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**TECHNICAL JOB
SPECIFICATION**

799/1

REVISION 0

DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

ELECTRICAL RESISTANCE WELDING “PIN- BRAZING”

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QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	05-04-2011	FIRST ISSUE	PQ DPT.	V.G.
Rev. No	Rev. Date	REASON FOR CHANGE	Made By	Approved By

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REFERENCE DOCUMENTS

Job Spec. No. 199/5

ELOT EN 1594

[Gas supply systems - Pipelines for maximum operating pressure over 16 bar –
Functional requirements]

ELOT EN 12068

[Cathodic protection - External organic coatings for the corrosion protection of
buried or immersed steel pipelines used in conjunction with cathodic protection -
Tapes and shrinkable materials]

ELOT EN 12799

[Brazing - Non-destructive examination of brazed joints]

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1.0 **SCOPE**

This specification covers the connection of copper conductors to the installed natural gas transmission pipelines.

2.0 **APPLICABLE STANDARDS**

ELOT EN 1594
ELOT EN 12068
ELOT EN 12799

3.0 **GENERAL**

Connections shall be performed by "Pin-Brazing" or similar methods, approved by Supervision. "CAD WELD" welding will not be accepted.

"Pin-Brazing" shall only be carried out by personnel skilled and experienced in such welding methods.

The Contractor shall submit a detailed procedure specification complying with this specification, for approval by Supervision, before any Pin-Brazing is carried out.

The welding procedure shall be qualified by visual examination and mechanically tested on two brazing with 2 hard blows on the side of the brazing by hammer and chisel.

If defects are found on finished welds, Contractor shall repair the defect and pay all resulting expenses, including re-insulation, excavation work, etc. Pin-Brazing can be performed even after the hydraulic test as the temperature during the Pin-Brazing is lower than 700°C.

4.0 **DRYING**

The area where the Pin-Brazing shall be carried out shall be dry. Heating to remove humidity shall be carried out in certain cases.

After construction, "Pin-Brazing" may, under any circumstance, not be exposed to heat influences above 100°C e.g. during a subsequent application of hot-applied insulating coating.

5.0 **WELDING TOOLS AND MATERIALS**

Contractor shall ensure that only equipment and material, correctly sized for the work, are used.

6.0 **CLEANING OF WELDING AREA**

"Pin-Brazing" shall be placed at least 100 mm from other welds.

Removal of 150 mm x 50 mm coating area from the top of the pipe, radius of all corners being not less than 5 mm.

Removal of all polyethylene and polymer coatings should be carried out by a rasp, ensuring that the surrounding insulating coating is not lifted or damaged.

Removal of the pipeline primer epoxy coating is achieved by a light grinding, using a grinder included in the Pin-Brazing equipment kit.

The cleaned area shall have a smooth ellipsoid shape.

Great care should be taken so as not to produce any cuts or grooves on the

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surrounding insulation.

The edges of the surrounding insulation shall be beveled with a half round rasp.

In case of a cable conductor having 2,5 ; 4,0 and 6,0 sq. mm cores, a copper sleeve will be required over the cable cores.

Each conductor end together with the special adaptable copper sleeve, shall be inserted to the "Pin-Brazing" lug.

The "Pin-Brazing" lug shall be crimped in two places with special compression tool. A single 2.5 mm² conductor shall be crimped:

- in one place only by using one copper sleeve,
- or in two places by using two copper sleeves.

Principle for cable connections with "Pin-Brazing" are shown on **FIGURE 1**.

7.0 **WELDING PERFORMANCE**

The instructions, from the Supplier of welding materials and tools, shall be strictly followed.

The size of the brazing pins and the ferrules shall be in accordance with the Supplier's instructions, taking into consideration the size of the sleeves.

After termination of the brazing, the top shall be removed and the strength of the brazing shall be tested by hammering lightly on the side of the brazing. The electrical continuity shall be checked with the use of an Ohmmeter.

8.0 **INSULATION AND CORROSION PROTECTION**

The welding area shall be insulated as described in **Job Spec. No. 199/5**, for cold applied use.

Cable lugs, welding area of the pipeline cable connection and open spaces of the pipeline should be coated with an initial insulating layer, in this case primer is used.

Then a layer of mastic is applied over the area of welds. The layer of mastic applied should be heated by a gas torch at low ambient temperature.

Finally, the welding areas of the pipeline cable connection should be insulated and protected against corrosion by adhesion of an e.g. Kebutyl Duplex Binde.

Cable outlets should be sized by a special Reparature Tape

Stripes of Reparature Tape are used in fastenings of the cables to the pipe.

The coating shall also cover the first section of the insulated cable. It is of the utmost importance that an absolute adhesion is achieved between the reincapsulation material and the pipe coating.

The completed insulation shall be controlled with a detector as described in **Job Spec. No. 199/5**.

Note: The insulating material shall be compatible with the specified 3 Layer PE coating.

FIGURE 1

PRINCIPLE FOR CABLE CONNECTIONS WITH "PIN BRAZING"

