

Aluminium and aluminium alloys — Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 —

Part 1: Technical conditions for inspection and delivery

The European Standard EN 12020-1:2001 has the status of a
British Standard

ICS 77.150.10

National foreword

This British Standard is the official English language version of EN 12020-1:2001. Together with the standards listed in the following table, it supersedes BS 1474:1987 which is withdrawn.

This part of BS EN 12020 is published together with:

- BS EN 755-9, *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Part 9: Profiles, tolerances on dimensions and form*;
- BS EN 12020-2, *Aluminium and aluminium alloys — Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 — Part 2: Tolerances on dimensions and form*.

The following table gives the full list of implemented European Standards which supersede BS 1474:1987.

Superseded British Standard	Superseding European Standards
BS 1474:1987	BS EN 515:1993, BS EN 573-3:1995, BS EN 573-4:1995, BS EN 755-1:1997, BS EN 755-2:1997, BS EN 755-3:1996, BS EN 755-4:1996, BS EN 755-5:1996, BS EN 755-6:1996, BS EN 755-7:1998, BS EN 755-8:1998, BS EN 755-9:2001, BS EN 12020-1:2001, BS EN 12020-2:2001

The UK participation in its preparation was entrusted by Technical Committee NFE/35, Light metals and their alloys, to Subcommittee NFE/35/5, Wrought aluminium and aluminium alloys, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 June 2001

Summary of pages

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

Aluminium et alliages d'aluminium — Profilés de précision
filés en alliages EN AW-6060 et EN AW-6063 — Partie 1:
Conditions techniques de contrôle et de livraison

Aluminium und Aluminiumlegierungen — Stranggepresste
Präzisionsprofile aus Legierungen EN AW-6060 und EN
AW-6063 — Teil 1: Technische Lieferbedingungen

This European Standard was approved by CEN on 18 February 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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Contents

	Page
Foreword	3
1 Scope	4
2 Normative references	5
3 Terms and definitions	6
4 Orders or tenders	6
4.1 General	6
4.2 Reference to a drawing	7
5 Requirements	7
5.1 Production and manufacturing processes	7
5.2 Quality control	7
5.3 Chemical composition	7
5.4 Mechanical properties	7
5.5 Freedom from surface defects	8
5.6 Tolerances on dimensions and form	8
6 Test procedures	8
6.1 Sampling	8
6.2 Test methods	8
7 Inspection documents	9
8 Marking of products	9
9 Packaging	9
10 Arbitration	9
Annex A (normative) Designations and definitions of surface pretreatments	10
Bibliography	11

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 132, Aluminium and aluminium alloys, the Secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2001, and conflicting national standards shall be withdrawn at the latest by October 2001.

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG5, Extruded and drawn products, to prepare the following standard:

- *EN 12020-1, 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 standard is part of a set of two standards. The other standard deals with:

- *EN 12020-2, Aluminium and aluminium alloys — Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 — Part 2: Tolerances on dimensions and form.*

Annex A is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This part of EN 12020 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). 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 300 mm;
- they are made to closer tolerances on dimensions and form.

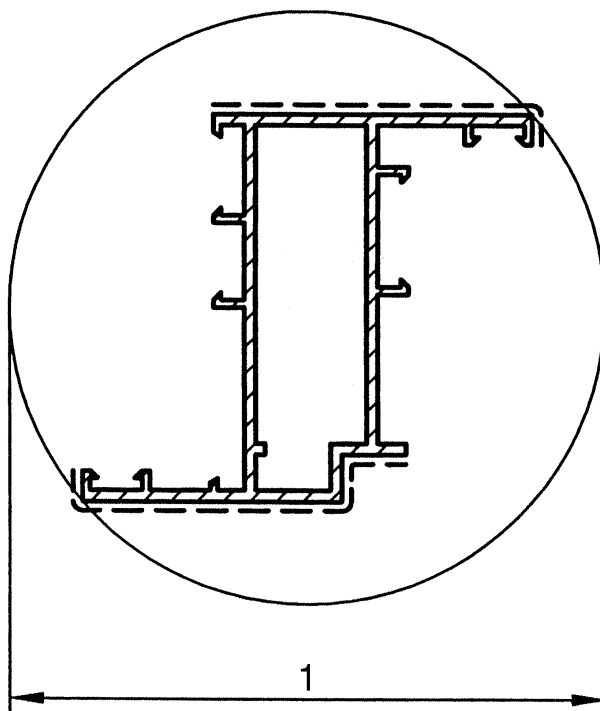
In the case of profiles which, due to the complexity of their design, are difficult to manufacture and specify, special agreements between purchaser and manufacturer may need to be reached.

NOTE 1 The thermal barrier material is not covered by this standard.

NOTE 2 Some of the products listed in the present standard can be subject to patent or patent applications, and their listing herein does not in any way imply the granting of a license under such patent right.

CEN/TC 132 affirms it is its policy that in the case when a patentee refuses to grant licenses on standardized standards products under reasonable and not discriminatory conditions then this product shall be removed from the corresponding standard.

Dimensions in millimetres

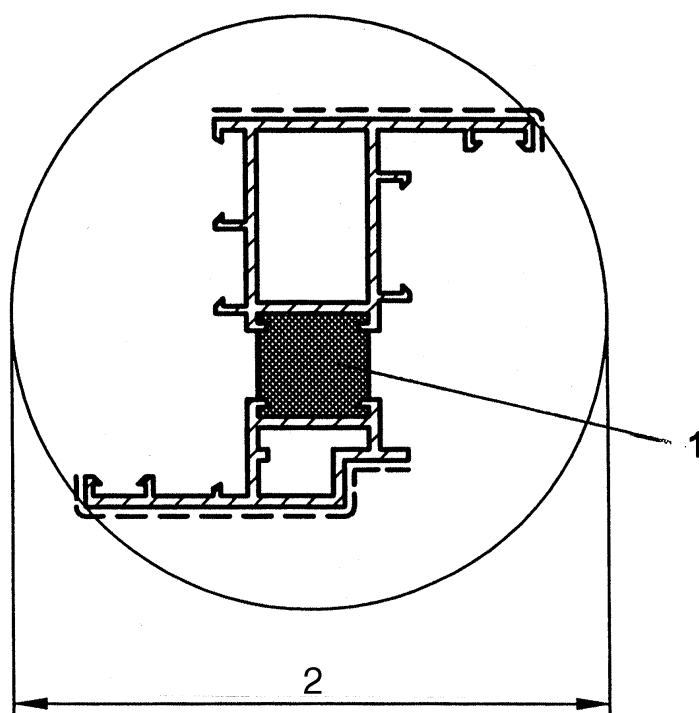


Key

- 1 *CD* max. 300

Figure 1 — Profile without thermal barrier

Dimensions in millimetres



Key

- 1 thermal barrier
- 2 CD max. 300

Figure 2 — Profile with thermal barrier

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 515, *Aluminium and aluminium alloys — Wrought products — Temper designations.*

EN 573-3, *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Part 3: Chemical composition.*

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

EN 755-2, *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Part 2: Mechanical properties.*

EN 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test (at ambient temperature).*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1 :1999).*

EN 10204, *Metallic products — Types of inspection documents.*

EN 12258-1, *Aluminium and aluminium alloys — Terms and definitions — Part 1: General terms.*

EN 12020-2, *Aluminium and aluminium alloys — Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 — Part 2: Tolerances on dimensions and form.*

3 Terms and definitions

For the purposes of this part of this European Standard, the terms and definitions given in EN 12258-1 apply.

4 Orders or tenders

4.1 General

The order or tender shall define the product required and shall contain the following information:

- a) the designation of the aluminium alloy as specified in EN 573-3;
- b) the temper of the material for delivery as specified in EN 515;
- c) the application, in particular when surface treatment is intended; this shall be expressly stated on the order (see annex A);
- d) the number of this European Standard or, if not appropriate, the properties agreed between purchaser and supplier;
- e) reference to a drawing defining the product (see 4.2), cross-sectional dimensions, surface requirements and any other relevant information;
- f) length¹⁾:
 - fixed or random;
 - for random lengths minimum and maximum shall be specified;
- g) quantity:
 - weight or number of pieces or total length;
 - tolerance on quantity;
- h) special requirements:
 - any special requirements agreed between the purchaser and supplier;
 - any requirement for inspection documents;
 - marking of products;
 - reference to other standards, if tolerances on dimensions and form differ from this standard;
 - additional or special testing;
 - installation length;
 - surface protection;

1) An allowance for process contact points may be necessary.

- i) packaging information:
 - pack weight/size.

4.2 Reference to a drawing

On the basis of the order documentation submitted, the manufacturer shall prepare drawings which are to be checked by the purchaser for accuracy and approved, the profiles then being manufactured in strict accordance with the approved drawing.

If for dimensions critical to function tolerances other than those specified in this standard are to be used, they shall be entered in the drawing adjacent to the associated nominal size. This also applies to the tolerances on form.

Where profiles are intended for later assembly, it is recommended that the manufacturer is provided with a drawing giving appropriate details.

Where for manufacturing reasons seams are to be located on visible surfaces, their position shall be indicated by the manufacturer on the drawing.

Visible surfaces shall be identified, indicating main and, if necessary, secondary order visible surfaces.

For profiles to be surface treated, surfaces and areas that are to be so treated is indicated on the drawing.

If the outline of a profile is modified by machining, it is recommended that the final shape is indicated.

5 Requirements

5.1 Production and manufacturing processes

Unless otherwise specified in the order, the production and manufacturing processes shall be left to the discretion of the producer. Unless it is explicitly stated in the order, no obligation shall be placed on the producer to use the same processes for subsequent or similar orders.

5.2 Quality control

The supplier shall be responsible for the performance of all inspection and tests required by the relevant European Standard and/or the particular specification prior to shipment of the product. If the purchaser wishes to inspect the product at the supplier's works, he shall notify the supplier at the time of placing the order.

5.3 Chemical composition

The chemical composition shall comply with the requirements of EN 573-3.

If the purchaser requires special limits for elements not specified in the above standard, these limits shall be stated on the order and after agreement between purchaser and supplier.

5.4 Mechanical properties

The mechanical properties shall comply with the requirements of EN 755-2 or those agreed between purchaser and supplier and stated on the order.

Hardness testing may be used for release purposes subject to agreement between purchaser and supplier.

5.5 Freedom from surface defects

The extruded surface shall be free from defects prejudicial to its suitable and proper use. Slight scoring and other minor defects are permissible providing that an R_z of 9 μm and R_a of 3 μm are not exceeded. Any discoloration or minor blemishes that are likely to be eliminated by the intended pretreatment for anodizing or by painting shall be permitted (see annex A).

NOTE The definitions given in annex A can differ from those specified in EN 12373-1 [1].

5.6 Tolerances on dimensions and form

Tolerances on dimensions and form shall be as specified in EN 12020-2.

6 Test procedures

6.1 Sampling

6.1.1 Chemical analysis

The specimens for chemical analysis shall be taken at the time of casting. Their shape and conditions of production (mould design, cooling rate, mass, etc.) shall be so designed that their composition is homogeneous and appropriate to the method of analysis.

6.1.2 Mechanical properties

Specimens shall be taken from each sample according to EN 755-1.

If required, test pieces for tensile testing shall be prepared according to EN 755-1.

6.2 Test methods

6.2.1 Chemical composition

Methods of analysis shall be at the discretion of the supplier. In case of dispute concerning the chemical composition, referee analysis shall be carried out by methods subject to agreement between purchaser and supplier. The results obtained shall be accepted by both parties.

6.2.2 Hardness testing

Hardness tests should be carried out in accordance with EN ISO 6506-1. Alternative hardness methods may be used subject to agreement between purchaser and supplier (e.g. Webster testing).

6.2.3 Tensile testing

If a tensile test is specifically required by the purchaser, the tensile test shall be carried out in accordance with EN 10002-1.

6.2.4 Measurement of dimensions

The dimensions shall be measured by means of measuring instruments which are of appropriate accuracy to the dimensions and dimensional tolerances required. All dimensions shall be checked at the ambient temperature of the workshop, laboratory, or in case of dispute, at a temperature between 15 °C and 25 °C.

6.2.5 Surface finish

Unless otherwise specified, examination of surface appearance shall be carried out visually without the assistance of magnifying apparatus on products (see annex A).

For products intended for surface treatments, e.g. anodizing, it can be necessary to carry out an appropriate test. The frequency and the method of the test shall be agreed between purchaser and supplier (see annex A).

7 Inspection documents

When requested by the purchaser and agreed upon by the supplier, the supplier shall provide the appropriate inspection document in accordance with EN 10204.

8 Marking of products

Marking of products shall be undertaken when specified in the standard or when agreed upon between purchaser and supplier and stated on the order. This marking shall not adversely affect the final use of the product. The detail of information required in the marking shall be subject to agreement between purchaser and supplier.

9 Packaging

Unless otherwise specified the method of packaging shall be determined by the supplier, who shall take all necessary precautions to ensure that, under the usual conditions of transportation, the product will be delivered in a condition suitable for use.

The product for delivery will not normally be treated with a corrosion preventative. If this is required, it shall be specified on the order and agreed with the supplier. The type of corrosion preventative used shall also be subject to agreement between purchaser and supplier.

10 Arbitration

In cases of dispute concerning conformity with the requirements of this European Standard or specification cited on the order before, rejecting the products, testing and examination shall be carried out by an arbitrator chosen by mutual agreement between purchaser and supplier.

The arbitrator's decision shall be final.

Annex A **(normative)**

Designations and definitions of surface pretreatments

P0 pretreatment: Any pretreatment without significant removal of material from the surface.

This pretreatment includes degreasing and slight etching to remove the oxide skin. The surface structure caused by extrusion is not changed. Grooves, small scratch marks and other defects remain visible. Corroded areas of the surface can be made visible by P0 pretreatment followed by anodizing.

P1 pretreatment: Surface pretreatment by grinding.

By grinding, a relatively uniform surface of a slightly matt appearance is formed. Surface defects, if any exist, are removed to a large degree. According to the size of the grinding grit, fine or coarse grooves may be visible.

P2 pretreatment: Surface pretreatment by brushing.

By brushing, a uniform bright surface is formed (compared to P1). On a typical brushed surface brush lines will be visible. Grooves, scratches, scores etc, are only partially removed.

P3 pretreatment: Surface pretreatment by buffing.

By buffing, a bright surface is formed. Grooves, scratch marks, scores are only removed to a small extent. The metal flow pattern on profiles may be made visible by this pretreatment.

P4 pretreatment: Surface pretreatment by grinding and brushing.

By grinding and brushing a uniform, clear surface is obtained. Grooves, scratch marks, scores and other surface defects, especially corroded parts of the surface which become visible after P0 or P6 pretreatment followed by anodizing, are removed.

P5 pretreatment: Surface pretreatment by grinding and buffing.

By grinding and buffing, a uniform, bright surface is obtained. Grooves, scratch marks, scores and other surface defects, especially corroded parts of the surface which become visible after a P0 or P6 pretreatment followed by anodizing, are removed.

P6 pretreatment: Surface pretreatment by a special type of etching.

By degreasing and etching in a special etching bath a satin or matt finish is obtained. Allowable slight grooves or roughness resulting from the fabrication process cannot be completely removed by this process, but can be reduced to a large degree. Corroded areas, if present, which affect the decorative appearance and are difficult to detect before etching, can be made visible by this treatment. These corroded areas, however, can be removed by an additional mechanical pretreatment. For profiles intended to be P6 pretreated, special measures for corrosion protection may be considered necessary.

Bibliography

- [1] EN 12373-1, *Aluminium and aluminium alloys — Anodizing — Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium.*

BSI — British Standards Institution

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