



**HELLENIC GAS
TRANSMISSION
SYSTEM OPERATOR**

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**TECHNICAL JOB
SPECIFICATION**

570/1

REVISION 0

DATE 29/06/2011

LNG PLANT

**STUD – BOLTS AND NUTS
(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. 970/2
[Shop Inspection of Equipment and Material for NGT Project]

ELOT EN 1515-1
[Flanges and their joints - Bolting - Part 1: Selection of bolting]

ELOT EN 1515-3
[Flanges and their joints. Bolting. Classification of bolt materials for steel flanges, class designated]

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 10269
[Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties]

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1.0 SCOPE

1.1 ITEM

Bolting materials for flanged joints.

1.2 SERVICE

Process and Utility piping at LNG Terminal.

1.3 ADDITIONAL INFORMATION

Additional information may be given in the Material Requisition and should be read in conjunction with this material specification.

2.0 GENERAL REQUIREMENTS

2.1 TYPE

Stud bolts with 2 nuts as per **ELOT EN 1515-1** and **ELOT EN 1515-3**, for flanges as per **ELOT EN 1759-1**.

2.2 MATERIAL

2.2.1 STUD BOLTS

For non-cryogenic service material 42CrMo4 as per **ELOT EN 10269**. See also table 1 of **ELOT EN 1515-3**.

For cryogenic service, the bolting material shall comply with X5CrNi1810 according to **ELOT EN 10269**.

2.2.2 NUTS

For non-cryogenic service material C45E as per **ELOT EN 10269**.

For cryogenic service, material shall comply with X5CrNi1810 according to **ELOT EN 10269**.

Nuts larger than 12 mm shall not be machined from barstock.

2.2.3 IMPACT TESTS

Stud bolts and nuts with thread diameter ≥ 50 mm shall be Charpy V-notch impact tested in accordance with **ELOT EN ISO 148-1** and cover the requirements set by the relevant manufacturing standard (**ELOT EN 10269**) at the minimum design temperature.

2.2.4 OTHER REQUIREMENTS

All bolting materials for cryogenic service shall have a solution annealing heat treatment with an additional cold work hardening treatment for bolts of class 600.

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 DIMENSIONS

2.3.1 **DIAMETER**
As per Material Requisition

2.3.2 **BOLT LENGTH**
As per Material Requisition

2.3.3 **THREAD**
Fine thread as per **ELOT EN 1515-1**.

2.3.4 **NUT**
As per **ELOT EN 1515-1**.

2.4 **MARKING**
As per material standard.

2.5 **SURFACE TREATMENT**
Carbon steel bolts and nuts shall be zinc (hot dipped galvanized) or phosphate coated.

2.6 **PACKING**
Bolts with nuts shall be packed separately by type, diameter and length. The packing shall be legibly marked with diameter and length.

3.0 TECHNICAL DOCUMENTATION

3.1 **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.

3.2 DOCUMENT REQUIREMENTS

3.2.1 **ON DELIVERY**
Vendor's inspection certificate marked with Owner's supply contract number and containing as a minimum.

- Chemical analysis results.
- Tensile test results representative of the finished materials (studs only).
- Proof load test results representative of the finished materials (nuts only).
- Hardness test results representative of the finished materials (nuts only).
- Impact test results (thread diameter \geq 50 mm only)

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4.0 INSPECTION AND CERTIFICATION

Inspection requirements are defined in the following documents.

- a. Material requisition
- b. DESFA Job Specification 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's document "Inspection and Test Instructions".