Workmanship Requirements

- Earthing strip shall be laid in a neat and workmanlike manner.
- Installation shall ensure continuous and reliable electrical conductivity.
- Strip shall be properly supported throughout its length.
- Entire work shall conform to the requirements of **IS 3043 (Code of Practice for Earthing)** and other applicable standards.

Scope Includes

The item includes cost of **50 mm × 6 mm G.I. strip, clamps, saddles, cleats, spacers, lugs, bolts, nuts, washers, supports, fixing accessories, cutting, bending, drilling, jointing, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Running Metres (Rmt)** of G.I. earthing strip actually installed and accepted.

Payment shall be made for the **completed length of earthing strip**, including all fixing arrangements, supports, joints, testing, and commissioning complete in all respects. No separate payment shall be made for clamps, saddles, bends, joints, or incidental operations.

Note: Earth pit and earth electrode are excluded from this item and shall be provided by other agencies.

Item 14 :

Cutting hole by Mechanical Means of upto 200 mm dia in slab/beam throughout the thickness

Making openings **up to 200 mm diameter** in **RCC slabs or beams** through the **entire thickness** by approved **mechanical means**, carried out carefully to avoid damage to existing reinforcement, structural members, and adjoining surfaces. The work shall include accurate setting out, execution of cutting, removal of the concrete core, handling and disposal of all debris, and proper finishing of the cut edges so as to leave the surrounding concrete sound and free from cracks.

All operations shall be carried out in a safe and workmanlike manner using suitable tools and equipment, strictly as per drawings, site conditions, and directions of the **Engineer-in-Charge**. Necessary precautions shall be taken to protect existing services, finishes, and structural stability during execution.

Measurement shall be taken on **Number (No.) basis**, and payment shall be made per opening after satisfactory completion and approval by the **Engineer-in-Charge**.

Item 15 :

Providing, fixing, testing & commissioning of Glycerin Filled dial type Pressure Gauge and range of 0-15 Kg/cm²

The pressure gauge shall be a **glycerin-filled, dial type instrument** with a measuring range of **0 to 15 kg/cm²**, suitable for use in fire-fighting and pressurised water systems. The gauge shall be of approved make, robust construction, and designed to provide accurate and vibration-free pressure indication under operating conditions.

The gauge shall have a corrosion-resistant metal casing, clear and legible dial markings, and suitable connection size compatible with the system piping. Necessary fittings such as adaptors, nipples, isolating cock/valve, sealing materials, and mounting accessories shall be provided to ensure proper installation and easy maintenance.

Installation shall be carried out at the designated locations in a manner that allows convenient reading of pressure. After installation, the gauge shall be tested to verify accuracy, proper calibration, and leak-free operation. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall conform to relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 16 :

Providing, fixing, testing & commissioning of Pressure Switches for automation of fire pumps. Pressure switches shall be double pole single throw type suitable for 3 phase supply with diaphragm. Aluminum Enclosure with IP 66 protection as required.

The pressure switch shall be of **double pole single throw (DPST) type**, suitable for **automation of fire pumps** and compatible with **3-phase electrical supply**. The switch shall operate on a **diaphragm-operated mechanism** to sense system pressure accurately and reliably for automatic start and stop of fire pumps.

The pressure switch shall be housed in a **robust aluminium enclosure** with a minimum **IP-66 degree of protection**, making it suitable for installation in fire pump rooms and damp or harsh operating environments. The enclosure shall be corrosion resistant and suitable for continuous service.

Necessary mounting arrangements, pressure connections, electrical terminals, and accessories shall be provided to ensure proper installation and integration with the fire pump control system. The switch shall be adjustable to the required cut-in and cut-out pressure settings as directed by the **Engineer-in-Charge**.

After installation, the pressure switch shall be tested to verify correct pressure sensing, electrical operation, and reliable automatic control of the fire pumps. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall conform to relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 17 :

Supplying, Installation, Testing and commissioning Sluice Gate Valve - Cast Iron PN-1.6 (Flanged). Hand Wheel Operated to IS: 1538 with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 150mm dia (For fire pump room & Accessories)

Materials

Sluice Gate Valve

- Valve shall be **Cast Iron (C.I.) Sluice Gate Valve**, flanged type.
- Nominal Pressure Rating: **PN 1.6 (16 kg/cm²)**.
- Nominal Diameter: **150 mm dia.**
- Valve shall conform to **IS: 14846 / IS: 780 / IS: 1538** or latest applicable standards.
- Valve shall be suitable for firefighting water applications.
- Valve body, bonnet, wedge, spindle, and other components shall be manufactured from approved materials as per relevant standards.
- Valve shall be provided with a non-rising or rising spindle arrangement as specified by the manufacturer.

Operating Mechanism

- Hand wheel operated type.
- Hand wheel shall be robust, corrosion resistant, and capable of smooth operation.
- Valve shall open and close fully without excessive operating effort.

Flanges & Jointing Materials

- Matching flanges of appropriate pressure class.
- Neoprene/rubber/compressed fibre gaskets of approved quality.
- Galvanized or high-tensile nuts, bolts, and washers.
- All accessories required for leak-proof connections.

Installation

- Valve shall be installed in the pipeline at the designated location as shown in approved drawings.
- Proper alignment of valve and pipeline shall be maintained.
- Necessary supports, anchors, and thrust arrangements shall be provided wherever required.
- Valve shall be installed in an accessible position for operation and maintenance.

Testing

- Valve and joints shall be subjected to hydrostatic pressure testing along with the connected piping system.
- All joints shall be checked for leakage.
- Smooth operation of valve through full open and full close positions shall be demonstrated.
- Testing shall be carried out to the satisfaction of the Engineer-in-Charge.

Commissioning

- Complete valve assembly shall be commissioned after successful testing.
- Proper identification and tagging shall be provided wherever required.
- Valve operation shall be demonstrated during system commissioning.

Applicable Standards

The valve and installation shall conform to:

- IS: 1538 (Latest Revision)
- IS: 780
- IS: 14846
- IS: 5290 (where applicable)
- NBC (National Building Code)
- Relevant Fire Fighting System Standards

Workmanship Requirements

- Valve shall be free from casting defects, leakage, cracks, or damage.
- Installation shall ensure proper alignment and leak-proof operation.
- Flanged joints shall be properly tightened with uniform torque.
- Entire assembly shall be rigid, safe, and suitable for long-term operation.

Scope Includes

The item includes cost of **150 mm dia Cast Iron PN 1.6 Sluice Gate Valve, flanges, gaskets, nuts, bolts, washers, supports, installation, alignment, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete valve units supplied, installed, tested, and commissioned.

Payment shall be made for the **fully installed and operational sluice gate valve assembly**, including flanges, fittings, jointing materials, testing, and commissioning complete in all respects.

Item 18 :

Supplying, Installation, Testing and commissioning Sluice Gate Valve - Cast Iron PN-1.6 (Flanged). Hand Wheel Operated to IS: 1538 with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 80mm dia (For fire pump room & Accessories)

Same as Item no. 17 only size of valve is 80 mm Instead of 150 mm

Item 19 :

Supplying, Installation, Testing and commissioning of C.I. Butterfly valve conforming to I.S:13095 class PN 16 rating with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 150mm dia. (for fire pump room & accessories)

The butterfly valve shall be of **cast iron (C.I.) construction**, conforming to **IS: 13095, Class PN-16 pressure rating**, suitable for use in fire-fighting water supply systems. The valve shall be of approved make and robust design, capable of reliable operation under specified working pressure and flow conditions.

The valve body shall be of close-grained cast iron, with disc and shaft of suitable corrosion-resistant material. The sealing arrangement shall ensure tight shut-off and smooth operation. The valve shall be suitable for **150 mm diameter pipeline** and shall be compatible with standard flanged pipe connections.

The valve shall be supplied complete with all required **mating flanges, nuts, bolts, washers, gaskets**, and other necessary fittings to achieve proper installation and leak-free performance. Installation shall be carried out in correct alignment with the pipeline, ensuring proper tightening of fasteners and uniform gasket compression.

After installation, the valve shall be tested for **leakage, smooth opening and closing operation, and pressure performance**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 20 :

Supplying, Installation, Testing and commissioning of C.I. Butterfly valve conforming to I.S:13095 class PN 16 rating with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 100mm dia. (for fire pump room & accessories)

Same as Item no. 19 only size of Valve is 100 mm dia. Instead of 150 mm dia.

Item 21 :

Supplying, Installation, Testing and commissioning of C.I. Butterfly valve conforming to I.S:13095 class PN 16 rating with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 80mm dia. (for fire pump room & accessories)

Same as Item no. 19 only size of Valve is 80 mm dia. Instead of 150 mm dia.

Item 22 :

Providing, fixing, testing and commissioning of C.I. Dual plate type Non-Return Valve class PN 16 rating with fittings, flanges, nut bolts, washers, gaskets etc. of sizes: 150mm dia. (for fire pump room & accessories)

The non-return valve shall be of **cast iron (C.I.) dual plate type**, conforming to **Class PN-16 pressure rating**, suitable for fire-fighting water supply systems. The valve shall be of approved make, robust construction, and designed to permit flow in one direction only, preventing backflow under all operating conditions.

The valve body shall be of close-grained cast iron with internal components suitable for long-term service in fire-fighting applications. The dual plates shall be spring-loaded or suitably balanced to ensure quick closing, minimum head loss, and smooth operation. The valve shall be suitable for installation in **150 mm diameter pipeline** and compatible with standard flanged connections.

The valve shall be provided complete with all required **fittings, companion flanges, nuts, bolts, washers, gaskets**, and sealing materials to achieve proper alignment and leak-proof installation. Installation shall be carried out carefully to ensure correct orientation and proper functioning of the non-return mechanism.

After installation, the valve shall be tested for **leakage, correct directional operation, and pressure performance**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 23 :

Providing, fixing, testing and commissioning of C.I. Dual plate type Non-Return Valve class PN 16 rating with fittings, flanges, nut bolts, washers, gaskets etc. of sizes: 80mm dia. (for fire pump room & accessories)

Same as Item no. 22 only size of Valve is 80 mm dia. Instead of 150 mm dia.

Item 24 :

Supplying, Installation, Testing and commissioning of Rubber Bellow conforming to I.S: Standard class PN 16 rating with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 150mm dia. (For fire pump room & Accessories)

Materials

Rubber Bellow

- Rubber bellow shall be of approved make and suitable for firefighting water service.
- Nominal Diameter: **150 mm**
- Pressure Rating: **PN 16 (16 kg/cm²)**
- Construction shall consist of reinforced synthetic rubber with multiple layers of nylon/synthetic fabric reinforcement.
- The bellow shall be designed to absorb:
 - Vibration
 - Noise transmission
 - Thermal expansion and contraction
 - Minor misalignment in piping systems

Flanges

- Both ends shall be provided with suitable **M.S./C.I./D.I. flanges** compatible with PN-16 pressure rating.
- Flanges shall be factory fitted and suitable for direct connection to the pipeline system.

Accessories

The assembly shall be complete with:

- Matching flanges.
- Neoprene/rubber gaskets.
- High tensile nuts and bolts.
- Plain washers and spring washers.
- Anti-corrosion protective coating on metallic components.
- All necessary fixing accessories required for complete installation.

Installation

- Rubber bellow shall be installed at locations indicated on drawings or as directed by the Engineer-in-Charge.
- Installation shall be carried out without introducing torsional stresses into the bellow.
- Proper alignment of connecting pipelines shall be ensured.

- Necessary supports and anchors shall be provided to prevent excessive movement.
- Flanged joints shall be tightened uniformly to ensure leak-proof performance.

Testing

- After installation, the rubber bellow assembly shall be tested along with the piping system.
- Hydrostatic pressure testing shall be carried out at specified test pressure.
- All joints shall be checked for leakage.
- Bellow shall be inspected for deformation, distortion, or abnormal movement during testing.

Commissioning

- The complete assembly shall be commissioned after successful testing.
- Proper functioning under operating conditions shall be demonstrated.
- Vibration isolation performance shall be verified where applicable.

Applicable Standards

The rubber bellow shall conform to:

- Relevant Indian Standards applicable for rubber expansion joints.
- PN 16 pressure class requirements.
- Manufacturer's specifications for firefighting applications.
- NBC and Fire Safety Guidelines where applicable.

Workmanship Requirements

- Rubber bellow shall be free from cracks, cuts, blisters, defects, or manufacturing imperfections.
- Installation shall be neat, properly aligned, and leak-proof.
- All fasteners shall be securely tightened.
- The assembly shall effectively absorb vibration and accommodate movement without damage.

Scope Includes

The item includes cost of **150 mm dia PN-16 rubber bellow, flanges, gaskets, nuts, bolts, washers, supports, fixing accessories, installation, alignment, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete rubber bellow assemblies supplied, installed, tested, and commissioned.

Payment shall be made for the **fully installed and operational rubber bellow assembly**, including flanges, gaskets, nuts, bolts, testing, and commissioning complete in all respects.

Item 25 :

Supplying, Installation, Testing and commissioning of Rubber Bellow conforming to I.S: Standard class PN 16 rating with Fittings, Flanges, Nut bolts, Washers, Gaskets etc. of size: 80mm dia. (For fire pump room & Accessories)

Same as Item no. 24 only size of Bellow is 80 mm dia. Instead of 150 mm dia.

Item 26 :

Supply, Installation, Testing and Commissioning of S.S. Ball Valves with all fittings required. 25mm dia.

The ball valve shall be of **stainless steel (S.S.) construction**, suitable for use in **fire pump room and fire-fighting system accessories**, and designed for reliable shut-off and control of water flow. The valve shall be of approved make and robust design, capable of withstanding the working pressure of the fire-fighting system.

The valve shall be suitable for **25 mm diameter pipeline** and shall be compatible with the piping arrangement provided. The valve shall be supplied complete with all necessary **fittings, adaptors, unions, nipples, fasteners, sealing materials**, and accessories required for proper installation and leak-free operation.

Installation shall be carried out carefully, ensuring correct alignment, accessibility for operation, and proper tightening of all joints. After installation, the valve shall be tested for **leakage, smooth opening and closing operation**, and pressure performance. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall conform to relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 27 :

Supply, Installation, Testing and Commissioning of S.S. Ball Valves with all fittings required. 15mm dia.

Same as Item no. 26 only size of Valve is 15 mm dia. Instead of 25 mm dia.

Item 28 :

Providing, fixing, testing and commissioning of Above Ground GI. ERW B Class Heavy duty pipes as per IS: 1239 (up to 150 mm dia.) and IS: 3589 (up to 200 mm dia. And above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with painting of one coat of primer and 2 or more coats of synthetic enamel paint of approved make / shade complete as per specification. 150mm dia

Materials

G.I. ERW Pipe

- Pipe shall be **Electric Resistance Welded (ERW) Galvanized Iron Heavy Duty (Class-B)** pipe.
- Nominal Diameter: **150 mm**
- Pipe shall conform to **IS:1239 (Part-I)** or latest revision for heavy-duty class pipes.
- Zinc coating shall be uniform and free from defects.
- Pipes shall be straight, round, and free from cracks, dents, laminations, or manufacturing defects.

Pipe Fittings

Providing and fixing all necessary fittings including:

- Flanges
- Bends
- Elbows
- Tees
- Reducers
- Unions
- Couplers
- End caps
- Expansion joints (where required)
- Pipe clamps
- Hangers
- Supporting brackets
- Anchor fasteners
- Nuts, bolts, washers, and gaskets

All fittings shall be of suitable pressure rating and compatible with the pipe system.

Installation

- Pipes shall be installed along approved routes and levels as shown in drawings.

- Necessary cutting, threading, grooving, welding, drilling, and fabrication shall be carried out wherever required.
- Pipes shall be properly aligned and securely supported using approved clamps, hangers, supports, and brackets.
- Pipe supports shall be spaced as per applicable standards and manufacturer's recommendations.
- Adequate provision shall be made for expansion, contraction, and vibration control.

Jointing

- Threaded joints shall be made using approved sealing compound/PTFE tape.
- Flanged joints shall be provided with approved quality rubber/neoprene gaskets.
- Welded joints, where required, shall be executed by skilled welders and properly cleaned.

Painting

After installation and testing:

- Exposed surfaces shall be cleaned thoroughly.
- One coat of approved anti-corrosive metal primer shall be applied.
- Two or more coats of approved synthetic enamel paint of specified colour/shade shall be applied.
- Painting shall conform to fire-fighting colour coding requirements wherever applicable.

Testing

- The complete piping system shall be hydrostatically tested at the specified test pressure.
- All joints, fittings, and connections shall be checked for leakage.
- Defects observed during testing shall be rectified and retested.
- Test certificates shall be submitted if required.

Commissioning

- Entire piping network shall be flushed, cleaned, and commissioned.
- Proper flow and pressure performance shall be demonstrated.
- System shall be handed over in complete working condition.

Applicable Standards

The work shall conform to:

- IS:1239 (Part-I) – Heavy Duty G.I. Pipes
- IS:3589 (where applicable)
- IS:1538 and related standards for fittings
- NBC (National Building Code)
- TAC Guidelines

- Relevant Fire Fighting Standards
- Approved Drawings and Specifications

Workmanship Requirements

- Pipes shall be installed true to line, level, and gradient.
- Supports and hangers shall provide rigid and vibration-free installation.
- All joints shall be leak-proof.
- Painting shall be uniform and free from peeling, runs, or patches.
- Entire installation shall be neat, safe, and suitable for long-term service.

Scope Includes

The item includes cost of **150 mm dia G.I. ERW Heavy Duty Pipe, all fittings, flanges, bends, tees, reducers, elbows, clamps, hangers, supports, nuts, bolts, washers, gaskets, cutting, threading, welding, fabrication, fixing, primer, painting, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, scaffolding, and all incidental charges** necessary for completion of the work.

Mode of Measurement

Measurement shall be made in **Running Metres (Rmt)** of pipe installed and accepted, measured along the centre line of the pipe, excluding the length of fittings.

Payment shall be made for the **actual length of pipe supplied, installed, painted, tested, and commissioned**, complete with all supports and accessories. No separate payment shall be made for cutting, threading, welding, clamps, hangers, supports, painting, testing, or incidental operations.

Item 29 :

Providing, fixing, testing and commissioning of Above Ground GI. ERW B Class Heavy duty pipes as per IS: 1239 (up to 150 mm dia.) and IS: 3589 (up to 200 mm dia. And above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with painting of one coat of primer and 2 or more coats of synthetic enamel paint of approved make / shade complete as per specification. 100mm dia

Same as Item no. 28 only size of Pipe is 100 mm dia. Instead of 150 mm dia.

Item 30 :

Providing, fixing, testing and commissioning of Above Ground GI. ERW B Class Heavy duty pipes as per IS: 1239 (up to 150 mm dia.) and IS: 3589 (up to 200 mm dia. And above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with painting of one coat of primer and 2 or more coats of synthetic enamel paint of approved make / shade complete as per specification. 80mm dia

Same as Item no. 28 only size of Pipe is 80 mm dia. Instead of 150 mm dia.

Item 31 :

Providing, fixing, testing and commissioning of Above Ground GI. ERW B Class Heavy duty pipes as per IS: 1239 (up to 150 mm dia.) and IS: 3589 (up to 200 mm dia. And above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with painting of one coat of primer and 2 or more coats of synthetic enamel paint of approved make / shade complete as per specification. 25mm dia

Same as Item no. 28 only size of Pipe is 25 mm dia. Instead of 150 mm dia

Item 32:

Providing, fixing, testing and commissioning of Under Ground GI. ERW B Class Heavy-duty pipes as per IS: 1239 (up to 150 mm dia.) and IS: 3589 (up to 200 mm dia. And above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with Anti Corrosive Treatment for underground pipe acrossing the road and plant entrance lines with primer & one coat of 3 MM thick anti corrosive tape. 100mm dia.

Materials

G.I. ERW Pipe

- Pipe shall be **Galvanized Iron (G.I.) Electric Resistance Welded (ERW) Heavy Duty Class-B Pipe**.
- Nominal Diameter: **100 mm**.
- Pipe shall conform to **IS:1239 (Part-I)** for heavy-duty class pipes.
- Pipes shall be free from dents, cracks, laminations, corrosion, and manufacturing defects.

Pipe Fittings

Providing and fixing all necessary fittings including:

- Flanges
- Bends
- Elbows
- Tees
- Reducers
- Unions
- Couplers
- End caps
- Specials
- Nuts, bolts, washers, and gaskets

All fittings shall be compatible with the pipe system and suitable for the operating pressure.

Excavation & Laying

- Trenches shall be excavated to the required width and depth as per approved drawings.
- Bottom of trench shall be properly dressed and prepared.
- Pipes shall be laid true to line and level with proper alignment.
- Suitable bedding and protection shall be provided wherever required.
- Pipe laying shall be carried out carefully to avoid damage to galvanizing and protective coatings.

Jointing

- Necessary cutting, threading, screwing, grooving, welding, and fabrication shall be carried out as required.
- Threaded joints shall be sealed using approved jointing compound/PTFE tape.
- Flanged joints shall be provided with approved quality rubber/neoprene gaskets.
- Welded joints shall be cleaned and protected after welding operations.

Anti-Corrosive Treatment

For underground pipe crossings below roads, paved areas, plant entrances, and other specified locations:

- Surface of pipe shall be thoroughly cleaned and dried.
- One coat of approved anti-corrosive primer shall be applied.
- After drying of primer, **3 mm thick anti-corrosive wrapping tape** shall be applied continuously over the pipe surface.
- Tape wrapping shall be applied with proper overlap as per manufacturer's recommendations.
- Ends, joints, fittings, and damaged portions shall also receive equivalent anti-corrosive treatment.
- The completed wrapping shall provide a continuous moisture-resistant protective barrier.

Backfilling

- After successful testing and inspection, trenches shall be backfilled with approved excavated material in layers.
- Backfill shall be compacted properly to avoid settlement.
- Surface shall be restored to original condition.

Testing

- Entire pipeline shall be subjected to hydrostatic pressure testing at specified pressure.
- All joints, fittings, and connections shall be checked for leakage.
- Defective portions shall be rectified and retested until satisfactory performance is achieved.

Commissioning

- Pipeline shall be flushed and cleaned before commissioning.
- Flow and pressure performance shall be verified.
- The complete system shall be commissioned and handed over in working condition.

Applicable Standards

The work shall conform to:

- IS:1239 (Part-I) – Heavy Duty G.I. Pipes
- IS:3589 (where applicable)
- IS:10221 (where applicable)

- NBC (National Building Code)
- TAC Guidelines
- Relevant Fire Fighting Standards
- Manufacturer's specifications for anti-corrosive wrapping system

Workmanship Requirements

- Pipes shall be laid true to line, level, and gradient.
- Anti-corrosive coating shall be continuous and free from damage.
- Joints shall be leak-proof and mechanically sound.
- Backfilling shall be carried out carefully to prevent damage to the pipe and coating.
- Entire installation shall be suitable for long-term underground service.

Scope Includes

The item includes cost of **100 mm dia G.I. ERW Heavy Duty Pipe, fittings, flanges, bends, tees, reducers, elbows, nuts, bolts, washers, gaskets, excavation, laying, cutting, threading, welding, anti-corrosive primer, 3 mm thick anti-corrosive tape wrapping, testing, backfilling, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary for completion of the work.

Mode of Measurement

Measurement shall be made in **Running Metres (Rmt)** of pipeline laid and accepted, measured along the centre line of the pipe, excluding fittings.

Payment shall be made for the **actual length of pipe supplied, laid, anti-corrosion treated, tested, and commissioned**, complete with all fittings and accessories. No separate payment shall be made for cutting, threading, wrapping overlaps, primer, testing, backfilling, or incidental operations.

Item 33 :

**Excavation and back Filling of soft soil for under ground pipe line of 0.6 mtr. Deep from the ground level.
(Depth 0.6 mtr * 0.8 mtr Wide)**

Scope of Work

- Excavation of trench in **soft soil** for laying underground pipeline.
- Trench dimensions shall be:
 - **Depth:** 0.60 metre below existing ground level.
 - **Width:** 0.80 metre.
- Excavation shall be carried out manually or mechanically as approved.

Excavation

- Excavation shall be done to the required line, level, width, and depth.
- Sides of trenches shall be properly trimmed and dressed.
- Bottom of trench shall be leveled and prepared to receive the pipeline.
- Any roots, loose material, debris, or unsuitable material encountered shall be removed.

Handling of Excavated Material

- Useful excavated earth shall be stacked alongside the trench for reuse in backfilling.
- Surplus or unsuitable excavated material shall be disposed of at locations approved by the Engineer-in-Charge.
- Necessary precautions shall be taken to prevent collapse of trench sides and obstruction to traffic or adjoining works.

Backfilling

- After laying, testing, and approval of the pipeline, the trench shall be backfilled using selected excavated earth.
- Backfilling shall be carried out in layers not exceeding **150 mm thickness**.
- Each layer shall be properly watered and compacted to achieve the required density.
- Care shall be taken to avoid displacement or damage to the pipeline during backfilling operations.

Finishing

- Ground surface shall be restored to its original condition after completion of backfilling.
- Excess material, debris, and waste shall be removed from the site.
- The completed trench area shall be left neat and clean.

Workmanship Requirements

- Excavation shall be true to line, level, width, and depth.
- Bottom of trench shall be firm and properly prepared.

- Backfilling and compaction shall be uniform throughout the trench length.
- Work shall conform to approved specifications and directions of the Engineer-in-Charge.

Scope Includes

The item includes cost of **excavation in soft soil, dressing of trench, stacking of useful earth, disposal of surplus material, backfilling, watering, compaction, restoration of surface, labour, tools and plants, machinery, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary for completion of the work.

Mode of Measurement

Measurement shall be made in **Running Meters (Rmt)** based on the actual excavated trench calculated from:

Length × 0.80 m Width × 0.60 m Depth

Payment shall be made for the **actual quantity of excavation and backfilling completed and accepted**, including excavation, stacking, refilling, compaction, and disposal of surplus material complete in all respects.

Item 34 :

Providing, fixing, testing and commissioning MS steel supports with Channels & Angle supports for Pumps, Hydrant and Sprinklers pipe line (Kg.)

Materials

Structural Steel Members

- Supports shall be fabricated from approved quality:
 - M.S. Angles
 - M.S. Channels
 - M.S. Flats
 - M.S. Plates
 - M.S. Rods and Clamps
- Structural steel sections shall conform to relevant IS specifications and be free from rust, cracks, laminations, bends, and other defects.

Fabrication

- Supports shall be fabricated to the required size, shape, and configuration as per approved shop drawings.
- Necessary cutting, drilling, notching, welding, grinding, and finishing shall be carried out.
- Welds shall be continuous, sound, and properly dressed.
- Suitable gusset plates, stiffeners, cleats, and reinforcement members shall be provided wherever required.

Installation

- Supports shall be fixed to walls, floors, ceilings, columns, beams, or structural members using:
 - Anchor fasteners
 - Foundation bolts
 - Expansion bolts
 - Clamps and brackets
- Supports shall be capable of safely carrying the dead load, operating load, and vibration load of the firefighting piping system and equipment.
- Proper spacing and alignment shall be maintained as per relevant standards and approved drawings.

Surface Preparation & Painting

- All steel surfaces shall be thoroughly cleaned of rust, oil, grease, welding slag, and foreign matter.
- One coat of approved anti-corrosive metal primer shall be applied.
- Two coats of approved synthetic enamel paint of specified shade shall be applied after installation.

- In corrosive environments, additional protective coatings shall be provided as specified.

Testing

- Supports shall be inspected for alignment, rigidity, and load-carrying capacity.
- Welds, fasteners, and anchorages shall be checked for adequacy and stability.
- The complete support system shall be verified during testing and commissioning of the firefighting installation.

Workmanship Requirements

- Supports shall be rigid, properly aligned, and vibration-free.
- No sagging, distortion, excessive deflection, or instability shall be permitted.
- Welding and fabrication shall be neat and professionally executed.
- Entire support system shall comply with firefighting standards and approved engineering practices.

Scope Includes

The item includes cost of **M.S. angles, channels, flats, plates, rods, clamps, brackets, anchor fasteners, foundation bolts, welding electrodes, cutting, drilling, fabrication, erection, primer, painting, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, scaffolding, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Kilograms (Kg)** of fabricated and erected M.S. supports actually used and accepted.

The weight shall be calculated based on the approved fabrication drawings or standard steel section weights, excluding wastage.

Payment shall be made for the **actual weight of completed M.S. support system**, including fabrication, erection, welding, painting, fixing, testing, and commissioning complete in all respects.

Item 35:

Supplying, installing and commissioning of Foot Valve with, suitable flanges, nuts, bolts, gaskets etc. complete. 100mm dia.

The foot valve shall be of **robust construction** and suitable for use in **fire-fighting water supply systems**, designed to prevent reverse flow and maintain prime in the suction line. The valve shall be of approved make, suitable for continuous submerged operation, and capable of withstanding the working pressure of the system.

The valve shall be suitable for **100 mm diameter pipeline** and compatible with standard flanged connections. It shall be provided complete with all required **companion flanges, nuts, bolts, washers, gaskets**, and other necessary fittings to ensure proper installation and leak-free performance. The strainer portion of the foot valve shall be designed to prevent ingress of debris while allowing free flow of water.

Installation shall be carried out in correct alignment at the suction end of the pipeline, ensuring firm fixing and unobstructed operation. After installation, the foot valve shall be checked for proper seating, smooth operation, and tightness to prevent loss of prime.

Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**. All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge.

Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 36 :

Supplying, installing and commissioning of Foot Valve with, suitable flanges, nuts, bolts, gaskets etc. complete. 80mm dia.

Same as Item no. 35 only size of Valve is 80 mm dia. Instead of 100 mm dia.

Item 37 :

Fire Fighting Equipement Providing, fixing, testing and commissioning of SS Single Headed Oblique Pattern Hydrant Landing Valves as per IS: 5290 with 80 mm dia flanged inlet & 63 mm dia female outlet complete with cap and chain etc.

The landing valve shall be a **single-headed oblique pattern hydrant landing valve** manufactured from **stainless steel**, conforming to **IS: 5290**, suitable for fire-fighting installations. The valve shall be of approved make and robust construction, designed for smooth operation and reliable performance under fire-fighting conditions.

The valve shall be provided with **80 mm diameter flanged inlet** and **63 mm diameter female outlet**, complete with **blank cap and chain**. The inlet flange shall be compatible with standard pipeline flanges and suitable for the working pressure of the system. The outlet threads shall be accurately machined to ensure proper coupling with fire hose connections.

Installation shall be carried out at the specified locations with correct alignment, proper tightening of flange bolts, and use of suitable gaskets to ensure leak-proof joints. The valve shall be easily accessible for operation during emergencies.

After installation, the landing valve shall be tested for **leakage, pressure integrity, and smooth opening and closing operation**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 38 :

Providing, fixing, testing and commissioning of SS Branch Pipe with nozzle of 25 mm nominal bore outlet suitable to fit with standard instantaneous type 63 mm dia coupling. As per IS:903

The branch pipe shall be of **stainless steel (SS) construction**, complete with nozzle, suitable for fire-fighting applications and conforming to **IS: 903**. The branch pipe shall be designed for reliable operation under fire-fighting pressure and shall be of approved make and robust workmanship.

The nozzle shall have a **25 mm nominal bore outlet**, accurately machined to ensure proper jet formation. The inlet end of the branch pipe shall be suitable to fit with **standard instantaneous type 63 mm diameter coupling**, ensuring quick and secure connection with fire hoses.

Installation shall include proper fixing and connection to the hose coupling, ensuring leak-free and smooth operation. After installation, the branch pipe and nozzle assembly shall be tested for **leakage, proper water discharge pattern, and pressure performance**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 39 :

Providing, fixing, testing and commissioning of 63 mm dia 15m long RRL Hose Pipe with 63 mm dia.Type A Male and female Stainless Steel couplings duly binded with GI wire, rivets etc. conforming to IS 636 as required.

The hose pipe shall be a **63 mm diameter RRL (Reinforced Rubber Lined) fire hose, 15 metres in length**, suitable for fire-fighting applications and conforming to **IS: 636**. The hose shall be of approved make, flexible, durable, and capable of withstanding the working pressure of the fire-fighting system without leakage or deformation.

Each hose pipe shall be provided with **63 mm diameter Type-A instantaneous stainless steel male and female couplings**, securely fixed to the hose ends. The couplings shall be properly **bound with G.I. wire, rivets, and ferrules**, ensuring firm attachment and leak-proof performance during operation.

The hose assembly shall be neatly installed at the designated location, properly coiled or mounted as specified, and kept ready for immediate use. After installation, the hose pipe shall be tested for **leakage, pressure integrity, and correct coupling engagement**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 40 :

Providing, fixing, testing and commissioning of weather proof standard fire Hose Cabinet wall mounting type 18 Gauge. (750 x 600 x 250) having Double Opening with M.S. fabricated stand, necessary locking arrangement by allen key.

The fire hose cabinet shall be of **weather-proof, wall-mounted type**, fabricated from **18-gauge sheet steel**, suitable for installation in fire-fighting systems. The cabinet size shall be **750 mm × 600 mm × 250 mm**, designed to accommodate fire hose and accessories conveniently and safely.

The cabinet shall be provided with **double opening doors**, properly hinged and reinforced, ensuring ease of access during emergency operation. It shall be complete with a **M.S. fabricated internal stand/bracket** suitable for mounting and supporting the fire hose and related equipment.

A proper **locking arrangement operated by Allen key** shall be provided to prevent unauthorized access while ensuring quick operation during emergencies. The cabinet shall be finished with approved protective coating/paint to provide resistance against corrosion and weather effects.

Installation shall be carried out at the designated location, securely fixed to the wall with suitable anchors and fasteners, ensuring proper alignment and stability. After installation, the cabinet shall be checked for proper opening, locking mechanism, finish, and overall workmanship.

All materials and workmanship shall conform to relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the **Engineer-in-Charge**. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 41 :

Providing, fixing, testing and commissioning of Wall mounting Fix type First aid Fire Hose Reel with drum, hanging bracket, 36 M x 25 mm dia high pressure hose reel tubing as per IS:884 with shut nozzle and ball valve and all required accessories.

The fire hose reel shall be of **wall-mounted, fixed type**, complete with **reel drum, swinging/hanging bracket**, and all necessary fittings, suitable for first-aid fire-fighting applications. The hose reel assembly shall be of approved make, robust construction, and designed for smooth and reliable operation.

The hose provided shall be **36 metres long and 25 mm in diameter**, made of **high-pressure hose reel tubing**, conforming to **IS: 884**, suitable for the working pressure of the fire-fighting system. The reel shall be complete with an approved **shut-off nozzle** and **ball valve** for controlling water flow.

The assembly shall include all required accessories such as inlet piping connection, fasteners, mounting hardware, sealing materials, and supports to ensure proper installation and leak-free performance. The hose reel shall be installed at the designated location with proper alignment and accessibility for quick deployment during emergencies.

After installation, the hose reel shall be tested for **leakage, smooth unwinding and rewinding of the hose, proper operation of the nozzle and valve**, and overall pressure performance. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 42 :

Providing, fixing, testing and commissioning of Two Way Fire Brigade Inlet for Draw Out Connection with 100mm dia. Foot Valve. blank cap and chain with necessary fittings, flanges, nut bolts etc. (Make: Shah Bhogilal/Safex/Winco)

Materials

Fire Brigade Inlet

- Two-way Fire Brigade Inlet (Breeching Inlet) manufactured from high-quality gunmetal, brass, or approved corrosion-resistant material.
- Suitable for connection to Fire Brigade delivery hoses.
- Designed for firefighting water supply applications.

- Conforming to relevant IS standards and Fire Safety requirements.

Inlet Connections

- Two Nos. instantaneous male inlet connections suitable for Fire Brigade hose coupling.
- Each inlet shall be provided with:
 - Blank cap
 - Chain arrangement
 - Rubber sealing washer

Foot Valve

- Providing and fixing **100 mm dia Foot Valve** of approved make and quality.
- Valve body shall be Cast Iron/Ductile Iron/Bronze as approved.
- Suitable for firefighting suction and draw-out applications.
- Complete with strainer and all necessary accessories.

Fittings & Accessories

The complete assembly shall include:

- Flanges
- Gaskets
- Nuts and bolts
- Washers
- Pipe nipples
- Reducers (if required)
- Supports and brackets
- Blank caps with chains
- Identification plate/signage where required

Installation

- Fire Brigade Inlet shall be installed at the designated location as shown in approved drawings.
- Unit shall be fixed firmly on wall, chamber, or support structure.
- Proper alignment and accessibility for Fire Brigade operation shall be ensured.
- All connections shall be leak-proof and securely fastened.

Testing

- Complete assembly shall be hydrostatically tested along with the firefighting pipeline system.
- All joints, couplings, and valves shall be checked for leakage.
- Functional testing shall be carried out to verify proper operation and water flow.

Commissioning

- Fire Brigade Inlet shall be commissioned after successful testing.
- Demonstration of operation and compatibility with standard Fire Brigade hose connections shall be carried out.
- System shall be handed over in complete working condition.

Applicable Standards

The equipment and installation shall comply with:

- Relevant Indian Standards for Fire Brigade Inlets
- NBC (National Building Code)
- TAC Guidelines
- Local Fire Authority Requirements
- Manufacturer's Specifications

Workmanship Requirements

- Assembly shall be rigid, properly aligned, and corrosion-resistant.
- Blank caps shall fit securely and be attached with chains.
- Foot valve shall operate smoothly and effectively.
- Entire installation shall be leak-proof, durable, and easily accessible during emergencies.

Scope Includes

The item includes cost of **Two-Way Fire Brigade Inlet, 100 mm dia Foot Valve, blank caps, chains, flanges, gaskets, nuts, bolts, washers, supports, brackets, fixing accessories, installation, testing, commissioning, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary for completion of the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete Two-Way Fire Brigade Inlet assemblies supplied, installed, tested, and commissioned.

Payment shall be made for the **fully installed and operational Fire Brigade Inlet assembly**, including foot valve, caps, chains, fittings, testing, and commissioning complete in all respects.

Approved Makes: *Shah Bhogilal, Safex, Winco* or equivalent approved by the Engineer-in-Charge.

Item 43 :

Providing, fixing, testing and commissioning of 25 mm dia Air Release Valve and Ball Valve assembly on top of each riser for Air release system.

The air release arrangement shall consist of a **25 mm diameter air release valve** installed at the **top of each riser**, complete with an **isolating ball valve**, forming an air release valve and ball valve assembly suitable for fire-fighting water piping systems. The assembly shall be of approved make and robust construction, capable of reliable operation under system working pressure.

The air release valve shall be designed to automatically release entrapped air from the riser during filling and operation of the system. The associated ball valve shall facilitate isolation of the air release valve for maintenance or replacement without disturbing the system.

All necessary **fittings, nipples, unions, adapters, sealing materials**, and accessories shall be provided to ensure proper installation and leak-free performance. Installation shall be carried out at the specified locations with correct orientation and adequate accessibility for operation and maintenance.

After installation, the air release valve and ball valve assembly shall be tested for **leakage, proper air release function, and pressure integrity**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 44 :

On - Off Pump Trigger System. Providing, fixing, testing and commissioning of On -Off Switch.

The **On–Off pump trigger switch** shall be of approved make and robust construction, suitable for **manual control of fire pumps** in the fire-fighting system. The switch shall be designed for reliable operation under the electrical load and environmental conditions of the pump room.

The switch shall be suitable for the required **voltage and current rating**, housed in a durable enclosure with proper insulation and protection. It shall be clearly marked for **ON and OFF positions** and provided with necessary terminals and accessories for safe and secure electrical connections.

Installation shall be carried out at the designated location, ensuring ease of access and safe operation. All wiring connections shall be neat, secure, and properly insulated, conforming to electrical safety practices.

After installation, the switch shall be tested for correct operation, continuity, and proper triggering of the pump. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, electrical safety regulations, fire-fighting system requirements, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 45 :

Providing, fixing, testing and commissioning of 3 Core X 1.5 Sqmm flexible Cable with PVC Conduit.

The flexible cable shall be **3 Core × 1.5 sq.mm**, of approved make, suitable for electrical connections in fire-fighting and allied services. The cable shall have **copper conductors** with PVC insulation and PVC outer sheath, rated for the required voltage and current, and suitable for continuous operation.

The cable shall be laid and protected inside **PVC conduit** of appropriate size and thickness. The conduit shall be surface-mounted or concealed as directed, securely fixed with saddles/clamps at suitable intervals to ensure proper support and neat appearance. All bends, joints, couplers, junction boxes, and accessories required for complete conduit installation shall be provided.

Cable terminations shall be carried out using suitable lugs, glands, ferrules, and insulating materials to ensure safe and reliable connections. Proper colour coding of cores shall be maintained throughout the installation.

After installation, the cable and conduit system shall be tested for **continuity, insulation resistance, and correctness of connections**. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, electrical safety norms, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Running Metre basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval.

Item 46 :

Providing, fixing, testing and commissioning of below Auto Glow Signage. Emergency Exit 4" X 12"

The auto glow signage shall be of **approved make and standard quality**, suitable for use as **Emergency Exit signage** in fire and life safety applications. The size of the signage shall be **4 inch × 12 inch**, clearly legible and designed to provide continuous visibility during power failure or emergency conditions by means of photoluminescent (auto glow) material.

The signage shall be fabricated from durable material with a smooth finish, resistant to fading, moisture, and normal indoor environmental conditions. The lettering and symbols shall be clear, properly proportioned, and compliant with applicable fire safety and emergency exit requirements.

The signage shall be fixed at designated locations using suitable fixing arrangements such as screws, anchors, or approved adhesive, ensuring firm mounting and proper visibility from the required distance and direction. Installation shall be carried out neatly and in alignment as directed by the **Engineer-in-Charge**.

After installation, the signage shall be checked for correct positioning, glow performance, and overall workmanship. All materials and workmanship shall conform to relevant **Indian Standards**, fire safety norms, and directions of the Engineer-in-Charge.

Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory installation, testing, commissioning, and approval by the Engineer-in-Charge.

Item 47 :

Providing, fixing, testing and commissioning of below Auto Glow Signage. Fire Fighting Equipments. 8" X 12"

Item Specification is same as Item no :- 46. Size of signage is 8" X 12" instead of 4" X 12". Also Signage is used for Fire Fighting Equipments instead of Emergency Exit.

Item 48 :

Providing, fixing, testing and commissioning of below Auto Glow Signages. Fire Extinguisher 4" X 12"

Item Specification is same as Item no :- 46. Signage is used for Fire Extinguisher of Emergency Exit.

Item 49 :

Providing and fixing of conventional manual call point.

MATERIAL & TECHNICAL SPECIFICATIONS

1. All supplied materials shall conform to the standards prescribed by the **Bureau of Indian Standards (BIS)**.
No payment shall be made if any sample or material fails to meet the required standards.
2. The Manual Call Point enclosure shall be made of **high-quality FR Polymer / ABS material**, suitable for fire alarm applications.
3. The MCP shall be:
 - **Square in shape**
 - **Red in colour**
4. Electrical characteristics:
 - Operating voltage: **18–26 V DC**
 - Rated current: **approx. 30 mA**
 - Operating frequency: **50 Hz**
5. The Manual Call Point shall be provided with a **reset mechanism/button** for restoring the system after activation.
6. Quoted rates shall be **inclusive of all costs**, including material, labour, GST, all applicable taxes, octroi, duties, royalties, cost of samples, testing charges in approved laboratories, and any other incidental charges.
No extra payment shall be made separately on any account.

EXECUTION

EXAMINATION

1. The contractor shall submit **test certificates for the two-core cable** used for the Manual Call Point system, indicating acceptable electrical values.
2. Site conditions shall be examined for compliance with installation requirements.
3. Installation shall commence only after all unsatisfactory conditions have been rectified.

INSTALLATION

1. Manual Call Points shall be installed at appropriate and accessible locations, as per **National Fire Safety Code, Gujarat Fire Safety Rules**, and manufacturer's recommendations.
2. Installation shall be carried out in a manner similar to other fire alarm initiating devices, ensuring ease of operation during emergencies.

3. All workmanship and installation practices shall conform to **relevant Indian Standards** and statutory fire safety requirements.
4. Wiring and terminations shall be neat, secure, and properly labeled.
5. The item shall be executed strictly as per the item description and directions of the **Engineer-in-Charge**.

TESTING AND COMMISSIONING

1. Each Manual Call Point shall be tested to verify proper alarm initiation and correct zone indication at the fire alarm control panel.
2. Reset operation shall be demonstrated to the satisfaction of the Engineer-in-Charge.
3. The system shall be commissioned only after satisfactory performance during testing.

MODE OF PAYMENT

1. The rate quoted for this item shall include the **complete cost of materials, labour, transportation, testing, and all incidentals**.
2. Payment shall be made **only after satisfactory completion**, testing, commissioning, and acceptance of the item as per standards and manufacturer's specifications.

MEASUREMENT AND PAYMENT

Measurement shall be made and payment released **on Number (No.) basis**, after satisfactory completion and approval by the **Engineer-in-Charge**.

Item 50 :

Providing and fixing of conventional horn cum strobe.

SCOPE OF WORK

1. Supply and installation of hooter devices capable of producing a clear and audible alarm signal for alerting and evacuation of occupants during fire emergencies.
2. The hooter shall operate automatically upon receiving an alarm signal from the fire alarm control panel and shall stop sounding upon receipt of silence or reset command from the control panel.
3. The system shall include all necessary wiring, terminations, interconnections, mounting accessories, and integration with the fire alarm control panel to ensure proper operation.
4. All materials supplied shall be new, unused, and of latest manufacture, conforming to relevant standards and approved by the Engineer-in-Charge.

BASIC SYSTEM REQUIREMENTS

1. The hooter system shall form part of a **complete, electrically supervised fire detection and evacuation system** operating on **24V DC** supply.
2. The system shall be compatible with zone conventional fire alarm control panels.
3. Zone-wise hooter circuit control and fault supervision shall be provided through the fire alarm panel.
4. Provision shall be made for interface with emergency power supply wherever specified.

QUALITY ASSURANCE

1. The manufacturer shall have proven experience in the design and manufacture of fire alarm hooters with satisfactory performance in similar installations.
2. Manufacturer's name, model number, and identification details shall be permanently marked on the hooter units.
3. All devices and accessories shall be standard products of the manufacturer's latest design and suitable for the intended application.
4. All components of the hooter system shall be sourced from a **single manufacturer** to ensure compatibility and continuous technical support.

PERFORMANCE REQUIREMENTS

1. The hooter shall produce adequate sound pressure levels as per applicable **IS / NFPA / EN standards** to ensure audibility throughout the protected area.
2. The system shall comply with **Gujarat Fire Safety Rules** and statutory requirements in force.

EXECUTION

EXAMINATION

1. The contractor shall examine site conditions to ensure suitability for installation.
2. Installation shall commence only after rectification of all unsatisfactory conditions affecting performance.

INSTALLATION

1. Hooters shall be installed at an effective mounting height generally between **1.8 m to 3.0 m (6 ft to 10 ft)** from finished floor level to ensure proper sound coverage.
2. Minimum vertical clearance of **1.2 m (4 ft)** shall be maintained between manual call points and hooters.
3. Surface cabling shall be neatly laid and securely fixed at suitable intervals as per manufacturer's recommendations.
4. Cable joints outside equipment enclosures shall be avoided as far as practicable.
5. Where cables pass through walls, floors, or slabs, suitable sleeves shall be provided and sealed with approved **fire-stopping material**.
6. A consistent color code shall be followed for all hooter and fire alarm circuit wiring.
7. Wiring within enclosures shall be neatly arranged to permit easy inspection, adjustment, and maintenance.

TESTING AND COMMISSIONING

1. The hooter system shall be tested by simulating alarm conditions from the fire alarm control panel to verify correct activation and audibility.
2. Proper operation of zone-wise control, silence, and reset functions shall be demonstrated.
3. Testing and commissioning shall be carried out in the presence of the Engineer-in-Charge to his full satisfaction.

DOCUMENTATION

Upon completion, the contractor shall submit:

1. As-built drawings showing hooter locations and wiring routes.
2. Test and commissioning reports.
3. Operation and maintenance manuals.

TRAINING

The contractor shall provide basic operational training to nominated staff regarding hooter operation, alarm response, and routine checks, free of cost.

CERTIFICATION

Upon completion, the contractor shall submit all required certificates as per **Gujarat Fire Safety Rules**, including:

- Installation Certificate
- Testing & Commissioning Certificate
- System Acceptance Certificate

Approval from the concerned **Fire Authority / Fire Officer** shall be obtained wherever applicable.

MEASUREMENT AND PAYMENT

Measurement shall be made and payment released **on Number (No.) basis**, after satisfactory completion, testing, commissioning, and acceptance by the Engineer-in-Charge.

Item 51 :

SITC Of Addressable Fire Alarm Panel

The **addressable fire alarm control panel** shall be of approved make and standard quality, suitable for use in an **addressable fire detection and alarm system**. The panel shall be microprocessor based, modular in design, and capable of monitoring, controlling, and indicating fire alarm devices connected on addressable loops.

The panel shall be housed in a robust metal enclosure with lockable front door, suitable for wall or floor mounting as required. It shall be complete with **main control unit, power supply unit, battery charger, display unit (LCD/LED), control keys/switches, audible buzzer, and necessary interface modules**. The panel shall support addressable devices such as smoke detectors, heat detectors, manual call points, and modules, with clear identification of device address and zone in alarm, fault, or supervisory condition.

The panel shall be suitable for operation on **230 V AC, 50 Hz power supply**, with provision for automatic changeover to **rechargeable standby batteries** in case of mains failure. All internal wiring shall be neatly dressed and properly terminated. The panel shall have adequate protection against short circuit, overload, and earth fault.

Installation shall be carried out at the designated location with proper fixing, earthing, and electrical connections. Necessary programming, addressing, and configuration of the panel shall be done to suit the system layout and cause-and-effect requirements as directed by the **Engineer-in-Charge**.

After installation, the panel shall be tested for correct functioning of alarms, faults, indications, controls, power supply changeover, and communication with all connected addressable devices. Testing and commissioning shall be carried out to the satisfaction of the **Engineer-in-Charge**.

All materials and workmanship shall comply with relevant **Indian Standards**, fire safety codes, manufacturer's specifications, and directions of the Engineer-in-Charge. Measurement shall be taken on **Number (No.) basis**, and payment shall be made after satisfactory supply, installation, testing, commissioning, and approval.

Item 52 :

Providing and fixing of 2x1.5 sqmm fire alarm armoured cable, 600/1000V rated with annealed copper conductor having XLPE insulation, steel wire armouring &FRLS outer sheath complete as required

Material and Standards

1. The cable shall be of **standard approved make**, new, unused, and of the manufacturer's latest production.
2. The conductor shall be **annealed electrolytic grade copper**, conforming to relevant **IS standards**.
3. Insulation shall be **XLPE**, suitable for fire alarm and signaling applications.
4. Armouring shall be **steel wire armouring (SWA)** for mechanical protection.
5. Outer sheath shall be **FRLS type**, suitable for fire detection and alarm systems.
6. The cable shall be **ISI marked** and compliant with **National Fire Safety Code** and applicable **IS specifications**.
7. No payment shall be made if any material or sample fails to comply with the prescribed standards or is rejected by the Engineer-in-Charge.

Quality Assurance

1. The manufacturer shall have proven experience in the manufacture of similar fire alarm and signaling cables with satisfactory service performance.
2. Manufacturer's name, cable size, voltage grade, and other identification details shall be clearly and indelibly marked on the cable.
3. Only approved materials conforming to the specifications shall be used.

Execution

Examination

1. The contractor shall submit **manufacturer's test certificates** for the supplied cable indicating electrical and physical characteristics.
2. Site conditions shall be examined to ensure suitability for installation.
3. Installation shall commence only after all unsatisfactory conditions have been rectified.

Installation

1. The cable shall be laid in **½ inch PVC conduit**, surface-mounted on walls or ceilings, securely fixed with approved saddles at regular intervals.

2. Bends, joints, and terminations shall be carried out neatly and strictly as per manufacturer's recommendations.
3. Cable joints outside junction boxes or equipment enclosures shall be avoided as far as practicable.
4. Proper care shall be taken to avoid mechanical damage to the cable during handling and installation.
5. All workmanship shall be as per **R&B electrical works practice** and directions of the Engineer-in-Charge.

Testing and Commissioning

1. After installation, the cable shall be tested for **continuity and insulation resistance** as per fire safety standards.
2. The system shall be commissioned only after satisfactory test results and approval by the Engineer-in-Charge.

Documentation

Upon completion, the contractor shall submit:

1. Manufacturer's test certificates for the cable.
2. As-built drawings showing actual cable routing.
3. Wiring layout / topology details as required.

Note:

Any damage to the cable due to **rodent attack, short circuit, or external mechanical causes** shall not be covered under warranty.

Measurement and Payment

Measurement shall be taken on the **actual length of cable laid**, measured along its route, and payment shall be made on **Running Metre basis**, after satisfactory completion, testing, and acceptance by the Engineer-in-Charge.

The rate shall be deemed to include the cost of **materials, labour, conduits, fixing accessories, testing, transportation, taxes, duties, and all incidentals**, and no extra payment shall be made on any account.

Item 53 :

Providing & laying cement concrete 1: 4 : 8 (1 Cement : 4 Coarse sand : 8 graded B.T stone aggregate 20mm nominal size) Curing comp. including cost of form work in foundation and plinth

Materials

Cement

- Ordinary Portland Cement (OPC) / Portland Pozzolana Cement (PPC) conforming to relevant IS specifications.

Fine Aggregate

- Clean, coarse sand conforming to IS specifications.
- Free from silt, clay, organic matter, and other deleterious substances.

Coarse Aggregate

- Hard, durable, graded stone aggregate of **20 mm nominal size**.
- Aggregate shall be clean, free from dust, dirt, and organic impurities.

Water

- Clean potable water suitable for construction purposes.

Mix Proportion

- Concrete shall be prepared in the proportion of: **1 : 4 : 8**

(1 Part Cement : 4 Parts Coarse Sand : 8 Parts Graded Stone Aggregate)

- Mixing shall be carried out mechanically in an approved concrete mixer to obtain a uniform and workable mix.

Preparation

- Foundation bed or plinth area shall be cleaned and dressed to the required line, level, and dimensions.
- Loose soil, debris, and standing water shall be removed before laying concrete.
- Formwork shall be erected where necessary and approved before concreting.

Laying & Compaction

- Concrete shall be laid in position immediately after mixing.
- Concrete shall be spread uniformly and compacted by ramming, tamping, or mechanical vibrators as required.
- Proper care shall be taken to avoid segregation of materials.

Finishing

- Surface shall be finished to the required line, level, slope, and thickness.
- Exposed surfaces shall be finished smooth and even.

Formwork

- Providing, erecting, maintaining, and removing formwork/shuttering required for foundation and plinth concrete work.
- Formwork shall be rigid, true to line and level, and sufficiently tight to prevent loss of mortar.

Curing

- Concrete shall be cured continuously for a minimum period of **7 days** or as directed by the Engineer-in-Charge.
- Adequate curing arrangements shall be made to ensure proper hydration and strength development.

Workmanship Requirements

- Concrete shall be dense, homogeneous, and free from segregation, honeycombing, or voids.
- Finished concrete shall conform to the specified dimensions, levels, and alignment.
- Entire work shall be executed in accordance with relevant IS specifications and approved engineering practices.

Scope Includes

The item includes cost of **cement, sand, stone aggregate, water, batching, mixing, transportation, laying, compacting, finishing, curing, formwork, labour, tools and plants, machinery, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Cubic Metres (Cum)** of finished concrete work in place.

Payment shall be made for the **actual quantity of cement concrete executed**, including formwork, compaction, finishing, and curing complete in all respects. No separate payment shall be made for formwork, curing, or incidental operations.

Item 54 :

Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. In Superstructure in Cement Mortar 1:6 (1-Cement : 6-fine sand) (B) Conventional

Materials

Bricks

- Bricks shall be first-class/common burnt clay building bricks conforming to relevant IS specifications.
- Minimum crushing strength shall be **35 kg/sq.cm.**
- Bricks shall be well burnt, uniform in size, shape, and colour.
- Bricks shall be free from cracks, stones, lime nodules, and other defects.
- Water absorption shall conform to applicable IS standards.

Cement

- Ordinary Portland Cement (OPC) or Portland Pozzolana Cement (PPC) conforming to relevant IS specifications.

Fine Aggregate

- Clean, well-graded fine sand free from silt, clay, organic matter, and other impurities.

Water

- Clean potable water suitable for masonry construction.

Mortar

- Cement mortar shall be prepared in the proportion of: **1 : 6**
(1 Part Cement : 6 Parts Fine Sand)
- Mortar shall be machine mixed or hand mixed on a watertight platform to obtain a uniform consistency.
- Mortar shall be used within the permissible period after mixing.

Preparation of Bricks

- Bricks shall be thoroughly soaked in clean water for at least one hour before use.
- Excess surface water shall be allowed to drain before laying.

Laying of Brick Masonry

- Brickwork shall be carried out in English bond or approved bond pattern.
- Bricks shall be laid with frogs upward (where applicable) on a full bed of mortar.
- Joints shall be properly filled with mortar and shall not exceed 10 mm in thickness.
- Courses shall be laid truly horizontal and walls shall be plumb, straight, and true to line.
- Proper bonding shall be maintained at corners, junctions, and intersections.

Joints and Finishing

- Joints shall be raked out to a depth of 10 mm to 12 mm while the mortar is still green where plastering is to be done.
- Exposed masonry joints, if any, shall be neatly finished as directed.

Scaffolding

- Necessary double scaffolding and staging shall be provided for execution of work at all heights.
- Scaffolding holes shall be properly filled after removal.

Curing

- Brick masonry shall be kept continuously moist and cured for a minimum period of **7 days** after completion.
- Adequate curing arrangements shall be maintained throughout the curing period.

Workmanship Requirements

- Masonry shall be true to line, level, plumb, and dimensions shown in drawings.
- No broken bricks shall be used except where necessary for closers.
- Masonry shall be free from bulging, settlement, cracks, and other defects.
- Entire work shall conform to relevant IS specifications and standard engineering practices.

Scope Includes

The item includes cost of **bricks, cement, sand, water, soaking of bricks, mortar preparation, laying, bonding, scaffolding, raking of joints, curing, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Cubic Metres (Cum)** of brick masonry actually constructed and accepted.

Payment shall be made for the **net volume of brick masonry work executed**, complete with mortar, scaffolding, and curing. No separate payment shall be made for scaffolding, raking of joints, soaking of bricks, or incidental operations.

Item 55 :

Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregates 20 mm nominal size) and curing complete including cost of formwork in (A) Wall Caps / Coping

Same as Item no 53 only ratio of mix is 1:3:6 instead of 1:4:8

Item 56 :

Providing and laying cement concrete 1:2:4 (1- Cement : 2-Coarse sand : 4- graded stone aggregates 20 mm nominal size) for reinforced concrete Chhajjas not exceeding 10cm. thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1-cement, 3 Fine sand) to give a smooth and even surface centering and formwork and curing complete excluding cost of reinforcement.

Materials

Cement

- Ordinary Portland Cement (OPC) or Portland Pozzolana Cement (PPC) conforming to relevant IS specifications.

Fine Aggregate

- Clean, coarse sand conforming to IS specifications and free from silt, clay, and organic impurities.

Coarse Aggregate

- Hard, durable graded stone aggregate of **20 mm nominal size**.
- Aggregate shall be clean and free from dust and deleterious materials.

Water

- Clean potable water suitable for concrete work.

Concrete Mix

- Concrete shall be prepared in the proportion:**1 : 2 : 4**
(1 Part Cement : 2 Parts Coarse Sand : 4 Parts Graded Stone Aggregate)
- Mixing shall be carried out mechanically to achieve a uniform and workable concrete mix.

Centering & Formwork

- Providing and erecting centering and shuttering of adequate strength and rigidity to support wet concrete.
- Formwork shall be true to line, level, dimensions, and required slope.
- Joints shall be sufficiently tight to prevent leakage of cement slurry.
- Formwork shall be removed carefully after the concrete attains adequate strength.

Placement of Concrete

- Concrete shall be placed in position immediately after mixing.
- Proper compaction shall be carried out using needle vibrators or approved methods to achieve dense and homogeneous concrete.
- Chhajjas shall be cast to the required thickness, projection, slope, and profile as shown in drawings.

Finishing

- Exposed soffit and edges of chhajjas shall be neatly finished.

- Top and exposed surfaces shall be finished with **12 mm thick cement mortar 1:3 (1 Cement : 3 Fine Sand)** or as required to obtain a smooth, even, and dense surface.
- Drip course/throating shall be provided wherever shown in drawings or directed by the Engineer-in-Charge.

Curing

- Concrete shall be cured continuously for a minimum period of **14 days**.
- Adequate measures shall be taken to prevent rapid drying and ensure proper strength development.

Reinforcement

- Reinforcement steel shall be placed as per approved structural drawings.
- **Cost of reinforcement, cutting, bending, binding, and placing shall be measured and paid separately and is excluded from this item.**

Workmanship Requirements

- Chhajjas shall be true to line, level, slope, and dimensions.
- Concrete shall be free from honeycombing, segregation, cracks, and surface defects.
- Finished surfaces shall be smooth, dense, and aesthetically acceptable.
- Entire work shall conform to relevant IS codes, structural drawings, and approved engineering practices.

Scope Includes

The item includes cost of **cement, sand, stone aggregate, water, mixing, transportation, centering, shuttering, placing, compacting, finishing with cement mortar 1:3, curing, labour, tools and plants, machinery, scaffolding, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Note: Cost of reinforcement steel is excluded and shall be paid separately.

Mode of Measurement

Measurement shall be made in **Cubic Metres (Cum)** of finished reinforced cement concrete chhajja work actually executed and accepted.

Payment shall be made for the **net volume of R.C.C. work**, including centering, shuttering, finishing, and curing complete. No separate payment shall be made for formwork, mortar finishing, scaffolding, or incidental operations.

Item 57 :

Providing 15 mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement : 3-sand)

Materials

Cement

- Ordinary Portland Cement (OPC) or Portland Pozzolana Cement (PPC) conforming to relevant IS specifications.

Fine Aggregate

- Clean, well-graded fine sand free from silt, clay, organic matter, and other deleterious substances.

Water

- Clean potable water suitable for plastering work.

Mortar

- Cement mortar shall be prepared in the proportion: **1 : 3**
(1 Part Cement : 3 Parts Fine Sand)
- Mortar shall be mixed thoroughly to obtain a uniform and workable consistency.
- Only fresh mortar shall be used, and re-tempered mortar shall not be permitted.

Surface Preparation

- Brick masonry surface shall be thoroughly cleaned of dust, loose mortar, dirt, oil, and foreign matter.
- Joints in masonry shall be raked out adequately where required.
- Surface shall be wetted uniformly before application of plaster.
- Any irregularities or projections shall be removed.

Application of Plaster

- Plaster shall be applied in a **single coat of 15 mm average thickness**.
- The plaster shall be laid evenly and firmly pressed onto the prepared surface.
- Proper screeds and guides shall be used to maintain uniform thickness, line, level, and plumb.

Finishing

- Surface shall be finished smooth, even, and true using wooden floats, steel trowels, or approved tools.
- Finished plaster shall be free from cracks, waves, hollows, blistering, tool marks, and other defects.
- All corners, arrises, junctions, and edges shall be finished neat and true.

Curing

- Plastered surfaces shall be cured continuously for a minimum period of **7 days**.

- Adequate moisture shall be maintained throughout the curing period.

Workmanship Requirements

- Plaster shall be uniform in thickness and appearance.
- Surface shall be perfectly true to line, level, and plumb.
- No unevenness, segregation, cracking, or debonding shall be permitted.
- Entire work shall conform to relevant IS specifications and standard construction practices.

Scope Includes

The item includes cost of **cement, sand, water, surface preparation, scaffolding, mixing, application, finishing, curing, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of actual plastered surface area.

Payment shall be made for the **finished plaster area**, including surface preparation, application, finishing, curing, scaffolding, and all incidental operations complete in all respects.

Item 58 :

20mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.

Materials

Cement

- Ordinary Portland Cement (OPC) or Portland Pozzolana Cement (PPC) conforming to relevant IS specifications.

Sand

- Clean, coarse sand for backing coat and selected screened sand for finishing coat.
- Sand shall be free from silt, clay, organic matter, and other deleterious substances.

Water

- Clean potable water suitable for plastering work.

Surface Preparation

- Masonry/concrete surfaces shall be cleaned thoroughly of dust, dirt, loose mortar, oil, grease, efflorescence, and foreign matter.
- Joints in brick masonry shall be properly raked out where required.
- Surface shall be wetted adequately before commencement of plastering.
- Projections and irregularities shall be removed and depressions made good.

Backing Coat

- Providing **12 mm thick backing coat in Cement Mortar 1:3**
(1 Cement : 3 Sand).
- Mortar shall be applied uniformly and brought to proper line, level, and plumb.
- Surface of the backing coat shall be roughened suitably to receive the finishing coat.

Finishing Coat

- Providing **8 mm thick finishing coat in Cement Mortar 1:1**
(1 Cement : 1 Sand).
- Finishing coat shall be applied over the green backing coat or as per standard practice.
- Surface shall be finished to obtain a uniform sand-faced texture.
- The finish shall be even, dense, and aesthetically acceptable throughout.

Finishing

- The plaster shall be finished with a neat sand-faced texture using approved methods.
- Edges, corners, arrises, grooves, bands, and junctions shall be sharp, true, and neatly finished.

- Surface shall be free from cracks, waviness, hollowness, blistering, or tool marks.

Scaffolding

- Necessary scaffolding, staging, platforms, and safety arrangements shall be provided for execution of work up to 10 metres height.
- Scaffolding holes shall be properly filled and finished after removal.

Curing

- The plastered surface shall be kept continuously moist and cured for a minimum period of **7 days**.
- Proper curing shall be carried out to prevent shrinkage cracks and ensure durability.

Workmanship Requirements

- Plaster shall be true to line, level, and plumb.
- Total thickness shall be maintained at **20 mm**.
- Surface shall exhibit a uniform sand-faced appearance throughout.
- Entire work shall conform to relevant IS specifications and approved construction practices.

Scope Includes

The item includes cost of **cement, sand, water, surface preparation, backing coat, finishing coat, scaffolding, mixing, application, finishing, curing, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of actual plastered surface area.

Payment shall be made for the **finished sand-faced plaster area**, including backing coat, finishing coat, scaffolding, curing, and all incidental operations complete in all respects. No separate payment shall be made for scaffolding, roughening, curing, or surface preparation.

Item 59 :

Wall painting (three coats) including priming coat with plastic emulsion paint of approved brand and manufacture on undecorated wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth including applying priming coat etc. complete.

Materials

Primer

- Approved quality wall primer compatible with plastic emulsion paint.
- Primer shall be alkali-resistant and suitable for masonry and plastered surfaces.

Plastic Emulsion Paint

- Premium quality interior/exterior plastic emulsion paint of approved brand, make, shade, and colour.
- Paint shall conform to relevant IS specifications and manufacturer's standards.

Water

- Clean water for dilution and preparation of paint as recommended by the manufacturer.

Surface Preparation

- Surface shall be thoroughly cleaned by removing dust, dirt, loose particles, mortar droppings, grease, efflorescence, and all foreign matter.
- Uneven portions shall be rubbed down and made smooth.
- Surface shall be sand-papered to obtain a clean, smooth, and uniform base.
- Any minor defects, holes, or cracks shall be rectified before painting.

Application of Primer

- One coat of approved wall primer shall be applied uniformly over the prepared surface.
- Primer shall be allowed to dry completely before application of paint.
- Primer coat shall provide a sound base and ensure proper adhesion of the paint system.

Application of Plastic Emulsion Paint

- Applying **three coats of plastic emulsion paint** of approved shade and colour.
- Paint shall be applied by brush, roller, or spray as per manufacturer's recommendations.
- Each coat shall be applied only after the previous coat has dried completely.
- The paint shall be applied uniformly without streaks, brush marks, lap marks, or patches.

Finishing

- Finished surface shall have a smooth, uniform, and even shade throughout.
- Surface shall be free from peeling, blistering, cracking, sagging, or colour variation.

- Adjacent surfaces, fittings, and fixtures shall be protected from paint splashes and stains.

Workmanship Requirements

- Painting shall be carried out by skilled painters using approved methods.
- Surface preparation shall be completed to the satisfaction of the Engineer-in-Charge before commencement of painting.
- Entire painted surface shall be uniform in appearance and colour.
- Work shall conform to manufacturer's specifications and standard painting practices.

Scope Includes

The item includes cost of **surface preparation, sand papering, cleaning, one coat of primer, three coats of plastic emulsion paint, scaffolding, labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, protection of adjacent surfaces, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of actual painted wall surface area.

Payment shall be made for the **finished painted area**, including surface preparation, primer coat, three coats of plastic emulsion paint, scaffolding, and all incidental operations complete in all respects.

Item 60 :

Finishing wall with Weather Proof Acrylic Emulsion Exterior Paint on wall surface (two coat) to give and even shade and of approved brand and manufacture including thoroughly brooming the surface to remove all dirt and remains of loose powered material.

Materials

Exterior Paint

- Weather Proof Acrylic Emulsion Exterior Paint of approved make and quality.
- Paint shall be specially formulated for exterior applications and resistant to:
 - Rain and moisture
 - Ultraviolet (UV) radiation
 - Fungal and algal growth
 - Atmospheric pollution
 - Colour fading and weathering effects

Water

- Clean water for dilution as per manufacturer's recommendations.

Surface Preparation

- The wall surface shall be thoroughly cleaned before painting.
- All dust, dirt, loose particles, mortar droppings, laitance, efflorescence, and other foreign matter shall be removed by brooming, brushing, or approved methods.
- Loose and powdery material shall be completely removed.
- Surface shall be dry, sound, and suitable for application of paint.
- Minor surface defects shall be rectified before commencement of painting.

Application of Paint

- Weather Proof Acrylic Emulsion Exterior Paint shall be applied in **two coats** over the prepared surface.
- Paint shall be applied uniformly by brush, roller, or spray as per manufacturer's specifications.
- The first coat shall be allowed to dry completely before applying the second coat.
- Necessary dilution shall be carried out strictly in accordance with the manufacturer's recommendations.

Finishing

- Finished surface shall have a smooth, uniform, and even shade throughout.
- Surface shall be free from brush marks, roller marks, streaks, sagging, peeling, blistering, or patchiness.
- Colour and shade shall be as approved by the Engineer-in-Charge.

Workmanship Requirements

- Painting shall be carried out by skilled workmen.
- Entire surface shall receive uniform coverage.
- Work shall be executed in accordance with the manufacturer's specifications and standard painting practices.
- Completed finish shall provide long-term protection against weathering and environmental exposure.

Scope Includes

The item includes cost of **surface cleaning, brooming, brushing, preparation of surface, two coats of Weather Proof Acrylic Emulsion Exterior Paint, labour, tools and plants, scaffolding, transportation, loading, unloading, handling, leads, lifts, protection of adjoining surfaces, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of actual painted wall surface area.

Payment shall be made for the **finished painted area**, including surface preparation, cleaning, application of two coats of exterior acrylic emulsion paint, scaffolding, and all incidental operations complete in all respects.

Item 61 :

Providing and Fixing Machine cut, free edges, machine polished Granite stone slab 18 mm thick (single piece not more than 150 cm) for Doors/Windows sill and Jambs cladding with the help of ancore fastening as per design including full molded round front edge and 1 cm nosing and laid on 20 mm thick cement mortar 1:6 (1 cement:6 coarse sand) jointed with grey cement slurry including rubbing and polishing finishing and etc complete.

Materials

Granite Stone

- Granite shall be of approved colour, pattern, texture, and shade as selected by the Engineer-in-Charge/Architect.
- Slabs shall be machine cut, machine polished, and free from cracks, cavities, veins, or other defects.
- Thickness of slab shall be **18 mm**.
- Individual slab length shall not exceed **150 cm** unless otherwise approved.
- All exposed surfaces shall be mirror polished.

Cement Mortar

- Cement mortar shall be prepared in the proportion:**1 : 6**
(1 Cement : 6 Coarse Sand)
- Mortar shall be of uniform consistency and suitable for bedding the granite slabs.

Cement Slurry

- Grey cement slurry shall be used for jointing and bonding of granite slabs.

Anchor Fasteners

- Stainless steel/non-corrosive anchor fasteners, cramps, clips, dowels, or approved fixing systems shall be provided wherever required for secure fixing.
- Anchors shall be capable of safely supporting the granite cladding without displacement.

Preparation

- Surface receiving the granite cladding shall be cleaned and prepared properly.
- Door/window openings shall be checked for dimensions, alignment, and levels before fixing.
- Granite slabs shall be accurately cut to the required size and profile.

Fixing

- Granite slabs shall be laid over **20 mm thick cement mortar (1:6)** bedding.
- Slabs shall be fixed true to line, level, plumb, and dimensions shown in drawings.
- Necessary anchor fasteners shall be provided for jamb cladding and other vertical surfaces.
- Joints shall be kept as thin as possible and filled with grey cement slurry.

Edge Finishing

- Front exposed edge shall be provided with **full moulded round edge finish**.
- **10 mm nosing** shall be formed along exposed edges as specified.
- All exposed arrises and corners shall be neatly finished and polished.

Rubbing & Polishing

- Granite surfaces shall be rubbed and polished to achieve a uniform mirror finish.
- Finished surface shall be smooth, even, and free from scratches, stains, chips, or tool marks.

Workmanship Requirements

- Granite slabs shall be properly aligned with uniform joints.
- Finished work shall be true to line, level, plumb, and slope where required.
- No hollow pockets, loose fixing, cracks, or damaged edges shall be permitted.
- The completed work shall present a neat and aesthetically pleasing appearance.

Scope Includes

The item includes cost of **18 mm thick granite slabs, cutting, shaping, moulding, polishing, anchor fasteners, cement mortar bedding, cement slurry jointing, rubbing, finishing, labour, tools and plants, scaffolding, transportation, loading, unloading, handling, leads, lifts, and all incidental charges** necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of granite surface actually fixed and accepted.

Payment shall be made for the **finished granite cladding/sill area**, including moulded edges, nosing, anchor fasteners, bedding mortar, polishing, and all incidental operations complete in all respects.

Item 62:

Both side laminate finish flush door. Providing Material & Labour charge for making laminate finish Flush Door (finished size of door is 40 mm) of size 975 mm x 2400 mm considering waterproof flush door sheet of 38 mm thickness covered both side by 1.0 mm thick Laminate supported by SS -314 finish hinges. All exposed framing of 65 mm x12 mm made by teak wood bidding complete with polish. Finishing with all necessary hardware's like handles, conceal mortise locks, cylinders with 6 no's of keys, stopers, tower bolt, MS nails, SS-314 screws etc. as per details given in drawing and as per instructions of Architect/Engineer In charge. Please see the Attached Make List for Approved Makes.

Door Shutter

- Door shutter shall be manufactured using **38 mm thick waterproof solid core flush door shutter** conforming to relevant IS specifications.
- Finished thickness of the shutter after lamination shall be **40 mm**.
- Flush door shall be free from warping, twisting, delamination, and manufacturing defects.
- The shutter shall be suitable for heavy-duty interior applications.

Laminate Finish

- Both faces of the shutter shall be finished with **1.0 mm thick decorative laminate** of approved colour, texture, pattern, and make.
- Laminate shall be bonded using approved adhesive under pressure to achieve a smooth and durable finish.
- All laminate surfaces shall be free from bubbles, wrinkles, cracks, open joints, or surface defects.

Teak Wood Edging

- All exposed edges of the shutter shall be provided with **65 mm × 12 mm teak wood beading/lipping**.
- Teak wood shall be seasoned, free from knots, cracks, sapwood, and other defects.
- Beading shall be neatly fixed and finished flush with the laminate surface.
- Exposed teak wood surfaces shall receive approved wood polish finish.

Hardware & Fittings

The rate shall include supply and fixing of the following approved quality hardware:

- SS-304 finish heavy-duty butt hinges of approved size.
- Concealed mortise lock.
- Brass/SS cylinder lock with **6 keys**.
- Stainless steel door handles.
- Stainless steel tower bolt.
- Door stopper.
- SS-304 screws.
- M.S. nails and fixing accessories.
- Any additional hardware shown in the drawings or specified by the Architect.

All fittings shall be fixed neatly and securely in proper position.

Installation

- Door shutter shall be fixed accurately in the door frame with proper alignment.
- Necessary cutting, fitting, mortising, grooving, drilling, and adjustments shall be carried out.
- Door shall operate smoothly without friction, sagging, or binding.
- Proper clearances shall be maintained on all sides.

Finishing

- Laminate finish shall be uniform in colour and appearance.
- Teak wood edging shall be machine-finished and polished.
- Hardware shall be properly aligned and securely fixed.
- The completed door shall be aesthetically finished and ready for use.

Workmanship Requirements

- Door shutter shall be true to dimensions and free from visible defects.
- All laminate joints and edges shall be perfectly finished.
- Hardware shall function smoothly and efficiently.
- Installation shall conform to approved drawings and manufacturer's recommendations.
- Entire work shall be executed to the satisfaction of the Architect/Engineer-in-Charge.

Scope Includes

The item includes cost of:

- 38 mm thick waterproof flush door shutter.
- 1.0 mm thick decorative laminate on both sides.
- 65 mm × 12 mm teak wood beading/lipping.
- Wood polish finish.
- SS-304 hinges.
- Mortise lock, cylinder, and 6 keys.
- Handles, tower bolt, stopper.
- Screws, nails, adhesives, and fixing accessories.
- Fabrication, cutting, fitting, installation, finishing.
- Labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of finished door shutter area actually supplied and fixed.

Item 63 :

Providing and fixing Anodized Aluminum Section Jindal Deluxe Sliding Window System 27mm series THREE track window as shown in elevation, shutter with 5mm thick transparent plain float glass, with transparent silicon sealant with allu. anodized coated fittings and fixture etc complete.

Aluminium Sections

- Window frame and shutter members shall be manufactured from **extruded anodized aluminium sections of Jindal Deluxe 27 mm Series** or approved equivalent.
- Sections shall be straight, true, and free from twists, warping, dents, or other defects.
- Anodizing shall be of approved shade and thickness as per relevant IS standards.
- Sections shall be suitable for three-track sliding window construction.

Window Configuration

- Window shall be of **Three Track Sliding Type** as shown in architectural elevations and drawings.
- Window size and configuration shall be as per approved drawings.
- Shutters shall slide smoothly on rollers within the track system.
- Necessary interlocking arrangements shall be provided for proper closure.

Glass

- Shutters shall be glazed with **5 mm thick transparent plain float glass** of approved make.
- Glass shall be free from bubbles, waves, scratches, distortions, and other defects.
- Glass shall be cut accurately to the required size and fixed securely within the aluminium sections.

Fittings & Accessories

The item shall include supply and fixing of:

- Heavy-duty nylon/aluminium rollers.
- Handles.
- Locks and locking arrangements.
- Rubber gaskets.
- Wool pile/weather strips.
- Corner cleats.
- Glazing beads.
- Screws and fixing accessories.
- Aluminium fasteners and brackets.
- All other necessary hardware required for proper operation.

All fittings shall be of approved make and suitable for aluminium sliding window systems.

Sealant

- Joints between glass and aluminium sections shall be sealed with approved **transparent silicone sealant**.
- Perimeter joints between aluminium frame and masonry/concrete surfaces shall also be sealed properly to prevent water leakage and air infiltration.

Installation

- Window frames shall be fixed true to line, level, and plumb.
- Necessary anchor fasteners, screws, holdfasts, and fixing brackets shall be provided.
- Frames shall be securely fixed to the structural opening without distortion.
- Shutters shall be installed after completion of frame fixing and glazing work.

Finishing

- Window shall operate smoothly without jamming, rattling, or excessive play.
- Glass shall be cleaned after installation.
- Aluminium surfaces shall be protected from scratches and damage during installation.
- Completed work shall be neat, watertight, and aesthetically acceptable.

Workmanship Requirements

- Aluminium sections shall be accurately fabricated and assembled.
- Corners shall be properly jointed and aligned.
- Glass installation shall be secure and free from stress points.
- Finished window system shall be weather-resistant, durable, and easy to operate.
- Entire work shall conform to approved drawings, manufacturer's specifications, and standard engineering practices.

Scope Includes

The item includes cost of:

- Jindal Deluxe 27 mm Series anodized aluminium sections.
- Three-track sliding window system.
- 5 mm thick transparent plain float glass.
- Rollers, handles, locks, gaskets, wool pile, glazing beads.
- Transparent silicone sealant.
- Fasteners, brackets, screws, and fixing accessories.
- Fabrication, glazing, installation, testing, and finishing.
- Labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, scaffolding, and all incidental charges.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of the actual window area supplied and fixed, measured over the outer dimensions of the frame.

Item 64 :

Structural steel work (Confirming to IS 4923-1997) riveted, bolted or welded in builtup for all type sections, in framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete as per the structural designs and directions of Engineer in charge.

Materials

Structural Steel

- Structural steel sections shall conform to **IS:4923-1997** and other relevant IS specifications.
- Steel shall be of approved grade and quality.
- Hollow sections, plates, angles, channels, beams, flats, tubes, and other members shall be free from rust, cracks, laminations, bends, twists, and manufacturing defects.
- Material shall conform to the sizes and thicknesses indicated in the approved structural drawings.

Fabrication

The work shall include:

- Marking and setting out.
- Cutting to required lengths and profiles.
- Drilling, punching, notching, coping, and edge preparation.
- Fabrication of built-up sections as per approved drawings.
- Shop welding and site welding as required.
- Fabrication of connection plates, gusset plates, cleats, stiffeners, base plates, splice plates, brackets, and other accessories.

All fabrication shall be carried out in accordance with approved fabrication drawings and standard engineering practices.

Connections

Connections shall be made by:

- Welding.
- Bolting.
- Riveting (where specified).

All bolts, nuts, washers, electrodes, welding consumables, and fastening accessories required for complete erection shall be included.

Welds shall be continuous, sound, and free from cracks, porosity, undercutting, or other defects.

Erection & Fixing

- Fabricated steel members shall be transported, lifted, hoisted, aligned, and erected in position.
- Proper temporary supports, staging, lifting equipment, and safety arrangements shall be provided.
- Members shall be fixed accurately to line, level, plumb, and alignment as per approved structural drawings.

- Necessary templates, packings, shims, and adjustment arrangements shall be provided during erection.

Primer Coating

- Before erection or immediately after fabrication, steel surfaces shall be cleaned of rust, oil, grease, mill scale, dirt, and welding slag.
- One coat of approved **steel primer** shall be applied uniformly over all steel surfaces.
- Primer shall be compatible with subsequent protective paint systems, if any.

Workmanship Requirements

- Structural members shall be fabricated and erected strictly in accordance with approved structural drawings.
- Alignment, levels, dimensions, and connections shall be checked and approved before final fixing.
- Steel work shall be free from distortion, excessive deflection, or instability.
- Entire work shall conform to relevant IS codes and accepted structural engineering practices.

Applicable Standards

The work shall comply with:

- IS:4923 – Hollow Steel Sections for Structural Use.
- IS:800 – General Construction in Steel.
- IS:816 – Code of Practice for Metal Arc Welding.
- IS:2062 – Structural Steel Specification.
- Relevant IS Codes and approved structural drawings.

Scope Includes

The item includes cost of:

- Structural steel sections.
- Cutting, drilling, welding, bolting, riveting.
- Connection plates, cleats, gussets, stiffeners.
- Hoisting, lifting, erection, alignment, and fixing.
- Welding electrodes, bolts, nuts, and washers.
- One coat of approved steel primer.
- Labour, tools and plants, cranes, machinery, scaffolding, transportation, loading, unloading, handling, leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Kilograms (Kg)** of structural steel work actually fabricated, erected, and accepted.

Payment shall be made for the **actual weight of completed structural steel work**, including fabrication, erection, welding, bolting, hoisting, fixing, and one coat of steel primer complete in all respects.

Item 65 :

Providing corrugated G.I. sheet of class-3 roofing fixed with galvanized iron J or L Hooks, Bolts and nuts 8mm diameter with bitumen and G.I. limpet washer or G.I. limpet washer. filled with white lead complete excluding the cost of purlins, Rafters and Trusses. (1) 0.80 m thick sheet.

Materials

Corrugated G.I. Sheets

- Corrugated Galvanized Iron sheets shall be of **Class-III** quality conforming to relevant IS specifications.
- Thickness of sheet shall be **0.80 mm**.
- Sheets shall be uniformly galvanized and free from cracks, dents, waviness, rust, and manufacturing defects.
- Corrugations shall be regular and uniform throughout the sheet length.

Fasteners

- Galvanized Iron **J-hooks or L-hooks**.
- G.I. bolts and nuts of **8 mm diameter**.
- Fasteners shall be of sufficient length and strength to suit the roofing structure.

Washers

- Bitumen washers.
- G.I. limpet washers.
- White lead paste for watertight sealing of fixing points.

Accessories

- Ridge pieces.
- Hip pieces.
- Valley gutters.
- Flashings.
- Aprons.
- Corner pieces.
- Other accessories necessary for a complete and weatherproof roofing system.

Laying & Fixing

- Roofing sheets shall be laid to the required line, level, and slope as shown in approved drawings.
- Side laps and end laps shall be provided as per standard specifications.
- Sheets shall be fixed securely to purlins using G.I. J-hooks or L-hooks, bolts, nuts, bitumen washers, and G.I. limpet washers.

- White lead shall be applied at fixing locations to ensure watertightness.
- Sheets shall be fixed without distortion, buckling, or damage to the galvanized coating.

Ridges, Valleys & Flashings

- Ridge pieces, valley gutters, flashings, and other accessories shall be fixed neatly and securely.
- All overlaps and joints shall be properly sealed to prevent leakage.
- Roofing shall be completed to provide a continuous weatherproof surface.

Finishing

- Finished roof shall be uniform, properly aligned, and free from visible defects.
- Damaged galvanized surfaces, if any, shall be touched up with approved zinc-rich paint.
- Roof shall be completely watertight and capable of withstanding normal wind and weather conditions.

Workmanship Requirements

- Roofing work shall be executed by skilled workmen.
- Sheets shall be handled carefully to prevent damage to galvanizing.
- All fixings shall be properly tightened and aligned.
- Entire roofing system shall conform to approved drawings and standard roofing practices.

Applicable Standards

The work shall comply with:

- IS:277 – Galvanized Steel Sheets.
- Relevant IS specifications for corrugated roofing sheets.
- Standard engineering and roofing practices.

Scope Includes

The item includes cost of:

- 0.80 mm thick Class-III corrugated G.I. sheets.
- J-hooks/L-hooks, bolts, nuts.
- Bitumen washers and G.I. limpet washers.
- White lead.
- Ridge pieces, valleys, flashings, and accessories.
- Cutting, drilling, fixing, sealing, and finishing.
- Labour, tools and plants, scaffolding, transportation, loading, unloading, handling, leads, lifts, and all incidental charges necessary to complete the work.

Exclusions

- Cost of **purlins, rafters, trusses, and main supporting structural framework** shall be measured and paid separately.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of roof area actually covered and accepted, measured on the slope of the roof.

Payment shall be made for the **finished roofing area**, including all fasteners, washers, ridges, flashings, sealing materials, and incidental operations complete in all respects.

Item 66 :

Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15cm thick of M200 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1cement:3fine sand) etc. complete.

Materials

Precast Concrete Kerb Stone

- Kerb stones shall be precast using **M-200 grade cement concrete**.
- Size of each kerb stone shall be:
 - Length : **300 mm**
 - Height : **300 mm**
 - Thickness : **150 mm**
- Kerb stones shall be machine-cast/vibrated and properly cured.
- Units shall be true to shape, dimensions, and free from cracks, honeycombing, chipped edges, or other defects.
- Colour and finish shall be uniform throughout.

Jointing Mortar

- Cement Mortar **1:3** (1 Cement : 3 Fine Sand) for filling joints between kerb stones.

Excavation & Preparation

- Excavation shall be carried out to the required width and depth for placing kerb stones.
- Foundation bed shall be properly dressed, compacted, and brought to the required level.
- Loose soil, debris, and unsuitable material shall be removed.

Fixing of Kerb Stones

- Kerb stones shall be placed in proper line, level, gradient, and curvature as shown in the approved drawings.
- Stones shall be set firmly and accurately to maintain uniform alignment.

- Necessary adjustments shall be made to achieve smooth curves and straight runs.
- Verticality and top levels shall be checked continuously during fixing.

Jointing

- Joints between adjacent kerb stones shall be filled with **cement mortar 1:3**.
- Joint width shall be kept uniform and neatly finished.
- Excess mortar shall be removed and exposed surfaces cleaned after completion.

Finishing

- Finished kerb line shall be true, straight, and aesthetically pleasing.
- Top and exposed faces shall be clean and free from mortar stains.
- Damaged kerb stones shall not be accepted and shall be replaced at the contractor's cost.

Curing

- Cement mortar joints and any bedding concrete, where provided, shall be properly cured for a minimum period of **7 days**.
- Adequate protection shall be provided during the curing period.

Workmanship Requirements

- Kerb stones shall be fixed firmly without rocking.
- Alignment, level, and joint spacing shall be maintained throughout.
- Entire work shall conform to approved drawings, specifications, and standard road construction practices.
- The finished work shall be durable and capable of withstanding traffic and environmental conditions.

Scope Includes

The item includes cost of:

- Precast M-200 grade concrete kerb stones.
- Excavation and preparation of foundation.
- Setting, alignment, and fixing.
- Cement mortar 1:3 joint filling.
- Finishing and curing.
- Labour, tools and plants, transportation, loading, unloading, handling, leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Running Metres (Rmt)** of kerb stone actually supplied, fixed, and accepted.

Payment shall be made for the **finished length of kerb stone work**, including excavation, fixing, alignment, jointing, curing, and all incidental operations complete in all respects.

Item 67 :

Road marking with hot applied thermoplastic paints with reflectorising glass beads on bitumin surface providing and laying a hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250gms per sqm area, thickness of 2.5mm is excluding of surface applied glass beds as per IRC:35-2015. The finished surface to be level, uniform and free from streaks and holes. zebra patta /bump patta lane/center line/ edge line/cut patta. The white color marking should provide liminance coefficient on cement road shall be min 130 mcd/m²/lux and Asphalt road shall be min 100 mcd/m²/lux during the service life during the day time. The marking should meet the performance criteria for night time reflectivity, wet reflectivity and skid resistance as mentioned in the section-15 of IRC 35-2015. Warranty for the Retro reflectivity should be two years.

Scope of Work

The work shall include providing and laying the following types of road markings:

- Zebra Crossing Markings (Zebra Patta)
- Speed Breaker/Bump Markings (Bump Patta)
- Lane Markings
- Centre Line Markings
- Edge Line Markings
- Stop Lines
- Chevron Markings
- Directional Arrows
- Cut Markings
- Other pavement markings as shown in approved drawings or directed by the Engineer-in-Charge.

Materials

Thermoplastic Compound

- Hot applied thermoplastic road marking material shall conform to **IRC:35-2015** and relevant MoRTH specifications.
- Material shall be suitable for application on both bituminous and cement concrete pavements.
- The compound shall contain approved pigments, binders, fillers, and glass beads.
- Material shall possess excellent adhesion, durability, abrasion resistance, skid resistance, and weather resistance.

Glass Beads

- Reflectorizing glass beads shall conform to relevant IRC and MoRTH specifications.
- Surface-applied glass beads shall be applied at the rate of:**250 grams per square metre**
- Glass beads shall be uniformly distributed immediately after application of thermoplastic material.

Thickness

- Finished thermoplastic marking thickness shall be:**2.5 mm thick**
- Thickness measurement shall exclude the surface-applied glass beads.

Surface Preparation

- Existing pavement surface shall be thoroughly cleaned before application.
- Surface shall be dry and free from dust, dirt, grease, oil, loose particles, laitance, and other foreign materials.
- Existing markings, if any, shall be removed wherever specified.
- Primer shall be applied where recommended by the manufacturer or required for concrete surfaces.

Application

- Thermoplastic material shall be heated in a suitable pre-heater and applied using approved thermoplastic road marking equipment.
- Application temperature shall be maintained as per manufacturer's recommendations.
- Markings shall be laid true to line, width, shape, and dimensions shown in approved drawings.
- Finished markings shall be uniform in thickness, colour, texture, and appearance.

Performance Requirements

The finished markings shall comply with the requirements of **IRC:35-2015** and shall satisfy the following:

Daytime Visibility

For White Colour Markings:

- On Cement Concrete Roads:

Minimum Luminance Coefficient:**130 mcd/m²/lux**

- On Bituminous (Asphalt) Roads:

Minimum Luminance Coefficient:**100 mcd/m²/lux**

The above values shall be maintained throughout the service life of the marking.

Night-Time Reflectivity

Road markings shall comply with the minimum retro-reflectivity requirements specified in **Section 15 of IRC:35-2015**.

Wet Reflectivity

Markings shall satisfy the wet-night visibility and wet reflectivity criteria prescribed under IRC:35-2015.

Skid Resistance

Finished markings shall provide adequate skid resistance and comply with the minimum skid resistance requirements specified in IRC:35-2015.

Quality Control

The contractor shall carry out:

- Thickness measurement.
- Retro-reflectivity testing.
- Luminance testing.
- Adhesion testing.
- Visual inspection.

- Skid resistance testing where required.

All test results shall conform to IRC:35-2015 requirements.

Warranty Requirement

The contractor shall provide a **minimum Two (2) Year Warranty** for the retro-reflectivity performance of the thermoplastic road markings from the date of completion.

During the warranty period:

- Any marking that fails to maintain the specified retro-reflectivity levels.
- Peeling, cracking, excessive wear, fading, debonding, or loss of visibility.

shall be rectified or replaced by the contractor at no additional cost to the Department.

Workmanship Requirements

- Markings shall be straight, sharp-edged, and uniform.
- Surface shall be free from streaks, pinholes, bubbles, cracks, uneven thickness, and other defects.
- Finished markings shall exhibit uniform reflectivity and colour.
- Work shall be executed by trained operators using approved thermoplastic road marking machines.

Scope Includes

The item includes cost of:

- Thermoplastic road marking compound.
- Reflectorizing glass beads.
- Surface cleaning and preparation.
- Primer where required.
- Heating and application equipment.
- Layout and marking.
- Testing and quality control.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Traffic management during execution.
- Warranty obligations for two years.
- All leads, lifts, taxes, royalties, and incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of road marking area actually laid and accepted.

For line markings, area shall be calculated as:

Length × Width of Marking

Payment shall be made for the actual area of thermoplastic marking executed, including glass beads, surface preparation, testing, and warranty obligations complete in all respects.

Item 68 :

Providing and Fixing 15 mm thick 300 mm x 300 mm Tactile Warning Tiles (Attention Tiles ie. Tactile Warning Surface Indicator (TWSI)) of Johnson Endura Tac Button Yellow Plus or equivalent make in flooring laid on 20 mm thick cement mortar 1:6 (1 cement: 6 coarse sand) on new surface and jointed with cement slurry including finished with flush pointing & cleaning the surface for all floors as per detailed drawing etc. complete as directed by Architect or Engineer in charge. The tiles shall be Anti Skid, Chemical Resistant, Fade Proof, Frost - Heat & Weather Proof, High Flexural Strength, Highly Durable, Stain Resistant All Tactile Warning Tiles meet the specific size and dimension standards as required by ISO/FDIS 23599.

Materials

Tactile Warning Tiles

- Tactile tiles shall be **300 mm × 300 mm × 15 mm thick**.
- Tiles shall be of approved yellow colour or as specified in the approved drawings.
- Surface shall consist of raised tactile warning studs/buttons conforming to accessibility standards.
- Tiles shall be manufactured specifically for tactile guidance and warning applications.
- Approved Make: **Johnson Endura Tac Button Yellow Plus** or equivalent approved make.

Performance Requirements

The tactile tiles shall possess the following properties:

- Anti-Skid Surface.
- Chemical Resistant.
- Fade Resistant.
- Frost Resistant.
- Heat Resistant.
- Weather Resistant.
- High Flexural Strength.
- High Abrasion Resistance.
- Highly Durable.
- Stain Resistant.
- Suitable for both interior and exterior applications.
- Designed specifically for accessibility and universal design requirements.

Standards

- Tactile Warning Tiles shall comply with:
 - **ISO/FDIS 23599** (Guidance Systems for Visually Impaired Persons).
 - Harmonized Guidelines and Standards for Universal Accessibility.
 - National Building Code (NBC) requirements wherever applicable.
 - Approved accessibility standards and architectural drawings.

Bedding

- Tiles shall be laid on **20 mm thick Cement Mortar 1:6**.

Mix Proportion:

- 1 Part Cement
- 6 Parts Coarse Sand
- Mortar bed shall be laid to proper line, level, and slope where required.

Laying

- Tiles shall be fixed accurately at designated locations as shown in drawings.
- Necessary alignment shall be maintained to ensure continuity of tactile guidance.
- Tiles shall be laid true to line, level, pattern, and direction.
- Special care shall be taken to maintain uniform tactile orientation.

Jointing

- Joints shall be filled with cement slurry.
- Joint width shall be uniform and neatly finished.
- Excess slurry shall be removed immediately after laying.

Finishing

- Surface shall be finished with flush pointing.
- Tiles shall be cleaned thoroughly after installation.
- Finished surface shall be level, uniform, and free from lippage, cracks, chips, stains, or other defects.

Workmanship Requirements

- Tiles shall be firmly bonded to the bedding mortar.
- No hollow sound, loose tiles, or uneven surfaces shall be permitted.
- Tactile patterns shall be aligned correctly to serve their intended guidance function.
- Finished work shall be aesthetically acceptable and fully compliant with accessibility requirements.

Scope Includes

The item includes cost of:

- 15 mm thick tactile warning tiles.
- Cement mortar bedding (1:6).
- Cement slurry jointing.
- Surface preparation.
- Laying, alignment, fixing, and finishing.
- Flush pointing.
- Cleaning and protection.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, wastage, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of tactile warning tiles actually laid and accepted.

Payment shall be made for the **finished area of tactile warning tiles**, including mortar bedding, jointing, fixing, finishing, and cleaning complete in all respects.

Item 69 :

Providing and fixing acrylic multilingual Braille (raised dots) DIRECTIONAL SIGNBOARDS of size 225 x 150mm designed as per accessibility standards and having 3.5mm thick acrylic base plate with Upper Case San Serif words made of white acrylic non glare cut out letters of height 15mm raised not less than 0.8mm above base plate and the equivalent word written in Hindi with Devanagari non glare acrylic letters of height 15mm raised not less than 0.8mm above base plate and having a non-glare acrylic cut arrow pointing in the required direction. Each signboard to be fixed as per manufacturers specifications on the wall at the approved location and at a height of 1200mm from FFL complete as per design / specifications and guidelines as per the entire satisfaction of the Engineer.

Materials

Base Plate

- Base plate shall be made from **3.5 mm thick acrylic sheet** of approved colour and finish.
- Surface shall be non-glare, smooth, durable, and suitable for indoor use.
- Acrylic sheet shall be free from cracks, scratches, bubbles, and manufacturing defects.

English Lettering

- Text shall be provided in **Upper Case Sans Serif letters**.
- Letters shall be fabricated from white non-glare acrylic material.
- Letter height shall be **15 mm**.
- Letters shall be raised **not less than 0.8 mm above the base plate**.
- Lettering shall be clear, legible, and permanently fixed to the base plate.

Hindi Lettering

- Equivalent wording shall be provided in **Hindi (Devanagari Script)**.
- Letters shall be fabricated from white non-glare acrylic material.
- Letter height shall be **15 mm**.
- Letters shall be raised **not less than 0.8 mm above the base plate**.
- Text shall be accurately translated and positioned as per approved design.

Braille Information

- Braille dots shall be accurately formed and permanently fixed.
- Braille shall conform to recognized accessibility standards and guidelines.
- Raised dots shall be durable, tactile, and easily readable by visually impaired users.
- Braille text shall correspond exactly to the displayed directional information.

Directional Arrow

- Signboard shall incorporate a **non-glare acrylic directional arrow**.
- Arrow shall be raised and clearly indicate the required direction.
- Direction and orientation shall be as shown in approved drawings or directed by the Engineer-in-Charge.

Design Requirements

- Overall signboard size: **225 mm × 150 mm**.
- Layout, fonts, spacing, Braille placement, and directional arrow shall conform to approved accessibility standards.
- Colour contrast between background and lettering shall ensure high visibility.

Installation

- Signboards shall be fixed securely on walls using approved fixing methods recommended by the manufacturer.
- Necessary screws, plugs, adhesives, spacers, mounting brackets, and accessories shall be included.
- Signboard shall be installed at a height of **1200 mm above Finished Floor Level (FFL)** unless otherwise directed.
- Location shall be as shown in drawings or as approved by the Engineer-in-Charge.

Workmanship Requirements

- Signboard shall be accurately fabricated with sharp lettering and properly aligned Braille.
- Surface shall be free from scratches, stains, cracks, or visible defects.
- Raised letters and Braille dots shall be firmly bonded and resistant to normal wear.
- Installation shall be neat, level, secure, and aesthetically acceptable.

Compliance Standards

The signboards shall comply with:

- Harmonized Guidelines and Standards for Universal Accessibility.
- National Building Code (NBC) Accessibility Provisions.
- Applicable Accessibility Standards for Signage and Braille Systems.

- Approved Architectural and Accessibility Drawings.

Scope Includes

The item includes cost of:

- 3.5 mm thick acrylic base plate.
- Raised English lettering.
- Raised Hindi (Devanagari) lettering.
- Braille dots.
- Acrylic directional arrow.
- Cutting, engraving, fabrication, and finishing.
- Fixing accessories, screws, plugs, adhesives, and mounting hardware.
- Installation at specified height.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of signboards supplied, fixed, and accepted.

Payment shall be made for each **completed multilingual Braille directional signboard**, including fabrication, lettering, Braille, directional arrow, fixing, installation, and all accessories complete in all respects.

Item 70 :

PROVIDING & FIXING BRAILE INDICATOR OF SIZE 170 MM X 35MM FOR HANDRAILS OF THE APPROVED DESIGN AND MAKE H BRAILE DOTS RAISED 0.5 MM ABOVE BASE PLATE TO BE INSTALLED AT SPECIFIC LOCATIONS AS PER DIRECTION ENGINEER IN CHARGE.

Materials

Braille Indicator Plate

- Braille indicator shall be manufactured from approved durable material such as stainless steel, anodized aluminium, acrylic, polycarbonate, or other approved material suitable for long-term use.
- Size of indicator shall be **170 mm × 35 mm**.
- Surface shall be smooth, non-corrosive, weather-resistant, and free from manufacturing defects.

Braille Dots

- Braille dots shall be accurately formed and permanently integrated with the indicator plate.
- Braille dots shall be **raised not less than 0.5 mm above the base plate**.
- Braille shall comply with applicable accessibility standards and guidelines.
- Braille information shall clearly identify the location, floor level, direction, or facility as specified.

Design Requirements

- Indicator design, content, lettering, and Braille arrangement shall be as approved by the Engineer-in-Charge.
- Braille characters shall be uniformly spaced and easily readable by touch.
- Plate edges shall be smooth and free from sharp corners.
- Indicator shall be resistant to wear, fading, and normal environmental conditions.

Installation

- Braille indicators shall be fixed on handrails at locations shown in approved drawings or as directed by the Engineer-in-Charge.
- Fixing shall be carried out using approved adhesive, screws, clamps, or manufacturer's recommended fixing system.
- Indicator shall be securely fixed without movement, vibration, or loosening.
- Installation shall ensure easy accessibility and tactile readability by users.

Workmanship Requirements

- Braille dots shall be clear, accurately formed, and permanently fixed.
- Indicator shall be installed straight, level, and firmly secured.
- Surface shall be free from scratches, cracks, stains, dents, or visible defects.
- The completed installation shall conform to accessibility requirements and approved designs.

Compliance Standards

The Braille indicator shall comply with:

- Harmonized Guidelines and Standards for Universal Accessibility.
- National Building Code (NBC) Accessibility Provisions.
- Applicable standards for tactile and Braille signage systems.
- Approved accessibility drawings and specifications.

Scope Includes

The item includes cost of:

- Braille indicator plate (170 mm × 35 mm).
- Raised Braille dots.
- Fabrication and finishing.
- Adhesives, screws, clamps, mounting accessories, and fixing materials.
- Installation on handrails.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Running Meter (Rmt.)** of Braille indicators supplied, fixed, and accepted.

Payment shall be made for each **completed Braille indicator installation**, including fabrication, raised Braille dots, fixing accessories, installation, and all incidental operations complete in all respects.

Item 71 :

Providing and Fixing a set of wall mounted 38 mm dia U shaped horizontal stainless steel collapsible grab bar 38mm vertical stainless steel fixed grab rail of grade SS 304 from round pipe supported and 75 mm dia 8 mm thick SS 304 base flange on wall Including anchor fasteners, nuts, accessories as per detailed drawing etc. complete as directed by Architect or Engineer in Incharge.

Materials

Stainless Steel Grab Bars

- Grab bars shall be manufactured from **SS 304 grade stainless steel round pipe**.
- Pipe outside diameter shall be **38 mm**.
- Stainless steel shall be corrosion-resistant, rust-proof, and suitable for wet and dry areas.
- Surface finish shall be satin/matt/brushed finish unless otherwise specified.
- Pipes shall be free from dents, cracks, weld marks, sharp edges, and manufacturing defects.

Collapsible Grab Bar

- Horizontal grab bar shall be **U-shaped collapsible/folding type**.
- Folding mechanism shall operate smoothly and safely.
- Grab bar shall remain firmly locked in both raised and lowered positions.
- Assembly shall be capable of supporting the prescribed accessibility load requirements.

Fixed Grab Rail

- Vertical grab rail shall be fixed type and fabricated from the same SS 304 pipe.
- Dimensions shall be as shown in approved drawings.

Base Flange

- Each grab bar shall be provided with **75 mm diameter × 8 mm thick SS 304 base flange**.
- Flanges shall be machined and finished properly.
- Flanges shall be designed to safely transfer loads to the supporting wall.

Fixing Arrangement

- Grab bars shall be fixed using approved quality:
 - Stainless steel anchor fasteners.
 - Stainless steel nuts and bolts.
 - Washers.
 - Concealed fixing covers where specified.
 - All necessary fixing accessories.
- Fasteners shall be corrosion resistant and suitable for the substrate.

Installation

- Grab bars shall be installed at locations, heights, and orientations shown in approved accessibility drawings.

- Installation shall ensure firm anchorage into the wall structure.
- Grab bars shall be level, plumb, and rigid after installation.
- Folding mechanism shall be checked for smooth operation after installation.

Accessibility Requirements

- Installation shall conform to applicable accessibility standards and barrier-free design guidelines.
- Grab bars shall provide adequate support and safety for elderly persons, persons with disabilities, and mobility-impaired users.
- Height and positioning shall comply with approved drawings and accessibility requirements.

Finishing

- Exposed surfaces shall be cleaned and polished after installation.
- Welds shall be ground smooth and finished uniformly.
- All sharp edges and burrs shall be removed.
- Completed installation shall present a neat and professional appearance.

Workmanship Requirements

- Grab bars shall be rigid, stable, and capable of withstanding operational loads.
- No movement, looseness, rattling, or deformation shall be permitted.
- Folding mechanism shall function smoothly throughout its operating range.
- Installation shall be free from visible defects, scratches, dents, or discoloration.

Scope Includes

The item includes cost of:

- SS 304 grade 38 mm dia round pipe.
- U-shaped collapsible horizontal grab bar.
- Vertical fixed grab rail.
- 75 mm dia × 8 mm thick SS 304 base flanges.
- Anchor fasteners, nuts, bolts, washers, covers, and accessories.
- Fabrication, welding, polishing, finishing, and installation.
- Testing and commissioning.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Set)** of complete grab bar assemblies supplied, fixed, and accepted.

Payment shall be made for each **complete installed set**, including collapsible grab bar, fixed grab rail, flanges, fasteners, accessories, fabrication, installation, testing, and finishing complete in all respects.

Item 72 :

Providing and Fixing Size: L 75mm x W 75mm x H 1200; 15 mm thick U shape corner Rubber Reflective Guards with yellow reflective Patti fixing on RCC/brick surface Including all fitting and material charges & It shall be Chemical Resistant, Fade Proof, Frost - Heat & Weather Proof, High Flexural Strength, Highly Durable, Stain Resistance as per detailed drawing etc. complete as directed by Architect or Engineer in charge.

Materials

Rubber Corner Guard

- Corner guard shall be manufactured from high-quality heavy-duty rubber compound.
- Shape shall be **U-shaped corner protector** suitable for fixing on RCC, masonry, or similar surfaces.
- Dimensions shall be:
 - Length of each side: **75 mm × 75 mm**
 - Height: **1200 mm**
 - Thickness: **15 mm**
- Material shall be flexible, impact-resistant, and capable of absorbing collision forces without damage.

Reflective Strip

- Corner guard shall be provided with **high-intensity yellow reflective pattis/reflective tapes** securely fixed on the exposed face.
- Reflective strips shall provide high visibility during day and night conditions.
- Reflective material shall be weatherproof and resistant to peeling or fading.

Performance Requirements

The corner guard shall possess the following properties:

- Chemical Resistant.
- Fade Resistant.
- Frost Resistant.
- Heat Resistant.
- Weather Resistant.
- High Flexural Strength.
- High Impact Resistance.
- Highly Durable.
- Stain Resistant.
- UV Resistant.
- Suitable for indoor and outdoor installations.

Fixing Arrangement

- Corner guards shall be fixed on RCC columns, brick masonry walls, retaining walls, parking structures, ramps, and other approved surfaces.

- Fixing shall be carried out using:
 - Stainless steel screws.
 - Anchor fasteners.
 - Nylon plugs.
 - Adhesive bonding compound where required.
 - All necessary fixing accessories.
- Fixing system shall ensure firm and permanent installation.

Installation

- Surface shall be cleaned and prepared before installation.
- Corner guard shall be aligned accurately and fixed plumb and straight.
- Fixing points shall be evenly spaced to prevent loosening or deformation.
- Installation shall be carried out at locations shown in drawings or as directed by the Engineer-in-Charge.

Finishing

- Installed corner guards shall be free from twists, distortions, cracks, or surface defects.
- Reflective strips shall be properly aligned and securely bonded.
- Completed installation shall provide a neat appearance and effective corner protection.

Workmanship Requirements

- Corner guards shall be securely fixed without movement.
- Reflective strips shall remain clearly visible after installation.
- No gaps shall be permitted between the guard and the supporting surface.
- Installation shall withstand normal impact loads encountered in parking and circulation areas.

Scope Includes

The item includes cost of:

- Rubber corner guard (75 mm × 75 mm × 1200 mm).
- Yellow reflective strips.
- Screws, anchor fasteners, nylon plugs, adhesives, and fixing accessories.
- Surface preparation.
- Alignment and installation.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, wastage, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete corner guards supplied, fixed, and accepted.

Item 73 :

Providing and fixing of acrylic, non-glare, tactile audio pictorial building layout as per the approved size, design and make, having 3mm thick acrylic non glare base plate of the approved colour and non-glare acrylic cut out symbols raised 3mm above base plate and Grade 2/ Grade 1 Braille to be integral with the sign face and be raised 0.5mm above base plate. The map to be installed at the specified location as per accessibility standards, shall be oriented to the position of the viewer and to be installed at a height of 800 mm from the finished ground/ floor level and using the necessary hardware specified by the manufacturer and to be installed up to the height of 800 mm from the finished ground/ floor level and using the necessary hardware specified by the manufacturer and to be installed complete as per design / specifications and guidelines as per the entire satisfaction of the the Engineer-in-charge.

Materials

Base Plate

- Base plate shall be manufactured from **3 mm thick acrylic non-glare sheet** of approved colour and finish.
- Surface shall be smooth, durable, scratch-resistant, and suitable for tactile reading.
- Acrylic sheet shall be free from cracks, bubbles, distortions, and manufacturing defects.

Tactile Symbols and Graphics

- Building layout, directional information, circulation routes, facility locations, and pictorial symbols shall be represented using **non-glare acrylic cut-out symbols**.
- Symbols shall be permanently fixed on the base plate.
- Symbols and graphics shall be raised **3 mm above the base plate**.
- Layout shall clearly identify major facilities, circulation paths, entrances, exits, lifts, staircases, toilets, reception areas, and other designated locations as shown in approved drawings.

Braille Information

- Grade-1 and/or Grade-2 Braille shall be integrated with the tactile layout.
- Braille shall be formed as an integral part of the sign face.
- Braille dots shall be raised **0.5 mm above the base plate**.
- Braille information shall correspond accurately to the tactile map and facility identification.
- Braille shall comply with recognized accessibility standards and guidelines.

Audio Accessibility Features

- The tactile layout shall incorporate audio accessibility provisions wherever specified in the approved design.
- Audio system, touch-sensitive activation device, QR-based system, NFC-based system, or equivalent approved technology shall provide building orientation and navigation information.
- Audio information shall correspond to the tactile map and accessibility requirements.
- Audio components shall be securely integrated within the system and protected against damage and unauthorized access.

Design Requirements

- Layout design shall be prepared in accordance with approved architectural and accessibility drawings.
- Map orientation shall correspond to the actual viewing direction of the user.
- Text, symbols, Braille, and graphics shall be arranged for maximum legibility and accessibility.
- Colour contrast shall be sufficient for partially sighted users.

Installation

- Tactile layout map shall be installed at the approved location shown in drawings or as directed by the Engineer-in-Charge.
- The map shall be oriented to the position of the viewer.
- Installation height shall be **800 mm above Finished Floor Level (FFL)** measured to the centerline or as specified in approved accessibility drawings.
- Necessary fixing hardware, brackets, screws, anchors, spacers, and mounting accessories recommended by the manufacturer shall be provided.
- Installation shall be rigid, level, secure, and vandal-resistant.

Accessibility Compliance

The tactile layout system shall comply with:

- Harmonized Guidelines and Standards for Universal Accessibility.
- National Building Code (NBC) Accessibility Provisions.
- Rights of Persons with Disabilities (RPWD) Guidelines.
- Applicable standards for tactile signage and Braille systems.
- Approved accessibility and architectural drawings.

Workmanship Requirements

- Raised symbols and Braille shall be accurately fabricated and securely fixed.
- Surface shall be free from scratches, cracks, stains, distortions, or visible defects.
- Audio features shall function properly after installation.
- Layout shall be clear, legible, durable, and easy to interpret.
- Entire installation shall be aesthetically pleasing and fully compliant with accessibility requirements.

Scope Includes

The item includes cost of:

- 3 mm thick non-glare acrylic base plate.
- Raised tactile symbols and pictograms.
- Integrated Grade-1/Grade-2 Braille.
- Audio accessibility system and associated components where specified.
- Cutting, engraving, fabrication, and finishing.
- Fixing brackets, anchors, screws, spacers, and mounting hardware.
- Installation, testing, and commissioning.

- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete tactile audio pictorial building layout units supplied, installed, tested, and accepted.

Payment shall be made for each **fully functional tactile audio pictorial building layout**, including acrylic base plate, tactile graphics, Braille information, audio accessibility features, fixing hardware, installation, testing, and commissioning complete in all respects.

Item 74 :

Providing & Fixing tactile layout plan of size 900mm x 600mm as approved design, made of 3.0mm thick acrylic non glare base plate and non glare cut out symbols with Braille on which Individual facility points, like Inquiry, reception, restrooms, medical room / first aid, cafeteria or breakout area, lounge, meeting room, conference room etc. present the respective floors with pictograph wherever needed all in tactile raised by minimum of 1.0mm to 2mm in various colours to make it legible for seniors, partial vision impaired etc. All the facility names should be in Braille, along with English or Hindi. The entire block of tactile signs should be mounted on wall for easy reading. The map to be installed at specified locations and installed at a height of 800mm.

Materials

Base Plate

- Base plate shall be manufactured from **3.0 mm thick acrylic sheet** with non-glare finish.
- Acrylic sheet shall be of approved colour and quality.
- Surface shall be smooth, durable, scratch-resistant, and suitable for tactile reading.
- The base plate shall be free from cracks, bubbles, distortions, or manufacturing defects.

Tactile Symbols & Graphics

- Facility locations and circulation information shall be represented through non-glare acrylic cut-out symbols and pictograms.
- Symbols shall be permanently fixed to the base plate.
- Tactile elements shall be raised **minimum 1.0 mm to 2.0 mm above the base plate**.
- Symbols shall be manufactured in approved contrasting colours to improve visibility for senior citizens and persons with partial visual impairment.

- Layout shall clearly indicate the location of facilities and circulation routes.

Facility Information

The tactile layout shall indicate, wherever applicable:

- Inquiry Counter
- Reception
- Restrooms / Accessible Toilets
- Medical Room / First Aid Room
- Cafeteria
- Breakout Area
- Lounge
- Meeting Rooms
- Conference Rooms
- Staircases
- Lifts
- Exits
- Waiting Areas
- Other facilities shown in approved drawings

Braille Information

- All facility names and directional information shall be provided in **Braille**.
- Braille shall be accurately positioned adjacent to the corresponding facility symbol.
- Braille dots shall be clear, durable, and easily readable by touch.
- Braille shall comply with applicable accessibility standards and guidelines.

Language Requirements

- Facility names shall be provided in:
 - **Braille**
 - **English**
 - **Hindi** (where specified)
- Lettering shall be clear, legible, and arranged in accordance with approved design.

Design Requirements

- Overall size of tactile layout plan shall be:

900 mm × 600 mm

- Colour contrast, symbol size, Braille placement, and pictograms shall conform to accessibility requirements.
- The design shall be prepared and approved prior to fabrication.

Installation

- The complete tactile layout plan shall be mounted securely on the wall using approved fixing hardware.
- Necessary screws, anchor fasteners, spacers, brackets, and accessories shall be included.
- Layout shall be installed at the designated location as shown in drawings.
- Mounting height shall be **800 mm above Finished Floor Level (FFL)** or as directed by the Engineer-in-Charge.
- The map shall be oriented correctly for easy interpretation by users.

Accessibility Compliance

The tactile layout plan shall comply with:

- Harmonized Guidelines and Standards for Universal Accessibility.
- National Building Code (NBC) Accessibility Provisions.
- Rights of Persons with Disabilities (RPWD) Guidelines.
- Applicable standards for tactile signage, Braille systems, and wayfinding information.

Workmanship Requirements

- Raised symbols and Braille shall be accurately fabricated and securely fixed.
- Surface shall be free from scratches, cracks, stains, distortions, or visible defects.
- Colour contrast shall remain clear and legible.
- Entire installation shall be neat, durable, and easy to read by visually impaired and partially sighted users.

Scope Includes

The item includes cost of:

- 3.0 mm thick acrylic non-glare base plate.
- Raised tactile symbols and pictograms.
- Braille information.
- English and Hindi lettering.
- Fabrication, cutting, engraving, and finishing.
- Fixing brackets, anchor fasteners, screws, spacers, and mounting hardware.
- Installation and alignment.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete tactile layout plans supplied, fixed, and accepted.

Payment shall be made for each **completed tactile layout plan**, including acrylic base plate, tactile symbols, pictograms, Braille text, multilingual lettering, fixing hardware, installation, and all incidental operations complete in all respects.

Item 75 :

APPROVAL FIRE SYSTEM FROM LOCAL FIRE AUTHORITY Getting of Fire Fighting System Approval from local fire authority with all other charges and documentations for getting No Objection Certificate.

Scope of Work

1. Preparation and submission of application for fire system approval to the **concerned Local Fire Authority**.
2. Preparation, compilation, and submission of all required documents, including:
 - Fire safety drawings (as-built)
 - System layout plans
 - Technical specifications
 - Test and commissioning reports
 - Certificates from licensed agency, wherever required
3. Liaisoning with the Fire Authority for scrutiny, inspection scheduling, and compliance.
4. Coordinating site inspection by the Fire Authority and attending inspections as required.
5. Carrying out minor clarifications, revisions in drawings, or documentation as demanded by the Fire Authority (excluding additional physical works, if any).
6. Obtaining the **Fire Fighting System Approval / Fire NOC** and submitting the same to the Department.

General Conditions

1. The quoted rate shall be **inclusive of all charges**, including application fees, scrutiny fees, inspection charges, documentation charges, liaisoning expenses, transportation, taxes, duties, and all incidental costs.
2. No separate payment shall be made for any correspondence, follow-up, visits, or liaisoning with the Fire Authority.
3. Approval shall be obtained strictly in accordance with **Gujarat Fire Safety Rules** and prevailing statutory norms.
4. If approval is delayed due to reasons attributable to the contractor, no extra payment or extension on this account shall be admissible.

Exclusions / Limitations

1. Any **additional fire-fighting works, modifications, or system upgradation** required by the Fire Authority for granting approval shall **not be included** in this item and shall be executed separately as directed by the Engineer-in-Charge.

2. Rejection or delay of approval due to non-compliance of existing building provisions beyond the contractor's scope shall not entitle the contractor to additional payment under this item.

Documentation

The contractor shall submit the following to the Engineer-in-Charge:

1. Copy of Fire Fighting System Approval / Fire NOC issued by the Local Fire Authority.
2. Acknowledged copies of submitted applications and drawings.
3. Inspection reports and compliance letters, if any.

Measurement and Payment

This item shall be measured and paid **on Job basis**, after successful obtaining and submission of the **Fire Fighting System Approval / Fire NOC** to the satisfaction of the Engineer-in-Charge.

The rate shall be deemed to include **all costs of documentation, liaisoning, statutory fees, inspections, transportation, taxes, duties, and incidental expenses**, and no extra payment shall be made on any account.

Item 76 :

Providing and Fixing 6 mm thick Lexan Polycarbonate multi wall roofing sheet fixed with hilti screw and rubber silicon sealer and aluminium strip of size 50 x 3 mm etc complete as directed by Engineer in charge

Materials

Polycarbonate Roofing Sheet

- Roofing sheets shall be **Lexan Multi-Wall Polycarbonate Sheets** or equivalent approved make.
- Thickness of sheet shall be **6 mm**.
- Sheets shall be UV-protected and suitable for exterior applications.
- Sheets shall be lightweight, impact-resistant, weather-resistant, and capable of transmitting natural daylight.
- Sheets shall be free from cracks, scratches, waviness, discoloration, or manufacturing defects.

Aluminium Fixing Strip

- Aluminium strips shall be of size **50 mm × 3 mm**.
- Strips shall be straight, corrosion-resistant, and free from bends or defects.
- Aluminium strips shall be provided at fixing locations to ensure proper holding of the sheets.

Fasteners

- Approved **Hilti screws/anchor fasteners** of suitable length and diameter.
- Fasteners shall be corrosion-resistant and compatible with the roofing system.
- Necessary washers and fixing accessories shall be provided.

Sealant

- Approved quality weatherproof **rubber silicone sealant**.
- Sealant shall provide a watertight and flexible joint.
- Sealant shall be UV resistant and suitable for exterior exposure.

Installation

- Polycarbonate sheets shall be cut accurately to the required size and shape.
- Sheets shall be laid true to line, level, and slope as shown in approved drawings.
- Adequate allowance shall be provided for thermal expansion and contraction of the sheets.
- Sheets shall be fixed to the supporting framework using aluminium strips and Hilti fasteners.
- Fasteners shall be installed without overstressing or damaging the sheets.
- All joints, overlaps, fixing holes, and perimeter edges shall be sealed with approved silicone sealant.

Finishing

- Roofing shall be installed to provide a neat, uniform, and watertight surface.

- Sheets shall be cleaned after installation.
- Protective film, where provided by the manufacturer, shall be removed after completion.
- Finished surface shall be free from scratches, cracks, leakage points, and visible defects.

Performance Requirements

The roofing system shall be:

- Weatherproof.
- UV resistant.
- Impact resistant.
- Corrosion resistant.
- Leak-proof.
- Durable under normal environmental conditions.
- Suitable for daylight transmission applications.

Workmanship Requirements

- Sheets shall be properly aligned and securely fixed.
- No buckling, distortion, or damage shall occur during installation.
- Joints shall be watertight and neatly finished.
- Installation shall strictly follow the manufacturer's recommendations and approved drawings.

Scope Includes

The item includes cost of:

- 6 mm thick Lexan polycarbonate multi-wall sheets.
- 50 mm × 3 mm aluminium strips.
- Hilti screws, washers, and fixing accessories.
- Silicone rubber sealant.
- Cutting, drilling, fitting, fixing, sealing, and finishing.
- Labour, tools and plants.
- Transportation, loading, unloading, handling.
- Leads, lifts, scaffolding, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Square Metres (Sqm)** of polycarbonate roofing sheet area actually supplied, fixed, and accepted.

Payment shall be made for the **finished roofing area**, including polycarbonate sheets, aluminium strips, fasteners, sealant, installation, and all incidental operations complete in all respects.

Item 77:

Providing Prefabricated Security Cabin 6 Ft (L) x 6 Ft (W) x 8 Ft (H) M.S. Built having Main Steel Frame and Walls made of Puff or FRP material and having features like Sliding Window , weatherproof , Electrical fittings , Fan , Main Door with locking arrangement etc, complete and Color as directed including Labour , Transportation etc. complete as directed by Engineer in Charge.

Overall Dimensions

- Length : **6'-0" (1.83 m)**
- Width : **6'-0" (1.83 m)**
- Height : **8'-0" (2.44 m)**

The dimensions shall be measured externally unless otherwise specified.

Structural Framework

- Main structure shall be fabricated from M.S. square tubes, rectangular hollow sections, angles, channels, or equivalent structural members of suitable size and thickness.
- Structural framework shall be designed to safely withstand handling, transportation, wind loads, and normal operational loads.
- All steel members shall be properly welded, ground smooth, and treated with:
 - One coat of approved anti-corrosive steel primer.
 - Two coats of synthetic enamel paint of approved shade.

Wall Panels

- Wall panels shall be constructed using:
 - PUF insulated panels, or
 - FRP insulated panels,

as approved by the Engineer-in-Charge.

- Panels shall be weatherproof, termite-proof, corrosion-resistant, and suitable for external exposure.
- Panel thickness shall be adequate to provide structural stability and thermal insulation.
- Internal and external surfaces shall have smooth factory-finished appearance.

Roofing

- Roof shall be fabricated using insulated PUF/FRP panel system or equivalent approved roofing arrangement.
- Roof shall be completely weatherproof and leak-proof.
- Proper slope shall be provided for rainwater drainage.

Flooring

- Cabin floor shall be provided with suitable structural flooring system.

- Flooring shall be finished with:
 - Anti-skid vinyl flooring,
 - Cement board flooring,
 - FRP flooring,
 - Or equivalent approved finish.
- Floor shall be capable of withstanding normal occupancy loads.

Doors

- One main entrance door shall be provided.
- Door shall be fabricated from insulated panel/FRP/M.S. frame construction.
- Complete with:
 - Locking arrangement.
 - Door handle.
 - Hinges.
 - Tower bolt.
 - Necessary hardware.

Windows

- Sliding windows of approved size and configuration.
- Window frames shall be aluminium/uPVC/FRP as approved.
- Glazing shall be clear glass or acrylic sheet.
- Provision of mosquito mesh where specified.
- Windows shall allow adequate ventilation and visibility.

Electrical Installation

Providing complete internal electrical wiring including:

- LED light fitting.
- Modular switchboard.
- Electrical wiring in concealed surface conduits/trunking.
- Socket outlet.
- MCB protection.
- Internal electrical connections.

Electrical installation shall conform to relevant electrical standards.

Ceiling Fan

- Providing and fixing one ceiling fan of approved make and suitable size.

- Complete with regulator, wiring, and accessories.

Finishing

- Cabin shall be finished in approved colour and shade as directed by the Engineer-in-Charge.
- Internal and external surfaces shall be neat, smooth, and aesthetically acceptable.
- All joints shall be properly sealed against water ingress.

Performance Requirements

The cabin shall be:

- Weatherproof.
- Leak-proof.
- Corrosion-resistant.
- Durable and portable.
- Suitable for security personnel occupancy.
- Structurally stable during transportation and service conditions.

Workmanship Requirements

- Fabrication shall be accurate and professional.
- All joints shall be properly sealed and finished.
- Doors and windows shall operate smoothly.
- Electrical fittings shall be tested before handover.
- Entire cabin shall be delivered in ready-to-use condition.

Scope Includes

The item includes cost of:

- M.S. structural framework.
- PUF/FRP wall and roof panels.
- Flooring system.
- Main entrance door with locking arrangement.
- Sliding windows.
- Electrical wiring, switches, light fittings, socket outlets.
- Ceiling fan.
- Primer and painting.
- Fabrication, transportation, loading, unloading, erection, fixing, testing, and commissioning.
- Labour, tools and plants, machinery, leads, lifts, and all incidental charges necessary to complete the work.

Mode of Measurement

Measurement shall be made in **Number (Nos.)** of complete prefabricated security cabins supplied, installed, tested, and accepted.

Payment shall be made for each **fully completed and operational security cabin**, including structure, wall panels, roof, flooring, doors, windows, electrical fittings, fan, transportation, erection, and all accessories complete in all respects.

Dated Signature of Contractor:

**Deputy Executive Engineer
R & B Subdivision
Nadiad**

**Executive Engineer
R & B Division
Nadiad**