



IECEX Ex TEST REPORT COVER

ExTR Reference Number: US/FMG/ExTR08.0019/00
 ExTR Free Reference Number.....: Project ID 3034056
 Complied by + signature (ExTL).....: Marlon Mitchell
 Reviewed by + signature (ExTL).....: Andrew Lozinski
 Approved by + signature (ExCB).....: David Styrcula
 Date of issue.....: 6 April 2009

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Ex Testing Laboratory (ExTL): FM Approvals LLC
 Address: 1151 Boston-Providence Turnpike, Norwood, MA 02062, USA

Applicant's name: Electronstandart-pribor
 Address: No. 35/2, Slavy Avenue, Saint Petersburg 192286
 Russian Federation

Standards: IEC 60079-0:2007, IEC 60079-1:2007
 Test procedure: IECEx Scheme
 Test Report Form No.....: ExTR Cover_1
 TRF Originator.....: FM Approvals LLC
 Master TRF.....: dated 2006-08

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Test item description: SGOES Gas Detector
 Trademark:



Model/type reference.....:	SGOES
Manufacturer	Electronstandart-pribor
Address	120 th Gatchinskoy divizii str, Promzona-2, Gatchina, Leningradskaya oblast 188301, Russian Federation
Code (e.g. Ex _ II_ T_).....:	Ex d IIC T4 Gb
Rating	

Copy of Marking Plate

Particulars: test item vs. test requirements

Classification of installation and use : stationary

Ingress protection : IP66

Rated ambient temperature range (°C) : -40°C to +85°C

General remarks:

General product information:

The SGOES Gas Detector's operation is founded on differential absorption of electromagnetic radiation by hydrocarbon molecules. The SGOES measures the change of IR radiation intensity after the IR radiation is passed through the test gas medium.

The SGOES Gas Detector enclosure is a cylindrical shaped housing constructed of aluminum alloy. Both ends of the housing are closed. The base is solid and contains the external grounding lug, wiring entry and mounting holes. The window cover contains one sapphire lens cemented in place and externally protected by a permanent guard/reflector assembly. The window cover also contains the mounting holes for the electronics. The base cover is provided with one ½ inch - 14 NPT conduit entry. O-rings are provided on the covers for environmental protection. The maximum free internal volume of the apparatus is approximately 374 cm³.

All applicable testing of the SGOES Gas Detector was tested under FM Approvals Project IDs 3034056, 3029728, and 3028847.

Manufacturer's Documents			
Title:	Drawing No.:	Rev. Level:	Date:
Cover of enclosure Assembly drawing	GSKF.301265.003AD	-	23.03.05
Base of enclosure Assembly drawing	GSKF.301314.002AD	-	23.03.05
Signal board Assembly drawing	GSKF.411619.010SB	-	23.03.05
Gas Analyzer SGOES Assembly drawing	GSKF.413311.002AD	-	23.03.05
Gas Detector SGOES Operating Manual	GSKF.413311.002-01OM	-	2008.06.21
Optical protection sapphire glass OMLDY enclosure	GSKF.711111.009	-	23.03.05
Enclosure for SGOES	GSKF.713538.006	-	23.03.05
Marking plate	GSKF.754312.124-IEC	-	23.05.05



IECEX TEST REPORT
IEC 60079
Electrical equipment for explosive gas atmospheres
Part 0: General requirements

ExTR Reference Number.....:	US/FMG/ExTR08.0019/00	
ExTR Free Reference Number	Project ID 3034056	
Complied by + signature (ExTL)	Marlon Mitchell	
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Address	1151 Boston-Providence Turnpike, Norwood, MA 02062, USA	
Applicant's name.....:	Electronstandart-pribor	
Address	No. 35/2 Slavy Avenue, Saint Petersburg 192286 Russian Federation	
Standard.....:	IEC 60079-0:2007, Fifth edition	
Test procedure	IECEX Scheme	
Test Report Form No.:	ExTR60079-0_5A	
TRF Originator	FM Approvals LLC	
Master TRF	dated 2007-11	
Instructions for Intended Use of Ex Test Report:		
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Possible test case verdicts:		
- test case does not apply to the test object:N / A		
- test object does meet the requirement:Pass		
General remarks:		
The tests results presented in this report relate only to the object tested. This report shall not be reproduced except in full without the written approval of the testing laboratory.		
"(see Attachment #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.		
Throughout this report a point is used as the decimal separator.		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
1	SCOPE		
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
4	APPARATUS GROUPING AND TEMPERATURE CLASSIFICATION		
4.1	Group I	The equipment is intended for Group II.	N / A
4.2	Group II	The equipment is intended for Group IIC.	Pass
4.3	Group III	The equipment is intended for Group II.	N / A
4.4	Equipment for a particular explosive atmosphere	The equipment is intended for Group IIC gases using type of protection 'd'.	Pass
5	TEMPERATURES		
5.1	Environmental influences		
5.1.1	Ambient temperatures	The equipment is intended for use in the ambient temperature range: -40°C to +85°C.	Pass
5.1.2	External source of heating or cooling	External sources of heating and cooling are to be within the ambient temperature limits of -40°C to +85°C. No other external source of heating or cooling is applicable.	Pass
5.2	Service temperature	Refer to 26.5.1.	Pass
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	Refer to 26.5.1.	Pass
5.3.2	Limitation of maximum surface temperature	This clause contains no requirements.	N / A
5.3.2.1	Group I electrical equipment	The equipment is intended for Group II.	N / A
5.3.2.2	Group II electrical equipment	The maximum surface temperature classification for the equipment is T4 Ta = -40°C to +85°C.	Pass
5.3.2.3	Group III electrical equipment		
5.3.2.3.1	Maximum surface temperature determined without a dust layer	The equipment is intended for Group II.	N / A
5.3.2.3.2	Maximum surface temperature with respect to dust layers	Refer to 5.3.2.3.1.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
5.3.3	Small component temperature for Group I or Group II electrical equipment	Not applicable as the equipment is not considered a small component.	N / A
6	REQUIREMENTS FOR ALL ELECTRICAL EQUIPMENT		
6.1	General	The SGOES Gas Detectors comply with IEC 60079-1 as well as this standard.	Pass
6.2	Mechanical strength of equipment	Mechanical strength per Clause 26.4 is met.	Pass
6.3	Opening times	The housing is marked with the following warning: "DO NOT SEPARATE WHEN ENERGIZED".	Pass
6.4	Circulating currents	The bonding facilities of the apparatus consist of internal and external, steel press-fit terminals. The internal terminal consists of a M10 screw, a flat washer and spring washer secured to a base which is press-fit to the inside of the cover. The external terminal consists of two flat washers, a spring washer and a M6 nut secured to a M6 stud which is press-fit into the side of cover.	Pass
6.5	Gasket retention	The o-rings provided on the flanged portions of the cover joints are secured in an o-ring groove on each end of the housing for proper assembly.	Pass
6.6	Electromagnetic and ultrasonic energy radiating equipment	This clause contains no requirements.	N / A
6.6.1	Radio frequency sources	The equipment does not contain sources of this type of energy.	N / A
6.6.2	Lasers or other continuous wave sources	The infrared (IR) light source used in the SGOES Gas Detectors has a specified output radiation power of 0.01 mW/mm ² . This value is significantly less than the maximum permitted 5 mW/mm ² according to IEC 60079-28 for Group IIC Gb equipment.	Pass
6.6.3	Ultrasonic sources	The equipment does not contain sources of this type of energy.	N / A
7	NON-METALLIC ENCLOSURES AND NON-METALLIC PARTS OF ENCLOSURES		
7.1	General		
7.1.1	Applicability	The equipment does not include any non-metallic enclosure parts except for the cement and glass materials used in the construction of the window cover.	Pass
7.1.2	Specification of materials	The cement and window materials are specified in the documents according to Clause 24.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.3	Plastic materials	Refer to 7.1.1.	Pass
7.1.4	Elastomeric materials	Refer to 7.1.1.	Pass
7.2	Thermal endurance		
7.2.1	Tests for thermal endurance	The cemented window cover was subjected to the thermal endurance tests according to Clauses 26.8 and 26.9.	Pass
7.2.2	Material selection	The cement material has a temperature index of +120°C which is greater than 20K above the maximum surface temperature of 94°C.	Pass
7.3	Resistance to light	Refer to 7.1.1.	N / A
7.4	Electrostatic charges on external non-metallic materials		
7.4.1	Applicability	Refer to 7.4.2.	Pass
7.4.2	Avoidance of a build-up of electrostatic charge on Group I or Group II electrical equipment	The approximate window area of 52 mm ² is significantly less than the allowed 8000 mm ² for Group IIC, Zone 1 as the window is surrounded by conductive earthed metal.	Pass
7.4.3	Avoidance of a build-up of electrostatic charge on equipment for Group III	The equipment is intended for Group II.	N / A
7.5	Threaded holes	Refer to 7.1.1.	N / A
8	METALLIC ENCLOSURES AND METALLIC PARTS OF ENCLOSURES		
8.1	Material Composition	The manufacturer's documents according to Clause 24 provide the material specifications of the enclosure and/or its parts.	Pass
8.1.1	Group I	The equipment is intended for Group II.	N / A
8.1.2	Group II	The aluminium used in the construction of the enclosure does not contain, by weight, more than 7.5% magnesium and titanium.	Pass
8.1.3	Group III	The equipment is intended for Group II.	N / A
8.2	Threaded Holes	The threaded holes in the enclosure for fasteners are tapped with a thread form that is compatible with the material used for the enclosure.	Pass
9	FASTENERS		
9.1	General	Stainless steel M5 screws used to secure the enclosure covers to prevent access to uninsulated live parts are only removable with the aid of a tool.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
9.2	Special fasteners	The M5-6g hexagon socket-head cap screws used to secure the enclosure covers require the use of a tool for removal. When the cap screws are fully engaged, the head of the screws are shrouded. The holes for these special fasteners comply with Clause 9.3.	Pass
9.3	Holes for special fasteners	This clause contains no requirements.	N / A
9.3.1	Thread engagement	The holes intended to accept the M5 fasteners have a thread engagement that is at least equal to the major diameter of the thread of the fastener.	Pass
9.3.2	Tolerance and clearance	The thread is of tolerance class 6H and the hole under the fastener head complies with a tolerance class of H13.	Pass
9.3.3	Hexagon socket set screw	Not applicable as the fasteners are not set screws.	N / A
10	INTERLOCKING DEVICES	The equipment contains no interlocking devices.	N / A
11	BUSHINGS	The equipment contains no bushings.	N / A
12	MATERIALS USED FOR CEMENTING	<p>The manufacturer's documentation, according to Clause 24, specifies the suitability of the cement material for use within the stated temperature limits of the equipment.</p> <p>The glass window is cemented in the enclosure cover with Anlaes' Epoxi Exclusive. This joint has a minimum design length of 10mm.</p> <p>The cemented joint was subjected to the thermal endurance to heat and cold tests as described in 26.8 and 26.9 of IEC 60079-0.</p> <p>The cement material has a temperature index of +120°C which is greater than 20K above the maximum surface temperature of 94°C.</p>	Pass
13	EX COMPONENTS		
13.1	General	The equipment contains no Ex components.	N / A
13.2	Mounting	Refer to 13.1.	N / A
13.3	Internal Mounting	Refer to 13.1.	N / A
13.4	External Mounting	Refer to 13.1.	N / A
14	CONNECTION FACILITIES AND TERMINAL COMPARTMENTS		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
14.1	General	The equipment contains internal connection facilities.	Pass
14.2	Termination compartment	The enclosure and access openings are dimensioned so that conductors can be readily connected.	Pass
14.3	Type of protection	The enclosure complies with IEC 60079-1 as Ex d.	Pass
14.4	Creepage and clearance	Not applicable as there are no creepage or clearance distances specified in IEC 60079-1.	N / A
15	CONNECTION FACILITIES FOR EARTHING OR BONDING CONDUCTORS		
15.1	Equipment requiring earthing	This clause contains no requirements.	N / A
15.1.1	Internal	A steel press-fit terminal is located and properly identified on the inside of the terminal cover. The terminal consists of a M10 screw, a flat washer and a spring washer.	Pass
15.1.2	External	A steel press-fit terminal is located and properly identified on the exterior of the terminal cover. The terminal consists of a M6 stud, two flat washers, a spring washer, and a nut.	Pass
15.2	Equipment not requiring earthing	Earthing is necessary for the equipment.	N / A
15.3	Size of conductor connection	Both the internal and external earth terminals are suitable for connection of a 4 mm ² conductor.	Pass
15.4	Protection against corrosion	The steel press-fit terminal located on the exterior of the terminal cover provides suitable protection against corrosion.	Pass
15.5	Secureness of electrical connections	The external press-fit terminal consisting of an M6 stud, two flat washers, spring washer and nut provides suitable protection against loosening and twisting.	Pass
16	ENTRIES INTO ENCLOSURES		
16.1	General	The manufacturer specifies one ½ inch-14 NPT entry intended for use with cable or conduit.	Pass
16.2	Identification of entries	The ½ inch-14 NPT entry is identified in the manufacturer's installation instructions.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
16.3	Cable glands	Not applicable as cable glands are not provided.	N / A
16.4	Blanking elements	Not applicable as the equipment contains one entry and therefore will have no unused entries after installation.	N / A
16.5	Temperature at branching point and entry point	The manufacturer's installation instructions contain the statement: "Supply connection wiring shall be rated at least 20°C above the rated ambient temperature of 85°C."	Pass
16.6	Electrostatic charges of cable sheaths	This clause contains no requirements.	N / A
17	SUPPLEMENTARY REQUIREMENTS FOR ROTATING ELECTRICAL MACHINES		
17.1	Fans and fan hoods	The equipment contains no fans or fan hoods.	N / A
17.2	Ventilation openings for external fans	Refer to 17.1.	N / A
17.3	Construction and mounting of the ventilation systems	Refer to 17.1.	N / A
17.4	Clearances for the ventilating systems	Refer to 17.1.	N / A
17.5	Materials for external fans and fan hoods	Refer to 17.1.	N / A
17.6	Equipotential bonding conductors	Refer to 17.1.	N / A
18	SUPPLEMENTARY REQUIREMENTS FOR SWITCHGEAR		
18.1	Flammable dielectric	The equipment is not switchgear.	N / A
18.2	Disconnectors	Refer to 18.1.	N / A
18.3	Group I – Provisions for locking	Refer to 18.1.	N / A
18.4	Doors and covers	Refer to 18.1.	N / A
19	SUPPLEMENTARY REQUIREMENTS FOR FUSES	The equipment contains no fuses.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
20	SUPPLEMENTARY REQUIREMENTS FOR PLUGS, SOCKETS OUTLETS AND CONNECTORS		
20.1	Interlocking	The equipment is neither a plug nor a socket.	N / A
20.1.1	Explosive gas atmospheres	Refer to 20.1.	N / A
20.1.2	Explosive dust atmospheres	Refer to 20.1.	N / A
20.2	Energized plugs	Refer to 20.1.	N / A
21	SUPPLEMENTARY REQUIREMENTS FOR LUMINAIRES		
21.1	General	The equipment is not a luminaire.	N / A
21.2	Covers for luminaires of EPL Gb or EPL Db	Refer to 21.1.	N / A
21.3	Covers for luminaires of EPL Gc or EPL Dc	Refer to 21.1.	N / A
21.4	Special lamps	Refer to 21.1.	N / A
22	SUPPLEMENTARY REQUIREMENTS FOR CAPLIGHTS AND HANDLIGHTS		
22.1	Group I caplights	The equipment is intended for Group II.	N / A
22.2	Group II and Group II caplights and handlights	The equipment is not a caplight, caplamp, or handlamp.	N / A
23	APPARATUS INCORPORATING CELLS AND BATTERIES		
23.1	General	The equipment contains no cells or batteries.	N / A
23.2	Batteries	Refer to 23.1.	N / A
23.3	Cell types	Refer to 23.1.	N / A
23.4	Cells in a battery	Refer to 23.1.	N / A
23.5	Ratings of batteries	Refer to 23.1.	N / A
23.6	Interchangeability	Refer to 23.1.	N / A
23.7	Charging of primary batteries	Refer to 23.1.	N / A
23.8	Leakage	Refer to 23.1.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
23.9	Connections	Refer to 23.1.	N / A
23.10	Orientation	Refer to 23.1.	N / A
23.11	Replacement of cells or batteries	Refer to 23.1.	N / A
23.12	Replaceable battery pack	Refer to 23.1.	N / A
24	DOCUMENTATION	Documentation is provided that details the compliance of the apparatus.	Pass
25	COMPLIANCE OF PROTOTYPE OR SAMPLE WITH DOCUMENTS	The samples of the apparatus submitted by the manufacturer complied with the definitive documents referred to in Clause 24.	Pass
26	TYPE TESTS		
26.1	General	All the required tests have been addressed. Where tests have been waived, full justification has been given.	Pass
26.2	Test configuration	Each test on the equipment test samples was conducted under the conditions considered to be the most unfavourable.	Pass
26.3	Tests in explosive test mixtures	The required tests from IEC 60079-1 have been addressed. See IEC 60079-1 assessment.	Pass
26.4	Tests of enclosures		
26.4.1	Order of tests		
26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass of parts of enclosures	Tests on the enclosure were conducted in the order as per this clause.	Pass
26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures	This clause contains no requirements.	N / A
26.4.1.2.1	Group I electrical equipment	The equipment is intended for Group II.	N / A
26.4.1.2.2	Group II and Group III electrical equipment	The apparatus contains no non-metallic enclosure parts except for the cement and glass used in the construction of the window cover.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.4.2	Resistance to impact	Various areas of the equipment, including the window guards, satisfied the 7 Joule impact test with the hardened steel tip under FM Approvals Project ID 3029728. As the window openings are less than 625 mm ² , only the window guards of three separate samples were subjected to the 7 Joule impact test. In addition, two cemented window covers satisfied the 7 Joule impact tests with the hardened steel tip following the thermal endurance to heat and cold tests; the impact sites were to the face of the cover, adjacent to the window and perpendicular to the outside rim.	Pass
26.4.3	Drop test	The equipment is not handheld or portable.	N / A
26.4.4	Acceptance criteria	The impact tests did not produce damage that would invalidate the type of protection of the apparatus.	Pass
26.4.5	Degree of protection (IP) by enclosures		
26.4.5.1	Test procedure	The applicable tests for IP66 were conducted under FM Approvals project ID 3029728. Refer to Appendix A of this report for test details.	Pass
26.4.5.2	Acceptance criteria	The acceptance criteria were in accordance with IEC 60529.	Pass

26.5	Thermal tests		
26.5.1	Temperature measurement		
26.5.1.1	General	Surface temperature testing was conducted under FM Approvals project ID 3029728. The testing revealed a 4K temperature rise above ambient. When linearly compensated for an ambient temperature of +85°C and including a +5K correction factor, the maximum surface temperature was determined to be +94°C. This temperature was found to be well within the manufacturer's requested temperature class marking of T4.	Pass
26.5.1.2	Service temperature	For the purpose of this evaluation, the maximum surface temperature was considered as the maximum service temperature.	Pass
26.5.1.3	Maximum surface temperature	Refer to 26.5.1.1.	Pass
26.5.2	Thermal shock test	The external surface of the apparatus was heated to a temperature of 121°C and then subjected to a 1mm stream of 10+/-5°C water sprayed at the light transmitting part. The test did not produce damage invalidating the type of protection.	Pass
26.5.3	Small component ignition test (Group I and Group II)		
26.5.3.1	General	The equipment is not a small component.	N / A
26.5.3.2	Procedure	Refer to 26.5.3.1.	N / A
26.5.3.3	Acceptance criteria	Refer to 26.5.3.1.	N / A

26.6	Torque test for bushings		
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IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.6.1	Test procedure	The equipment contains no bushings.	N / A
26.6.2	Acceptance criteria	Refer to 26.6.1.	N / A
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.7.1	General	The apparatus contains no non-metallic enclosure parts except for the cement and glass materials used in the construction of the window cover.	N / A
26.7.2	Test temperatures	Refer to 26.7.1.	N / A
26.8	Thermal endurance to heat	Samples of the housing window cover were subjected to continuous storage for 2 weeks at 95°C and 90%RH followed by 2 weeks in an air oven at 120°C.	Pass
26.9	Thermal endurance to cold	Following the thermal endurance to heat, the samples of the housing window cover were subjected to continuous storage for 24 hours between -45°C to -50°C.	Pass
26.10	Resistance to light		
26.10.1	Test procedure	Refer to 26.7.1.	N / A
26.10.2	Acceptance criteria	Refer to 26.7.1.	N / A
26.11	Resistance to chemical agents for Group I electrical equipment	The equipment is intended for Group II.	N / A
26.12	Earth continuity	Refer to 26.7.1.	N / A
26.13	Surface resistance test of parts of parts of enclosures of non-metallic materials	Not applicable as the inspection window area is less than the maximum allowed area. Refer to 7.4.2.	N / A
26.14	Charging tests		
26.14.1	Introduction	Refer to 26.7.1.	N / A
26.14.2	Principle of the test	Refer to 26.7.1.	N / A
26.14.3	Samples and test apparatus	Refer to 26.7.1.	N / A
26.14.4	Ambient conditions	Refer to 26.7.1.	N / A
26.14.5	Conditioning	Refer to 26.7.1.	N / A
26.14.6	Determination of the most efficient charging method		
26.14.6.1	Method A: Rubbing with a pure polyamide cloth	Refer to 26.7.1.	N / A
26.14.6.2	Method B: Rubbing with a cotton cloth	Refer to 26.7.1.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.14.6.3	Method C: Charging by influence with a d.c. high-voltage power supply	Refer to 26.7.1.	N / A
26.14.7	Assessment of discharge	Refer to 26.7.1.	N / A
26.15	Measurement of capacitance		
26.15.1	Test procedure	Refer to 26.7.1.	N / A
26.15.2	Acceptance criteria	Refer to 26.7.1.	N / A
27	Routine tests	Routine testing of the equipment is not required.	N / A
28	MANUFACTURER'S RESPONSIBILITY		
28.1	Conformity with the documentation	The manufacturer shall include within his quality system the verification and tests necessary to ensure compliance of the electrical equipment with the documentation.	Pass
28.2	Certificate	FM Approvals LLC is to issue an IECEx Certificate confirming the equipment is in conformity with the requirements of the applicable standards.	Pass
28.3	Responsibility for marking	The manufacturer's responsibility will be indicated by placing the relevant marking on the product. By marking the electrical apparatus, the manufacturer attests that the electrical apparatus has been constructed in accordance with the applicable requirements of the relevant standards and the routine verification and tests have been successfully completed and that the product complies with the documentation.	Pass
29	MARKING	The manufacturer shall assure that the marking system indicated in this clause are only applied to electrical equipment which comply with IEC 60079-0 and IEC 60079-1.	Pass
29.1	Location	A stainless steel nameplate is permanently attached to the equipment housing by mechanical means.	Pass
29.2	General	The following marking information is included on the manufacturer's marking plate: a) The name of the manufacturer, Electronstandart-pribor. b) The manufacturer's type identification. c) A serial number. d) Certificate reference number IECEx FMG 08.0011. f) Refer to 29.3 for the specific Ex marking for explosive gas atmospheres. g) IP66 marking.	

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
29.3	Ex marking for explosive gas atmospheres	The following Ex marking information is included on the manufacturer's marking plate: a) The symbol Ex. b) The symbol for the type of protection, d. c) The symbol of the Group, IIC. d) The temperature class, T4 Ta = -40°C to +85°C. e) The equipment protection level, Gb. The markings a) to e) are placed in the order per this clause and each separated by a small space.	
29.4	Ex marking for explosive dust atmospheres	The equipment is intended for explosive gas atmospheres.	N / A
29.5	Combined types of protection	The equipment does not contain different parts employing different types of protection.	N / A
29.6	Multiple types of protection	The equipment does not use multiple types of protection.	N / A
29.7	Ga using two independent Gb types of protection	The equipment does not use two Gb types of protection to achieve EPL Ga.	N / A
29.8	Ex components	The equipment is not an Ex component.	N / A
29.9	Small equipment and small Ex components	The equipment is not a small Ex component or considered small equipment.	N / A
29.10	Extremely small equipment and extremely small Ex components	The equipment is not an extremely small Ex component or considered extremely small equipment.	N / A
29.11	Warning markings	The housing is marked with the following warning: "DO NOT SEPARATE WHEN ENERGIZED".	Pass
29.12	Alternate marking of equipment protection levels (EPLs)	For clarity, alternate marking is not used.	N / A
29.12.1	Alternate marking of type of protection for explosive gas atmospheres	Refer to 29.12.	N / A
29.12.2	Alternate marking of type of protection for explosive dust atmospheres	The equipment is intended for explosive gas atmospheres.	N / A
29.13	Cells and batteries	The equipment contains no cells or batteries.	N / A
30	INSTRUCTIONS		

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
30.1	General	The manufacturer's instructions contain all pertinent information required in this clause including a recapitulation of the marking information and a listing of the standards and dates with which the apparatus is declared to comply.	Pass
30.2	Cells and batteries	The equipment contains no cells or batteries.	N / A
Annex A (Normative)	SUPPLEMENTARY REQUIREMENTS FOR CABLE GLANDS		
A.1	General	Cable glands are not included with the equipment.	N / A
A.2	Constructional requirements		
A.2.1	Cable sealing	Refer to A.1.	N / A
A.2.2	Filling compounds	Refer to A.1.	N / A
A.2.3	Clamping		
A.2.3.1	General	Refer to A.1.	N / A
A.2.3.2	Group II or Group III cable glands	Refer to A.1.	N / A
A.2.4	Lead-in of cable		
A.2.4.1	Sharp edges	Refer to A.1.	N / A
A.2.4.2	Point of entry	Refer to A.1.	N / A
A.2.5	Released by a tool	Refer to A.1.	N / A
A.2.6	Fixing	Refer to A.1.	N / A
A.2.7	Degree of protection	Refer to A.1.	N / A
A.3	Type tests		
A.3.1	Tests of clamping of non-armoured and braided cables		
A.3.1.1	Cable glands with clamping by the sealing ring	Refer to A.1.	N / A
A.3.1.2	Cable glands with clamping by the filling compound	Refer to A.1.	N / A
A.3.1.3	Cable glands with clamping by means of a clamping device	Refer to A.1.	N / A
A.3.1.4	Tensile test	Refer to A.1.	N / A
A.3.1.5	Mechanical strength	Refer to A.1.	N / A
A.3.2	Tests of clamping of armoured cables		
A.3.2.1	Tests of clamping where the armourings are clamped by a device within the gland	Refer to A.1.	N / A
A.3.2.1.1	Tensile test	Refer to A.1.	N / A
A.3.2.1.2	Mechanical strength	Refer to A.1.	N / A
A.3.2.2	Tests of clamping where the armourings are not clamped by a device within the gland	Refer to A.1.	N / A
A.3.3	Type test for resistance to impact	Refer to A.1.	N / A

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
A.3.4	Test for degree of protection (IP) of cable glands	Refer to A.1.	N / A
A.4	Marking		
A.4.1	Marking of cable glands	Refer to A.1.	N / A
A.4.2	Marking of cable sealing rings	Refer to A.1.	N / A
Annex B (Normative)	Table B.1 – Clauses with which Ex components shall comply		N / A

APPENDIX A

Verification of Compliance to IEC 60529:2001 - The following tests verified the IP66 rating for the SGOES Gas Detector housing. The testing and evaluation described below was conducted under FM Approvals Project ID 3029728.

Dust Exclusion Test (IP6X) - An SGOES Gas Analyzer housing sample was suspended in a circulating dust atmosphere of 200 mesh talc. The sample was connected to a vacuum pump adjusted to draw a vacuum of 20 mBar on the sample. The test lasted a total of 8 hours. At the conclusion of the test, the sample was removed from the test chamber, excess dust was removed from the surface and opened. Results are satisfactory as the enclosure was found to have excluded the entry of dust.

Water Hosedown Test (IPX6) - The complete sample was subjected to a stream of water from a hose with a ½ inch (12.5mm) nozzle that delivers at least 26.4 gallons (100 liters) per minute. The stream of water was directed at the sample from all sides from a distance of 8.2 to 9.8 feet (2.5 to 3.0 meters) for 3 minutes. At the conclusion of the test, the enclosure was opened and inspected. The sample had excluded the entry of water. This is satisfactory.



IECEX TEST REPORT
IEC 60079-1
Explosive atmospheres - Part 1:
Equipment protection by flameproof enclosures "d"

ExTR Reference Number.....: US/FMG/ExTR08.0019/00
 ExTR Free Reference Number: Project ID 3034056
 Complied by + signature (ExTL).....: Marlon Mitchell
 Reviewed by + signature (ExTL).....: Andrew Lozinski
 Date of issue: 6 April 2009

Ex Testing Laboratory (ExTL).....: FM Approvals LLC
 Address.....: 1151 Boston-Providence Turnpike, Norwood, MA 02062, USA

Applicant's name.....: Electronstandart-pribor
 Address.....: No. 35/2, Slavy Avenue, Saint Petersburg 192286
 Russian Federation

Standard.....: IEC 60079-1:2007, Sixth edition
 Test procedure.....: IECEX Scheme
 Test Report Form No.: ExTR60079-1_6A
 TRF Originator: FM Approvals LLC
 Master TRF: dated 2007-05

Instructions for Intended Use of Ex Test Report:
 This ExTR blank document is to be compiled and reviewed by the ExTL. The ExTR package in which this ExTR is incorporated (comprised of a single ExTR document or multiple ExTR documents) is to be accompanied by a single ExTR Cover Sheet, which is to be approved by the ExCB. IECEX Test Report Addendum(s) and/or IECEX Test Report of National Differences may also supplement this ExTR.

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Possible test case verdicts:
 - test case does not apply to the test object:N / A
 - test object does meet the requirement:Pass

General remarks:
 The tests results presented in this report relate only to the object tested.
 This report shall not be reproduced except in full without the written approval of the testing laboratory.
 "(see Attachment #)" refers to additional information appended to the report.
 "(see Appended table)" refers to a table appended to the report.
 Throughout this report, a point is used as the decimal separator.

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
1	SCOPE		
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
4	EQUIPMENT GROUPING AND TEMPERATURE CLASSIFICATION	The apparatus is intended for Group IIC with a temperature classification of T4 Ta = -40°C to +85°C.	Pass
5	FLAMEPROOF JOINTS		
5.1	General requirements	The flameproof joints of apparatus comply with the requirements of Clause 5 as outlined in Clause 5.2 and 5.3 below.	Pass
5.2	Non-threaded joints		
5.2.1	Width of joints (<i>L</i>)	The joint width between the covers and enclosure comply with Table 2 as the cylindrical joint width is 14.9 mm for apparatus enclosure volume of 374 cm ³ . This complies for Group IIC as the joint width is at least 12.5 mm and the gap does not exceed 0.15 mm for an enclosure volume not exceeding 500 cm ³ . This joint is identical to that which was previously tested and evaluated under FM Approvals Project ID 3031854.	Pass
5.2.2	Gap (<i>i</i>)	The joint gap between the covers and enclosure comply with Table 2 as the cylindrical joint gap is 0.095 mm for the apparatus enclosure volume of 374 cm ³ . This complies for Group IIC as the joint gap does not exceed 0.15 mm for a joint width of at least 12.5 mm and for an enclosure volume not exceeding 500 cm ³ . This joint is identical to that which was previously tested and evaluated under FM Approvals Project ID 3031854. During non-transmission testing, the cylindrical gap was increased to at least 0.1425 mm which is 150% of the maximum design value.	Pass
5.2.3	Spigot joints	Only the cylindrical part of the spigot joints between the covers and enclosure were taken into account per Figure 2b.	Pass
5.2.4	Holes in joint surfaces	The equipment contains no holes in joint surfaces.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
5.2.4.1	Flanged joints with holes outside the enclosure (see Figures 3 and 5)	Refer to 5.2.4.	N / A
5.2.4.2	Flanged joints with holes inside the enclosure (see Figure 4)	Refer to 5.2.4.	N / A
5.2.4.3	Spigot joints where, to the edges of the holes, the joint consists of a cylindrical part and a plane part (see Figure 6)	Refer to 5.2.4.	N / A
5.2.4.4	Spigot joints where, to the edges of the holes, the joint consists only of the plane part (see Figures 7 and 8), in so far as plane joints are permitted (see 5.2.7)	Refer to 5.2.4.	N / A
5.2.5	Conical joints	The equipment contains no conical joints.	N / A
5.2.6	Joints with partial cylindrical surfaces (not permitted for Group IIC)	The equipment contains no partial cylindrical surfaces.	N / A
5.2.7	Flanged joints for acetylene atmospheres	The equipment contains no flanged joints.	N / A
5.2.8	Serrated joints	The equipment contains no serrated joints.	N / A
5.3	Threaded joints	The ½ inch-14 NPT entry meets the requirements of Table 4 with a 13.5 mm axial thread length, 1.8 mm pitch and 7.5 threads provided. The manufacturer's specified L-1 gauging of +1/2 to +2 turns is within the required L-1 gauging of 0 to +2 turns.	Pass
5.4	Gaskets (including O-rings)	O-rings are provided between the covers and enclosure. The o-rings provide sealing for outdoor protection and are not included in the flamepath joint construction.	Pass
5.5	Equipment using capillaries	The equipment contains no capillaries.	N / A
6	CEMENTED JOINTS		
6.1	General	<p>The glass window is cemented in the enclosure cover with Anlaes' Epoxi Exclusive. This joint has a minimum design length of 10 mm.</p> <p>The cemented joint was subjected to the thermal endurance to heat and cold tests as described in 26.8 and 26.9 of IEC 60079-0.</p> <p>The cement material has a temperature index of +120°C which is greater than 20K above the maximum surface temperature of 94°C.</p>	Pass

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.2	Mechanical strength	Following the tests for thermal endurance to heat and cold, the equipment was subjected to the overpressure test as described in 15.1.3.	Pass
6.3	Width of cemented joints	The width of the cemented joint meets the required minimum of 10 mm for an enclosure with volume of 374 cm ³ .	Pass
7	OPERATING RODS		
7.1	Diameter of operating rod	The equipment contains no operating rods.	N / A
7.2	Diametrical clearance	Refer to 7.1.	N / A
8	SUPPLEMENTARY REQUIREMENTS FOR SHAFTS AND BEARINGS		
8.1	Joints of shafts	The equipment contains no shafts or bearings.	N / A
8.1.1	Cylindrical joints	Refer to 8.1.	N / A
8.1.2	Labyrinth joints	Refer to 8.1.	N / A
8.1.3	Joints with floating glands	Refer to 8.1.	N / A
8.2	Bearings		
8.2.1	Sleeve Bearings	Refer to 8.1.	N / A
8.2.2	Rolling-element bearings	Refer to 8.1.	N / A
9	LIGHT-TRANSMITTING PARTS	The window on the equipment meets the applicable requirements of IEC 60079-0.	Pass
10	BREATHING AND DRAINING DEVICES WHICH FORM PART OF A FLAMEPROOF ENCLOSURE	The equipment contains no breathing or draining devices.	N / A
10.1	Openings for breathing or draining	Refer to 10.	N / A
10.2	Composition limits	Refer to 10.	N / A
10.3	Dimensions	Refer to 10.	N / A
10.4	Elements with measurable paths	Refer to 10.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
10.5	Elements with non-measurable paths	Refer to 10.	N / A
10.6	Removable devices	Refer to 10.	N / A
10.7	Mounting arrangements of the elements	Refer to 10.	N / A
10.8	Mechanical strength	Refer to 10.	N / A
10.9	Breathing devices and draining devices when used as Ex components	Refer to 10.	N / A
10.9.1	Mounting arrangements of the elements and components	Refer to 10.	N / A
10.9.2	Type tests for breathing and draining devices used as Ex components	Refer to 10.	N / A
10.9.2.1	Test of the ability of the breathing and draining device to withstand pressure		
10.9.2.1.1	Test procedure	Refer to 10.	N / A
10.9.2.1.2	Acceptance criteria	Refer to 10.	N / A
10.9.2.2	Thermal tests	Refer to 10.	N / A
10.9.2.2.1	Test procedure	Refer to 10.	N / A
10.9.2.2.2	Acceptance criteria	Refer to 10.	N / A
10.9.2.3	Test for non-transmission of an internal ignition	Refer to 10.	N / A
10.9.2.3.1	Test procedure	Refer to 10.	N / A
10.9.2.3.2	Acceptance criteria	Refer to 10.	N / A
10.9.3	Ex component certificate	Refer to 10.	N / A
11	FASTENERS, ASSOCIATED HOLES AND CLOSING DEVICES		
11.1	Type of fastener	The M5 hexagon socket-head cap screws used to secure the enclosure covers comply with this clause and IEC 60079-0. When the cap screws are fully engaged, the head of the screws are shrouded.	Pass
11.2	Plastic material or light alloys	The equipment contains no plastic material or light alloys.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
11.3	Yield stress	The steel cap screws used to bolt the covers to the enclosure comply with this clause. A calculation (based on the pressure of 1.5 times the reference explosion pressure obtained in Clause 15.1.2.1) was conducted to determine the actual stress of the bolts used to secure the covers to the enclosure. The calculation found that the stress on the bolts was less than 240 N/mm ² . No special markings are therefore required.	Pass
11.4	Studs	The equipment contains no studs.	N / A
11.5	Fasteners through walls	Fastener holes do not penetrate the flameproof enclosure.	N / A
11.6	Blind holes	The equipment contains no fasteners into blind holes.	N / A
11.7	Screws into blind holes	Refer to 11.6.	N / A
11.8	Closing of through holes	The equipment contains no holes that were drilled through for ease of manufacture.	N / A
11.9	Closure of apertures and compliance of blanking elements	After installation, the equipment contains no unused entries which would require blanking elements.	N / A
11.9.1	Closing device removable from outside	Refer to 11.9.	N / A
11.9.2	Tool used to remove closing device	Refer to 11.9.	N / A
11.9.3	Special removal technique	Refer to 11.9.	N / A
11.9.4	Blanking element used with an adapter	Refer to 11.9.	N / A
11.10	Separate fastening arrangements for threaded doors/covers	The equipment contains no threaded doors or covers.	N / A
12	MATERIALS AND MECHANICAL STRENGTH OF ENCLOSURES – MATERIALS INSIDE THE ENCLOSURES		
12.1	Tests prescribed by Clauses 14 to 16	The equipment complies with the relevant tests in Clauses 14 through 16.	Pass
12.2	Assembly of multiple flameproof enclosures	The equipment consists of one flameproof enclosure.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
12.3	Intercommunicating enclosure compartments	The equipment is designed to take into account the resulting higher stresses that may occur due to the compartmentalized construction.	Pass
12.4	Use of cast iron	Not applicable as the materials used in the construction of the equipment are aluminum alloy and/or stainless steel.	N / A
12.5	Use of liquids	The equipment does not use liquids within the enclosure.	N / A
12.6	Insulating materials for Group I apparatus	The equipment is intended for Group II.	N / A
12.7	Zinc content	The aluminium alloy and stainless steel used in the construction of the flameproof enclosure contains no zinc or zinc alloy.	N / A
13	ENTRIES FOR FLAMEPROOF ENCLOSURES	The housing provides one opening which is satisfactory for connection of cable or conduit. The manufacturer's installation instructions specify the number, type, and location of the enclosure opening.	Pass
13.1	Cable glands	Cable glands are not included with the equipment.	N / A
13.2	Conduit sealing devices	Conduit sealing devices are not included with the equipment.	N / A
13.2.1	Permitted for Group II only	The equipment is intended for Group II and is provided with one conduit entry.	Pass
13.2.2	Requirements for sealing device	Refer to 13.2.	N / A
13.3	Plugs and sockets and cable couplers		
13.3.1	Construction & mounting	The equipment contains no plugs, sockets, or cable couplers.	N / A
13.3.2	Flameproof joints of contact parts	Refer to 13.3.1.	N / A
13.3.3	Flameproof properties in the event of internal explosion	Refer to 13.3.1.	N / A
13.3.4	Exemption & warning label	Refer to 13.3.1.	N / A
13.4	Bushings	The equipment contains no bushings.	N / A
14	VERIFICATION AND TESTS	In addition to compliance with this standard, the equipment also complies with IEC 60079-0.	Pass

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
15	TYPE TESTS	The tests were conducted in the sequence defined in this clause. Testing of the equipment was conducted under the conditions considered to be most severe.	Pass
15.1	Tests of ability of the enclosure to withstand pressure		
15.1.1	General	At the conclusion of the tests in Clause 15.1.2 and 15.1.3, the equipment was examined and it was determined that no permanent deformation or damage had occurred.	Pass
15.1.2	Determination of explosion pressure (reference pressure)	Explosion pressure testing was conducted at -40°C with all internal components and o-rings in place.	Pass
15.1.2.1	Test procedure	One series of ten tests was performed on the sample at -40°C. The gas inlet connection was located in the side of the enclosure while the gas outlet connection was located in the conduit entry. Pressures were recorded in the side of the enclosure in three places. The o-rings between the covers and enclosure were installed and all joints were fully engaged. The tests consisted of igniting mixtures of 31% hydrogen and 14% acetylene, by volume in air. The tests were conducted five times for each gas concentration. Ignition was initiated by a spark plug installed at the gas outlet connection. The highest ignition pressure recorded was 171 psi (1180 kPa) at a gas concentration of 14% acetylene.	Pass
15.1.2.2	Rotating electrical machines	The equipment is not a rotating electrical machine.	N / A
15.1.2.3	Pressure-piling	The tests were made five times for each gas concentration.	Pass
15.1.2.4	Apparatus intended for use in a single gas	The equipment is not intended for use in a single specified gas.	N / A
15.1.3	Overpressure test	An overpressure test was satisfactorily performed on samples of the housing with window covers at a pressure of 685 psi (4720 kPa) for a ten second duration with no signs of permanent deformation. The 685 psi (4720 kPa) overpressure test value is at least 4 times the maximum explosion reference pressure value that was obtained in 15.1.2.	Pass
15.1.3.1	Overpressure test - First method (static)	The test procedure described in this clause was the method used. See remarks for Clause 15.1.3.	Pass
15.1.3.2	Overpressure test - second method (dynamic)	Refer to 15.1.3.1.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
15.2	Test for non-transmission of an internal ignition	The test sample previously subjected to the overpressure test in Clause 15.1.3 was subjected to the test for non-transmission. All o-rings were removed. The flanged portion of the spigot joints were enlarged to at least 0.3 mm for Group IIC. Tests were conducted at +85°C.	Pass
15.2.1	Electrical equipment of groups I, IIA and IIB		
15.2.1.1	Test gap and test gas	The equipment is intended for Group IIC.	N / A
15.2.1.2	Increasing of gaps for test	Refer to 15.2.1.1.	N / A
15.2.1.3	Number of tests and acceptance criterion	Refer to 15.2.1.1.	N / A
15.2.2	Electrical apparatus of group IIC	This clause contains no requirements.	N / A
15.2.2.1	First method	Group IIC non-transmission of internal ignition testing was satisfactorily performed on the apparatus. The cylindrical joints were successfully tested and evaluated under FM Approvals Project ID 3031854 with modifications as follows: one of the cylindrical gaps between the cover and enclosure was enlarged to within 1.35 and 1.5 times the maximum design value of 0.095 mm. The cemented window joint was successfully tested and evaluated under FM Approvals Project ID 3034056 for this program. In both cases, one series of ten tests was performed on the sample at +85°C. The tests consisted of igniting mixtures of 27.5% hydrogen and 7.5% acetylene, by volume in air. The tests were conducted five times for each gas concentration. Ignition was initiated by a spark plug installed at the gas outlet connection in the conduit entry of the equipment.	Pass
15.2.2.2	Second method	Refer to 15.2.2.1.	N / A
15.2.2.3	Single constructions	The equipment is not a single construction.	N / A
15.3	(Reserved for future use)		
15.4	Tests of flameproof enclosures with breathing and draining devices	The equipment contains no breathing or draining devices.	N / A
15.4.1	Tests of ability of the enclosure to withstand pressure	Refer to 15.4.	N / A
15.4.1.1	Replacement of breathing and draining devices	Refer to 15.4.	N / A
15.4.1.2	Over pressure test	Refer to 15.4.	N / A
15.4.2	Thermal tests		

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
15.4.2.1	Test procedure	Refer to 15.4.	N / A
15.4.2.2	Acceptance criterion	Refer to 15.4.	N / A
15.4.3	Tests for non-transmission of an internal ignition	Refer to 15.4.	N / A
15.4.3.1	Test procedure	Refer to 15.4.	N / A
15.4.3.2	Non-transmission test for breathing and draining devices	Refer to 15.4.	N / A
15.4.3.2.1	Method A	Refer to 15.4.	N / A
15.4.3.2.2	Method B	Refer to 15.4.	N / A
15.4.3.3	Acceptance criterion	Refer to 15.4.	N / A
16	ROUTINE TESTS		
16.1	General	No routine overpressure tests are required as the apparatus satisfactorily passed the four times overpressure test for exemption of the routine test.	N / A
16.1.1	Routine overpressure test – first method	Refer to 16.1.	N / A
16.1.2	Routine test – second method	Refer to 16.1.	N / A
16.1.3	Routine test – empty enclosure & parts of enclosure	Refer to 16.1.	N / A
16.2	Routine tests – where not required	Refer to 16.1.	N / A
16.3	Routine tests – acceptance criterion	Refer to 16.1.	N / A
17	SWITCHGEAR FOR GROUP I	The equipment is not switchgear and is intended for Group II.	N / A
17.1	Means of isolation	Refer to 17.	N / A
17.1.1	Fitted inside Ex d enclosure	Refer to 17.	N / A
17.1.2	Fitted inside another enclosure	Refer to 17.	N / A
17.1.3	Plug and socket or a cable coupler – Compliance with 13.3	Refer to 17.	N / A
17.2	Doors or covers		
17.2.1	Quick-acting doors or covers	Refer to 17.	N / A
17.2.1.1	Retention of properties	Refer to 17.	N / A
17.2.1.2	Closure of isolator	Refer to 17.	N / A
17.2.2	Doors or covers fixed by screws	Refer to 17.	N / A
17.2.3	Threaded doors or covers	Refer to 17.	N / A
18	LAMP HOLDERS AND LAMP CAPS	The equipment contains no lampholders or lamp caps.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
18.1	Device preventing lamps working loose	Refer to 18.	N / A
18.2	Holders and caps for lamps with cylindrical caps		
18.2.1	Holders and caps for tubular fluorescent lamps	Refer to 18.	N / A
18.2.2	Other holders	Refer to 18.	N / A
18.3	Holders for lamps with threaded caps		
18.3.1	Resistant to corrosion	Refer to 18.	N / A
18.3.2	Contact separation	Refer to 18.	N / A
18.3.3	E26/E27 and E39/E40 threaded lampholders	Refer to 18.	N / A
19	NON-METALLIC ENCLOSURES AND NON-METALLIC PARTS OF ENCLOSURES	The apparatus contains no non-metallic enclosure parts except for the cement and glass used in the construction of the window cover.	N / A
19.1	(Reserved for future use)		
19.2	Special constructional requirements		
19.2.1	Resistance to tracking and creepage distances on internal surfaces of the enclosure walls	Refer to 19.	N / A
19.3	Supplementary requirements for type tests	Refer to 19.	N / A
19.3.1	Tests for flameproofness		
19.3.1.1	Test procedure	Refer to 19.	N / A
19.3.1.2	Tests of ability of the enclosure to withstand pressure	Refer to 19.	N / A
19.3.1.3	Test of erosion by flame	Refer to 19.	N / A
19.3.1.4	Test for non-transmission of an internal ignition	Refer to 19.	N / A
19.3.2	Flammability	Refer to 19.	N / A
20	MARKING		
20.1	General	The equipment is marked in accordance with IEC 60079-0.	Pass
20.2	Caution and warning markings	The housing is marked with the following warning: "DO NOT SEPARATE WHEN ENERGIZED".	Pass

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
20.3	Informative markings	This clause contains examples of informative markings.	N / A

Annex A (Normative)	ADDITIONAL REQUIREMENTS FOR CRIMPED RIBBON ELEMENTS AND MULTIPLE SCREEN ELEMENTS OF BREATHING AND DRAINING DEVICES		
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A.1	Crimped ribbon and multiple screen elements	The equipment contains no crimped element or multiple screen elements of breathing and draining devices.	N / A
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A.2	Path dimensions	Refer to A.1.	N / A
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A.3	Annex B requirements	Refer to A.1.	N / A
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A.4	Type tests	Refer to A.1.	N / A
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Annex B (Normative)	ADDITIONAL REQUIREMENTS FOR ELEMENTS, WITH NON-MEASURABLE PATHS, OF BREATHING AND DRAINING DEVICES		
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B.1	Sintered metal elements		
B.1.1	Construction	The equipment contains no elements with non-measurable paths of breathing and draining devices.	N / A
B.1.2	Bubble test pore size	Refer to B.1.1.	N / A
B.1.3	Density	Refer to B.1.1.	N / A
B.1.4	Open porosity and/or fluid permeability	Refer to B.1.1.	N / A
B.1.5	Identification	Refer to B.1.1.	N / A

B.2	Pressed metal wire elements		
B.2.1	Construction	Refer to B.1.1.	N / A
B.2.2	Specifications	Refer to B.1.1.	N / A
B.2.3	Bubble test pore size	Refer to B.1.1.	N / A
B.2.4	Density	Refer to B.1.1.	N / A
B.2.5	Open porosity and or fluid permeability	Refer to B.1.1.	N / A
B.2.6	Identification	Refer to B.1.1.	N / A

B.3	Metal foam elements		
B.3.1	Construction	Refer to B.1.1.	N / A
B.3.2	Chromium content	Refer to B.1.1.	N / A
B.3.3	Bubble test pore size	Refer to B.1.1.	N / A
B.3.4	Density	Refer to B.1.1.	N / A
B.3.5	Open porosity and/or fluid permeability	Refer to B.1.1.	N / A

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Clause	Requirement – Test	Result – Remark	Verdict
B.3.6	Identification	Refer to B.1.1.	N / A

Annex C (Normative)	ADDITIONAL REQUIREMENTS FOR FLAMEPROOF ENTRY DEVICES		
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C.1	General	The equipment does not include cable glands, conduit sealing devices, Ex blanking elements, Ex thread adaptors, or bushings.	N / A
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C.2	Constructional requirements		
C.2.1	Sealing methods		
C.2.1.1	Cable glands with elastomeric sealing rings		
C.2.1.1.1	Minimum uncompressed axial height	Refer to C.1.	N / A
C.2.1.1.2	Cable glands with only one specific elastomeric sealing ring	Refer to C.1.	N / A
C.2.1.2	Cable glands sealed with setting compound	Refer to C.1.	N / A
C.2.1.3	Conduit sealing devices with setting compound	Refer to C.1.	N / A
C.2.1.4	Bushings	Refer to C.1.	N / A
C.2.2	Threads	Refer to C.1.	N / A
C.2.3	Constructional requirements for Ex blanking elements		
C.2.3.1	Design requirements	Refer to C.1.	N / A
C.2.3.2	Parallel threads	Refer to C.1.	N / A
C.2.4	Constructional requirements for Ex thread adaptors		
C.2.4.1	Compliance of threads	Refer to C.1.	N / A
C.2.4.2	Threads co-axial	Refer to C.1.	N / A
C.2.4.3	Length and internal volume	Refer to C.1.	N / A

C.3	Type tests		
C.3.1	Sealing test	Refer to C.1.	N / A
C.3.1.1	Cable glands and conduit sealing devices with sealing ring	Refer to C.1.	N / A
C.3.1.2	Cable glands sealed with setting compound	Refer to C.1.	N / A
C.3.1.3	Conduit sealing devices sealed with setting compound	Refer to C.1.	N / A
C.3.2	Test of mechanical strength		
C.3.2.1	Cable glands with a threaded compression element	Refer to C.1.	N / A
C.3.2.2	Cable glands with a compression element fixed by screws	Refer to C.1.	N / A
C3.2.3	Cable glands sealed with setting compound	Refer to C.1.	N / A
C3.2.4	Acceptance criteria	Refer to C.1.	N / A
C.3.3	Type tests for Ex blanking elements		

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Clause	Requirement – Test	Result – Remark	Verdict
C.3.3.1	Torque test	Refer to C.1.	N / A
C.3.3.2	Over-pressure test	Refer to C.1.	N / A
C.3.4	Type tests for Ex thread adapters		
C.3.4.1	Torque test	Refer to C.1.	N / A
C.3.4.2	Impact test	Refer to C.1.	N / A
C.3.4.3	Over-pressure test	Refer to C.1.	N / A

Annex D (Normative)	EMPTY FLAMEPROOF ENCLOSURES AS EX COMPONENTS
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D.1	General
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D.2	Introductory remarks
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D.3	Ex component enclosure requirements		
D.3.1	Compliance with IEC 60079-0 & 60079-1	The equipment is not an Ex component.	N / A
D.3.2	Geometry of enclosure	Refer to D.3.1.	N / A
D.3.3	Rotating machines	Refer to D.3.1.	N / A
D.3.4	Means of mounting	Refer to D.3.1.	N / A
D.3.5	Drilled holes	Refer to D.3.1.	N / A
D.3.6	Reference pressure	Refer to D.3.1.	N / A
D.3.7	Over-pressure	Refer to D.3.1.	N / A
D.3.8	Marking internally	Refer to D.3.1.	N / A
D.3.9	External marking provision	Refer to D.3.1.	N / A
D.3.10	Information in certificate	Refer to D.3.1.	N / A

D.4	Utilization of an Ex component enclosure certificate to prepare an equipment certificate		
D.4.1	Procedure	Refer to D.3.1.	N / A
D.4.2	Application of the schedule of limitations	Refer to D.3.1.	N / A

Annex E (Normative)	CELLS AND BATTERIES USED IN FLAMEPROOF "D" ENCLOSURES
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E.1	Introductory remarks
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E.2	Acceptable electrochemical systems	The equipment contains no cells or batteries.	N / A
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E.3	General requirements for cells (or batteries) inside flameproof enclosures		
E.3.1	Restrictions	Refer to E.2.	N / A
E.3.2	Warning label	Refer to E.2.	N / A

IEC 60079-1			
Clause	Requirement – Test	Result – Remark	Verdict
E.3.3	Mounting	Refer to E.2.	N / A
E.3.4	Relative movement	Refer to E.2.	N / A

E.4	Arrangement of safety devices		
E.4.1	Prevention of excessive temperature and cell damage		
E.4.1.1	Short circuit condition	Refer to E.2.	N / A
E.4.1.2	Infallible components	Refer to E.2.	N / A
E.4.2	Prevention of cell polarity reversal or reverse charging by another cell in the same battery		
E.4.2.1	Additional protection	Refer to E.2.	N / A
E.4.2.2	Protection against polarity reversal or reverse charging	Refer to E.2.	N / A
E.4.3	Prevention of inadvertent charging of a battery by other voltage sources in the enclosure	Refer to E.2.	N / A

E.5	Recharging of secondary cells inside flameproof enclosures		
E.5.1	Allowable cell type	Refer to E.2.	N / A
E.5.2	Charging condition and safety devices	Refer to E.2.	N / A
E.5.3	Reverse charging	Refer to E.2.	N / A
E.5.4	Additional safety device(s)	Refer to E.2.	N / A
E.5.5	Recharging within enclosure	Refer to E.2.	N / A

E.6	Rating of protection diodes and reliability of protection devices	Refer to E.2.	N / A
E.6.1	Voltage rating & compliance with E.4.2	Refer to E.2.	N / A
E.6.2	Voltage rating & compliance with E.4.3	Refer to E.2.	N / A
E.6.3	Current rating	Refer to E.2.	N / A
E.6.4	Safety integrity	Refer to E.2.	N / A

Annex F (Informative)	MECHANICAL PROPERTIES FOR SCREWS AND NUTS		
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Annex G (Informative)	INTRODUCTION OF AN ALTERNATIVE RISK ASSESMENT METHOD ENCOMPASSING "EQUIPMENT PROTECTION LEVELS" FOR EX EQUIPMENT		
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