

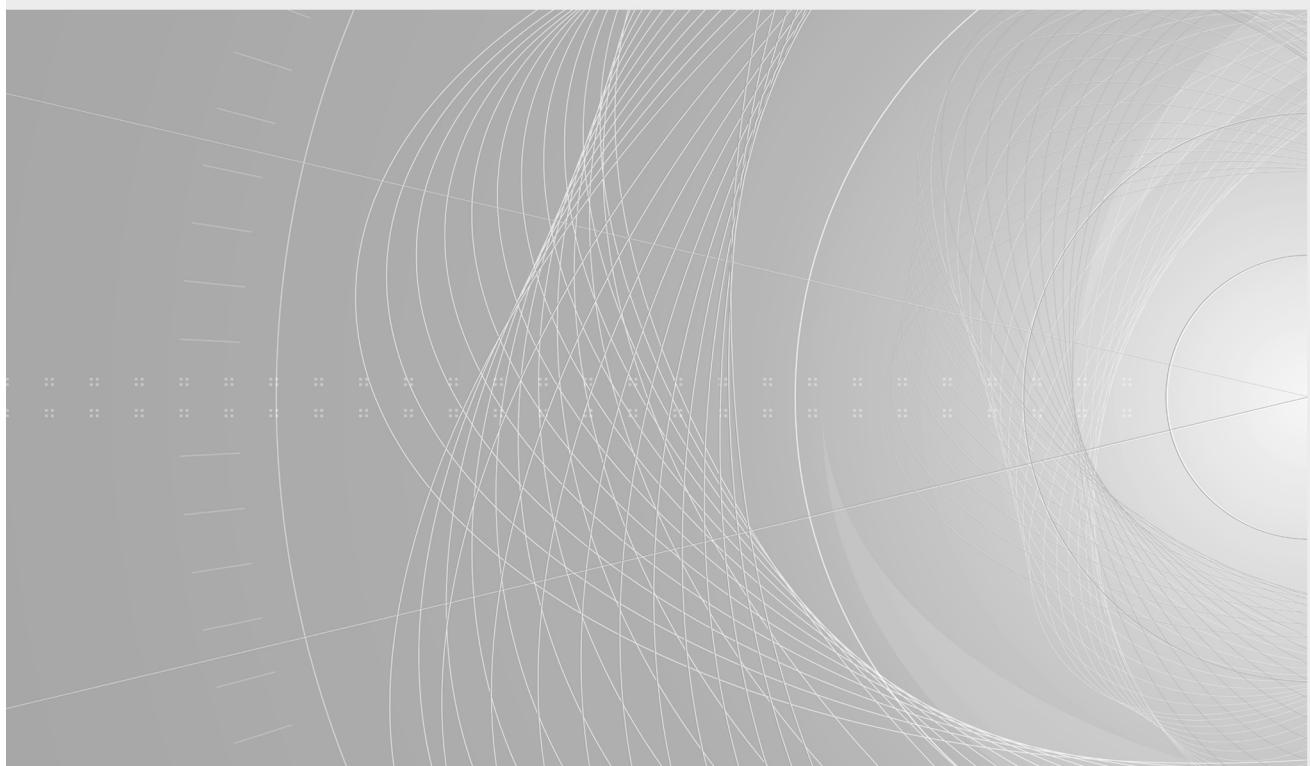
INTERNATIONAL STANDARD

NORME INTERNATIONALE



Explosive atmospheres – IEC STANDARD PREVIEW
Part 14: Electrical installations design, selection and erection
(standards.iteh.ai)

Atmosphères explosives – IEC 60079-14:2013
Partie 14: Conception, sélection et construction des installations électriques
<https://standards.iteh.ai/catalog/standards/sis/41c5787c-3bc6-4b54-9823-1eee7a2ede45/iec-60079-14-2013>





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2013 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

iTeh STANDARD PREVIEW (standards.iteh.ai)

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications. <https://standards.iteh.ai/catalog/standards/sis/41c3787c-5bc6-4b54-9823-007a2ede45/iec-60079-14-2013>

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalelement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 60079-14

Edition 5.0 2013-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Explosive atmospheres – STANDARD PREVIEW
Part 14: Electrical installations design, selection and erection
(standards.iec.ch)

Atmosphères explosives – [IEC 60079-14:2013](#)

Partie 14: Conception, sélection et construction des installations électriques

[1eee7a2ede45/iec-60079-14-2013](#)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX
XG

ICS 26.260.20

ISBN 978-2-8322-1276-9

Warning! Make sure that you obtained this publication from an authorized distributor.

Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60079-14
Edition 5.0 2013-11

EXPLOSIVE ATMOSPHERES –**Part 14: Electrical installations design, selection and erection****INTERPRETATION SHEET 1**

This interpretation sheet has been prepared by subcommittee 31J: Classification of hazardous areas and installation requirements, of IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

ISH	Report on voting
31J/268/ISH	31J/270/RVD

<https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9825>

Full information on the voting for the approval of this interpretation sheet can be found in the report on voting indicated in the above table.

INTERPRETATION SHEET**Interpretation sheet for IEC 60079-14:2013, Explosive atmospheres – Part 14: Electrical installations design, selection and erection**

Following decision No 1 of the SC 31J meeting in Frankfurt in 2016, the issuing of an Interpretation Sheet for IEC 60079-14:2013 was requested, in order to clarify the issues relating to the installation of the converter supply or reduced voltage starting of electric motors.

Details of interpretation:**Interpretation of sub clauses 11.2.1 b), 11.2.2 b), 11.3.5 b), 11.4.1 b) 11.4.2 b), 11.5.1 b), 11.5.2 b), 11.6.1 b) and 11.6.2 b) for Motors with converter supply or reduced voltage starting**

The motor has not been type-tested for this duty as a unit in association with the converter. In this case, means (or equipment) for direct temperature control by embedded temperature sensors specified in the motor documentation or other effective measures for limiting the surface temperature of the motor housing shall be provided. The effectiveness of the temperature control shall take into consideration power, speed range, torque and frequency for the duty required and shall be verified and documented. ***The action of the protective device shall cause the motor to be electrically disconnected.***"

Question

Is physical disconnection, such as a switch (circuit breaker) or contactor, required to accomplish the intent of this requirement ?

Interpretation

The intention of this requirement is to protect the machine from excessive surface temperatures.

Any action within the control circuit for the motor that accomplishes one of the following satisfactorily meets the intent of this requirement:

- direct physical disconnection resulting in no output voltage to the motor, or,
- control circuit intervention such as ceasing modulation, resulting in the motor not operating.

NOTE In this case, voltage to a motor may still exist, but the motor does not operate.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60079-14:2013
<https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9825-1eee7a2ede45/iec-60079-14-2013>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60079-14
Edition 5.0 2013-11

EXPLOSIVE ATMOSPHERES –

Part 14: Electrical installations design, selection and erection

INTERPRETATION SHEET 2

This interpretation sheet has been prepared by subcommittee 31J: Classification of hazardous areas and installation requirements, of IEC technical committee 31: Equipment for explosive atmospheres.

iTeh STANDARD PREVIEW
The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31J/302/DISH	31J/303/RVDISH

<https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9825>

Full information on the voting for the approval of this interpretation sheet can be found in the report on voting indicated in the above table.

Background

With changes to the Type of Protection designations in the IEC 60079 Series, a number of these Type of Protection designations are not identified in the current edition of IEC 60079-14. This may create confusion for end users regarding the correct application of equipment with these Types of Protection.

Question

How should equipment be marked with new Type of Protection designations be handled in accordance with IEC 60079-14?

Interpretation

Equipment marked with new Type of Protection designations shall be applied in accordance with IEC 60079-14 requirements based on the following points and IEC 60079-14:2013, Table 2.

- Ex "eb" should be treated as equivalent to Ex "e"
- Ex "ec" should be treated as equivalent to Ex "nA"
- Ex "db" should be treated as equivalent to Ex "d"
- Ex "dc" requirements should be based on Ex "d" requirements but is only suitable for EPL Gc
- Ex "ob" should be treated as equivalent to Ex "o"
- Ex "oc" requirements should be based on Ex "o" requirements but is only suitable for EPL Gc

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 60079-14:2013](#)

<https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9825-1eee7a2ede45/iec-60079-14-2013>

CONTENTS

FOREWORD	11
INTRODUCTION	16
1 Scope	18
2 Normative references	19
3 Terms and definitions	20
3.1 General	20
3.2 Hazardous areas	21
3.3 Flameproof enclosure	22
3.4 Increased safety	22
3.5 Intrinsic safety	23
3.6 Intrinsic safety parameters	24
3.7 Pressurization	24
3.8 Type of protection “n”	24
3.9 oil-immersion “o”	25
3.10 powder filling “q”	25
3.11 encapsulation “m”	25
3.12 protection by enclosure “t”	25
3.13 Electrical supply systems	25
3.14 Equipment	25
3.15 radio frequency identification (RFID)	26
4 General	26
4.1 General requirements	26
4.2 Documentation	27
4.3 Initial inspection	28
4.4 Assurance of conformity of equipment	28
4.4.1 Equipment with certificates according to IEC standards	28
4.4.2 Equipment without certificates according to IEC standards	28
4.4.3 Selection of repaired, second hand or existing equipment	29
4.5 Qualifications of personnel	29
5 Selection of equipment	29
5.1 Information requirements	29
5.2 Zones	30
5.3 Relationship between equipment protection levels (EPLs) and zones	30
5.4 Selection of equipment according to EPLs	30
5.4.1 General	30
5.4.2 Relationship between EPLs and types of protection	30
5.4.3 Equipment for use in locations requiring EPL “Ga” or “Da”	32
5.4.4 Equipment for use in locations requiring EPL “Gb” or “Db”	32
5.4.5 Equipment for use in locations requiring EPL “Gc” or “Dc”	32
5.5 Selection according to equipment grouping	32
5.6 Selection according to the ignition temperature of the gas, vapour or dust and ambient temperature	33
5.6.1 General	33
5.6.2 Gas or vapour	33
5.6.3 Dust	34
5.7 Selection of radiating equipment	36
5.7.1 General	36

	5.7.2	Ignition process	36
5.8		Selection of ultrasonic equipment	36
	5.8.1	General	36
	5.8.2	Ignition process	37
5.9		Selection to cover external influences	37
5.10		Selection of transportable, portable and personal equipment	38
	5.10.1	General	38
	5.10.2	Transportable and portable equipment.....	39
	5.10.3	Personal equipment.....	39
5.11		Rotating electrical machines	39
	5.11.1	General	39
	5.11.2	Environmental Factors for “Ex” machine installation.....	40
	5.11.3	Power and accessory connections, grounding.....	40
	5.11.4	Motors fed from a converter supply.....	41
	5.11.5	Switching motors above 1kV.....	41
5.12		Luminaires	42
5.13		Plugs and socket outlets	42
	5.13.1	General	42
	5.13.2	Specific requirements for explosive dust atmospheres	42
	5.13.3	Location.....	42
5.14		Cells and batteries.....	42
	5.14.1	Charging of secondary cells and batteries	42
	5.14.2	Ventilation	43
5.15		RFID tags	43
	5.15.1	https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9823-0e7a2ec45/iec-60079-14-2013	43
	5.15.2	Passive RFID tags.....	43
	5.15.3	Mounting RFID tags	43
5.16		Gas detection equipment	43
6		Protection from dangerous (incendive) sparking	44
6.1		Light metals as construction materials	44
6.2		Danger from live parts.....	44
6.3		Danger from exposed and extraneous conductive parts	44
	6.3.1	General	44
	6.3.2	TN type of system earthing	45
	6.3.3	TT type of system earthing	45
	6.3.4	IT type of system earthing	45
	6.3.5	SELV and PELV systems.....	45
	6.3.6	Electrical separation	45
	6.3.7	Non Ex electrical equipment above hazardous areas	45
6.4		Potential equalization.....	46
	6.4.1	General	46
	6.4.2	Temporary bonding.....	47
6.5		Static electricity	47
	6.5.1	General	47
	6.5.2	Avoidance of a build-up of electrostatic charge on construction and protecting parts for locations requiring EPL “Ga”, “Gb” and “Gc”	47
	6.5.3	Avoidance of a build-up of electrostatic charge on construction and protecting parts for locations requiring EPL “Da”, “Db” and “Dc”	49

6.6	Lightning protection	49
6.7	Electromagnetic radiation.....	49
6.7.1	General	49
6.7.2	Radio frequency received in hazardous areas.....	49
6.8	Cathodically protected metallic parts.....	50
6.9	Ignition by optical radiation	50
7	Electrical protection	51
8	Switch-off and electrical isolation.....	51
8.1	General.....	51
8.2	Switch-off.....	51
8.3	Electrical isolation.....	51
9	Cables and wiring systems	52
9.1	General.....	52
9.2	Aluminium conductors.....	52
9.3	Cables	52
9.3.1	General	52
9.3.2	Cables for fixed installations	52
9.3.3	Flexible cables for fixed installations (excluding intrinsically safe circuits)	53
9.3.4	Flexible cables supplying transportable and portable equipment (excluding intrinsically safe circuits)	53
9.3.5	Single insulated wires (excluding intrinsically safe circuits).....	54
9.3.6	Overhead lines	54
9.3.7	Avoidance of damage	54
9.3.8	Cable surface temperature.....	54
9.3.9	Resistance to flame propagation.....	54
9.4	Conduit systems	55
9.5	Additional requirements	56
9.6	Installation requirements	56
9.6.1	Circuits traversing a hazardous area.....	56
9.6.2	Terminations.....	56
9.6.3	Unused cores	56
9.6.4	Openings in walls	56
9.6.5	Passage and collection of flammables	56
9.6.6	Accumulation of dust	57
10	Cable entry systems and blanking elements	57
10.1	General.....	57
10.2	Selection of cable glands	57
10.3	Connections of cables to equipment.....	58
10.4	Additional requirements for entries other than Ex “d”, Ex “t” or Ex “nR”	59
10.5	Unused openings	59
10.6	Additional requirements for type of protection “d” – Flameproof enclosures	59
10.6.1	General	59
10.6.2	Selection of cable glands	60
10.7	Additional requirements for type of protection “t” – Protection by enclosure	60
10.8	Additional requirements for type of protection “nR” – Restricted breathing enclosure	61

11	Rotating electrical machines	61
11.1	General.....	61
11.2	Motors with type of protection “d” – Flameproof enclosures	61
11.2.1	Motors with a converter supply	61
11.2.2	Reduced-voltage starting (soft starting)	62
11.3	Motors with type of protection “e” – Increased safety	62
11.3.1	Mains-operated.....	62
11.3.2	Winding temperature sensors	63
11.3.3	Machines with rated voltage greater than 1 kV.....	64
11.3.4	Motors with converter supply	64
11.3.5	Reduced-voltage starting (soft starting)	64
11.4	Motors with type of protection “p” and “pD” – Pressurized enclosures	64
11.4.1	Motors with a converter supply	64
11.4.2	Reduced-voltage starting (soft starting)	65
11.5	Motors with type of protection “t” – Protection by enclosures supplied at varying frequency and voltage	65
11.5.1	Motors with a converter supply	65
11.5.2	Reduced-voltage starting (soft starting)	66
11.6	Motors with type of protection “nA” – Non-sparking	66
11.6.1	Motors with converter supply	66
11.6.2	Reduced voltage starting (soft starting)	66
11.6.3	Machines with rated voltage greater than 1 kV.....	66
12	Luminaires.....	67
13	Electric heating systems	67
13.1	General.....	67
13.2	Temperature monitoring.....	67
13.3	Limiting temperature	68
13.4	Safety device	68
13.5	Electrical trace heating systems.....	69
14	Additional requirements for type of protection “d” – Flameproof enclosures	69
14.1	General.....	69
14.2	Solid obstacles	70
14.3	Protection of flameproof joints.....	70
14.4	Conduit systems	71
15	Additional requirements for type of protection “e” – Increased safety	71
15.1	General.....	71
15.2	Maximum dissipated power of terminal box enclosures	72
15.3	Conductor terminations	72
15.4	Maximum number of conductors in relation to the cross-section and the permissible continuous current.....	73
16	Additional requirements for types of protection “i” – Intrinsic safety	73
16.1	General.....	73
16.2	Installations to meet the requirements of EPL “Gb” or “Gc” and “Db” or “Dc”	74
16.2.1	Equipment	74
16.2.2	Cables	75
16.2.3	Earthing of intrinsically safe circuits	79
16.2.4	Verification of intrinsically safe circuits	80
16.3	Installations to meet the requirements of EPL “Ga” or “Da”	81

ITEH STANDARD PREVIEW
(standards.iteh.ai)

16.4	Simple apparatus	82
16.5	Terminal boxes	84
16.5.1	General	84
16.5.2	Terminal boxes with only one intrinsically safe circuit	84
16.5.3	Terminal boxes with more than one intrinsically safe circuit	84
16.5.4	Terminal boxes with non-intrinsically safe and intrinsically safe circuits	85
16.5.5	Plugs and sockets used for external connections	85
16.6	Special applications	85
17	Additional requirements for pressurized enclosures	85
17.1	General.....	85
17.2	Type of protection “p”.....	86
17.2.1	General	86
17.2.2	Ducting	86
17.2.3	Action to be taken on failure of pressurization.....	87
17.2.4	Multiple pressurized enclosures with a common safety device	89
17.2.5	Purging.....	89
17.2.6	Protective gas.....	90
17.3	Type of protection “pD”	90
17.3.1	Sources of protective gas	90
17.3.2	Automatic switch-off.....	91
17.3.3	Alarm.....	91
17.3.4	Common source of protective gas.....	91
17.3.5	Switching on electrical supply.....	91
17.4	Rooms for explosive gas atmosphere.....	91
17.4.1	Pressurized rooms	91
17.4.2	Analyser houses	92
18	Additional requirements for type of protection “n”.....	92
18.1	General.....	92
18.2	“nR” equipment	92
18.3	Combinations of terminals and conductors for general connection and junction boxes.....	93
18.4	Conductor terminations	93
19	Additional requirements for type of protection “o”– Oil immersion	93
19.1	General.....	93
19.2	External connections.....	94
20	Additional requirements for type of protection “q” – Powder filling.....	94
21	Additional requirements for type of protection “m” – Encapsulation	94
22	Additional requirements for type of protection “op” – Optical radiation	94
23	Additional requirements for type of protection “t” – Protection by enclosure	95
Annex A (normative) Knowledge, skills and competencies of responsible persons, operatives/technicians and designers		96
A.1	Scope	96
A.2	Knowledge and skills	96
A.2.1	Responsible persons	96
A.2.2	Operatives/technicians (selection and erection)	96
A.2.3	Designers (design and selection)	96
A.3	Competencies	97

A.3.1	General	97
A.3.2	Responsible persons	97
A.3.3	Operatives/technicians	97
A.3.4	Designers	97
A.4	Assessment	98
Annex B (informative)	Safe work procedure guidelines for explosive gas atmospheres	99
Annex C (normative)	Initial inspection – Equipment-specific inspection schedules	100
Annex D (informative)	Electrical installations in extremely low ambient temperature	105
D.1	General.....	105
D.2	Cables	105
D.3	Electrical trace heating systems.....	105
D.4	Lighting systems	105
D.4.1	General	105
D.4.2	Emergency lights	105
D.5	Electrical rotating machines	105
Annex E (informative)	Restricted breathing test for cables	106
E.1	Test procedure.....	106
Annex F (informative)	Installation of electrical trace heating systems.....	107
F.1	General.....	107
F.2	Definitions..... F.2.1 Electrical trace heating system	107
	F.2.2 System components	107
	F.2.3 Site-fabricated trace heaters.....	107
	F.2.4 Location of sensors	108
	F.2.5 Thermal insulation	108 https://standards.iteh.ai/catalog/standards/sist/41c3787c-3bc6-4b54-9825-1eeea2ede45/iec-60079-14-2013
	F.2.6 Personnel aspects	108
F.3	General requirements	108
F.4	Requirements for EPL “Gb”, “Gc”, “Db” and “Dc”	109
F.4.1	General	109
F.4.2	Stabilized design	109
F.4.3	Controlled design.....	109
F.5	Design information	110
F.5.1	Design information drawings and documents	110
F.5.2	Isometric or heater configuration line lists and load charts	110
F.6	Incoming inspections	111
F.6.1	Receiving materials	111
F.6.2	Pre-installation testing	112
F.6.3	Visual examination	112
F.6.4	Insulation resistance test	112
F.6.5	Component substitution	112
F.6.6	Location of power supply	112
F.7	Installation of trace heaters.....	113
F.7.1	General	113
F.7.2	Connections and terminations	114
F.7.3	Conductor terminations.....	115
F.8	Installation of control and monitoring equipment	115
F.8.1	Verification of equipment suitability.....	115
F.8.2	Sensor considerations	115

F.8.3	Controller operation, calibration, and access	119
F.9	Installation of thermal insulation system.....	120
F.9.1	General	120
F.9.2	Preparatory work	120
F.10	Installation of distribution wiring and coordination with branch circuits	120
F.10.1	General	120
F.10.2	Tagging/identification.....	120
F.11	Final installation review.....	120
F.11.1	Necessary modifications	120
F.11.2	Field (site work) circuit insulation resistance test	121
F.11.3	Visual inspection	121
F.12	Commissioning	121
F.12.1	Pre-commissioning check	121
F.12.2	Functional check and final documentation.....	121
Annex G (normative)	Potential stator winding discharge risk assessment – Ignition risk factors	124
Annex H (normative)	Verification of intrinsically safe circuits with more than one associated apparatus with linear current/voltage characteristics	125
H.1	General.....	125
H.2	Intrinsic safety with level of protection “ib”	125
H.3	Intrinsic safety with level of protection “ic”	125
Annex I (informative)	Methods of determining the maximum system voltages and currents in intrinsically safe circuits with more than one associated apparatus with linear current/voltage characteristics (as required by Annex H).....	126
I.1	Intrinsically safe circuits with linear current/voltage characteristics	126
I.2	Intrinsically safe circuits with non-linear current/voltage characteristics	128
Annex J (informative)	Determination of cable parameters	129
J.1	Measurements	129
J.2	Cables carrying more than one intrinsically safe circuit	129
J.2.1	General	129
J.2.2	Type A cables.....	129
J.2.3	Type B cables.....	130
J.2.4	Type C cables.....	130
J.3	FISCO.....	130
Annex K (normative)	Additional requirements for type of protection “op” – Optical radiation	131
K.1	General.....	131
K.2	Inherently safe optical radiation “op is”	131
K.2.1	General	131
K.2.2	Change of cross sections.....	131
K.2.3	Coupler.....	131
K.3	Protected optical radiation “op pr”	131
K.3.1	General	131
K.3.2	Radiation inside enclosures	132
K.4	Optical radiation interlocked with optical breakage “op sh”	132
Annex L (informative)	Examples of dust layers of excessive thickness	133
Annex M (informative)	Hybrid mixtures.....	134
M.1	General.....	134
M.2	Concentration limits	134

M.3	Energy/temperature limits	134
M.4	Selection of equipment.....	134
M.5	Use of flameproof equipment	134
M.6	Electrostatic hazard	134
M.7	Installation requirements	135
Bibliography.....		136

Figure 1 – Correlation between the maximum permissible surface temperature and depth of dust layers	35
Figure 2 – Earthing of conducting screens	76
Figure F.1 – Typical installation of control sensor and sensor for temperature limiting control	117
Figure F.2 – Limiting device sensor on sheath of trace heater.....	118
Figure F.3 – Limiting device sensor as artificial hot spot	119
Figure I.1 – Series connection – Summation of voltage	127
Figure I.2 – Parallel connection – Summation of currents.....	127
Figure I.3 – Series and parallel connections – Summations of voltages and summations of currents.....	128
Figure L.1 – Examples for dust layers of excessive thickness with the requirement of laboratory investigation	133

THE STANDARD PREVIEW

(standards.iteh.ai)

Table 1 – Equipment protection levels (EPLs) where only zones are assigned	30
Table 2 – Default relationship between types of protection and EPLs.....	31
Table 3 – Relationship between gas/vapour or dust subdivision and equipment group	33
Table 4 – Relationship between gas or vapour ignition temperature and temperature class of equipment.....	34
Table 5 – Limitation of surface areas	48
Table 6 – Maximum diameter or width.....	48
Table 7 – Limitation of thickness of non-metallic layer	48
Table 8 – Radio frequency power thresholds.....	50
Table 9 – Radio-frequency energy thresholds	50
Table 10 – Selection of glands, adapters and blanking elements type of protection according to the enclosure type of protection	58
Table 11 – Level of protection, equipment group and ingress protection relationship	61
Table 12 – Requirements for the temperature monitoring systems	68
Table 13 – Minimum distance of obstruction from the flameproof flange joints related to the gas group of the hazardous area.....	70
Table 14 – Example of defined terminal/conductor arrangement – Maximum number of wires in relation to the cross-section and the permissible continuous current	73
Table 15 – Variation in maximum power dissipation with ambient temperature for Equipment Group II.....	83
Table 16 – Determination of type of protection (with no flammable release within the enclosure).....	86
Table 17 – Use of spark and particle barriers	87
Table 18 – Summary of protection requirements for enclosures without an internal source of release	88
Table 19 – Summary of protection requirements for enclosures	90