SLOVENSKI STANDARD
oSIST prEN IEC 60079-2:2022

01-november-2022

Eksplozivne atmosfere - 2. del: Zaščita opreme z nadtlakom "p"

Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"

Explosionsgefährdete Bereiche - Teil 2: Geräteschutz durch Überdruckkapselung "p"

Atmosphères explosives - Partie 2: Protection du matériel par enveloppe à surpression interne "p"

Ta slovenski standard je istoveten z: **prEN IEC 60079-2:2022**

ICS:

29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres

oSIST prEN IEC 60079-2:2022 **en,fr,de**

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COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60079-2 ED7**	
DATE OF CIRCULATION: **2022-09-02**	CLOSING DATE FOR VOTING: **2022-11-25**
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IEC TC 31 : EQUIPMENT FOR EXPLOSIVE ATMOSPHERES

SECRETARIAT: United Kingdom	SECRETARY: Mr Tom Stack
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

Due to the translation period (ISO/IEC DIR 1:2022 A.5.1) the CDV for IEC 60079-2 ED7 'Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"' is due to be circulated from 2022-08-26 to 2022-11-18. So unfortunately the ballot result and comments would be late for the meetings in San Francisco.

It is possible to extract any votes/comments that have been submitted on a ballot prior to it closing so NC's are encouraged to submit comments before the October meeting if possible. Any comments that have been submitted on the ballot will be reviewed by MT 60079-2. Note these comments will be anonymised to not indicate actual voting by an NC.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

Part 2: Equipment protection by pressurization “p”

FOREWORD

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IEC 60079-2 has been prepared by maintenance team MT60079-2: Maintenance of IEC 60079-2, of IEC technical committee 31: Explosive atmospheres. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2014, This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

Changes	Clause in 6th edition	Clause in 7th edition	Type		
			Minor and Editorial Changes	**Extension**	**Major Technical Changes**
Clarification in scope that use of gas detection to eliminate purging is not within scope of standard.	1	1	x		
Added correlation table to 60079-0		1	x		
Clarification in scope that other oxidizers present in flammable material are not covered	1	11	x		
Changed term dilution to dilution flow	3.3	3.3	x		
Changed term dilution area to dilution volume	3.3	3.4	x		
Update to term hermetically sealed device to align with others	3.7	3.7	x		
Clarification of what ignition-capable equipment (ICE) is	3.8	3.8	x		
Added definition for pressurization overpressure	-	0	x		
Added definition for maximum overpressure	-	**Error! Reference source not found.**	x		
Clarified definition for pressurization control system	3.14	3.14	x		
Added definition for pressurized equipment	-	3.16	x		
Clarification in definition for purging that it applies to the pressurized equipment	3.18	3.19	x		
Various locations clarified based on newly defined terms		Whole document	x		
Replaced Table 1 and Table 4 with Figure 1 and Figure 2	4 &13.1	4 &11.1	x		
Direction on enclosure requirements for “pyb” and “pzc” when IP54 enclosure is required for EPL Gc equipment used	-	5.1			C1
Addition of information for instructions about doors or covers		5.3.1			C2
Moved text found previously in section 5.3.3 about doors opening violently to a general location in 5.3 so it applies to all Groups.	5.3.3	5.3	x for Group II and III		C3 for Group I
Clarification that safety device if overpressure can occur that would cause deformation of enclosure needs to comply with 8.3.1.	5.4	5.4	x		
Separated part of the clause into new a clause for items that pertain the pressurized equipment, not just the pressurized enclosure	5.5 to 5.10	6	x		
Added equivalent geometries for vents of internal compartments as well as clarified that volumes that are protected by another protection method do not need purged	5.5.2	6.2		x	
Clarified that the section on sealing was relevant to conduit and cable for sealing at installation. Moved to testing section and instruction section.	5.8	**Error! Reference source not found.** 13.1 17	x		
Modified the Specific Condition of Use that if the spark and particle barrier is not included that the protective vent shall discharge to a non-hazardous area only	5.9	6.5			C4
Added new section for electric machines		6.6			C5
Added new section for bypass or override function		6.7			C6

			Type		
Changes	**Clause in 6th edition**	**Clause in 7th edition**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Moved detail that originally only applied to “pzc” so it would apply to all levels of protection that the maximum surface temperature of the pressurized equipment shall account for internal equipment that has its own explosion protection that may remain energized	6.3	7.1			C7
Added new requirements for determining maximum surface temperatures of electric machines in “pxb” and “pyb” including a new table	6.2	7.2			C8
Added further details in table to better capture safety devices	Table 3	Table 5	x		
Removed option for manufacturer of equipment to identify missing safety devices with an “X” and give details in a Specific Condition of Use	7.3	8.2			C9
Moved away from term ‘single fault tolerant’ to focus on terms used in association with EPL Gb/Db, “normal use and expected malfunctions. Based on this, “pxb” has been clarified which safety devices or control functions need to consider ‘expected malfunctions’.	7.2	8.1			C10
Added requirements that the instructions need to give information on the safety devices and control functions, how to verify proper operation and that verification is needed prior to putting pressurized equipment into service.	7.2	8.2			C11
Changed “safety device” to “control function” in many locations including table 5 to cover pressurization control systems that incorporate a chain of devices to support a safety function	Table 3	Table 5	x		
Re-organized section to better capture details applicable to all pressurization control systems and those certified as Ex associated equipment.	7.4	8.3	x		
Clarification that pressurized equipment shall be supplied with a pressurization control system		8.3.1	x		
Additional marking and instruction requirements for systems with a regulator that has a failure mode that could cause the maximum pressure to be exceeded	7.4.1 7.4.2 7.4.3	8.3.1			C12
Incorporated the details on the functional sequence diagram for “pxb” into the section on “pxb” pressurization control systems	7.5	8.3.4	x		
Added requirements for pressurization control systems evaluated as Ex associated equipment that they require a “X” following of the certificate number and additional information required	7.4	8.3.5			C13
Identification that the purge requirements in old 7.8, now 8.5 are part of the criteria. Additionally, clarified what aspects need to be considered for expected malfunctions	7.7	8.4			C14
Table added to clarify Group I and Group II purging criteria and changed requirements and needed warning labels	7.8	8.5	x		
Added information for pressurization control systems that can manage purge time based on total volume	7.8	8.5		X	
Clarified in requirements and in warning text that after enclosure has been cleaned, pressurization overpressure is required before power can be applied	7.9	8.6			C15
Clarification for “pxb” that control function needs to be appropriate for normal operation and expected malfunctions	7.10	8.7			C16
Clarification that flowmeters used to detect pressurization overpressure in pressurized equipment shall be at the outlet of the pressurized enclosure unless there are additional provisions. Also clarified for “pxb” what needs to be appropriate for normal operation and expected malfunctions	7.11	8.8			C17

			Type		
Changes	**Clause in 6th edition**	**Clause in 7th edition**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Details on what the manufacturer needs to supply in the instructions, and pointing to the type test for maximum overpressure test	7.12	8.9			C18
Clarification that the initial enclosure and any additional enclosures shall be purged before connecting supply	7.13	8.10	x		
Combined old clauses10 through 15 under single clause to have a single section on pressurized equipment with internal source of release	10-15	11	x		
For pressurized equipment with containment systems, the instructions shall include the maximum rate of process pressure change	12.1	11.3.1			C19
Changes in wording for Specific Conditions of Use	12.3	11.3.3			C20
Further details and considerations when liquids are released	13.1	11.4.1			C21
Expanded the requirements	13.3.4	11.4.4			C22
Possible further documentation requirements	14	11.5			C23
Clarification on order of tests for Pressurized enclosures and sample requirements	-	13.1			C24
Changes to criteria for passing overpressure test	16.2	13.3			C25
Added clarification on testing pressurized equipment using a pressurization control system that can manage purge time based on total volume		13.6.1			C26
Clarification that the minimum purging time specified by the manufacturer shall not be less than the measured purge time	16.4.2	13.6.2	x		
Additional considerations for equipment that has moving parts that can affect internal airflow	16.6	13.8			C27
Change to pressure increase rate for overpressure test for containment systems	16.7.1	13.9.1			C28
Added type tests for pressurization control systems		13.11			C29
Added requirement where the warnings shall be placed on the pressurized equipment	18.1	15.1			C30
added new requirement for start-up and operation instructions of the pressurization control system	18.3	15.3			C31
Added restriction marking for no additional oxidizers	18.4	15.4			C32
Clarified and add marking requirements for pressurization control systems evaluated as Ex associated equipment	18.6	15.6			C33
New marking for systems that contain flammable substance		15.815.8			C34
Added new section for documentation with specific requirements	-	**Error! Reference source not found.**			C35
Added needed references and new requirements to instruction section and further details of what needs to be included in the instructions	19	17			C36
Annex A moved to type test section	Annex A	13.5	x		
Clarification of figure F.1	Annex F	**Error! Reference source not found.**Annex F	x		
Further details in E.3 and E.4	Annex E	Annex E	x		
Cell and battery requirements updated	Annex G/H	12			C37

			Type		
Changes	**Clause in 6th edition**	**Clause in 7th edition**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Annex A – informative annex for containment systems with liquid	-	**Error! Reference source not found.**Annex A	x		
Annex G – new – normative guidance on evaluation of safety control functions		Annex G			C38

Explanations:

A) Definitions

Minor and editorial changes clarification decrease of technical requirements minor technical change editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

Extension addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition. 5.

Major technical changes addition of technical requirements increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfill the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in clause B) below

B) Information about the background of 'Major Technical Changes'

C1 – major technical change for "pyb" and possibly "pzc" when incorporating EPL Gc equipment that has a Specific Condition of Use that requires a IP54 enclosure to IEC 60079-0 requirements. This additional text clarifies how to handle these requirements when integrating into a pressurized enclosure, where the pressurized enclosure does not meet IP54 due to the pressure relief vent.

C2 – major technical change for additional information either in instructions or in marking that now needs to be provided to the user about details on the doors and covers and risks associated in opening them.

C3 – the concern of pressure on a door or cover and the risk it poses is not limited to applications only in Groups II and III.

C4 – if the spark and particle barrier is needed and not supplied with a piece of pressurized equipment, the Specific Condition of Use is to clearly direct how to safely install the equipment. In this case, due to the risk of ejecting incandescent particles the only option is to have the vent exhaust into a non-hazardous area.

C5 – to align with other Ex standards and maintain appropriate protection for electric machines with rated voltages exceeding 1kV, direction on where thermal sensors and their leads are to be place has been added.

C6 – knowing that systems already come with bypass or maintenance switches, the standard now provides needed direction to assure minimum safety of the equipment.

C7 – previously only applied to “pzc” but determined that it needed to be applied to all levels of protection.

C8 – the combination of motor and converter to determine maximum temperature needs to be considered. In the event that the converter is not specified, tests need to be done to confirm thermal protection is effective with appropriate margin for the assigned maximum surface temperature.

C9 – the ability for the end user to properly select the needed safety devices to complete a safe install of the pressurized equipment was determined to not be in line with installation requirements found in 60079-14.

C10 – moved away from single fault tolerant, in favor of the term ‘expected malfunctions’ to align with definition for EPL Db/Gb in IEC 60079-0.Clearly identified which control functions or safety devices need to meet the ‘expected malfunctions’ level of safety for “pxb” Also relaxed the requirement for “pyb” to consider expected malfunctions (previously single fault tolerant) since “pyb” already has a layer of safety based on the restriction to EPL Dc/Gc equipment contained within the pressurized enclosure. Additional requirements for these elements in the schedule drawings. See also Annex G

C11 - added clear requirements that the instructions need to provide details to the user on the functions of the safety devices or control functions of the pressurization control system, how to test these devices or control functions, and the interval that they should be checked.

C12 – added marking requirements for the maximum overpressure of the enclosure now required based on the safety device limit. Also have additional instruction requirements when multiple combinations of regulators and pressure relief vents are available.

C13 – The pressurization control systems sold as associated equipment do not fully handle all concerns for pressurized equipment when installed. It is essential that when a pressurized control system is used, that the final pressurized equipment is fully assessed to the requirements of this standard.

C14 – for “pxb”, clarification that safety devices or control function involved with verification of overpressure, purge flow and purge timer are the elements that require a design to cover normal operation and expected malfunctions.

C15 – clarification on the order of operation and needed safety for applications in Group III.

C16 – clarification on “pxb” that pressurized equipment that has a requirement for minimum flow rate of protective gas for temperature control needs to be appropriate to handle expected malfunctions.

C17 – When a flowmeter is used at the inlet of the pressurized enclosure of the pressurized equipment, special provisions will need to be made to assure that the flow being measured is able to properly pressurize the equipment to the required pressurization overpressure. There could be conditions such as open doors or open apertures that would prevent the required pressurization overpressure from being reached based only the flowmeter at the inlet without additional measures to confirm the defined area to be pressurized and a defined maximum leakage rate are in place.

C18 – added details of what needs to be provided in the instructions prepared.

C19 – new requirement that instructions need to indicate what the process flow rate of pressure change for pressurized equipment with containment systems

C20 – specific condition Specific Condition of use Use has new wording for clarification, this could require an update to certificates and other documentation

C21 – additional considerations and requirements when containment systems that have the possibility of liquid release added to better address the risks. This includes further details in new Annex A

C22 – limited liquid release requirements have been increased to better address the needed safety