DESFA
Hellenic Gas Transmission System Operator

HELLENIC GAS TRANSMISSION SYSTEM OPERATOR

357-359, MESSOGION AVE.,
15231 ATHENS, GREECE
Tel.: 210 6501258
Fax : 210 6501551

TECHNICAL JOB SPECIFICATION

171/1

REVISION 0

DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

STEEL PIPE

QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

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

CONTENTS

REFERENCE DOCUMENTS

REFERENCE DOCUMENTS

Job Spec. No. 970/2
[Shop Inspection of equipment and materials for NGT project]

Job Spec. No. 970/3
[Inspection and Test Instructions]

ELOT EN 10208-2
[Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 2: Pipes of requirements class B]

ELOT EN 10045-1
[Charpy impact test on metallic materials; part 1: test method]

ELOT EN 10274
[Metallic materials - Drop weight tear test]

ELOT EN 10246 series
[Non-destructive testing of steel tubes]

ELOT EN 10204
[Metallic products - Types of inspection documents]

1.0 SCOPE

This technical job specification is specifying the steel pipe for transmission on land of high pressure (design pressure greater than 19 bar) sweet natural gas with sporadic conveyance of water and glycol.
This technical job specification is according to the European Standard EN 10208-2 and all the requirements that are set there in are fully valid.
However this technical job specification outlines the basic requirements and specifies some preferences with respect the EN 10208-2 whenever they exist there in. So for details the user refers to the relevant paragraphs of EN 10208-2 that are mentioned here below for each individual aspect.

2.0 GENERAL REQUIREMENTS

2.1 SPECIFICATIONS

Steel pipe NB (normalized) or MB (thermomechanically rolled), as per table 1: "Classification and designation of the steels" EN 10208-2.

2.2 UNITS

Metric system.

2.3 MANUFACTURING

The following types of pipes shall be acceptable for use:
- Seamless (S)
- High frequency welded (HFW)
- Submerged arc-welded longitudinal (SAWL)
- Submerged arc-welded helical (SAWH)

Type of pipe and manufacturing route (starting material, pipe forming and heat treatment conditions) as per table 2 EN 10208-2.

Only pipes with one (single) seam weld are accepted.

For each project the grade of the steel shall be defined according to the design requirements, mentioned on the purchase order sheet.

2.3.1 Dimensions, masses and tolerances

As per paragraph 8.6 EN 10208-2 and table 8: "Preferred outside diameters and wall thicknesses (indicated by the shadowed field)", table 9: "Tolerances on diameter and out-of-roundness" and table 10: "Tolerances on wall thickness".

2.3.2 Pipe lengths

As per paragraph 8.6.3.3 EN 10208-2.
For outside dia ≥ 219,1 mm (NPS 8") random length groups shall be class r4 as per table 11: "Requirements for random length groups" EN 10208-2.

2.3.3 Finish of pipe ends

As per paragraph 8.6.4 EN 10208-2.

For pipes smaller than DN 40 no beveling is required.

2.4 CHEMICAL COMPOSITION

For steel pipe NB and MB as per paragraph 8.2, table 3: "Chemical composition of the cast analysis for wall thicknesses ≤ 25 mm" EN 10208-2.
Carbon equivalent as defined in table 3.

3.0 INSPECTION - TESTS

3.1 INSPECTION

3.1.1 Type of inspection

Inspection shall be performed by Third Party Accredited Inspection Body.
Inspection documents shall be "type 3.2" as per table A1 "Summary of inspection documents" EN 10204 – latest edition and the requirements of paragraphs 9.2.1 and 9.2.2, EN 10208-2.

3.2 TESTS

3.2.1 Chemical analysis

As per paragraph 9.4.1, EN 10208-2.

3.2.2 Tensile test

As per paragraph 9.4.2, EN 10208-2.

3.2.3 Impact test

Charpy V-notch impact tests shall be taken for each heat and satisfy the requirements of EN 10208-2 para 9.4.3 with all specimens being removed transverse to the longitudinal axis and with a test temperature not higher than -20°C, unless a lower temperature is specified in the DATA SHEET.
The minimum impact energy values shall satisfy the requirements of Table 6, EN 10208-2. Only for pipe types SAWL and SAWH Heat Affected Zone impact tests shall be performed at -20°C according to the requirements of ISO 3183 §9.8.3

3.2.4 Drop weight tear (DWT) test

As per paragraph 9.4.4, EN 10208-2.

3.2.5 Bend test

As per paragraph 9.4.5, EN 10208-2.

3.2.6 Flattening test

As per paragraph 9.4.6, EN 10208-2.

3.2.7 Micrographics and metallographic examination

As per paragraph 9.4.7, EN 10208-2.

3.2.8 Hydrostatic test

As per paragraph 9.4.8, EN 10208-2.

3.2.9 Visual examination

As per paragraph 9.4.9, EN 10208-2.

3.2.10 Dimensional testing

As per paragraph 9.4.10, EN 10208-2.

3.2.11 Weighing

As per paragraph 9.4.11 EN 10208-2.

3.2.12 Non – destructive testing

As per paragraph 9.4.12, EN 10208-2 and EN 10246- series.

According to Annex C EN 10208-2 the following preferences are valid:

- Paragraph C.2.2 "Timing of NDT operations".

NDT of the weld seam of HFW pipe less than 200 mm outside diameter and full body NDT of seamless pipe shall be carried out before or after the hydrostatic test. NDT of the weld seam of SAW pipe and HWF pipe equal to or greater than 200 mm outside diameter, shall be carried out after the hydrostatic test.

- Paragraph C.2.3 "Residual magnetism at the ends".

The residual magnetism at the ends of the ends of each pipe, in the direction parallel to the pipe axis shall not exceed 30 G (3mT). Measurement for checking compliance with requirement shall be as per same paragraph of the said EN 10208-2.

- Paragraph C.2.4 "Laminar imperfections at the pipes ends".

Laminar imperfections greater than 6 mm in the circumferential direction are not permitted within 25 mm of each end of the pipe.
Verification of this requirement shall be carried out with an ultrasonic test as per EN10246-17.

- Table C.1: "Survey of non-destructive tests".

- For seamless pipes:
  - Residual magnetism at the pipe ends is tested according to reference C.2.3
  - Laminar imperfections at the pipe ends are tested according to reference C 2.4
  - Longitudinal imperfections are tested according to reference C.3.1 and U2/C acceptance criteria.
- For High frequency welded pipes:
  - Longitudinal imperfections in the weld are tested according to reference C.4.1.1.
  - Laminar imperfections at the pipes ends are tested according to reference C.4.2.

- Laminar imperfections on strip edges/area adjacent to weld seam are tested according to reference C.4.3.

- For submerged arc welded pipes:
  - Longitudinal / transverse imperfections in the weld are tested according to reference C.5.1.
  - Laminar imperfections at the pipes body are tested according to reference C.5.2.
  - NDT of the weld seam at pipe ends/repaired areas are tested according to references C.5.4 and C.5.5.

- Paragraph C.2.5 "Untested pipe ends".

In the case of short length at both pipe ends that cannot be tested the following apply:

- for seamless or HFW pipe, the untested ends shall be subjected to a manual/semi-automatic test using the same technique, test sensitivity, test parameters etc as specified in the relevant clause of EN 10208. For manual testing, the scanning speed shall not exceed 150 mm/s.
- for SAW pipe, the provision of C.5.4 shall apply.

- Paragraph C.2.6 "Suspect pipe".

In all cases, pipes giving rise to indications producing a trigger/alarm condition as a result of the specified NDT operation(s) shall be deemed suspect.
Suspect pipe shall be dealt with in accordance with the clause 'Acceptance' as given in the relevant European Standard for NDT of pipe. Repair by welding is only permitted on the weld of non-cold-expanded SAW pipe, provided that the provisions of C.4 are fulfilled.

- Paragraph C.3 "NDT of seamless pipe".

The following preference is valid.
Paragraph C.3.1: Seamless pipes shall be ultrasonically inspected for the detection of longitudinal imperfections in accordance with prEN 10246-7 to acceptance level U2/C.

- Paragraph C.4 "NDT of HFW pipe".

Preferences as per paragraph C. 4.2 here in above applies.

- Paragraph C.5 "NDT of SAW pipe".

Preferences as per paragraph C. 5.2 here in above applies.

- Paragraph C.5.5 "Radiographic inspection of the weld seam".

- C. 5.5.1 Where applicable, radiographic inspection of the weld seam shall be conducted in accordance with ELOT EN 10246-10 to image quality class R1, with the conditions given in to the relevant paragraphs of Annex C, EN 10208-2.

- C5.5.2 The acceptance limits for radiographic of the weld seam shall be as given in to the relevant paragraphs of Annex C, EN 10208-2.

3.2.13 Retests, sorting and reprocessing

As per paragraph 9.5 EN 10208-2.

4.0 PIPE - MARKING

As per clause 10 EN, 10208-2.
Additionally the OWNER CONTRACT identification number shall be paint stenciled.

4.1 ADDITIONAL REQUIREMENTS

4.1.1 Reflective Paint for Pipe D ≥ 355,59 mm

In addition to the above the following shall be marked in white reflective weather resistant paint on pipe D ≥ 355,59 mm only:
- Welding seams at each end of pipe.
- Die stamping to be framed.
- Length of pipe (in meters to two decimals) to be marked internally on one end of pipe. This requirement may be omitted on coated pipe if the information is "colour" stamped onto the external coating.
- Circumferential band midpoint of pipe if specified on DATA SHEET.

4.2 COLOR CODING

If required on the DATA SHEET, pipes of the same diameter, but with different wall thickness, are to be color codes at each end of the pipe, by two painted circumferential bands or similar, in order of increasing wall thickness, as follows:
No color / yellow / red / blue.
As an alternative to painting a corresponding coloring of the coating marking (if any) may be used.

5.0 TECHNICAL DOCUMENTATION

5.1 QUANTITY
Four copies of each inclusive of original for all Documents and Certificates.
Also electronic files of all Documents and Certificates must be submitted by Contractor to the Owner.

5.2 DOCUMENTS REQUIREMENTS

5.2.1 With Tender
Information about type(s) of surface treatment offered.
Statement of the test pressure applied in the hydrostatic test (standard, alternative or special pressure).
Statement of the Non Destructive Examination applied inclusive of test method in use, scanning pattern, notch standard etc.

5.2.2 After Award of Contract (Before Production)

Manufacturers Detailed Test and Inspection plan approved by OWNER. The plan shall additionally show the control points at which the independent inspectors witnessing / approval is required as per section 4.1 herein. (This clause is not applicable to "Stock list" supplied pipe).

5.2.3 On Delivery

Pipe Certification Package as per EN 10208-2.
OWNER or Third Party Accredited Inspection Body will issue Inspection Release Note (IRN) if not completed / included in Pipe Certification Package.