GESAMTVERBAND DER ALUMINIUMINDUSTRIE e.V.

How to order aluminium products according to EN standards

GDA/EAA-Guide

How to order aluminium products according to EN standards

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1. General

1.1 European standards on aluminium products

There is an increasing variety of aluminium products with different properties and quality requirements, see also AluSelect. The European aluminium industry wants to make sure that aluminium is the customer's choice and wants to facilitate the trade with aluminium. Therefore, EAA has promoted European Standards dealing with aluminium products which are superseding national standards since more than ten years. These European Standards describe the state of the art and, contrary to the outdated national standards, can be used as a safeguard against product liabilities.

Looking at the title lists of the European Standards on aluminium products - more than 120 European standards have already been published - one may have some doubts if the "European approach" has really brought a simplification. These guidelines will show that, indeed, the European Standards on aluminium products have a high degree of transparency.

Customers of aluminium products often are small companies which are not familiar with the aluminium standards. They just write down in their orders what they want without any reference to EN standards. In such cases the supplier should include references to standards into the confirmation of the order. This gives both parties the necessary basis of negotiations for the possible case that the customer is not satisfied with the supplied product.

The reason of complaints with significant financial consequences are often misunderstandings, especially if a language other than the native language is used for the correspondence. Therefore, it is important to use the appropriate terminology according to the definitions as given in the European standards. In this document, the standardised terms and definitions for the different types of aluminium products are given, based on a global document GAG-01 which can be down-loaded under ….

These guide-lines should especially be used when incoming orders have to be checked as a part of the suppliers' quality assurance system. Especially for the confirmation of the order, which is normally the relevant contractual document, these guide-lines should be considered.

1.2 Aluminium products for general application (standard products)

Aluminium products for general application usually have the form of sheet, plate, foil, rod/bar, tube, profile or wire. For each of these forms, European standards "for general applications" are published each of them consisting of different parts, e. g.

- Sheet, and plate: EN 485-1 to -4;
- Rod/bar tube and profile: EN 754-1 to -8 (for drawn products) and EN 755-1 to -9 (for extruded products)
- Foil: EN 546-1 to 4
- Drawn wire: EN 1301-1 to 3

Part 1 of each standard contains technical conditions for inspection and delivery which indicate

- which information should included in an "order document", i. e. a document or set of documents to which supplier and purchaser agreed at the time of ordering
- which are the requirements on the products (including references to the other parts of the standards)
- how the manufacturer should produce and test the product
- how the product should be shipped and which information should be submitted to the customer
- how arbitration should happen, if necessary.

Part 2 specifies the mechanical properties of the relevant alloys and tempers, and in the following parts the tolerances of form and dimension, and in specific cases additional properties are specified.

Customers who need such standard products in small quantities usually buy them from stockists which have ordered the product from the manufacturer according to the relevant European standard. By the appropriate process control, inspection and testing, the manufacturer has made sure that the properties of the product are in conformance with the requirements of these standards.

Customers who need the standard products in larger quantities typically buy them directly from the manufacturer.

1.3 Aluminium products with special requirements (special products)

Many customers need special products with requirements which differ from those of the standard products or additional requirements. In such cases, it is normally advantageous to order according to European standards and include the special requirements in the order, because, in most cases, such special requirements are only related to a limited number of properties and tests. In this case the special reference to the standard means that for all those properties, test methods and delivery specifications which are not covered by the special requirements, the requirements of the relevant European standard are valid.

If, as an example, a customer wants to order sheet with closer dimensional tolerances than indicated in the European standard, then he , can indicate these special tolerances in his order and, nevertheless, refer to EN 485-1. In this case, the requirements of the standard related to dimensional tolerances will be replaced by the closer requirements laid down in the order and the other requirements are unchanged.

However, it can be difficult to get such special products in small quantities from a stockist. If a special product is ordered from a manufacturer, then the latter has to produce special lots under special conditions which means higher costs and a higher price.

For some products such as lithographic sheet, car body sheet etc., only a few suppliers and customers exist. In such cases often customer specifications exist and EN standards are disregarded.

1.4 EN standards for special applications

As special requirements usually refer to specific applications, a special group of European standards has been created for such applications, e. g. for aluminium in contact with food, for pressure vessels, for railway cars, for marine applications, for electrotechnical applications, for packaging and for structural building applications. In such standards specific alloys for the relevant application are recommended and additional or stricter requirements on mechanical properties, dimensional tolerances and other properties are specified.

In many cases, a standard for specific application allows to unify the additional requirements necessary for a specific application, which allows a cost reduction for production and testing.

It is the decision – and the responsibility – of the purchaser if he wants to order aluminium products for a special application according to an EN standard for general application or according to an EN standard for special application.

Standards for special applications have also been worked out by large customers, of associations and classification societies. They are not considered in this document.

1.5 General terms and definitions

In this document, the different forms of products are defined according to GAG-01, and recommendations how to order such products according to European standards are given. Further general terms and definitions, also taken from GAG-01 and helpful for the understanding, can be found in Annex A.

The list of EN standards of CEN/TC 132 on aluminium products can be found in Annex B

2. Ordering rolled products

2.1 Ordering flat rolled products according to EN 485-1

EN 485-1 specifies which information should be part of the order document – agreed between supplier and purchaser – to make sure that the supplied product really meets the expectations of the purchaser. The information is grouped into twelve different positions a), b) c) … l):

a) form and type of product:

- form of the product (sheet, strip, plate, etc.);
- designation of the aluminium or aluminium alloy;

b) temper of the material for delivery according to EN 515 and, if different, the temper for use;

c) reference to this European Standard;

d) specification of mechanical properties, if additional to or different from prEN 485-2;

e) reference to the standard for tolerances of form and dimensions (EN 485-3 or EN 485-4);

f) dimensions and shape of the product:

- thickness;
- width;
- length of sheet and plate, as applicable (in the rolling direction);
- internal and external diameters of the coil, or dimension and type of the core, as applicable.

NOTE 1 Unless otherwise agreed, the length is the largest dimension of the sheet or plate and corresponds to the rolling direction.

g) specification or tolerances, if additional to or different from EN 485-3 or EN 485-4;

h) quantity:

- mass or number of pieces;

quantity tolerances if required;

i) any requirements for inspection documents;

j) any other test, in addition to chemical analysis and tensile testing;

k) any additional requirements, such as:

- quality assurance;
- specific inspection schemes;
- marking of products;
- references of drawing, etc.;
- special packing requirements;

l) for products intended for decorative anodizing by the purchaser, the order document shall also contain the following:

- statement that the product is intended to be anodized;
- intended particular surface treatment (according to the relevant European Standard);
- whether a decorative appearance after anodizing is required for both sides and, if only one side, its position with respect to the strip (inside or outside of the coil) or the sheet or plate (upside or downside).

Products intended to form a specific area after anodizing (such as a façade) should be ordered in a single batch.
The order document should indicate the intended application.

The following Table 1 gives some examples and additional explanations.

Table 1 General instructions, applied to the example of rolled products

Indication	Example	Explanations
a) form and type of product	**Example a)** Sheet, alloy EN AW-5052	The material designations and the limits of the chemical analysis are laid down in EN 573-3. Reference to this standard is not necessary, as such a reference is already made in EN 485-1.
	Example b) alloy Pe-253 according to actual prospectus	In this example a special requirement related to chemical analysis is given by which the reference to EN 573-3 in EN 485-1 becomes invalid. Special requirements in the order document supersede requirements of a standard
b) temper of the material for delivery according to EN 515 and, if different, the temper for use	Temper H18	The temper designation is defined in EN 515. Reference to this standard is not necessary, as such a reference is already made in EN 485-1.
c) reference to this European Standard	…according to EN 485-1	This reference means that all requirements of EN 485-1 are part of the orderdocument. This statement also means that the requirements of other standards to which reference is made in this standard, e.g. EN 573-3 for chemical composition, EN 485-2 for mechanical properties and different standards for testing procedures are part of the order document, as well. Such references need not be repeated in the order document. However, if references to other standards are made in the purchase order, then these references apply.
d) specification of mechanical properties, if additional to or different from prEN 485-2	-	No indication means that specifications of EN 485-2 apply
e) reference to the standard for tolerances of form and dimensions (EN 485-3 or EN 485-4)	Tolerances according to EN 485-4	This reference is necessary because two possible tolerance standards for rolled products exist, namely EN 485-3 and EN 485-4.
f) dimensions and shape of the product	Length: 1500 mm; Width: 1050 mm; Thickness: 1,2 mm	It is essential that no misunderstandings are possible. It is not sufficient to write "1500 x 1050 x 1,2", if no reference is made to a document where it is clearly stated what these figures mean.
g) specification or tolerances, if additional to or different from EN 485-3 or EN 485-4	Thickness tolerance 50 % of value as specified in EN 485-4	For a width of 1050 mm and a thickness of 1,2 mm, EN 485-4 requires a thickness tolerance of $\pm$0,09 mm. For this order, a thickness tolerance of $\pm$0.45 mm applies
h) quantity: - mass or number of pieces; quantity tolerances if required	20 tonnes; Maximum deviations from ordered quantity: + 2 %	Narrow tolerances cause additional costs, e. g. production scrap at the supplier's rolling mill and should be specified only if really necessary
i) any requirements for inspection documents	Inspection certificate type 3.1 to be included	Details about this document are described in EN 10204:2004, subclause 4.1.
j) any other test, in addition to chemical analysis and tensile testing	Anodizing test and bend test to be included	Further details can be exchanged by separate documents
k) any additional requirements	Special requirements on planity according to enclosure.	As elsewhere, special requirements replace conflicting requirements of the relevant standard.
l) additional information for products intended for decorative anodizing by the purchaser	Sheet will be used for anodized facade panels; please supply anodizing quality for top side	

2.2 Instructions for ordering flat rolled products

The following table gives an overview over the different forms of flat rolled products, according to their definitions which are laid down in GAG-01. For each of these products, recommendations are given about the standards to be considered when ordering

Table 2 Forms of flat rolled products and EN standards to be considered when ordering

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
sheet: rolled product that is rectangular in cross section with nominal thickness less than 6 mm (in USA less than 0.250 inches) but not less than 0,20 mm (in USA not less than 0.006 inches) and with slit, sheared or sawed edges NOTE 1:A sheet can be supplied in a corrugated, embossed, coated, edge conditioned or perforated form. NOTE 2: Sheet between 3 mm and 6 mm is sometimes called „shate“. NOTE 3:In Europe, the term "sheet" is only used for rolled products supplied in straight length, for coiled sheet the term "strip" is used.	EN 485-1	*mechanical properties*: EN 485-2 *tolerances on form and dimensions hot-rolled:* EN 485-3 *tolerances on form and dimensions cold-rolled*: EN 485-4 EN 485-1 only refers to sheet for general application
plate rolled product that is rectangular in cross section and with thickness not less than 6 mm (in USA not less than 0.250 inch) with sheared or sawn edges	EN 485-1	*mechanical properties*: EN 485-2 *tolerances on form and dimensions hot-rolled*: EN 485-3 *tolerances on form and dimensions cold-rolled*: EN 485-4 EN 485-1 only refers to plate for general application
hot rolled sheet/hot rolled plate sheet or plate the final thickness of which is obtained by hot rolling NOTE: A reroll plate is often called "slab".	EN 485-1	for hot-rolled re-roll stock see EN 12482-1
cold rolled sheet/cold rolled plate sheet or plate the final thickness of which is obtained by cold rolling	EN 485-1	for cold-rolled re-roll stock see EN 12482-2
reroll stock coiled sheet suitable and intended for further rolling	EN 12482-1 EN 12482-2	for hot-rolled re-roll stock see EN 12482-1 for cold-rolled re-roll stock see EN 12482-2
anodizing sheet sheet with metallurgical characteristics and surface quality suitable for the development of protective and decorative films by anodic oxidation processes	EN 485-1	see Table 1
brazing sheet sheet of a low melting point alloy or clad with a low melting point alloy, used for brazing	EN 485-1 with special requirements	normally, a close co-operation between supplier and customer is necessary which includes qualification procedures

Table 2 Forms of flat rolled products and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
can stock sheet or strip used for the fabrication of rigid cans including ends (lids) and tabs by drawing/ironing, pressing or forming operations. Can stock covers can body stock, end (lid) stock and tab stock	EN 541	EN 541 contains also dimensional tolerances and mechanical properties
circle stock sheet, strip or plate intended to be sawn, sheared or blanked into circles to be subsequently formed, drawn, etc.	EN 485-1	special requirements on circles according EN 941 and EN 851 to be considered
foil stock reroll stock suitable for further rolling to foil	EN 12482-1 EN 12482-2	foil stock is considered as a special form of re-roll stock
lithographic sheet sheet having a superior finish on one side with respect to freedom from surface imperfections and supplied with a maximum degree of flatness for use as a plate in offset printing	EN 485-1 with special requirements	normally, a close co-operation between supplier and customer is necessary which includes qualification procedures
fin stock coiled sheet or foil suitable and intended for manufacture of fins for heat-exchanger applications	EN 683-1	*mechanical properties*: EN 683-2 *tolerances on form and dimensions*: EN 683-3 special properties EN 683-4
reflector sheet sheet with special requirements related to the surface quality intended and suitable for the manufacture of reflectors	EN 485-1 with special requirements	normally, a close co-operation between supplier and customer is necessary which includes qualification procedures
roofing sheet sheet intended and suitable for roofing application	EN 485-1	special requirements according EN 507 to be considered
painted sheet sheet, one or both sides of which has a factory-applied paint coating of controlled thickness	EN 1396	EN 1396 applies to coil coated sheet, otherwise additional requirements
mill finish sheet/plate sheet/plate having a finish defined by the actual roll grinding and rolling conditions, without further specification from a customer or a standard. NOTE: The finish of mill finish sheet/plate can vary from sheet to sheet or within one sheet	EN 485-1	

Table 2 Forms of flat rolled products and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
satin-finish sheet sheet with a fine-textured matt finish on one or both surfaces	EN 485-1	special requirements to be clearly specified
corrugated sheet, profiled sheet roll-formed sheet of symmetric or asymmetric profile	EN 485-1	profile and special requirements to be clearly specified. For coil-coated material see EN 1396.
patterned sheet; embossed sheet sheet on which a raised or indented pattern has been impressed or embossed on either one or both faces	EN 485-1 EN 1386 in case of tread plates	additional requirements and mechanical values of EN 1386 should be considered
tread plate sheet or plate upon which a pattern has been impressed on one side by rolling using a specially prepared roll with an appropriate pattern, to provide improved traction	EN 1386	EN 1386 contains special mechanical properties
machined plate semi-finished product produced from a plate completely machined over one or two sides	EN 485-1	special requirements to be clearly specified
tooling plate cast or rolled product of rectangular cross-section over 6 mm (in USA 0,250 inches) in thickness, and with edges either as-cast, sheared or sawn, with internal stress levels controlled to achieve maximum stability for machining purposes in tool and jig applications	EN 485-1	special requirements to be clearly specified, because the provisions of EN 485-1 usually are not sufficient for this product Cast products not covered by EN 485-1
blank piece of metal of regular or irregular shape taken from a flat wrought product intended for subsequent processing such as bending, stamping or deep drawing	EN 485-1	EN 851 and EN 941 to be considered; special requirements to be clearly specified
circle circular blank fabricated from plate, sheet, or foil	EN 941 (general application.); EN 851 (culinary application))	
disc circle from which a central concentric area has been removed		
slug piece of metal of uniform thickness, of regular or irregular shape taken from a wrought product, typically for impact extrusion, with or without a centre hole NOTE: This term is also used for cast or thyxocast pieces to be formed in semi-solid condition (thyxoforming).	EN 570	

Table 2 Forms of flat rolled products and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
foil flat rolled product of rectangular cross-section with uniform thickness equal to or less than 0,20 mm (200 microns) NOTE: In USA the maximum thickness of a foil is less than 0,006 inch.	EN 546-1	*mechanical properties*: EN 546-2 *tolerances on form and dimensions*: EN 546-3 special properties EN 546-4
converter foil foil, typically soft annealed, supplied for further processing such as colouring, printing, embossing or laminating	EN 546-1	see "foil". Furthermore, special requirements related to surface appearance and porosity are to be fulfilled.
container foil single rolled foil with a gauge above approximately 35 µm, produced at soft or intermediate temper and often involving alloys of the 3xxx and 8xxx series intended for press forming into smooth or wrinkled walled containers for foodstuffs and the like	EN 546-1	see "foil". Furthermore, special requirements related to formability are to be fulfilled
consumer foil; household foil foil intended for public use, principally for use in culinary applications such as cooking and storage	EN 546-1	see "foil".
embossed foil; patterned foil foil on which a pattern has been impressed or embossed on either one or both faces	EN 546-1	see "foil".
printed foil foil printed with a design or on all-over colour	EN 546-1	see "foil".
rolled aluminium products for structural building application	EN 15088	see also chapter 1.4. The special standards mentioned here formulate recommendations and specific requirements reflecting the intended application, in addition or alternatively to the basic standards of the EN 485 and EN 546 series, which are referenced for the remaining properties. By ordering according to the special standard, the basic standards apply by reference. Alternatively, the product can be ordered according to the basic standard, together with the special requirements
rolled aluminium products for pressure vessels	EN 12392	
rolled aluminium products for tanks for the transport of dangerous goods	EN 14286	
rolled aluminium products for electro-technical applications	EN 14121	
rolled aluminium products for packaging applications	EN 14287	
rolled aluminium products for structural railway application	EN 13981-2	
rolled aluminium products in contact with food	EN 602, EN 14392, if anodised	
rolled aluminium products for marine applications	prEN 13195 (EN 13195:2002 withdrawn)	

3. Ordering extruded and drawn products

The following tables give an overview over the different forms of extruded and drawn products, according to their definitions which are laid down in GAG-01. For each of these products, recommendations are given about the standards to be considered when ordering

Table 3 Forms of extruded and cold-drawn products and EN standards to be considered when ordering

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
extruded profile profile brought to final dimensions by extruding	EN 755-1 for general application, EN 12020-1 for precision profiles of AW-6060 and AW-6063 type alloys	*mechanical properties*: EN 755-2; *tolerances on form and dimensions for extruded profiles for general applications*: EN 755-9; *tolerances on form and dimensions for precision profiles*: EN 12 020-2.
extruded rod/bar Rod or bar brought to final dimensions by extrusion.	EN 755-1	*mechanical properties*: EN 755-2; tolerance standards depending on cross-section: EN 755-3 to EN 755-6
cold-drawn rod/bar Rod or bar brought to final dimensions by cold-drawing.	EN 754-1	*mechanical properties*: EN 754-2; tolerance standards depending on cross-section: EN 754-3 to EN 755-6.
extruded round bar extruded bar of a round cross-section	EN 755-1	*mechanical properties*: EN 755-2; *tolerances on form and dimensions*: EN 755-3
cold-drawn round bar cold-drawn bar of a round cross-section	EN 754-1	*mechanical properties*: EN 754-2; *tolerances on form and dimensions*: EN 754-3
extruded square bar extruded bar of a square cross-section	EN 755-1	*mechanical properties*: EN 755-2; *tolerances on form and dimensions*: EN 755-4
cold-drawn square bar cold-drawn bar of a square cross-section	EN 754-1	*mechanical properties*: EN 754-2; *tolerances on form and dimensions*: EN 754-4
extruded rectangular bar extruded bar of a rectangular cross-section NOTE: The term „rectangular bar“ includes „flattened circles“ and „modified rectangles“ of which two opposite sides are convex arcs, the other two sides being straight, of equal length and parallel.	EN 755-1	*mechanical properties*: EN 755-2; *tolerances on form and dimensions*: EN 755-5
cold-drawn rectangular bar cold-drawn bar of a rectangular cross-section NOTE: (see extruded rectangular bar)	EN 754-1	*mechanical properties*: EN 754-2; *tolerances on form and dimensions*: EN 754-5
extruded hexagonal bar bar having the cross-section of a regular hexagon	EN 755-1	*mechanical properties*: EN 755-2; *tolerances on form and dimensions*: EN 755-6

Table 3 Forms of extruded and cold-drawn products and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
cold-drawn hexagonal bar bar having the cross-section of a regular hexagon	EN 754-1	*mechanical properties*: EN 754-2; *tolerances on form and dimensions*: EN 754-6
extruded forging stock extruded product, e.g. rod or bar, suitable for forging	EN 603-1	*Mechanical properties*: EN 603-2; *tolerances on form and dimensions*: EN 603-3; can also be ordered according to EN 755-1
machining stock bar or wire typically supplied to close *tolerances* and suitable for repetition machining operations NOTE: This product is sometimes referred to as “screw machine stock (SMS)	no specific European Standard	related semi-finished product standard together with special requirements to be used.
wire wrought product that is long in relation to its cross section, which is square or rectangular with sharp or rounded corners or edges, or is round, hexagonal, or octagonal NOTE 1: In North America, the maximum diameter or perpendicular distance between parallel faces of a wire is 0,375 inches; above this limit the product is called "rod" or "bar". NOTE 2: In Europe, a wire is supplied in coiled form; if supplied in straight length, the product is called "rod" or "bar".	EN 1301-1	*mechanical properties*: EN 1301-2 *tolerances on form and dimensions*: EN 1301-3 Definitions of alternative products (strip, profiles, tube, rod/bar) should be considered.
drawing stock semi-finished wrought product of uniform cross section along its whole length, supplied in coils and of a quality intended and suitable for drawing into wire	EN 1715-1	special requirements for electrotechnical applications: EN 1715-2; special requirements for mechanical applications: EN 1715-3; special requirements for welding applications: EN 1715-3
conductor wire wire possessing the requisite electrical and *mechanical properties* for use as an electrical conductor	see CENELEC	
welding wire wire for use as filler metal in joining by welding	EN 1715-4 ISO 18273	
extruded tube tube brought to final dimensions by extruding	EN 755-1	*mechanical properties*: EN 755-2; *tolerances on form and dimensions*: EN 755-7 for seamless tube and EN 755-8 for porthole/bridge tube
drawn tube tube brought to final dimensions by drawing through a die	EN 754-1	*mechanical properties*: EN 754-2; *tolerances on form and dimensions*: EN 754-7 for seamless tube and EN 754-8 for porthole/bridge tube

Table 3 Forms of extruded and cold-drawn products and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
porthole tube/bridge tube tube produced by extrusion of a solid billet through a porthole or bridge die. NOTE: The product is characterised by one ore more longitudinal extrusion seams	EN 754-1, EN 755-1	*mechanical properties*: EN 754-2 for drawn product and EN 755-2 for extruded product; *tolerances on form and dimensions*: EN 754-8 for drawn product and EN 755-8 for extruded product
seamless tube tube which does not contain any line junctures resulting from method of manufacture	EN 754-1, EN 755-1	*mechanical properties*: EN 754-2 for drawn product and EN 755-2 for extruded product; *tolerances on form and dimensions*: EN 754-7 for drawn product and EN 755-7 for extruded product
welded tube tube produced by longitudinal seam-welding, typically of formed sheet NOTE: Welded tubes can be fabricated by arc-welding with or without welding wire, high frequency seam welding, or any other type of welding.	-	EN standards only for H.F. seam welded tube, see below
H.F. seam welded tube welded tube fabricated from strip by use of H.F. current without filler wire	EN 1592-1	*mechanical properties*: EN 1592-2; *tolerances on form and dimensions*: EN 1592-3 for round tube and EN 1592-4 for tube with other cross-sections
tube stock semi-finished tube suitable for the production of drawn tube NOTE: Tube stock is also referred to as tube bloom.	no specific EN Standard	In the case of extruded tube see 3.4.2
extruded and drawn aluminium products for structural building application	EN 15088	see also chapter 1.4. The special standards mentioned here formulate recommendations and specific requirements reflecting the intended application, in addition or alternatively to the basic standards of the EN 754 and EN 755 series, which are referenced for the remaining properties. By ordering according to the special standard, the basic standards apply by reference. Alternatively, the product can be ordered according to the basic standard, together with the special requirements
extruded and drawn aluminium products for pressure vessels	EN 12392	
extruded and drawn aluminium products for electro technical applications	EN 14121	
extruded aluminium products for structural railway application	EN 13981-2	
extruded and drawn aluminium products in contact with food	EN 602, EN 14392, if anodised	
extruded and drawn aluminium products for marine applications	prEN 13195 (EN 13195:2002 withdrawn)	

4. Ordering castings and forgings

The following table gives an overview over the different forms of castings and forgings, according to their definitions which are laid down in GAG-01. For each of these products, recommendations are given about the standards to be considered when ordering

Table 4 Forms of castings and forgings and EN standards to be considered when ordering

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
casting product at or near finished shape, formed by solidification of the metal in a mould or a die	EN 1559-1, -4	EN 1706 for alloy and product specification; EN 1676 for casting ingots
sand casting casting produced by pouring molten metal into a sand mould and allowing it to solidify	EN 1559-1, -4	EN 1706 for alloy and product specification; EN 1676 for casting ingots
die casting casting produced by introducing molten metal under substantial pressure, typically above 100 bars into a metal die and characterized by a high degree of fidelity to the die cavity NOTE: The term "pressure die casting" or "high pressure die casting" is often used for this concept.	EN 1559-1, -4	EN 1706 for alloy and product specification; EN 1676 for casting ingots
permanent mould casting casting produced by introducing molten metal by gravity or low pressure into a mould constructed of durable material, typically iron or steel, and allowing it to solidify NOTE: permanent mould casting where the metal solidifies in a metal mould under low pressure (typically less than 1 bar above atmospheric pressure) is also referred to as "low pressure die casting	EN 1559-1, -4	EN 1706 for alloy and product specification; EN 1676 for casting ingots
precision casting casting which fulfils special requirements concerning tolerances on form and dimensions NOTE: Precision castings can be produced by different casting processes.	EN 1559-1, -4	EN 1706 for alloy and product specification; EN 1676 for casting ingots; special requirements to be specified
investment casting precision casting formed by a three step process comprising: a) fabrication of a ceramic mould around a wax or thermoplastic pattern with a refractory slurry that sets at room temperature b) removal of the pattern through the use of heat c) pouring of metal into this mould and allowing it to solidify	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots; special requirements to be specified
forging wrought product formed by hammering or pressing, typically when hot, between open dies (hand forging) or closed dies (drop or die forging)	EN 586-1	*mechanical properties*: EN 586-2; *tolerances on form and dimensions:* EN 586-3

Table 4 Forms of castings and forgings and EN standards to be considered when ordering (continued)

Definition of Product	EN-Standard for Generalities	Other EN Standards, comments
precision forging forging produced to tolerances closer than standard	EN 586-1	*mechanical properties*: EN 586-2 *tolerances on form and dimensions:* EN 586-3 special requirements are to be specified
Castings for structural railway application	prEN 13981-4*	specifies qualification procedures and additional properties, including fatigue behaviour and welded joints
Forgings for structural railway application	EN 13981-3*	
Castings and forgings in contact with food	EN 601	EN 601 only for alloy composition, other properties see product specific standards

5. Ordering aluminium ingots and aluminium scrap

The following tables give an overview over the different forms of aluminium ingots and aluminium scrap, according to their definitions which are laid down in GAG-01. For each of these products, recommendations are given about the standards to be considered when ordering

Table 5 Forms of aluminium ingots and aluminium scrap and EN standards to be considered when ordering

Definition of Product	EN-Standard	Other EN Standards, comments
ingot for remelting; remelt ingot ingot intended and suitable for remelting NOTE 1:Large ingots for remelting, typically having a mass of about 500 kg, are often called “sows“. NOTE 2: Small ingots for remelting typically having a mass of less than 25 kg, are often called “pigs“.	EN 576, if unalloyed aluminium EN 1676, if casting alloy	
primary aluminium ingot ingot of unalloyed or alloyed aluminium cast from primary aluminium and possibly a small amount of run-around scrap	EN 576, if unalloyed aluminium EN 1676, if casting alloy	EN Standards refer to properties of the product and don't differ between primary and recycled aluminium.
recycled aluminium ingot aluminium ingot obtained by recycling of scrap NOTE 1:The term "secondary aluminium" should be avoided for this concept. NOTE 2: The terms "recycled aluminium sheet", "recycled aluminium casting", "recycled aluminium profile" are defined accordingly		
casting alloy alloy primarily intended for the production of castings	EN 1676; EN 577, if liquid metal	Requirements for chemical compositions of castings are slightly different, see EN 1706

refined aluminium alloy casting alloy obtained after metallurgical treatment of molten metal obtained from aluminium scrap	EN 1676; EN 577, if liquid metal	Requirements for chemical compositions of castings are slightly different, see EN 1706
aluminium ingot for casting aluminium alloy cast in a form suitable for remelting and for producing castings.	EN 1676	Requirements for chemical compositions of castings are slightly different, see EN 1706

Table 5 Forms of unwrought metal and scrap and EN standards to be considered when ordering (Continued)

hardener alloy containing at least some aluminium and one or more additional elements intended to be added to molten aluminum to adjust the chemical composition and /or to control the as cast structure. NOTE 1: The term “master alloy” is used for different concepts in different reasons and should be avoided. In Europe the term refers to hardeners obtained from melting and in the US the term refers to a hardener which combines several metallic elements in a fixed ratio and which is intended to be added to pure aluminum to provide a finished alloy composition. NOTE 2: Hardeners can have various forms including waffles (obtained by casting the melt into an adequate mould), briquettes (obtained by compacting a powder), granules and wire. **extrusion ingot** ingot, intended and suitable for extruding, typically of solid circular cross-section, sometimes with a central hollow or a flattened cross-section **extrusion billet** extrusion ingot cut to length	EN 575 EN 486	
rolling ingot ingot intended or suitable for rolling	EN 487	
forging ingot ingot intended and suitable for forging	EN 604-1	*Tolerances:* EN 604-2
(aluminium) scrap raw material, destined for trade and industry, mainly consisting of aluminium resulting from the collection and/or recovery of • metal that arises as by-product at various production stages; or • products after use to be used for the production of wrought and cast alloys and for other production processes	EN 13920-1	EN 13920-2 ... EN 13920-16 are dealing with different scrap categories

Annex A Terms and definitions

aluminium

unalloyed aluminium or aluminium alloy

NOTE: In the USA the term "aluminum" is used.

unalloyed aluminium

aluminium without alloying elements where the minimum aluminium content is specified to be greater than 99,00%

NOTE: Unalloyed aluminium is often called “aluminium", i.e. the term "aluminium" then does not include aluminium alloys.

refined aluminium

unalloyed aluminium of high purity (aluminium content of at least: 99,950% by mass) obtained by special metallurgical treatments

primary aluminium

Unalloyed aluminium produced from alumina, typically by electrolysis, and with an aluminium content of 99,7%.

ingot

cast product intended and suitable for remelting or forming by hot or cold working

forming

process by which a metal is transformed into a desired shape without changing its mass

working

forming of solid metal

hot working

forming of a solid metal after preheating

NOTE: Strain hardening may or may not occur during hot working

cold working

forming of a solid metal without preheating

wrought product

product that has been subjected to hot working and/or cold working

semi-finished product

product hat has undergone some processing and is supplied for further processing before it is ready for use

NOTE: Semi-finished products include wrought products and castings

rolling

forming of solid metal in a gap between two rotating cylinders

preheating

process in which the material is raised to an elevated temperature for the start of the first operation of forming solid metal.

NOTE: In some cases preheating can be combined with homogenization

hot rolling

rolling after preheating

NOTE 1: The purpose of hot rolling is typically to improve the efficiency of the rolling process

NOTE 2: Surface finish and dimensional tolerance control of hot rolled metal are generally inferior to cold rolled metal.

cold rolling

rolling without preheating

flat rolled product[1]

rolled product with uniform wall thickness

extrusion (process)

process in which a billet in a container is forced under pressure through an aperture of a die

direct extrusion

extrusion process with relative movement between billet and container

indirect extrusion

extrusion process without relative movement between billet and container

profile

wrought product that is long in relation to its cross-sectional dimensions which is of a form other than that of sheet, plate, rod, bar, tube, wire or foil

NOTE: For profiles sometimes the term "shape" or "section" is used.

solid profile

profile in which the cross-section does not include any enclosed void

hollow profile

profile in which the cross section completely encloses one or more voids

precision profile

profile which fulfils special requirements concerning tolerances on form and dimensions

rod

solid wrought product of circular cross section that is long in relation to its diameter, typically supplied in straight length

NOTE 1:In North America, the minimum diameter of a rod is 10 mm; below this limit, the product is called "wire".

NOTE 2: In Europe, a rod is supplied in straight length; if supplied in coiled form, the product is called "wire".

NOTE 3:In Europe, a rod is often called "round bar".

bar

solid wrought product that is long in relation to its cross section which is square or rectangular (excluding plate and flattened wire) with sharp or rounded corners or edges, or is a regular hexagon or octagon, typically supplied in straight length

NOTE 1:In North America, the minimum perpendicular distance between parallel faces of a bar is 10 mm; below this limit the product is called "wire".

NOTE 2: In Europe, a bar is supplied in straight length; if supplied in coiled form, the product is called "wire".

tube

hollow wrought product of uniform cross-section with only one enclosed void and with a uniform wall thickness, supplied in straight lengths or in coiled form. Cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons and can have corners rounded, provided the inner and outer cross-sections are concentric and have the same form and orientation

NOTE: Tubes can be formed by extrusion or by forming and joining of sheet.

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[1] Not from GAG 01

Annex B: List of EN standards of CEN/TC 132 on aluminium products

Designation systems, chemical composition and environmental aspects

EN 515:1993 "Aluminium and aluminium alloys - Wrought products – Temper designations"

EN 573-1:2004 "Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 1: Numerical designation system"

EN 573-2:1994 "Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 2: Chemical symbol based designation system"

EN 573-3:2007 "Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition"

EN 573-5:2007 "Aluminium and aluminium alloys – Chemical composition and form of wrought products – Part 5: Codification of standardized wrought products"

EN 1780-1:2002 "Aluminium and aluminium alloys - Designation of alloyed aluminium ingots for remelting, master alloys and castings - Part 1: Numerical designation system"

EN 1780-2: 2002 "Aluminium and aluminium alloys - Designation of alloyed aluminium ingots for remelting, master alloys and castings - Part 2: Chemical symbol based designation system"

EN 1780-3: 2002 "Aluminium and aluminium alloys - Designation of alloyed aluminium ingots for remelting, master alloys and castings - Part 3: Writing rules for chemical composition"

EN 15530:2008 "Aluminium and aluminium alloys – Environmental aspects of aluminium products – General guidelines for their inclusion in standards"

Terms and definitions

EN 12258-1:1998 "Aluminium and aluminium alloys – Terms and definitions – Part 1:General terms"

EN 12258-2:2004 "Aluminium and aluminium alloys – Terms and definitions – Part 2: Chemical analysis

EN 12258-3:2003 "Aluminium and aluminium alloys – Terms and definitions – Part 3: Terms related to aluminium scrap"

EN 12258-4:2004 "Aluminium and aluminium alloys – Terms and definitions – Part 4: Residues of the aluminium industry"

Sheet, strip and plate and related products

EN 485-1:2008 "Aluminium and aluminium alloys - Sheet, strip and plate - Part 1: Technical conditions for inspection and delivery"

EN 485-2:2007 "Aluminium and aluminium alloys - Sheet, strip and plate - Part 2: Mechanical properties"

EN 485-3:2003 "Aluminium and aluminium alloys - Sheet, strip and plate - Part 3: Tolerances on dimensions and form for hot-rolled products"

EN 485-4:1993 "Aluminium and aluminium alloys - Sheet, strip and plate - Part 4: Tolerances on shape and dimensions for cold-rolled products"

EN 12482-1:1998 "Aluminium and aluminium alloys - Reroll stock for general applications - Part 1: Specifications for hot rolled reroll stock"

EN 12482-2:1998 "Aluminium and aluminium alloys - Reroll stock for general applications - Part 2: Specifications for cold rolled reroll stock"

EN 570:2007 "Aluminium and aluminium alloys - Impact extrusion slugs obtained from wrought products - Specifications"

EN 1592-1:1997 "Aluminium and aluminium alloys - HF seam welded tubes - Part 1: Technical conditions for inspection and delivery"

EN 1592-2:1997 "Aluminium and aluminium alloys - HF seam welded tubes - Part 2: Mechanical properties"

EN 1592-3:1997 "Aluminium and aluminium alloys - HF seam welded tubes - Part 3: Tolerances on dimensions and form for circular tubes"

EN 1592-4:1997 "Aluminium and aluminium alloys - HF seam welded tubes - Part 4: Tolerances on dimensions and form for square, rectangular and shaped tubes"

EN 1386:2007 "Aluminium and aluminium alloys - Tread plate - Specifications"

EN 1396:2007 "Aluminium and aluminium alloys - Coil coated sheet and strip for general applications - Specifications"

EN 851:1995 "Aluminium and aluminium alloys - Circle and circle stock for the production of culinary utensils - Specifications"

EN 941:1995 "Aluminium and aluminium alloys - Circle and circle stock for general applications – Specifications"

Foil and finstock

EN 546-1:2007 "Aluminium and aluminium alloys - Foil - Part 1: Technical conditions for inspection and delivery"

EN 546-2:2007 "Aluminium and aluminium alloys - Foil - Part 2: Mechanical properties"

EN 546-3:2007 "Aluminium and aluminium alloys - Foil - Part 3: Tolerances on dimensions"

EN 546-4:2007 "Aluminium and aluminium alloys - Foils - Part 4: Special property requirements"

EN 683-1:2006 "Aluminium and aluminium alloys - Finstock - Part 1: Special property requirements"

EN 683-2:2006 "Aluminium and aluminium alloys - Finstock - Part 2: Mechanical properties"

EN 683-3:2006 "Aluminium and aluminium alloys - Finstock - Part 3: Tolerances on dimensions and form"

Extruded rod/bar, tube and profiles

EN 755-1:2008 "Aluminium and aluminium alloys -Extruded rod/bar, tube and profiles - Part 1: Technical conditions for inspection and delivery"

EN 755-2:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties"

EN 755-3:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 3: Round bars, tolerances on dimensions and form"

EN 755-4:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 4: Square bars, tolerances on dimensions and form"

EN 755-5:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 5: Rectangular bars, tolerances on dimensions and form"

EN 755-6:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 6: Hexagonal bars, tolerances on dimensions and form"

EN 755-7:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 7: Seamless tubes, tolerances on dimensions and form"

EN 755-8:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 8: Porthole tubes, tolerances on dimensions and form"

EN 755-9:2008 "Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 9: Profiles, tolerances on dimensions and form"

EN 12020-1:2008 "Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 1: Technical conditions for inspection and delivery"

EN 12020-2:2008 "Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 2: Tolerances on dimensions and form"

EN 13957:2008 "Aluminium and aluminium alloys –Extruded round, coiled tube for general applications – Specification"

Forgings and forging stock

EN 586-1:1997 "Aluminium and aluminium alloys – Forgings – Part 1: Technical conditions for inspection and delivery"

EN 586-2:1994 ”Aluminium and aluminium alloys – Forgings – Part 2: Mechanical properties and additional property requirements"

EN 586-3:2001 "Aluminium and aluminium alloys - Forgings - Part 3: Tolerances on dimensions and form"

EN 603-1:1996 "Aluminium and aluminium alloys – Wrought forging stock – Part 1: Technical conditions for inspection and delivery"

EN 603-2:1996 "Aluminium and aluminium alloys – Wrought forging stock – Part 2: Mechanical properties"

EN 603-3:2000 "Aluminium and aluminium alloys – Wrought forging stock – Part 3: Tolerances on dimensions and form"

EN 604-1:1997 "Aluminium and aluminium alloys – Cast forging stock – Part 1: Technical conditions for inspection and delivery"

EN 604-2:1997 "Aluminium and aluminium alloys – Cast forging stock – Part 2: Tolerances on dimensions and form"

Cold drawn rod bar and tube

EN 754-1:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 1: Technical conditions for inspection and delivery"

EN 754-2:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 2: Mechanical properties"

EN 754-3:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 3: Round bars, tolerances on dimensions and form"

EN 754-4:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 4: Square bars, tolerances on dimensions and form"

EN 754-5:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 5: Rectangular bars, tolerances on dimensions and form"

EN 754-6:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 6: Hexagonal bars, tolerances on dimensions and form"

EN 754-7:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 7: Seamless tubes, tolerances on dimensions and form"

EN 754-8:2008 "Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 8: Porthole tubes, tolerances on dimensions and form "

EN 13958:2008 "Aluminium and aluminium alloys - Cold drawn round, coiled tube for general applications - Specification"

Drawing stock and drawn wire

EN 1715-1:2008 "Aluminium and aluminium alloys - Drawing stock - Part 1: General requirements and technical conditions for inspection and delivery"

EN 1715-2:2008 "Aluminium and aluminium alloys - Drawing stock - Part 2: Specific requirements for electrical applications"

EN 1715-3:2008 "Aluminium and aluminium alloys - Drawing stock - Part 3: Specific requirements for mechanical uses (excluding welding)"

EN 1715-4:2008 "Aluminium and aluminium alloys - Drawing stock - Part 4: Specific requirements for welding applications"

EN 1301-1:2008 "Aluminium and aluminium alloys - Drawn wire - Part 1: Technical conditions for inspection and delivery"

EN 1301-2:2008 "Aluminium and aluminium alloys - Drawn wire - Part 2: Mechanical properties"

EN 1301-3:2008 "Aluminium and aluminium alloys - Drawn wire - Part 3: Tolerances on dimensions"

Aluminium products for special applications

EN 12392:2000 "Aluminium and aluminium alloys - Wrought products – Special requirements for products intended for the production of pressure equipment"

EN 14121:2003 Aluminium and aluminium alloys – Aluminium sheet, strip and plate for electrotechnical applications

prEN 14286:2007 Aluminium and aluminium alloys – Weldable rolled products for tanks for the storage and transportation of dangerous goods

EN 14287:2004 Aluminium and aluminium alloys – Specific requirements on the chemical composition of products intended to be used for the manufacture of packaging and packaging components

EN 541:2006 "Aluminium and aluminium alloys - Rolled products for cans, closures and lids – Specifications"

EN 601:2004 "Aluminium and aluminium alloys - Castings - Chemical composition of castings for use in contact with foodstuff"

EN 602:2004 "Aluminium and aluminium alloys - Wrought products – Chemical composition of semi-finished products used for the fabrication of articles for use in contact with foodstuff"

EN 14392:2007 "Aluminium and aluminium alloys – Special requirements for anodised products for use in contact with foodstuff"

prEN 13195 "Aluminium and aluminium alloys - Specifications for wrought and cast products for marine applications (shipbuilding, marine and offshore) "

EN 13981-1:2003 "Aluminium and aluminium alloys – Products for structural railway applications – Technical conditions for inspection and delivery – Part 1:Extruded products"

EN 13981-2:2004 "Aluminium and aluminium alloys – Products for structural railway applications – Technical conditions for inspection and delivery – Part 2:Plates and sheets"

EN 13981-3:2006 "Aluminium and aluminium alloys – Products for structural railway applications – Technical conditions for inspection and delivery – Part 3: Castings"

EN 13981-4:2006 "Aluminium and aluminium alloys – Products for structural railway applications – Technical conditions for inspection and delivery – Part 4: Forgings"

EN 15088:2005 "Aluminium and aluminium alloys – Structural products for construction works – Technical conditions for inspection and delivery"

EN 15088:2005 "Aluminium and aluminium alloys – Structural products for construction works – Technical conditions for inspection and delivery"

Anodizing

EN 12373-1:2001 "Aluminium and aluminium alloys – Anodizing – Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium"

EN 12373-2:1998 "Aluminium and aluminium alloys - Anodizing - Part 2: Determination of mass per unit area (surface density) of anodic oxidation coatings - Gravimetric method"

EN 12373-3:1998 "Aluminium and aluminium alloys - Anodizing - Part 3: Determination of thickness of anodic oxidation coatings - Non-destructive measurement by split-beam microscope"

EN 12373-4:1998 "Aluminium and aluminium alloys - Anodizing - Part 4: Estimation of loss of absorptive power of anodic oxidation coatings after sealing by dye spot test with prior acid treatment"

EN 12373-5:1998 Aluminium and aluminium alloys – Anodizing – Part 5: Assessment of quality of sealed anodic oxidation coatings by measurement of admittance"

EN 12373-6:1998 "Aluminium and aluminium alloys - Anodizing - Part 6: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution without prior acid treatment"

EN 12373-7:2002 "Aluminium and aluminium alloys – Anodizing - Part 7: Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment"

EN 12373-8:1998 "Aluminium and aluminium alloys - Anodizing - Part 8: Determination of the comparative fastness to ultra-violet light and heat of coloured anodic oxidation coatings"

EN 12373-9:1998 "Aluminium and aluminium alloys - Anodizing - Part 9: Measurement of wear resistance and wear index of anodic oxidation coatings using an abrasive wheel wear test apparatus"

EN 12373-10:1998 "Aluminium and aluminium alloys - Anodizing - Part 10: Measurement of mean specific abrasion resistance of anodic oxidation coatings using an abrasive jet test apparatus"

EN 12373-11:2000 "Aluminium and aluminium alloys - Anodizing - Part 11: Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20°, 45°, 60° or 85°"

EN 12373-12:2000 "Aluminium and aluminium alloys - Anodizing - Part 12: Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments"

EN 12373-13:2000 "Aluminium and aluminium alloys - Anodizing - Part 13: Measurement

of reflectance characteristics of aluminium surfaces using a goniophotometer or an abridged goniophotometer" **EN 12373-14:2000** "Aluminium and aluminium alloys - Anodizing - Part 14: Visual determination of image clarity of anodic oxidation coatings - Chart scale method"

EN 12373-15:2000 "Aluminium and aluminium alloys - Anodizing - Part 15: Assessment of resistance of anodic oxidation coatings to cracking by deformation"

EN 12373-16:2001 "Aluminium and aluminium alloys - Anodizing - Part 16: Check of continuity of thin anodic oxidation coatings – Copper sulphate test“

EN 12373-17:2001 "Aluminium and aluminium alloys - Anodizing - Part 17: Determination of electric breakdown potential”

EN 12373-18:2001 "Aluminium and aluminium alloys - Anodizing - Part 18: Rating system for the evaluation of pitting corrosion - Chart method”

EN 12373-19:2001 "Aluminium and aluminium alloys - Anodizing - Part 19: Rating system for the evaluation of pitting corrosion – Grid method”

Chemical analysis and test methods

EN 14242:2004 "Aluminium and aluminium alloys - Chemical analysis – Inductively coupled plasma optical emission spectral analysis”

EN 14361:2004 "Aluminium and aluminium alloys - Chemical analysis - Sampling from metal melts "

EN 14726:2005 "Aluminium and aluminium alloys - Chemical analysis - Guideline for spark optical emission spectrometric analysis "

EN 1669:1996 "Aluminium and aluminium alloys - Test methods - Earing test for sheet and strip"

Liquid metal, master alloys, ingots and castings

EN 576:2004 "Aluminium and aluminium alloys - Unalloyed aluminium ingots for remelting - Specifications"

EN 575:1995 "Aluminium and aluminium alloys - Master alloys produced by melting - Specifications"

EN 577 1995 "Aluminium and aluminium alloys - Liquid metal - Specifications"

EN 486:1994 "Aluminium and aluminium alloys -Extrusion ingots -Specifications"

EN 487:1993 "Aluminium and aluminium alloys - Rolling ingots - Specifications"

EN 1559-4:1999 "Founding - Technical conditions of delivery - Part 4: Additional requirements for aluminium alloy castings"

EN 1676:1996 "Aluminium and aluminium alloys – Alloyed ingots for remelting – Specifications”

EN 1706:1998 "Aluminium and aluminium alloys – Castings - Chemical composition and mechanical properties"

Scrap

EN 13920-1:2003 "Aluminium and aluminium alloys - Scrap - Part 1:General requirements, sampling and tests"

EN 13920-2:2003 "Aluminium and aluminium alloys - Scrap - Part 2: Unalloyed aluminium scrap"

EN 13920-3:2003 "Aluminium and aluminium alloys - Scrap - Part 3: Wire and cable scrap"

EN 13920-4:2003 "Aluminium and aluminium alloys - Scrap - Part 4:Scrap consisting of one single wrought alloy"

EN 13920-5:2003 "Aluminium and aluminium alloys - Scrap - Part 5: Scrap consisting of two or more wrought alloys of the same series"

EN13920-6:2003 "Aluminium and aluminium alloys - Scrap - Part 6: Scrap consisting of two or more wrought alloys"

EN 13920-7:2003 "Aluminium and aluminium alloys - Scrap - Part 7: Scrap consisting of castings"

EN 13920-8:2003 "Aluminium and aluminium alloys - Scrap - Part 8: Scrap consisting of non ferrous materials from shredding processes destined to aluminium separation processes"

EN 13920-9:2003 "Aluminium and aluminium alloys - Scrap - Part 9: Scrap from aluminium separation processes of non-ferrous shredded materials"

EN 13920-10:2003 "Aluminium and aluminium alloys - Scrap - Part 10: Scrap consisting of used aluminium beverage cans"

EN 13920-11:2003 "Aluminium and aluminium alloys - Scrap - Part 11: Scrap consisting of aluminium -copper radiators"

EN 13920-12:2003 "Aluminium and aluminium alloys - Scrap - Part 12: Turnings containing one single alloy"

EN 13920-13:2003 "Aluminium and aluminium alloys - Scrap - Part 13: Mixed turnings consisting of two or more alloys"

EN 13920-14:2003 "Aluminium and aluminium alloys - Scrap - Part 14: Scrap from postconsumer aluminium packagings"

EN 13920-15:2003 "Aluminium and aluminium alloys - Scrap - Part 15: Decorated aluminium scrap from post-consumer aluminium packagings"

EN13920-16:2003 "Aluminium and aluminium alloys - Scrap - Part 16: Scrap consisting of skimmings, drosses, spills and metallics"