**Section II: Schedule of Requirements**

# **Supply, testing, delivery and unloading of Manhole Covers, Manhole Steps, Valves, GI pipes and fittings and Sewer Cleaning Rods & Accessories to Multi LWSCs- Warehouses of - Local Water and Sanitation Corporation - Yemen.**

| **Lot #** | **Lot Description** |
| --- | --- |
| **1** | Lot 1: Supply and Delivery of Manhole Covers, Ibb- Yareem Branch (LWSC) |
| **2** | Lot 2: Supply and Delivery of Manhole Covers, TAIZ (LWSC) |
| **3** | Lot 3: Supply and Delivery of Manhole Steps, TAIZ (LWSC) |
| **4** | Lot 4: Supply and Delivery of Sewer Cleaning Rods & Accessories, TAIZ (LWSC) |
| **5** | Lot 5: Supply and Delivery of G.I. pipes and fittings, Ibb- Yareem Branch (LWSC) |
| **6** | Lot 6: Supply and Delivery of Valves Sa'dah (LWSC) |
| **7** | Lot 7: Supply and Delivery of Valves, Ibb (LWSC) |
| **8** | Lot 7: Supply and Delivery of Valves Hadramout - Al-Shahr Branch (LWSC) |
| **9** | Lot 9: Supply and Delivery of DI Fittings Sa'dah (LWSC) |
| **10** | Lot 10: Supply and Delivery of Maintenance Fittings- Hadramout - Al-Shahr Branch (LWSC) |

# **GENERAL**

1. **Delivery and unloading** will be made to warehouses of LWSC- (Taiz, Ibb (Yareem Branch), Sa'dah, Hadramout (Al-Shahr Branch)). The supplier shall provide all required racks and supports to pipe ends over horizontal surfaces with support bonds.
2. Documentary evidence to prove that the material offered comply with the Technical Specifications given below **must** be provided.
3. **Technical Data/Brochures:** bidders **Must** provide relevant technical data detailing the technical data of the material and manufacturer brochures, where there is more than one model on a brochure, the bidder, **Must** highlight the option which they are quoting for in this tender.
4. All materials shall be complying with specified International Standards and shall be supplied from reputable and approved manufactures and country of origin.
5. The bidder shall submit a certificate from the manufacturer certifying that all supplied products have been tested and that they have successfully passed the tests prescribed by the relative international standard specifications.

**Lot 1: Supply and Delivery of Manhole Covers, Ibb- Yareem Branch (LWSC)**

* Heavy duty ductile iron circular ventilated manhole covers and frames class D400.
* The load rating for the frames and covers shall be to carry weight loads about 40 tons for class D 400
* Medium-duty ductile iron circular ventilated manhole covers and frames class C-250
* The load rating for the frames and covers shall be to carry weight loads about 25 tons for class C 250
* Clear opening not less than ø 600 mm.
* Depth of frame 150 mm.

**Security locking:**

* The unit should be providing with a heavy-duty security locking.
* The cover shall be secured within its frame.

**Locking system:**

* designed so as to allow opening of the covers by special keys, should be provided three kits.

**coating**:

* Manhole cover and frame shall be coated with 2 Layers of Black Non -Toxic water Based Bitumen coating To BS 3416
* All casting shall be Thoroughly Cleaned and free of molding Sands, Rust or any other impurity Before applying the protective coating.
* The coating Shall be free of Bare patches or lack of Adhesion

**Test Load and weight:**

* the D.I. Manhole cover and Frames shall be Designed and Tested according to BS EN 124 class D400

**Markings**: the casting of Marking shall be clearly legible for Both cover and frame with:

* The name of manufacturer
* The standard to which it is certified (IS EN 124)
* The load classification of the frame and cover
* The letters “**YAREEM SEWER**” shall be clearly and indelibly marked (cast or stamped) on the cover.

**Lot 2: Supply and Delivery of Manhole Covers, TAIZ (LWSC)**

* MANHOLE COVER AND FRAMES ACCORDING TO BS EN 124
* Heavy duty ductile iron circular manhole covers and frames class D400.
* The load rating for the frames and covers shall be to carry weight loads about 40 tons for class D 400
* Medium-duty ductile iron circular manhole covers and frames class C-250
* The load rating for the frames and covers shall be to carry weight loads about 25 tons for class C 250
* Clear opening not less than ø 600 mm.
* Depth of frame not less than 100 mm.

**Security locking:**

* The unit should be providing with a heavy-duty security locking.
* The cover shall be secured within its frame.

**Locking system:**

* designed so as to allow opening of the covers by special keys, should be provided three kits.

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**Bolts and Nuts:**

* unless otherwise indicated, Bolts for The Cover shall be Grade 8.8 M16 Hexagon Headed Bolt complete with Hexagon lock Nuts.

**coating**:

* - Manhole cover and frame shall be coated with 2 Layers of Black Non -Toxic water \_Based Bitumen coating To BS 3416
* - All casting shall be Thoroughly Cleaned and free of molding Sands, Rust or any other impurity Before applying the protective coating.
* - The coating Shall be free of Bare patches or lack of Adhesion

**Test Load and weight:**

* the D.I. Manhole cover and Frames shall be Designed and Tested according to BS EN 124 class D400 & C250

**Markings**:

 the casting of Marking shall be clearly legible for Both cover and frame with:

* The name of manufacturer
* The standard to which it is certified (BS EN 124)
* The load classification of the frame and cover
* The letters “**TAIZ SEWER**" shall be clearly and indelibly marked (cast or stamped) on the cover.

 **Lot 3: Supply and Delivery of Manhole Steps, TAIZ (LWSC)**

 **Supply and delivery of Mahhole Steps with the following specifications:**

* Comply with EN 13101, DIN 19555 or equivalents.
* Superior resistance to all types of corrosive environments found in manholes.
* Withstand a vertical load test of 225 kg. There is no any deflection of the step after a load of 200 kg is applied.
* Have a minimum of 100 Kg pull out strength.
* Withstand impact testing of up to 250 Nm with no deflection, cracking or breaking.
* Material specification:
* Plastic- manhole steps are made of two layers of polyethylene or polypropylene with minimum 2 mm thickness of each layer.
* Steel Reinforcing Bar- 10 mm steel rods.
* Dimensions: at least: 260mm length,165 mm width and 20 mm thickness.
* Tread width –approx. 11. mm
* Projection from wall – min.70 mm
* Leg centre dimension – approx.16.3 mm
* Manhole steps designed to be driven into a preformed hole created by drilling. Minimum Embedment into the concrete is 70 mm.

The bidder confirms that the manufacturer quality control test results and report will be provided.

**Lot 4: Supply and Delivery of Sewer Cleaning Rods & Accessories, TAIZ (LWSC)**

**SUPPLY AND DELIVER OF Sewer Cleaning Rods and Accessories WITH THE FOLLOWING SPECIFACTIONS:**

**STEEL RODS**

Rods are manufactured from high tensile carbon steel and are used for heavy duty sewer cleaning applications.

High tensile carbon steel each rod with a 2way lock fast ferrule of hardened materials(cadmium) ,8 mm diameter,3000mm length of Spring steel cleaning rod with quick connect, disconnect spring loaded pin coupling

**JOINTS**

Joints materials: Brass or Stainless steel, strength, corrosion resistance, and ease of working in very demanding environments containing acid, alkaline, and strong chemicals.

**Tools**

Tools are manufactured from high tensile Brass or carbon steel and are used for heavy duty sewer cleaning applications, should be available to 8mm diameter of rods.

* Socket Holder: A heavy-duty tool that engages with ferrules to enable rods to be pulled and withdrawn from pipes & drains, for 8mm rods.
* quick couplers rods as the male and female couplings slide together to form a single union
* Socket for 8mm interconnecting SteelKane rod
* Rodder Cutter set , ( Straight Auger - retrieving Auger - Spade Cutter and saw - tooth Cutter Quick Couplers rods )
* Retrieving Tool for 8mm Steelkane Rods: For recovery of loose or lost rods in drains and sewer
* The bidder confirms that the manufacturer quality control test results and report will be provided.
* The supplier must provide any necessary parts or tools complementary to the main part ( rods) and determine the price independently.

**Certificates:**

**The supplier shall submit: -**

1. Certified copies of manufacturers quality control test results and reports.
2. Certified copies of compliance certificates for uPVC pipes, fittings and other components. "This is to certify that pipes and specials delivered in this consignment comply with the required specifications. "

**Transporting and Handling**

Pipes, and fittings should be transported and handled according to the manufacturer’s recommendation strictly.

The following general points should be taken into consideration:

* Contact with burrs or sharp metal edges on racks, etc, should be avoided.
* The ends of pipes should be protected from damage to avoid the Risk of unsatisfactory jointing .
* Storage (if applicable) of pipes in heated area exceeding 25o C should be avoided .
* If , due to unsatisfactory storage or handling , a pipe is damaged or kinked , the damage portion should be cut out completely.
* Handling, transport, loading and unloading pipes and fittings shall be according to
        the manufacturer's recommendations.
* The supplier shall use suitable cranes, lifting machine with safe and reliable lifting tools to avoid any form of torsion, distortion, scratches for the pipes and fittings during loading and unloading the materials.
* The supplier shall take care to avoid contact or impact with any sharp edges, such as iron angles, sharp sheet metal, or nails.
* The supplier shall bear the cost of unloading at TWSLC warehouses.
* The pipes shall be placed on horizontal surfaces, and not be stored on the end of the coupling
* The supplier shall provide all required racks and supports to pipe ends over horizontal surfaces with support bonds.
* The allowed height of pipes rows at store shall be according to manufacturer's instructions.
* Pipes and fittings shall be handled carefully when loading/unloading them by hand, or lifting tools to avoid any damage that leads to rejection of the material
* The supplier shall ensure proper storage in the (TWSLC) warehouses.

**Lot 5: Supply and Delivery of G.I. pipes and fittings, Ibb- Yareem Branch (LWSC)**

Galvanized iron pipes and fittings:

* GI pipes and fittings should conform to:
* All Galvanized iron pipes and fittings should medium Class
* All Galvanized iron pipes and should conform to BS 1387, Class medium
* All GI pipes length should be (5.8-6) meters, threaded ends, including sockets.
* All pipes must be delivered with a plastic protection cover.
* All pipe and fittings shall be designed and manufactured for a working pressure of 25.0 kg/cm2.
* The threads shall conform to BS 21 or ISO 7.

Fittings:

* Supply, delivery and testing of Fittings in accordance to international standards, class 150,
* dimension in accordance to ASME/ANSI B16.3,
* coating in accordance to ASTM A153/ B633, Malleable - Iron Screwed Fittings.

**Lot 6: Supply and Delivery of Valves Sa'dah (LWSC)**

 **And**

**Lot 7: Supply and Delivery of Valves, Ibb (LWSC)**

 **And**

**Lot 8: Supply and Delivery of Valves Hadramout - Al-Shahr Branch (LWSC)**

* All valves are flanged or female threads both ends joint type **(as per BoQ for each lot).**
* All materials used in the manufacture of the valves shall conform to the following minimum standards:
1. Ductile Cast Iron DIN 1693 or equivalent
2. Brass DIN 17 600 or equivalent
3. Cast iron DIN 1691 Mat. No. 0.6025 or equivalent
4. Gunmetal DIN 1705 Mat. No. 2.1096.01 or equivalent
5. Aluminium Bronze DIN 1725 or equivalent
6. Stainless Steel St 1.4021 or equivalent
7. Protection Epoxy powder coated, inside and outside
8. Screws St 8.8 DIN 912 or equivalent

### **GATE VALVES**

* Ductile Iron (D.I.) Flanged Gate Valves in accordance to:
* **General Design**: BS 5163

**• The face-to-face dimensions according to:** DIN3202-F4

* + - * **Flanged drilled according to:** EN 1092 Direction of closing: close clockwise.
* **Pressure class:** PN16
* **Hydraulic test:** According to BS 5163 (Body: 1.5 PN, Seat: 1.1 PN)
* **working temperature** up to 50 °C
* All materials used in the manufacture of the valves shall conform to the following minimum standards:

**Body, Wedge and Bonnet:** Ductile iron, GGG-50, to DIN 1693

**Coating**: Electrostatically applied epoxy coating

**Stem:** Stainless steel

**O-rings, Gaskets :** EPDM rubber

**Bonnet bolts**: Stainless steel

* All valves shall include: couplings, adaptors, Bolts, Nuts and suitable Gaskets as per required and according to BoQ
* All gate valves to be supplied shall have resilient seals; the gate shall be of cast iron covered with a suitable resilient facing material.
* Indicators, hand wheels, caps for key operation, extension spindles, capstan headstocks, locking devices and other detailed requirements shall be provided as specified in the “Bill of Quantities “.
* All valves shall be 'open end' tested by an approved method and shall be watertight at the appropriate test pressure.
* Hand wheels shall have smooth rims and be of such a diameter to enable two men to operate the valve. The direction of opening and closing shall be clearly marked on the hand wheel.
* Indicators, hand wheels, caps for key operation, extension spindles, capstan headstocks, locking devices and other detailed requirements shall be provided as specified in the “Bill of Quantities “.

### **VALVE ACCESSORIES**

* Hand wheels, spindle heads, spindle extensions, and other accessories for the supplied valves shall be provided as indicated in the “Bill of Quantities “and shall be in accordance with the internationally accepted standards.
* **MARKING FOR VALVES :**

Each Valves, hydrants and similar items shall be marked as follows:

| **Item** | **Description** |  |
| --- | --- | --- |
| Embossed or stamped on the main body or frame casting: |  |
| 1 | Manufacturer's name or trade marks |  |
| 2 | Material designation  |  |
| 3 | Applicable Standards |  |
|  | the pressure class where appropriate |  |
| 4 | Dimensions, mm (nominal diameter) |  |
| 5 | for unidirectional valves, an arrow indicating the direction of flow. |  |
| Labelled or painted conspicuously on the Labelled or painted conspicuously on the main body of the item and on the outside of packing cases: |  |
| 1 | the weight of the item in tonnes or kilograms. |  |
| 2 | the item reference number given in the contract documents drawings. |  |
| 3 | the name of the Employer and the project or contract name number. |  |

The VALVES shall be rejected, if the above information for marking is not shown clearly on each piece.

**Lot 9: Supply and Delivery of DI Fittings Sa'dah (LWSC)**

 **DI pipes and fittings should conform to:**

* All ductile iron pipes should conform to IS0 2531/ BS EN 545/ DIN EN 545/ DIN 28605
* Wall thickness of pipe should be Class K9, 6M Length.
* Joint Type: socket and spigot/ flanged (as per of BoQ)
* Pipes (flanged) and fittings except tees: Class K12
* Tees: Class K 14
* All pipes and fittings are internally lined with sulphate resistance cement mortar according to ISO- 4179 / DIN EN 545/ BS EN 545.
* Externally the pipe should be coated with metallic ZINC (130g/m2), plus bitumen coating (70 μm) according to ISO- 8179.
* Protection against corrosion with Epoxy coating, conforming to DIN EN 14901.
* **Gasket:**
	+ Rubber 80 IRHD Moulded Compound to BS EN681-1: Type WA, WC, WG or BS EN68, Type G, for: COUPLING (Large Diameter), FLANGE ADAPTOR (Large Diameter)
	+ EPDM Grade “E” to BS EN 681-1 Type WA WRAS Listed for: FLEXIBLE COUPLING (Large Diameter), FLEXIBLE STEPPEDS COUPLINGS (Large Diameter), FLEXIBLE FLANGE ADAPTOR (Large Diameter)
	+ EPDM compound Grade ‘E’ to BS EN 681-1 WRAS approved, or nitrile compound to DIN 3535-3, for: FLEXIBLE COUPLING (Small Diameter), FLEXIBLE FLANGE ADAPTOR, FLEXIBLE GRIP COUPLING, FLEXIBLE GRIP FLANGE ADAPTOR,
	+ Gaskets rubbers according to ISO- 4633

**Lot 10: Supply and Delivery of Maintenance Fittings- Hadramout - Al-Shahr Branch (LWSC)**

All standard fittings shall be class K12

### **Types of Joints**

#### ***Flexible Joints***

**"Push on" "T" type (Tyton Joint)** are available for pipes & fittings of the range DN 80 ~ DN 2000.

**"Mechanical" "K"** type (Bolted-Gland Joint) are available for pipes and fittings of the range DN 80 ~ DN 2000. Note: Standard rubber gaskets for potable water comply with BS 2494:1990 "W" type (water), EN 681-1, ISO 4633 & BS 6920. Rubber gaskets for sewerage application are nitrile or synthetic rubber comply with EN 598.

Rubber gaskets for gas pipeline in compliance to ISO 6447.

#### ***Flange Joints***

Dimensional details of flanges designated PN 10, PN 16, PN 25 and PN 40 are produced in accordance with ISO 2531 / EN 545 / EN 598 / EN 969. Flanges shown in our specification are dimensionally compatible with the corresponding flanges BS 4504.

PN 16 flanges are supplied as standard for pipes and fittings of the range DN 80 ~ DN 2000. PN 10, PN 25 and PN 40 flanges are also available upon request.

### **Pressure & Temperature Ratings**

| **DN** | **Pipes** | **Fittings** |
| --- | --- | --- |
| **(Nominal size) mm** | **bar K<9** | **bar K ≥ 9** | **bar** |
| 80 ~ 300 | 0.5（K+1)2 | 50 | 25 |
| 350 ~ 600 | 0.5 K2 | 40 | 16 |
| 700 ~ 1200 | 0.5（K-1)2 | 32 | 10 |
| 1400 ~ 2000 | 0.5（K-2)2 | 25 | 10 |

The nominal pressure rating is applicable to the temperature range -10oC to 80oC; the purchasers should be consulted with the manufacturers where pressure-temperature conditions are out of this range.

### **Mechanical Properties**

|  | **Pipes** | **Fittings** |
| --- | --- | --- |
| **Tensile** | **420 N / mm2 (MPa) min.** | **420 N / mm2 (MPa) min.** |
| **Elongation** | **DN ≤ 1000** | **10% Min.** | **5% Min.** |
| **DN ≥ 1100** | **7% Min.** |
| **Hardness** | **HB 230 max.** | **HB 250 max.** |

### **Coatings & Linings**

|  | **Pipes** | **Fittings** |
| --- | --- | --- |
| **Outside****Externa** | * Unless otherwise specified by the purchaser, all pipes are coated externally zinc coating with covered by a finishing layer of Bituminous paint in accordance with BS EN 545 and ISO 8179.
* Bituminous paint complies with

BS 4147: 1980 type Ⅰ grade C orBS 3416: 1991 type Ⅱ | * Unless otherwise specified by the purchaser, all fittings are coated externally with zinc coating covered by a finishing layer of bituminous paint in accordance with BS EN 545 and ISO 8179.
* Bituminous paint complies with

BS 4147: 1980 type Ⅰ grade C orBS 3416: 1988 type Ⅱ |
| **Inside** | * Unless otherwise specified by the purchaser, all pipes are sulphate-resistant cement lined to ISO 4179.

. | * Unless otherwise specified by the purchaser, Fusion Bonded Epoxy, Liquid applied Epoxy coating are also available upon request and comply to BS 6920.
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## ***Maintenance Fittings***

### **Coupling**

* Centre Sleeve/End Rings: Ductile iron BS EN 1563, EN GJS-450-10
* Gasket: EPDM compound Grade ‘E’ to BS EN 681-1 WRAS approved, or nitrile compound to DIN 3535-3 ‘
* Bolts/Nuts/Washers: Bolts - Steel to BS EN ISO898-1: Property Class 4.8, Nuts - Steel to BS4190: Grade 4, Washers - Stainless Steel to BS1449: Part 2: Grade 304S15
* Coatings: Flange adaptor body, Part center sleeve, end rings are coated in Risen Nylon 11 to WIS 4-52-01
* Working Pressure: 16 bar

### **Flange Adaptor**

* Centre Sleeve/End Rings: Ductile iron BS EN 1563, EN GJS-450-10
* Gasket: EPDM compound Grade ‘E’ to BS EN 681-1 WRAS approved, or nitrile compound to DIN 3535-3 ‘
* Bolts/Nuts/Washers: Bolts - Steel to BS EN ISO898-1: Property Class 4.8, Nuts - Steel to BS4190: Grade 4, Washers - Stainless Steel to BS1449: Part 2: Grade 304S15
* Coatings: Flange adaptor body, Part center sleeve, end rings are coated in Risen Nylon 11 to WIS 4-52-01
* Flange drilling: Accordance BS EN 1092-1 PN16 Drilling
* Working Pressure: 16 bar.

### **Saddles**

Tapping Saddles **MUST** be Compatible with all types of pipe material, such as PVC, PE, DI, AC and CI pipes. also it **MUST** be for linking networks made of the same or different materials.

* **Body:** Ductile iron, Coating with Epoxy 250 μm
* **Screw:** Stainless steel type 304
* **Seal pipe / saddle**: EPDM Rubber
* **Nut**: Stainless steel type 304
* **Bande:** Stainless steel type 304 Passivated
* **Rubber / bande**: EPM/TN Rubber
* **Wash:** Stainless steel type 304
* Working Pressure: 16 bar.

**Certificates:**

**The supplier shall submit: -**

1. Certified copies of manufacturers quality control test results and reports.
2. Certified copies of compliance certificates for valves, fittings and other components. "This is to certify that pipes and specials delivered in this consignment comply with the required specifications. "

**Delivery requirements and Comparative Data Table:**

| **UNOPS Requirements** | **Is quotation compliant? Bidder to complete** | **Details** **Bidder to complete** |
| --- | --- | --- |
| **Delivery time** | The Bidder shall deliver the goods within 5 months after the Contract signature. | ☐ Yes ☐ No | Insert details  |
| **Delivery place and Incoterms rules** | DAP as per Incoterms 2020 (unloaded custom cleared) at LWSC- (Taiz, Ibb(Yareem Branch), Sa'dah, Hadramout(Al-Shah Branch) Wherehouses- Yemen. | ☐ Yes ☐ No | Insert details  |
| **UNOPS Right to vary requirements** | At the time the Contract is awarded, UNOPS reserves the right to vary the quantity of the goods and associated services specified above, provided this does not exceed +/- [20%] , without any change in the unit prices or other terms and conditions of the RFQ. | ☐ Yes ☐ No | Insert details  |