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IEC 60079-2 Ed.6.0 (2014)

AS/NZS 60079.2:2015

Australian/New Zealand Standard™

Explosive atmospheres

Part 2: Equipment protection by pressurized enclosure 'p'

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The following are represented on Committee EL-014:

Auckland Regional Chamber of Commerce
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute of Petroleum
Australian Petroleum Production and Exploration Association
Australian Pipeline and Gas Association
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This Standard was issued in draft form for comment as DR AS/NZS 60079.2:2015.

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Part 2: Equipment protection by pressurized enclosure ‘p’

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-014, Equipment for Explosive Atmospheres, to supersede AS/NZS 60079.2:2007 and AS/NZS 61241.4:2002.

The objective of this Standard is to set out the requirements for the construction and testing of electrical apparatus with pressurized enclosures, of protection type 'p', intended for use in explosive gas atmospheres or explosive dust atmospheres. It also includes the requirements for pressurized enclosures containing a limited release of a flammable substance.

This Standard is identical with, and has been reproduced from IEC 60079-2 Ed.6.0 (2014), *Explosive atmospheres,* Part *2: Equipment protection by pressurized enclosure "p".* Changes to the Standard introduced by this edition are listed in the IEC Foreword.

This Standard is to be read in conjunction with AS/NZS 60079.0, *Explosive atmospheres*, Part 0: *Equipment—General requirements*.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text 'this part of IEC 60079' should read 'this Australian/New Zealand Standard'.

(b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian or Australian/New Zealand Standard*	
IEC		AS	
60034	Rotating electrical machines	60034	Rotating electrical machines
60034-5	Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code)—Classification	60034.5	Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code)—Classification
60529	Degrees of protection provided by enclosures (IP Code)	60529	Degrees of protection provided by enclosures (IP Code)
		AS/NZS	
60079	Explosive atmospheres	60079	Explosive atmospheres
60079-0	Part 0: Equipment—General requirements	60079.0	Part 0: Equipment—General requirements
60079-11	Part 11: Equipment protection by intrinsic safety "i"	60079.11	Part 11: Equipment protection by intrinsic safety 'i'
60079-15	Part 15: Equipment protection by type of protection "n"	60079.15	Part 15: Equipment protection by type of protection 'n'

Only normative references that have been adopted as Australian or Australian/New Zealand Standard have been listed.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

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IEC FOREWORD

The significance of changes between IEC 60079-2, Edition 6.0, 2014 and IEC 60079-2, Edition 5.0, 2007 are as listed below:

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		Type		
Changes	**Clause**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Scope Expanded to include combustible dust	1		X	
Protective Gas Replaced “apparatus” with “equipment”	3			
Protective Gas Revised to show that purging is not required for explosive dust atmospheres	3.16	X		
Level of Protection “pxb” Term and definitions revised to reflect EPL and level of protection	3.21	X		
Level of Protection “pyb” Term and definitions revised to reflect EPL and level of protection	3.22	X		
Level of Protection “pzc” Term and definitions revised to reflect EPL and level of protection	3.23	X		
Lower Flammable Limit Term and definition revised to agree with 60079-0	3.26	X		
Upper Flammable Limit Term and definition revised to agree with 60079-0	3.27	X		
Table 1 – Determination of protection level Revised to use EPL terminology	Table 1	X		
Table 2 – Design Criteria based upon level of protection Revised to use EPL terminology	Table 2	X		
Enclosure Requirements relaxed for specific designs	5.1		X	
Group II and Group III pressurized enclosures Text revised to use EPL terminology	5.3.3	X		
Group II and Group III Level of Protection “pxb” Added that warning also applies for explosive dust atmospheres	5.3.5		X	
Group II and Group III door and cover warning Added that warning also applies for explosive dust atmospheres	5.3.6		X	
Group II and Group III door and cover warning Revised warning from atmosphere “may be present” to “is present”	5.3.6	X		
Mechanical Strength Removed reference to 60079-0 by clause number for “X” condition	5.4	X		
Spark and particle barriers Removed reference to 60079-0 by clause number for “X” condition	5.9	X		
Cells and batteries Added requirements for cells and batteries	5.10			C1
For Level of Protection “pxb” or Level of Protection “pyb” Revised Table to use terminology consistent with EPLs	6.2	X		

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		Type		
Changes	**Clause**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Suitability of safety devices for hazardous area Word “explosion” changed to “ignition” to reflect UFL/LFL terms	7.1	X		
Integrity of safety devices Added requirement for detecting fan failure	7.2			C2
Table 3 – Safety devices based upon Level of Protection Revised column labels to use Level of Protection terminology	Table 3	X		
Provider of safety devices Remove reference to 60079-0 by clause number for “X” condition	7.3	X		
Pressurization System evaluated as associated equipment Added requirements for pressurization systems	7.4			C3
Sequence diagram for Level of Protection “pxb” Revised text to use Level of Protection terminology	7.5	X		
Group I and Group II purging automated for Level of Protection “pxb” Revised text to use Level of Protection terminology	7.7	X		
Group I and Group II purging automated for Level of Protection “pxb” Added text specifying that for “pxb”, control must be automated	7.7			C4
Group I or Group II – purging criteria Revised text to use Level of Protection terminology	7.8	X		
Group III – cleaning Added text for cleaning enclosures used in explosive dust atmospheres	7.9		X	
Safety devices to detect minimum overpressure Add word “minimum” to clause title to be consistent with text	7.11	X		
Safety devices to detect minimum overpressure Revised text to use Level of Protection terminology	7.11 d)	X		
Value of minimum overpressure Added word “minimum” to clause title to be consistent with text	7.12	X		
Value of minimum overpressure Revised text to use Level of Protection terminology	7.12	X		
Value of minimum overpressure Added text to reflect a note in Annex C	7.12		X	
Pressurizing multiple enclosures Revised text to use Level of Protection terminology	7.13	X		
Safety devices on doors and covers Revised text to use Level of Protection terminology	7.14	X		
Equipment that may remain energized Revised text to use EPL and level of protection terminology	7.15	X		
Equipment permitted within Level of Protection “pyb” Revised text to use EPL and level of protection terminology	7.16	X		
Group I and Group II Filling procedure Allow filling in a hazardous location if tested as non-hazardous	8.4		X	

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		Type		
Changes	**Clause**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Group III Filling Procedure Added static pressurization filling procedure for combustible dust	8.5		X	
Safety devices Revised text to use Level of Protection terminology	8.6	X		
Equipment that may remain energized Revised text to use EPL terminology	8.7	X		
Overpressure Removed reference to 60079-0 by clause number	8.8	X		
Backup supply Added requirements for a backup supply of protective gas	9.1			C5
Independent supplies Provided requirements for independence of pressurization	9.2		X	C6
Release Conditions Removed reference to 60079-0 by clause number for “X” condition	11.1.2	X		
Containment system with a limited release Removed reference to 60079-0 by clause number for “X” condition	12.3	X		
13.3.3 Limited release of a gas or vapour Revised text to reflect UFL/LFL terms	13.3.3	X		
Ignition-capable equipment Revised text to use Level of Protection terminology	14	X		
Type verification and tests Edition 5 clauses 16.1 to 16.7 moved to Edition 6 clauses 16.2 to 16.8	16	X		
Determining the maximum overpressure rating Added requirements to determine maximum overpressure	16.1			C7
Maximum overpressure test Moved Maximum overpressure test to 16.2	16.2			C7
Leakage test Clarify the acceptance criteria for the test	16.3.2		X	
Tests for an infallible containment system Clarify the rating used for the test	16.7.1			C8
Tests for an infallible containment system Modified test for infallible containment	16.7.2			C9
Edition 5 – Verifying ability of the pressurized enclosure to limit internal pressure Eliminated test	16.8			C7
Functional test Clarified that applies only to safety devices provided with enclosures	17.1	X		
Tests for an infallible containment system Waived helium leak tests for liquid systems	17.3		X	

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		Type		
Changes	**Clause**	**Minor and Editorial Changes**	**Extension**	**Major Technical Changes**
Supplementary marking Allowed continued use of type of protection marking	18.3			
Pressurization systems Clarified use of Ex [p] and [Ex p] marking	18.6	X		
Warnings required in other clauses Added table number	18.7	X		
Warnings required in other clauses Added warning from 7.9	18.7		X	
Warnings required in other clauses Added warnings from Annex G and Annex H	18.7			C1
Instructions Added requirements for Group III	19		X	
Edition 5 Annex G – Infallibility test for containment system Deleted and replaced	Annex G	X		
Edition 5 Annex H – Introduction of an alternative risk assessment method encompassing “equipment protection levels” Deleted and replaced	Annex H	X		
Annex G – Internal Cells and Batteries for Level of Protection “pxb” and Level of Protection “pyb” Added requirements for cells and Batteries			X	
Annex H – Internal Cells and Batteries for Level of Protection “pzc” Added requirements for cells and Batteries			X	

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 – Added annexes with requirements for using cells and batteries.

C2 – Added requirement that fan failure cannot be based upon loss of power to the fan.

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C3 – Added requirements for equipment evaluated as a pressurization system to provide uniformity in the testing of such equipment.

C4 – Although, in Edition 5, the title of clause 7.6 stated automated purging, the word automated was not in the requirement. It is intended that all “pxb” equipment have an automated purging system to prevent energizing of ignition capable circuits until the purge cycle has been properly completed. This requires verifying that the flow is at least the minimum required for the purge time as well as verifying that the minimum overpressure exists within the enclosure.

C5 – If a backup supply of protective gas is provided, then both the primary and the backup supply needs to be capable of maintaining the required pressurization.

C6 – If a pressurized enclosure is used within a larger pressurized enclosure the protective gas supplies need to be independent.

C7 – The previous text in 16.1 of Edition 5, assumed that the enclosures had a maximum overpressure rating, but this is rarely the case. Some test houses relied upon the test in 16.8 to determine the maximum overpressure. Various methods were used to simulate regulator failure such as removing the regulator, but this also removed the orifices that would limit the flow. Based upon test house experience, the danger of flying fragments from the enclosure is acceptably small as either the enclosure or the gaskets will deform to relieve the internal pressure. A decision was taken to eliminate the overpressure test based upon the failed regulator. In addition, the definition of maximum overpressure is now based upon the value obtained when the pressurized enclosure is operated within its ratings. This maximum overpressure will generally occur when the equipment is in rapid purge mode with the maximum rated pressure applied to the inlet of the regulator. The Edition 5 text of 16.1 was modified and moved to 16.2.

C8 – The term overpressure in most cases implies operation outside of the normal ratings. Text was clarified to use the term “maximum operating pressure” rather than maximum internal overpressure. Test was 16.6.1 in Edition 5.

C9 – The test was modified to use helium leak detection rather than rely on maintaining a vacuum since this would depend upon the capability of the vacuum system. Test was 16.6.2 in Edition 5.

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INTRODUCTION

This part of IEC 60079 gives requirements for the design, construction, testing and marking of electrical equipment for use in explosive atmospheres in which

a) a protective gas maintained at a pressure above that of the external atmosphere is used to guard against the formation of an explosive gas atmosphere within enclosures which do not contain an internal source of release of flammable gas or vapour;

b) a protective gas maintained at a pressure above that of the external atmosphere is used to guard against the formation of an explosive gas atmosphere within enclosures and is supplied to an enclosure containing one or more internal sources of release in order to guard against the formation of an explosive gas atmosphere; or

c) a protective gas maintained at a pressure above that of the external atmosphere, is used to prevent the entry of combustible dust which might otherwise lead to the formation of an explosive dust atmosphere within enclosures, but only where there is no internal source of release of combustible dust.

This standard includes requirements for the equipment and its associated equipment including the inlet and exhaust ducts, and also for the auxiliary control equipment necessary to ensure that pressurization and/or dilution is established and maintained.

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AUSTRALIAN/NEW ZEALAND STANDARD

Explosive atmospheres

Part 2:
Equipment protection by pressurized enclosure ‘p’

1 Scope

This part of IEC 60079 contains the specific requirements for the construction and testing of electrical equipment with pressurized enclosures, of type of protection “p”, intended for use in explosive gas atmospheres or explosive dust atmospheres. It also includes the requirements for pressurized enclosures containing a limited release of a flammable substance.

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirements of this standard take precedence.

This standard does not include the requirements for:

- pressurized enclosures where the containment system may release
  a) air with an oxygen content greater than normal, or
  b) oxygen in combination with inert gas where the oxygen is in a proportion greater than 21 %.
- pressurized rooms or analyser houses; see IEC 60079-13;
- pressurized enclosures used where “explosives” or pyrotechnics are present;
- pressurized enclosures used where hybrid mixtures of gas/vapour and combustible dust are present;
- pressurized enclosures used where pyrophoric substances such as explosives or propellants containing their own oxidizers are present
- pressurized enclosures with an internal source of release of combustible dust.

NOTE When the user acts in the role of the manufacturer, it is typically the user’s responsibility to ensure that all relevant parts of this standard are applied to the manufacturing and testing of the equipment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification*

IEC 60050 (all parts), *International Electrotechnical Vocabulary*

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-15, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

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IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127, (All parts) *Miniature fuses*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-151, IEC 60050-426 and IEC 60079-0, as well as the following apply.

NOTE Unless otherwise specified, the terms "voltage" and "current" mean the r.m.s. values of an alternating, direct or composite voltage or current.

3.1
alarm
piece of equipment that generates a visual or audible signal that is intended to attract attention

3.2
containment system
part of the equipment containing the flammable substance that may constitute an internal source of release

3.3
dilution
continuous supply of a protective gas, after purging, at such a rate that the concentration of a flammable substance inside the pressurized enclosure is maintained at a value outside the explosive limits at any potential ignition source (that is to say, outside the dilution area)

Note 1 to entry: Dilution of oxygen by inert gas may result in a concentration of flammable gas or vapour above the upper flammable limit (UFL).

3.4
dilution area
area in the vicinity of an internal source of release where the concentration of a flammable substance is not diluted to a safe concentration

3.5
enclosure volume
volume of the empty enclosure without internal equipment. For rotating electrical machines, the free internal volume plus the volume displaced by the rotor

3.6
flammable substance
gases, vapours, liquids or mixtures thereof that are capable of being ignited

3.7
hermetically sealed device
device which is so constructed that the external atmosphere cannot gain access to the interior and in which any seal is made by fusion

Note 1 to entry: Examples of fusion include brazing, welding or the fusion of glass to metal.

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3.8
ignition-capable equipment
ICE
equipment which in normal operation constitutes a source of ignition for a specified explosive atmosphere.

3.9
indicator
piece of equipment that shows whether flow or pressure is adequate and which is intended to be monitored periodically, consistent with the requirement of the application

3.10
internal source of release
point or location from which a flammable substance in the form of a flammable gas or vapour or liquid may be released into the pressurized enclosure such that in the presence of air an explosive gas atmosphere could be formed

3.11
leakage compensation
provision of a flow of protective gas sufficient to compensate for any leakage from the pressurized enclosure and its ducts

3.12
overpressure
pressure above ambient pressure within a pressurized enclosure

3.13
pressurization
technique of guarding against the ingress of the external atmosphere into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere

3.14
pressurization system
grouping of safety devices and other components used to pressurize and monitor or control a pressurized enclosure

3.15
pressurized enclosure
enclosure in which a protective gas is maintained at a pressure greater than that of the external atmosphere

3.16
protective gas
air or inert gas used for maintaining an overpressure and, if required, dilution and purging

Note 1 to entry: For the purposes of this standard, inert gas means nitrogen, carbon dioxide, argon or any gas which, when mixed with oxygen in the ratio 4 parts inert to 1 part oxygen as found in air, does not make the ignition and flammability properties, such as explosive limits, more onerous.

3.17
protective gas supply
compressor, blower or compressed gas container that provides the protective gas at a positive pressure

Note 1 to entry: The protective gas supply includes inlet (suction) pipes or ducts, pressure regulators, outlet pipes, ducts, and supply valves.

Note 2 to entry: Components of the pressurization system other than the pressure regulator, are not included.

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3.18
purging
in a pressurized enclosure, the operation of passing a quantity of protective gas through the enclosure and ducts, so that the concentration of the explosive gas atmosphere is brought to a safe level

3.19
static pressurization
maintenance of an overpressure within a pressurized enclosure without the addition of protective gas in a hazardous area

3.20
Level of Protection "pxb"
pressurized enclosure providing Equipment Protection Level Mb, Gb or Db

Note 1 to entry: This permits unprotected equipment to be installed within the pressurized enclosure except for safety devices, see 3.23.

3.21
Level of Protection "pyb"
pressurized enclosure providing Equipment Protection Level Gb or Db with Equipment Protection Level Gc or Dc internal to the pressurized enclosure

Note 1 to entry: This permits Equipment Protection Level Gc or Dc equipment to be installed within the pressurized enclosure, except for safety devices, see 3.23

3.22
Level of Protection "pzc"
pressurized enclosure providing Equipment Protection Level Gc or Dc

Note 1 to entry: This permits unprotected equipment to be installed within the pressurized enclosure except for safety devices, see 3.23.

3.23

safety device
device used to implement or maintain the integrity of the type of protection

3.24
lower flammable limit
LFL
volume fraction of flammable gas or vapour in air below which an explosive gas atmosphere will not form, expressed as a percentage (see IEC 60079-20-1)

Note 1 to entry: This is also known as Lower Explosive Limit (LEL).

3.25
upper flammable limit
UFL
volume fraction of flammable gas or vapour in air above which an explosive gas atmosphere will not form, expressed as a percentage (see IEC 60079-20-1)

Note 1 to entry: This is also known as Upper Explosive Limit (UEL).

4 Protection levels

Protection by pressurization is subdivided into three Levels of Protection ("pxb", "pyb" and "pzc") which are selected based upon the Equipment Protection Level required (Mb, Gb, Db, Gc or Dc), whether there is the potential for an internal release, and whether the equipment within the pressurized enclosure is ignition-capable; see Table 1. The Level of Protection then

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defines design criteria for the pressurized enclosure and the pressurization system; see Table 2.

Table 1 – Determination of protection level

Is there an internal release condition?	Highest Equipment Protection Level requirement for external explosive atmosphere	Does enclosure contain ignition-capable equipment?	Level of Protection
No	Mb, Gb or Db	Yes or no	Level of Protection “pxb”
No	Gb or Db	No	Level of Protection “pyb”
No	Gc or Dc	Yes or no	Level of Protection “pzc”
Yes, gas/vapour	Mb, Gb, or Db	No or Yes and the ignition-capable equipment is not located in the dilution area	Level of Protection “pxb”
Yes, gas/vapour	Gb or Db	No	Level of Protection “pyb”
Yes, gas/vapour	Gc or Dc	Yes and the ignition-capable equipment is not located in the dilution area	Level of Protection “pxb”
Yes, gas/vapour	Gc or Dc	No	Level of Protection “pyb”
Yes liquid	Gb or Db	Yes or No	Level of Protection “pxb” (inert)
Yes liquid	Gb or Db	No	Level of Protection “pyb” (inert)
Yes liquid	Gc or Dc	Yes or No	Level of Protection “pzc” (inert)
If the flammable substance is a liquid, normal release is never permitted. The protective gas shall be inert if "(inert)" is shown after the pressurization level; see Clause 13.			

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Table 2 – Design criteria based upon level of protection

Design criteria	Level of Protection "pxb"	Level of Protection "pyb"	Level of Protection "pzc" with indicator	Level of Protection "pzc" with alarm
Degree of enclosure protection according to IEC 60529 or IEC 60034-5	IP4X minimum	IP4X minimum	IP4X minimum	IP3X minimum
Resistance of enclosure to impact	IEC 60079-0 applies	IEC 60079-0 applies	IEC 60079-0 applies	apply half the value shown in IEC 60079-0
Verifying purge period for Group I and Group II	Requires a timing device and monitoring of pressure and flow	Time and flow marked	Time and flow marked	Time and flow marked
Preventing incandescent particles from exiting a normally closed relief vent into an area requiring EPL Mb, Gb or Db	Spark and particle barrier required, see 5.9, unless incandescent particles not normally produced	No requirement[a)]	Level of protection "pzc" does not apply to areas requiring EPL Mb, Gb or Db	Level of protection "pzc" does not apply to areas requiring EPL Mb, Gb or Db
Preventing incandescent particles from exiting a normally closed relief vent into an area requiring EPL Gc or Dc	No requirement[b)]	No requirement[b)]	No requirement, see footnote b)	No requirement[b)]
Preventing incandescent particles from exiting a vent that opens during normal operation, to an area requiring EPL Mb, Gb or Db	Spark and particle barrier required, see 5.9	Spark and particle barrier required, see 5.9	Level of Protection "pzc" does not apply to areas requiring EPL Mb, Gb or Db	Level of Protection "pzc" does not apply to areas requiring EPL Mb, Gb or Db
Preventing incandescent particles from exiting a vent that opens during normal operation to an area requiring EPL Gc, or Dc	Spark and particle barrier required, see 5.9, unless incandescent particles not normally produced	No requirement [a)]	Spark and particle barrier required, see 5.9, unless incandescent particles not normally produced	Spark and particle barrier required, see 5.9, unless incandescent particles not normally produced
Door or cover opens only with use of a tool	Warning, see 5.3 and 6.2 b) ii)	Warning, see 5.3.6[b)]	Warning, see 5.3.6[c)]	Warning, see 5.3.6[c)]
Door or cover opens without use of a tool	Interlock, see 7.14 (no internal hot parts)	Warning, see 5.3.6[a)]	Warning, see 5.3.6[c)]	Warning, see 5.3.6[c)]
Internal hot parts that require a cool-down period before opening enclosure	Comply with 6.2 b) ii)	No requirement[a)]	Warning, see 5.3.6	Warning, see 5.3.6

[a)] 6.2b) ii) is not applicable for Level of Protection "pyb" since neither hot internal parts nor normally created incandescent particles are permitted.

[b)] There is no requirement for spark and particle barriers since in abnormal operation, where the relief vent opens, it is unlikely that the external atmosphere is within the explosive limits.

[c)] There is no requirement for tool accessibility on a Level of Protection "pzc" enclosure since in normal operation the enclosure is pressurized with all covers and doors in place. If a cover or door is removed, it is unlikely that the atmosphere is within the explosive limits.

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