
**Električne naprave za eksplozivne plinske atmosfere – 19. del: Popravilo in
obnova naprav, ki se uporabljajo v eksplozivnih atmosferah (brez eksplozivov)**

Electrical apparatus for explosive gas atmospheres – Part 19: Repair and overhaul
for apparatus used in explosive atmospheres (other than explosives)

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Titre :CEI 60079-19 Ed. 2.0 : Matériel électrique pour atmosphères explosives gazeuses - Partie 19: Réparation et révision du matériel utilisé en atmosphères explosives (autre que celui utilisé pour la fabrication des explosifs)

Title : IEC 60079-19 Ed. 2.0: Electrical apparatus for explosive gas atmospheres - Part 19: Repair and overhaul for apparatus used in explosive atmospheres (other than explosives)

Note d'introduction

Introductory note

Afin de permettre la compréhension des corrections faites au cours de la préparation, un projet (CDV) de la CEI 60079-19 Ed 2.0 indiquant, à l'aide de marques placées dans la marge du texte, les modifications par rapport au CD 31J/101/CD a été fourni.

A draft (CDV) of IEC 60079-19, Ed 2.0 showing the alteration to CD 31J/101/CD by outside borders has been provided to allow an understanding of corrections made during the preparation

Des exigences relatives aux poussières ont été ajoutées.

Dust requirements have been added.

ATTENTION	ATTENTION
CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC)	Parallel IEC CDV/CENELEC Enquiry

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL APPARATUS FOR EXPLOSIVE ATMOSPHERES –**Part 19: Repair and overhaul for apparatus used
in explosive atmospheres (other than explosives)**

FOREWORD

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

The text of this standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

The Annexes form an integral part of this standard.

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

The committee has decided that the contents of this publication will remain unchanged until 2011. At this date, the publication will be

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

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INTRODUCTION

When electrical apparatus is installed in areas where dangerous concentrations and quantities of flammable gases, vapours, mists or dusts 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 60079 is supplementary to other relevant IEC standards, for example IEC 60364 as regards installation requirements, and also refers to IEC 60079 and its appropriate parts for the design requirements of suitable electrical apparatus.

Clause 2 of this part of IEC 60079 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 design 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 there are also competent independent repair organizations who have the facilities to carry out repair work on equipment employing some or all of the types of protection covered by IEC 60079.

For repaired equipment to retain the integrity of the type(s) of protection employed in its design and construction, detailed knowledge of the original manufacturer's design (which may only be obtainable from design and manufacturing drawings) and any certification documentation may be necessary. Where equipment is not being returned to the original manufacturer for repair, the use of repair organisations that are recommended by the original manufacturer should be considered.

ELECTRICAL APPARATUS FOR EXPLOSIVE ATMOSPHERES –

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

1 Scope

This part of IEC 60079:

- gives instructions, principally of a technical nature, on the repair, overhaul, reclamation and modification of a certified apparatus designed for use in explosive atmospheres;
- 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 60079.

IEC 60034, *Rotating electrical machines*

IEC 60079, *Electrical apparatus for explosive gas atmospheres*

IEC 60079-0, *Electrical apparatus for explosive gas atmospheres - Part 0: General requirements.*

IEC 60079-1, *Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d"*

IEC 60079-1-1, *Electrical apparatus for explosive gas atmospheres – Part 1-1: Flameproof enclosures "d" - Method of test for ascertainment of maximum experimental safe gap*

IEC 60079-2, *Electrical apparatus for explosive gas atmospheres - Part 2: Pressurized enclosure "p"*

IEC 60079-7, *Electrical apparatus for explosive gas atmospheres - Part 7: Increased safety "e"*

IEC 60079-11, *Electrical apparatus for explosive gas atmospheres - Part 11 Intrinsic safety "i"*

IEC 60079-14, *Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in explosive gas atmospheres (other than mines)*

IEC 60079-15, *Electrical apparatus for explosive gas atmospheres - Part 15: Type of protection "n"*

IEC 60079-26, *Electrical apparatus for explosive gas atmospheres - Part 26: Construction, test and marking of Group II Zone 0 electrical apparatus*

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

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

IEC 61241-2, *Electrical apparatus for use in the presence of combustible dust – Part 2: Type of protection "pD"*

IEC 60085, *Thermal evaluation and classification of electrical insulation*

IEC 60364, *Electrical installations of buildings*

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

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

ISO 6158, *Metallic coatings - Electroplated coatings of chromium for engineering purposes*

ISO 9000, *Quality management and quality assurance standards - Guidance for selection and use*

2.2 Definitions and terms

For the purpose of this part of IEC 60079, 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. (see scope)

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.

NOTE Changes permitted within certification are not considered to be modifications.

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 repair facility: A facility providing a service that consists of repairs, overhauls, or reclamations of Explosion Protected 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.

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2.2.12 certificate references: A certificate reference number may refer to a single design or a range of apparatus of similar design.

The symbol "X" is used to denote special conditions of safe use. The certification documents need to be studied before such apparatus is installed, repaired, overhauled, reclaimed or modified.

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.

2.2.18 type of Protection "tD": (formerly known as DIP) is a type of protection in which parts that can ignite a combustible dust atmosphere, are placed in an enclosure designed to exclude the ingress of dust and to limit the surface temperature exposed to the explosive atmosphere.

2.2.19 2.2.19 type of Protection "pD": This form of explosion protection is reliant upon the enclosure being subjected to a continuous pressure as per IEC 61241-2, from a supply of uncontaminated air or other non-flammable gas while electricity is connected to the enclosure.

2.3 General Principles

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.;

In circumstances where the certification documents are not available then the repair or overhaul shall be carried out on the apparatus in accordance with this standard and other relevant standard(s).

If other repair or modification techniques are used which are not in accordance with this standard, 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

2.4 Statutory requirements

2.4.1 The repair facility

The repair facility shall be aware of any specific requirements in relevant national legislation which may govern the repair and overhaul operation

2.4.2 The user

The apparatus user should be aware of any relevant legislation should he wish to undertake the repair or overhaul of equipment himself. In addition, he should be aware of any changes in responsibility for health and safety should refurbishment and/or re-installation be carried out by a third party.

2.5 Instructions for the user

2.5.1 Certificates and documents

The apparatus design certificate and other related documents (see 2.6.1.4.1) should be obtained as part of the original purchase contract.

2.5.2 Records and work instructions

All relevant documentation that is available shall be obtained as part of the original purchase contract. Records of any previous repairs, overhauls or modifications shall be kept by the user and made available to the repairer.

NOTE It will be in the interests of the user that the repairer is notified, whenever possible, of the fault and/or nature of the work to be done.

Special requirements stipulated in the user's specifications, and which are supplementary to the various standards e.g. enhanced ingress protection, shall be brought to the attention of the repairer.

The user shall inform the repairer of any statutory requirement for compliance with certification (see note 2 in the introduction).

2.5.3 Re-installation of repaired apparatus

Before the repaired apparatus is re-commissioned, cable/conduit entry systems shall be checked to ensure that they are undamaged and are appropriate to the apparatus type of protection. Recommendations may be found in clause 9 of IEC 60079-14.

2.5.4 Repair facilities

The user shall ascertain that the repair facility concerned can demonstrate compliance with the relevant stipulations of this standard.

2.6 Instructions for the repair facility

2.6.1 Repair and Overhaul

2.6.1.1 General

2.6.1.1 General

The repair facility shall appoint a person ("Responsible Person") with the required competency (see Annex B), within the management organisation, to accept responsibility and authority for ensuring that the overhauled/repared equipment complies with the certification status agreed with the user. The person so appointed shall have a working knowledge of the appropriate explosion protection standards and an understanding of this document.

The repair facility must have adequate repair and overhaul facilities as well as the appropriate equipment necessary and trained Operatives with the required competency (see Annex B) and authority to carry out the activities, taking into account the specific type of protection.

The repair facility shall conduct an assessment of the status of the apparatus to be repaired, agree with the user the expected certification status of the apparatus after repair and the scope of work to be done. This should include the omission of any tests mentioned within this document that the user could reasonably assume to be included. The assessment shall be documented and shall address the relevant clauses of the appropriate apparatus standard and this standard and be included in the job report to the user. Such assessments shall be conducted by the Responsible person (supported by appropriate Operatives). The responsible person shall only conduct assessments with the explosion protection techniques for which they have demonstrated their competence.

The repair facility shall include procedures and systems to carry out overhaul/repair work at sites external to the repair facility, where appropriate.

2.6.1.2 Certification and standards

2.6.1.2.1 General

The repairer's attention is directed to the need to be informed of, and to comply with, the relevant explosion-protected standards and certification requirements applicable to the apparatus to be repaired or overhauled.

2.6.1.3 Competency

The repairer of the apparatus shall ensure that those operatives directly concerned with the repair and/or overhaul of the certified apparatus are trained, experienced, skilled and knowledgeable and/or supervised on this type of work.

Training and competency assessments are specified in Annex B.

Appropriate training and assessment shall be undertaken from time to time at intervals depending on the frequency of utilisation of the technique or skill and change of standards or regulations. The interval should normally not exceed three years

2.6.1.4 Testing

Should it prove impracticable to carry out certain tests, e.g., a component of a complete apparatus taken off site for repair such as a rotor of a rotating machine, the repairer shall, before putting the repaired equipment back into service, ascertain from the user or manufacturer the consequences of omitting such tests.

NOTE In some countries, legal consequences may depend upon the extent to which the carrying out or not of certain actions or tests is practicable.

2.6.1.5 Documentation

2.6.1.5.1 General

The repair facility should seek to obtain all necessary information/data from the manufacturer or user for the repair and/or overhaul of the apparatus). This may include information relating to previous repairs, overhauls or modifications. He should also have available and refer to the relevant explosion-protected standard.

The data available for the repair and/or overhaul should include but need not be limited to, details of the:

- technical specification;
- drawings;
- explosion protection performance and conditions of use;
- dismantling and assembly instructions;
- certificate limitations (special conditions for safe use), where specified;
- marking (including certification marking);
- recommended methods of repair/overhaul for the apparatus;
- list of spare parts.

The information may be subject to amendments including those relative to certification.

NOTE 1: 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.

NOTE 2: As from Ed 4 IEC 60079-0 manufacturers are required to give Instructions including repair.

The repair facility shall maintain controlled copies of any relevant explosion protection standards with which repaired/overhauled apparatus is claimed to comply.

2.6.1.5.2 Job report to the user

At the completion of the work, job reports shall be submitted to the user containing, at least, the following:

Details of fault detected

Full details of repair and overhaul

List of replaced or reclaimed parts

Results of all checks and tests (in sufficient detail to be useful if required by the next repairer, see 2.5.2)

Summary of previous history of the repaired product including information as gathered under 2.5.2

Copy of the user contract or order

The job reports of repairs/overhauls shall be retained for a period of time as agreed with the User. Retained information shall be adequately controlled to ensure correct retrieval.

2.6.1.5.3 Repair facility records

The following records shall be retained by the repair facility:

- Current and past copies of relevant Technical Standards
- Certification of Facility Quality Standard including
 - 1) Details of Repair Licence Scheme providers Quality Assessment Scheme (where a licence is held)
 - 2) Test instrument calibration
 - 3) Competency & training records of personnel
 - 4) Purchasing control system
 - 5) Customer Complaints System
 - 6) Internal & where appropriate external audit documentation
 - 7) Management review
 - 8) Process control procedures
 - 9) Register of manufacturer's drawings
- Job Records including:
 - 1) Mechanical inspection record for compliance with relevant standards
 - 2) Defect identification
 - 2) Electrical test records before and after repair including traceability of instruments used and pass/fail criteria)