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Responsible committee: GEL/10 Fluids for electrotechnical applications

Interested committees:

Title: BS IEC 63360 Ed.1.0 Fluids for electrotechnical application: Mixtures of gases alternative to SF6

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Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

PROJECT NUMBER: IEC 63360 ED1	
DATE OF CIRCULATION: 2022-03-18	CLOSING DATE FOR COMMENTS: 2022-06-10
SUPERSEDES DOCUMENTS: 10/1122/NP, 10/1128/RVN	

IEC TC 10 : FLUIDS FOR ELECTROTECHNICAL APPLICATIONS	
SECRETARIAT: Italy	SECRETARY: Mr Massimo Pompili
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 14,SC 17A,SC 17C,SC 36A,TC 38,TC 112	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☒ ENVIRONMENT ☒ QUALITY ASSURANCE ☒ SAFETY	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Fluids for electrotechnical application: Mixtures of gases alternative to SF₆

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FLUIDS FOR ELECTROTECHNICAL APPLICATION: ALTERNATIVES TO SF₆

FOREWORD

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IEC 63360 has been prepared by subcommittee 41: ALTERNATIVES TO SF₆, of IEC technical committee 10: FLUIDS FOR ELECTROTECHNICAL APPLICATIONS. It is an International Standard

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

Draft	Report on voting
10/XX/FDIS	10/XX/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement available

at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at <http://www.iec.ch/standardsdev/publications>.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document can involve the use of a patent. IEC takes no position concerning the evidence, validity, and scope of this patent right.

The holder of this patent right has assured IEC that s/he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information can be obtained from the patent database available at <http://patents.iec.ch>.

Attention is drawn to the possibility that some of the elements of this document can be the subject of patent rights other than those in the patent database. IEC shall not be held responsible for identifying any or all such patent rights.

Considering the limited information for some of the data which appear in the informative Annex A, the reader should be aware that the information related with possible alternative to SF₆ are still a matter of study.

FLUIDS FOR ELECTROTECHNICAL APPLICATION: ALTERNATIVES TO SF₆

1. Scope

This document specifies the quality for technical grade alternatives to SF₆ for use in electric power equipment.

Detection techniques, covering in-situ portable instrumentation, applicable to the analysis of alternatives to SF₆ prior to the introduction of these gases into the electric power equipment are also described in this document.

Information about alternatives to SF₆ by-products and the procedure for evaluating the potential effects of alternatives to SF₆ and its by-products on human health will be covered by IEC 63359, their handling and disposal being carried out according to international and local regulations with regard to the impact on the environment.

It is the responsibility of the gas supplier to guarantee that alternatives to SF₆ are safe for handle, in accordance with international and local regulations.

Handling of alternatives to SF₆ is covered by IEC 62271-4.

For alternatives to SF₆ not covered by this document the electric power equipment manufacturer or gas manufacturer should provide the information needed, following the structure of this document. Such alternatives to SF₆ should also be described in a next edition or in amendments to this edition.

This document does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

NOTE 1 Throughout this document, the term “pressure” stands for “absolute pressure”.

NOTE 2 If not otherwise specified in this document, concentration values (e.g. %, ppmv, µl/l) of gas components or contaminants are given in volume fraction at 20 °C and 100 kPa. More information on temperature and pressure dependence of molar fraction and volume fraction is given in Annex C.

NOTE 3 If alternatives to SF₆ for electric power equipment are regulated, their designation and regulation origin can be found in the IEC 62474 database (available at <https://std.iec.ch/iec62474>).

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 60050-212, *International Electrotechnical Vocabulary – Part 212: Electrical insulating solids, liquids and gases* (available at <http://www.electropedia.org>)

IEC 60050-441, *International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses* (available at <http://www.electropedia.org>)

IEC 60050-826, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations* (available at <http://www.electropedia.org>)

59 IEC 62271-4:XXXX, *High-voltage switchgear and controlgear – Part 4: Handling procedures for*
60 *gases for insulation and/or switching*

61 IEC 60376:2018, *Specification of technical grade sulphur hexafluoride (SF₆) and*
62 *complementary gases to be used in its mixtures for use in electrical equipment*

63 IEC 60480:2019, *Specifications for the re-use of sulphur hexafluoride (SF₆) and its mixtures in*
64 *electrical equipment*

65 **3. Terms, definitions and abbreviated terms**

66 For the purposes of this document, the terms and definitions given in IEC 60050-212,
67 IEC 60050-441 and IEC 60050-826 as well as the following apply.

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

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

72 **3.1. General terms and definitions**

73 **3.1.1**

74 **electric power equipment**

75 any high-voltage or medium-voltage equipment containing gas for insulation and/or switching,
76 e.g. switchgear and controlgear, gas insulated lines, transformers, instrument transformers, etc.

77 **3.1.2**

78 **gas**

79 a pure gas or gas mixture used for insulation and/or switching within electric power equipment

80 NOTE 1 to entry: A gas might contain contaminants.

81 **3.1.3**

82 **pure gas**

83 a gas made up of identical atoms or molecules used for insulation and/or switching within
84 electric power equipment

85 NOTE 1 to entry: A pure gas might contain contaminants.

86 EXAMPLE CO₂ is a typical example of a pure gas.

87 **3.1.4**

88 **gas mixture**

89 a gas made up of a minimum of two different pure gases used for insulation and/or switching
90 within electric power equipment

91 NOTE 1 to entry: A gas mixture might contain contaminants.

92 EXAMPLE CO₂/O₂ is a typical example of a gas mixture of two pure gases.

93 **3.1.5**

94 **contaminant**

95 foreign substance or material in an insulating liquid, gas or solid

96 [SOURCE: IEC 60050-212:2010, 212-17-27, modified – "and which usually has a deleterious
97 effect on one or more properties" has been deleted.]