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colour inside

Railway applications – Electric equipment for rolling stock – Part 5: Electrotechnical components – Rules for HV fuses

INTERNATIONAL
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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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RAILWAY APPLICATIONS – ELECTRIC EQUIPMENT FOR ROLLING STOCK –

Part 5: Electrotechnical components – Rules for HV fuses

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.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60077-5 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition, issued in 2003. It constitutes a technical revision.

This edition includes the following main technical changes with regard to the previous edition:

a) test method of test duty III for verification of breaking capacity is reviewed.

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

FDIS	Report on voting
9/2539/FDIS	9/2555/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.

This document should be read in conjunction with IEC 60077-1 and IEC 60077-2.

A list of all parts in the IEC 60077 series, published under the general title *Railway applications – Electric equipment for rolling stock*, 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 website 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

RAILWAY APPLICATIONS – ELECTRIC EQUIPMENT FOR ROLLING STOCK –

Part 5: Electrotechnical components – Rules for HV fuses

1 Scope ~~and object~~

The purpose of this part of IEC 60077 is to give additional or amended rules for high voltage (HV) fuses as a supplement to those given by IEC 60077-2.

NOTE 1 In this document the term high voltage fuses is used in the context of the voltages used in the field of railway rolling stock.

The high voltage fuses concerned are those ~~to be~~ connected into power and/or auxiliary circuits. The nominal voltage of these circuits lies between 600 V DC and 3 000 V DC, according to IEC 60850. These fuses ~~may~~ can also be used in auxiliary AC circuits up to a nominal voltage of 1 500 V.

NOTE 2 Certain of these rules ~~may~~, after agreement between the user and the manufacturer, ~~be~~ are used for fuses installed on vehicles other than rail rolling stock such as mine locomotives, trolleybuses, etc.

This document together with IEC 60077-2 states specifically:

a) the characteristics of the fuses;

b) the service conditions with which the fuses ~~have to~~ comply with reference to:
   - operation and behaviour in normal service;
   - operation and behaviour in case of short circuit;
   - dielectric properties.

c) the tests intended for confirming the compliance of the fuse with the characteristics under the service conditions and the methods ~~to be~~ adopted for these tests;

d) the information ~~to be~~ marked on, or given with, the fuse.

This document does not cover parallel connection of fuses.

During preparation of this document, IEC 60269-1 and IEC 60282-1 have been considered and their requirements have been kept as far as possible.

This document makes reference to the general rules for electrotechnical components given in IEC 60077-2, but for general conditions reference is made directly to IEC 60077-1.

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(441):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*~~

~~IEC 60050(811):1991, *International Electrotechnical Vocabulary (IEV) – Chapter 811: Electric traction*~~

IEC 60077-1:~~1999~~2017, *Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules*

IEC 60077-2:~~1999~~2017, *Railway applications – Electric equipment for rolling stock – Part 2: Electrotechnical components – General rules*

IEC 60269-1:~~1998~~2006, *Low-voltage fuses – Part 1: General* requirements
IEC 60269-1:2006/AMD1:2009
IEC 60269-1:2006/AMD2:2014

IEC 60282-1:~~2002~~2009, *High-voltage fuses – Part 1: Current-limiting fuses*
IEC 60282-1:2009/AMD1:2014

~~IEC 60850:2000, *Railway applications – Supply voltages of traction systems*~~

IEC 61373~~:1999~~, *Railway applications – Rolling stock equipment – Shock and vibration tests*

ISO 3~~:1973~~, *Preferred numbers – Series of preferred numbers*

IEC 60077-5

Edition 2.0 2019-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Electric equipment for rolling stock – Part 5: Electrotechnical components – Rules for HV fuses

Applications ferroviaires – Équipements électriques du matériel roulant – Partie 5: Composants électrotechniques – Règles pour les fusibles à haute tension

IEC 60077-5:2019-10(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 5: Electrotechnical components – Rules for HV fuses

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RAILWAY APPLICATIONS – ELECTRIC EQUIPMENT FOR ROLLING STOCK –

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This document together with IEC 60077-2 states specifically:

a) the characteristics of the fuses;
b) the service conditions with which the fuses comply with reference to:
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   – operation and behaviour in case of short circuit;
   – dielectric properties.
c) the tests intended for confirming the compliance of the fuse with the characteristics under the service conditions and the methods adopted for these tests;
d) the information marked on, or given with, the fuse.

This document does not cover parallel connection of fuses.

During preparation of this document, IEC 60269-1 and IEC 60282-1 have been considered and their requirements have been kept as far as possible.

This document makes reference to the general rules for electrotechnical components given in IEC 60077-2, but for general conditions reference is made directly to IEC 60077-1.

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 60077-1:2017, *Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules*

IEC 60077-2:2017, *Railway applications – Electric equipment for rolling stock – Part 2: Electrotechnical components – General rules*

IEC 60269-1:2006, *Low-voltage fuses – Part 1: General* requirements
IEC 60269-1:2006/AMD1:2009
IEC 60269-1:2006/AMD2:2014

IEC 60282-1:2009, *High-voltage fuses – Part 1: Current-limiting fuses*
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IEC 61373, *Railway applications – Rolling stock equipment – Shock and vibration tests*

ISO 3, *Preferred numbers – Series of preferred numbers*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPLICATIONS FERROVIAIRES – ÉQUIPEMENTS ÉLECTRIQUES DU MATÉRIEL ROULANT –

Partie 5: Composants électrotechniques – Règles pour les fusibles à haute tension

AVANT-PROPOS

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La Norme internationale IEC 60077-5 a été établie par le comité d'études 9 de l'IEC: Matériels et systèmes électriques ferroviaires.

Cette deuxième édition annule et remplace la première édition, parue en 2003. Elle constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) révision de la méthode d'essai des conditions d'essai III pour la vérification du pouvoir de coupure.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
9/2539/FDIS	9/2555/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Il convient qu'il soit lu conjointement avec l'IEC 60077-1 et l'IEC 60077-2.

Une liste de toutes les parties de la série IEC 60077, publiées sous le titre général *Applications ferroviaires – Équipements électriques du matériel roulant*, peut être consultée sur le site web de l'IEC.

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APPLICATIONS FERROVIAIRES – ÉQUIPEMENTS ÉLECTRIQUES DU MATÉRIEL ROULANT –

Partie 5: Composants électrotechniques – Règles pour les fusibles à haute tension

1 Domaine d'application

L'objet de la présente partie de l'IEC 60077 est de fournir des règles complémentaires ou amendées pour les fusibles à haute tension, en plus de celles données dans l'IEC 60077-2.

NOTE 1 Dans le présent document, le terme fusible à haute tension est utilisé dans le contexte des tensions utilisées dans le domaine du matériel roulant pour le chemin de fer.

Les fusibles à haute tension concernés sont connectés dans les circuits de puissance et/ou auxiliaires. La tension nominale de ces circuits est située entre 600 V CC et 3 000 V CC, conformément à l'IEC 60850. Ces fusibles peuvent également être utilisés dans des circuits auxiliaires à courant alternatif jusqu'à une tension nominale de 1 500 V.

NOTE 2 Certaines de ces règles, après accord entre l'utilisateur et le constructeur, sont utilisées pour les fusibles installés dans des véhicules autres que ceux du matériel roulant ferroviaire, comme par exemple des locomotives de mine, des trolleybus, etc.

En complément de l'IEC 60077-2, le présent document précise particulièrement:

a) les caractéristiques des fusibles;
b) les conditions de service que les fusibles supportent du point de vue:
   – du fonctionnement et du comportement en service normal;
   – du fonctionnement et du comportement en cas de court-circuit;
   – des propriétés diélectriques.
c) les essais destinés à vérifier la conformité du fusible avec les caractéristiques dans les conditions de service ainsi que les méthodes à adopter pour ces essais;
d) les informations données avec ou marquées sur le fusible.

Le présent document ne couvre pas le montage en parallèle des fusibles.

Durant la préparation du présent document, l'IEC 60269-1 et l'IEC 60282-1 ont été consultées et leurs exigences ont été conservées dans la mesure du possible.

Le présent document fait référence aux règles générales pour les composants électrotechniques données dans l'IEC 60077-2, mais en ce qui concerne les conditions générales, il se réfère directement à l'IEC 60077-1.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60077-1:2017, *Applications ferroviaires – Equipements électriques du matériel roulant – Partie 1: Conditions générales de service et règles générales*

IEC 60077-2:2017, *Applications ferroviaires – Equipements électriques du matériel roulant – Partie 2: Composants électrotechniques – Règles générales*

IEC 60269-1:2006, *Fusibles basse tension – Partie 1: Exigences* générales
IEC 60269-1:2006/AMD1:2009
IEC 60269-1:2006/AMD2:2014

IEC 60282-1:2009, *Fusibles à haute tension – Partie 1: Fusibles limiteurs de courant*
IEC 60282-1:2009/AMD1:2014

IEC 61373, *Applications ferroviaires – Matériel roulant – Essais de chocs et vibrations*

ISO 3, *Nombres normaux – Séries de nombres normaux*