

Electrical apparatus for explosive gas atmospheres —

**Part 19: Repair and overhaul for
apparatus used in explosive
atmospheres (other than mines or
explosives)**

ICS 29.260.20

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

National foreword

This British Standard reproduces verbatim IEC 60079-19:1993 and implements it as the UK national standard.

The UK participation in its preparation was entrusted by Technical Committee GEL/31, Electrical apparatus for explosive atmospheres, to Subcommittee GEL/31/11, Code of practice for electrical apparatus for explosive atmospheres, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

From 1 January 1997, all IEC publications have the number 60000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 60027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the IEC title page, page ii, pages 1 to 22 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 October 1997

© BSI 09-1999

ISBN 0 580 28548 0

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
National foreword	Inside front cover
Text of IEC 79-19	1

**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC
79-19**

Première édition
First edition
1993-09

**Matériel électrique pour atmosphères explosives
gazeuses**

Partie 19:

Réparation et révision du matériel utilisé en
atmosphères explosives (autre que celui utilisé dans
les mines ou pour la fabrication des explosifs)

**Electrical apparatus for explosive gas
atmospheres**

Part 19:

Repair and overhaul for apparatus used in explosive
atmospheres (other than mines or explosives)



Numéro de référence
Reference number
CEI/IEC 79-19: 1993



Documents

Document Sharing Hub

Contents

	Page
Introduction	1
1 Scope	1
2 General requirements	2
2.1 Normative references	2
2.2 Definitions and terms	2
2.3 Statutory requirements	3
2.4 Instructions for the manufacturer	4
2.5 Instructions for the user	4
2.6 Instructions for the repairer	4
3 Additional requirements for the repair and overhaul of an apparatus with type of protection “d” (flameproof)	7
3.1 Application	7
3.2 Repair and overhaul	7
3.3 Reclamation	9
3.4 Modifications	10
4 Additional requirements for the repair and overhaul of an apparatus with type of protection “i” (intrinsic safety)	11
4.1 Application	11
4.2 Repair and overhaul	11
4.3 Reclamation	12
4.4 Modifications	12
5 Additional requirements for the repair and overhaul of an apparatus with type of protection “p” (pressurized)	13
5.1 Application	13
5.2 Repair and overhaul	13
5.3 Reclamation	14
5.4 Modifications	15
6 Additional requirements for the repair and overhaul of an apparatus with type of protection “e” (increased safety)	15
6.1 Application	15
6.2 Repair and overhaul	15
6.3 Reclamation	17
6.4 Modifications	18
7 Additional requirements for the repair and overhaul of an apparatus with type of protection “n” (non-sparking)	18
7.1 Application	18
7.2 Repair and overhaul	18
7.3 Reclamation	20
7.4 Modifications	21
Annex A (normative) Identification of repaired apparatus by marking	22

Introduction

When an electrical apparatus is installed in areas where dangerous concentrations and quantities of flammable gases, vapours or mists may be present in the atmosphere, protective measures are to be 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 79 is supplementary to other relevant IEC standards, for example IEC 364 as regards installation requirements, and also refers to IEC 79 and its appropriate parts for the design requirements of suitable electrical apparatus.

Clause 2 of this part of IEC 79 contains general requirements for the repair and overhaul of an apparatus and should be read in conjunction with the other relevant clauses of this standard dealing with the detailed requirements for individual types of protection.

In cases where a protection apparatus incorporates more than one type of protection, reference should be made to all clauses involved.

This part not only gives guidance on the practical means of maintaining the electrical safety and performance requirements of repaired apparatus, but also defines procedures for maintaining, after repair, compliance of the apparatus with the provisions of the certificate of conformity or with the provisions of the appropriate explosion protection standard where a certificate is not available.

The nature of the explosion protection offered by each type of protection varies according to its unique features. Reference should be made to the appropriate standard(s) for details.

Users will utilize the most appropriate repair facilities for any particular item of equipment, whether they be the facilities of the manufacturer or a suitably competent and equipped repairer (see note 1).

This part recognizes the necessity of a required level of competence for the repair of the apparatus. Some manufacturers may recommend that the apparatus be repaired only by them.

In the case of the repair or overhaul of an apparatus which has been the subject of third-party certification, it may be necessary to clarify the position of the continued conformity of the apparatus with the certificate.

NOTE 1 Whilst some manufacturers recommend that certain equipment be returned to them for repair and some nominate repairers, there are also competent independent repair organizations who have the facilities to carry out this class of work.

NOTE 2 Third-party certification is generally not a legal requirement, but may be in specific areas of application.

Assuming that repairs and overhauls are carried out using good engineering practices then:

- a) if manufacturers' specified parts or parts as specified in the certification documentation are used in a repair or overhaul, the apparatus is presumed to be in conformity with the certificate;
- b) if repairs or modifications are carried out on the apparatus specifically as detailed in the certification documents, the apparatus should still conform with the certificate;
- c) if repair or overhaul is carried out on the apparatus in accordance with this standard and other relevant standard(s), although not in compliance with a) and b) above, then it is unlikely that the apparatus will be unsafe although it may not conform fully with the certificate;
- d) if other repair or modification techniques are used, then it will be necessary to ascertain, from the manufacturers, and/or the certification authority, the suitability of the apparatus for continued use in a potentially explosive atmosphere.

1 Scope

This part of IEC 79:

- gives instructions, principally of a technical nature, on the repair, overhaul, reclamation and modification of a certified apparatus designed for use in explosive atmospheres (other than mining applications or explosive processing and manufacture);
- is not applicable to maintenance, other than when repair and overhaul cannot be disassociated from maintenance, neither does it give advice on cable entry systems which may require renewal when the apparatus is re-installed;
- assumes that good engineering practices are adopted throughout.

NOTE Much of the content of this standard is concerned with the repair and overhaul of electrical rotating machines. This is not because they are the most important items of explosion-protected equipment but rather because they are often major items of repairable capital equipment in which, whatever type of protection is involved, sufficient commonality of construction exists as to make possible more detailed instructions for their repair, overhaul, reclamation or modification.

2 General requirements

This clause covers those aspects of repair, overhaul, reclamation and modification which are common to all explosion-protected apparatus. Subsequent clauses provide instructions for the additional requirements relevant to specific types of protection. When an apparatus incorporates more than one type of protection, reference shall be made to the appropriate clauses.

NOTE Additional requirements for types of protection “o” and “q” have not been defined.

2.1 Normative references

The following normative documents contain provisions which, through reference in the text, constitute provisions of this part of IEC 79. At the time of publication, the editions were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 79 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 34, *Rotating electrical machines*.

IEC 79, *Electrical apparatus for explosive gas atmospheres*.

IEC 79-0:1983, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements*.

IEC 79-1:1990, *Electrical apparatus for explosive gas atmospheres — Part 1: Construction and verification test of flameproof enclosures of electrical apparatus*.

IEC 79-1A:1975, *Electrical apparatus for explosive gas atmospheres — First supplement: Appendix D: Method of test for ascertainment of maximum experimental safe gap*.

IEC 79-2:1983, *Electrical apparatus for explosive gas atmospheres — Part 2: Electrical apparatus — type of protection “p”*.

IEC 79-7:1990, *Electrical apparatus for explosive gas atmospheres — Part 7: Increased safety “e”*.

IEC 79-11:1991, *Electrical apparatus for explosive gas atmospheres — Part 11: Intrinsic safety “i”*.

IEC 79-14:1984, *Electrical apparatus for explosive gas atmospheres — Part 14: Electrical installations in explosive gas atmospheres (other than mines)*.

IEC 79-15:1987, *Electrical apparatus for explosive gas atmospheres — Part 15: Electrical apparatus with type of protection “n”*.

IEC 85:1984, *Thermal evaluation and classification of electrical insulation*.

IEC 364:1989, *Electrical installations of buildings*.

IEC 529:1989, *Degrees of protection provided by enclosures (IP Code)*.

ISO 4526:1984, *Metallic coatings — Electroplated coatings of nickel for engineering purposes*.

ISO 6158:1984, *Metallic coatings — Electroplated coatings of chromium for engineering purposes*.

ISO 9000:1987, *Quality management and quality assurance standards — Guidance for selection and use*.

2.2 Definitions and terms

For the purpose of this part of IEC 79, the following definitions apply.

2.2.1

serviceable condition

condition which permits a replacement or reclaimed component part to be used without prejudice to the performance or explosion protection aspects of the apparatus, with due regard to the certification requirements as applicable, in which such a component part is used

2.2.2

repair

action to restore a faulty apparatus to its fully serviceable condition and in compliance with the relevant standard

NOTE The relevant standard means the standard to which the apparatus was originally designed.

2.2.3

overhaul

action to restore to a fully serviceable condition an apparatus which has been in use or in storage for a period of time but which is not faulty

2.2.4

maintenance

routine actions taken to preserve the fully serviceable condition of the installed apparatus

2.2.5

component part

an indivisible item

NOTE The assembly of such items may form an apparatus.

2.2.6

reclamation

means of repair involving, for example, the removal or addition of material to reclaim component parts which have sustained damage, in order to restore such parts to a serviceable condition in accordance with the relevant standard

NOTE The relevant standard means the standard to which the individual parts were originally manufactured.

2.2.7**modification**

change to the design of the apparatus which affects material, fit, form or function

2.2.8**manufacturer**

maker of the apparatus (who may also be the supplier, the importer or the agent) in whose name usually the certification where appropriate of the apparatus was originally registered

2.2.9**user**

user of the apparatus

2.2.10**repairer**

repairer of the apparatus who may be the manufacturer, the user or a third party (repair agency)

2.2.11**certification**

certification leading to the issue of a certificate of conformity which refers primarily to assessments of apparatus carried out by a recognized testing authority

this standard may also apply to apparatus certified by other certification authorities, or to apparatus which has been self-certified by manufacturers or users as complying with recognized standards

2.2.12**certificate references**

a certificate reference number may refer to a single design or a range of apparatus of similar design the suffix "X" when added to the certificate number indicates special conditions of use and that the certification documents need to be studied before such apparatus is installed, repaired, overhauled, reclaimed or modified

NOTE See 25.2 9) of IEC 79-0.

2.2.13**copy winding**

process by which a winding is totally or partially replaced by another, the characteristics and properties of which are at least as good as those of the original

2.2.14**type of protection "d"**

type of protection in which parts which can ignite an explosive atmosphere are placed in an enclosure which can withstand the pressure developed during an explosion of an explosive mixture and which prevents the transmission of the explosion to the explosive atmosphere surrounding the enclosure

2.2.15**type of protection "i"**

circuit in which no spark or any thermal effect produced in the test conditions prescribed in the relevant standard(s) (which include normal operation and specific fault condition) is capable of causing ignition of a given explosive atmosphere

2.2.16**type of protection "p"**

type of protection by which the entry of a surrounding atmosphere into the enclosure of the electrical apparatus is prevented by maintaining, inside the said enclosure, a protective gas at a higher pressure than that of the surrounding atmosphere. The overpressure is maintained either with or without a continuous flow of the protective gas

2.2.17**type of protection "e"**

type of protection by which measures are applied so as to prevent, with a higher degree of security, the possibility of excessive temperatures and the occurrence of arcs or sparks in the interior and on the external parts of the electrical apparatus which would not produce them in normal service

2.2.18**type of protection "n"**

type of protection applied to the electrical apparatus such that, in normal operation, it is not capable of igniting the surrounding explosive atmosphere and that a fault capable of causing ignition is not likely to occur

2.3 Statutory requirements**2.3.1 General**

The repairer should be aware of certain specific requirements in the relevant national legislation which may govern the repair and overhaul operation.

2.3.2 The manufacturer

Even though there may be no legal requirement, it is recommended that the manufacturer should take such steps as are necessary to ensure that there will be available in connection with the use of the apparatus adequate information (see note) concerning:

- the use for which it is designed and has been tested;
- any conditions necessary to ensure that, when put to use, it will be safe and without risks to health.

NOTE It is not reasonably practicable to assume that adequate information is, or can be so widely circulated that it is always available where and when it is needed. Sources of adequate information are users, manufacturers or certifying authorities.