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Railway applications - Windscreens for trains

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. 03/24

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Supersedes EN 15152:2019

English Version

Railway applications - Windscreens for trains

Applications ferroviaires - Vitres frontales pour véhicules ferroviaires

Bahnanwendungen - Frontscheiben für Schienenfahrzeuge

This European Standard was approved by CEN on 17 June 2019 and includes Amendment approved by CEN on 27 November 2023.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword

This document (EN 15152:2019+A1:2023) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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

This document supersedes A1 EN 15152:2019 A1.

This document includes Amendment 1 approved by CEN on 27 November 2023.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

In comparison with the previous edition, the following technical modifications have been made:

Clause/subclause/table/figure	Change
Whole document and scope	Introduction of urban rail requirements, requirements for high speed trains and for certain types of OTMs
2 Normative references	The normative references have been updated
3 Terms and definitions	Creation of new definitions for different types of windscreen and glazing (e.g lateral windscreens, passenger windscreens, etc)
3 Terms and definitions	A1 New definitions for hotspots, heavy rail systems and urban rail systems A1
4.1.1 Windscreen classifications	New sub clause for the classification of windscreens into different types: driver's windscreens, lateral windscreen, passenger windscreen
4.2 Optical areas	New definitions of different optical areas based on the types of windscreens
4.3 Windscreen test requirements	All the test requirements as well as test prescriptions have been moved to the corresponding sub clauses
4.4 Marking	Former 4.3.3 has been moved and modified
4.5 Service requirements	New sub clause for in service requirements for windscreens
4.6 Storage and handling	New sub clause for storage and handling requirements for windscreens
5 Visual and optical requirements	New clause created for visual and optical requirements in order to separate them from functional requirements
5.1.2 Visual inspection procedure for appearance defects	New sub clause with precise instructions for the inspection of windscreens
5.1.3 Definition and classification of defects	New criteria for defining defects and their tolerances
5.1.4 Defect acceptance criteria	The notion of negligible, minor and major defects has been replaced by the number of acceptable defects on a given

Clause/subclause/table/figure	Change
	surface of the windscreen
5.2 Optical characteristics	New sub clause assembling all the optical requirements as well as the related measurement methods. Different requirements for urban rail have been introduced
6 Mechanical characteristics	New clause assembling all the mechanical requirements for windscreens. The clause has been editorially rearranged with regards to the previous version
6.1.1 Impact test requirements	Separate new requirements for the testing of high speed trains. Temperature ranges for the test have been introduced. The notion of testing at different angles (e.g 90° or at installation angle) has been introduced
6.1.4 Impact test procedure	The test procedure is now described in detail. Notably The notion of testing at different angles (e.g 90° or at installation angle) has been introduced
6.2 Residual visibility	New requirement and associated test
6.4 Resistance to repeated impact from small particles (gravelling)	Editorial rearrangement of the sub clause and introduction of more precise test methods
6.5 Bullet resistance	New requirement and associated test
7 Performance in service	New clause assembling several requirements for heating systems, for the resistance against ageing, the accelerated weathering test, thermal cycling, etc. All the sub clauses have been editorial reworked and more precise test methods have been introduced
Annex A – Determination of windscreen angles	New annex introduced to help the user determine the type of the windscreen (e.g driver's windscreen, lateral windscreen, etc)
Annex B – Transmittance calculation for inclined windscreens	New annex explaining the calculation method for light transmittance of windscreens at installation angle
Annex C – Windscreen test sample mounting	New annex giving precise instructions for the installation of test samples. The set up applies to impact and gravelling tests
Annex D – Impact test projectile	New, more precise criteria for the impact test projectile, based on actual examples
Annex E – Gravelling test projectile	New annex for the precise description of the gravelling test projectile
Annex F – Test samples	New annex with precise requirements for test samples used in different tests throughout the document
Annex G – Summary of testing requirements	Editorial rearrangement of the annex in order to take into account all the changes made to the document
Annex ZA – Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered	New Annex ZA

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

〈A1〉 Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website. 〈A1〉

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

〈A1〉 This document specifies the functional requirements for rail vehicle windscreens, including type testing, routine testing, and inspection methods for high speed rail, heavy rail, and urban rail vehicles, including metro and tram applications. 〈A1〉

This document is also applicable for tram vehicles.

For on-track machines (OTMs) when in transport mode (self-propelled or hauled) the requirements of this standard are applicable. OTMs in working configuration are outside the scope of this document.

Determination of the size, shape, orientation and position of windscreens is outside the scope of this document. These data form part of the windscreen technical specification.

This document applies to windscreens made of laminated glass, which is the most commonly used material but also to other materials, subject to the performance requirements being satisfied.

This document does not specify requirements for the interfaces between the windscreen and the vehicle. Accordingly this document does not address issues relating to: installation, structural integrity and crashworthiness.

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.

EN 755-2:2016, *Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties*

EN 1063:1999, *Glass in building - Security glazing - Testing and classification of resistance against bullet attack*

EN 2155-9, *Aerospace series - Test method for transparent materials for aircraft glazing - Part 9 : Determination of haze*

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

EN 50155, *Railway applications — Rolling stock — Electronic equipment*

EN ISO 4892-3, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (ISO 4892-3)*

EN ISO 11664-1 (CIE S 014-1), *Colorimetry — Part 1: CIE standard colorimetric observers (ISO 11664-1)*

EN ISO 11664-2 (CIE, S 014-2), *Colorimetry — Part 2: CIE standard illuminants (ISO 11664-2)*

EN ISO 11664-3 (CIE, S 014-3), *Colorimetry — Part 3: CIE tristimulus values (ISO 11664-3)*

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 3537, *Road vehicles — Safety glazing materials — Mechanical tests*

ISO 3538:1997, *Road vehicles — Safety glazing materials — Test methods for optical properties*

ISO 6362-2:2014, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 2: Mechanical properties*

CIE 15:2004, *Colorimetry, 3rd Edition* [1]

CIE 38:1977, *Radiometric and photometric characteristics of materials and their measurement* [1]

CIE S 004, *Colours of Light Signals* [1]

[1] Can be obtained from: International Commission of Illumination, CIE Central Bureau, Kegelgasse 27, A-1030 Wien.