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**TECHNICAL JOB
SPECIFICATION**

560/1

REVISION 0

DATE 29/06/2011

LNG PLANT

FLANGES

(CRYOGENIC SERVICES INCLUDED)

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QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	29-06-2011	FIRST ISSUE	PQ DPT	V.G.
Rev. No	Rev. Date	REASON FOR CHANGE	Made By	Approved By

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REFERENCE DOCUMENTS

- DESFA Job Spec. No. 900/2
[Material Colour Coding]
- DESFA Job Spec. No. 930/1
[Positive Material Identification (P.M.I.)]
- DESFA Job Spec. No. 970/2
[Shop Inspection of Equipment and Materials for NGT project]
- DESFA Std. Dwg. No. STD-00-51-08
- ELOT EN 10213
[Steel castings for pressure purposes]
- ELOT EN 10222 series
[Steel forgings for pressure purposes]
- ELOT EN 1759-1 [Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, class-designated. Steel flanges, NPS 1/2 to 24]
- ELOT EN ISO 148-1 supersedes ELOT EN 10045-1
[Metallic materials - Charpy pendulum impact test - Part 1: Test method]
- ELOT EN 583 series
[Non-Destructive testing – ultrasonic examination]
- ASME B16.47
[Large Diameter Steel Flanges]

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1.0 **SCOPE**

1.1 **ITEM**

Carbon and alloy steel flanges.

1.2 **SERVICE**

Process and Utility piping at LNG installation.

1.3 **ADDITIONAL INFORMATION**

Additional technical information may be given in the Material Requisition and should be read in conjunction with this material specification. Any conflict between requirements of this Specification and Material Requisition supplementary design data or Codes shall be referred to Owner for clarification, before proceeding with the fabrication of the affected part.

Flange Manufacturer/Vendor shall be responsible to design, fabricate and supply flanges in accordance with the requirements of applicable documents. In no event, however, dimensions, thickness etc are to be less than those required by standards.

2.0 **GENERAL REQUIREMENTS**

2.1 **STANDARD**

As per **ELOT EN 1759-1**. For flanges with DN>600 not covered by this standard, dimensions given in **ASME B16.47** Series B applies.

2.2 **MATERIAL**

The flange material shall be in accordance with ELOT EN 1759-1 table 3b and shall be given in the relevant Material Requisition and Data Sheet.

Verification of mechanical properties shall include impact testing. One set of three Charpy V-notch specimens shall be obtained in accordance with **ELOT EN ISO 148-1**.

Impact testing shall be carried out at the minimum design temperature for each material and shall cover the requirements of **ELOT EN 10222 series** for forged flanges and **ELOT EN 10213** for cast flanges.

Repair by welding shall not be permitted.

In any case the flange material shall have specified minimum yield strength and impact toughness not less than the abutting pipe or piping component.

Colour coding shall be in accordance with DESFA specification **900/3**.

Positive material identification shall be (P.M.I) shall be performed according to DESFA specification **930/1**.

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2.3 PRESSURE RATING

As per Material Requisition.
See Material Requisition for details of design pressure, design factor, corrosion allowance and abutting pipe dimensions and Material Specifications.

2.4 TYPE

As per Material Requisition.

2.5 FACING

Raised Face.

2.6 SIZE

As per Material Requisition.

2.7 BORE

As per Material Requisition, (specified by wall thickness).

2.8 HEAT TREATMENT

Normalizing, quench and tempering, or solution annealing shall be required according to the respective material specifications.

2.9 NON DESTRUCTIVE TESTING

Welding neck flanges DN > 350 shall be ultrasonic examined in accordance with **ELOT EN 583 series**.

2.10 TOLERANCES

Welding neck flanges DN > 350 shall, in addition to **ELOT EN 1759-1**, fulfill the following tolerances:

- inside diameter of welding ends shall be within + 1.6 mm of abutting pipes inside diameter
- thickness of the hub shall nowhere be less than the minimum calculated thickness

2.11 FINISH

Flanges DN >350 shall be free of injurious defects as defined in **ELOT EN 1759-1**.

2.12 SURFACE TREATMENT

Soluble rust-preventive varnish.

2.13 MARKING

As per **ELOT EN 1759-1**. Flanges shall additionally bear Owner Supply Contract Number.

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2.14 PACKING

Flanges shall be bundled by bolting together or secured by wire of suitable strength passed through the bolt holes.

3.0 SUPPLEMENTARY REQUIREMENTS

3.1 GENERAL

The following Supplementary Requirements (SR1, SR2, SR3 and SR4) shall not apply unless specifically requested in the Material Requisition.

Further requirements, if specifically mentioned in the Material Requisition, shall be valid. In case of conflict between such requirements and the requirements contained herein, the former shall prevail.

3.2 SUPPLEMENTARY REQUIREMENTS - SR1

Blind flanges shall be furnished with removable and threaded lifting eyes placed in the flange edge if the weight of the flange exceeds 50 kg. Thread size shall not exceed 1/3 of flange edge thickness. Other thread data shall be as specified in **ELOT EN 1759-1**.

3.3 SUPPLEMENTARY REQUIREMENTS - SR2

Bolt holes in welding neck flanges shall be threaded over entire length to accommodate mating flange bolts.
Thread size, series and class shall comply with **ELOT EN 1759-1** and the bolt diameter data of the applicable Template Table.

3.4 SUPPLEMENTARY REQUIREMENTS - SR3

Blind flanges shall be furnished with a drilled and threaded centre hole designed to accommodate a vent screw as shown on DESFA Std Dwg. No. STD-00-51-08.
Vent screw and safety splint will be supplied with the blind flange.

3.5 SUPPLEMENTARY REQUIREMENTS - SR4

Blind flanges shall be furnished with a drilled and threaded centre hole according to **ELOT EN 1759-1**.

4.0 TECHNICAL DOCUMENTATION

4.1 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.

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4.2 DOCUMENT REQUIREMENTS

4.2.1 WITH TENDER

Information about type of varnish offered and recommended method for future removal of varnish.

4.2.2 AFTER AWARD OF CONTRACT

For flanges DN > 350 design calculations in accordance with **ELOT EN 1759-1**.

4.2.3 ON DELIVERY

Flange Certification Package.

5.0 INSPECTION AND CERTIFICATION

Inspection requirements are defined in the following documents :

- a. Material Requisition.
- b. **DESFA Job Spec. No. 970/2** "Shop Inspection of Equipment and Material for NGT Project".
- c. Relevant Project Specifications.
- d. Inspection Clauses of Applicable Codes.

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