



OGDCL PAKISTAN:  
OIL & GAS DEVELOPMENT  
COMPANY LIMITED

## KPD-TAY Compression Project (Phase-II)

**ISSUED FOR TENDER**

0	6-1-2022	ISSUED FOR TENDER	HB	MD	KM	MPM	MAS		
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REVISIONS			APPROVAL				CLIENT APPROVAL		



ENAR Petrotech Services (Pvt.) Limited ,  
7-B , Sector 7-A , Korangi Industrial Area ,  
Karachi Pakistan

TITLE:

### SPECIFICATION FOR DRAINAGE

PROJECT NO.  
**14-0258**

DOCUMENT NO:

**0258 – CA – 7015 – 0**



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**1.0 GENERAL**

- 1.1 Works shall be constructed in accordance with BS CP 301: 1971 Building Drainage.
- 1.2 All pipes and fitting mention in this specification shall be used with the recommendation of manufacturer and approved by OGDCL /OGDCL's Representative.
- 1.3 Pipes and fittings shall be jointed and laid in accordance with the manufacturer's recommendations.
- 1.4 Unless otherwise stated, the provisions of the latest revised editions of relevant British Standards and Codes of Practice shall be held, to be incorporated in the specification of materials and workmanship.
- 1.5 Drains shall be accurately laid, true to line and grade from point to point. Manholes shall be provided at changes of direction or gradient and at points of connection. Drain runs between manholes should be absolutely straight. Lines and falls shall be accurately set.
- 1.6 The Contractor shall perform all necessary excavation for drains, manholes, septic tanks, soak ways, etc. Uphold sides, level or grade bottoms back fill & ram and remove surplus soil as directed by the OGDCL / OGDCL's Representative.

**2.0 PIPE WORK**

- 2.1 The trench shall be as narrow as practicable but not less than the pipe diameter plus 300mm to permit adequate compaction of side fill.
- 2.2 The trench sides shall be kept vertical unless the approved use of a batter is unavoidable. In the latter case the sides of the trench shall be kept vertical up to 300mm above the top of the pipe.
- 2.3 Bedding material shall be either:
  - a) Broken stone, gravel or other similar uniform material available locally.
  - b) Sand to BS 882 Zones 1-4.
  - c) 1:2:4 concrete bedding using S.R. Cement.



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- 2.4 Pipes shall be laid with the socket ends against the flow and shall rest on a solid and even bearing for the full length of the barrel.
- 2.5 Trenches shall be back-filled only after drains have been tested.
- 2.6 The finished bottom shall be true to line and gradient.
- 2.7 Rigid pipes including RCC Concrete pipes, asbestos cement pipes, cast iron pipes, uPVC pipes shall either be laid directly on the natural formation or on a granular bed or on a concrete base in the trench bottom. The type of base provided shall depend on the nature of the trench formation and the presence of ground water.
- 2.8 Where the nature of the ground is such as to allow the trench formation to be trimmed to provide a uniform and solid bearing, pipes shall be laid upon the formation. Socket and joint holes shall be as short as practicable and shall be scraped or cut into the formation.
- 2.9 Where because of the nature of the ground or the presence of ground water pipes cannot be laid directly on the trench formation, the trench shall be excavated below the invert level of the pipe to a depth to allow a minimum thickness of 100mm of granular bedding material which shall extend the full width of the trench.
- 2.10 Where rigid pipes with flexible joints are employed with a concrete bed, haunch or surround a simple constructional flexible joint shall be provided in the concrete and at the face of a pipe joint at intervals of not more than 5 meters to reduce the natural rigidity of the concrete.
- 2.11 The width of concrete beds shall be 150mm greater than the external diameter of the pipe on both sides.
- 2.12 Where drains run beneath building they shall be constructed of cast iron pipes or uPVC pipes and shall be encased in concrete on bottom, top and both sides to a thickness of 150mm greater than the external diameter of the pipe and adequate flexibility in the pipeline shall be allowed.
- 2.13 The head of every drainage system shall be ventilated and such ventilating pipes shall, where possible, be fixed against the outside face or an external wall unless otherwise shown on the drawings and carried up to a height of 900mm above that part of the structure immediately adjacent to it. The ventilating pipe shall be fitted with a galvanized or copper wire balloon at the top.



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### **3.0 CAST IRON PIPES AND FITTINGS FOR BELOW GROUND**

- All C.I Pipes shall be C.I. spun type manufactured by C.M.E or approved equivalent and shall conform to BS 1211 Class B or BS 437 and fitting shall conform with BS 1130.
- Cast iron pipes and fittings shall be jointed by one of the following methods:
  - a) By lightly caulked white hemp yarn or lead strip and molten pig lead tightly caulked to fill the socket.
  - b) By lightly caulked white hemp yarn or lead strip and lead wool tightly caulked home skein by skein to fill the socket.
  - c) Where pipes are under buildings the Contractor is to join the pipe with a 'Tyton' flexible joint or similar approved method.

### **4.0 uPVC PIPE & FITTINGS**

- The uPVC pipes and fittings shall conform to ISO 3633 : 1991 & PS 3214 / 1992.
- Solvent cement for jointing will be provided for uPVC pipe & fittings.

### **5.0 CONCRETE PIPE & PIPE FITTINGS**

- All pipes and pipe fittings shall conform to ASTM designation C-14 for unreinforced pipes and C-76 for reinforced pipes latest revision of the specified standard shall be applicable in all cases and shall be resistant to sulphate attack.
- The rubber rings to be used for jointing sewer pipes and pipe fittings shall conform to latest revision of ASTM designation C443 "Joints for Circular Concrete Sewer and Culvert pipe using flexible water tight rubber type gaskets". The tongue or spigot end of each pipe shall be specially designed to form groove or offset to fit the manufacturer's rubber ring design. Rubber rings for use shall be supplied by the pipe manufacturer.

### **6.0 AC PRESSURE PIPE & FITTINGS.**

- The AC pressure pipe and coupling shall conform to Pakistan Standard Specification No. PS 428 : 1984.



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- The rubber rings shall conform to to Pakistan Standard Specification No. PS 1915 : 1989.

**7.0 SANITARY SEWERAGE MANHOLES**

- 7.1 Sanitary Sewerage Manholes shall be constructed in the positions and to the dimensions shown on the drawings or as directed by the OGDCL /OGDCL's Representative.
- 7.2 Excavation for manholes shall be carried out as per Specification for "Earth Work and Excavation".
- 7.3 Base Slab, Benching and Concrete for Embedding Cast Iron Frame shall be carried out as per Specification of "Plain and Reinforced Concrete Works".
- 7.4 Block Masonry and Plastering of Manhole shall be carried out as per Specification of "Block Masonry" and Cement Plaster".
- 7.5 Manhole Cover and Frame shall be of Cast Iron Manhole Frame shall be embedded in concrete 1 : 2 : 4 CC.
- 7.5 The Contractor shall provide sample of Manhole Cover and Frame for the approval by OGDCL /OGDCL's Representative.

**8.0 OILY WATER MANHOLES**

- 8.1 Oily Water Manholes shall be constructed in the positions and to the dimensions shown on the drawings and as per specifications or as directed by the OGDCL / OGDCL's Representative.
- 8.2 Excavation for Manholes shall be carried out as per Specification for "Earth Work and Excavation".
- 8.3 The Specification for "Plain & Reinforced Concrete Works" shall be followed for the concerting and reinforcement of Manholes.
- 8.4 The Contractor shall be responsible to install inlet and outlet carbon steel pipes to correct lines and levels as shown on drawings. However, the pipes shall be supplied by Piping.



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8.5 Manholes cover shall be of cast iron.

8.6 The Contractor shall provide sample of Manhole cover and frame for the approval of OGDCL / OGDCL's Representative.

**9.0 CATCH BASIN**

9.1 Catch Basin shall be constructed in the positions and the dimensions shown on the drawings and as per specifications or as directed by the OGDCL / OGDCL's Representative.

9.2 Excavation for Catch Basin shall be carried out as per Specification for "Earth Work and Excavation".

9.3 The Specification for "Plain & reinforced Concrete Works" shall be followed for the concreting and reinforcement of Catch Basin.

9.4 The Contractor shall be responsible to install inlet and outlet carbon steel pipes to correct lines and levels as shown on drawings. However, the pipes shall be supplied by Piping.

9.5 Catch Basin shall be of cast iron and of Vapour Seal type.

9.6 The Contractor shall provide sample of Catch Basin cover and frame for the approval of OGDCL / OGDCL's Representative.

**10.0 DRAIN HUBS**

Drain hubs are usually used for above ground equipment drainage, and shall be constructed in the positions and to the dimension shown on the drawings..

**11.0 VALVE PIT**

11.1 Value Pit shall be constructed in the positions and to the dimensions shown on the drawings and as per specification or as directed by OGDCL / OGDCL's Representative.

11.2 Excavation for Valve Pit shall be carried out as per Specification for "Earth Work and Excavation".



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- 11.3 The Specification for “Plain & reinforced Concrete Works” shall be followed for the concreting and reinforcement of Valve Pit.
- 11.4 The Contractor shall be responsible to install inlet and outlet carbon steel pipes to correct lines and levels as shown on drawings. However, the pipes shall be supplied by Piping.
- 9.5 Valve Pit cover shall be of checkered plate and shall be fabricated as per details shown on drawings as per approval of OGDCL / OGDCL’s Representative.

**12.0 CAST IRON COVER WITH FRAME**

Cast iron cover and frame shall be of the size and duty as specified on the drawings. The specified size means the clear opening. The cover shall be complete with frame. Top of cover shall be roughened in an approved pattern, and lifting arrangement shall also be provided.

The frame shall be well set in place at the time of pouring of concrete. The cover shall tightly fit in the frame. It shall be air-tight and water-tight. The duty, weight, test and working load for 600 mm circular or square C.I. cover and frame shall be as follows:

<b><u>Duty of Cover &amp; Frame</u></b>	<b><u>Weight (kg)</u></b>
For Traffic Area	105
Non Traffic Area	055

**13.0 SEPTIC TANKS**

- 13.1 Septic tanks shall be sized as shown on the drawings.
- 13.2 Septic tanks shall be reinforced cement concrete and as per “Plain & Reinforced Cement Concrete” specification.
- 13.3 Walls of septic tanks shall be 300mm thick or as shown on drawings.

**14.0 SOAKWAYS/SOAK PIT**

- 14.1 Cover shall be 150mm thick reinforced concrete or as shown on drawings.
- 14.2 Soak ways shall be of the sizes and in the positions shown on the drawings.





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## 15.0 **STORM WATER DRAIN**

Storm water drains are provided to cater for the rainwater discharge, and waste from off-sites and utilities areas, and shall be constructed PCC / RCC in the positions to the dimensions shown on the drawing and shall be as per Specification of “Plain & Reinforced Cement Concrete”.

## 16.0 **TESTING**

### 16.1 **Tests before Backfilling:**

- a) The section shall be filled with water and after about one hour test readings shall be taken.
- b) A test pressure of 1.2m head of water shall be applied at the high end of the section (but not more than 2.4m at the low end). Steeply graded mains shall be tested in sections.
- c) The loss of water over a period of 30 minutes shall be measured by adding water from a measuring vessel at regular intervals of 10 minutes and noting the quantity required to maintain the original water level in the standpipe.
- d) The average quantity of water added shall not exceed 0.06 liters per hour per 100 linear meters per millimeter of nominal bore of the drain.
- e) For sections of drain where the highest point is more than 1.2m below the water table the following infiltration test shall be undertaken.
- f) Inlets to the system shall be closed. Visual inspection at manholes or inspection chambers will reveal any flow the cause of which shall be investigated and the faults rectified.
- g) Tests for line, level and freedom from obstruction shall be applied by means of a mirror at one end of the drain and a lamp at the other.
- h) **Final Test**  
The water test shall be repeated in accordance with the requirements of the Local Authority.



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i) Smoke Testing

For smoke testing the smoke machine and necessary chemical or smoke rockets is to be provided.

17.0 **SAFETY**

17.1 The Contractor shall ensure that all-timbering, shuttering, staging, strutting, ladders etc. used in drain trenches and pits are adequate for the duty involved.