



Glossary of

**Terms used in the
wrought aluminium industry**

Lexique des termes utilisés dans l'industrie de l'aluminium corroyé

Lexikon der Begriffe für die Schmiedaluminiumindustrie

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Foreword

This British Standard Glossary of terms generally accepted and used in connection with the manufacture of wrought aluminium products is a revision of BS 3660 : 1963, and is based on a draft prepared by a committee set up by the aluminium industry. The revised glossary reflects changes in terminology that have occurred since 1963 and also takes account of definitions proposed by the International Organization for Standardization (ISO) and the Association Européenne des Constructeurs de Matériel Aérospatial.

In this new edition of the glossary, all terms have been arranged in alphabetical order. When two or more synonymous terms are in use, the preferred term is given first in bold type, the intention being that it shall gradually replace the non-preferred terms which are given in less prominent type. In cases where there are two or more synonymous preferred terms, all such terms are given in bold type.

Symbols used in the aluminium industry, together with meanings, are given in appendix A to this glossary.

British Standard Glossary of

Terms used in the wrought aluminium industry

Term	Definition
ageing	Hardening caused by the precipitation of a constituent from a super-saturated solid solution.
ageing, artificial	See <i>artificial ageing</i> .
ageing, delayed	See <i>delayed ageing</i> .
ageing, duplex	See <i>duplex ageing</i> .
ageing, natural	See <i>natural ageing</i> .
ageing, step	See <i>step ageing</i> .
all-over marking	A method of identifying sheet, plate and strip by printing at close intervals over the surface the name or symbol of the manufacturer, the relevant specification number and, in some cases, the temper and thickness of the material.
alloying element	An element intentionally introduced in controlled quantity into a base metal or an alloy.
aluminium, primary	See <i>primary aluminium</i> .
aluminium, refined	See <i>refined aluminium</i> .
aluminium, secondary	See <i>secondary aluminium</i> . NOTE. See also <i>secondary aluminium alloy</i> .
aluminium alloy	A metallic substance, consisting of an intentional admixture of elements, the predominant element being aluminium.
aluminium alloy, secondary	See <i>secondary aluminium alloy</i> . NOTE. See also <i>secondary aluminium</i> .
angle	The relative orientation of two adjacent faces of a section generally measured over the full length of both.
angle, draft	See <i>draft angle</i> .
angle, matching draft	See <i>matching draft angle</i> .
angle, natural draft	See <i>natural draft angle</i> .
annealing	Thermal treatment intended to soften a metal or alloy hardened by cold work or artificial ageing.
annealing, differential	See <i>differential annealing</i> .
annealing, flash	See <i>flash annealing</i> .
annealing, partial	See <i>partial annealing</i> .

Term	Definition
annealing, precipitation	See <i>precipitation annealing</i> .
annealing, recrystallization	See <i>recrystallization annealing</i> .
annealing, super	See <i>super annealing</i> .
anodizing	An electrochemical method of producing an integral oxide film on aluminium surfaces. The thickness and other film characteristics can be controlled to meet varied requirements for improved corrosion resistance, improved abrasion resistance, electrical insulation or as a pretreatment for subsequently applied coatings.
anodizing, architectural	See <i>architectural anodizing</i> .
anodizing, bright	See <i>bright anodizing</i> .
anodizing, colour	See <i>colour anodizing</i> .
anodizing, decorative	See <i>decorative anodizing</i> .
anodizing, hard	See <i>hard anodizing</i> .
anodizing, integral colour	See <i>integral colour anodizing</i> .
anodizing, protective	See <i>protective anodizing</i> .
anodizing quality material	Material with characteristics that make it suitable for decorative anodizing after suitable preliminary treatment.
anodizing test	A non-destructive test for detecting certain defects in material that is anodized and rinsed. If cracks or other superficial flaws are present in the material they retain some of the chromic acid solution which subsequently seeps out and stains the anodic film.
architectural anodizing	Anodizing to be used in permanent, interior, exterior and static situations where both attractive appearance and long life are essential.
arrested mandrel	A mandrel attached to an auxiliary extrusion ram. As the main ram moves forward the mandrel is held stationary in the die, resulting in a product of uniform wall thickness along the length.
artificial ageing precipitation treatment	Thermal treatment of an alloy that increases the hardness and strength by precipitation of constituents from the super-saturated solid solution at above room temperature.
as-quenched condition	The condition of an alloy during the time immediately following the quench and before the mechanical properties have been significantly raised by precipitation hardening.
back end defect extrusion defect	A longitudinal discontinuity in the extreme rear portion of an extruded product that is normally discarded.
back extrusion	A process in which a heated ingot in an enclosed container is extruded backwards over the mandrel and supporting stem.
bar	A round, rectangular or regular polygonal solid section supplied in straight lengths. The term is applied to materials of not less than 6 mm diameter or minor dimension.
barrelling tumbling	The treatment of articles in a rotating container in the presence of abrasives and water for deburring or to produce a variety of surface textures.
batch	Consignment, or a part thereof, comprising products of the same grade or alloy, temper and thickness or cross section, processed in the same manner.

Term	Definition
bend radius	The radius of curvature of the former around which a specimen is bent.
bend test	The bending of a specimen to conform with a predetermined radius and angle, to assess bending characteristics and ductility.
billet	See <i>ingot</i> .
billet, bored extrusion	See <i>bored extrusion ingot</i> .
billet, extrusion	See <i>extrusion ingot</i> .
billet, hollow extrusion	See <i>hollow extrusion ingot</i> .
bite mark	A mark on the roll coating caused by the initial feeding of the ingot, which is subsequently transferred to the hot rolled slab.
blank	A piece of metal prepared for subsequent fabrication by forming, bending, cupping, drawing, impact extrusion, pressing, etc.
blanking	The production of circles and other shapes by shearing on a blanking press.
blanking die	A die used for shearing circles and other blanks.
blanking press	A press used for shearing blanks from plate, sheet or strip.
blast cleaning grit blasting sand blasting shot blasting vapour blasting	The projection of abrasive grit, sand, small particles of steel, glass or other materials, or a mixture of abrasive grit, water and air, to strike the surface of an article in order to clean it. A matt or satin finish is produced, depending upon the particle size used.
blister	A raised area on the surface of the metal caused by the expansion of a gas enclosed in a sub-surface void.
blister, bond	See <i>bond blister</i> .
blister, coating	See <i>coating blister</i> .
blister, core	See <i>core blister</i> .
bolt stock	Round bar or wire suitable for the manufacture of bolts.
bond blister	A blister at the interface between the coating and the core of clad products.
bore test	A test on tube to verify freedom from constriction by passing a metallic bob or wire of specified dimensions through the tube.
bow	The deviation, in the form of an arc, of the longitudinal axis of a product.
bored extrusion billet	See <i>bored extrusion ingot</i> .
bored extrusion ingot bored extrusion billet	An extrusion ingot with a central longitudinal hole produced by machining.
brazing rod	Rod of an alloy with a low melting range for use as filler metal in brazing.
brazing sheet	Sheet of a low melting range alloy or clad with a low melting range alloy, used for brazing.
brazing strip	Strip of a low melting range alloy or clad with a low melting range alloy, used for brazing.
brazing wire	Wire of an alloy with a low melting range for use as filler metal in brazing.

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Term	Definition
breaking down	The initial hot-working operation whereby a heavy reduction is given to rolling ingot or cast forging stock.
bright anodizing	Anodizing with brightness as a primary objective.
brightening, chemical	See <i>chemical brightening</i> .
brightening, electrochemical	See <i>electrochemical brightening</i> .
buckle	Departure from flatness represented by alternate bulges and hollows along the length of a rolled product, the edges of which remain reasonably flat.
buffing	See <i>mechanical polishing</i> .
bull block	A machine for drawing rod, bar and tube in coil form through one die.
burr	A thin ridge of roughness on an edge left by a cutting operation such as slitting, trimming, shearing, blanking, sawing, etc.
busbars	Bar or section for use as a common junction between electrical circuits.
can stock sheet	See <i>container stock sheet</i> .
cast	Metal taken from the same melt in a furnace or crucible, or of several melts mixed in the same furnace or crucible before pouring, or metal taken from a furnace without subsequent addition (when a continuous melting process is used). In the case of continuous or semicontinuous casting procedures this is also regarded as the product of a cycle up to 24 h where the same alloy and shape is cast.
casting, chill	See <i>chill casting</i> .
casting, continuous	See <i>continuous casting</i> .
casting, direct chill	See <i>direct chill (DC) casting</i> .
casting, semicontinuous	See <i>semicontinuous casting</i> .
chatter marks	Regularly spaced superficial transverse markings produced by vibration between the metal and the working surface during fabrication.
chemical brightening	Chemical treatment to improve the specular reflectivity of a surface.
chemical conversion coating	Treatment of material with chemical solutions by dipping or spraying to increase the thickness of the natural oxide film on the surface or to build up an oxide film bearing chromates or phosphates.
chill casting	A process in which molten metal is poured into a permanent mould and solidified.
circle	A circular blank fabricated from plate, sheet or foil.
circumscribing circle	A circle that will just contain the cross section of an extrusion, usually designated by its diameter.
clad material	Material that has a thin layer of aluminium or aluminium alloy metallurgically bonded to it usually by rolling, extruding or drawing.
clipper die trimmer die	A die used for removing the flash from stampings and forgings.
clipping	The removal of the flash from drop stampings and pressings.
close-to-form forging	A die forging of such dimensional accuracy that subsequent machining is eliminated or reduced to a minimum.

Term	Definition
closed die	Forging dies, usually in pairs, into which impressions have been cut to impart the required shape.
coating blister	A blister in the coating of a clad product.
coining	A final cold forging operation applied to obtain close tolerances.
cold compression	Working of forged material at room temperature under compression through the thickness in the solution treated condition immediately after quenching to relieve internal stresses caused by quenching, and to minimize distortion during machining.
cold working work hardening strain hardening	Modification of a metal structure by working at room temperature or moderate temperatures, resulting in an increase in strength and hardness with a general loss of ductility.
colour anodizing	Incorporation of colouring matter either during anodizing or by subsequent processing into the film of anodized aluminium.
concavity	An inward curvature across the width of a surface of a rolled or extruded product.
concentricity	Uniformity of wall thickness throughout the cross section of a tube. The tolerance on concentricity is established by the wall thickness tolerance.
conductor wire	Wire possessing the requisite electrical and mechanical properties for use as an electrical conductor.
conduit tube	Drawn, extruded or welded tube intended for encasing insulated electrical wiring.
container	A hollow cylinder in an extrusion press from which the ingot is extruded.
container stock sheet can stock sheet	Thin sheet used for the fabrication of packaging containers and closures by pressing or forming operations.
continuous casting	A process in which liquid metal is solidified rapidly in a water-cooled mould or die and continuously withdrawn and cut while the mould is being simultaneously replenished with liquid metal.
control bar	A forged test bar in a given alloy, of known response to heat treatment, that is included in a furnace load to check the effectiveness of the heat treatment operation.
controlled atmosphere	An atmosphere in which the concentration, temperature and pressure of constituents are maintained within controlled limits so as to minimize (or more rarely induce) certain reactions between the atmosphere and the material treated, e.g. oxidation.
controlled stretching	Stretching to effect a specified extension (percentage permanent set) in order to relieve internal stress and to minimize distortion during machining.
convexity	An outward curvature across the width of a surface of a rolled or extruded product.
cooling curve	A curve showing the relationship between time and temperature during the cooling of a metal.
core blister	A blister in the core of clad material.
corner radius	The radius of an arc to which adjacent sides of a product are tangential.
corrosion	The deterioration of a metal by chemical or electrochemical reaction with its environment.

Term	Definition
corrosion, intercrystalline	See <i>intercrystalline corrosion</i> .
corrosion, intergranular	See <i>intercrystalline corrosion</i> .
corrosion, pitting	See <i>pitting corrosion</i> .
corrosion, stress	See <i>stress corrosion</i> .
corrugated sheet, general purpose	See <i>general purpose corrugated sheet</i> .
corrugated sheet, troughed type A	See <i>troughed type A corrugated sheet</i> .
corrugated sheet, troughed type B	See <i>troughed type B corrugated sheet</i> .
critical quenching rate	The minimum mean cooling rate from solution treatment temperature necessary to enable an alloy to meet specified mechanical property requirements in the precipitation hardened condition.
critical strain, lower	See <i>lower critical strain</i> .
critical strain, upper	See <i>upper critical strain</i> .
cropping	The removal, by shearing or sawing, of the ends of cast or semifabricated products at an intermediate stage of processing.
crown	The difference in thickness between one edge and the centre of a rolled product.
cut-up test	A destructive test carried out on forgings to verify details of the grain flow and mechanical properties in various positions in the forgings.
decking corrugated sheet	Formed sheet, usually of asymmetrical profile, having narrow, steep-sided troughs interspaced with wide flats.
deep drawing	The forming of deeply recessed parts by means of plastic deformation of the material.
deep drawing sheet	Specially produced sheet with characteristics that make it suitable for deep drawing.
deep drawing strip	Specially produced strip with characteristics that make it suitable for deep drawing.
degreasing	The removal of oil or grease, usually by a suitable organic solvent or an aqueous detergent.
delayed age hardening	See <i>delayed ageing</i> .
delayed ageing delayed age hardening	Natural ageing delayed by keeping an alloy at a temperature below room temperature. After returning to room temperature the natural ageing process continues normally.
desensitization	Heating for a relatively long period at a temperature generally above 200 °C, applied to certain non-heat treatable alloys in order to reduce their susceptibility to stress corrosion.
detwisting	An operation designed to remove torsional deviations from the transverse axis along the length of an extrusion.
die, blanking	See <i>blanking die</i> .
die, clipper	See <i>clipper die</i> .

Term	Definition
die, closed	See <i>closed die</i> .
die, drawing	See <i>drawing die</i> .
die, extrusion	See <i>extrusion die</i> .
die, finishing	See <i>finishing die</i> .
die, moulding	See <i>moulding die</i> .
die, multi-hole	See <i>multi-hole die</i> .
die, open	See <i>open die</i> .
die, preforming	See <i>preforming die</i> .
die, porthole	See <i>porthole die</i> .
die, single-hole	See <i>single-hole die</i> .
die, swageing	See <i>swageing die</i> .
die, turks head	See <i>turks head die</i> .
die forging	A forging shaped by working in closed dies.
die lines	Continuous longitudinal lines formed on extruded or drawn products by minor irregularities on the bearing surfaces of the die.
die scores	Relatively deep continuous longitudinal lines on extruded or drawn products caused by the build-up of aluminium on the bearing surface of the die.
differential annealing	The heating of blanks so that the peripheral annulus or other specified parts only are annealed.
diffusion in clad material	Diffusion of the alloying constituents from the core to the cladding during thermal treatment.
diffusion staining	Patchy discoloration that may arise from diffusion in clad material.
dimensional tolerance	An allowable amount of deviation from a specified geometrical characteristic.
direct chill (DC) casting	A casting technique in which the metal is solidified in a water-cooled open-ended mould from the bottom of which water is directly applied to the emerging ingot.
direct extrusion	A process in which an ingot in the container is forced under pressure through an aperture in a stationary die.
directional properties	The mechanical properties of a product in various directions with respect to the grain flow.
dished edges	Departure from flatness associated with edge distortion during shearing, slitting or blanking.
double skin	A thin surface layer separated from the parent material by a film of oxide or other foreign matter and originating during extrusion, sometimes described as a sub-surface defect.
draft angle	Taper on the sides of die impressions and forgings to facilitate removal of the forgings from the die.
draw bench	A machine for drawing bar, rod, sections and tubing in straight lengths.