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**TECHNICAL JOB
SPECIFICATION**

799/4

REVISION 0

DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

PERMANENT ELECTRICAL EARTHINGS

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QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	05-04-2011	FIRST ISSUE	PQ DPT.	V.G.
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REFERENCE DOCUMENTS

Job Spec. No. 799/2
[Installation of Cathodic Protection System]

Std Drawing No. STD-00-78-16
[Cathodic Protection for Pipelines - Measuring Posts K3J,
K3G/A&B]

Std Drawing No. STD-00-78-18
[Cathodic Protection for Pipelines - Measuring Posts K4J,
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Std Drawing No. STD-4-73-01
[Electrical Standard Details]

IEC 61936
[Power installations exceeding 1kV A.C. common rules]

prEN 50522
[Earthing of power installations exceeding 1 kV a.c.]

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1.0 SCOPE

This Specification specifies the installation of the permanent electrical earthing system along the transmission line in connection with measuring posts and permanent electrical earthing system at pipeline stations (vent stack, pits, fencing, steel structures e.t.c.).

The requirements of the following shall be fulfilled:

- This specification.
- **Job Spec. No. 799/2.**
- **Std Drawing No. STD-00-78-16 and STD-00-78-18.**
- **Std Drawing No. STD-4-73-01 pages 2.4, 2.5, 2.6.**

2.0 EARTHING ALONG TRANSMISSION LINE DUE TO PROXIMITY EFFECTS

Contractor shall install the earthing system along the transmission line and supply all necessary bulk materials.

The earthing along the transmission line in connection with measuring posts shall be horizontal, continuous hot dip galvanized steel stay wire, connected as shown on **Std Drawings No. STD-00-78-16 & STD-00-78-18.**

2.1 EARTHING ELECTRODE MATERIAL

The horizontal earthings shall be established with electrodes in accordance with the following material specification:

- Continuous hot dip galvanized steel stay wire.
- External diameter minimum 12 mm.
- 70 μm layer of zinc corresponding to 500 g/m^2 .

The electrode material shall be approved by the Owner's Representative prior to installation.

Further material details are shown in relevant Material Requisition.

2.2 CONSTRUCTION OF HORIZONTAL EARTHINGS

Contractor shall construct horizontal earthings running parallel to pipeline, with leakage resistances to remote earth as indicated on the relevant drawings with the following tolerance on the resistance value :

+ 10%, -20%.

All parts of the horizontal earthing shall be minimum 0.2m from secondary metallic constructions (pipeline).

Location of the earthing shall be approved by the Owner's Representative.

The earthing shall be established by laying horizontally and parallel to pipe line with the necessary length of wire into the ground.

Cable connection to earthing electrode shall be performed by "C" type compression connector, and the joint shall be placed inside cast resin type splicing kit (type 3M 92-A1 or similar), in accordance with **Std Drawing No. STD-00-78-16, STD-00-78-18.**

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All necessary precautions shall be taken in order to avoid electrolytic corrosion between different types of metal.

The construction shall be carried out by personnel skilled and experienced in the establishing of electrical earthings.

Important Note:

The values of soil resistivity and length of earth wire are approximately.

The exact values of soil resistivity at the individual earthing electrode points shall be measured by Contractor in accordance with **IEC 61936** and **prEN 50522**.

The actual length of earth wire and the earthing leakage resistance to remote earth is Contractor's responsibility.

The maximum earth wire length shall be 110m in the case of a one-side connection to the pipe line and 220m in the case of a centre-connection to the pipeline. In case that a longer (than 220m) earth wire is necessary due to increased value of soil resistivity, an appropriate backfilling material (clay) shall be used to decrease the soil resistivity, in order the required earth wire length to be up to 220m.

3.0 PERMANENT ELECTRICAL EARTHING AT PIPELINE STATIONS (LINE VALVE, SCRAPER e.t.c.)

Contractor shall install horizontal earthing system at vent stack (where insulating coupling exists only), and vertical earthing system at pits, fences and other steel structures as shown on **Std Drawing No. STD-4-73-01**.

3.1 HORIZONTAL EARTHING AT VENT STACKS

Contractor shall install horizontal earthing system at vent stacks only where insulating coupling exists, in accordance with **Std Drawing No. STD-4-73-01**, para 2.4:

- Electrode, as per **para 2.1** above, length 5m.
- NYY-J cable.
- Various bulk materials as shown on **Std Drawing No. STD-4-73-01** para 2.4.

All materials shall be approved by the Supervision and/or Owner's Representative prior to installation.

The location of the earthing shall be approved by the Owner's Representative.

Cable connection to earthing electrode shall be performed by "C" type compression connector and the join shall be placed inside cast resin type splicing kit (type 3M 92-A1 or similar).

All necessary precautions shall be taken in order to avoid electrolytic corrosion between different types of metal.

3.2 VERTICAL EARTHING

Contractor shall install vertical earthing system at pits, fences and other structures.

The vertical earthing shall be established with electrode and NYY cable with the following material specifications:

- Steel core copper glad ground rod 2 x 1.5 m, diameter 3/4".

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- NYY-j cable.

- Various bulk materials as shown on **Std Drawing No. STD-4-73-01**.

The materials shall be approved by the Owner's Representative prior to installation. Cable connection to earthing electrode shall be performed by suitable connector.

All necessary precautions shall be taken in order to avoid electrolytic corrosion between different types of metal.

4.0

CONTRACTOR'S DOCUMENTATION

During the installation of the earthing Contractor shall record the earthing leakage resistance to remote earth with suitable intervals.

Contractor shall prepare as-built drawings showing locations of earthing, pipeline, measuring post with chainage, and cable connections.

The leakage resistance record and the as-built drawing shall be presented to the Owner's Representative for approval.