INTERNATIONAL STANDARD

ISO 12856-3

First edition
2022-02

Railway applications — Polymeric composite sleepers, bearers and transoms —

Part 3: General requirements

Applications ferroviaires — Traverses et supports en matériaux composites à matrice polymère —

Partie 3: Exigences générales

Reference number
ISO 12856-3:2022(E)

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Published in Switzerland

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Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Symbols **4**

5 General characteristics **6**
5.1 General 6
5.2 Geometrical design, mass and tolerances 6
5.3 Surface finish 11
5.4 Loading 11
5.4.1 Loads 11
5.4.2 Load distribution 11
5.5 Characteristic bending moments 11
5.6 Ecodesign 11

6 Quality control **12**
6.1 General 12
6.2 Quality control during design approval tests 12
6.3 Quality control during manufacturing 13

7 Documentation **13**
7.1 General 13
7.2 Data to be supplied by the purchaser 13
7.3 Data to be provided by the supplier 14
7.3.1 Before the design approval tests 14
7.3.2 After the design approval tests 14
7.3.3 Prior to start-up of production 14
7.4 Marking 15

8 Product testing **15**
8.1 General 15
8.2 Tests on product 15
8.2.1 General 15
8.2.2 Bending resistance 17
8.2.3 Thermal expansion 22
8.2.4 Permanent deformation of screw/insert in function of temperature 22
8.2.5 Fastening system 22
8.2.6 Electrical resistance 22
8.2.7 Screw, spike, cast-in and glued-in fastening components 23
8.2.8 Fire 23
8.2.9 System test 23
8.3 Tests on material characteristics 23
8.3.1 Chemical compatibility 23
8.3.2 Environmental resistance 23
8.3.3 Environmental compatibility 24
8.3.4 Mechanical properties 24
8.4 Additional tests for consideration (optional) 24
8.4.1 Damaging of the sleeper surface by ballast 24
8.4.2 Test in track 24
8.4.3 Lateral resistance 24

Annex A (informative) **Definition and recommendation for measurement of rail seat inclination and twist between rail seats** **25**

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Annex B (informative) **Design methods and factors** **26**
Annex C (informative) **Calculation of bending moments for transom** **39**
Bibliography **42**

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Foreword

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 269, *Railway applications*, Subcommittee SC 1, *Infrastructure.*

A list of all parts in the ISO 12856 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is used as the technical basis for transaction between corresponding parties (purchaser – supplier).

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Railway applications — Polymeric composite sleepers, bearers and transoms —

Part 3: General requirements

1 Scope

This document specifies general requirements of polymeric composite railway sleepers. It is applicable to the sleepers, bearers and transoms to be installed in all tracks (both heavy and urban rail) with or without ballast.

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.

ISO 12856-1, *Railway applications — Polymeric composite sleepers, bearers and transoms — Part 1: Material characteristics*

ISO 12856-2, *Railway applications — Polymeric composite sleepers, bearers and transoms — Part 2: Product testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
purchaser
body responsible for purchasing the product on the network company's behalf

3.2
supplier
body responsible for the use of the International Standard in response to the *purchaser's* (3.1) requirement

Note 1 to entry: The supplier is also responsible for requirements which apply to the product of the *manufacturer* (3.3).

3.3
manufacturer
organization which produces the *sleepers* (3.4), the *bearers* (3.5) and the *transoms* (3.6)

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3.4
sleeper
transverse component of the track which controls the *gauge* (3.29) and transmits loads from the rail to the ballast or other sleeper support

3.5
bearer
transverse component of switches and crossings which controls the relative geometry of two or more running rails and different pieces of special track work, and transmits loads from the rails to the ballast or other bearer support

3.6
transom
transverse component of track on bridges with open deck which controls the *gauge* (3.29) and transmits loads from the rail to the bridge structure

3.7
longitudinal beams for ballastless track on bridges
longitudinal component of *ballastless track* (3.27) on bridges which supports several *fastening systems* (3.28) for one rail

3.8
bending moment
moment applied on the polymeric composite *sleeper* (3.4), *bearer* (3.5) or *transom* (3.6) which produces tension and compression in the element

3.9
positive bending moment
moment which produces tension at the bottom of the polymeric composite *sleeper* (3.4), *bearer* (3.5) or *transom* (3.6)

3.10
negative bending moment
moment which produces tension at the top of the polymeric composite *sleeper* (3.4), *bearer* (3.5) or *transom* (3.6)

3.11
rail seat
area on which a running rail rests

3.12
rail seat area
rail seat (3.11) and the immediate area around the *fastening system* (3.28)

3.13
rail seat bending moment
moment under the centre line of the rail

3.14
centre bending moment
moment at the centre part of a *monoblock sleeper* (3.15)

3.15
monoblock sleeper
sleeper (3.4) consisting of one element of material

3.16
twin-block sleeper
sleeper (3.4) in which two *blocks* (3.17) are connected by a connecting bar

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3.17
block
short polymeric composite element which transmits loads from one rail to the ballast or other support

3.18
test load
load applied during testing

3.19
dynamic rail seat load
P_k
characteristic load on a *rail seat* (3.11) of the *sleeper* (3.4) for normal service dynamic loading

Note 1 to entry: Usually the characteristic load corresponds to the mean value plus "n" standard deviations of the dynamic wheel load.

Note 2 to entry: The term "dynamic load" used within this series, with respect to tests, should be interpreted as "cyclic load".

3.20
characteristic bending moment
M_k
bending moment (3.8) from the *dynamic rail seat load* (3.19)

3.21
characteristic positive bending moment for rail seat section
$M_{k,r,pos}$
positive bending moment (3.9) at the *rail seat* (3.11) from the *dynamic rail seat load* (3.19)

3.22
characteristic negative bending moment for rail seat section
$M_{k,r,neg}$
negative bending moment (3.10) at the *rail seat* (3.11) from the *dynamic rail seat load* (3.19)

3.23
characteristic negative bending moment for centre section
$M_{k,c,neg}$
negative bending moment (3.10) at the centre section from the *dynamic rail seat load* (3.19)

3.24
characteristic positive bending moment for centre section
$M_{k,c,pos}$
positive bending moment (3.9) at the centre section from the *dynamic rail seat load* (3.19)

3.25
thermal expansion
elongation of the *sleeper* (3.4), *bearer* (3.5) or *transom* (3.6) as a result of increasing temperature

3.26
bedding modulus
pressure (force per surface area) per unit deflection and measured under a uniaxial load

3.27
ballastless track
high fixity track constrained by means other than ballast

3.28
fastening system
any device used to secure running rails into chairs or baseplates or directly to *sleepers* (3.4), *bearers* (3.5), *transoms* (3.6) or other rail supports

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3.29
gauge
lateral distance between the running edges of rails in track

3.30
lateral track resistance
ability of a *sleeper* (3.4) to resist movement, perpendicular to rail, under lateral loading

3.31
conductor rail
rigid metallic section or rail mounted on insulators to distribute electrical energy to trains

3.32
geometric ballast plate
GBP
rigid steel plate with geometrically structured surface simulating ballast contact

Note 1 to entry: See ISO 12856-2:2020, Annex A.

3.33
flat plate
FP
rigid steel plate with flat surface with dimension 300 mm by 300 mm

3.34
design approval test
test on a polymeric composite *sleeper* (3.4), *bearer* (3.5) or *transom* (3.6) or part of it to demonstrate compliance with the acceptance criteria

3.35
routine test
quality control test in terms of regular manufacturing

4 Symbols

For the purposes of this document, the symbols and abbreviated terms listed in Table 1 apply.

Table 1 — Symbols

Symbol	Description	Unit
b_1	Maximum bottom width of the polymeric composite sleeper, bearer or transom.	m
b_2	Top width of the polymeric composite sleeper, bearer or transom.	m
b_3	Top width of the polymeric composite sleeper, bearer or transom at the axis of the rail seat.	m
d_{0s}	Deformation of the sleeper in the strength test under F_{r0}.	mm
d_{1s}	Deformation of the sleeper in the strength test under $k_{1s} \times F_{r0}$.	mm
d_{2s}	Deformation of the sleeper in the strength test under $k_{2s} \times F_{r0}$.	mm
$d_{1s,lim}$	Upper limit for the sleeper deformation in the strength test at exceptional load level.	mm
$d_{2s,lim}$	Upper limit for the sleeper deformation in the strength test at accidental load level.	mm
F	Planeness of each rail seat area: with regard to two points 150 mm apart.	—
F_{c0}	Positive reference test load at the centre section of the sleeper.	kN
F_{c0n}	Negative reference test load at the centre section of the sleeper	kN
F_{r0}	Positive reference test load for the rail seat section.	kN
F_{cB}	Maximum positive test load at centre of sleeper, bearer or transom.	kN
F_{cBn}	Maximum negative test load at centre of sleeper, bearer or transom.	kN

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