SVENSK STANDARD SS-EN 50155

Fastställd	Utgåva	Sida	Ansvarig kommitté
2017-11-23	4	1 (1+105)	SEK TK 9

Järnvägstillämpningar – Elektronisk utrustning för rälsfordon

Railway applications – Rolling stock – Electronic equipment

Som svensk standard gäller europastandarden EN 50155:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50155:2017.

Nationellt förord

Tidigare fastställd svensk standard SS-EN 50155, utgåva 3, 2007 och SS-EN 50155 C1, utgåva 1, 2010, gäller ej fr o m 2020-10-13.

ICS 45.060.10

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50155

October 2017

ICS 45.060.01

Supersedes EN 50155:2007

English Version

Railway applications - Rolling stock - Electronic equipment

Applications ferroviaires - Équipements électroniques utilisés sur le matériel roulant

Bahnanwendungen - Elektronische Einrichtungen auf Schienenfahrzeugen

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

Ref. No. EN 50155:2017 E

SEK Svensk Elstandard

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European foreword

This document (EN 50155:2017) has been prepared by CLC/SC 9XB, “Electrical, electronic and electromechanical material on board rolling stock, including associated software”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-04-13
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-10-13

This document supersedes EN 50155:2007.

EN 50155:2017 includes the following significant technical changes with respect to EN 50155:2007:

a) revision of Clause 1, Scope;

b) revision of Clause 2, Normative references;

c) revision of Clause 3, Terms, definitions and abbreviations, with reorganisation of subclauses;

d) improvement of Clause 4, General requirements, in terms of better wording, requirement expansion and reorganisation of subclauses;

e) revision of Clause 5, Electrical service conditions, with reorganisation of subclauses;

f) improvement of Clause 6, Reliability, maintainability and expected useful life, with reorganization of subclauses and introduction of explicative figures;

g) revision of Clause 7, Design;

h) introduction of a new Clause 8, Non-railway designed electronic equipment;

i) renumbering of previous Clause 8 to Clause 9, Components, and revision;

j) renumbering of previous Clause 9 to Clause 10, Construction, and introduction of new requirements;

k) renumbering of previous Clause 10 to Clause 11, Safety, and improving of the wording;

l) renumbering of previous Clause 11 to Clause 12, Documentation, and introduction of new requirements also considering new technologies;

m) renumbering of previous Clause 12 to Clause 13, Testing, text improvement with a particular attention to table “List of tests” and introduction of explaining figures;

n) introduction of the following informative Annexes:

    1) Annex A - List of default requirements of EN 50155 and related clauses;

    2) Annex B - Testing approach;

3) Annex C - Severity of the service conditions in different rolling stock locations;

4) Annex D - Example of test report compliance summary;

5) Annex E - Life cycle model examples;

6) Annex F - Design guidelines for electronic hardware used on board of rolling stock;

7) Annex G - Non-railway designed electronic equipment;

o) Bibliography (extended and corrected).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive 2008/57/EC amended by Commission Directive 2011/18/EU, see informative Annex ZZ, which is an integral part of this document.

Introduction

This standard is applied in the design, manufacturing, testing of any electronic equipment installed on board rolling stock.

It also describes the electrical and environmental operating conditions.

There are not correlations between the operating temperature classes listed in Table 1 and the air temperature classes listed in EN 50125-1:2014, Table 2.

The aim of this standard is not to be a detailed guideline for the design of the electronic equipment; the design is made under the responsibility of the supplier. The supplier should take into account the requirements resulting from the specific location of the on board installation (see Annex C).

This standard contains the design, the documentation and the testing requirements.

The roles of user and/or supplier are shown in Figure 1 below.

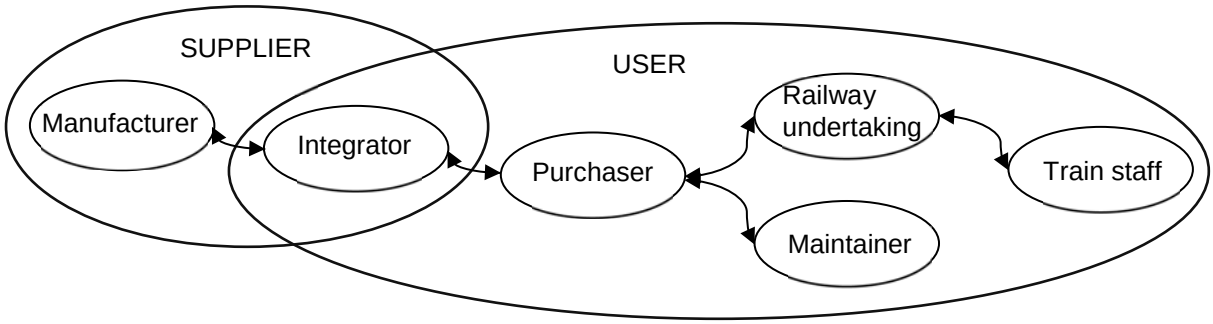

Figure 1 — Roles and relationship of user and/or supplier

1 Scope

This European Standard applies to all electronic equipment for control, regulation, protection, diagnostic, energy supply, etc. installed on rail vehicles.

For the purpose of this European Standard, electronic equipment is defined as equipment mainly composed of semiconductor devices and recognized associated components. These components will mainly be mounted on printed boards.

Sensors (current, voltage, speed, etc.) and Semiconductor drive unit (SDU) for power electronic devices are covered by this standard. Complete Semiconductor drive unit (SDU) and power converters are covered by EN 61287-1.

This European Standard covers the conditions of operation, design requirements, documentation, and testing of electronic equipment, as well as basic hardware and software requirements considered necessary for compliant and reliable equipment.

Specific requirements related to practices necessary to ensure defined levels of functional safety will be determined in accordance with relevant railway safety standards.

The software requirements for on board railway equipment are specified by EN 50657.

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.

EN 45545 (all parts), *Railway applications — Fire protection on railway vehicles*

EN 45545-2:2013+A1:2015, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behaviour of materials and components*

EN 50121-3-2:2016, *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock - Apparatus*

EN 50124-1:2017, *Railway applications — Insulation coordination — Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment*

EN 50125-1:2014, *Railway applications — Environmental conditions for equipment — Part 1: Rolling stock and on-board equipment*

EN 50126-1:2017, *Railway Applications — The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) — Part 1: Generic RAMS Process*

EN 50153:2014, *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 50163:2004, *Railway applications — Supply voltages of traction systems (IEC 60850:2000, not equivalent)*

EN 50657:2017, *Railway applications — Rolling stock applications — Software onboard of rolling stock*

EN 60068-2-1:2007, *Environmental testing — Part 2-1: Tests — Test A: Cold (IEC 60068-2-1:2007)*

EN 60068-2-2:2007, *Environmental testing — Part 2-2: Tests — Test B: Dry heat (IEC 60068-2-2:2007)*

EN 60068-2-11:1999, *Environmental testing — Part 2: Tests — Test Ka: Salt mist (IEC 60068-2-11:1981)*

EN 60068-2-30:2005, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30:2005)*

EN 60297 (all parts), *Mechanical structures for electrical and electronic equipment — Dimensions of mechanical structures of the 482,6 mm (19 in) series (IEC 60297 series)*

EN 60352-1:1997, *Solderless connections — Part 1: Wrapped connections — General requirements, test methods and practical guidance (IEC 60352-1:1997)*

EN 60352-2:2006, *Solderless connections — Part 2: Crimped connections — General requirements, test methods and practical guidance (IEC 60352-2:2004)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61249-2-7:2001, *Materials for printed boards and other interconnecting structures — Part 2-7: Reinforced base materials, clad and unclad — Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad (IEC 61249-2-7:2002)*

EN 61249-2-22:2005, *Materials for printed boards and other interconnecting structures — Part 2-22: Reinforced base materials, clad and unclad — Modified non-halogenated epoxide woven E-glass laminated sheets of defined flammability (vertical burning test), copper-clad (IEC 61249-2-22:2003)*

EN 61373:2010, *Railway applications — Rolling stock equipment — Shock and vibration tests (IEC 61373:2010)*

EN 62326 (all parts), *Printed boards (IEC 62326 series)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

ISO/IEC 90003, *Software engineering — Guidelines for the application of ISO 9001:2008 to computer software*

ISO/IEC/IEEE 15289:2017, *Systems and software engineering — Content of life-cycle information items (documentation)*

IPC-A-600 (H):2010, Acceptability of Printed Boards

IPC-A-610 (E):2010, Acceptability of Electronic Assemblies

IPC-2220:2010 series, Family of Design Documents

IPC-2221 (B):2012, Generic Standard on Printed Board Design

IPC-2222 (A):2010, Sectional Design Standard for Rigid Organic Printed Boards

IPC-2223 (C):2011, Sectional Design Standard for Flexible Printed Boards

IPC-2581 (B):2013, Generic Requirements for Printed Board Assembly Products Manufacturing Description Data and Transfer Methodology

IPC-4101 (D):2014, Specification for Base Materials for Rigid and Multilayer Printed Boards

IPC-6013 (C):2013, Qualification and Performance Specification for Flexible Printed Boards

IPC-7711B/7721B:2007, Rework, Modification and Repair of Electronic Assemblies