Catalogue of European standards in the aluminium and aluminium alloys field

Under revision

New publications during last three years (2018-2020)

September 2020

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Content

1. Designations systems, chemical composition and environmental aspects

EN 515:2017	Revised standard	Aluminium and aluminium alloys - Wrought products - Temper designations
This European Standard establishes temper designations for all forms of wrought aluminium and aluminium alloys and for continuously cast aluminium and aluminium alloys drawing stock and strip intended to be wrought. NOTE Some of these temper designations may be subject of patent or patent applications and their listing herein is not to be construed in any way as the granting of a license under such patent right. Additional temper designations, conforming to this standard, may be standardized with CEN/TC 132 and AECMA/5 provided: - The temper is used or is available for use by more than one user; - Mechanical property limits are defined; - The characteristics of the temper are significantly different from those of all other tempers which have the same sequence of basic treatments and for which designations already have been assigned for the same alloy and product; The following are also defined if characteristics other than mechanical properties are considered significant: - Test methods and limits for the characteristics; or - The specific practices used to produce the temper.		

EN 573-1:2004		Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 1: Numerical designation system
This document specifies a European designation system of wrought aluminium and aluminium alloys, based on an international designation system, and the procedure to obtain such international designation. It is in accordance with the "Recommendation" dated December 15, 1970, as revised in March 2002, for an International Designation System for Wrought Aluminum and Wrought Aluminum Alloys issued by the Aluminum Association, Washington DC 20006, USA. This standard applies to wrought products and to ingots intended to be wrought.		

EN 573-2:1994		Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 2: Chemical symbol based designation system
This Part of EN 573 specifies a code of designation applicable to aluminium and aluminium alloys as specified in the relevant European Standards. It is a descriptive code based primarily on chemical symbols. The designations in accordance with this Part of EN 573 are intended primarily as a supplement to the four figure designation described in EN 573-1. This standard applies to wrought products and to ingots intended to be wrought.		

EN 573-3:2013 +A1:2019	New amendment under development	Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products
This European Standard specifies the chemical composition limits of wrought aluminium and wrought aluminium alloys and form of products. The chemical composition limits of aluminium and aluminium alloys specified herein are completely identical with those registered with the Aluminum Association, 1525, Wilson Boulevard, Suite 600, Arlington, VA 22209, USA, for the corresponding alloys. Guidelines for the introduction of new wrought aluminium and wrought aluminium alloys in standards are presented in Annex B.		

EN 573-5:2007		Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 5: Codification of standardized wrought products
This document specifies the codification of some standardized semi-finished wrought products for use in ordering information. NOTE Codification is usually required for technical drawings. It does not apply to castings; cast forging stock, rolling ingots, extrusion billets and ingots for re-melting.		

EN 1780-1:2002		Aluminium and aluminium alloys - Designation of alloyed aluminium ingots for re-melting, master alloys and castings - Part 1: Numerical designation system
This European Standard specifies a five-figure numerical designation system for aluminium alloys and master alloys as specified in the relevant European Standards. It applies to ingots for re-melting and to castings for all applications including aerospace. A designation system for unalloyed aluminium is specified in EN 576. An alternative chemical symbol-based designation system is specified in EN 1780-2. The writing rules for chemical composition are specified in EN 1780-3.		

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
This European Standard specifies a chemical symbol-based designation system for aluminium alloys and master alloys as specified in the relevant European Standards. It applies to ingots for re-melting and to castings. A designation system for unalloyed aluminium is specified in EN 576. An alternative numerical designation system is specified in EN 1780-1. Writing rules for chemical composition are specified in EN 1780-3		

EN 1780-3:2002		Aluminium and aluminium alloys - Designation of alloyed aluminium ingots for re-melting, master alloys and castings - Part 3: Writing rules for chemical composition
This European Standard specifies the writing rules for chemical composition of alloyed aluminium ingots for re-melting, master alloys and castings. Writing rules for unalloyed aluminium are specified in EN 576. The five-figure numerical and the chemical symbol-based designation systems of materials are specified in EN 1780-1 and EN 1780-2, respectively.		

EN 15530:2008		Aluminium and aluminium alloys - Environmental aspects of aluminium products - General guidelines for their inclusion in standards
This European Standard gives guidelines for standard writers who draft standards dealing with aluminium products or dealing with semi-finished products which are intended to be used for aluminium products. It applies to all applications of aluminium products It provides a structure on how to identify and consider environmental aspects and potential environmental impacts of aluminium products throughout their life cycle, when writing standards taking into account the specific properties of aluminium and specific aspects of the life cycle of aluminium products. It gives guidance on how the life cycle of aluminium products should be taken into account, considering the provisions given in EN ISO 14044. It also explains cases where restrictions on aluminium products, which are motivated by environmental considerations, are not appropriate and gives guidance on how to avoid unnecessary requirements. This European Standard does not include health and safety aspects related to the production, use or recycling of aluminium products.		

2. Terms and definitions

EN 12258-1:2012		Aluminium and aluminium alloys - Terms and definitions - Part 1: General terms
This European Standard defines general terms which are helpful for the communication within the aluminium industry and its customers relating to products of aluminium and aluminium alloys. Note: In some terms and definitions "metal" is used for aluminium and aluminium alloys". Definitions in other standards applying to a particular field of application can be more specific than the definitions of identical terms in this standard; these can be found in the relevant standards.		

EN 12258-2:2004		Aluminium and aluminium alloys - Terms and definitions - Part 2: Chemical analysis
This European Standard defines general terms which are helpful for the communication within the aluminium industry and its customers relating to the chemical analysis. A glossary (annex A) comprises all terms in alphabetical order which are defined in this standard.		

EN 12258-3:2003		Aluminium and aluminium alloys - Terms and definitions - Part 3: Scrap
This European Standard contains definitions of terms related to scrap of aluminium and aluminium alloys which are helpful for the communication within the aluminium industry and between the industry and the authorities. Definitions of general terms which are helpful for the communication within the aluminium industry are laid down in EN 12258-1.		

EN 12258-4:2004		Aluminium and aluminium alloys - Terms and definitions - Part 4: Residues of the aluminium industry
This European Standard contains definitions of terms which are helpful for the communication within the aluminium industry, authorities and subcontractors dealing with the shipment, recovery or disposal of residues. It only contains residues which are specific for the aluminium industry. Residues which generally occur with identical inherent properties in other industries and private households are defined in EN 13965-1. This European Standard does not contain terms and definitions related to aluminium scrap; such terms and de-finitions can be found in EN 12258-3. The inclusion of a material in this standard does not mean that the material is a waste. Definitions of general terms which are helpful for the communication within the aluminium industry are laid down in EN 12258-1.		

3. Sheet, strips and plate and related products

3.1. General applications

EN 485-1:2016	Revised Standard	Aluminium and aluminium alloys - Sheet, strip and plate - Part 1: Technical conditions for inspection and delivery

This document specifies the technical conditions for inspection and delivery of wrought aluminium and wrought aluminium alloy sheet, strip and plate for general applications. It also includes provisions for ordering and testing. It applies to products with a thickness over 0,20 mm up to and including 400 mm.

For many special applications of aluminium strip, sheet and plate, specific European Standards exist, where different or additional requirements are formulated and the appropriate alloys and tempers are selected: see Annex A. Most of these special European Standards refer to provisions of this document. The selection of the relevant special European Standards is under the responsibility of the purchaser.

Whenever the application involves special properties, such as corrosion resistance, toughness, fatigue strength, surface appearance and welding properties, the user should consult the supplier and consider the relevant special European Standard, as applicable.

EN 485-2:2016 + A1:2018	New amendment	Aluminium and aluminium alloys - Sheet, strip and plate - Part 2: Mechanical properties

This European Standard specifies the mechanical properties of wrought aluminium and wrought aluminium alloy sheet, strip and plate for general engineering applications. It does not apply to semi-finished rolled products in coiled form to be subjected to further rolling (reroll stock) or to special products such as corrugated, embossed, painted, sheets and strips or to special applications such as aerospace, can stock, finstock, for which mechanical properties are specified in separate European Standards. The chemical composition limits of the alloys are specified in EN 573-3.

Temper designations are defined in Annex B, in compliance with the provisions of EN 515.

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

This part of this European Standard specifies the tolerances on form and dimensions for wrought aluminium and aluminium alloy sheet, strip and plate obtained by hot-rolling, for general engineering applications. It applies to products with a thickness from 2,5 mm up to and including 400 mm. It does not apply to semi-finished rolled products in coiled form to be subjected to further rolling (reroll stock) or to special products such as corrugated, embossed, etc. sheet and strip or to special applications such as aerospace which are dealt with in separate European Standards.

Technical conditions for inspection and delivery of products covered by this standard are specified in EN 485-1.

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

This Part of EN 485 specifies the tolerances on shape and dimensions for wrought aluminium and aluminium alloy sheet, strip and plate obtained by cold-rolling, for general engineering applications. It applies to products with a thickness over 0,20 mm up to and including 50 mm. It does not apply to semi-finished rolled products in coiled form to be subjected to further rolling (reroll stock) or to special products such as corrugated, embossed, etc. sheet and strip or to special applications such as aerospace, can stock, etc. which are dealt with in separate European Standards.

Technical conditions for inspection and delivery of products covered by this standard are specified in EN 485-1.

3.2. Particular requirements

EN 570:2007		Aluminium and aluminium alloys - Impact extrusion slugs obtained from wrought products - Specification
This document specifies the technical conditions for inspection and delivery, tolerances on dimensions and form and other requirements for flat or preformed wrought aluminium and wrought aluminium alloy slugs for impact extrusion. It applies to slugs produced either by punching of rolled products or by cutting of extruded products. Slugs covered in this document are suitable for the manufacture of impact extruded parts for packaging and industrial applications.		

EN 941:2014	Under revision	Aluminium and aluminium alloys - Circle and circle stock for the production of general applications - Specifications
This European Standard specifies the particular requirements for wrought aluminium and aluminium alloys in the form of circle or circle stock for general applications. It applies to: — Circles made out of hot or cold rolled circles stock by: — Blanking: thickness 0,2 mm up to including 12 mm and with a diameter up to 1 000 mm; — Sawing or shearing: thickness 0,2 mm up to and including 200 mm with a diameter up to 3 500 mm; — Hot or cold rolled circle stock with a thickness from 0,2 mm up to and including 200 mm and with a width up to 3 500 mm. It does not apply to slugs for impact extrusions or to circle and circle stock for culinary utensils applications which are dealt with in other European Standards.		

EN 1592-1:1997		Aluminium and aluminium alloys - HF seam welded tubes - Part 1: Technical conditions for inspection and delivery
This part of EN 1592 specifies the technical conditions for inspection and delivery of HF seam welded aluminium tubes. It is applicable to HF seam welded tubes obtained by forming cold-rolled strips. It is applicable to aluminium tubes produced from uncoated aluminium strip, as well as to tubing that is pre-lacquered, pre-painted or pre-anodized prior to forming.		

EN 1592-2:1997		Aluminium and aluminium alloys - HF seam welded tubes - Part 2: Mechanical properties
This Part of EN 1592 specifies the mechanical properties of wrought aluminium alloy HF seam welded tubes for general engineering applications. It is not applicable to irrigation and heat exchanger tubes. The chemical composition limits of these materials are given in EN 573-3. Mechanical property limits are specified for all Class A alloys, as defined in EN 573-4. The definitions of temper designations are specified in EN 515.		

EN 1592-3:1997		Aluminium and aluminium alloys - HF seam welded tubes - Part 3: Tolerances on dimensions and form for circular tubes
This part of EN 1592 specifies the tolerances on dimensions and form of circular HF seam welded tubes with a diameter up to and including 80 mm and a wall thickness up to and including 2,5 mm. These tubes are manufactured from flat rolled aluminium alloy strip longitudinally welded in a continuous process by the passage of an electric current across the abutting edges without the addition of filler metal. This standard also applies to tubes manufactured from aluminium alloy strip which is painted, lacquered or anodized prior to forming.		

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
This Part of EN 1592 specifies the tolerances on dimensions and form of square, rectangular and shaped HF seam welded tubes. These tubes are manufactured from flat rolled aluminium alloy strip longitudinally welded in a continuous process by the passage of an electric current across the abutting edges without the addition of filler metal. This standard also applies to tubes manufactured from aluminium alloy strip which is painted, lacquered or anodized prior to forming.		

EN 12482-1:1998		Aluminium and aluminium alloys - Reroll stock for general applications - Part 1: Specifications for hot rolled reroll stock
This part of EN 12482 specifies the particular requirements for wrought aluminium and aluminium alloys in the form of hot rolled strip. The thickness range covered is from 2,0 mm to 12 mm. It does not apply to hot-rolled strip which are not rerolled such as strip for general engineering or special applications.		

EN 12482-2:1998		Aluminium and aluminium alloys - Reroll stock for general applications - Part 2: Specifications for cold rolled reroll stock
This part of EN 12482 specifies the particular requirements for wrought aluminium and aluminium alloys in the form of hot rolled strip. The thickness range covered is over 0,20 mm to 4 mm. It does not apply to cold rolled strip which are not rerolled such as strip for general engineering or special applications.		

EN 1386:2007		Aluminium and aluminium alloys - Tread plate - Specifications
This document specifies the technical conditions of inspection and delivery, the mechanical properties, the tolerances on dimensions and form of rolled semi-finished aluminium alloy products intended for floor plating, e.g. in vehicle construction, shipbuilding and metallic structures with a raised pattern on one side and a smooth surface on the other side. It applies to sheets, strips and plates from 1,2 mm up to 20 mm in thickness and up to and including 2 500 mm in width, and to sheets and plates up to 14 000 mm in length.		

EN 16914:2017	New standard	Aluminium and aluminium alloys — Hot-rolled armour plates in weldable aluminium alloy — Technical delivery conditions
This European Standard specifies the technical delivery conditions relating to armour plates in weldable aluminium alloy with a nominal thickness between 10 mm and 70 mm. For thickness below 10 mm, other specifications may be applied.		

4. Foil and finstock

EN 546-1:2006		Aluminium and aluminium alloys - Foil - Part 1: Technical conditions for inspection and delivery
This document specifies the technical conditions for inspection and delivery of wrought aluminium and aluminium alloy foil. The gauge range covered is 6 µm to 200 µm. It does not apply to lacquered, painted, embossed or laminated products.		

EN 546-2:2006		Aluminium and aluminium alloys - Foil - Part 2: Mechanical properties
This document specifies the mechanical properties of wrought aluminium and aluminium alloy foil. The chemical composition limits of these materials are specified in EN 573-3. The designations of aluminium and aluminium alloys and the temper designations used in this standard are specified in EN 573-3 and the temper designation are defined EN 515.		

EN 546-3:2006		Aluminium and aluminium alloys - Foil - Part 3: Tolerances on dimensions
This document specifies the tolerances on dimensions for single and double-rolled aluminium and aluminium alloy foil supplied in accordance with EN 546-1.		

EN 546-4:2006		Aluminium and aluminium alloys - Foil - Part 4: Special property requirements
This document specifies the requirements for special properties of wrought aluminium and wrought aluminium alloy foil and their tests. It applies to flat rolled products. It does not apply to lacquered, painted, embossed or laminated products. The technical conditions for inspection and delivery of foil are specified in EN 546-1.		

EN 683-1:2006		Aluminium and aluminium alloys - Finstock - Part 1: Technical conditions for inspection and delivery
This document specifies the technical conditions for inspection and delivery of wrought aluminium and wrought aluminium alloy finstock. The gauge range covered is 60 µm to 400 µm. It does not apply to cladded finstock.		

EN 683-2:2006		Aluminium and aluminium alloys - Finstock - Part 2: Mechanical properties
This document specifies the mechanical properties of wrought aluminium and wrought aluminium alloy finstock. The chemical composition limits of these materials are specified in EN 573-3, unless otherwise agreed between supplier and purchaser. The designations of wrought aluminium and wrought aluminium alloys and the temper designations used in this standard are specified in EN 573-3, and the temper designations are defined in EN 515.		

EN 683-3:2006		Aluminium and aluminium alloys - Finstock - Part 3: Tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for wrought aluminium and wrought aluminium alloy finstock supplied in accordance with EN 683-1.		

5. Extruded rod/bar, tube and profiles

5.1. General applications

EN 755-1:2016	Revised standard	Aluminium and aluminium alloys- Extruded rod/bar, tube and profiles - Part 1: Technical conditions for inspection and delivery
This document specifies the technical conditions for inspection and delivery of wrought aluminium and aluminium alloy extruded rod/bar, tube and profile for general engineering applications. This document does not apply to: - forging stock (EN 603), - extruded precision profiles in alloys EN AW-6060 and EN AW-6063 (EN 12020), - products delivered in coils (EN 13957), - coiled tubes cut to length (EN 13957).		

EN 755-2:2016	Revised standard	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties
This document specifies the mechanical property limits resulting from tensile testing applicable to aluminium and aluminium alloy extruded rod/bar, tube and profile. Technical conditions for inspection and delivery, including product and testing requirements, are specified in EN 755-1. Temper designations are defined in EN 515. The chemical composition limits for these materials are given in EN 573-3.		

EN 755-3:2008		Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 3: Round bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded round bars having diameters in the range from 8 mm up to 320 mm. The temper designations used in this part are according to EN 515.		

EN 755-4:2008		Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 4: Square bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded square bars having widths across flats from 10 mm up to 220 mm. The temper designations used in this part are according to EN 515.		

EN 755-5:2008		Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 5: Rectangular bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded rectangular bars having thicknesses in the range from 2 mm up to 240 mm and widths in the range from 10 mm up to 600 mm. The temper designations used in this part are according to EN 515.		

EN 755-6:2008		Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 6: Hexagonal bars, tolerances on dimensions and form
This document specifies the dimension and form tolerances for aluminium and aluminium alloy extruded hexagonal bars having widths across flats in the range from 10 mm up to 220 mm. The temper designations used in this part are according to EN 515.		

EN 755-7:2016	Revised standard	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 7: Seamless tubes, tolerances on dimensions and form

This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded seamless tubes with an outside diameter (OD) from 8 mm to 450 mm (round tube, see Figure 1) or with a cross section contained within a circumscribing circle (CD) from 10 mm to 350 mm (other than round tube, see Figure 2), supplied in straight lengths. This standard only applies to tube produced by the seamless die/mandrel method of extrusion. This standard applies to extruded seamless tube for general engineering applications only.
The temper designations used in this part are according to EN 515. This European Standard does not apply to:
- extruded tubes produced by porthole/bridge method (EN 755-8),
- tubes delivered in coils (EN 13957),
- coiled tubes cut to length (EN 13957).

EN 755-8:2016	Revised standard	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 8: Porthole tubes, tolerances on dimensions and form

This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded porthole tubes with an outside diameter (OD) from 8 mm to 450 mm (round tube, see Figure 1) or with a cross section contained within a circumscribing circle (CD) from 10 mm to 350 mm (other than round tube, see Figure 2), supplied in straight lengths.

This standard only applies to extruded porthole tube for general engineering applications made in the following alloys:
- EN AW-1050A, EN AW-1200, EN AW-1350;
- EN AW-3003, EN AW-3103;
- EN AW-5005, EN AW-5005A, EN AW-5049, EN AW-5051A, EN AW-5251, EN AW-5052;
- EN AW-6101A, EN AW-6101B, EN AW-6005, EN AW-6005A, EN AW-6008, EN AW-6110A, EN AW-6012, EN AW-6014, EN AW-6018, EN AW-6351, EN AW-6060, EN AW-6360, EN AW-6061, EN AW-6261, EN AW-6262, EN AW-6262A, EN AW-6063, EN AW-6063A, EN AW-6463, EN AW-6065, EN AW-6081, EN AW-6082; EN AW-6182,
- EN AW-7003, EN AW-7005, EN AW-7108, EN AW-7108A, EN AW-7020.

The temper designations used in this part are according to EN 515. This standard only applies to tube produced by the tube porthole/bridge method. This standard does not apply to:
- extruded tubes produced by the seamless, die/mandrel method (EN 755-7),
- tubes delivered in coils (prEN 13957),
- coiled tubes cut to length (prEN 13957).

EN 755-9:2016	Revised standard	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 9: Profiles, tolerances on dimensions and form

This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy extruded profile with a cross section contained within a circumscribing circle not greater than 800 mm (see Figure 1).
The temper designations used in this part are according to EN 515. This standard applies to extruded profiles for general engineering applications only.

5.2. Particular requirements

EN 12020-1:2008	Under revision	Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 1: Technical conditions for inspection and delivery
This document specifies technical conditions for inspection and delivery of alloys EN AW-6060 and EN AW-6063 extruded precision profiles manufactured with and without a thermal barrier (see Figures 1 and 2) and without further surface treatment. Precision profiles covered in this document are distinguished from extruded profiles for general applications covered in EN 755-9 by the following characteristics: - they are mainly for architectural applications; - they meet more stringent requirements regarding the surface condition of visible surfaces; - the maximum diameter of the circumscribing circle CD is 350 mm, - they are made to closer tolerances on dimensions and form. In the case of profiles, which, due to the complexity of their design are difficult to manufacture and specify, then special agreements between supplier and purchaser may need to be reached.		

EN 12020-2:2016+ AC1:2017	Under revision	Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 - Part 2: Tolerances on dimensions and form
This document specifies tolerances on dimensions and form of extruded precision profiles, in alloys EN AW-6060 and EN AW-6063 manufactured with and without a thermal barrier (see Figures 1 and 2). It applies to extruded products supplied without further surface treatment. Precision profiles covered in this standard are distinguished from extruded profiles for general applications covered in EN 755-9 by the following characteristics: - they are mainly for architectural applications; - they meet more stringent requirements regarding the surface condition of visible surfaces; - the maximum diameter of the circumscribing circle CD is 350 mm; - they are made to closer tolerances on dimensions and form. In the case of profiles which, due to the complexity of their design, are difficult to manufacture and specify, then special agreements between supplier and purchaser may need to be reached.		

EN 13957:2008		Aluminium and aluminium alloys - Extruded round, coiled tube for general applications - Specification
This European Standard specifies the tolerances on dimensions and form of round aluminium and aluminium alloys porthole extruded tubes with an outside diameter (OD) of over 2 mm up to and including 50 mm supplied in coil form or in straight lengths cut from coiled material: see Figure 1. This European Standard mainly applies to round extruded tube for general engineering applications manufactured in 1xxx series of aluminium and 3xxx series of alloys. The use of this European Standard for non-standardised 1xxx aluminium and 3xxx alloys or alloys from other series, e.g. 5xxx or 6xxx, is subject to agreement between supplier and purchaser. This European Standard only applies to: - Round tube produced by the porthole/bridge method, extruded in coil form to the final dimensions required; - Tube as above but delivered in straight lengths cut from coiled material. This European Standard does not apply to: - Seamless extruded (die/mandrel method) tubes (EN 755-7); - Tubes extruded in straight lengths (i.e. not coiled) (EN 755-8).		

6. Forgings and forging stock

EN 586-1:1997		Aluminium and aluminium alloys - Forgings - Part 1: Technical conditions for inspection and delivery
This part of EN 586 specifies the technical conditions for inspection and delivery of aluminium and aluminium alloy forgings for general engineering applications.		

EN 586-2:1994		Aluminium and aluminium alloys - Forgings - Part 2: Mechanical properties and additional property requirements
This part of EN 586 specifies the mechanical properties and additional properties of forgings in aluminium and aluminium alloys for general engineering applications. The chemical composition and temper designations for these alloys are specified in EN 573-3 and EN 515 respectively.		

EN 586-3:2001		Aluminium and aluminium alloys - Forgings - Part 3: Tolerances on dimensions and form
This European Standard specifies the tolerances on dimensions and form of aluminium and aluminium alloy forgings for general engineering applications of usual design concepts which are formed hot. It applies to : - die forgings without machining all over : shape dimensions $n_{max} \leq 2\,000$ mm, die closure dimensions $t_{max} \leq 600$ mm and projected area $A \leq 4\,000$ cm²; - die forgings with machining all over : shape dimensions $n_{max} \leq 6\,000$ mm and projected area $A \leq 22\,000$ cm²; - hand forgings: profile dimensions $n_{max} \leq 8\,000$ mm. Tolerances on forgings outside the scope of this standard or of complex design can be mutually agreed between supplier and purchaser. Design guidelines for die and hand forgings are given in annex A.		

EN 603-1:1996		Aluminium and aluminium alloys - Wrought forging stock - Part 1: Technical conditions for inspection and delivery
This part of EN 603 specifies the technical conditions for inspection and delivery of aluminium and aluminium alloy forging stock for general engineering applications. It applies to extruded and rolled products.		

EN 603-2:1996		Aluminium and aluminium alloys - Wrought forging stock - Part 2: Mechanical properties
This Part of EN 603 specifies the mechanical properties of wrought forging stock in aluminium and aluminium alloys for general engineering applications. The chemical composition and temper designations for these alloys are specified in EN 573-3 and EN 515 respectively.		

EN 603-3:2000	Under revision	Aluminium and aluminium alloys - Wrought forging stock - Part 3: Tolerances on dimensions and form
This Part of this EN 603 specifies the tolerances on dimensions and form of wrought aluminium and aluminium alloy forging stock. It applies to extruded and rolled products.		

EN 604-1:1997		Aluminium and aluminium alloys - Cast forging stock - Part 1: Technical conditions for inspection and delivery
This part of this standard specifies the technical conditions for inspection and delivery of cast aluminium and aluminium alloy forging stock for general engineering applications.		

EN 604-2:1997		Aluminium and aluminium alloys - Cast forging stock - Part 2: Tolerances on dimensions and form
This part of this European standard specifies the tolerances on dimensions and form of cast aluminium and aluminium alloy forging stock for general engineering applications. The chemical compositions for these alloys are specified in EN 573-3. The technical conditions for inspection and delivery of these products are specified in EN 604-1.		

7. Cold drawn rod bar and tube

7.1. General applications

EN 754-1:2016	Revised standard	Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 1: Technical conditions for inspection and delivery
This document specifies the technical conditions for inspection and delivery of aluminium and aluminium alloy cold drawn rod/bar and tube for general engineering applications. This document applies to products which are extruded and then cold drawn. This document does not apply to: - forging stock (EN 603), - products delivered in coils (EN 13958), - coiled tubes cut to length (EN 13958).		

EN 754-2:2016	Revised standard	Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 2: Mechanical properties
This document specifies the mechanical property limits resulting from tensile testing applicable to aluminium and aluminium alloy cold drawn rod/bar and tube. Technical conditions for inspection and delivery, including product and testing requirements, are specified in EN 754-1. Temper designations are defined in EN 515. The chemical composition limits for these materials are given in EN 573-3.		

EN 754-3:2008		Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 3: Round bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy cold drawn round bars having diameters in the range from 3 mm up to and including 100 mm. The temper designations used in this part are according to EN 515.		

EN 754-4:2008		Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 4: Square bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy cold drawn square bars having widths across flats from 3 mm up to and including 100 mm. The temper designations used in this part are according to EN 515.		

EN 754-5:2008		Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 5: Rectangular bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy cold drawn rectangular bars having thicknesses in the range from 2 mm up to and including 60 mm and widths in the range from 5 mm up to and including 200 mm. The temper designations used in this part are according to EN 515.		

EN 754-6:2008		Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 6: Hexagonal bars, tolerances on dimensions and form
This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy cold drawn hexagonal bars having widths across flats in the range from 3 mm up to and including 80 mm. The temper designations used in this part are according to EN 515.		

EN 754-7:2016	Revised standard	Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 7: Seamless tubes, tolerances on dimensions and form

This document specifies the tolerances on dimensions and form for aluminium and aluminium alloys cold drawn seamless tubes with an outside diameter (OD) from 3 mm to 350 mm (round tube, see Figure 1) or with a cross section contained within a circumscribing circle (CD) from 8 mm to 300 mm (other than round tube, see Figure 2) supplied in straight lengths.

This standard only applies to tube produced by the seamless die/mandrel method of extrusion (and then cold drawn to the final dimensions required).

The temper designations used in this part are according to EN 515. This document applies to cold drawn, seamless tube for general engineering applications. This document does not apply to:
- cold drawn tube produced by the porthole/bridge method (EN 754-8),
- tubes delivered in coils (EN 13958),
- coiled tubes cut to length (EN 13958).

EN 754-8:2016	Revised standard	Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 8: Porthole tubes, tolerances on dimensions and form

This document specifies the tolerances on dimensions and form for aluminium and aluminium alloy cold drawn porthole tubes with an outside diameter (OD) from 3 mm to 350 mm (round tube, see Figure 1) or with a cross section contained within a circumscribing circle (CD) from 8 mm to 300 mm (other than round tube, see Figure 2), supplied in straight lengths.

This document only applies to cold drawn tube for general engineering applications made in the following alloys:
- EN AW-1050A, EN AW-1200;
- EN AW-3003, EN AW-3103;
- EN AW-5005, EN AW-5005A, EN AW-5049, EN AW-5251, EN AW-5052;
- EN AW-6012, EN AW-6060, EN AW-6061, EN AW-6262, EN AW-6262A;
- EN AW-6063, EN AW-6063A, EN AW-6065, EN AW-6082;
- EN AW-7020.

The temper designations used in this part are according to EN 515. This document only applies to tube produced by the porthole/bridge method of extrusion only (and then cold drawn to the final dimensions).This document does not apply to:
- cold drawn tubes produced by the seamless, die/mandrel method (EN 754-7),
- tubes delivered in coils (EN 13958),
- coiled tubes cut to length (EN 13958).

7.2. Special requirements

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

This European Standard specifies the tolerances on dimensions and form of round aluminium and aluminium alloys porthole extruded and cold drawn tubes with an outside diameter (OD) of over 2 mm up to and including 50 mm supplied in coil form or in straight lengths cut from coiled material: see Figure 1.

This European Standard mainly applies to round cold drawn tube for general engineering applications manufactured in 1xxx series of aluminium and 3xxx series of alloys. The use of this European Standard for non-standardised 1xxx aluminium and 3xxx alloys or alloys from other series, e.g. 5xxx or 6xxx, is subject to agreement between supplier and purchaser.

This European Standard only applies to:
- round tube extruded by the porthole/bridge method in coil form and then cold drawn to the final dimensions required;
- tube as above but delivered in straight lengths cut from coiled material.

This European Standard does not apply to:
- seamless extruded (die/mandrel method) and drawn tubes (EN 754-7);
- tubes extruded in straight lengths (i.e. not coiled) and drawn (EN 754-8).

8. Drawn wire and drawing stock

EN 1301-1:2008		Aluminium and aluminium alloys - Drawn wire - Part 1: Technical conditions for inspection and delivery
This document specifies the technical conditions for inspection and delivery of aluminium and aluminium alloy drawn wire for general engineering applications. It does not apply for aeronautical application. It applies to drawn wires, except for electrical or welding purposes. It does not apply to drawing stock.		

EN 1301-2:2008		Aluminium and aluminium alloys - Drawn wire - Part 2: Mechanical properties
This document specifies the mechanical properties of aluminium and aluminium alloy drawn wires for general engineering applications (except aeronautical rivets). It applies to drawn wires, except for electrical or welding purposes. It does not apply to drawing stock. The designation of aluminium and aluminium alloys, their chemical composition and the temper designations used in this standard are in accordance with EN 573- 3 and EN 515 respectively.		

EN 1301-3:2008		Aluminium and aluminium alloys - Drawn wire - Part 3: Tolerances on dimensions
This document specifies the tolerances on dimensions of aluminium and aluminium alloy drawn wire for general engineering applications (except aeronautical applications), covering diameters, thicknesses or widths or width across flats up to and including 20 mm. It applies to drawn wires, except for electrical or welding purposes. It does not apply to drawing stock.		

EN 1715-1:2008		Aluminium and aluminium alloys - Drawing stock - Part 1: General requirements and technical conditions for inspection and delivery
This European Standard specifies general requirements for drawing stock of aluminium and aluminium alloys delivered in the form of coils with a unit mass ranging between 1 t and 4 t and obtained by common industrial processes. It also specifies the technical conditions for inspection and delivery of these products. It applies to drawing stock intended for the following main fields of application: - wires for general electrical purposes; - wires for general mechanical uses; - wires for brazing and welding and metal spraying; - food packaging. The specific requirements to drawing stock for these applications are specified in EN 1715-2, EN 1715-3 and EN 1715-4. It does not apply to wires which are drawn, but only to drawing stock which is produced by hot-working.		

EN 1715-2:2008		Aluminium and aluminium alloys - Drawing stock - Part 2: Specific requirements for electrical applications
This European Standard specifies requirements for drawing stock of aluminium and aluminium alloys for electrical applications. The general requirements and technical conditions for inspection and delivery are specified in EN 1715-1. This European Standard does not apply to drawn wire.		

EN 1715-3:2008		Aluminium and aluminium alloys - Drawing stock - Part 3: Specific requirements for mechanical uses (excluding welding)
This European Standard specifies specific requirements for drawing stock of aluminium and aluminium alloys for general mechanical uses (excluding welding). The general requirements and technical conditions for inspection and delivery are specified in EN 1715-1. This European Standard does not apply to drawn wire.		

EN 1715-4:2008		Aluminium and aluminium alloys - Drawing stock - Part 4: Specific requirements for welding applications
This European Standard specifies specific requirements for drawing stock of aluminium and aluminium alloys for welding applications. The general requirements and technical conditions for inspection and delivery are specified in EN 1715-1. This European Standard does not apply to drawn wire.		

9. Aluminium products for special end-uses

9.1. Packaging and articles in contact with foodstuff

EN 541:2006		Aluminium and aluminium alloys - Rolled products for cans, closures and lids - Specifications
This document specifies the technical conditions for inspection and delivery, mechanical properties, dimensional tolerances and other requirements for rolled products made from wrought aluminium and wrought aluminium alloys with thicknesses from 0,150 mm to 0,500 mm for manufacturing rigid cans, closures, lids and tabs.		

EN 601:2004		Aluminium and aluminium alloys - Castings - Chemical composition of castings for use in contact with foodstuff
This European Standard specifies the maximum mass content of alloying elements and impurities in aluminium and aluminium alloy cast materials and articles designed to be in contact with foodstuff. It contains provisions for the demonstration of conformity of products with the present standard.		

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
This European Standard specifies the maximum percentage content of alloying elements and impurities present in wrought aluminium and aluminium alloys which are fabricated into materials and articles designed to be in contact with foodstuff. It contains provisions for the demonstration of conformity of products with the present standard.		

EN 851:2014	Under revision	Aluminium and aluminium alloys - Circle and circle stock for the production of culinary utensils - Specifications
This European Standard specifies the particular requirements for wrought aluminium and aluminium alloys in the form of circle or circle stock for culinary utensils applications. This standard is applicable to: — Circles made out of hot or cold rolled circles stock, with a thickness from 0,2 mm up to and including 12 mm and with a diameter from 100 mm up to and including 1 600 mm. NOTE Circles with a diameter up to 1 000 mm can be produced by blanking. — Hot or cold-rolled circle stock with a thickness from 0,2 mm up to and including 12 mm and with a width up to 1 600 mm. This European Standard is not applicable to slugs for impact extrusions which are dealt with in other European Standards.		

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
This European Standard specifies additional requirements on the chemical composition of aluminium and aluminium alloys intended for the manufacture of packaging and packaging components, as well as related specific technical conditions of inspection and delivery. The scope of this standard is fully defined by the final application.		

EN 14392:2007		Aluminium and aluminium alloys - Requirements for anodised products for use in contact with foodstuff
This European Standard specifies requirements for coloured or uncoloured anodic oxidation coatings on wrought and cast products in aluminium and aluminium alloys for use in contact with food. These requirements cover the chemical composition of the bath, the sealing and the properties of the obtained anodic oxidation coatings. They do not cover dyestuffs and pigments but do cover the metallic deposits produced by electrolytic colouring.		

EN 16773:2016	New standard	Aluminium and aluminium alloys - Guideline for the production of foil-stock in the field of semi rigid foodstuff containers
This European Standard provides a guideline about manufacturing practices for rolled products in the thicknesses range between ≥ 35 µm and ≤ 200 µm having surface quality characteristics essential for production of aluminium semi-rigid containers, lids and disposable platters which are used in contact with foodstuff. This European Standard can be applied to the production cycle of the “rolled semi-finished goods”. This European Standard cannot be applied to the production process of containers, lids and disposable platters.		

9.2. Pressure equipment

EN 12392:2016 preparation of an Amendment	97/23/EC 2014/68/EU	Aluminium and aluminium alloys - Wrought products - Special requirements for products intended for the production of pressure equipment
This European Standard specifies the material requirements and testing procedures applicable to wrought and cast aluminium and aluminium alloys intended for use in the production of pressure equipment. This European Standard covers: - the products forms, grades and tempers of wrought and cast aluminium and aluminium alloys which may be used for such applications together with data for wrought and cast alloys over their permissible working temperature ranges; - the permissible alloys/ tempers covered by this are those given in Table A.1 and in B.1 for wrought alloys and in Table A.2 and in B.2 for castings; - the technical conditions for inspection and delivery, mechanical property limits and tolerances on form and dimensions by reference to the appropriate European standards for the relevant wrought and cast aluminium and aluminium alloys, and - additional requirements which are specific to pressure equipment applications. It applies to hot-rolled plate, cold-rolled sheet/ strip/ circles, extruded or extruded and cold drawn rod/bar, tube, extruded open / hollow profiles, forgings and castings, by this standard are those given in Table A.1 for wrought alloys and in Table A.2 for castings. It is the sole objective of this standard to cover materials only for pressure purposes and it excludes any elements of fabrication or fabrication methods for pressure equipment; such information can be found in the relevant standards listed in the “Bibliography” section.		

9.3. Marine

EN 13195:2013		Aluminium and aluminium alloys - Specifications for wrought and cast products for marine applications (shipbuilding, marine and offshore)
This European Standard specifies properties and technical conditions for inspection and delivery of wrought and cast aluminium and aluminium alloy products recommended for marine applications, including shipbuilding and offshore applications. Additional information is given about high magnesium alloys, with special regard to their sensitivity to intergranular and exfoliation corrosion. This European Standard is intended to be used in conjunction with relevant European, national or international regulations as applicable, to which it comes in support. For products intended to be used in marine constructions to be classified by a Classification Society, the relevant requirements of this Society apply. This European Standard covers: — wrought products in aluminium alloys (see Clause 6); — castings in aluminium alloys (see Clause 7). Information is given in Annex A to guide the user in the selection of aluminium and aluminium alloys and tempers for various applications. This European Standard does not cover: — execution and design, covered by the rules of the Classification Societies or EN 1090-3 and EN 1999-1-1 to EN 1999-1-5; — welding, covered by EN 1011-4.		

9.4. Railway

EN 13981-1:2003		Aluminium and aluminium alloys - Products for structural railway applications - Technical conditions for inspection and delivery - Part 1: Extruded products
This European Standard specifies requirements for extruded products (rod/bar, tube, profiles) which contribute to the structural properties of the railcar bodyshell and other major structural components. The requirements on welded joints specified in this standard are not applicable to welded assemblies and subassemblies as they are specified for material qualification purposes only. It specifies particular requirements regarding qualification, quality control, material properties and dimensional tolerances. Furthermore, guidelines for application and use are also given.		

EN 13981-2:2004		Aluminium and aluminium alloys - Products for structural railway applications - Technical conditions for inspection and delivery - Part 2: Plates and sheets
This document specifies requirements for rolled products (plate and sheet) which contribute to the structural properties of the railcar bodyshell and of other major structural components. It specifies particular requirements regarding qualification, quality control, material properties and dimensional tolerances are specified. Furthermore, guidelines for application and use are given.		

EN 13981-3:2006		Aluminium and aluminium alloys - Products for structural railway applications - Technical conditions for inspection and delivery - Part 3: Castings
This document specifies requirements for castings which contribute to the structural properties of the railcar bodyshell and other major structural components. It specifies particular requirements regarding qualification, quality control, material properties and dimensional tolerances and gives guide-lines for application and use.		

EN 13981-4:2006		Aluminium and aluminium alloys - Products for structural railway applications - Technical conditions for inspection and delivery - Part 4: Forgings
This European Standard specifies requirements for forgings (hand forgings, die forgings) which contribute to the structural properties of the railcar body-shell and other major structural components. The requirements on welded joints specified in this European Standard are not applicable to welded assemblies and sub-assemblies as they are specified for material qualification purposes only. It specifies particular requirements regarding qualification, quality control, material properties and dimensional tolerances. Furthermore, guidelines for application and use are given.		

9.5. Electro-technical applications

EN 14121:2009		Aluminium and aluminium alloys - Sheet, strip and plate for electro-technical applications
This European Standard specifies the technical conditions for inspection and delivery, the mechanical properties and electrical conductivity of wrought aluminium and aluminium alloys sheet, strip and plate for electro-technical applications such as bus bars and other conductors, products requiring a certain minimum electrical conductivity. It applies to products with a thickness over 0,20 mm up to and including 150 mm.		

9.6. Transport of dangerous goods

EN 14286:2008		Aluminium and aluminium alloys - Weldable rolled products for tanks for the storage and transportation of dangerous goods
This document specifies the technical conditions of inspection and delivery, the mechanical properties, the tolerances on dimensions and form of rolled semi-finished aluminium alloy products intended for tanks for the storage and transportation of dangerous goods, in particular of gasoline and other liquid hydrocarbons. It applies to hot or cold-rolled strip, sheet and plate with a thickness from 3,0 mm and up to and including 12,0 mm used as a wall material.		

9.7. Structures in construction

prEN 15088 Revision in progress	EU 305/2011	Aluminium and aluminium alloys — Structural products for construction works
New scope: This European standard specifies product characteristics, testing assessment, sampling methods and the assessment and verification of constancy of performance of internal and external semi-finished structural aluminium products, to be used in buildings and civil engineering works where their characteristic affects the mechanical resistance and stability of these construction works or parts thereof, which may not fit into structural products without any further transformation (e.g. cutting, drilling). This European standard does not apply: - to products which are produced from semi-finished products and after transformation are used on particular structural construction products, - to construction products that are produced with joining operations (e.g. bolting, welding).		

10. Surface treatment

10.1. Anodising

EN ISO 2085:2018	Revised standard	Anodizing of aluminium and its alloys - Check for continuity of thin anodic oxidation coatings - Copper sulfate test
This document specifies a method for checking the continuity of thin anodic oxidation coatings on aluminium and its alloys by a copper sulfate contact test. The use of this method is limited to anodic coatings of thickness less than 5 µm or coatings that have been deformed, which includes those produced by coil anodizing techniques. NOTE The method described enables a rapid check to be made for the continuity of a thin coating of aluminium oxidation on aluminium and its alloys. In cases of doubt regarding a visible fault on the surface of a coating, the use of this method makes it possible to verify whether the fault corresponds to a local gap in the coating that exposes bare metal.		

EN ISO 2106:2020	Revised standard	Anodizing of aluminium and its alloys - Determination of mass per unit area (surface density) of anodic oxidation coatings - Gravimetric method
This International Standard specifies a gravimetric method for determining the mass per unit area (surface density) of anodic oxidation coatings on aluminium and its alloys. The method is applicable to all oxidation coatings formed by anodizing aluminium and its alloys, either cast or wrought, and is suitable for most aluminium alloys, except those in which the copper content is greater than 6 %.		

EN ISO 2128:2010		Anodizing of aluminium and its alloys - Determination of thickness of anodic oxidation coatings - Non-destructive measurement by split-beam microscope
This International Standard specifies a non-destructive method for determining the thickness of anodic oxidation coatings on aluminium and its alloys using a split-beam microscope. The method is applicable, in most industrial cases, to anodic oxidation coatings above 10 µm, or above 5 µm when the surface is smooth. The use of the method specified is limited by the need for the two luminous lines described in Clause 3 to be visible and distinctly separated, i.e. not in the case of opaque or dark-coloured coatings.		

EN ISO 2143:2017		Anodizing of aluminium and its alloys - Estimation of loss of absorptive power of anodic oxidation coatings after sealing - Dye-spot test with prior acid treatment
This International Standard specifies a method of estimating the loss of absorptive power of anodic oxidation coatings that have undergone a sealing treatment, by dye absorption after acid pre-treatment. The method is suitable for use as a production control method and is applicable to anodic oxidation coatings which may be subjected to weathering or aggressive environments, or where resistance to staining is important. The method is not applicable to those coatings that: a) are formed on alloys containing more than 2 % copper or 4 % silicon; b) are sealed by the dichromate process; c) have been given supplementary processing, e.g. oiling, waxing or lacquering; d) are coloured in deep shades; e) are less than 3 µm thick. The method is less appropriate where nickel or cobalt salts, or organic additives, have been added to the sealing bath.		

EN ISO 2376:2019		Anodizing of aluminium and its alloys - Determination of electric breakdown potential
This document specifies test methods for the determination of the breakdown voltage and withstand voltage of anodic oxidation coatings on aluminium and its alloys, on flat or near-flat surfaces and on round wire. The methods are applicable to anodic oxidation coatings used primarily as electrical insulators. The methods are not applicable to coatings in the vicinity of cut edges, the edges of holes, or sharp changes of angle on, for example, extruded shapes.		

EN ISO 2931:2018	Revised standard	Anodizing of aluminium and its alloys - Assessment of quality of sealed anodic oxidation coatings by measurement of admittance
ISO 2931:2017 specifies a method for assessing the quality of sealed anodic oxidation coatings on aluminium and its alloys by measurement of the admittance. The method is applicable to anodic oxidation coatings sealed in an aqueous medium. NOTE 1 Results obtained from anodic oxidation coatings sealed by different methods, e.g. hydrothermal sealing and cold sealing, are not necessarily comparable. NOTE 2 Results obtained from anodic oxidation coatings on alloys containing more than 2 % silicon or 5 % manganese or 3 % magnesium are not comparable with results obtained from anodic oxidation coatings on more dilute alloys. The method is suitable for use as a production-control test and as an acceptance test where there is agreement between the anodizer and the customer. Any type of anodized component can be tested by the method described, provided that there is a sufficient area (a circle of diameter about 20 mm) and that the film thickness is greater than 3 µm.		

EN ISO 3210:2017	Creation of a part 2	Anodizing of aluminium and its alloys - Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution
This International Standard specifies methods of assessing the quality of sealed anodic oxidation coatings on aluminium and its alloys by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution. This International Standard consists of the following two methods. – Method 1: 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. – Method 2: 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. Method 1 is applicable to anodic oxidation coatings intended for decorative or protective purposes or where resistance to staining is important. Method 2 is applicable to anodic oxidation coatings intended for architectural purposes. For less severe applications, Method 1 may be more suitable. The methods are not applicable to the following: – hard-type anodic oxidation coatings which normally are not sealed; – anodic oxidation coatings that have been sealed only in dichromate solutions; – anodic oxidation coatings produced in chromic acid solutions; – anodic oxidation coatings that have undergone a treatment to render them hydrophobic.		

EN ISO 3211:2018	Revised standard	Anodizing of aluminium and its alloys - Assessment of resistance of anodic oxidation coatings to cracking by deformation

This document specifies an empirical method for assessing the resistance of anodic oxidation coatings to cracking by deformation. The method is applicable particularly to sheet material with anodic oxidation coatings of thickness less than 5 µm and is useful for development purposes.

NOTE If the test specimen is thick, more than 5 µm of coating can be measured (see Clause 9).

EN ISO 6581:2018	Revised standard	Anodizing of aluminium and its alloys - Determination of the comparative fastness to ultraviolet light and heat of coloured anodic oxidation coatings

This document specifies a comparative method for the determination of the fastness of coloured anodic oxidation coatings to ultraviolet (UV) light and heat.

The method is not suitable for testing coloured anodic oxidation coatings that are heat sensitive.

NOTE Dark-coloured test specimens will normally reach the highest temperatures.

EN ISO 6719:2010		Anodizing of aluminium and its alloys - Measurement of reflectance characteristics of aluminium surfaces using integrating-sphere instruments

This International Standard specifies a method of measuring the total and diffuse luminous reflectance characteristics of aluminium surfaces, using integrating-sphere instruments. The method described is also applicable to the measurement of specular reflectance (principal gloss value), specularity and diffuseness.

The method is unsuitable for use with lighting reflectors.

EN ISO 7599:2018	Revised standard	Anodizing of aluminium and its alloys - General specifications for anodic oxidation coatings on aluminium

ISO 7599:2018 specifies a method for specifying decorative and protective anodic oxidation coatings on aluminium (including aluminium-based alloys). It defines the characteristic properties of anodic oxidation coatings, lists methods of test for checking the characteristic properties, provides minimum performance requirements, and gives information on the grades of aluminium suitable for anodizing and the importance of pretreatment to ensure the required appearance or texture of the finished work.

It is not applicable to:
a) non-porous anodic oxidation coatings of the barrier layer type,
b) anodic oxidation coatings produced by chromic acid or phosphoric acid anodizing,
c) anodic oxidation coatings intended merely to prepare the substrate for subsequent application of organic coatings or for the electrodeposition of metals, and
d) hard anodic oxidation coatings used mainly for engineering purposes, for which abrasion and wear resistance are the primary characteristics (see ISO 10074).

EN ISO 7668:2018	Revised standard	Anodizing of aluminium and its alloys - Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20 degrees, 45 degrees, 60 degrees or 85 degrees

ISO 7668:2018 specifies methods for the measurement of specular reflectance and specular gloss of flat samples of anodized aluminium using geometries of 20° (Method A), 45° (Method B), 60° (Method C) and 85° (Method D); and of specular reflectance by an additional 45° method (Method E) employing a narrow acceptance angle.

The methods described are intended mainly for use with clear anodized surfaces. They can be used with colour-anodized aluminium, but only with similar colours.

EN ISO 7759:2010		Anodizing of aluminium and its alloys - Measurement of reflectance characteristics of aluminium surfaces using a gonio-photometer or an abridged gonio-photometer
This International Standard specifies a method for the measurement of the reflectance characteristics of high-loss anodized aluminium surfaces. The method described is also suitable for the measurement of the reflectance characteristics of other high-loss metal surfaces. The method is not suitable for diffuse-finish metal surfaces and does not measure colour.		

EN ISO 8251:2018	Revised standard	Anodizing of aluminium and its alloys - Measurement of abrasion resistance of anodic oxidation coatings
This document specifies the following tests: a) abrasive-wheel-wear test, determining the abrasion resistance of anodic oxidation coatings with abrasive wheel on flat specimens of aluminium and its alloys; b) abrasive jet test, determining the comparative abrasion resistance of anodic oxidation coatings with jet of abrasive particles on anodic oxidation coatings of aluminium and its alloys; c) falling sand abrasion test, determining the abrasion resistance of anodic oxidation coatings with falling sand on thin anodic oxidation coatings of aluminium and its alloys. The use of abrasive-wheel-wear test and abrasive jet test for coatings produced by hard anodizing is described in ISO 10074.		

EN ISO 8993:2018	Revised standard	Anodizing of aluminium and its alloys - Rating system for the evaluation of pitting corrosion - Chart method
This document specifies a chart rating system based on standard charts that provides a means of defining levels of performance of anodic oxidation coatings on aluminium and its alloys that have been subjected to corrosion tests. This rating system is applicable to pitting corrosion resulting from — accelerated tests, — exposure to corrosive environments, and — practical service tests. This document takes into account only pitting corrosion resulting from penetration of the protective anodic oxidation coating.		

EN ISO 8994:2018	Revised standard	Anodizing of aluminium and its alloys - Rating system for the evaluation of pitting corrosion - Grid method
This document specifies a grid rating system that provides a means of defining levels of performance of anodic oxidation coatings on aluminium and its alloys that have been subjected to corrosion tests. This rating system is applicable to pitting corrosion resulting from — accelerated tests, — exposure to corrosive environments, and — practical service tests. This document takes into account only pitting corrosion of the basis metal resulting from penetration of the protective anodic oxidation coating.		

EN ISO 10215:2018		Anodizing of aluminium and its alloys - Visual determination of image clarity of anodic oxidation coatings - Chart scale method
ISO 10215:2018 specifies a visual method for determining the image clarity of anodic oxidation coatings on aluminium and its alloys, using a chart scale and a lightness scale, which are defined. The method is applicable only to flat surfaces that can reflect the image of the chart scale pattern.		

EN ISO 18771:2020		Anodizing of aluminium and its alloys - Method to test the surface abrasion resistance using glass-coated abrasive paper
This document specifies a method for the determination of the surface abrasion resistance of anodic oxidation coatings produced by sulfuric acid anodizing of aluminium and its alloys. It is mainly intended for the evaluation of external architectural coatings. It is a production control method that relies to a large extent on operator experience and instruction.		

10.2. Coil coating

EN 1396:2015		Aluminium and aluminium alloys - Coil coated sheet and strip for general applications - Specifications
This European Standard specifies the particular requirements for wrought aluminium and wrought aluminium alloys in the form of coil coated sheet and strip for general applications. This product is generally supplied in thicknesses up to 3,0 mm. It applies to cold-rolled aluminium and aluminium alloy strip coated by the coil coating process, either in the final width or slit afterwards, and to sheet obtained from such strip. It does not apply to coil coated sheet and strip used for special applications such as cans, closures and lids which are dealt with in separate EN 541.		

11. Chemical analysis and test methods

EN 1669:1996		Aluminium and aluminium alloys - Test methods - Earing test for sheet and strip
This standard specifies the method for determining the ear height of sheet and strip of nominal thicknesses from 0,08 mm to 6 mm after deep drawing.		

EN 14242:2004	Under revision	Aluminium and aluminium alloys - Chemical analysis - Inductively coupled plasma optical emission spectral analysis
This document specifies the inductively coupled plasma optical emission spectral analysis (ICP-OES) of aluminium and aluminium alloys. This method is applicable to the determination of silicon, iron, copper, manganese, magnesium, chromium, nickel, zinc, titanium, gallium, vanadium, beryllium, bismuth, calcium, cadmium, cobalt, lithium, sodium, lead, antimony, tin, strontium, and zirconium in aluminium and aluminium alloys. NOTE The national safety instructions should be taken into consideration.		

EN 14361:2004	Under revision	Aluminium and aluminium alloys - Chemical analysis - Sampling from metal melts
This document specifies criteria for sampling and gives guidance on the sampling from melts in order to verify if the chemical composition of the product fabricated from a metal melt is in conformance with the specification. NOTE For sampling from product or laboratory samples see EN 14242 or prEN 14726.		

EN 14726:2019	Revised standard	Aluminium and aluminium alloys - Chemical analysis - Guideline for spark optical emission spectrometric analysis
This document describes the criteria and the procedure for analysing aluminium and aluminium alloys with spark optical emission spectrometry (S-OES). The scope of this document covers the following: - sample preparation; - operational guidelines for an optical emission spectrometer (including maintenance); - traceability of the analytical results to the International System of units: mass (kg); - assessing the uncertainty associated with each analytical result. This document refers to simultaneous spark emission spectrometers for the analysis of solid samples. It applies to the determination of silicon, iron, copper, manganese, magnesium, chromium, nickel, zinc, titanium, boron, gallium, vanadium, beryllium, bismuth, calcium, cadmium, cobalt, lithium, sodium, phosphorus, lead, antimony, tin, strontium and zirconium in aluminium and aluminium alloys. Elements other than those listed above may be analysed on the condition that: a) suitable reference materials are available; and b) the instrument is suitably calibrated and equipped. In the case of determining mercury, for compliance purposes an alternate method with a limit of quantification < 0,000 1 % is recommended as its detection is compromised by intense iron interference at 253,65 nm. The test result obtained from a spark optical emission spectrometer generally concerns an amount of less than one milligram per spark spot. The result can be used to refer to the laboratory test sample, to the aluminium or aluminium alloy melt or to the cast product.		

12. Liquid metal, master alloys, ingots and castings

EN 486:2009		Aluminium and aluminium alloys - Extrusion ingots - Specifications
This European Standard specifies the general requirements to be met by extrusion ingots of aluminium and aluminium alloys obtained by semi-continuous or continuous casting, from primary or recycled metal, for general engineering applications.		

EN 487:2009		Aluminium and aluminium alloys - Rolling ingots – Specifications
This European Standard specifies the general requirements to be met by rolling ingots of aluminium or aluminium alloys obtained by semi-continuous vertical casting.		

EN 575:1995		Aluminium and aluminium alloys - Master alloys produced by melting - Specifications
This European Standard specifies the requirements for grades of master alloys produced by melting and intended for addition to a melt to adjust composition and/or to control impurities and/or to control the as-cast structure. It specifies the classification and designation applicable to these grades, the conditions in which they are produced, their properties and the marks by which they are identified.		

EN 576:2003		Aluminium and aluminium alloys - Unalloyed aluminium ingots for remelting - Specifications
This European Standard specifies the requirements for grades of unalloyed aluminium in the form of ingots for remelting. It specifies the designations for these grades, the conditions in which they are produced, their properties and the marks by which they are identified.		

EN 577:1995		Aluminium and aluminium alloys - Liquid metal - Specifications
This European Standard specifies the requirements for the delivery in liquid metal of unalloyed aluminium or aluminium alloys.		

EN 1676:2020	Revised standard	Aluminium and aluminium alloys - Alloyed ingots for remelting - Specifications
This European Standard defines the requirements for grades of alloyed aluminium ingots intended for re-melting. It specifies the classifications and designations applicable to these grades, the conditions in which they are produced, their properties and the marks by which they are identified.		

EN 1706:2020	Revised standard	Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties
preparation of an Amendment		
This European Standard specifies the chemical composition limits for aluminium casting alloys and mechanical properties of separately cast test pieces for these alloys. Annex B is included as a guide to the selection of alloys for a specific use or process. This European Standard is intended to be used in conjunction with EN 576, EN 1559-1, EN 1559-4, EN 1676 and EN ISO 8062-3.		

EN 1559-4:2015		Founding - Technical conditions of delivery - Part 4: Additional requirements for aluminium alloy castings
This part of EN 1559 specifies the additional technical conditions for delivery of aluminium alloy castings unless other technical delivery conditions have been agreed at the time of acceptance of the order. This standard denotes clauses specific to aluminium alloy castings under existing or new headings and retains the same structure and numbering system as used in EN 1559-1. It repeats the numbering of clauses and sub-clauses even if nothing extra or different has been added. (This standard is managed by CEN/TC 190.)		

CEN/TR 16749:2014		Aluminium and aluminium alloys - Classification of defects and imperfections in high Pressure, Low Pressure and Gravity Die Cast Products
This Technical Report specifies the classification of the defects and imperfections may be present in cast products manufactured by high pressure, low pressure and gravity die casting of aluminium alloys.		

CEN/TR 16748:2014		Aluminium and aluminium alloys - Mechanical potential of Al-Si alloys for high pressure, low pressure and gravity die casting
This Technical Report presents the characteristics of reference dies and reference castings, to be used for evaluating the mechanical potential (in terms of Ultimate Tensile Strength, Yield Strength and Elongation) which can be expected by Al-Si based alloys, cast by high pressure, low pressure and gravity (permanent mould) processes. These properties are measured on separately cast test specimens produced with state-of-the-art knowledge on die design, process management and alloy treatments correctly applied to minimize defects and imperfections.		

13. Scrap

EN 13920-1:2003		Aluminium and aluminium alloys - Scrap - Part 1: General requirements, sampling and tests
This European Standard specifies general requirements and guidelines for the delivery and classification of the different categories of aluminium scrap, including quality requirements, sampling and tests. This standard is referred to in Council Regulation (EU) No 333/2011, establishing criteria determining when certain types of scrap metal cease to be waste. NOTE Special requirements and guidelines for each of the scrap categories are specified in EN 13920-2 to EN 13920-16.		

EN 13920-2:2003		Aluminium and aluminium alloys - Scrap - Part 2: Unalloyed aluminium scrap
This European Standard specifies characteristics, chemical composition and metal yield of unalloyed aluminium scrap with a chemical composition of not less than 99,5 % aluminium. EXAMPLE Production scrap from sheet, strip, tube etc. where unalloyed aluminium is used. New and old scrap from lithographic sheet. Old scrap from various products selected to meet the specifications of this standard.		

EN 13920-3:2003		Aluminium and aluminium alloys - Scrap - Part 3: Wire and cable scrap
This European Standard specifies characteristics, chemical composition and metal yield of new and old scrap recovered from wire or cable of unalloyed aluminium with a chemical composition not less than 99,5 % aluminium, or of defined aluminium alloys. EXAMPLE New scrap from manufacturing of cables and wires. Old scrap from used aluminium cables obtained from dismantling of electrical lines.		

EN 13920-4:2003		Aluminium and aluminium alloys - Scrap - Part 4: Scrap consisting of one single wrought alloy
This European Standard specifies characteristics chemical composition and metal yield of scrap consisting of one single wrought aluminium alloy. EXAMPLE Production scrap of sheet, strip, tubes, extruded or drawn profiles, ends of extrusion ingots etc. It does not apply to turnings which are covered by EN 13920-12.		

EN 13920-5:2003		Aluminium and aluminium alloys - Scrap - Part 5: Scrap consisting of two or more wrought alloys of the same series
This European Standard specifies characteristics chemical composition and metal yield of aluminium scrap consisting of a mix of pieces obtained from two or more wrought aluminium alloys of the same series. EXAMPLE Cuttings of sheet, strip and tube, extruded profiles, defective aluminium products. Old selected scrap.		

EN 13920-6:2003		Aluminium and aluminium alloys - Scrap - Part 6: Scrap consisting of two or more wrought alloys
This European Standard specifies characteristics chemical composition and metal yield of aluminium scrap (predominantly old scrap) consisting of two or more wrought aluminium alloys. EXAMPLE Mix of used pots and pans, TV antennas, road signals, car-plates, window frames and other end-of-life aluminium objects. Scrap from demolition of buildings.		

EN 13920-7:2003		Aluminium and aluminium alloys - Scrap - Part 7: Scrap consisting of castings
This European Standard specifies characteristics, chemical composition and metal yield of aluminium scrap consisting of aluminium castings in entire or fragmented pieces. EXAMPLE Production scrap from foundries, e.g. rejected pieces and risings. Collected castings of various alloys e.g. from maintenance or dismantling of vehicles, household appliances, industrial machinery etc. Selected whole castings, e.g. pistons, wheels.		

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
This European Standard specifies requirements for aluminium-containing shredded material mixed with other metals and non-metallic components (rubber, plastic, glass etc.) produced by shredding end-of-life vehicles, household appliances, etc. It is applicable to material intended for further preparation/selection processes by the user to get the aluminium scrap separated from other foreign materials. The separated fraction of aluminium scrap is described in EN 13920-9.		

EN 13920-9:2003		Aluminium and aluminium alloys - Scrap - Part 9: Scrap from aluminium separation processes of non-ferrous shredded materials
This European Standard specifies the characteristics, chemical composition and metal yield of the aluminium scrap fraction obtained by flotation or other separation processes of non-ferrous shredded materials. It applies to scrap consisting mainly of aluminium castings, but also containing aluminium scrap from wrought products. EXAMPLE The aluminium fraction as obtained by flotation of the material specified in EN 13920-8.		

EN 13920-10:2003		Aluminium and aluminium alloys - Scrap - Part 10: Scrap consisting of used aluminium beverage cans
This European Standard specifies characteristics, form, chemical composition and metal yield of scrap consisting of used aluminium beverage cans (UBC). Complete cans, after removal of the liquid content, even if not obtained from post-consumer collection schemes, are within the scope of this standard and are also regarded as UBC.		

EN 13920-11:2003		Aluminium and aluminium alloys - Scrap - Part 11: Scrap consisting of aluminium-copper radiators
This European Standard specifies characteristics and chemical composition of scrap consisting of aluminium-copper radiators with a copper content sufficiently high to allow its use as alloying material in the production of aluminium alloys. EXAMPLE Prepared radiators from vehicles, refrigerators or from other industrial equipment.		

EN 13920-12:2003		Aluminium and aluminium alloys - Scrap - Part 12: Turnings consisting of one single alloy
This European Standard specifies characteristics, chemical composition and metal yield of scrap which consists of aluminium turnings of one single wrought (EN 573-3) or cast (EN 1706) specified alloy. EXAMPLE Scalpings, millings, borings from plates, extruded profiles, castings, etc.		

EN 13920-13:2003		Aluminium and aluminium alloys - Scrap - Part 13: Mixed turnings consisting of two or more alloys
This European Standard specifies characteristics, chemical composition and metal yield of aluminium scrap in the form of turnings consisting of two or more alloys. EXAMPLE Scalpings, millings, borings from plates, extruded profiles, castings etc.		

EN 13920-14:2003		Aluminium and aluminium alloys - Scrap - Part 14: Scrap from post-consumer aluminium packaging
This European Standard specifies characteristics, form, chemical composition and metal yield of scrap consisting of a mixture of used aluminium packaging. This mixture includes aluminium foil laminated with paper or plastics having a metal yield less than 28 %. EXAMPLE Mix of pet food containers and lids, food cans, semi-rigid containers such as those used for catering, domestic use or distribution, wrapping aluminium foil for household or commercial applications, beverage containers, yoghurt lids, spray containers, bottle caps, coffee pouches, etc.		

EN 13920-15:2003		Aluminium and aluminium alloys - Scrap - Part 15: De-coated aluminium scrap from post-consumer aluminium packaging
This European Standard specifies characteristics, chemical composition and metal yield of de-coated aluminium scrap obtained by de-coating mixed used aluminium packaging through various processes, e.g. pyrolysis, mechanical delamination, chemical delamination or a combination of these. It also applies to aluminium scrap separated from the bottom ashes of incinerators. EXAMPLE A mix of used aluminium packaging scrap of different alloys which were de-coated to be used for melting or other forms of metal recycling.		

EN 13920-16:2003		Aluminium and aluminium alloys - Scrap - Part 16: Scrap consisting of skimmings, drosses, spills and metallics
This European Standard specifies characteristics, chemical composition and metal yield of aluminium scrap consisting of skimmings, drosses and spills. It also applies to the metallics obtained by dry processing of drosses and skimmings. Full lots of dross fines with a particle size smaller than 0,8 mm, or lots of drosses with a metal yield less than 30 % are not within the scope of this Standard.		

14. Disclaimer

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