ICS 21.100.20, 45.040 SLOVENSKÁ TECHNICKÁ NORMA December 2022

STN	**Železnice Skrine nápravových ložísk Valivé ložiská**	**STN EN 12080+A1 28 2210**

Railway applications - Axleboxes - Rolling bearings

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. 11/22

Obsahuje: EN 12080:2017+A1:2022

Oznámením tejto normy sa ruší
STN EN 12080 (28 2210) z marca 2018

135900

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12080:2017+A1

September 2022

ICS 21.100.20; 45.040 Supersedes EN 12080:2017

English Version

Railway applications - Axleboxes - Rolling bearings

Applications ferroviaires - Boîtes d'essieux - Roulements

Bahnanwendungen - Radsatzlager - Wälzlager

This European Standard was approved by CEN on 19 June 2017 and includes Amendment 1 approved by CEN on 6 June 2022.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

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

Ref. No. EN 12080:2017+A1:2022 E

Contents

Page

European foreword ... 5

Introduction ... 7

1 Scope ... 8

2 Normative references ... 8

3 Terms and definitions ... 9

4 Technical specification ... 11
4.1 General requirements ... 11
4.2 Technical specification content ... 11

5 Quality systems ... 12

6 Manufacture ... 12
6.1 Steel manufacturing ... 12
6.2 Heat treatment ... 12
6.3 Traceability ... 13
6.4 Coatings ... 14
6.4.1 General ... 14
6.4.2 Permanent coating ... 14
6.4.3 Non-permanent coating ... 14

7 Material properties ... 14
7.1 General ... 14
7.2 Steel for rings and rolling elements ... 14
7.2.1 Grades ... 14
7.2.2 Inclusion content ... 15
7.3 Materials of other components (cages, spacers, seals etc.) ... 15

8 Geometry and dimensions ... 15
8.1 Dimensions and tolerances ... 15
8.2 Rolling bearing internal clearance ... 15
8.2.1 Rolling bearing clearance before mounting ... 15
8.2.2 Rolling bearing clearance after mounting ... 16

9 Mechanical properties — inner ring expanding ability ... 16

10 Physical properties ... 16
10.1 Visual aspect ... 16
10.1.1 Rings and rolling elements ... 16
10.1.2 Cages ... 16
10.2 Soundness of rings and rolling elements ... 16
10.2.1 General rules ... 16
10.2.2 Internal soundness of rings ... 17
10.2.3 Soundness of ring surfaces ... 17
10.2.4 Soundness of roller raceway surfaces ... 17
10.2.5 Grinding burns ... 17
10.3 Case depth ... 17
10.4 Surface hardness ... 18

11 Marking 18
11.1 General 18
11.2 Marking of rings for cylindrical roller bearings (CRB) 19
11.3 Marking of cartridge bearings for axleboxes 19
11.4 Marking of spherical roller bearings (SRB) 20
11.5 Prefix and postfix 20
12 Inspection 20
12.1 Inspection plan 20
12.2 Sampling 21
13 Quality records 22
14 Approval 22
15 Delivery and packing 22
15.1 Greasing of rolling bearings 22
15.2 Corrosion protection 22
15.3 Packaging 22
Annex A (normative) Ultrasonic inspection of rolling bearing rings 24
A.1 Purpose 24
A.2 Principle 24
A.3 Equipment 24
A.4 Operating procedure 24
A.4.1 General rules 24
A.4.2 Preparation of rings 24
A.4.3 Examination 25
A.4.4 Calibration 25
Annex B (normative) Magnetic particle inspection of ring surfaces 29
B.1 Purpose 29
B.2 Principle 29
B.3 Equipment 29
B.4 Operation procedure 30
B.4.1 Preparation of rings 30
B.4.2 Examination 30
B.4.3 Demagnetisation 30
Annex C (normative) Eddy current inspection of the raceways of the rollers 31
C.1 Purpose 31
C.2 Principle 31
C.3 Equipment 31
C.4 Operating procedure 31
C.4.1 Preparation of rollers 31
C.4.2 Examination 31
C.4.3 Calibration 32

Annex D (normative) Cages of polymeric material ... 34
D.1 Purpose ... 34
D.2 Material ... 34
D.2.1 General ... 34
D.2.2 Base material ... 34
D.2.3 Additives ... 34
D.2.4 Conditioning ... 34
D.3 Cage requirements ... 34
D.3.1 Inspection plan ... 34
D.3.2 Moisture content ... 36
D.3.3 Fibre glass diameter and length measurement procedure ... 36
D.3.4 Surface quality ... 37
D.3.5 Sub-surface quality ... 37
D.4 Mechanical tests ... 39
D.4.1 Test conditions ... 39
D.4.2 Bending test procedures ... 40
D.4.3 Tension test procedures ... 41
D.5 Thermal ageing in grease or oil bath ... 43
Annex E (normative) Approval procedures ... 44
E.1 General ... 44
E.2 Complete procedure, type C ... 44
E.2.1 General ... 44
E.2.2 Stage 1 ... 44
E.2.3 Stage 2 ... 44
E.2.4 Stage 3 ... 44
E.2.5 Stage 4 ... 45
E.2.6 Decision ... 45
E.3 Reduced procedure, type R ... 45
Annex F (normative) Criteria to determine the extent of approval procedures ... 46
Annex G (informative) Examples of axlebox assemblies ... 48
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of Directive (EU) 2016/797 aimed to be covered ... 50
Bibliography ... 52

European foreword

This document (EN 12080:2017+A1:2022) 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 March 2023, and conflicting national standards shall be withdrawn at the latest by March 2023.

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 includes Amendment 1 approved by CEN on 6 June 2022.

This document supersedes ▌A1⟩ EN 12080:2017 ⟨A1▌.

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

The main changes with respect to the previous edition are listed below:

— ▌A1⟩ The use of conditioning for polymer cages is no longer mandatory and is specified in 4.2

— A clarification of deviations in marking of cylindrical roller bearings is new in 11.2 and 11.3

— The inspection plan for inclusion content in 12.1 (footnote h in Table 3) has been made clearer and now also includes specifications for sample preparations

— The sensor definition in C.3 is now more relevant

— Conditioning can now be performed also at the bearing manufacturer (see D.2.4)

— The sample frequency for polymeric cages in D.3.1.1 is now more relevant and the terms “Approval” and “Series” are better defined

— Table D.1 has been renamed for clarity and the requirements for “Viscosity index” and “Length of glass fibres” have been relaxed to be more relevant

— The requirement for “Mechanical test for material approval” in Table D.1 have been changed so that it is clear that the Charpy impact test is on “un-notched” samples and made according to the relevant norm, the requirement for the “Bending strength on the test specimen” is changed and a clarification on how “Thermal ageing in grease or oil bath” is performed has been added

— Footnote d in Table D.1 now allows for use of inspection certificate 3.1 and a new footnote “h” is added to specify sampling frequency

— ISO 15512 can be used for moisture content determination in D.3.2 and a clarification on the use of desiccator is added

— In D.3.4.3 some additions are made on how to address burrs on the edge and outside of functional areas

— D.3.5 is rewritten to address “void clusters” and Figure D.1 is replaced

— The Annex ZA has been revised to take into account EU Directive (EU) 2016/797 ⟨A1▌

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

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This standard is part of a set of standards: EN 12080, EN 12081 and EN 12082.

This European Standard has been drawn up with the purpose of aiming at optimum performance in rail transportation. Performance implies a certain quality level of the vehicle running gear, which every railway undertaking may require, notably by imposing procedures in approval and requesting the existence of a quality assurance system for the supply of rolling bearings intended for rolling stock operating on its network or other networks in Europe.

1 Scope

This European Standard specifies the quality parameters of axlebox rolling bearings supporting the load of the vehicle, required for reliable operation of trains on European networks. It covers metallurgical and material properties as well as geometric and dimensional characteristics. It also defines methods for quality assurance and conditions for approval of the products.

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 10204:2004, *Metallic products - Types of inspection documents*

EN 12081:2017, *Railway applications - Axleboxes - Lubricating greases*

EN 12082:2017, *Railway applications - Axleboxes - Performance testing*

EN 13018:2016, *Non-destructive testing - Visual testing - General principles*

EN 15663:2017, *Railway applications - Definition of vehicle reference masses*

EN ISO 178:2010, *Plastics - Determination of flexural properties (ISO 178:2010)*

EN ISO 179-1:2010, *Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test (ISO 179-1:2010)*

EN ISO 307:2007, *Plastics - Polyamides - Determination of viscosity number (ISO 307:2007)*

EN ISO 683-17:2014, *Heat-treated steels, alloy steels and free-cutting steels - Part 17: Ball and roller bearing steels (ISO 683-17:2014)*

EN ISO 1172:2003, *Textile-glass-reinforced plastics - Prepregs, moulding compounds and laminates - Determination of the textile-glass and mineral-filler content - Calcination methods (ISO 1172:1996)*

EN ISO 1183-1:2012, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1:2012)*

EN ISO 1183-2:2004, *Plastics - Methods for determining the density of non-cellular plastics - Part 2: Density gradient column method (ISO 1183-2:2004)*

EN ISO 2639:2002, *Steels - Determination and verification of the depth of carburized and hardened cases (ISO 2639:2002)*

EN ISO 3059:2012, *Non-destructive testing - Penetrant testing and magnetic particle testing - Viewing conditions (ISO 3059:2012)*

EN ISO 3451-1:2008, *Plastics - Determination of ash - Part 1: General methods (ISO 3451-1:2008)*

EN ISO 6507-1:2005, *Metallic materials - Vickers hardness test - Part 1: Test method (ISO 6507-1:2005)*

EN ISO 6508-1:2016, *Metallic materials - Rockwell hardness test - Part 1: Test method (ISO 6508-1:2016)*

EN ISO 6508-2:2015, *Metallic materials - Rockwell hardness test - Part 2: Verification and calibration of testing machines and indenters (ISO 6508-2:2015)*

EN ISO 6508-3:2015, *Metallic materials - Rockwell hardness test - Part 3: Calibration of reference blocks (ISO 6508-3:2015)*

EN ISO 9934-1:2016, *Non-destructive testing - Magnetic particle testing - Part 1: General principles (ISO 9934-1:2016)*

EN ISO 9934-2:2015, *Non-destructive testing - Magnetic particle testing - Part 2: Detection media (ISO 9934-2:2015)*

EN ISO 9934-3:2014, *Non-destructive testing - Magnetic particle testing - Part 3: Equipment (ISO 9934-3:2015)*

EN ISO 11357-3:2013, *Plastics - Differential scanning calorimetry (DSC) - Part 3: Determination of temperature and enthalpy of melting and crystallization (ISO 11357-3:2011)*

ISO 281:2007, *Rolling bearings — Dynamic load ratings and rating life*

ISO 492:2014, *Rolling bearings — Radial bearings — Geometrical product specifications (GPS) and tolerance values*

ISO 4967:2013, *Steel - Determination of content of non-metallic inclusions - Micrographic method using standard diagrams*

〖A1〉 ISO 15512:2016, *Plastics* — Determination of water content 〈A1〗