BRITISH STANDARD

BS EN
12020-1:2008

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

Part 1: Technical conditions for inspection and delivery

ICS 77.150.10

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 12020-1:2008. It supersedes BS EN 12020-1:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee NFE/35, Light metals and their alloys.

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

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

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Foreword

This document (EN 12020-1:2008) 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

This document supersedes EN 12020-1:2001.

Within its programme of work, Technical committee CEN/TC 132 entrusted CEN/TC 132/WG 5 "*Extruded and drawn products*" to revise EN 12020-1:2001

The following technical modifications have been introduced during the revision:

— Clause 3: Definition of "order document" is included

— Subclause 4.2: An additional Figure 3 is included identifying visible surfaces and weld lines

— Subclause 5.5: Requirements to streaks and surface texture appearance on visible surfaces in mill finish are included

— Subclause 5.7: Requirements to tolerance on mass are included

EN 12020 comprises the following parts under the general title "*Aluminium and aluminium alloys — Extruded precision profiles in alloys EN AW-6060 and EN AW-6063*":

— *Part 1: Technical conditions for inspection and delivery*

— *Part 2: Tolerances on dimensions and form*

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1 Scope

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;

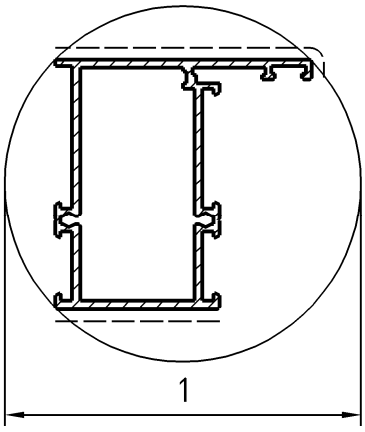
— they meet more stringent requirements regarding the surface condition of visible surfaces;

— 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.

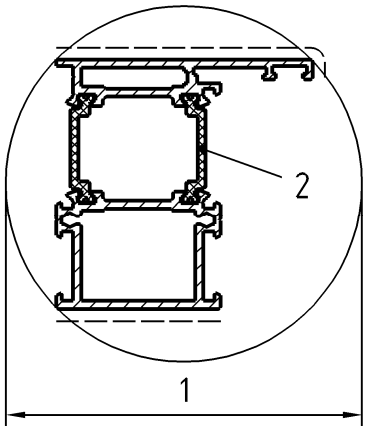
NOTE The effect of the thermal barrier material on the dimensional tolerances is covered by EN 12020-2 although the actual thermal barrier material itself is not (see EN 14024).



Key

1 *CD* maximum 350 mm

Figure 1 — Profile without thermal barrier



Key

1 *CD* maximum 350 mm
2 thermal barriers

Figure 2 — Profile containing thermal barrier

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references only the edition cited applies. For undated references the latest edition of the referenced document (including any amendments) applies.

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 and form of products*

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 10204, *Metallic products — Types of inspection documents*

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*

EN 12206-1, *Paints and varnishes — Coating of aluminium and aluminium alloys for architectural purposes — Part 1: Coatings prepared from coating powder*

EN 12258-1:1998, *Aluminium and aluminium alloys — Terms and definitions — Part 1: General terms*

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

EN 14242, *Aluminium and aluminium alloys — Chemical analysis — Inductively coupled plasma optical emission spectral analysis*

EN 14361, *Aluminium and Aluminium alloys — Chemical analysis — Sampling from metal melts*

EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997)*

EN ISO 4288, *Geometrical product specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture (ISO 4288:1996)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12258-1:1998 and the following apply.

3.1
order document
document or set of documents agreed between supplier and purchaser at the time of ordering

4 Ordering information

4.1 General

The order document shall contain the following:

a) the designation of the aluminium alloy (EN AW-6060 or EN AW-6063);

b) the temper of the material for delivery in accordance with EN 755-2 (The temper designations to be used are according to EN 515);

c) the application, in particular, when surface treatment is intended; this shall be expressly stated on the order document;

d) reference to this document (EN 12020-1);

e) reference to a drawing defining the product (see 4.2), cross sectional dimensions, mass per meter calculated on nominal section dimensions, surface requirements and any other relevant information;

f) length:

- fixed or random,
- for random lengths minimum and maximum shall be specified,
- an allowance for process contact points of surface treatment may be necessary;

g) quantity:

- mass or number of pieces or total length,
- tolerance on quantity;

h) special requirements:

- any special requirements agreed between the supplier and purchaser,
- agreement on plane parallelism,
- any requirement for inspection documents,
- marking of products,
- reference to other standards, if tolerances on dimensions and form differ from those specified in EN 12020-2,
- additional or special testing,
- installation length,
- surface protection;

i) packaging information:

- pack mass/size.

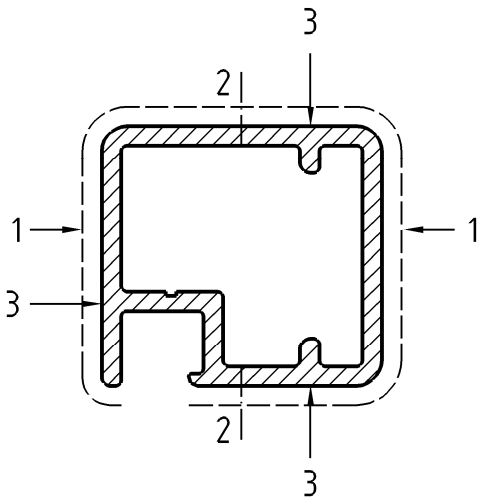
4.2 Reference to a drawing

On the basis of the order document, 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 document 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 weld lines are to be located on visible surfaces their position or approximate area of appearance should be indicated by the manufacturer on the drawing.

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



Key

1 visible surface
2 area of probable appearance of weld lines
3 area of probable appearance of T-joint streaks

Figure 3 – Marking of visible surfaces of approximate area of appearance of weld lines and T-joint streaks

For profiles intended for surface treatment, surfaces and areas that are to be so treated should be indicated on the drawing. If the outline of a profile is modified by machining, it is recommended that the final shape is also indicated.

5 Requirements

5.1 Production and manufacturing processes

Unless otherwise specified in the order document, the production and manufacturing processes shall be left to the discretion of the manufacturer. Unless it is explicitly stated in the order document, no obligation shall be placed on the manufacturer 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 manufacturer's works, he shall notify the supplier at the time of placing the order.

5.3 Chemical composition limit

The chemical composition limit shall be in conformity with the requirements specified in EN 573-3.

If the purchaser requires closer limits for elements than those specified in the above standard, these limits shall be according to an agreement between supplier and purchaser and stated in the order document.

5.4 Mechanical properties

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

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

5.5 Freedom from surface defects

The extruded visible surface shall be free from defects prejudicial to its suitable and proper use. Slight scoring and other minor defects are permissible providing that values of Rz of 9 μm or Ra of 2 μm are not exceeded when determined according to EN ISO 4287 and EN ISO 4288. Any discoloration or minor blemishes that are likely to be eliminated by the intended pretreatment for anodizing according to EN 12373-1 or by painting according to EN 12206-1 shall be permitted.

Requirements on streaks and surface texture appearance on visible surfaces in mill finish, anodized and painted conditions shall be agreed between supplier and purchaser.

5.6 Tolerances on dimensions and form

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

5.7 Section mass

Specific mass per metre may vary within the minimum and maximum allowances of section dimensions as given in EN 12020–2, if not otherwise agreed between supplier and purchaser.

6 Test procedures

6.1 Sampling

6.1.1 Samples for chemical analysis

Sampling shall be carried out at the time of casting according to EN 14361. The average content of each sample shall be within the specification for the chemical composition limits.

NOTE EN 14361 includes criteria on how to determine number, volume and shape of samples, about time and location of sampling and about the design and maintenance of the tools, in order to make sure that the average chemical composition of the sample is representative of the average chemical composition of the whole melt.

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 limit

The ranges of application and the accuracy of the test procedure used shall be validated and proved by the supplier. In case of dispute concerning the chemical composition limits, referee analysis shall be carried out in accordance with EN 14242.

NOTE For the rapid determination of the chemical composition limit different spectral analysis methods are used (e.g. S-OES, XRF, GDOES). For S-OES see EN 14726.

6.2.2 Hardness testing

Hardness tests shall be carried out in accordance with EN ISO 6506-1. Alternative hardness test methods may be used subject to agreement between supplier and purchaser (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.

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 supplier and purchaser.

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, or other types of documents such as certificate of conformity.

8 Marking of products

Marking of products shall be undertaken when specified in the standard or when agreed upon between supplier and purchaser and stated in the order document. 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 supplier and purchaser.

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 in the order document and agreed with the supplier. The type of corrosion preventative used shall also be subject to agreement between supplier and purchaser.

10 Arbitration

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

The decision of the arbitrator shall be final.

Bibliography

[1] EN 14024, *Metal profiles with thermal barrier — Mechanical performance — Requirements, proof and tests for assessment*

[2] EN 14726, *Aluminium and aluminium alloys — Chemical analysis — Guideline for spark optical emission spectrometric analysis*

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