



**Hellenic Gas Transmission System Operator S.A.**  
357-359 Messogion Av., GR 152 31 Halandri  
Tel.: 213 088 4000  
Fax: 210 674 9504  
Email: desfa@desfa.gr

## TECHNICAL SPECIFICATION

**Doc No: DSF-SPC-ELE-006**

**Rev. 1**

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### HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

# AREA CLASSIFICATION

**JUNE 2021**


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1	Second Issue	30-06-2021	PP	KM	TPI
0	First Issue	05-04-2011	PQ DPT.		V.G.
<b>REV</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>PRPD</b>	<b>CHKD</b>	<b>APVD</b>




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## 1 INTRODUCTION

## 2 SCOPE AND OBJECTIVES

Scope of this Specification is to point out some additional information for determining the sources of hazard for area classification drawings preparation.

Following criteria given below are for area classification determination for plant installation. Where fire and/or explosion hazards may exist.

## 3 REFERENCES

### 3.1 Reference Documents

### 3.2 Reference Codes and Standards

2014/34/EU	Equipment Explosive Atmospheres Directive
2014/35/EU	Low Voltage Directive
2014/30/EU	Electromagnetic Compatibility Directive
MINISTERIAL DECISION	
50/12081/642/2006 F A –	
GG B / 1222/5.9.2006	Security Home Electrical Installations (E.I.E.). Introduction of a Differential Current Installation of Construction and Fundamental Grounding
ELOT EN 1594 E3	Gas Supply Systems. Pipelines for Maximum Operating Pressure over 16 bar. Functional Requirements
ELOT EN 14161+A1	Petroleum and Natural Gas Industries. Pipeline Transportation Systems
BS EN 62561-1:2017	Lightning protection system components (LPSC). Requirements for connection components
BS EN 62561-2:2012	Lightning Protection System Components (LPSC). Requirements for conductors and earth electrodes



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BS EN 62561-3:2017	Lightning protection system components (LPSC). Requirements for isolating spark gaps (ISG)
BS EN 62561-4:2017	Lightning protection system components (LPSC). Requirements for conductor fasteners
BS EN 62561-5:2017	Lightning protection system components (LPSC). Requirements for earth electrode inspection housings and earth electrode seals
BS EN IEC 62561-6:2018	Lightning protection system components (LPSC). Requirements for lightning strike counters (LSC)
BS EN IEC 62561-7:2018	Lightning protection system components (LPSC). Requirements for earthing enhancing compounds
ELOT EN IEC 60079-0 E5	Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements
ELOT EN 60079-7 E3	Electrical Apparatus for Explosive Gas Atmospheres - Part 7: Increased safety e
ELOT EN 60079-10-1 E2	Electrical Apparatus for Explosive Gas Atmospheres – Part 10: Classification of Hazardous Areas
ELOT EN 60099-4 E3	Surge Arresters - Metal Oxide Surge Arresters without Gaps for A.C. Systems
ELOT EN IEC 60099-5 E3	Surge Arresters - Selection & Application Recommendations
ELOT EN 62305-1 E2	Protection against Lightning, Part 1: General Principles
ELOT EN 62305-2 E2	Protection against Lightning, Part 2: Risk Management
ELOT EN 62305-3 E3	Protection against Lightning, Physical Damage to Structures and Life Hazard
ELOT EN 62305-4 E4	Protection against Lightning, Part 4: Electrical and Electronic Systems within Structures
ELOT EN ISO 9001 E4	Quality Management Systems
ELOT EN ISO/IEC 17025 E3	General Requirements for the Competence of Testing and Calibration Laboratories
ELOT HD 384	Requirements for Electrical Installations



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ELOT HD 60364	Electrical Installations of Buildings
EN 61000	Electromagnetic compatibility (EMC)
EN 61643-11	Low Voltage Surge Protective Devices – Part 11: SPDs Connected to Low Voltage Power Distribution Systems – Performance Requirements and Testing Methods
EN 61643-21	Low Voltage Surge Protective Devices – Part 22: SPDs Connected to Telecommunication and Signaling Networks – Performance Requirements and Testing Methods
IEC 60664	Insulation Coordination for Equipment within Low-Voltage Systems
IEC 61643-12	Low Voltage Surge Protective Devices – Part 12: SPDs Connected to Low Voltage Power Distribution Systems – Selection and Application Principles
IEC 61643-22	Low Voltage Surge Protective Devices – Part 22: SPDs Connected to Telecommunication and Signaling Networks – Selection and Application Principles
IEC 62548	Design Requirements for Photovoltaic (PV) Arrays
IEC 62561-1	Lightning Protection Components (LPC), Part 1: Requirements for Connection Components
IEC 62561-2	Lightning Protection Components (LPC), Part 2: Requirements for Conductors and Earth Electrodes
IEC 62561-3	Lightning Protection Components (LPC), Part 3: Requirements for Isolating Spark Gaps
IEC 62561-4	Lightning Protection Components (LPC), Part 4: Requirements for Conductor Fasteners
IEC 62561-5	Lightning Protection Components (LPC), Part 5: Requirements for Earth Electrode Inspection Housings and Earth Electrode Seals
IEC 62561-6	Lightning Protection Components (LPC), Part 6: Requirements for Lightning Strike Counters



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IEC 62561-7	Lightning Protection Components (LPC), Part 7: Requirements for Earthing Enhancing Compounds
ELOT EN 60071-1	Insulation Coordination – Definitions, Principles & Rules
ELOT EN 60071-2	Insulation Coordination – Application Guide
EN 60664-1	Insulation Coordination for equipment within Low Voltage Systems
IEC 61643-11	Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power distribution systems - Requirements and tests

## 4 ACRONYMS

AC	Alternating Current
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATEX	ATmosphères EXplosibles (Explosive Atmospheres)
ATS	Automatic Transfer System
BMS	Building Management System
BVS	Block Valve Station
BCC	Back-up Control Centre at Nea Messimvria
CCTV	Closed Circuit Television System
CPR	Construction Products Regulation
CP	Cathodic Protection
CPU	Central Processor Unit
CS	Compressor Station
DB	Distribution Board
DC	Direct current
DCS	Distributed Control System
DEG	Detailed Engineering
DIN	Deutsches Institut für Normung (German Institute of Standardization)
DVA	Digital Voice Announcer



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DVD	Digital Video Disc
EDG	Emergency Diesel Generator
ELOT	Hellenic Organization for Standardization
ELV	Extra Low Voltage (nominal voltage not exceeding 50 V AC or 120 V DC (ripple-free) between conductors or to earth, as defined by the Standard EN 61558)
EN	European Norms
EPC	Engineering, Procurement and Construction
EU	European Union
ESD	Emergency Shut Down
F&G	Fire and Gas
FACP	Fire Alarm Central Control Panel
FARP	Fire Alarm Repeater Control Panel
FAT	Factory Acceptance Test
FEG	Field Engineering
FC	Floe Computer
FOC	Fibre Optic Cable
GCC	Gas Control Centre at Patima
HEDNO	Hellenic Electricity Distribution Network Operator
HDPE	High Density Polyethylene
HMI	Human Machine Interface
HVAC	Heating Ventilation Air Conditioning
I/O	Input / Output
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU	International Telecommunication Union
LAN	Local Area Network
LCS	Local Control System
LED	Light Emitting Diode
LFEP	Local Fire Detection & Fire Extinguishing Panel
LV	Low Voltage





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LSP	Load Share Panel
MSC/MCS/SMC	Main Station Controller
MV	Medium Voltage
MPS	Master Project Schedule
MPR	Monthly Progress Report
NFPA	National Fire Protection Association
NNGTS	National Natural Gas Transmission System
NTSC	National Television System Committee
O&M	Operation and Maintenance
PID	Piping and Instrumentation Diagram
PA/GA	Public Address / General Alarm
PCS	Process Control System
PED	Pressure Equipment Directive
PEP	Project Execution Plan
PFD	Process Flow Diagram
PLC	Programmable Logic Controller
PMS	Power Management System
POC	Project Organization Chart
PAL	Phase Alternate Line
PPC	Public Power Corporation
PTZ	Pan, Tilt, Zoom
PVC	Poly Vinyl Chloride
QA	Quality Assurance
RCC	Remote Communications and Controls
RFI	Radio Frequency Interference
RTD	Resistance Temperature Detectors
RTU	Remote terminal Unit
S/S	Scraper Station
SAT	Site Acceptance Test
SCADA	Supervisory Control and Data Acquisition (including Telemetry)
SCS	Station Control System



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SFP	Small Form-factor Pluggable
SPD	Surge Protection Device
SPL	Sound Pressure Level
UDP	User Datagram Protocol
UPS	Uninterruptible Power Supply
UV	Ultraviolet
VGA	Video Graphics Array
VMS	Video Management Software

## **5 GENERAL**

The area classification shall be done by checking the existence and location in the plant of any source of hazard, and taking into consideration the characteristics of the substances involved and giving rise to different degree of hazard. General information for area classification is given in the General Electrical Specification, which has to be considered also for the selection of the type of equipment and relevant enclosures to be used in classified hazardous locations.

### **5.1 Standards**

The classification of hazardous locations shall be done in accordance with EL0T EN 60079-10.

### **5.2 Area Classification Drawings**

The classification of hazardous locations shall be represented on particular drawing where type and extension of such classified locations shall be shown. The drawings shall be self-explanatory, with notes specifying at least:

- type of substances giving rise to the classification,
- equipment to be used in the classified hazardous locations.

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## 6 LOCATION OF SOURCES OF HAZARD

The following guide lines have been prepared to give assistance in order to define which items of plant should normally be considered source of hazard, and which should not. The assessment must be always considering the particular circumstances of each individual situation.


Uniformity criteria shall be adopted in the interpretation and application of mentioned standards. In this analysis one has not to assure that the whole plant is a hazardous environment. Certain items, by the nature of safety factors in design and by control and inspection in manufacturing and maintenance are practically free from fail (e.g. the shell of a pressure vessel). On the other hand, items as drain cocks, vents and pump glands, are obviously points at which flammable material can be released from a closed system. It is specifically from such points that the hazardous areas and the safety distance should be measured.

Plant items have to be divided into groups, depending on whether they would normally be regarded as hazardous or not. Items have to be regarded as source of hazard if they release gases, vapors or substances which vaporize on release.

### 6.1 Typical Sources of Hazard to Be Considered for Area Classification

Machines, equipment, or their parts for production and processing of dangerous substances which can be released into the atmosphere in normal and abnormal operating conditions have to be generally considered as source of hazard. The items listed here below will be particularly taken into account:

- pump glands and shaft glands on rotating or reciprocating shafts of rotary filters, contactors, mixers, and other machines. (In centrifugal, reciprocating and rotary compressors the glands are the main hazard, but other sources of hazard should be regarded as the compressor casing and in some cases, parts of the gland sealing system),
- the drain rims around the pump pad,
- cooling water effluent systems from hydrocarbon service,
- vents of safety valves and rupture disk when non-conveyed to flare or gas meter,

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- drain connection used in process operation and permitting release of flammable vapour to atmosphere,
- sample points,
- vents to atmosphere,
- motorized valves,
- some types of stream analyzers,
- drum and container filling plant
- fixed roof storage tanks, including water draw- off arrangements,
- floating roof storage tanks including water draw-off arrangements.

Whether any particular hazardous area is zone 1 or zone 2, it will depend on whether the hazard can normally be expected to be present or whether it is unlikely to be present as noted in ELOT EN 60079-10.

## 7 PROCESS AREA

The above ground exposed parts of the natural gas line valve stations, scrapper stations and mixing station are considered as process areas. In the process area there is usually sufficient combination of sources of hazard that extension of relevant classified locations overlaps and produce an unbroken classified environment. The theoretical existence of small pockets of safe locations is not realistic and should be avoided.

ELOT EN 60079-10 shall be used to define the hazardous area.

Pits shall be classified as zone 1 up to the earth surface and they shall generate a zone 2 classification extended horizontally up to a distance of 3 m from the side of the trap and vertically from a ground to an elevation of 3.0 m above the trap cover, as per ELOT EN 60079-10.