

STN	Dráhové aplikácie. Trakčné transformátory a tlmivky na dráhových vozidlách.	STN EN 60310 34 1580
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Railway applications - Traction transformers and inductors on board rolling Stock

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/16

Obsahuje: EN 60310:2016, IEC 60310:2016

Oznámením tejto normy sa od 02.03.2019 ruší
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60310

April 2016

ICS 45.060

Supersedes EN 60310:2004

English Version

**Railway applications - Traction transformers and inductors on
board rolling Stock
(IEC 60310:2016)**

Applications ferroviaires - Transformateurs de traction et
bobines d'inductance à bord du matériel roulant
(IEC 60310:2016)

Bahnanwendungen - Transformatoren und Drosselspulen
auf Bahnfahrzeugen
(IEC 60310:2016)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 9/2080/FDIS, future edition 4 of IEC 60310, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60310:2016.

The following dates are fixed:

- latest date by which the document has to be (dop) 2016-12-02
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2019-03-02
standards conflicting with the
document have to be withdrawn

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60216-1	NOTE	Harmonized as EN 60216-1.
IEC 60216-5	NOTE	Harmonized as EN 60216-5.
IEC 60505	NOTE	Harmonized as EN 60505.
IEC 61287-1	NOTE	Harmonized as EN 61287-1.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-811	-	International electrotechnical vocabulary (IEV) - Chapter 811: Electric traction	-	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60060-2	-	High-voltage test techniques - Part 2: Measuring systems	EN 60060-2	-
IEC 60076-1	2011	Power transformers - Part 1: General	EN 60076-1	2011
IEC 60076-2	-	Power transformers - Part 2: Temperature rise for liquid-immersed transformers	EN 60076-2	-
IEC 60076-3	-	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air	EN 60076-3	-
IEC 60076-4	-	Power transformers - Part 4: Guide to the lightning impulse and switching impulse testing - Power transformers and reactors	EN 60076-4	-
IEC 60076-5	-	Power transformers - Part 5: Ability to withstand short circuit	EN 60076-5	-
IEC 60076-6	2007	Power transformers - Part 6: Reactors	EN 60076-6	2008
IEC 60076-7	-	Power transformers - Part 7: Loading guide for oil-immersed power transformers	-	-
IEC 60076-10	-	Power transformers - Part 10: Determination of sound levels	EN 60076-10	-
IEC 60076-11	-	Power transformers - Part 11: Dry-type transformers	EN 60076-11	-
IEC 60076-12	2008	Power transformers - Part 12: Loading guide for dry-type power transformers	-	-
IEC 60076-14	-	Power transformers - Part 14: Liquid-immersed power transformers using high-temperature insulation materials	EN 60076-14	-

EN 60310:2016

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60076-18	-	Power transformers - Part 18: Measurement of frequency response	EN 60076-18	-
IEC 60077-1	-	Railway applications - Electric equipment for rolling stock - Part 1: General service conditions and general rules	EN 60077-1	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60270	-	High-voltage test techniques - Partial discharge measurements	EN 60270	-
IEC 60296	-	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear	EN 60296	-
IEC 60836	-	Specifications for unused silicone insulating liquids for electrotechnical purposes	EN 60836	-
IEC 60850	-	Railway applications - Supply voltages of traction systems	-	-
IEC 61039	-	Classification of insulating liquids	EN 61039	-
IEC 61099	-	Insulating liquids - Specifications for unused synthetic organic esters for electrical purposes	EN 61099	-
IEC 61373	2010	Railway applications - Rolling stock equipment - Shock and vibration tests	EN 61373	2010
IEC 61378-1	2011	Convertor transformers - Part 1: Transformers for industrial applications	EN 61378-1	2011
IEC 62497-1	-	Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment	-	-
IEC 62498-1	-	Railway applications - Environmental conditions for equipment - Part 1: Equipment on board rolling stock	-	-
ISO 3746	-	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane	EN ISO 3746	-
ISO 9614-1	-	Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points	EN ISO 9614-1	-
ISO 9614-2	-	Acoustics - Determination of sound power levels of noise sources using sound intensity - Part-2: Measurement by scanning	EN ISO 9614-2	-



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INTERNATIONAL STANDARD

NORME INTERNATIONALE



Railway applications – Traction transformers and inductors on board rolling stock

Applications ferroviaires – Transformateurs de traction et bobines d'inductance à bord du matériel roulant



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Edition 4.0 2016-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Railway applications – Traction transformers and inductors on board rolling stock

Applications ferroviaires – Transformateurs de traction et bobines d'inductance à bord du matériel roulant

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CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions	9
3.1 General definitions	10
3.2 Definitions for transformers	11
3.3 Definitions for inductors.....	11
4 Classification.....	12
4.1 Classification of transformers	12
4.2 Classification of inductors.....	12
5 Service conditions	12
6 Rated current and load profile	13
6.1 Load profile.....	13
6.2 Rated current.....	13
7 Rated voltage and power of transformer windings.....	13
7.1 Rated line-side voltage.....	13
7.2 Rated secondary voltage	13
7.3 Rated power of transformer	14
8 Transformer tapplings.....	14
9 Cooling.....	14
9.1 Identification of transformers and inductors according to cooling method	14
9.2 Arrangement of symbols.....	15
9.2.1 Enclosed transformers and inductors.....	15
9.2.2 Non-enclosed transformers and inductors	15
9.2.3 Air cooling	15
10 Temperature limits.....	15
10.1 Classification of insulating materials	15
10.2 Temperature limits of solid insulation.....	16
10.3 Temperature limits for liquid	16
10.4 Temperature limits for other parts.....	17
11 Mechanical design	17
12 Rating plates	17
13 Tests.....	18
13.1 Categories of tests	18
13.1.1 General	18
13.1.2 Type tests.....	18
13.1.3 Routine tests.....	18
13.1.4 Investigation tests	18
13.2 Tests on transformers	18
13.2.1 General – List of tests	18
13.2.2 Tolerances.....	20
13.2.3 Visual checks (type, routine test) and functional tests (optional type and routine test)	20
13.2.4 Mass (type and optional routine test).....	20
13.2.5 Measurement of winding resistance (type and routine tests).....	21

13.2.6	Measurement of voltage ratio, polarities and vector groups (type and routine tests).....	21
13.2.7	Measurement of no-load primary current and losses (type and routine tests)	22
13.2.8	Measurement of impedance voltages or short-circuit impedances (type and routine tests)	22
13.2.9	Measurement of fundamental load losses (type and routine tests)	23
13.2.10	Determination of total losses (type test)	24
13.2.11	Temperature-rise test (type test)	24
13.2.12	Insulation resistance test (optional type and routine test)	28
13.2.13	Dielectric tests (type and routine tests)	28
13.2.14	Partial discharge test (type or optional routine test for dry-type, investigation test for immersed type)	34
13.2.15	Short-circuit withstand test (optional type test).....	36
13.2.16	Shock and vibration test (optional type test).....	38
13.2.17	Voltage transmission ratio – VTR (optional type test)	40
13.2.18	Noise measurement (type test)	41
13.2.19	Leakage magnetic flux density measurement (optional type test).....	41
13.2.20	Electrical Frequency Response Analysis FRA (investigation test)	42
13.2.21	Inrush current measurement (optional type test)	42
13.3	Tests on inductors.....	43
13.3.1	List of tests	43
13.3.2	Tolerances.....	43
13.3.3	Visual checks (type and routine test)	44
13.3.4	Mass (type and optional routine test)	44
13.3.5	Measurement of winding resistance (type and routine test)	44
13.3.6	Determination of losses (type test)	44
13.3.7	Measurement of inductance (type and routine tests)	45
13.3.8	Temperature-rise test (type tests).....	48
13.3.9	Insulation resistance test (optional type and routine test)	48
13.3.10	Dielectric tests (type and routine tests).....	48
13.3.11	Partial discharge test (type or optional routine test for the dry-type)	49
13.3.12	Short-circuit withstand test (optional type test).....	49
13.3.13	Shock and vibration test (optional type test).....	50
13.3.14	Vibration test with current flowing (investigation test)	50
13.3.15	Noise measurement (type test).....	50
13.3.16	Leakage magnetic flux density measurement (optional type test).....	50
Annex A (informative) List of items for which an agreement between purchaser and manufacturer is needed or for which further information or specifications shall be given by the purchaser or by the manufacturer		51
A.1	Items subject to agreement between purchaser and manufacturer	51
A.1.1	Transformer and inductors	51
A.1.2	Transformers	52
A.1.3	Inductors	53
A.2	Information to be given by purchaser to manufacturer	54
A.2.1	Transformers and inductors.....	54
A.2.2	Transformers	55
A.2.3	Inductors	55
A.3	Information to be given by manufacturer to purchaser	56
A.3.1	Transformers and inductors.....	56

A.3.2	Transformers	56
A.3.3	Inductors	56
Annex B (informative)	Thermal ageing and insulation life time	57
B.1	Insulation life time and thermal ageing	57
B.2	Definitions of thermal endurance	57
B.3	Thermal endurance calculations	58
B.4	Special considerations for thermal design and test	59
B.4.1	General	59
B.4.2	Cooling medium temperature at the external interface	59
B.4.3	Rated current	60
B.4.4	Temperature rise test of a dry-type transformer/inductor	60
B.5	Thermal conformity of the insulation system	60
B.6	End of life criterion	60
Annex C (informative)	Example of thermal endurance calculation to demonstrate the suitability of an insulation system for a specified application	61
C.1	Preliminary	61
C.2	Example 1 – Temperature limits for a dry-type transformer/inductor	61
C.3	Example 2 – Thermal endurance calculation	61
C.3.1	General	61
C.3.2	Operating conditions to be provided by the purchaser	62
C.3.3	Thermal endurance characteristics to be provided by the manufacturer	62
C.3.4	Temperature rise test results	62
C.3.5	Calculations	63
Annex D (informative)	Wet dielectric tests for dry-type transformers and inductors	65
D.1	General	65
D.2	Wet test 1 (optional type test or optional routine test): short soaking	65
D.3	Wet test 2 (investigation test or optional type test): misting	66
D.4	Wet test 3 (investigation test): thermal shock – long soaking – misting	66
D.4.1	General	66
D.4.2	Temperature conditioning	66
D.4.3	Thermal shock	66
D.4.4	Dielectric test	66
D.5	Common test procedure and criteria for wet dielectric tests	66
Annex E (informative)	Load profiles	68
Bibliography		69
Figure 1	– Examples of set up for induced voltage withstanding tests	31
Figure 2	– Examples of set up for separate source voltage withstanding tests	32
Figure 3	– Examples of impulse test connections for traction, inductor and auxiliary transformers	33
Figure 4	– Partial discharge test: voltage versus time	35
Figure 5	– Configurations for VTR test	41
Figure 6	– Example of test circuit	42
Table 1	– Letter symbols for cooling method	14
Table 2	– Order of symbols	15
Table 3	– Temperature limits of solid insulation	16

Table 4 – Temperature limits for liquid.....	16
Table 5 – List of checks and tests to be made on traction transformers	19
Table 6 – Tolerances	20
Table 7 – Reference temperatures	21
Table 8 – Dielectric test voltage	30
Table 9 – Partial discharge measurements	35
Table 10 – List of checks and tests to be made on inductors.....	43
Table 11 – Tolerances	44
Table 12 – Test method of voltage between terminals withstand test.....	49
Table C.1 – Temperature limits and expected lifetime for a dry-type transformer or inductor (examples)	61
Table C.2 – Load cycle histogram	62
Table C.3 – Temperature histogram	62
Table C.4 – Temperature rise test results	63
Table C.5 – Thermal endurance calculation	63
Table C.6 – Equivalent current and temperatures	64

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RAILWAY APPLICATIONS –
TRACTION TRANSFORMERS AND
INDUCTORS ON BOARD ROLLING STOCK****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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International Standard IEC 60310 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This fourth edition cancels and replaces the third edition issued in 2004 and constitutes a technical revision.

This edition takes into account the new generic railway standards, more specifically general service conditions referring to IEC 62498-1 and shock and vibration considerations referring to IEC 61373. It also includes the following significant technical changes with regard to the previous edition:

- temperature limits;
- temperature-rise test;
- dielectric tests;
- partial discharge test;

- inductance measurement methods;
- voltage between terminals withstand test;
- thermal ageing and insulation lifetime (informative);
- examples of thermal endurance calculation (informative);
- wet dielectric tests (informative);
- load profiles (informative).

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

FDIS	Report on voting
9/2080/FDIS	9/2117/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.

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 the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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RAILWAY APPLICATIONS – TRACTION TRANSFORMERS AND INDUCTORS ON BOARD ROLLING STOCK

1 Scope

This International Standard applies to traction and auxiliary power transformers installed on board rolling stock and to the various types of power inductors inserted in the traction and auxiliary circuits of rolling stock, of dry or liquid-immersed design.

NOTE The requirements of IEC 60076 (all parts) are applicable to transformers and inductors where they do not conflict with this standard, or with the specialized IEC publications dealing with traction applications.

This standard can also be applied, after agreement between purchaser and manufacturer, to the traction transformers of three-phase a.c. line-side powered vehicles and to the transformers inserted in the single-phase or poly-phase auxiliary circuits of vehicles, except instrument transformers and transformers of a rated output below 1 kVA single-phase or 5 kVA poly-phase.

This standard does not cover accessories such as tap changers, resistors, heat exchangers, fans, etc., intended for mounting on the transformers or inductors, which are tested separately according to relevant rules.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60076-1:2011, *Power transformers – Part 1: General*

IEC 60076-2, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60076-3, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-4, *Power transformers – Part 4: Guide to the lightning impulse and switching impulse testing – Power transformers and reactors*

IEC 60076-5, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-6:2007, *Power transformers – Part 6: Reactors*

IEC 60076-7, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-10, *Power transformers – Part 10: Determination of sound levels*

IEC 60076-11, *Power transformers – Part 11: Dry-type transformers*

IEC 60076-12:2008, *Power transformers – Part 12: Loading guide for dry-type transformers*

IEC 60076-14, *Power transformers – Part 14: Liquid-immersed power transformers using high-temperature insulation materials*

IEC 60076-18, *Power transformers – Part 18: Measurement of frequency response*

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

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

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60836, *Specifications for unused silicone insulating liquids for electrotechnical purposes*

IEC 60850, *Railway applications – Supply voltage of traction systems*

IEC 61039, *Classification of insulating liquids*

IEC 61099, *Insulating liquids – Specifications for unused synthetic organic esters for electrical purposes*

IEC 61373:2010, *Railway applications – Rolling stock equipment – Shock and vibration tests*

IEC 61378-1:2011, *Convertor transformers – Part 1: Transformers for industrial applications*

IEC 62497-1, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*

IEC 62498-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

ISO 3746, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*

ISO 9614-2, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 2: Measurement by scanning*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN