



EUROPEAN ALUMINIUM ASSOCIATION

EAA Standards Committee STC

EAA Guide

How to order aluminium products
according to European EN Standards

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1. General instructions

1.1. The advantages of ordering according to standards

There are increasing varieties of aluminium products together with increasing quality requirements. As a response to this market demand, the variety of forms of unwrought aluminium metal and semi-finished products is growing.

On the European market dealing with different languages, it would have been extremely difficult to communicate such a complexity of forms and requirements without aluminium standards. Therefore, the European aluminium industry has pushed forward the establishment of European Standards dealing with aluminium products. These European Standards describe the state of the art and, contrary to the outdated national standards, can be used as a safeguard against product liabilities.

As long as the variety of national standards, which did not fit together, existed, many customers were reluctant to order according to standards. Standards of particular companies or of associations or a more or less skilfully composed set of customer specifications were used. Now, after most of the European Standards on aluminium have been published, there is an opportunity of a new beginning.

Looking at the title lists of the European Standards on aluminium – more than 120 standards have already been published and in two years it will be more than 130 - one may have some doubts if the "European approach" has really brought a simplification. These guide-lines will show that, indeed, the European Standards on aluminium have a high degree of transparency

Many customers need special products with requirements going beyond the requirements laid down in European Standards. Even 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 a customer wants to order sheet with closer dimensional tolerances than indicated in the European Standard, then he, nevertheless, can formulate these tolerances in his order and refer to the standard, nevertheless. 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.

Customers often are small companies that 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 him the necessary safety for the possible case that the customer is not satisfied with the supplied product.

As special requirements usually refer to specific applications, a special group of European Standards is being created for such applications, e.g. for aluminium in contact with food, for pressure vessels, for railway cars or for marine applications, for electrotechnical applications or for materials used in structural applications. In such standards specific alloys may be specified and stricter requirements on mechanical properties, dimensional tolerances and other properties may be defined (see chapter 7).

This document only refers to European Standards EN on aluminium and aluminium alloys, which have been worked out by the CEN Technical Committee CEN/TC 132 "Aluminium and

aluminium alloys" and does not consider the large family of European Standards for aluminium products for aerospace applications developed within AECMA¹.

1.2. Some general points to consider

The European Standards are related to the different forms of unwrought metal and semi-finished products. For each of these forms, specifications and requirements are laid down in the framework of technical delivery conditions, which indicate:

- Which information a purchase order should include
- Which are the requirements on the products
- How the supplier 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.

In some cases when requirements on properties are complex, e.g. for mechanical properties and dimensional tolerances, they are specified in particular standards. The related test methods may also be specified in separate documents. Finally, special standards specify the different designations of aluminium and aluminium alloys and tempers, and in specific standard terms and definitions of importance for the aluminium industry are laid down. In the standard on technical conditions of delivery, these additional standards are referenced to.

There may be the intention to order products using abbreviations. For this case, prEN 573-5 is being developed. But it should be considered that abbreviations might lead to misunderstandings, especially in the case of typing errors. Any abbreviation should be clearly defined.

This guideline 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, this guideline should be considered.

¹ www.aecma.com

1.3. Ordering according to standards: using EN 485-1 as an example

The instructions how to proceed when ordering or confirming an order according to a European Standard are similar in the standards which are related to the different forms of aluminium products. In table 1 using the example of EN 485-1 on sheet and strip, the information required in a purchase order when ordering according to European Standards is listed. The sequence of information in such a purchase order is not standardized.

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

Indication	Example	Explanations
product designation, specification of weight	5 t aluminium sheet	According to EN 485-1 only products within the scope of this standard should be ordered, i.e. strip, sheet, plate and shate.
material and temper designation	Example a) alloy EN AW-5052, temper H18	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, temper H18	In this example a special requirement related to chemical analysis is given by which the reference to EN 573-1,2,3 becomes invalid. Special requirements can replace requirements of standards.
Reference to this standard	according to EN 485-1	This reference means that all requirements of EN 485-1 are part of the order as agreed by supplier and purchaser. 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, 485-2 for mechanical properties and different standards for testing procedures are part of the order as well. Such references need not be repeated in the purchase order. However, if references to other standards are made in the purchase order, then these references apply.
dimensions and form 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.
reference to tolerance standard	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.
maximum deviations from ordered quantity	maximum deviations from ordered quantity: $\pm 2\%$	Narrow tolerances cause additional costs, e.g. production scrap at the supplier's rolling mill and should be specified only if really necessary.
application/special requirements	to be used for anodized facade panels; please supply anodizing quality special requirements on planity according to enclosure packaging: ... labelling: ...	The information about use for anodizing quality is required in EN 485-1. For other applications such information is also helpful, especially if it includes safety aspects. As elsewhere, special requirements replace conflicting requirements of the relevant standard.
requirements on test certificates	test report to be included	The different types of inspection documents are described in clause 7 of EN 485-1. Here, the document as described in sub-clause 7.2.2 of this standard is meant.

2. Ordering rolled products

2.1. Instructions for ordering strip

The following tables 2 and 3 list which type of coiled rolled products should be ordered according to which standard and what special considerations are necessary. The definitions of the products correspond to EN 12258-1.

Table 2 – Possible kinds of rolled products in coiled form, excluding foil and finstock

Definition of Product	EN-Standard	Remarks
<p>2.1.1 strip: Flat rolled product of rectangular cross-section with uniform thickness over 0,20 mm, supplied in coils usually with trimmed edges. The thickness does not exceed one-tenth of the width.</p> <p>NOTE 1 : A strip can be supplied in a corrugated, embossed, coated, edge conditioned and perforated form.</p> <p>NOTE 2 : "Strip" is sometimes called "coil".</p>	EN 485-1	<p>mechanical properties: EN 485-2</p> <p>dimensional tolerances hot-rolled: EN 485-3</p> <p>dimensional tolerances cold-rolled: EN 485-4</p> <p>EN 485-1 only refers to strip for general application</p>
<p>2.1.2 hot rolled strip: Strip the final thickness of which is obtained by hot-rolling.</p>	EN 485-1	for hot-rolled re-roll stock see EN 12482-1
<p>2.1.3 re-roll stock : Strip intended for further rolling.</p>	EN 12482-1 EN 12482-2	<p>for hot-rolled re-roll stock see EN 12482-1</p> <p>for cold-rolled re-roll stock see EN 12482-1</p>
<p>2.1.4 foil stock: Re-roll stock suitable for further rolling to foil.</p>	EN 12482-1 EN 12482-2	foil stock is considered as a special form of re-roll stock, see 2.1.3
<p>2.1.5 can stock: Sheet or strip used for the fabrication of rigid cans including lids and tabs by drawing/ironing, pressing or forming operations. Can stock covers can body stock, lid stock and tab stock.</p>	EN 541	
<p>2.1.6 reflector strip: Strip with special requirements related to the surface quality intended for the manufacture of anodised reflectors.</p>	EN 485-1 with special requirements	normally, a close cooperation between supplier and customer is necessary which includes qualification procedures
<p>2.1.7 lithographic strip; offset strip: Strip 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.</p>	EN 485-1 with special requirements	normally, a close co-operation between supplier and customer is necessary which includes qualification procedures
<p>2.1.8 brazing strip: Strip of a low melting point alloy or strip clad with a low melting point alloy, used for brazing.</p>	EN 485-1 with special requirements	normally, a close cooperation between supplier and customer is necessary which includes qualification procedures

Table 3 – Possible kinds of foil and finstock

Definition of Product	EN-Standard	Remarks
2.1.9 foil: Flat rolled product of rectangular cross-section with uniform thickness equal to or less than 0,20 mm. NOTE : Foil in the upper thickness range is often called thin strip.	EN 546-1	mechanical properties: EN 546-2 dimensional tolerances: EN 546-3 special properties EN 546-4
2.1.10 finstock: Flat cold rolled product of rectangular cross section and thickness in the gauge range 80 μm to 350 μm suitable for heat exchanger applications.	EN 683-1	mechanical properties: EN 683-2 dimensional tolerances: EN 683-3
2.1.11 etched foil: Foil roughened chemically or electrochemically to provide an increased surface area.	not existing	this is a special product for electrotechnical application
2.1.12 container foil: Single rolled material in the gauge ranges 35 μm to 200 μm , produced at soft or intermediate temper and often involving alloys of the 3xxx and 8xxx series. The foil can be coloured/printed, and is usually supplied lubricated for press forming into smooth or wrinkled walled containers for foodstuffs and the like.	EN 546-1	see 2.1.9. Furthermore, special requirements related to formability are to be fulfilled
2.1.13 converter foil: Rolled aluminium in the gauge range 5 μm to 200 μm , produced either by double rolling (5 μm to 70 μm), or single rolling (35 μm to 200 μm), typically soft annealed and supplied for further processing such as colouring, printing, embossing or laminating.	EN 546-1	see 2.1.9. Furthermore, special requirements related to surface appearance and porosity are to be fulfilled
2.1.14 consumer foil; household foil: Foil intended for public use, principally for use in culinary applications such as cooking and storage.	EN 546-1	see 2.1.9
2.1.15 printed foil: Foil printed with a design or an all-over colour.	EN 546-1	
2.1.16 embossed foil; patterned foil: Foil on which a raised or indented pattern has been impressed or embossed on either one or both faces.	EN 546-1	

2.2. Instructions for ordering sheet and plate which have not undergone machining or forming operations

The table 4 lists how to order sheet and plate, which have not undergone any machining or forming operation according to European Standards. The definitions of different kinds of such products correspond to EN 12258-1.

Table 4 - Sheet and plate which have not undergone machining or forming operations

Definition of Product	EN-Standard	Remarks
<p>2.2.1 sheet/plate: Flat rolled product of rectangular cross-section with uniform thickness between 0,20 mm and 6 mm for sheet or above 6 mm for plate, supplied in straight lengths (i.e. flat) usually with trimmed or sawn edges. The thickness does not exceed one-tenth of the width.</p> <p>NOTE 1 : A sheet may be supplied in a corrugated, embossed, coated, edge conditioned or perforated form</p> <p>NOTE 2 : Sheet between 3 mm and 6 mm is sometimes called "shate".</p>	EN 485-1	<p>mechanical properties: EN 485-2</p> <p>dimensional tolerances hot-rolled: EN 485-3</p> <p>dimensional tolerances cold-rolled: EN 485-4</p> <p>EN 485-1 does not include re-roll stock, tread plates, can stock and coil-coated strip</p> <p>For tread plate EN 1386 should be used. For coil-coated sheet EN 1396 should be used</p>
<p>2.2.2 hot rolled sheet/hot rolled plate: Sheet or plate the final thickness of which is obtained by hot rolling.</p>	EN 485-1	dimensional tolerances see EN 485-3
<p>2.2.3 rolled slab: Wrought product coming out of the breakdown mill on the hot line.</p>	EN 485-1	dimensional tolerances see EN 485-3
<p>2.2.4 can stock: Sheet or strip used for the fabrication of rigid cans including lids and tabs by drawing/ironing, pressing or forming operations. Can stock covers can body stock, lid stock and tab stock.</p>	EN 541	EN 541 contains also dimensional tolerances and mechanical properties
<p>2.2.5 lithographic sheet; offset sheet: Sheet/strip 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.</p>	EN 485-1 with special requirements	special requirements and qualification procedures are usual
<p>2.2.6 satin-finish sheet: Sheet with a fine-textured matt finish on one or both surfaces.</p>	EN 485-1	special requirements to be clearly specified
<p>2.2.7 circle stock: Sheet, strip or plate intended to be sawn, sheared or blanked into circles to be subsequently formed, drawn, etc.</p>	EN 485-1	special requirements according EN 941 and EN 851 to be considered
<p>2.2.8 roll-bonded sheet: Composite of two sheets pressure welded together during rolling except at predetermined areas that are subsequently inflated to form a labyrinth or passageway.</p>	not existing	
<p>2.2.9 brazing sheet: Sheet of a low melting temperature alloy or clad with a low melting temperature alloy, used for brazing.</p>	not existing	tolerances according to EN 485-3 or EN 485-4 can be fixed
<p>2.2.10 tooling plate: Cast or rolled product of rectangular cross-section over 6 mm 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.</p>	EN 485-1	special requirements to be clearly specified, because the provisions of EN 485-1 are not sufficient for this product

2.3. Instructions for ordering machined sheet and plate which have undergone machining or forming operations

The table 5 lists how to order sheet and plate, which have undergone machining or forming operations according to European Standards. The definitions of different kinds of such products correspond to EN 12258-1.

Table 5 - Sheet and plate which have undergone machining or forming operations

Definition of Product	EN-Standard	Remarks
2.3.1 corrugated sheet; profiled sheet: Roll-formed sheet of symmetric or asymmetric profile.	EN 485-1	special requirements to be clearly specified. For coil-coated material see EN 1396
2.3.2 roofing sheet: Corrugated sheet suitable for roofing application.	EN 485-1	special requirements according EN 507 to be considered
2.3.3 patterned sheet; embossed sheet: Sheet on which a raised or indented pattern has been impressed or embossed on either one or both faces.	not existing	
2.3.4 tread plate: Patterned sheet upon which a raised pattern has been impressed on one side by rolling.	EN 1386	EN 1386 contains special mechanical properties
2.3.5 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

2.4. Instructions for ordering other flat-rolled products

The table 6 lists how to order other flat-rolled products which are not described under 2.1 - 2.3 according to European Standards. The definitions of different kinds of such products correspond to EN 12258-1.

Table 6 - Other flat-rolled material

Definition of Product	EN-Standard	Remarks
2.4.1 slug: Piece of metal of uniform thickness and of regular or irregular shape taken from a wrought or unwrought product, usually for impact extrusion. Slugs are supplied with or without a centre hole.	EN 570	
2.4.2 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
2.4.3 circle: Circular blank obtained by sawing, shearing or by blanking of a flat rolled product with a uniform thickness over 0,20 mm. NOTE : A circle specified for the fabrication of culinary utensils is called "culinary circle".	EN 941 (general application); EN 851 (culinary application)	
2.4.4 laminated material: Product consisting of at least one layer of metal and at least one layer of non-metal bonded together e.g. paper on aluminium foil, extruded plastics films on aluminium foil, etc.	not existing	not to be ordered according to standards

3. Ordering extruded and drawn products

The following tables 7 to 10 list how to order different types of extruded and drawn products according to European Standards. If a standard mentioned here is still under preparation, the relevant prEN should be quoted. The definitions of such products correspond to EN 12258-1.

Table 7 - Profiles

Definition of Product	EN-Standard	Remarks
3.1.1 profile; section; shape: Wrought product, usually extruded, of uniform cross-section along its whole length and with a cross-section other than rod/bar, wire, tube, sheet or strip. Usually supplied in straight lengths but sometimes in coiled form. Depending on the form of the cross-section, it can be called solid profile (see 3.1.3) or hollow profile (see 3.1.4).	EN 755-1 for general application; EN 12020-1 for precision profiles (EN AW-6060 and EN AW-6063)	mechanical properties for extruded standard profiles and precision profiles: EN 755-2; tolerances for extruded profiles for general applications: EN 755-9; tolerances for precision profiles: EN 12020-2
3.1.2 extruded profile: Profile brought to final dimensions by extrusion.	see 3.1.1	includes coiled profiles, excludes drawn profiles
3.1.3 solid profile; solid section; solid shape: Profile in which the cross-section does not include any enclosed void.	see 3.1.1	does not include rod/bar (see definition under 3.2.1)
3.1.4 hollow profile; hollow section; hollow shape: Profile in which the cross-section includes either one enclosed void, provided that the cross-section is other than a tube, or more than one enclosed void (see figure 1).	see 3.9.1	special sections of tubes to be considered
3.1.5 precision profile: Profile which fulfils special requirements concerning tolerances on form and dimensions.	EN 12020-1 for precision profiles (EN AW-6060 and EN AW-6063)	tolerances for precision profiles: EN 12020-2

3.1. Instructions for ordering rod and bar

Table 8 - Rod and bar

Definition of Product	EN-Standard	Remarks
<p>3.2.1 rod/bar: Solid wrought product of uniform cross-section along its whole length, supplied in straight lengths. Cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons (see figure 2). Products with a square, rectangular, triangular or polygonal cross-section can have corners rounded along their whole length.</p> <p>NOTE : Rod can be supplied in coils.</p>	<p>Generalities see EN 754-1 for drawn rod/bar and EN 755-1 for extruded rod/bar</p>	<p>mechanical properties for extruded rod/bar: EN 755-2; mechanical properties for drawn rod/bar: EN 754-2; different standards for tolerances according to cross-sections. Definitions of alternative products (plate, profiles, tube, wire) should be considered</p>
<p>3.2.2 extruded rod/bar: Rod or bar brought to final dimensions by extrusion.</p>	<p>Generalities see EN 755-1</p>	<p>different tolerance standards depending on cross-section</p>
<p>3.2.3 cold-drawn rod/bar: Rod or bar brought to final dimensions by cold-drawing.</p>	<p>Generalities see EN 754-1</p>	<p>different tolerance standards depending on cross-section</p>
<p>3.2.4 brazing rod: Rod of a low melting temperature alloy for use as filler metal in brazing.</p>	<p>see 3.2.1</p>	<p>special requirements to be agreed upon</p>
<p>3.2.5 filler rod; welding rod: Rod for use as filler metal in joining by welding.</p>	<p>see 3.2.1</p>	<p>special requirements to be agreed upon</p>
<p>3.2.6 square rod/bar: Rod or bar of a square cross-section.</p>	<p>see 3.2.1</p>	<p>tolerances see EN 754-4 for drawn rod/bar and EN 755-4 for extruded rod/bar</p>
<p>3.2.7 rectangular rod/bar: Rod or bar of a rectangular cross-section.</p> <p>NOTE 1 : The thickness exceeds one-tenth of the width.</p> <p>NOTE 2 : The term "rectangular rod/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.</p>	<p>see 3.2.1</p>	<p>tolerances see EN 754-5 for drawn rectangular rod/bar and EN 755-5 for extruded EN 485-1 with special requirements rod/bar</p>
<p>3.2.8 hexagonal rod/bar: rod or bar having the cross-section of a regular hexagon.</p>	<p>see 3.2.1</p>	<p>tolerances see EN 754-6 for drawn hexagonal rod/bar and EN 755-6 for extruded hexagonal rod/bar</p>

3.2. Instructions for ordering wire

Table 9 - Wire and drawing stock

Definition of Product	EN-Standard	Remarks
<p>3.3.1 wire: Wrought product of uniform cross-section along its whole length, supplied in coiled form. Cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons (see figure 3). Products with a square, rectangular, triangular, or polygonal cross-section can have corners rounded along their whole length.</p> <p>NOTE 1 : For rectangular wires :</p> <ul style="list-style-type: none"> - the thickness exceeds one-tenth of the width ; - the term "rectangular wire" 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. <p>NOTE 2 : Wire in the upper thickness range is often called "coiled rod".</p>	EN 1301-1	<p>mechanical properties: EN 1301-2 dimensional tolerances: EN 1301-3</p> <p>Definitions of alternative products (strip, profiles, tube, rod/bar) should be considered.</p>
<p>3.3.2 drawing stock: Semi-finished solid wrought product of uniform cross-section along its whole length supplied in coils of a quality suitable to drawing into wire. Cross-sections are approximately round, triangular or regular polygonal with dimensions usually exceeding 7 mm (see figure 4).</p>	EN 1715-1	<p>special requirements for electrotechnical applications: EN 1715-2 special requirements for mechanical applications: EN 1715-3 special requirements for welding applications: EN 1715-3</p>
<p>3.3.3 conductor wire: Wire possessing the requisite electrical and mechanical properties for use as an electrical conductor.</p>	see CENELEC ²	
<p>3.3.4 filler wire; welding wire: Wire for use as filler metal in joining by welding.</p>	EN Standard is being worked out	
<p>3.3.5 flattened wire: Wire produced by flattening round wire between rolls or by drawing through a die with flat opening.</p>	see 3.3.1	
<p>3.3.6 brazing wire: Wire of a low melting temperature alloy for use as filler metal in brazing.</p>	EN 1715-1 with special requirements	

² www.cenelec.be

3.3. Instructions for ordering tube

Table 10 - Tube and tube stock

Definition of Product	EN-Standard	Remarks
<p>3.4.1 tube: Hollow wrought product of uniform cross-section with only one enclosed void along its whole length, 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 along their whole length, provided the inner and outer cross-sections are concentric and have the same form and orientation.</p> <p>NOTE : Tubes can also be formed by piercing and by forming and joining sheet or strip.</p>	<p>generalities see EN 754-1 for drawn tube and EN 755-1 for extruded tube; special EN standards for H.F. seam welded tube (see 3.4.8)</p>	<p>mechanical properties for extruded tube: EN 755-2; mechanical properties for drawn tube: EN 754-2; different standards for tolerances for seamless and porthole tubes. Definitions of the alternative product "profile" should be considered</p>
<p>3.4.2 extruded tube: Tube brought to final dimensions by extrusion.</p>	EN 755-1	<p>mechanical properties: EN 755-2; tolerances see EN 755-7 for seamless tube and EN 755-8 for porthole/bridge tube</p>
<p>3.4.3 drawn tube: Tube brought to final dimensions by cold drawing.</p>	EN 754-1	mechanical properties: EN 754-2;
<p>3.4.4 porthole/bridge tube: Tube produced by extrusion of a solid billet through a porthole or bridge die. This tube is characterized by one or more seams formed by longitudinal bonding of two or more edges under pressure.</p>	EN 754-1, EN 755-1	tolerances see EN 754-8 for drawn product and EN 755-8 for extruded product
<p>3.4.5 seamless tube: Tube in which there is no split or longitudinal bonding of edges by pressure, fusion or mechanical interlocking.</p>	EN 754-1, EN 755-1	tolerances see EN 754-7 for drawn product and EN 755-4 for extruded product
<p>3.4.6 welded tube: Tube formed from plate, sheet or strip with the abutting edges automatically welded.</p>	EN standard only for H.F. welded tube	
<p>3.4.7 seam welded tube: Welded tube fabricated using filler wire.</p>	EN standard only for H.F. welded tube	
<p>3.4.8 H.F. seam welded tube: Welded tube fabricated from strip by use of H.F. current without filler wire.</p>	EN 1592-1	mechanical properties see EN 1592-2; tolerances see EN 1592-3 for round tube and EN 1592-4 for tube with other cross-sections
<p>3.4.9 tube stock: Semi-finished tube suitable for the production of drawn tube.</p>	no specific EN Standard	In the case of extruded tube see 3.4.2

4. Ordering castings and forgings

The tables 11 and 12 list how to order different types of castings and forgings according to European Standards. The definitions of such products correspond to EN 12258-1.

4.1. Instructions for ordering castings

Table 11 - Castings

Definition of Product	EN-Standard	Remarks
4.1.1 casting: Unwrought product at or near finished shape, formed by solidification of the metal in a mould.	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots
4.1.2 sand casting: Casting formed in a sand mould (at atmospheric pressure).	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots
4.1.3 pressure die-casting; high-pressure die-casting: Casting formed in a metal mould, the molten metal being solidified under high pressure (typically 7 MPa).	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots
4.1.4 permanent mould casting; chill casting: Casting formed in a metal mould, the molten metal being solidified under gravity (at atmospheric pressure)	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots
4.1.5 low pressure die casting: Casting formed in a metal mould, the molten metal being solidified under low pressure (typically 7 kPa above atmospheric pressure)	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots
4.1.6 precision casting: Casting which fulfils special requirements concerning tolerances on form and dimensions. NOTE : Precision castings can be produced by any casting process.	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots special requirements to be specified
4.1.7 investment casting; lost wax casting: Precision casting formed by a two step process comprising : a) fabrication of a ceramic mould around a wax or thermoplastic pattern which is lost during the process and b) pouring of metal into this mould.	EN 1559-1, -4	EN 1706 for alloy product specification; EN 1676 for casting ingots special requirements to be specified

4.2. Instructions for ordering forging stock and forgings

Table 12 - Forgings and forging stock

Definition of Product	EN-Standard	Remarks
4.2.1 forging: Wrought product formed by hammering or pressing, usually when hot, between open dies (hand forging) or closed dies (drop or die forging)	EN 586-1	Mechanical properties: EN 586-2 Tolerances of form and dimensions: EN 586-3
4.2.2 die forging: Forging shaped by working in closed dies	see 4.1.1	
4.2.3 precision forging: Forging produced to tolerances closer than standard	see 4.1.1	special requirements on form and dimensions to be specified
4.2.4 drop forging: Forging formed by a heavy die which drops on the metal	see 4.1.1	
4.2.5 rolled/extruded forging stock: Extruded or rolled product: e.g. rod or bar, suitable for forging	EN 603-1	Mechanical properties: EN 603-2 Tolerances of form and dimensions: EN 603-3
4.2.6 cast forging stock: Cast product, e.g. billet, suitable for forging	EN 604-1	Tolerances of form and dimensions: EN 604-2

5. Ordering unwrought metal and scrap

The tables 13 and 14 list how to order different types of unwrought metal according to European Standards. The definitions of such products correspond to EN 12258-1.

5.1. Instructions for ordering liquid metal, ingots for remelting and scrap

Table 13 - Liquid metal and ingots for remelting

Definition of Product	EN-Standard	Remarks
<p>5.1.1 unalloyed aluminium: Metal with a minimum content of 99,0 % by mass of aluminium and with content by mass of any other element within the following limits :</p> <ul style="list-style-type: none"> - a total content of iron and silicon not greater than 1,0 % ; - a content of any other element not greater than 0,10 % except for copper which can have a content of up to 0,20 % provided that neither the chromium nor the manganese content exceeds 0,05 %. 	EN 576; EN 577, if liquid metal	May also be ordered with AA designations and reference to EN Standard
<p>5.1.2 aluminium ingot for remelting: Aluminium or aluminium alloy cast in a form suitable for remelting which has been processed, as appropriate, to adjust the chemical composition and/or to remove certain metallic or non-metallic impurities.</p> <p>NOTE 1 : Large ingots for remelting, usually having a weight of about 500 kg, are often called "sows".</p> <p>NOTE 2 : Small ingots for remelting usually having a weight of less than 25 kg, are often called "pigs".</p>	EN 576, if unalloyed aluminium; EN 1676, if casting alloy	
<p>5.1.3 primary ingot: Ingot produced from primary metal. It can incorporate suitably identified uncontaminated scrap from the ingot production.</p>	see 5.1.2 and 5.1.5	EN Standards refer to properties of the product and do not differ between primary and remelted aluminium
<p>5.1.4 remelt aluminium: Wrought aluminium or aluminium alloy obtained by remelting.</p>	chemical composition see EN 573-3	
<p>5.1.5 casting alloy: Alloy primarily intended for the production of castings.</p>	EN 1676; EN 577, if liquid metal	Requirements for chemical compositions of castings are slightly different, see EN 1706
<p>5.1.6 refined aluminium alloy: An aluminium casting alloy obtained after metallurgical treatment of molten metal obtained from aluminium scrap.</p>	see 5.1.5	
<p>5.1.7 aluminium ingot for casting: Aluminium alloy cast in a form suitable for remelting and for producing castings.</p>	see 5.1.5	
<p>5.1.8 master alloy; hardener: Alloy intended only for addition to a melt to adjust composition and/or to control impurities and/or to control the as-cast structure. Some master alloys can contain more than 50 % of the main alloying element</p>	EN 575	

<p>5.1.9 (aluminium) scrap raw material, destined for trade and industry, mainly consisting of aluminium and/or aluminium alloys, resulting from the collection and/or recovery of - metal that arises at various stages of fabrication or - products after use to be used for the production of wrought and cast alloys and for other production processes</p>	<p>EN 13920-1</p>	<p>EN 13920-2 to EN 13920-16 are dealing with different scrap categories</p>
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5.2. Instructions for ordering ingots for rolling, extruding and forging

Table 14 - Ingots for extruding, forging and rolling

Definition of Product	EN-Standard	Remarks
<p>5.2.1. extrusion billet; ingot for extruding : Metal cast in a form suitable for extruding.</p>	<p>EN 486</p>	
<p>5.2.2. ingot for forging; forging ingot; cast forging stock: Metal cast in a form suitable for forging.</p>	<p>EN 604-1</p>	<p>Tolerances see EN 604-2</p>
<p>5.2.3. ingot for rolling; rolling ingot : Metal cast in a form suitable for rolling.</p>	<p>EN 487</p>	

6. Ordering other aluminium products

The table 15 lists how to order different types of other aluminium products. The definitions of such products correspond to EN 12258-1.

Table 15 - Other aluminium products

Definition of Product	EN-Standard	Remarks
6.1 busbar: Rigid electrical conductor of any cross-section.	no specific European Standard	related semi-finished product standard together with special requirements to be used
6.2 flake; flake powder: Flat or scale-like metal particles the thickness of which is small compared with the other dimensions. NOTE : Master alloys in the form of flakes are also called "splatters".	no specific European Standard	
6.3 granules: Metal particles of drop-like shape of more than 1 mm.	no specific European Standard	
6.4 aluminium powder: Aggregate of discrete metal particles with diameters up to 62,5 μm .	no specific European Standard	
6.5 grit: Aggregate of discrete metal particles usually with diameter between 62,5 μm and 1 mm.	no specific European Standard	
6.6 aluminium powder product: Product made from fine aluminium powder by compacting, sintering, hot pressing and eventually subsequent working. The product is characterized by a composition or structure which is difficult or impossible to obtain via casting.	no specific European Standard	
6.7 machining stock: Bar or wire usually supplied to close tolerances and suitable for repetition machining operations.	no specific European Standard	related semi-finished product standard together with special requirements to be used
6.8 bolt/rievet/screw stock: Bar or wire suitable for the manufacture of bolts/rievets/screws.	no specific European Standard	related semi-finished product standard together with special requirements to be used

7. Ordering aluminium products for specific applications

The table 16 lists how to order different types of aluminium products for specific applications. The products may comprise different types which are defined in **tables 2 – 15**. In this table, only the standards of CEN/TC 132 "Aluminium and Aluminium alloys" are considered. There are many other European Standards of other CEN Technical Committees where requirements on aluminium products in addition to the general requirements are specified.

Table 16 - Aluminium products for specific applications

Definition of Product	EN-Standard	Remarks
7.1 Wrought products for pressure vessels	EN 12392	harmonised standard in connection with the European pressure vessels Directive
7.2 Castings in contact with food	EN 601	general requirements on alloy composition
7.3 Wrought products in contact with food	EN 602	general requirements on alloy composition
7.4 Anodised products in contact with food	prEN 14392	
7.5 Cast and wrought products for marine applications	EN 13195-1	
7.6 Extruded aluminium products for structural railway application	EN 13981-1	specifies qualification procedures and additional properties, including fatigue behaviour and welded joints
7.7 Rolled aluminium products for structural railway application	EN 13981-2	specifies qualification procedures and additional properties, including fatigue behaviour and welded joints
7.8 Forgings for structural railway application	prEN 13981-3	specifies qualification procedures and additional properties, including fatigue behaviour and welded joints
7.9 Castings for structural railway application	prEN 13981-4	specifies qualification procedures and additional properties, including fatigue behaviour and welded joints
7.10 Rolled products for tanks for the transport of dangerous goods	prEN 14286	
7.11 Rolled products for electrotechnical applications	prEN 14121	
7.12 Rolled aluminium products for packaging applications	prEN 14287	
7.13 Structural products for construction works	prEN WI 00132184	harmonised standard in connection with the European Construction Products Directive CPD

8. Where to order European Standards

Although named "European Standard" and developed in pan-European working groups under central management from CEN, no real European EN Standards can be ordered. It is up to the CEN members, which are the national standards bodies of Austria, Belgium, Cyprus ..., to publish the EN standard in their countries as nationally adopted European Standard.

EXAMPLE: EN 485-1; This European Standard exists in three official versions (English, French, German). A version in any other language was translated under the responsibility of a CEN member and notified to the Central Secretariat in order to obtain the same status as the official versions.

Country	National Standardisation Body NSB	EN 485-1 has been published as	Available from	NSB's website / Online-Shop or Database
Austria	ON	OENORM EN 485-1	Österreichisches Normungsinstitut	www.on-norm.at www.norm-online.info
Belgium	IBN	NBN EN 485-1	IBN Institut Belge de Normalisation	www.bin.be http://193.75.139.38
Cyprus	CYS	CYS EN 485-1	Cyprus Organisation of Promotion of Quality	www.cys.mcit.gov.cy
Czech Republic	CSNI	ČSN EN 485-1	CSNI (Cesky normalizacni institut)	www.csni.cz
Denmark	DS	DS/EN 485-1	DS Danish Standards Association	www.ds.dk
Estonia	EVS	EVS EN 485-1	Eesti Standardikeskus	www.evs.ee
Finland	SFS	SFS EN 485-1	Suomen Standardisoimisliitto	www.sfs.fi
France	AFNOR	NF EN 485-1	AFNOR	www.afnor.fr www.boutique.afnor.fr
Germany	DIN	DIN EN 485-1	Beuth Verlag GmbH	www.din.de www.mybeuth.de
Greece	ELOT	EAOT EN 485.01	ELOT Hellenic Organization for Standardization	www.elot.gr https://sales.elot.gr
Hungary	MSZT		MSZT Magyar Szabványügyi Testület	www.mszt.hu
Iceland	IST	ÍST EN 485-1	Staðlaráð Íslands	www.stadlar.is
Ireland	NSAI		ILI (London Information/ Infonorme)	www.nsai.ie www.standards.ie
Italy	UNI	UNI EN 485-1	UNI - Ente Nazionale Italiano di Unificazione	www.uni.com http://webstore.uni.com

Country	National Standardisation Body NSB	EN 485-1 has been published as	Available from	NSB's website / Online-Shop or Database
Latvia	LVS	LVS 485-1		www.lvs.lv
Lithuania	LST	LST 485-1		http://alpha.lsd.lt
Luxembourg	SEE	EN 485-1		www.etat.lu http://jsappl.etat.lu/see/
Malta	MSA		Malta Standards Authority	www.msa.org.mt
Netherlands	NEN	NEN-EN 485-1	NEN Normshop	www.nen.nl
Norway	NSF	NS-EN 485-1	Pronorm AS	http://standard.no
Poland	PKN	PN-EN 485-1	Polski Komitet Normalizacyjny	www.pkn.pl
Portugal	IPQ			www.ipq.pt
Slovakia	SUTN	STN EN 485-1	SUTN Slovensky ustav technickej normalizacie	www.sutn.gov.sk
Slovenia	SIST	SIST EN 485-1	SIST Slovenia Institute for Standardization	www.sist.si http://search.sist.si/sista3/searchpage_en1.html
Spain	AENOR	UNE-EN 485-1	ASOCIACION ESPAÑOLA DE NORMALIZACION Y CERTIFICACION (AENOR)	www.aenor.es
Sweden	SIS	SS-EN 485-1	SIS Publishing	www.sis.se
Switzerland	SNV	SN EN 485-1	Schweizerische Normen-Vereinigung	www.snv.ch www.mysnv.ch
United Kingdom	BSI	BS EN 485-1	British Standards Institution	www.bsi-global.com http://bsonline.techindex.co.uk

Other entering points for searching standards might be:

- CEN www.cenorm.be/catweb/cwen.htm
- ILI www.ilideutschland.com/