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TECHNICAL JOB SPECIFICATION

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REVISION 1

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LIQUEFIED NATURAL GAS PLANTS

GENERAL SPECIFICATION FOR HYDROCARBON GAS DETECTORS AND RECEIVER MODULES

QUALITY ASSURANCE PAGE

CHANGES LOG

- Changes in para 1.5.1
- Changes in para 2.1.6
- Changes in para 2.2.8 a & b

REVISIONS LOG

1	22-09-2011	DESFA COMMENTS	PQ DPT	VG
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REFERENCE DOCUMENTS

ELOT EN 54-1
[Fire detection and fire alarm systems - Part 1: Introduction]

ELOT EN 10088
[Stainless steels - Part 1: List of stainless steels]

ELOT EN 60079 series
[Explosive atmospheres]

ELOT EN 60079-11
[Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"]

ELOT EN 60079-26
[Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga]

CECC 00111-0
[Rule of Procedure 11. Specifications. An introduction to the types of specifications applicable within the CECC system]

EU DIRECTIVES

LVD 2006/95/EC
[Harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits]

EMC 2004/108/EC
[Approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC EMC]

ATEX 94/9/EC
[Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres]

1.0 GENERAL

1.1 This document defines the basic requirements for Hydrocarbon gas detectors and Receiver Modules.

1.2 ENVIRONMENTAL CONDITIONS (FIELD)

Maximum Temperature in Shade	47°C
Maximum Temperature in Sun	60°C
Minimum Temperature in Shade	-5°C
Humidity	Up to 99% at Low Temperature

The atmosphere is dusty, humid, saliferous marine environment.

1.3 Carbon and ferritic alloy steel surfaces – shall be protected to suit a marine environment.

1.4 ENVIRONMENTAL CONDITIONS (CONTROL ROOM)

The control room mounted equipment will be located in an air-conditioned control room which is classified as a non-hazardous area, but shall be suitable for operating up to 44 °C.

1.5 ELECTRICAL AREA CLASSIFICATION

1.5.1 FIELD

1 Field equipment will be located in a hazardous area, classified as Zone 1 Gas Group IIB, Temperature Class T3 in accordance with **ELOT EN 60079-26**. All equipment shall be certified and a certificate included in Vendor's bid.

1.5.2 CONTROL ROOM

Control room equipment where required by the associated field equipment shall be suitable for operation within intrinsically safe loops and shall be design for use with zener barriers in accordance with **ELOT EN 60079-11**.

All field equipment shall have cable entry threaded N.P.T.

1.6 ELECTRICAL POWER SUPPLIES

a) 230 Volt AC uninterrupted Power Supply (+10V). 50 Hz (± 1.5 Hz) harmonic distortion to be no greater than 5% at 50 Hz. No standby battery required.

b) Any 24 volt DC for field mounted equipment shall be derived integrally from within the associated panel instruments.

2.0 DESIGN

2.1 COMBUSTIBLE HYDROCARBON GAS DETECTORS

2.1.1 The combustible gas sensors shall be of the all solid state, continuous diffusion catalytically treated element type. The electrical resistance of the "element" shall vary in direct proportion to the combustible gas content of the air surrounding the sensor. A reference bead shall be used to provide circuit stability against changes in ambient temperature, humidity and pressure. The sensors shall be designed to operate on a standard 4 - 20mA circuit and use a 2 or 3 wire system connected to receiver modules.

It is a preference of this specification that calibration / checking is carried out from the receiver module in the control room.

2.1.2 The combustible gas sensors shall determine the combustible gas content of the surrounding atmosphere with a accuracy of ± 2% of the true value.

2.1.3 Repeatability shall be better than ± 2% of reading.

2.1.4 Drift shall be less than ± 5% of reading per year.

2.1.5 Response time shall be less than 60 seconds to derive a value of 50% of full scale when exposed to a gas concentration equal to the maximum L.E.L. of that gas.

1 **2.1.6** The sensor shall be supplied completely assembled with a junction box to terminate a signal cable with up to 1.5 mm^2 conductors, be weatherproof to IP65 and suitable for installation in a hazardous area as specified in para. 1.5.1.

2.1.7 Dust covers and /or splash guards shall be provided as necessary to meet the environmental conditions specified.

2.1.8 All metallic parts used in the construction of the combustible gas sensors shall be made from stainless steel X5CrNiMo17-12-2 (1.4401) as per **ELOT EN 10088**.

2.2 RECEIVER MODULES

2.2.1 The system shall be designated to be automatic. The receiver modules shall display the NORMAL – ALARM – FAULT status of the channel and provide FAULT and alarms contacts. The modules shall be fitted with various alarm cancel and test switches.

2.2.2 All wiring from field mounted devices shall be supervised continuously for open and short circuit condition by End-of-Line resistors or manufacturer's standard method and any fault shall be alarmed and displayed at the control room to enable operator to take necessary safety action.

2.2.3 The receiver modules shall be in the control room and are required to be of the high density, 19 inch rack for flush panel mounting. The modules shall be removed from the front of the mounting rack.

2.2.4 The receiver modules and logic hardware shall be of the all solid state electronic type, and be immune from the effects of R.F. interference which may arise from the use of site radio transmitters and marine radios. Components shall conform to **CECC 00111-0**, where possible, otherwise shall be of high grade commercial specification debated to **ELOT EN 54-1**.

2.2.5 One monitor channel is required for each field mounted gas sensor. Multipoint monitor channels will not be considered.

2.2.6 Calibration adjustments shall be carried out from the front of the channel. When placed in the "calibration mode", the remote alarm functions shall be inhibited.

2.2.7 Monitor channels shall be supplied win an integrally mounted analogue or digital indicator to display the measured value as follows:

Combustible gases – 0 to 100% L.E.L.

2.2.8 Gas sensor monitor channels shall separately display three alarm states as follows:

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a) High level alarm (20% LEL): flashing amber LED.
b) High-high alarm (40% alarm): flashing red LED.
c) Gas monitor or sensor malfunction: steady yellow LED.

2.2.9 Remote alarm initiating contacts shall be provided for the alarm conditions listed in 2.2.8 above. Remote alarm initiating contacts shall be volt free D.P.D.T. Alarm initiating contacts (on b, c only) are required to latch once the alarm set point has been reached. A common "Alarm Reset" button shall be supplied for each group of modules which are mounted in one 19 inch rack, to reset the alarms.

2.2.10 An indicating lamp (green LED.) shall be provided to indicate the module and field sensor are operating normally.

2.2.11 Sensor failure or power failure at the monitor channel shall cause the remote alarm initiating contacts to change over (open).

2.2.12 Approximately 20% spare space capacity shall be provided to facilitate additional gas monitor channels.

2.2.13 All control room equipment shall be suitable for installation in the area as specified in para. 1.4.