

**CONSTRUCTION STANDARD FOR UNDERGROUND
DISTRIBUTION NETWORK
PART 18: PRECAST MINI MANHOLE & HANDHOLE**

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DISTRIBUTION NETWORK**

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1 Document Control & Record

| # | Date | Revision No. | Major Revision Description |
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2 GENERAL**2.1 Scope**

- 2.1.1 This specification covers the minimum standards and requirements for the construction, of precast Mini-Manholes (Mini-MH) and Handholes (HH) to be supplied to SEC Distribution for the construction of Medium Voltage (MV) and telecom underground networks infrastructure.
- 2.1.2 This standard is subject to revision as new materials and methods of construction are developed. The latest revision of this standard shall be applicable. The date and version/revision of the latest issue of each sheet is printed at the top corner above the standard number.

2.2 Intended Use

- 2.2.1 Precast MINI-MHs & HH are used as an access point for an underground MV and fiber-based telecom network infrastructure, allowing inspection, maintenance, and system upgrades of Distribution MV power and fiber network infrastructure. Precast MINI-MH & HH will be installed in open trench as per the technical specification set in the OSP infrastructure implementation guidelines.
- 2.2.2 The Precast MINI-MH & HH are interconnected with ducts, and are used to house MV and Telecom network elements such as MV power cables, splicing joint closure (JCL), Fiber Access Terminal (FAT), and fiber cables installation.
- 2.2.3 The specifications cover the design and technical specifications for the following structure type (Precast MINI-MH and HH):
- 2.2.4 There are two types of structures:
- Precast Mini-MANHOLE Single Round Cover Hinges Type**
 - Precast HANDHOLE Type 1: Double Covers with Hinges**
 - Precast HANDHOLE Type 2: Single Cover**

2.3 Long Term Performance Requirements

- 2.3.1 The Precast MINI-MH & HH and their accessories supplied in compliance with this specification shall be capable of withstanding the typical service conditions of the Kingdom of Saudi Arabia for a period of Thirty (30) years without any degradation.
- 2.3.2 The Precast MINI-MH & HH shall be designed, manufactured by high quality materials only and “packaged” so that the storing, installation, operation and maintenance, characteristics shall not degrade when exposed to the environmental conditions of Saudi Arabia. The environmental conditions of Saudi Arabia may include ambient air temperature variations from -10°C to +85°C.

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2.3.3 A warranty of at least thirty (30) years shall be granted by the manufacturer from the date of manufacturing the material for SE Distribution.

2.4 Associated Specifications

2.4.1 The following standards shall be applied, and deemed to be an integral part of this specification:

1. ASTM A615,
2. ASTM C150
3. ASTM C39/C39-18,
4. ISO 9001: 2015 Quality Management System.
5. BS EN 124 D 400

2.5 Abbreviations

ISO: International Standard Organization

ASTM: American Society for Testing and Materials

BS : British Standard

3 TECHNICAL REQUIREMENTS**3.1 General**

3.1.1 The Precast Mini-MH & HH structure shall be compatible with current DISTRIBUTION installation standards, operation, and maintenance practices.

3.1.2 Precast Mini-MH & HH structure shall be built under the controlled conditions of a fabrication yard.

3.1.3 The Precast Mini-MH & HH structure shall be fully equipped with all accessories: ladder, cable brackets, cable bracket supports, and sump cover.

3.1.4 The Precast Mini-MH & HH structure shall not pose any safety threat to handlers and non-toxic and dermatologically safe item to users.

3.1.5 The Precast Mini-MH & HH structure shall be of high-quality design, workmanship and finish. The inner and outer surface of the chamber shall be smooth, clean and free from grooves, sharp edges, cracks and blisters shrink holes or any other defects or foreign matters, which might impair the performance of the product in service.

3.1.6 The Precast Mini-MH & HH structure shall be highly resistant to all kinds of corrosive liquids, aggressive media and chemicals usually existing into the

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ground. All metal parts of the precast Mini-MH & HH structure shall be protected against corrosion.

- 3.1.7 The Precast Mini-MH & HH structure shall be designed to allow multiple connections of Main, Mini and Micro duct to the walls of the chambers.
- 3.1.8 After installation below ground level, Precast Mini-MH & HH structure shall not crack, bend out of shape or shift their positions.
- 3.1.9 The Manufacturer shall issue a letter of warranty conditional to the type approval.
- 3.1.10 Any violation to the technical specification set in this document may result in putting the product of the manufacturer suspending or cancelling the type approval.
- 3.1.11 The manufacturer shall maintain and share with Distribution the material delivered to its contractors including but not limited to the serial number, the manufacturing details and the delivery date to the contractor.
- 3.1.12 The manufacturer shall conduct third party test for sample of the delivered material to the contractors on his own cost. Distribution will collect the sample. These sample shall be delivered to the third-party laboratory at no cost to Distribution. The test result shall be shared directly with Distribution with no intervention from the manufacturer. If a test failed, the type approval shall be suspended or cancelled. The manufacturer shall not deliver any item to the contractors once the type approval is suspended or cancelled.
- 3.1.13 The manufacturer shall submit compliance statement as per Annex 1 of this document. Manufacturer shall support the compliance statement with supporting documents such as data sheets, drawings, installation and operation manuals and third-party test if required.

- 3.4.14 The manufacturer shall submit compliance statement as per Annex-1

3.2 Design Requirements

- 3.2.1 The Precast MINI-MH & HH shall be supplied according to the design requirements specified below and summarized in the Drawings # 1: Mini-Manhole Model and Drawing#2 Handhole Type 1 Model and Drawing#3 Handhole Type 2 Model.

3.3 Precast Mini-MH Single Round Cover for MV Power & Telecom

- 3.3.1 The required size of the Mini-MH is Outside Dimensions (LxWxH) = 1550x1550x1990mm and Inside Dimensions: (LxWxH) = 1200x1200x1200mm.
- 3.3.2 **Windows configurations** as per Drawing #1 (on two walls opposite to each other)

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3.3.3 Concrete Specification

3.3.3.1 Cement Type: Sulphate resistant cement Type-V as per ASTM C150.

3.3.3.2 Concrete compressive strength 4000 psi at 28 days as per ASTM C39/C39-18.

3.3.3.3 Concrete Slump: 100mm \pm 25mm.

3.3.3.4 Temperature: Less than 35°.

3.3.3.5 Curing of Concrete must be using any of the following methodology: Sprinkling of water, Application of curing compound, or Covering of concrete to avoid the loss of water contents.

3.3.4 Steel Reinforcement: it shall be 60 Grade steel reinforcing bars as per ASTM A615 for Walls & bottom slab, extra steel bars at opening of roof. The steel reinforcing bars will be displaced at opening of Manhole instead of cutting. (Reinforcement schedule given in Drawing# 1).

3.3.5 Clear cover of concrete shall be 15mm minimum from inside and 20mm minimum from outside must be provided to reinforcing bars.

3.3.6 External coating: All the surface exposing to earth must be coated with two coats of bituminous material.

3.3.7 Mini-Manhole Cover & Frame

3.3.7.1 Material: Ductile iron

3.3.7.2 Loading capacity: Heavy duty D400 (BSEN 124), Loading (Tons): 40

3.3.7.3 Shape: Round

3.3.7.4 Clear opening (mm): Ø600

3.3.7.5 Frame over base (mm): Ø810

3.3.7.6 Depth/Height (mm): 150

3.3.7.7 Cover Hinges to frame

3.3.7.8 Prying slot/register: 3

3.3.7.9 Protective coating: Painted with two layers of black Bitumen paint

3.3.7.10 Blind lifting keyhole: one (1) on cover

3.3.7.11 Locking device Stainless steel: two (2)

3.3.7.12 Dawiyat logo engraved on cover

3.3.7.13 Saudi Electricity (SEC) engraved on each cover

3.3.7.14 Manufactory Code (MC): manufactory name

3.3.7.15 Holes for anchoring with Bolts: 4

3.3.7.16 Rubber gasket

3.3.7.17 Cover Design: See Mini-MH Single Round Cover Ductile Iron Drawing #4

3.3.8 Accessories (Refer to Drawing#5: Mini-MH Accessories)

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- 3.3.9 **Cable Bracket Supports** material shall be hot dipped galvanized steel, size 700mm x 50mm x 40mm (Plate thickness:4mm)
- 3.3.10 **Bracket Supports** material shall be hot dipped galvanized steel, size:250 mm long (Plate thickness:4mm)
- 3.3.11 **Sump Cover**- Material shall be hot dipped galvanized steel, size 400mm x 400mm (Plate thickness: 4mm).
- 3.3.12 **Marking Plate (MP)** in aluminum size 65mm x 120mm x 1mm, to be fixed inside on surface of the neck of Mini-MH
- 3.3.13 **Ladder** material shall be hot dipped galvanized steel with size of 1500mm Long (Plate thickness: 6mm)
- 3.3.14 **Ladder Support** material shall be hot dipped steel and size 15mm±1mm
- 3.3.15 **Earthing:** Bonding ribbon made of tinted copper having size approximately 10mm wide and 1mm thick must be provided in each Manhole, attached & fixed with reinforcing bars before pouring concrete, to the inner wall of Mini-Manhole by bonding clamp.

3.4 **Handhole Type 1: Double Covers with Hinges**

- 3.4.1 The required size of the Mini-MH is Outside Dimensions (LxWxH) = 1600x900x1000mm and Inside Dimensions: (LxWxH) = 1300x600x850mm.
- 3.4.2 Windows configurations as per below Drawing # 2 (on two walls opposite to each other)
- 3.4.3 **Concrete Specification:**
 - 3.4.3.1 Cement Type: Sulphate resistant cement Type-V as per ASTM C150
 - 3.4.3.2 Concrete compressive strength 4000 psi at 28 days as per ASTM C39/C39-18,
 - 3.4.3.3 Concrete Slump: 100mm ± 25mm
 - 3.4.3.4 Temperature: Less than 35°
 - 3.4.3.5 Curing of Concrete must be using any of the following methodology: Sprinkling of water, Application of curing compound, or Covering of concrete to avoid the loss of water contents.
- 3.4.4 **Steel Reinforcement:** it shall be 60 Grade steel reinforcing bars as per ASTM A615 for Walls & bottom slab, extra steel bars at opening of roof. The steel reinforcing bars will be displaced at opening of Manhole instead of cutting. (Reinforcement schedule given in Drawing#2).
- 3.4.5 **Clear cover of concrete** shall be 15mm minimum from inside and 20mm minimum from outside must be provided to reinforcing bars.
- 3.4.6 **External coating:** All the surface exposing to earth must be coated with two coats of bituminous material.
- 3.4.7 **Handhole Type 1 Cover & Frame**

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- 3.4.7.1 Material: Ductile iron ASTM A536 Grade 80-55-06 iron
- 3.4.7.2 Loading capacity: Heavy duty D400 (BSEN 124), Loading (Tons): 40
- 3.4.7.3 Shape: Rectangular
- 3.4.7.4 Clear opening (LxWmm): 1300x600
- 3.4.7.5 Frame over base (LxWmm): 1480x780
- 3.4.7.6 Depth/Height (mm): 100
- 3.4.7.7 Cover Hinges to frame
- 3.4.7.8 Protective coating: Painted with two layers of black Bitumen paint
- 3.4.7.9 Blind lifting keyhole: one (1) in each cover
- 3.4.7.10 Locking device Stainless steel: two (2) in each cover
- 3.4.7.11 Dawiyat logo engraved on each cover
- 3.4.7.12 Saudi Electricity (SEC) engraved on each cover
- 3.4.7.13 Manufactory Code/name
- 3.4.7.14 Holes for anchoring with Bolts: 12
- 3.4.7.15 Rubber gasket
- 3.4.7.16 Cover Design: See HH Type 1 Double Cover Ductile Iron Drawing #6
- 3.4.8 **Accessories** (Refer to Drawing#7 Handhole Accessories)
- 3.4.9 **Cable Bracket Supports** material shall be hot dipped galvanized steel, size 700mm x 50mm x 40mm (Plate thickness:4mm)
- 3.4.10 **Bracket Supports** material shall be hot dipped galvanized steel, size: 250mm long (Plate thickness: 4mm)
- 3.4.11 **Sump Cover-** Material shall be hot dipped galvanized steel, size 300mm x 300mm (Plate thickness: 4mm).
- 3.4.12 **Marking Plate (MP)** in aluminum size 65mm x 120mm x 1mm, to be fixed inside on surface of the HH wall.
- 3.4.13 **Swivel Arm** material in steel hot dipped galvanization with Size (Long/ plate thickness) = 1220mm/4mm
- 3.4.14 **Earthing:** Bonding ribbon made of tinted copper having size approximately 10mm wide and 1mm thick must be provided in each Manhole, attached & fixed with reinforcing bars before pouring concrete, to the inner wall of Mini-Manhole by bonding clamp.
- 3.5 **Handhole Type 2: Single Cover**
 - 3.5.1 The required size of the Mini-MH is Outside Dimensions (LxWxH) = 600x600x650mm and Inside Dimensions: (LxWxH) = 400x400x500mm.
 - 3.5.2 Windows configurations as per below Drawing # 3 Handhole Type 2 Single Cover.

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3.5.3 Concrete Specification:

- 3.5.3.1 Cement Type: Sulphate resistant cement Type-V as per ASTM C150
- 3.5.3.2 Concrete cylinder compressive strength shall be minimum of 5000 psi at 28 days.
- 3.5.3.3 **Steel reinforcements** shall conform to ASTM A615, deformed bars grade 60 with minimum yield strength of 420mpa.
- 3.5.3.4 Pre-formed structure cover shall be heavy duty (H-40) (see Drawing#3)
- 3.5.3.5 Hot dip galvanized steel accessories

3.6 Drawings

- 3.6.1 Drawing# 1: Mini –Manhole Model
- 3.6.2 Drawing# 2: Handhole Type 1 Model
- 3.6.3 Drawing# 3: Handhole Type 2 Model
- 3.6.4 Drawing# 4: Mini-Manhole Single Round Cover Hinges Type
- 3.6.5 Drawing# 5: Mini-Manhole Accessories
- 3.6.6 Drawing# 6: Handhole Type 1 Double Covers Hinges Type
- 3.6.7 Drawing# 7: Handhole Type 1 Accessories

3.7 Material Properties and Test Requirements

| Test | Characteristic | Test Method | Acceptance Criteria | Frequen cy |
|---|-------------------------------|---|---|---------------|
| Mechanical, Environmental Parameters | | | | |
| 1.1 | Concrete compressive strength | shall be minimum of 4000PSI AT | Minimum of 4000psi at 28days | 28days |
| 1.2 | Cement shall be | sulfate resistant type V | Conforming to ASTM CI.50 | NA |
| 1.3 | Walls expose to earth | shall be coated with approved bituminous material | Shall be coated with approved bituminous material | |
| 1.4 | Reinforcement bars | shall conform to ASTM A.615 grade 60 | Shall conform to ASTM615 grade 60 | |
| 1.5 | Cover & frame | DTSC04 | DTSC04 | |

Table 1: Mechanical, environmental parameters & characteristics

3.8 Distribution Unit Code

| Unit Code | Description | Unit of Measure |
|-----------|---|-----------------|
| TSCxxx | Precast Mini-Manhole Single Round Cover Hinges Type – (MV & Telecom Applications) | Piece |
| TSCxxx | Precast Handhole Type 1: Double Covers with Hinges– (MV & Telecom Applications) | Piece |
| TSCxxx | Precast Handhole Type 2: Single Covers | Piece |

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ANNEX COMPLIANCE SHEET

| Section | Compliance | Remarks |
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| 2.3 | Long Term Performance Requirements | |
| 2.3.1 | The Precast MINI-MH & HH and their accessories supplied in compliance with this specification shall be capable of withstanding the typical service conditions of the Kingdom of Saudi Arabia for a period of Thirty (30) years without any degradation. | |
| 2.3.2 | The Precast MINI-MH & HH shall be designed, manufactured by high quality materials only and "packaged" so that the storing, installation, operation and maintenance, characteristics shall not degrade when exposed to the environmental conditions of Saudi Arabia. The environmental conditions of Saudi Arabia may include ambient air temperature variations from -10°C to +85°C. | |
| 2.3.3 | A warranty of at least thirty (30) years shall be granted by the manufacturer from the date of manufacturing the material for SE Distribution. | |
| 3.0 | TECHNICAL REQUIREMENTS | |
| 3.1 | General | |
| 3.1.1 | The Precast Mini-MH & HH structure shall be compatible with current DISTRIBUTION installation standards, operation, and maintenance practices. | |
| 3.1.2 | Precast Mini-MH & HH structure shall be built under the controlled conditions of a fabrication yard. | |
| 3.1.3 | The Precast Mini-MH & HH structure shall be fully equipped with all accessories: ladder, cable brackets, cable bracket supports, and sump cover. | |
| 3.1.4 | The Precast Mini-MH & HH structure shall not pose any safety threat to handlers and non-toxic and dermatologically safe item to users. | |
| 3.1.5 | The Precast Mini-MH & HH structure shall be of high-quality design, workmanship and finish. The inner and outer surface of the chamber shall be smooth, clean and free from grooves, sharp edges, cracks and blisters shrink holes or any other defects or foreign matters, which might impair the performance of the product in service. | |
| 3.1.6 | The Precast Mini-MH & HH structure shall be highly resistant to all kinds of corrosive liquids, aggressive media and chemicals usually existing into the ground. All metal parts of the precast Mini-MH & HH structure shall be protected against corrosion. | |
| 3.1.7 | The Precast Mini-MH & HH structure shall be designed to allow multiple connections of Main, Mini and Micro duct to the walls of the chambers. | |
| 3.1.8 | After installation below ground level, Precast Mini-MH & HH structure shall not crack, bend out of shape or shift their positions. | |
| 3.1.9 | The Manufacturer shall issue a letter of warranty conditional to the type approval. | |
| 3.1.10 | Any violation to the technical specification set in this document may result in putting the product of the manufacturer suspending or cancelling the type approval. | |

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| 3.1.11 | The manufacturer shall maintain and share with Distribution the material delivered to its contractors including but not limited to the serial number, the manufacturing details and the delivery date to the contractor. | | |
| 3.1.12 | The manufacturer shall conduct third party test for sample of the delivered material to the contractors on his own cost. Distribution will collect the sample. These sample shall be delivered to the third-party laboratory at no cost to Distribution. The test result shall be shared directly with Distribution with no intervention from the manufacturer. If a test failed, the type approval shall be suspended or cancelled. The manufacturer shall not deliver any item to the contractors once the type approval is suspended or cancelled. | | |
| 3.1.13 | The manufacturer shall submit compliance statement as per Annex 1 of this document. Manufacturer shall support the compliance statement with supporting documents such as data sheets, drawings, installation and operation manuals and third-party test if required. | | |
| 3.1.14 | The manufacturer shall submit compliance statement as per Annex-1 | | |
| 3.2 | Design Requirements (see table 1 below) | | |
| 3.2.1 | Precast MINI-MH & HH shall be supplied according to the design requirements specified below and summarized in the Drawings # 1: Mini-Manhole Model and Drawing#2 Handhole Type 1 Model and Drawing#3 Handhole Type 2 Model. | | |
| 3.3 | Precast Mini-MH Single Round Cover for MV Power & Telecom | | |
| 3.3.1 | The required size of the Mini-MH is Outside Dimensions (LxWxH) = 1550x1550x1990mm and Inside Dimensions: (LxWxH) = 1200x1200x1200mm. | | |
| 3.3.2 | Windows configurations as per Drawing #1 (on two walls opposite to each other) | | |
| 3.3.3 | Concrete specification | | |
| 3.3.3.1 | Type: Sulphate resistant cement Type-V as per ASTM C150. | | |
| 3.3.3.2 | Concrete compressive strength 4000 psi at 28 days as per ASTM C39/C39-18. | | |
| 3.3.3.3 | Concrete Slump: 100mm ± 25mm. | | |
| 3.3.3.4 | Temperature: Less than 35°. | | |
| 3.3.3.5 | Curing of Concrete must be using any of the following methodology: Sprinkling of water, Application of curing compound, or Covering of concrete to avoid the loss of water contents | | |
| 3.3.4 | Steel Reinforcement: it shall be 60 Grade steel reinforcing bars as per ASTM A615 for Walls & bottom slab, extra steel bars at opening of roof. The steel reinforcing bars will be displaced at opening of Manhole instead of cutting. (Reinforcement schedule given in Drawing# 1). | | |
| 3.3.5 | Clear cover of concrete shall be 15mm minimum from inside and 20mm minimum from outside must be provided to reinforcing bars. | | |
| 3.3.6 | External coating: All the surface exposing to earth must be coated with two coats of bituminous material. | | |
| 3.3.7 | Mini-Manhole Cover & Frame | | |
| 3.3.7.1 | Material: Ductile iron | | |

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| 3.3.7.2 | Loading capacity: Heavy duty D400 (BSEN 124), Loading (Tons): 40 | | |
| 3.3.7.3 | Shape: Round | | |
| 3.3.7.4 | Clear opening (mm): Ø600 | | |
| 3.3.7.5 | Frame over base (mm): Ø810 | | |
| 3.3.7.6 | Depth/Height (mm): 150 | | |
| 3.3.7.7 | Cover Hinges to frame | | |
| 3.3.7.8 | Prying slot/register: 3 | | |
| 3.3.7.9 | Protective coating: Painted with two layers of black Bitumen paint | | |
| 3.3.7.10 | Blind lifting keyhole: one (1) on cover | | |
| 3.3.7.11 | Locking device Stainless steel: two (2) | | |
| 3.3.7.12 | Dawiyat logo engraved on cover | | |
| 3.3.7.13 | Saudi Electricity (SEC) engraved on each cover | | |
| 3.3.7.14 | Manufactory Code (MC): manufactory name | | |
| 3.3.7.15 | Holes for anchoring with Bolts: 4 | | |
| 3.3.7.16 | Rubber gasket | | |
| 3.3.7.17 | Design: See Mini-MH Single Round Cover Ductile Iron Drawing #4 | | |
| 3.3.8 | Accessories (Refer to Drawing#5: Mini-MH Accessories) | | |
| 3.3.9 | Cable Bracket Supports material shall be hot dipped galvanized steel, size 700mm x 50mm x 40mm (Plate thickness:4mm) | | |
| 3.3.10 | Bracket Supports material shall be hot dipped galvanized steel, size:250 mm long (Plate thickness:4mm) | | |
| 3.3.11 | Sump Cover - Material shall be hot dipped galvanized steel, size 400mm x 400mm (Plate thickness: 4mm). | | |
| 3.3.12 | Marking Plate (MP) in aluminum size 65mm x 120mm x 1mm, to be fixed inside on surface of the neck of Mini-MH | | |
| 3.3.13 | Ladder material shall be hot dipped galvanized steel with size of 1500mm Long (Plate thickness: 6mm) | | |
| 3.3.14 | Ladder Support material shall be hot dipped steel and size 15mm±1mm | | |
| 3.3.15 | Earthing: Bonding ribbon made of tinted copper having size approximately 10mm wide and 1mm thick must be provided in each Manhole, attached & fixed with reinforcing bars before pouring concrete, to the inner wall of Mini-Manhole by bonding clamp. | | |
| 3.4 | Handhole Type 1: Double Covers with Hinges | | |
| 3.4.1 | The required size of the Mini-MH is Outside Dimensions (LxWxH) = 1600x900x1000mm and Inside Dimensions: (LxWxH) = 1300x600x850mm. | | |
| 3.4.2 | Windows configurations as per below Drawing # 2 (on two walls opposite to each other) | | |
| 3.4.3 | Concrete Specification: | | |
| 3.4.3.1 | Cement Type: Sulphate resistant cement Type-V as per ASTM C150 | | |
| 3.4.3.2 | Concrete compressive strength 4000 psi at 28 days as per ASTM C39/C39-18, | | |
| 3.4.3.3 | Concrete Slump: 100mm ± 25mm | | |
| 3.4.3.4 | Temperature: Less than 35° | | |

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|--------------|--|--|--|
| 3.4.3.5 | Curing of Concrete must be using any of the following methodology: Sprinkling of water, Application of curing compound, or Covering of concrete to avoid the loss of water contents. | | |
| 3.4.4 | Reinforcement: it shall be 60 Grade steel reinforcing bars as per ASTM A615 for Walls & bottom slab, extra steel bars at opening of roof. The steel reinforcing bars will be displaced at opening of Manhole instead of cutting. (Reinforcement schedule given in Drawing#2). | | |
| 3.4.5 | Clear cover of concrete shall be 15mm minimum from inside and 20mm minimum from outside must be provided to reinforcing bars. | | |
| 3.4.6 | External coating: All the surface exposing to earth must be coated with two coats of bituminous material. | | |
| 3.4.7 | Handhole Type 1 Cover & Frame | | |
| 3.4.7.1 | Material: Ductile iron ASTM A536 Grade 80-55-06 iron | | |
| 3.4.7.2 | Loading capacity: Heavy duty D400 (BSEN 124), Loading (Tons): 40 | | |
| 3.4.7.3 | Shape: Rectangular | | |
| 3.4.7.4 | Clear opening (LxWmm): 1300x600 | | |
| 3.4.7.5 | Frame over base (LxWmm): 1480x780 | | |
| 3.4.7.6 | Depth/Height (mm): 100 | | |
| 3.4.7.7 | Cover Hinges to frame | | |
| 3.4.7.8 | Protective coating: Painted with two layers of black Bitumen paint | | |
| 3.4.7.9 | Blind lifting keyhole: one (1) in each cover | | |
| 3.4.7.10 | Locking device Stainless steel: two (2) in each cover | | |
| 3.4.7.11 | Dawiyat logo engraved on each cover | | |
| 3.4.7.12 | Saudi Electricity (SEC) engraved on each cover | | |
| 3.4.7.13 | Manufactory Code/name | | |
| 3.4.7.14 | Holes for anchoring with Bolts: 12 | | |
| 3.4.7.15 | Rubber gasket | | |
| 3.4.7.16 | Cover Design: See HH Type 1 Double Cover Ductile Iron Drawing #6 | | |
| 3.4.7.17 | Accessories (Refer to Drawing#7 Handhole Accessories) | | |
| 3.4.8 | Cable Bracket Supports material shall be hot dipped galvanized steel, size 700mm x 50mm x 40mm (Plate thickness:4mm) | | |
| 3.4.9 | Bracket Supports material shall be hot dipped galvanized steel, size: 250mm long (Plate thickness: 4mm) | | |
| 3.4.10 | Sump Cover- Material shall be hot dipped galvanized steel, size 300mm x 300mm (Plate thickness: 4mm). | | |
| 3.4.11 | Marking Plate (MP) in aluminum size 65mm x 120mm x 1mm, to be fixed inside on surface of the HH wall. | | |
| 3.4.12 | Swivel Arm material in steel hot dipped galvanization with Size (Long/ plate thickness) = 1220mm/4mm | | |
| 3.4.13 | Earthing: Bonding ribbon made of tinted copper having size approximately 10mm wide and 1mm thick must be provided in each Manhole, attached & fixed with reinforcing bars before pouring concrete, to the inner wall of Mini-Manhole by bonding clamp. | | |
| 3.5 | hole Type 2: Single Cover | | |
| 3.5.1 | The required size of the Mini-MH is Outside Dimensions (LxWxH) = 600x600x650mm and Inside Dimensions: (LxWxH) = 400x400x500mm. | | |
| 3.5.2 | Windows configurations as per below Drawing # 3 Handhole Type 2 Single Cover. | | |
| 3.5.3 | Concrete Specification: | | |

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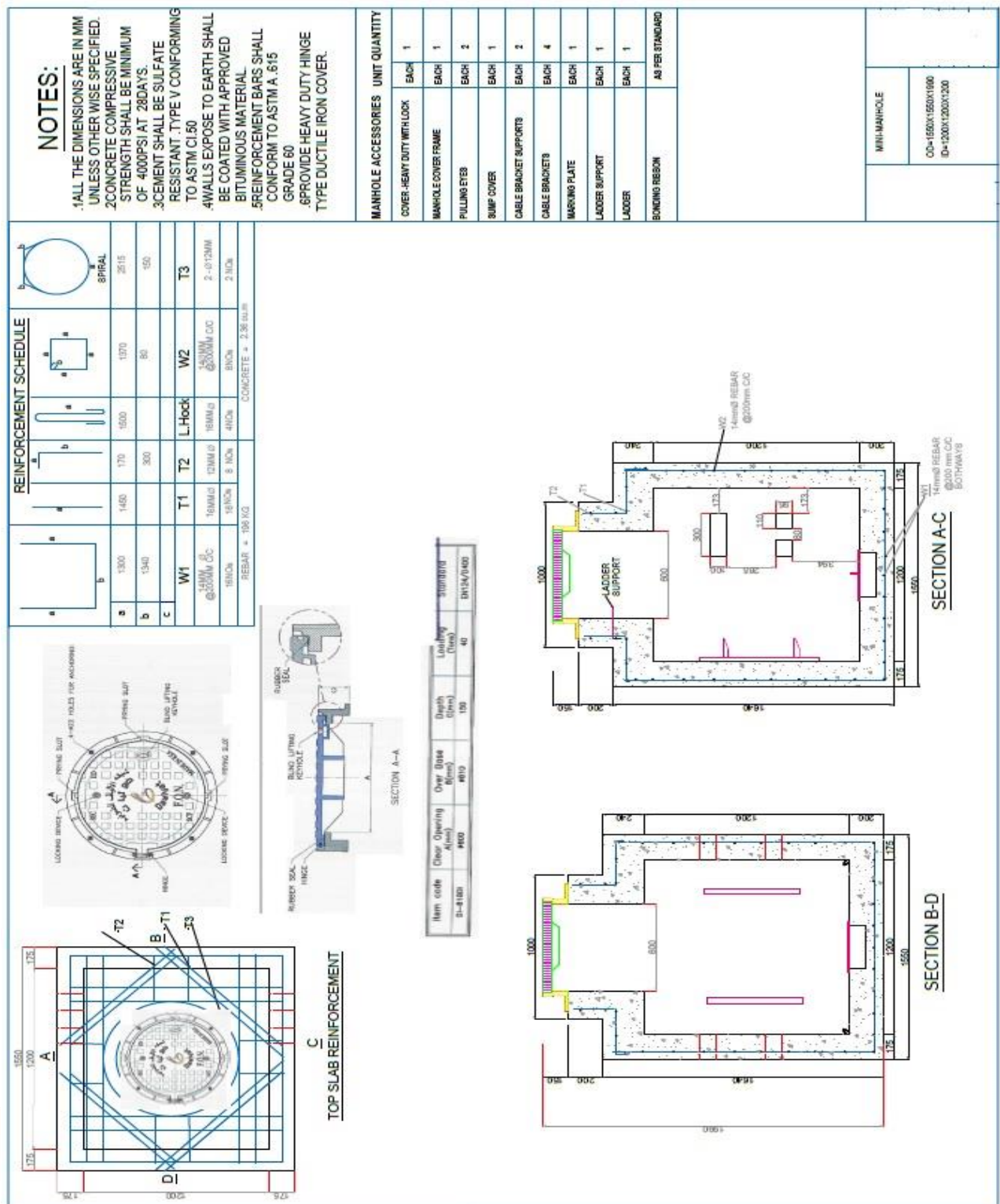
| | | | |
|------------|---|--|--|
| 3.5.3.1 | Cement Type: Sulphate resistant cement Type-V as per ASTM C150 | | |
| 3.5.3.2 | Concrete cylinder compressive strength shall be minimum of 5000 psi at 28 days. | | |
| 3.5.3.3 | Steel reinforcements shall conform to ASTM A615, deformed bars grade 60 with minimum yield strength of 420mpa. | | |
| 3.5.3.4 | Pre-formed structure cover shall be heavy duty (H-40) (see Drawing#3) | | |
| 3.5.3.5 | galvanized steel accessories | | |
| 3.6 | DRAWINGS #1-7 | | |
| 3.7 | Material Properties and Test Requirements (see Table 1) | | |

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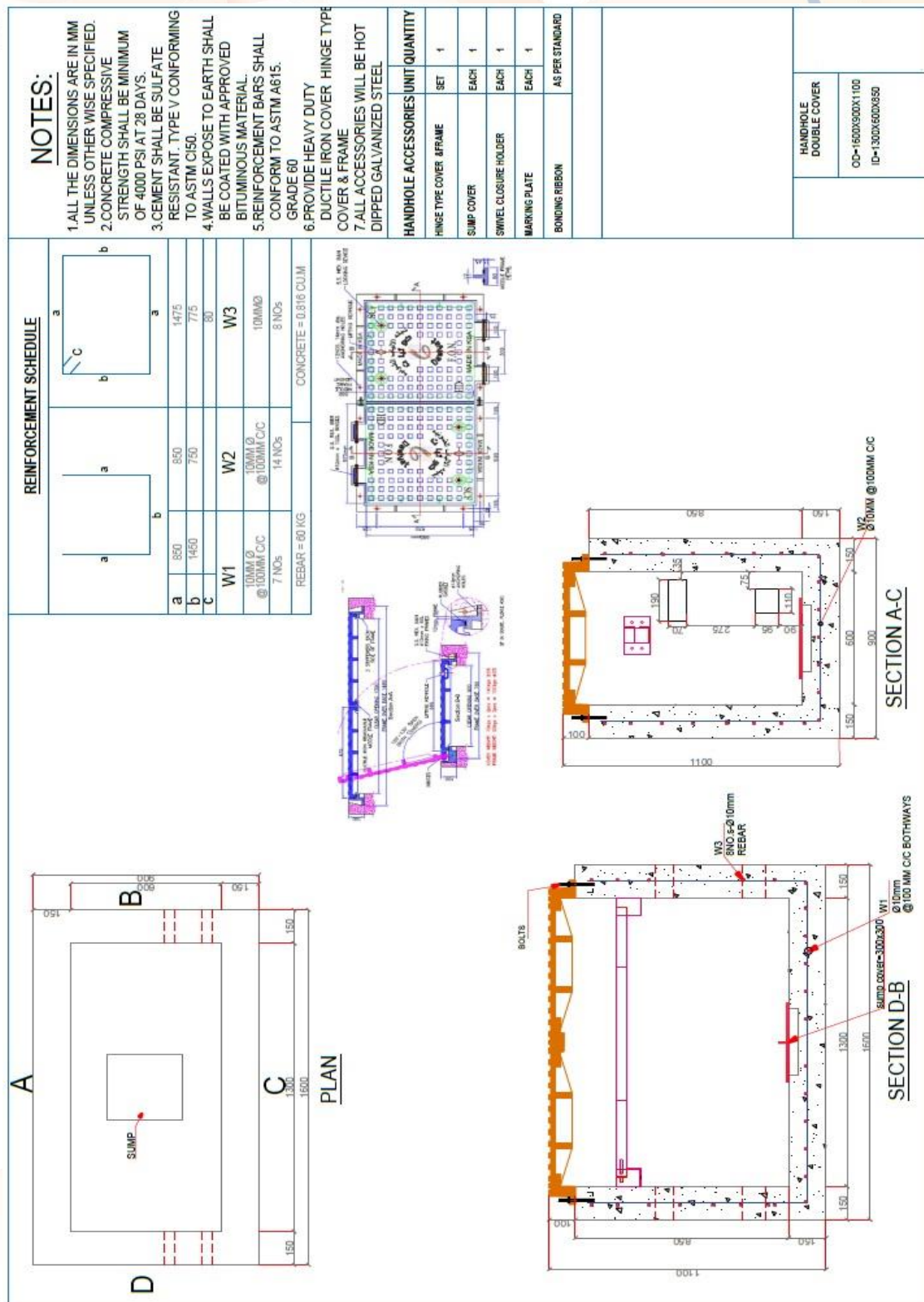
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DRAWING# 1: MINI-MANHOLE MODEL

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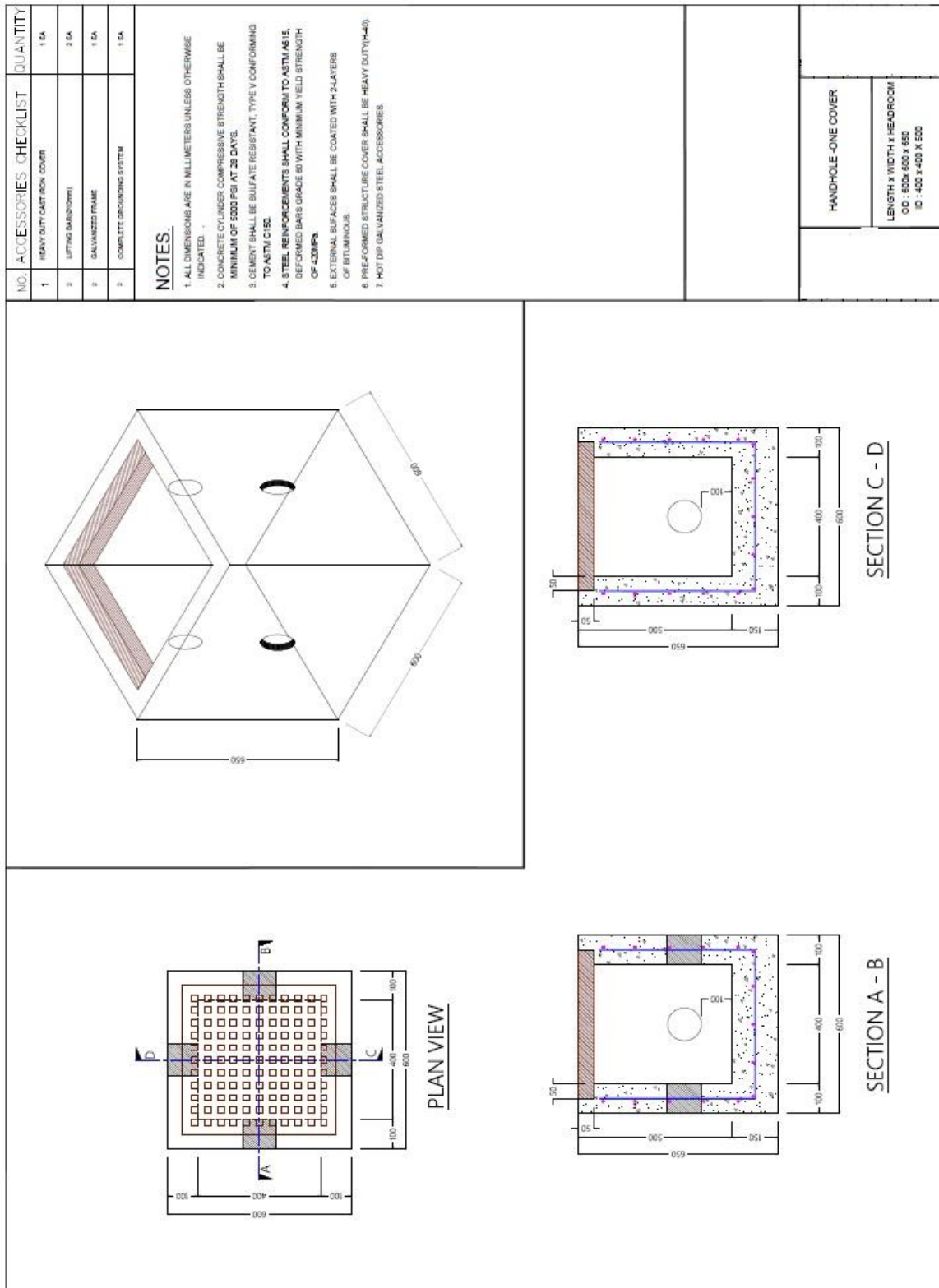
DRAWING# 2: HANDHOLE TYPE 1 MODEL

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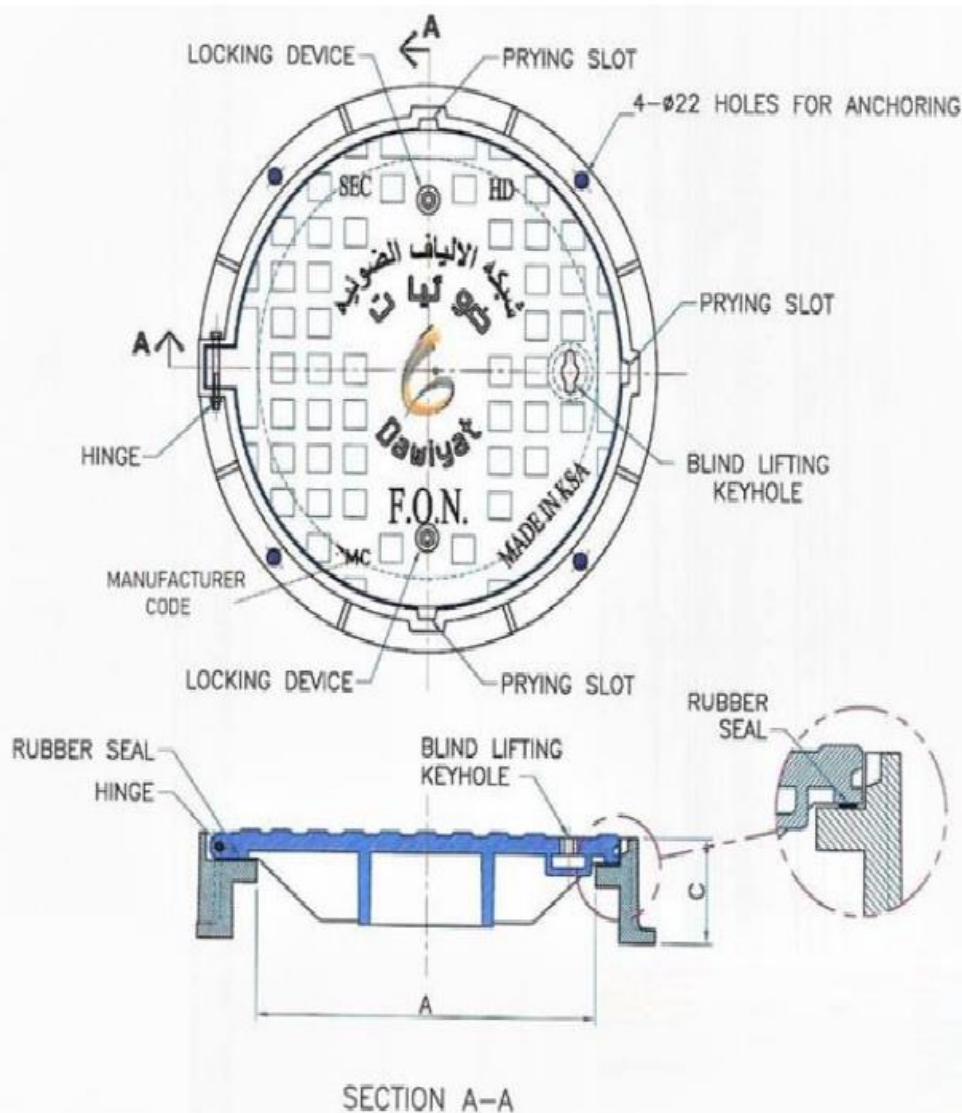
DRAWING# 3: HANDHOLE TYPE 2 MODEL

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| Item Code | Clear Opening A(mm) | Over Base B(mm) | Depth C(mm) | Loading (Tone) | Standard |
|-----------|------------------------|--------------------|----------------|-------------------|-------------|
| DI-818DI | Φ600 | Φ810 | 150 | 40 | EN 124/D400 |

DRAWING# 4: MINI-MANHOLE SINGLE ROUND COVER HINGES TYPE

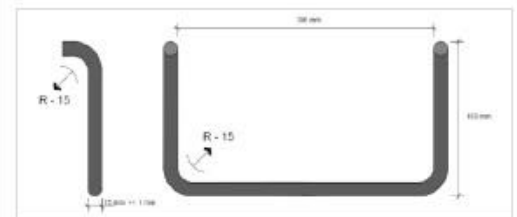
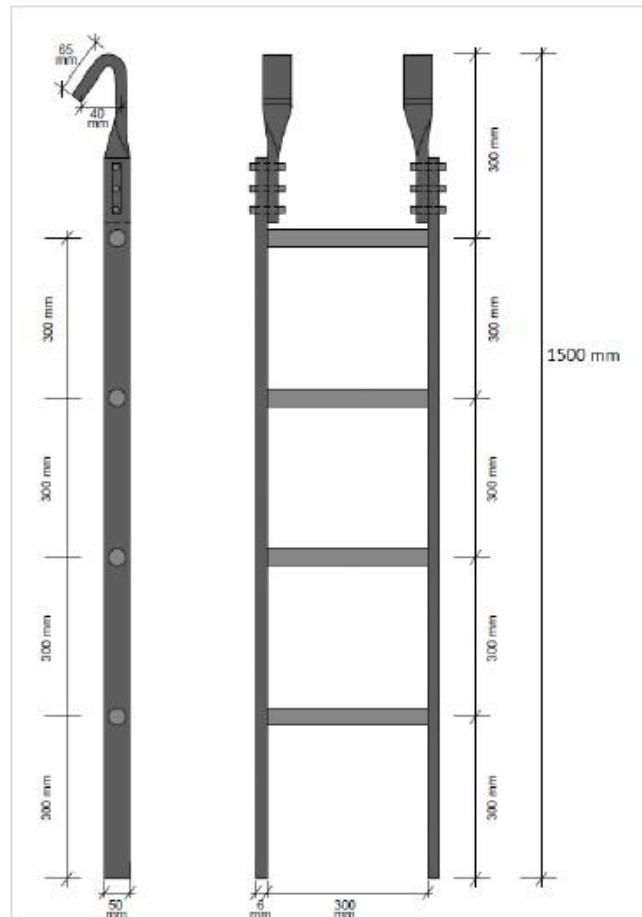
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DRAWING# 5: MINI-MANHOLE ACCESSORIES

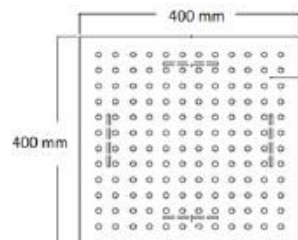
1- Ladder



2- SUMP

Material: Hot Dipped galvanized steel Size: 400mm x 400mm (Plate thickness: 4mm)

Nos/Manhole: 1



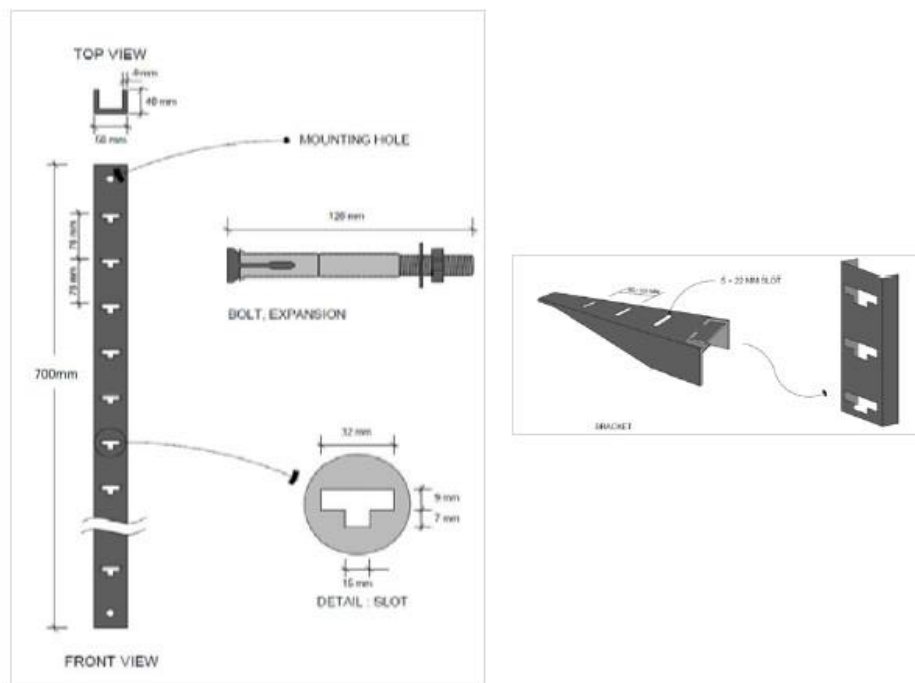
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3- Cable Brackets



4- Marking Plate

- Material: Aluminum
- Size: 65mm x 120mm x 1mm
- Marking plate must be fixed on inside surface of long wall of handhole.



5- Earthing System

- Bonding ribbon made of tinted copper having size approximately 10mm and 1mm thick must be fixed in each handhole.
- Bonding ribbon must be attached & fixed with reinforcing bars before pouring concrete.
- Bonding ribbon must be attached to the inner wall of handhole by bonding clamp.

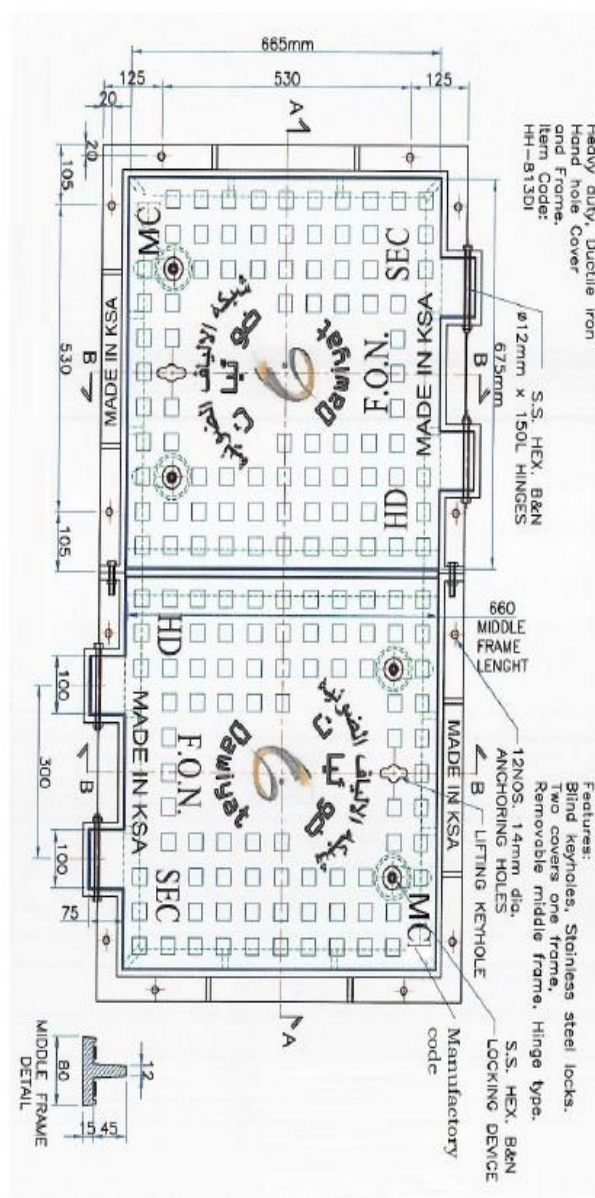
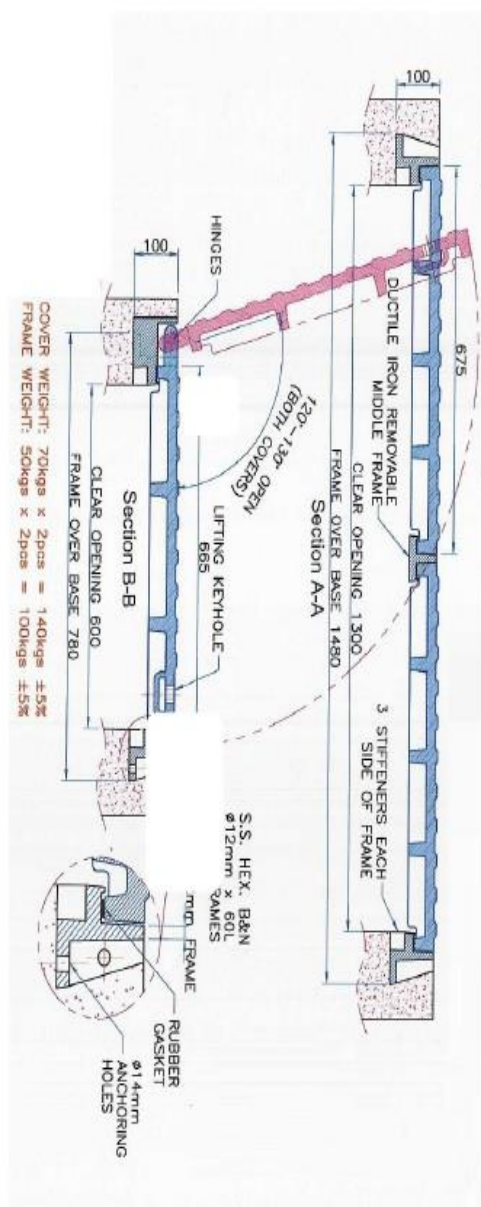
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DRAWING# 6: HANDHOLE TYPE 1 DOUBLE COVERS HINGES TYPE



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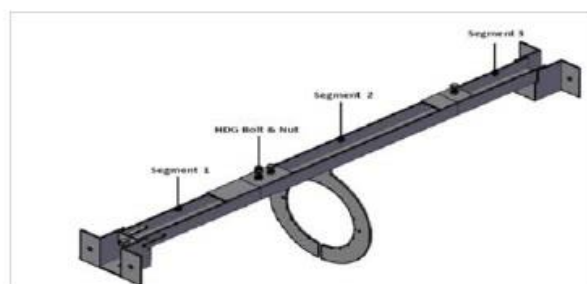
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DRAWING# 7: HANDHOLE TYPE 1 ACCESSORIES

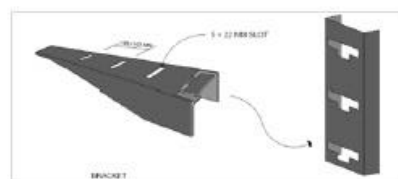
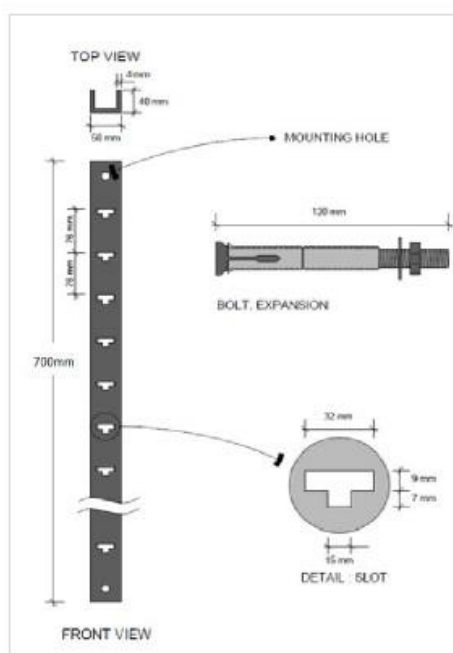
1- Swivel Arm

Material: Hot Dipped galvanized steel Size:1220mm Long (Plate thickness:4mm).

Nos/handhole: 1



2- Cable Brackets

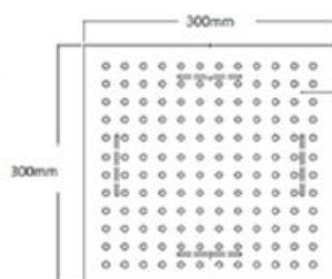


3- Sump

Material: Hot dipped galvanized steel,

Size: 300mm x 300mm (Plate thickness: 4mm)

Nos/handhole: 1



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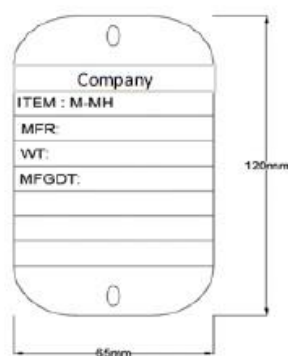
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4- Marking Plate

Material: Aluminum

Size: 65mm x 120mm x 1mm

Marking plate must be fixed on inside surface of long wall of handhole.

**5- Earthing system**

- a- Bonding ribbon made of tinted copper having size approximately 10mm wide and 1mm thick must be fixed in each handhole.
- b- Bonding ribbon must be attached & fixed with reinforcing bars before pouring concrete.
- c- Bonding ribbon must be attached to the inner wall of handhole by bonding clamp.