



SLOVENSKI STANDARD

SIST EN 16914:2017

01-maj-2017

Aluminij in aluminijeve zlitine - Vroče valjane oklopne plošče iz varjenih aluminijevih zlitin - Tehnični dobavni pogoji

Aluminium and aluminium alloys - Hot-rolled armour plates in weldable aluminium alloy - Technical delivery conditions

Aluminium und Aluminiumlegierungen - Warmgewalzte Panzerplatten aus schweißgeeigneter Aluminiumlegierung - Technische Lieferbedingungen

Aluminium et alliage d'aluminium - Tôles en alliage d'aluminium soudable laminées à chaud pour blindage - Partie 1 : conditions techniques de livraison

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Aluminium and aluminium alloys - Hot-rolled armour plates in weldable aluminium alloy - Technical delivery conditions

Aluminium et alliages d'aluminium - Tôles en alliage d'aluminium soudable laminées à chaud pour blindage
- Conditions techniques de livraison

Aluminium und Aluminiumlegierungen - Warmgewalzte Panzerplatten aus schweißgeeigneter Aluminiumlegierung - Technische Lieferbedingungen

This European Standard was approved by CEN on 16 January 2017.

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

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European foreword

This document (EN 16914:2017) has been prepared by Technical Committee CEN/TC 132 “Aluminium and aluminium alloys”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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.

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.

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1 Scope

This European Standard specifies the technical delivery conditions relating to armour plates in weldable aluminium alloy with a nominal thickness between 10 mm and 70 mm.

For thickness below 10 mm, other specifications may be applied.

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 485-1, *Aluminium and aluminium alloys - Sheet, strip and plate - Part 1: Technical conditions for inspection and delivery*

EN 485-3, *Aluminium and aluminium alloys - Sheet, strip and plate - Part 3: Tolerances on dimensions and form for hot-rolled products*

EN 10204, *Metallic products - Types of inspection documents*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2016)*

3 Designation

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The aluminium alloys concerned by this document are designated in accordance with the categories listed in Table 1 below:

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Table 1 — Categories

Category	Characteristics	Mechanical characteristics	Temper
ARAL1	Aluminium alloy for armour ^a	See 5.2	T651
ARAL2	Aluminium alloy for armour ^b	See 5.2	H13X ^c
^a ARAL1 aluminium alloy shall have an EN AW-7020 type chemical composition and the mechanical, ballistic and strength characteristics described in the different parts of standard in the relevant standards. ^b ARAL2 aluminium alloy shall have an EN AW-5083 type chemical composition and the mechanical characteristics described in the different parts of standard in the relevant standards. ^c According to EN 515 or as agreed between supplier and purchaser.			

4 Information to be provided by the purchaser

4.1 Mandatory information (tenders and orders)

The following information shall be provided by the purchaser at the time of the call for tenders and of the order:

- a) form and nature of the product:
 - 1) the designation of the aluminium or aluminium alloy, in accordance with Table 1, specifying the temper for ARAL2;
- b) the reference to this European Standard;

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- c) the nominal dimensions and form of the product:
- 1) thickness;
 - 2) width;
 - 3) length (in the rolling direction): At each order, the rolling direction shall be specified. Unless otherwise specified, the longest dimension shall be the length;
- d) the form and dimension tolerances;
- e) quantity required: number of pieces, and the applicable quantity tolerance;
- f) all requests for inspection documents;
- g) all special requirements agreed upon between the supplier and the customer;
- h) the applicable standard for ballistic testing, unless otherwise specified.

4.2 Options

When specified, the options specified in this document are listed below:

- a) determination of the chemical composition of the product (see 5.1);
- b) the acceptance according to the requirements in this document shall be supervised by an external inspection organization; the name of this organization shall then be explicitly stated at the time of the order;

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These options shall be specified at the time of placing the order.

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5 Requirements

5.1 Chemical composition

The chemical composition of the alloy shall be within the ranges for chemistry specified in Table 2 or Table 3:

Table 2 — Chemical composition for analysis from melt, in weight-% (ARAL1)

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Zr	Zr + Ti	Al	Other	
											Each	Total
Min.			0,10	0,05	1,0	0,10	4,0	0,08	0,08	remainder		
Max.	0,35	0,40	0,20	0,50	1,4	0,35	5,0	0,20	0,25		0,05	0,15

Table 3 — Chemical composition for analysis from melt, in weight-% (ARAL2)

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al	Other	
										Each	Total
Min.				0,40	4,0	0,05			remainder		
Max.	0,40	0,40	0,10	1	4,9	0,25	0,25	0,15		0,05	0,15

If agreed between the supplier and the purchaser at the time of the call for tenders and of the order (see 4.2, option 1), the products delivered may be subjected to a determination of chemical composition.

The chemical composition shall be determined according to the methods disclosed in EN 485-1 or a method to be agreed between supplier and purchaser.

5.2 Mechanical characteristics

The tensile tests shall be performed in the longitudinal transverse direction (perpendicular to the rolling direction) and the values shall fit within the ranges indicated in Table 4 or Table 5.

Table 4 — Mechanical characteristics –ARAL1

	At a temperature of + 20 °C		
	Tensile strength	Yield strength	Elongation after fracture
	R_m MPa	$R_{p0.2}$ MPa	A %
Min.	360	310	10 %
Max.	440	390	–

Table 5 — Mechanical characteristics – ARAL2

	At a temperature of + 20 °C		
	Tensile strength	Yield strength	Elongation after fracture
	R_m MPa	$R_{p0.2}$ MPa	A %
Min.	315	245	9 %
Max.	400	360	–

5.3 Stress corrosion

In the case of ARAL1 plates with a thickness over 20 mm, intended for use in a mechanically-welded structure, a stress corrosion test shall be performed in accordance with Annex A.

In the case of non-welded plates, this test is not required. This information shall be specified at the time of the call for tenders and of the order (see 4.2).

5.4 Absence of defects

The surface quality of the plates shall be in accordance with the requirements in EN 485-1.

5.5 Quality of the edges

The edges and ends of the plates shall be visually checked, and shall be free from delamination that could be detrimental to the welding.

In case of doubt, a non-destructive test (NDT) shall be performed by the supplier; the choice of method is at the supplier's discretion. This absence of lamination shall be checked up to 100 mm from the edges.