



**HELLENIC GAS
TRANSMISSION
SYSTEM OPERATOR**

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

**TECHNICAL JOB
SPECIFICATION**

F3

REVISION 1

DATE 22/09/2011

LIQUEFIED NATURAL GAS PLANTS

FIXED WATER SPRAY SYSTEM

FOR LNG STORAGE TANKS

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QUALITY ASSURANCE PAGE

CHANGES LOG

- para 4.1: 89/106/EEC CPD added

REVISIONS LOG

1	22-09-2011	CPD added in para 4.1	PQ DPT	VG
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REFERENCE DOCUMENTS

ELOT EN 1473

[Installations and Equipment for Liquefied Natural Gas. Design of onshore installations]

EU DIRECTIVES

89/106/EEC CPD

[Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products]

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1.0 GENERAL

- 1.1 This specification covers the requirements for a fixed water spray system for the cooling of exposed outer surfaces of an LNG Storage Tank.
- 1.2 Each LNG Storage Tank shall be provided with a fixed cooling water spray system to give protection against thermal radiation resulting for an LNG fire on an adjacent Storage Tank.
- 1.3 Water sprays shall be provided to protect the pipe racks adjacent to each tank up to the first remotely operable isolation valves.
- 1.4 Water for the fixed spray systems shall be delivered from the LNG terminal firewater main at the Contractor's battery limit.

2.0 EUROPEAN STANDARDS AND SPECIFICATIONS

- 2.1 Applicable European standards and specifications shall include the following:
ELOT EN 1473 "Installations and Equipment for Liquefied Natural Gas. Design of onshore installations"

3.0 DESIGN REQUIREMENTS

- 3.1 The design of the water spray system shall be in accordance with **ELOT EN 1473**, including the water application rate.
- 3.2 The concrete outer container shall be provided with a deluge water system and an adequate distribution system (including protection of roof mounted equipment and piping) sized to give the water application rate specified.
- 3.3 The system shall be divided into sections, one to cover the dome roof, one to cover roof mounted equipment and one to cover any parts of the tank shell which are exposed to thermal radiation from an adjacent tank fire. Each section shall have an independent supply header and the roof section shall be provided with duplicate 100% headers. A remotely operated deluge valve shall be provided for each supply header.
- 3.4 The system shall be initiated automatically by the fire detection system. On detection of fire on any one storage tank, the water spray system on an adjacent storage tank shall operate by opening deluge valves. The preselected water spray sections shall also be capable of being initiated manually.
- 3.5 Design of the deluge water system shall be submitted for review by the OWNER.

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- 3.6 The concrete outer container shall be of such a quality as to resist erosion damage which may be caused by the deluge rate during application of water during the burn out period.
- 3.7 The water spray system shall be fireproofed for exposure to the heat fluxes specified for an adjacent tank fire for a period of 1 hour. The deluge valves shall be located in a fireproofed housing.
- 3.8 If parts of the tank shell are exposed above ground, deflector rings shall be provided to direct firewater run off from the tank roof into the tank shell.
- 3.9 The following water application rates and design heat flux levels shall be used:

Tank component	Water Application Rate	Design Heat Flux
Roof and roof mounted equipment	8.2 l/min/M ²	45 Kw/M ²
Tank Shell	8.2 l/min/M ²	40 Kw/M ²

- 3.10 Where required, spraying systems shall distribute the water flow evenly onto the exposed surfaces. In this way equipment subjected to radiation shall not reach unacceptably high local temperatures (see para 13.6.3 ELOT EN 1473).
- 3.11 The LNG plant (particularly impounding basins) shall be equipped with drainage systems capable of draining the volumes of water generated by these systems (see para 13.6.2 ELOT EN 1473).
- 3.12 Recirculation of used water may be considered where practicable and shall depend on its ability to remove the transferred heat in a fire of long duration while keeping the integrity and working ability of the unit. Precautions should also be taken to ensure that flammable materials are not returned with the re-circulated water (see para 13.6.3 ELOT EN 1473).

4.0 MATERIALS

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- 4.1 Piping materials for water spray systems shall be in accordance with the project piping specifications and shall fulfill the requirements of the EU Directive 89/106/EEC CPD.

5.0 SURFACE PREPARATION AND PAINTING

- 5.1 All surface preparation and painting shall be suitable for a marine environment.
- 5.2 Surfaces other than those which are fireproofed shall be painted in accordance with the Project Design Specification for painting and protective coatings.