



HELLENIC GAS
TRANSMISSION
SYSTEM OPERATOR

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TECHNICAL JOB
SPECIFICATION

191/1

REVISION 0

DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

SCRAPER TRAPS



HELLENIC GAS TRANSMISSION SYSTEM OPERATOR

Job Spec. No 191/1

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QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	05-04-2011	FIRST ISSUE	PQ DPT	VG
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ATTACHMENT 1

REFERENCE DOCUMENTS

Job Spec. No. 830/1

[External Painting]

Job Spec. No. 970/2

[Shop Inspection of equipment and materials for NOT project]

Std Drawing No. STD-00-11-01

Std Drawing No. STD-00-11-02

ELOT EN 13445-1 (harmonised with EU Directive 97/23/EC- PED)

[Unfired pressure vessels – Part 1: General]

ELOT EN 13445-2 (harmonised with EU Directive 97/23/EC- PED)

[Unfired pressure vessels – Part 2: Materials]

ELOT EN 13445-3 (harmonised with EU Directive 97/23/EC- PED)

[Unfired pressure vessels – Part 3: Design]

ELOT EN 13445-4 (harmonised with EU Directive 97/23/EC- PED)

[Unfired pressure vessels – Part 4: Fabrication]

ELOT EN 13445-5 (harmonised with EU Directive 97/23/EC- PED)

[Unfired pressure vessels – Part 5: Inspection and TestingEN 61000-6-2

Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments]

1.0 SCOPE**1.1 ITEM**

Scraper Traps

1.2 SERVICE

Sweet natural gas with sporadic passage of water and glycol.

1.3 APPLICATION

Used for the sending/receiving of pipeline pigs.

1.4 ADDITIONAL REQUIREMENTS

Additional information may be given in the Data Sheets, Standard Drawings and Material Requisition and these documents should be read in conjunction with this specification. Any conflict between requirements of this specification and all additional information as described above shall be referred to Owner for clarification before proceeding with fabrication of the affected part.

Vendor shall be responsible to design equipments and their components in accordance with the requirements of applicable documents.

In no event, however, are thicknesses, etc to be less than those shown on the drawings unless specific written approval to the contrary is received from Owner.

2.0 GENERAL REQUIREMENTS**2.1 DESIGN LEGISLATION AND STANDARDS**

ELOT EN 13445.

Any additional requirements of this specification shall be fulfilled.

2.1.1 Design Data

Refer to Data Sheet.

2.1.2 Calculations

Allowable stresses shall be in accordance to **ELOT EN 13445.**

Reinforcement pads for openings shall be equal to the greater of the requirements obtained from the following:

- New vessel subject to testing conditions with no corrosion allowance.
- Vessel subject to design conditions with corrosion allowance as indicated in Data Sheet.

2.2 UNITS

Metric

2.3 OPERATING TEMPERATURE RANGE

As per Data Sheet

2.4 DESIGN PRESSURE

As per Data Sheet

2.5 CONSTRUCTION

2.5.1 General

For information concerning dimensions and general layout, refer to **Std Drawings No. STD-00-11-01 & 02, latest revision.**

2.5.2 Scraper Trap

Left handed or right handed as per Data Sheet.

A left-handed scraper trap has the outlet for the feed-line placed to the left and the closing door hinged to the right, seen from the closing door end in direction of the pipe. Correspondingly right-handed scraper trap has the outlet for the feed-line placed to the right and the closing door hinged to the left.

Scraper trap shall have a minimum thickness of not less than the requirements of the **ELOT EN 13445** using design temperature and design pressure as specified on the Data Sheet. In any event the minimum thickness shall not be less (excluded the corrosion allowance specified) than the value of 5mm for carbon steel equipments and low alloy steel.

2.5.3 Closures

Quick-closing type equipment with self-sealing gasket. Gasket will be from asbestos free material.

The opening arrangement shall be such that pressure equalisation is achieved before the closure can be opened.

All heads shall conform to permissible Standard shapes.

Only silicone-based grease may be used for treating self-sealing gaskets.

2.5.4 Branches and Branch Connections

Shall be radial and perpendicular to the traps center axis in accordance with **ELOT EN 13445**.

Branches >20% of trap's diameter shall be fitted with guide bars as per Attachment 1. Number of guide bars as per Table 1 below.

Guide bars and cross-rails shall be made of killed carbon steel.

B	Wt	h	<											R	>
			1050	900	750	700	650	600	550	500	450	400	350		
DN 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DN 100	8	30	-	-	-	-	-	-	-	-	-	-	-	-	2
DN 150	8	35	-	-	-	-	-	-	2	2	2	2	2	-	2
DN 200	8	40	-	-	2	2	2	2	2	2	2	2	2	3	3
DN 250	8	50	-	2	2	2	2	2	2	2	3	3	3	3	3
DN 300	10	55	2	2	2	2	2	2	3	3	3	3	3	3	3
DN 350	10	55	3	3	3	3	3	3	3	3	3	3	3	3	3
DN 400	10	60	3	3	3	3	3	3	3	3	3	3	3	-	-
DN 450	10	65	3	3	3	3	3	3	3	3	3	-	-	-	-
DN 500	10	70	3	3	3	3	3	3	3	3	-	-	-	-	-
DN 550	15	70	3	3	3	3	3	3	3	-	-	-	-	-	-
DN 600	15	75	3	3	3	3	3	3	-	-	-	-	-	-	-
DN 650	15	80	3	3	3	3	3	-	-	-	-	-	-	-	-
DN 700	15	85	3	3	3	3	-	-	-	-	-	-	-	-	-
DN 750	15	90	4	4	4	-	-	-	-	-	-	-	-	-	-
DN 900	20	100	4	4	-	-	-	-	-	-	-	-	-	-	-
DN 1050	20	120	5	-	-	-	-	-	-	-	-	-	-	-	-

No. of bars

B = Nominal branch dia.(mm)
R = Nominal run diameter(mm)

wt = Guide bar wall thickness
h = Guide bar height

TABLE 1

REQUIRED NUMBER OF GUIDE BARS AND GUIDE BAR DIMENSIONS (mm).

2.5.5 Vessel External Attachments

Vendor supply shall also include the following:

- Saddle supports
 - External insulation supports if specified
 - Support lugs, clips and brackets for ladders, platforms etc.
 - All attachments to the vessel as required for shipment and erection.
- All external attachments shall be of the same material as the shell and head to which they are directly attached.

2.5.6 Tolerances

The out of roundness U at butt-welding ends shall not exceed 0.5%.

2.5.7 Pig alerts

Pig alerts shall be specified and supplied by scraper Vendor.
Type of pig alerts shall be approved by Owner.

2.6 MATERIALS

2.6.1 General

According to **ELOT EN 13445-2**.

Plate material according to **ELOT EN 13445-2**. Casting shall not be used. No other material will be used unless specifically otherwise authorized in writing by Owner.

Welding fittings for pressure parts shall be of seamless steel.

The steel shall comply with the requirements of **ELOT EN 13445-2**.

The starting material as plates and pipe shall be normalised.

When normalized and tempered materials are specified, the tempering shall be performed prior to any welding, unless specifically otherwise authorized in writing by Owner.

The tempering temperature shall be 10°C higher than that required for post weld heat treatment, unless otherwise specified.

The individual steel items shall be marked with Vendor's mark and material grade.

Prefabricated items, as caps, reducers, and flanges shall be marked according to the Standard.

Unless otherwise approved in writing by Owner, the same plate material specification shall be used for reinforcing pads as for the vessel parts to which they are attached.

2.6.2 Impact Tests

On all pressure retaining components impact tests shall be performed on each material used according to **ELOT EN 13445**, consisting of three test specimens from the same heat as the actual delivery.

The test temperature shall be -20°C or lower with acceptance criteria as follows:
Mean value from 3 tests 28 joules or better with the lowest single value 22 joules with all test- specimens being removed transverse to the longitudinal axis.

2.7 FABRICATION

2.7.1 General

Scraper traps shall be manufactured in accordance with the requirements **ELOT EN 13445**.

Scraper traps shall be completely shop fabricated and no field work shall be accepted by Owner.

Tolerances on out-of-roundness of scraper traps shall conform to the Standard and Owner requirements.

All tolerances must be referred to the completed vessel, after heat treatment if required.

2.7.2 Branches

Branches \geq DN 80 shall be made with forgings or hot pressing. Welded joints or similar are not permitted.

Branches < DN 80 may be made with weldolets, sockolets or similar.

2.7.3 **Beveling**

Welding ends shall be bevelled in accordance with **ELOT EN 13445**.

2.7.4 **Closure**

The frame shall be manufactured from forged or rolled material.
The cap shall be made from forged material.

Cap shall be spun or pressed from blanks of sufficient thickness, to obtain the minimum thickness as shown on the drawings.

Hinges in accordance with Vendor Engineering Standard, shall be supplied for all closures.

2.7.5 **Heat Treatment**

Scraper chambers shall undergo appropriate heat treatment after completion of all forming and welding work if such treatment is required by the applicable Standard.

Forged closures with wall thicknesses over 30 mm shall be stress relieved after the completion of all forming and welding work.

Cast closures, irrespective of wall thickness, shall be stress relieved after the completion of all forming and welding work.

Any heat treatment operations performed by vessel fabricator and intended to enhance mechanical properties, shall obtain Owner's approval.

Vessels which have been submitted to PWHT shall have a large warning notice painted on shell, at convenient locations stating:

STRESS RELIEVED VESSEL NO WELD PERMITTED.

2.7.6 **Repair of Surface Defects**

Minor surface defects in the parent material may be removed by grinding, provided min. wall thickness after grinding > calculated min. wall thickness.

2.7.7 **Welding Procedures /Welders Qualification**

According to **ELOT EN 13445**.

2.7.8 **WELDING**

The hardness of the weld seam and the heat-affected zone may not exceed 300 HV 10. Arc burn is not permitted.

2.7.9 **Repair By Welding**

Repair of weld seams are only permitted provided the repair procedure has been approved by an independent Accredited Inspection Body.

2.8 **NON DESTRUCTIVE EXAMINATION**

2.8.1 **General**

All joints on pressure retaining parts, except for nozzle weld seam with sizes below DN 100, shall be 100% radiographed and found acceptable in accordance with **ELOT EN 13445**.

2.8.2 Branches DN < 100

If weld-on nozzles are used, the affected area of the shell plate shall be ultrasonically tested for laminations before welding. Laminations are not allowed. Nozzle weld seam shall be 100% magnetic particle or dye penetrant examined in accordance with **ELOT EN 13445**.

2.8.3 Extruded Areas and Guide Bars

External and accessible internal extruded areas and guide bars shall be magnetic particle examined in accordance with **ELOT EN 13445**. Cracks are not allowed.

2.8.4 Forgings

Forged caps shall be ultrasonically inspected over their whole area according to **ELOT EN 13445**.

2.8.5 Plates

The plates shall be inspected ultrasonically and satisfy the requirements of **ELOT EN 13445**.

2.8.6 Bevelled Edges

For all bevelled edges (plate and branches), which are to be welded, the closer 50 mm shall be ultrasonically inspected for laminations and other defects. Acceptance requirements according to **ELOT EN 13445**.

Laminations extending into the face of the bevel end having a transverse dimension > 6mm are not acceptable.

2.9 TESTING

2.9.1 Hydrostatic Test

Completed scraper traps shall, before delivery, undergo a hydrostatic pressure test at a test pressure of $P_t = 2 \times \text{design pressure}$. The test pressure shall be maintained and recorded for at least one hour.

Field hydrostatic testing for shop fabricated vessels will be made, unless otherwise specified on the DATA SHEET.

Temperature of water shall never be less than 4°C. Vessel Vendor shall take all necessary precautions to avoid brittle fracture of vessels during hydrostatic test.

In addition the equipment shall be immediately drained after hydrostatic test and carefully dried by blowing with air and an absolute absence of any pocket water must be ensured.

The type of gaskets used for the hydrotest must be the same selected for the operating conditions. All gaskets shall be replaced, after hydrostatic test.

2.10 SURFACE TREATMENT

2.10.1 External

Vessel shall be painted as specified on vessel Data Sheet. Owner Specification **Job Spec. No. 830/1** shall dictate surface preparation and painting required.

Zinc contaminations of stainless steel materials and to a lesser extent of carbon steel components, may result in embrittlement and even in failure of vessel.

Therefore all parts painted with rich zinc paints or hot dip galvanized shall not be

welded to the vessel.

The primer shall allow over-coating after 6 months of stocking on site without any significant reduction in adhesion of the following coats. If necessary this shall be achieved by additionally application of a sealer.

Machined surfaces shall not be painted.

Welding ends shall be capped and protected against corrosion or damage in transit.

2.10.2 Internal

As stated in Data Sheet.

2.11 **MARKING**

A hanger shall be welded on each scraper trap and to this there shall be riveted a stainless steel identification plate giving: Item number and the information required by **ELOT EN 13445**.

ALL TEXT SHALL BE IN ENGLISH.

3.0 TECHNICAL DOCUMENTATION

3.1 **QUANTITY**

Four copies of each inclusive of original for all documents and certificates, except otherwise specified.

Four copies of each inclusive of one reproducible for all drawings, except otherwise specified.

Also electronic files (word documents and/or AutoCAD documents as applicable) of all Documents and Certificates must be submitted by Vendor to the Owner.

3.2 **DOCUMENT REQUIREMENTS**

All drawings must be marked with Owner purchase order number and to the part number to which they apply.

All drawings (except those with tender) shall be addressed to Owners central document control.

3.2.1 With Tender

Dimensional drawings with list of parts, including overall weight.

Statement regarding materials used for all main parts with reference to material standards.

Completed Data Sheets (if not complete).

3.2.2 After Award Contract (Before Production)

Preliminary outline and/or assembly drawings adequate for foundation design shall be furnished within two (2) weeks of letter of intent.

For approval drawings of categories (1), (2) and (3) shall be provided not later than three (3) weeks after letter of intent.

The following documentations shall be provided for the Owners approval:

- Detailed construction drawings including parts list detailing material standard and grade, item description, and certification level, eight (8) copies.
- Detailed design calculations, eight (8) copies.
- WPS & PQR, three (3) copies.
- Heat treatment + specification, three (3) copies.
- Non destructive testing specification, three (3) copies.
- Pressure test specification, three (3) copies.
- Surface treatment specification, three (3) copies.
- Identification plate text, three (3) copies.
- An approved copy (BY AN INDEPENDENT ACCREDITED INSPECTION BODY) of the Vendors Detailed Test and Inspection plan.
- Electronic files (word documents and/or AutoCAD documents as applicable) of all Documents and Certificates.

The plan should additionally show the control points at which an independent Accredited Inspection Body witnessing / approval is required, as per section 5 herein.

3.2.3 On Delivery

Comprehensive operation, maintenance and reconditioning manuals, thirteen (13) copies.

As built drawings, sixteen copies (16).

Scraper Trap Certification Package as listed above, five (5) copies.

Certified drawings required two weeks after return of "For Approval" drawings.

Also electronic files (word documents and/or AutoCAD documents as applicable) of all Documents and Certificates.

4.0 INSPECTION AND CERTIFICATION

Inspection will be performed by an independent Accredited Inspection Body.

Inspection requirements are defined in the following documents:

- a) Material requisition.
- b) Owner specification Job Spec. No. 970/2.
- c) Relevant project specifications.
- d) Inspection clauses of applicable Standards.

Inspection procedures to be followed are detailed in Owner document "Inspection and test instructions".

5.0 SPARE PARTS

As a minimum two (2) spare gaskets, plus 10% of bolts and nuts (if any) shall be supplied for closure part of vessel.

6.0 SHIPMENT

One piece vessel shall be completely equipped with all internal and external attachments before shipment, unless otherwise specified on the drawings.

Where necessary, vessels and its components shall be supported by temporary stiffeners to avoid distortion and damage during transportation and erection.

All exposed machined surfaces shall be coated with rust presentative. All flanges shall be protected with wooden covers and all threaded connections shall be plugged.

7.0 GUARANTEES

For guarantee requirements see the purchase order.

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