

DIN EN 14730-1



ICS 25.160.10; 93.100

Supersedes
DIN EN 14730-1:2010-12
**Railway applications –
Track –**
**Aluminothermic welding of rails – Part 1: Approval of welding processes;
English version EN 14730-1:2017,
English translation of DIN EN 14730-1:2017-06**

 Bahnanwendungen –
Oberbau –

 Aluminothermisches Schweißen von Schienen – Teil 1: Zulassung der Schweißverfahren;
Englische Fassung EN 14730-1:2017,
Englische Übersetzung von DIN EN 14730-1:2017-06

 Applications ferroviaires –
Voie –

 Soudage des rails par aluminothermie – Partie 1: Approbation des procédés de soudage;
Version anglaise EN 14730-1:2017,
Traduction anglaise de DIN EN 14730-1:2017-06

Document comprises 44 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

A comma is used as the decimal marker.

National foreword

This document has been prepared by Technical Committee CEN/TC 256 “Railway applications” (Secretariat: DIN, Germany).

The responsible German body involved in its preparation was *DIN-Normenausschuss Fahrweg und Schienenfahrzeuge* (DIN Standards Committee Railway), Subcommittee NA 087-00-01-01 UA “Welding of rails”.

This standard is based on the English reference version.

Amendments

This standard differs from DIN EN 14730-1:2010-12 as follows:

- a) Clause 4 “Information to be supplied by the railway authority” has been revised;
- b) Table 1 “Rail profile groups” has been revised and “Group 4” has been deleted;
- c) Figure 2 “Ground collar surface” has been deleted;
- d) Table 5 “Ranges for running surface hardness tests” and Table 7 “Chemical composition” have been revised and extended by rail grades R370CrHT and R400HT;
- e) Annex C “Ultrasonic inspection procedure on aluminothermic welds to be sectioned” has been revised, details on the setup for testing have been deleted and the Annex has been included as new Annex G;
- f) Annex E “Procedure for measurement” has been included as Annex D;
- g) Annex J “Fatigue test methods for aluminothermic welds” has been revised and calibration procedures have been deleted;
- h) the standard has been editorially revised.

Previous editions

DIN EN 14730-1: 2006-10, 2010-12

English Version

Railway applications - Track - Aluminothermic welding of rails - Part 1: Approval of welding processes

Applications ferroviaires - Voie - Soudage des rails par aluminothermie - Partie 1: Approbation des procédés de soudage

Bahnanwendungen - Oberbau - Aluminothermisches Schweißen von Schienen - Teil 1: Zulassung der Schweißverfahren

This European Standard was approved by CEN on 13 August 2016.

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, 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 United Kingdom.



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

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

Contents

Page

European foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Information to be supplied by the railway authority.....	8
5 Approval procedure	8
5.1 General.....	8
5.2 Process identification	8
5.3 General requirements	9
5.4 Documents to be submitted with the request for approval.....	9
5.4.1 The process manual	9
5.4.2 Drawing with the required measurements	10
Figure 1 — Dimensions taken from mould pattern	10
5.4.3 Chemical analysis ranges and tolerances.....	11
5.5 Initial compliance testing.....	11
Table 1 — Rail profile groups	11
Table 2 — Testing scheme.....	11
5.6 Extension of initial compliance testing	12
5.7 Preparation and allocation of test welds.....	12
6 Re-approval following process changes	13
6.1 Changes requiring approval	13
6.1.1 Geometric parameters	13
6.1.2 Crucible system.....	13
6.1.3 Tapping system.....	13
6.1.4 Pre-heating system.....	13
6.1.5 Portion	13
6.1.6 Welding gap.....	14
6.2 Test requirements for re-approval following process changes	14
Table 3 process changes	15
7 Laboratory tests.....	17
7.1 Visual surface examination	17
7.1.1 As-cast weld surface.....	17
Table 4 — Maximum dimensions of slag or sand defects	17
7.1.2 Ground weld surface	17
7.1.3 Visible heat affected zone.....	17
7.2 Running surface hardness test.....	17
Table 5 — Ranges for running surface hardness tests.....	18
7.3 Slow bend test	18
7.4 Internal examination	18
7.4.1 Weld soundness.....	18

Figure 2 — Transverse section of head, web and foot of the rail	19
Figure 3 — Sectioning of Welds	20
7.4.2 Fusion zone – Shape and dimension	21
Figure 4 — Shape of fusion zone on the etched longitudinal vertical section	21
7.4.3 Fusion zone	21
7.4.4 Heat softened zone width	22
Table 6 — Ranges of heat softened zone	22
7.5 Fatigue test.....	22
7.6 Chemical analysis	22
Table 7 — Chemical composition.....	23
Annex A (informative) Steps in approval.....	24
Annex B (informative) Suggested sequence of laboratory test.....	25
Annex C (normative) Procedure for Fry etching	26
Annex D (informative) Procedure for measurement of surface hardness.....	27
Figure D.1 — Location of surface hardness tests.....	27
Annex E (normative) Procedure for slow bend test.....	28
Figure E.1 — Slow bend test schematic.....	28
Annex F (normative) Procedure for recording test weld fracture face defects	29
Figure F.1 — Rail profile grid	30
Annex G (normative) Ultrasonic inspection procedure on aluminothermic welds to be sectioned.....	31
G.1 General	31
G.2 Test equipment.....	31
G.3 Preparation of samples	31
G.4 Adjustment.....	31
G.5 Testing.....	32
G.6 Reporting.....	32
Annex H (normative) Procedure for microscopic examination of the visible heat affected zone and fusion zone of welds	33
Figure H.1 — Scheme for taking samples for microscopic examination	33
Annex I (normative) Procedure for measurement of the heat softened zone width	34
I.1 Measurement of hardness	34
Figure I.1 — Longitudinal hardness measurement.....	34
I.2 Evaluation of hardness data	34
I.2.1 General	34
Figure I.2 — Typical hardness profile	35
I.2.2 Mean hardness of parent rail.....	35
I.2.3 Measurement hardness line	35