

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Explosive atmospheres –
Part 19: Equipment repair, overhaul and reclamation**

**Atmosphères explosives –
Partie 19: Réparation, révision et remise en état de l'appareil**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

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

IEC 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: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC 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.

IEC Just Published - webstore.iec.ch/justpublished

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

Service Clients - webstore.iec.ch/csc

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

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Explosive atmospheres –
Part 19: Equipment repair, overhaul and reclamation**

**Atmosphères explosives –
Partie 19: Réparation, révision et remise en état de l'appareil**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.260.20

ISBN 978-2-8322-7527-6

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.
--

CONTENTS

FOREWORD	8
INTRODUCTION	13
1 Scope	14
2 Normative references	14
3 Terms and definitions	15
4 General	20
4.1 General principles	20
4.2 Instructions for the user	20
4.2.1 Ex Equipment Certificates and schedule drawings	20
4.2.2 Records and work instructions	21
4.2.3 Re-installation of repaired equipment	21
4.2.4 Service facilities	21
4.3 Instructions for the service facility	21
4.3.1 Statutory requirements	21
4.3.2 Repair and overhaul	21
4.3.3 Reclamations	26
4.3.4 Alterations and modifications	29
4.3.5 Temporary repairs	30
4.3.6 Electric machines	30
4.3.7 Control equipment	32
5 Additional requirements for the repair and overhaul of equipment with Type of Protection "d"	32
5.1 Application	32
5.2 Repair and overhaul	33
5.2.1 Enclosures	33
5.2.2 Water jackets	34
5.2.3 Entries into enclosures	34
5.2.4 Terminations	34
5.2.5 Insulation	34
5.2.6 Internal connections	34
5.2.7 Electric machines	34
5.2.8 Auxiliary equipment	35
5.3 Reclamation	36
5.3.1 General	36
5.3.2 Enclosures	36
5.3.3 Sleeving	38
5.3.4 Shafts and housings	38
5.3.5 Sleeve bearings	38
5.3.6 Rotors and stators	38
5.4 Alterations and modifications	38
5.4.1 Enclosures	38
5.4.2 Entries into enclosures	38
5.4.3 Terminations	39
5.4.4 Windings	39
5.4.5 Auxiliary equipment	39

6	Additional requirements for the repair and overhaul of equipment with Type of Protection "i"	39
6.1	Application	39
6.2	Repair and overhaul.....	40
6.2.1	Enclosures	40
6.2.2	Cable glands	40
6.2.3	Terminations.....	40
6.2.4	Soldered connections	40
6.2.5	Fuses	41
6.2.6	Relays	41
6.2.7	Shunt diode safety barriers and galvanic isolators	41
6.2.8	Printed circuit boards.....	41
6.2.9	Optocouplers and piezoelectric components	42
6.2.10	Electrical components.....	42
6.2.11	Batteries	42
6.2.12	Internal wiring.....	42
6.2.13	Transformers	43
6.2.14	Encapsulated components	43
6.2.15	Non-electrical parts	43
6.2.16	Testing	43
6.3	Reclamation.....	43
6.4	Modifications.....	43
7	Additional requirements for the repair and overhaul of equipment with Type of Protection "p"	43
7.1	Application	43
7.2	Repair and overhaul.....	44
7.2.1	Enclosures	44
7.2.2	Entries into enclosures	44
7.2.3	Terminations.....	44
7.2.4	Insulation.....	44
7.2.5	Internal connections	44
7.2.6	Electric machines	45
7.2.7	Auxiliary devices.....	46
7.2.8	Light-transmitting parts	46
7.2.9	Encapsulated parts	46
7.2.10	Batteries	46
7.2.11	Lamps	46
7.2.12	Lampholders.....	46
7.2.13	Ballasts	46
7.3	Reclamation.....	46
7.3.1	General	46
7.3.2	Enclosures	46
7.3.3	Shafts and housings	47
7.3.4	Sleeve bearings.....	47
7.3.5	Rotors and stators	47
7.4	Alterations and modifications	47
7.4.1	Enclosures	47
7.4.2	Entries into enclosures	47
7.4.3	Terminations.....	47

7.4.4	Windings	48
7.4.5	Auxiliary equipment	48
7.5	Pressurization system	48
8	Additional requirements for the repair and overhaul of equipment with Type of Protection "e"	48
8.1	Application	48
8.2	Repair and overhaul.....	49
8.2.1	Enclosures	49
8.2.2	Entries into enclosures	49
8.2.3	Terminations.....	49
8.2.4	Insulation.....	49
8.2.5	Internal connections	49
8.2.6	Electric machines	50
8.2.7	Light-transmitting parts	52
8.2.8	Encapsulated parts	52
8.2.9	Batteries.....	53
8.2.10	Lamps	53
8.2.11	Lampholders.....	53
8.2.12	Ballasts	53
8.2.13	Breathing devices	53
8.3	Reclamation.....	53
8.3.1	General	53
8.3.2	Enclosures	53
8.3.3	Sleeve bearings.....	54
8.3.4	Rotors and stators	54
8.4	Alterations and modifications	54
8.4.1	Enclosures	54
8.4.2	Entries into enclosures	54
8.4.3	Terminations.....	54
8.4.4	Windings	54
8.4.5	Auxiliary equipment	55
9	Additional requirements for the repair and overhaul of equipment with Type of Protection "n"	55
9.1	Application	55
9.2	Repair and overhaul.....	55
9.2.1	Enclosures	55
9.2.2	Entries into enclosures	55
9.2.3	Terminations.....	56
9.2.4	Insulation.....	56
9.2.5	Internal connections	56
9.2.6	Electric machines	56
9.2.7	Light-transmitting parts	58
9.2.8	Encapsulated parts	58
9.2.9	Batteries.....	59
9.2.10	Lamps	59
9.2.11	Lampholders.....	59
9.2.12	Ballasts	59
9.2.13	Enclosed break devices	59
9.2.14	Breathing devices	59

9.3	Reclamation.....	59
9.3.1	General	59
9.3.2	Enclosures	59
9.3.3	Joints	59
9.3.4	Shafts and housings	60
9.3.5	Sleeve bearings.....	60
9.3.6	Rotors and stators	60
9.4	Alterations and modifications	60
9.4.1	Enclosures	60
9.4.2	Entries into enclosures	60
9.4.3	Terminations.....	60
9.4.4	Windings	60
9.4.5	Auxiliary equipment	61
10	Additional requirements for the repair and overhaul of equipment covered by IEC 60079-26	61
11	Additional requirements for the repair and overhaul of equipment with Type of Protection “t” (formerly “tD” or DIP).....	61
11.1	Application	61
11.2	Repair and overhaul.....	61
11.2.1	Enclosures	61
11.2.2	Entries into enclosures	62
11.2.3	Terminations.....	62
11.2.4	Insulation.....	62
11.2.5	Internal connections	62
11.2.6	Electric machines	62
11.2.7	Light-transmitting parts	63
11.2.8	Batteries.....	63
11.2.9	Lamps	63
11.2.10	Lamp holders.....	64
11.2.11	Ballasts	64
11.2.12	Breathing devices	64
11.3	Reclamation.....	64
11.3.1	General	64
11.3.2	Enclosures	64
11.3.3	Joints	64
11.3.4	Shafts and housings	64
11.3.5	Sleeve bearings.....	65
11.3.6	Rotors and stators	65
11.4	Alterations and modifications	65
11.4.1	Enclosures	65
11.4.2	Entries into enclosures	65
11.4.3	Windings	65
11.4.4	Auxiliary equipment	65
12	Requirements for the repair and overhaul of equipment with Type of Protection “o”.....	65
12.1	Application	65
12.2	Repair and overhaul.....	66
12.2.1	Associated Types of Protection.....	66
12.2.2	Removal of protective liquid.....	66

12.2.3	Replacement of components.....	66
12.2.4	Preparation for replacing protective liquid.....	66
12.2.5	Protective liquid.....	66
12.2.6	Closure of container	66
12.3	Reclamation.....	66
12.4	Modifications.....	67
13	Requirements for the repair and overhaul of equipment with Type of Protection “q”	67
13.1	Application.....	67
13.2	Repair and overhaul.....	67
13.2.1	Associated Types of Protection.....	67
13.2.2	Removal of protective materials.....	67
13.2.3	Replacement of components.....	67
13.2.4	Preparation for replacing protective materials	67
13.2.5	Protective materials	67
13.2.6	Closure of container	67
13.3	Reclamation.....	68
13.4	Modifications.....	68
14	Requirements for the repair and overhaul of equipment with Type of Protection “s”	68
15	Electrical resistance trace heating	68
Annex A (normative)	Identification of repaired equipment by marking	69
A.1	Marking information	69
A.2	Symbols.....	69
A.2.1	Repair in accordance with schedule drawings or manufacturer's specification	69
A.2.2	Repair in accordance with the Type of Protection standards but not the schedule drawings	69
A.2.3	Other situations	70
Annex B (normative)	Knowledge, skills and competence of responsible persons and operatives.....	71
B.1	General.....	71
B.2	Knowledge and skills	71
B.2.1	Responsible persons	71
B.2.2	Operatives.....	71
B.3	Competence	71
B.3.1	General	71
B.3.2	Responsible persons	72
B.3.3	Operatives.....	72
B.4	Assessment	72
B.5	Qualification of reclamation operatives.....	72
Annex C (normative)	Requirements for measurements in flameproof equipment during overhaul, repair and reclamation (including guidance on tolerances).....	73
Annex D (informative)	Evaluation of best practice during rewinding and repair.....	76
Annex E (informative)	Additional requirements relating to Ex control equipment	77
E.1	General.....	77
E.2	Common items.....	77
E.3	Isolators and circuit interrupters.....	77
E.4	Interlocks and mechanical linkages.....	78
E.5	Earth fault devices	78
E.6	Other devices	78

E.7 Transformers	78
Bibliography.....	80
Figure A.1 – Repair in accordance with IEC 60079-19 and schedule drawings or manufacturer's specification.....	69
Figure A.2 – Repair in accordance with the Type of Protection standards but with insufficient evidence of full compliance with the schedule drawings	70
Figure C.1 – Determination of maximum gap of reclaimed parts.....	75
Table C.1 – Determination of maximum gap of reclaimed parts	73

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 19: Equipment repair, overhaul and reclamation****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60079-19 has been prepared by subcommittee 31J: Classification of hazardous areas and installation requirements, of IEC technical committee 31: Equipment for explosive atmospheres.

This fourth edition cancels and replaces the third edition published in 2010 together with Amendment 1:2015. This edition constitutes a technical revision.

The significance of the changes between IEC 60079-19, Edition 3 (2010), including Amendment 1 (2015), and IEC 60079-19, Edition 4 (2019) are as listed below:

Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Relationship between IEC 60034-23 and IEC 60079-19	Introduction	X		
Document applicable to Type(s) of Protection “o” and “q”	1		X	
Standard for electrical resistance trace heating added	2		X	
Terms “repair facility” and “service facility” are considered equivalent. Changed “repair facility” to “service facility”	3 to 15	X		
Terms and definitions aligned alphabetically	3	X		
Clarification of definition “certificate”	3.2	X		
Addition of definition “Component Certificate”	3.2.1		X	
Addition of definition “Ex Equipment Certificate”	3.2.2		X	
Addition of definition “schedule drawing”	3.2.3		X	
Change in terms used from “certificate documents” to “schedule drawing”	4 Annex E	X		
Change in terms used from “certificate documents” to “Ex Equipment Certificates” and “schedule drawings”	4.2.1	X		
Change in terms used from “motor”, “rotating machine”, “rotating electrical machine” to “electric machine”	All	X		
Addition of specific operating requirements	4.3.2.1		X	
Clarification of requirements for repair of components	4.3.2.3		X	
Addition of a requirement to review “X” conditions	4.3.2.4.2		X	
Change in terms from “bolt” to “fastener”	4.3.2.5.2	X		
Addition of bullet point for marking of repairs to certification documentation	4.3.2.6 a)		X	
Addition of bullet point for fitness for purpose assessment to IEC 60079-17	4.3.2.6 e)		X	
Additional actions to be taken in case of uncertainty of a reclamation	4.3.3.1		X	
Change of “subject to repair” to “repairable”	4.3.3.2	X		
Elimination of duplication of requirements	4.3.3.3.1	X		
Addition of bullet point including other welding techniques to ISO 4063	4.3.3.4.5		X	
Addition of requirement for threaded hole verification using GO, NO-GO gauges and threaded hole reclamation test	4.3.3.4.7		X	
The role of a service facility clarified to exclude the role of a manufacturer when making alterations	4.3.4.1		X	
Addition of requirement that the Ex report following equipment modification shall not have an attestation of compliance	4.3.4.2		X	
Clarification of repairer's duty to confirm service condition following any reclamation	4.3.6.2	X		
Restructuring of requirements relating to testing of electric machines as subclauses of 4.3.6 from Type of Protection clauses 5, 7, 8, 9, 10 and 11 in previous editions.	4.3.6.3.1 and 4.3.6.3.2	X		
Addition of a requirement for greases with non-evaporating solvents for joint corrosion protection materials	5.2.1.1		X	
Revised a recommendation to a requirement “should” to “shall”	5.2.4		X	
Revised a recommendation to a requirement. “is necessary” to “shall be taken”	5.2.7.2		X	
Text amended to make requirement clearer	5.2.8.1	X		

Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Addition of requirement for threaded hole verification using GO, NO-GO gauge and threaded hole reclamation tests	5.3.2.3		X	
Addition of requirements for Type of Protection “i” requiring repair to manufacturer’s documentation and certificate requirements only Repair of multilayer boards or any board with surface mounted devices are excluded	6.1			C1
Addition of “thermal property” requirement for terminations	6.2.3		X	
Change in text of requirements for soldered connections	6.2.4	X		
Revised a recommendation to a requirement for fuses, “inappropriate” to “not permitted”	6.2.5		X	
Addition of requirement for printed circuit board repair	6.2.8		X	
Change in text of requirement for electrical components replacing “certification” by “assessment by a suitable competent person”	6.2.10	X		
Elimination of duplication of text	6.2.11	X		
Change in text for internal wiring replacing “certification” by “assessment by a suitable competent person”	6.2.12	X		
Addition of Type(s) of Protection marks with Explosion Protection Levels	7		X	
Addition of new subclause detailing requirements for verification of pressurization system	7.5		X	
Addition of “Level of Protection” to clarify “eb”	8	X		
Change in requirements for copy winding as introduced in IEC 60079-19:2010/AMD 1:2015	8.2.6.1.2		X	
Elimination of duplication of note and text and correction of bullet point letters	8.2.6.1.2			
Change in text to clarify the requirements for windings with voltage > 1 000 V	8.2.6.1.3	X		
Change in text to clarify the requirements relating to “light transmitting parts”	8.2.7	X		
Addition of Type of Protection “e” with Level of Protection “ec”	9	X	X	
Change in text to clarify the requirements for windings with voltage > 1 000 V	9.2.6.1.4	X		
Text moved from body of text in 9.2.6.1.3 to a new subclause to clarify that copy winding requirements apply to all voltages	9.2.6.1.5		X	
Addition of requirement from IEC 60079-19:2010/AMD 1:2015 that core losses after stripping shall not exceed 110 % of core losses before stripping	9.2.6.1.5 j) – s)		X	
Elimination of duplication of requirement in 4.3.6.2.1	9.2.6.1.5 t)	X		
Addition of Type of Protection standard numbers	11.1	X		
Addition of new Level of Protection marks “pxb”, “pyb” and “pzc”	7.1	X		
Addition of new clause with requirements for Type of Protection “o”	12		X	
Addition of new clause with requirements for Type of Protection “q”	13		X	
Addition of new clause with requirements for Type of Protection “s”	14		X	

Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Addition of new clause with requirements for electric resistance trace heating"	15		X	
Addition of new Figure 1 description to clarify the intent of R in a square	A.2.1	X		
Addition of new Figure 2 description to clarify the intent of R in an inverted triangle	A.2.2	X		

NOTE 1 The technical changes referred to include the significance of technical changes in the revised IEC standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance can be found by referring to the Redline version of the standard.

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 from the previous standard.

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 an overhaul or repair of product to the preceding edition will not always be able to fulfil the requirements given in the later edition. For these changes additional information is provided in clause B) below.

NOTE These changes represent current technological knowledge. However, these changes do not normally have an influence on equipment already placed on the market.

B) Information about the background of 'major technical changes'

- C1 Due to the detailed nature of Type of Protection "i", repair to other than manufacturers schedule drawings risks violation of the Type of Protection. Some components such as multi-layer boards are not suitable for repair.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
31J/295/FDIS	31J/297/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60079 series, published under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

When equipment is installed in areas where dangerous concentrations and quantities of flammable gases, vapours or dusts may be present in the atmosphere, protective measures are applied to reduce the likelihood of explosion due to ignition by arcs, sparks or hot surfaces produced either in normal operation or under specified fault conditions.

This part of IEC 60079 is supplementary to other relevant IEC standards, for example the IEC 60034 series, in particular IEC 60034-23, and also refers to the IEC 60079 series and its appropriate parts for the design requirements of suitable electrical equipment.

The nature of the explosion protection offered by each Type of Protection varies according to its unique features.

This document gives guidance on the practical means of maintaining the explosion protection of repaired equipment. This document also defines procedures for repair, overhaul or reclamation and verification of continued compliance of the equipment with the provisions of the Ex Equipment Certificate or with the provisions of the appropriate explosion protection standard where an Ex Equipment Certificate is not available.

It is intended that the users utilize the most appropriate service facilities for any particular item of equipment, whether they be the facilities of the manufacturer or a suitably competent and equipped repairer.

This document recognizes the necessity of a required level of competence for the repair, overhaul and reclamation of the equipment. Some manufacturers may recommend that the equipment be repaired only by them.

Much of the content of this document is concerned with the repair and overhaul of electric machines. This is because they are items of repairable Ex equipment in which, irrespective of the Type of Protection involved, sufficient commonality of construction exists as to make possible more detailed instructions for their repair, overhaul, reclamation or modification.

EXPLOSIVE ATMOSPHERES –

Part 19: Equipment repair, overhaul and reclamation

1 Scope

This part of IEC 60079:

- gives instructions, principally of a technical nature, on the repair, overhaul, reclamation and modification of Ex equipment designed for use in explosive atmospheres;
- applies to overhaul and repair which mitigates deficiencies identified during operation, inspection and maintenance;
- does not give advice on cable and wiring systems which can require a renewal when the equipment is re-installed; and
- is not applicable to Type of Protection “m”.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-23: Rotating electrical machines - Part 23: Repair, overhaul and reclamation

IEC 60079-0:2017, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures “d”*

IEC 60079-2, *Explosive atmospheres – Part 2: Equipment protection by pressurized enclosure “p”*

IEC 60079-6, *Explosive atmospheres – Part 6 Equipment protection by liquid immersion “o”*

IEC 60079-7, *Explosive atmospheres – Part 7: Equipment protection by increased safety “e”*

IEC 60079-11:2011, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”*

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

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

IEC 60079-26, *Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga*

IEC/IEEE 60079-30-1, *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements*

IEC/IEEE 60079-30-2, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance*

IEC 60079-31, *Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure “t”*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

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

IEC 61241-01, *Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements*

IEC 61241-12, *Electrical apparatus for use in the presence of combustible dust – Part 1: Protection by enclosures “tD”*

IEC 61241-1-13, *Electrical apparatus for use in the presence of combustible dust – Part 1-1: Electrical apparatus protected by enclosures and surface temperature limitation – Specification for apparatus*

IEC 61241-44, *Electrical apparatus for use in the presence of combustible dust – Part 4: Type of Protection “pD”*

ISO 4526, *Metallic coatings – Electroplated coatings of nickel for engineering purposes*

ISO 6158, *Metallic coatings – Electrodeposited coatings of chromium for engineering purposes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE Additional definitions applicable to explosive atmospheres can be found in IEC 60050-426.

3.1

alteration

change to a product that results in an alternative construction that is described in the certificate documentation

1 Withdrawn.

2 Withdrawn.

3 Withdrawn.

4 Withdrawn.