



OGDCL PAKISTAN:
OIL & GAS DEVELOPMENT
COMPANY LIMITED

KPD-TAY Compression Project (Phase-II)

ISSUED FOR TENDER

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

SPECIFICATION FOR TANK FOUNDATION

PROJECT NO.
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KPT-TAYCOMPRESSION PROJECT
SPECIFICATION FOR TANK FOUNDATION

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1.0 **GENERAL**

The work under this specification consists of furnishing all plant, labor, equipment, appliances, material and in performing all R.C.C. Ring wall operation in connection with the requirement for construction of Sand Pad Foundations and Earthen/ R.C.C. Dykes for vertical steel storage tanks.

In addition to this specification the latest editions of the following standards and codes shall also be referred:-

- BS-377 or Method of Testing Soils for Civil Modified Engineering purposes.
- AASHO
- API Standard 650 Appendix –B.

2.0 **SAND PAD FOUNDATION**

Sand Pad Foundations for Tanks shall be constructed as follows:

- All operation regarding excavation, filling, shoring and dewatering /drainage, etc., required for foundation/dykes construction shall be according to the specification as laid down under Specification for "Earthwork and Excavation/ Dewatering".
- Earth shall be excavated upto depths as indicated in the tank foundation drawings. Bottom of excavation shall be perfectly horizontal and firmly compacted to achieve 95% maximum dry density at optimum moisture content and tested as per modified AASHO.
- The foundation shall be filled with coarse sand. These fillings shall be laid in successive 15cm thick layers, properly dressed, watered and firmly compacted at optimum moisture content to achieve 95% of maximum dry density.
- Over the mixture of dense layer, after compaction, a corrosion-proof layer 75mm thick shall be laid, composed of 65 kg of bitumen blended with one cubic meter of dry sand in revolving mixer (attached with Burner) with maximum 5% moisture and 0.1 to 2mm granulation. The corrosion-proof layer shall be firmly compacted by means of approved mechanical 1½ tons roller or plate compactor.
- Pits for draw-off sump shall be made after the above operations have been completed.



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- After the tanks have been mounted and before making pipe connection, tanks shall be blanked and gradually filled with water to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and full, with breaks of 2 days between the stages for surcharging the impure clay soil. This operation is required to eliminate possible future settlements.
- At final stage, the walkway upto the edge of the bottom plate and the side slope of the foundation shall be lined with stone pitching with Cement Sand Mortar (1:4) Mix.

3.0 **RCC RING WALL**

Generally, reinforced cement concrete ring wall type foundation is recommended for the following reasons:

- If sub grade is weak and inadequate to carry the load of the filled tank.
- This type of foundation is particularly important with floating roof tank with regard to shell distortion.
- Minimize the possibility of differential settlements.
- Will provide better distribution of the concentrated load of the shell to produce a more nearly uniform soil loading under the tank.
- Will retain the fill under the tank bottom and prevent loss of material from erosion or adjacent tank excavation.
- Will act as a moisture barrier.

All operation regarding construction of RCC Ring wall foundation shall be according to this specification and as laid down under specification for “Plain and Reinforced Concrete” and execution of other items of work shall be similar to those as describe under the head of “Sand Pad Foundation”.

4.0 **MATERIALS**

- 4.1 The material for infilling in the tank pad body shall be coarse sand with maximum size not exceeding 10mm and generally falling within the following grading limits:



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| <u>BS Standard Sieve</u> | <u>% Passing (By Weight)</u> |
|------------------------------------|------------------------------|
| (³ / ₈ ") | 100 |
| (³ / ₁₆ ") | 90 - 100 |
| No. 7 | 60 - 95 |
| No. 14 | 30 - 70 |
| No. 25 | 15 - 35 |
| No. 52 | 10 - 25 |
| No. 100 | 5 - 15 |
| No. 200 | |

5.0 ANTI-CORROSIVE LAYER

Anti-corrosive layer should be bitumen sand compound given in Clause 2.0 to obtain the optimum proportion. Field test is to be carried out, if required, from the approved soil-testing laboratory.

6.0 TOLERANCE

Tank foundations shall be constructed to tolerances, which permit proper erection of the structure without shimming or leveling of the plates. Foundations shall be level within ± 3 mm within any 9 meter of arc length and no two points of the periphery shall differ in elevation by more than 6mm.

7.0 FIELD COMPACTION CONTROL

7.1 Qualified personnel and approved laboratory facilities shall be provided to carry out the test detailed in BS 1377 or modified AASHO and determination of moisture content of fill material to control the compaction of all material in accordance with this specification.

7.2 Density tests shall be carried out at every course of foundation material and at a frequency of not less than one test per 100 ft².

8.0 SUPERVISION OF TANK SETTLEMENTS UNDER HYDRAULIC TEST

The controlled water test of tank is required to supervise the eventual developments of the foundation settlement. The measurement of settlement shall be done by means of four reference lines placed on horizontal circumference of tank shell from known bench mark using topographical instrument, and should be performed at each distinct stage of filling.