



SLOVENSKI STANDARD
oSIST prEN 17682:2021
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Železniške naprave - Infrastruktura - Elastični element za sistem plavajočih plošč

Railway applications - Infrastructure - Resilient element for floating slab system

Bahnanwendungen - Infrastruktur - Elastisches Element für Unterbodenmattensystem

Applications ferroviaires - Infrastructure - Élément élastique pour système de dalles flottantes

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Ta slovenski standard je istoveten z: prEN 17682

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ICS:

93.100

Gradnja železnic

Construction of railways

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EUROPEAN STANDARD
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English Version

Railway applications - Infrastructure - Resilient element for floating slab system

Applications ferroviaires - Infrastructure - Élément
élastique pour système de dalles flottantes

Bahnwendungen - Infrastruktur - Elastisches
Element für Unterbodenmattensystem

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 17682:2021) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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Introduction

In a track for railway vehicles, the Resilient Element for Floating Slab (REFS) is a product which is placed between the substructure and the ballastless track. This document applies to the performance-related properties of these elements.

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1 Scope

This document is applicable to Resilient Element for Floating Slab system (REFS) – Elements used in floating slab and defines the test procedures and their acceptance criteria.

The document covers not only those parameters related to the effectiveness of a track structure in mitigating vibrations, that is, to reduce the emission of vibrations and structure-borne noise, but also the parameters that are needed for the static analysis and for the verification of track safety.

Floating slab track systems in the form of track base plates and track troughs are individual solutions in which there is considerable variation in the engineering design and the types of resilient elements used. For this reason, a floating slab track system is always an individual engineering solution and therefore, it is not possible to define all specific conditions for the resilient elements in the present document

The most typical types of resilient elements are:

- Full surface bearings,
- Strip bearings,
- Discrete bearings (including the helical steel spring element),
- Vertical bearings.

This document provides particular information in the following areas:

- tests methods, tests arrangements and evaluation criteria of Resilient Element for Floating Slab system,
- data supplied by the purchaser and by the supplier,
- definition of general process of homologation,
- definition of routine tests.

This document defines the specific test procedures for REFS:

- stiffness tests,
- fatigue tests,
- severe environmental condition test.

This document also sets out procedures for testing fitness for purpose and provides information on quality monitoring as part of quality assurance procedures. This document does not, however, contain requirements pertaining to the functions of Resilient Element for Floating Slab system. It is the responsibility of the purchaser to define these requirements and to choose the optional tests.

This document is not applicable for fastening system and for booted concrete block and sleeper completed with boots covered by EN 13481-5.

prEN 17682:2021 (E)**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 ISO 7500-1, *Metallic materials - Calibration and verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Calibration and verification of the force-measuring system (ISO 7500-1)*

EN ISO 9513:2012, *Metallic materials - Calibration of extensometer systems used in uniaxial testing (ISO 9513:2012)*

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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 floating slab system
track system where a designed elasticity by resilient element is introduced between the ballastless track system or trough slab and its substructure

3.2 Resilient Element for Floating Slab system (REFS)
product of resilient material installed in the floating slab system including all integral parts of the product in order to mitigate vibrations

3.3 full surface bearing
resilient element arranged as a mat in between the floating slab and its substructure to provide continuous elastic support of the floating slab

3.4 strip bearing
resilient element arranged as a strip in between the floating slab and its substructure to provide continuous longitudinal elastic support of the floating slab. Continuous means any longitudinal gap between 2 strips is less than 10% of one strip length, and not larger than strip width. Exceptions only because of the construction requirement: i.e. Drainage

3.5 discrete bearing
resilient element arranged as a point support in between floating slab and its substructure to provide discontinuous elastic support of the floating slab (including helical steel spring element), with designed spacing between them over 10% of their length

Note 1 to entry: helical steel spring element, consisting of a helical steel spring according to EN 13906-1 and a viscous or a solid damping system assembled in one device.

3.6**vertical bearing**

vertical resilient element for floating slab system in order to constrain the horizontal movements

3.7**stiffness**

force per unit deflection, measured under a uniaxial force

3.8**bedding modulus**

compressive stress (force per unit area) per unit deflection, measured under a uniaxial force

3.9**static stiffness or static bedding modulus**

force or stress per unit deflection measured under a uniaxial static load

3.10**dynamic stiffness or dynamic bedding modulus**

force or stress per unit deflection measured under a uniaxial force which acts periodically at a given frequency of (5 – 20) Hz around between specific force or stress levels

Note 1 to entry: This value is determined mainly for calculation of dynamic deformation of tracks.

3.11**acoustic stiffness**

dynamic stiffness of an elastic track support component that is measured under a static preload and at small amplitudes of displacement or velocity applied in the frequency range relevant to noise or vibration perception

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3.12**mitigation of ground-borne noise and vibration**

reduction of mechanical vibration and/or ground-borne noise into the surroundings

Note 1 to entry: REFS has no direct influence on noise-mitigation only in some indirect cases e.g. mitigate the reradiated sound from bridge-structures.”

3.13**general design approval tests**

tests performed to demonstrate the compliance of the product properties with the requirements, for standard dimensions

3.14**project design approval tests**

tests performed to demonstrate the compliance of the product properties with the requirements for a specific project, set by the purchaser

3.15**routine tests**

tests performed to demonstrate the compliance of the product properties to the quality plan, set by the supplier

3.16**purchaser**

operator or user of the equipment, or the customer of the material on the user's behalf

prEN 17682:2021 (E)**3.17****supplier**

company /body responsible for the execution of purchaser's requirements

Note 1 to entry: This can be the manufacturer or his designated representative, stockist, distributor, or agent. The supplier is responsible for the use of the EN in response to the purchaser's requirements and will ensure all local conditions of purchase requirements are satisfied.

3.18**manufacturer**

organization responsible for blending and processing material constituents, integrating them in the manufacturing process and subsequently cutting, stamping or moulding to final dimensions

4 Symbols and abbreviations**Table 1 — Symbols**

Symbols	Characterization	Units
A	area	mm ²
C	bedding modulus	N/mm ³
d	displacement	mm
Δ	variation	-
F	force	kN
f	frequency	Hz
k	stiffness	N/mm
m	mass	kg
η	loss factor	-
κ	stiffening ratio between dynamic bedding modulus and static bedding modulus	-
σ	stress (compressive or tensile)	N/mm ²
Φ	dynamic coefficient	-
R	roughness	mm

Table 2 — Indices of the symbols

Indices	Characterization
<i>0</i>	minimum load
<i>i Hz</i>	value of frequency in measurement
<i>af</i>	after
<i>be</i>	before
<i>dyn</i>	dynamic
<i>A</i>	acoustic (bedding modulus)
<i>h</i>	horizontal
<i>max</i>	maximum
<i>min</i>	minimum
<i>i</i>	sequential number in order to differentiate types of measurements
<i>stat</i>	static
<i>tend</i>	tendency
<i>test</i>	test load
<i>v</i>	vertical
<i>a</i>	arithmetic mean value
<i>c</i>	cycles
<i>M</i>	million