BRITISH STANDARD

BS EN 1774 : 1998

Incorporating Corrigendum No. 1

Zinc and zinc alloys — Alloys for foundry purposes — Ingot and liquid

The European Standard EN 1774 : 1997 has the status of a British Standard

ICS 77.120.60; 77.150.60

National foreword

This British Standard is the English language version of EN 1774 : 1997. It partially supersedes BS 1004 : 1972 which will be withdrawn upon publication of BS EN 12844.

The UK participation in its preparation was entrusted to Technical Committee NFE/8, Zinc and zinc 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 committee 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 Board, was published under the authority of the Standards Board and comes into effect on 15 January 1998

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10047 Corr. No. 1	June 1998	Indicated in the text by a sideline in the margin

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1774

September 1997

ICS 77.120.60; 77.150.60

Descriptors: Zinc, zinc alloys, ingots, liquids, designation, specifications, chemical composition, marking, labelling

English version

Zinc and zinc alloys — Alloys for foundry purposes — Ingot and liquid

Zinc et alliages de zinc — Alliages pour fonderie — Lingots et liquide

Zink und Zinklegierungen — Gußlegierungen — In Blockform und in flüssiger Form

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 1774 : 1997 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 209, Zinc and zinc 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 March 1998, and conflicting national standards shall be withdrawn at the latest by March 1998.

Within its programme of work Technical Committee CEN/TC 209 requested CEN/TC 209/SC 4, Casting alloys and castings, to prepare the following standard:

EN 1774 Zinc and zinc alloys — Alloys for foundry purposes — Ingots and liquid

This European standard is one a series concerning zinc and zinc alloys for foundry purposes.

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.

Contents

1 Scope

This European Standard specifies the designations, chemical compositions, marking and other requirements for zinc alloys, in ingots or liquid form, produced for foundry purposes.

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.

EN 1179	*Zinc and zinc alloys — Primary zinc*
prEN 12019	*Zinc and zinc alloys — Optical emission spectrometric analysis*
prEN 12060	*Zinc and zinc alloys — Method of sampling — Specifications*
ISO 301 : 1981	*Zinc alloy ingots intended for casting*

3 Definitions

For the purpose of this European Standard, the following definitions apply.

3.1 ingot

Cast product intended for remelting.

3.2 jumbo

Large ingot, not suitable for manual handling, weighing at least 30 kg. Normally a jumbo weighs several hundred kilograms.

3.3 bundle

Collection of ingots taken from one or more batches (see **3.6**) and secured, for example by banding, for the purposes of handling, shipment and storage.

3.4 zinc alloys

Zinc with additions of one or more alloying elements, such as: Al, Mg, Cu, Cr, Ti.

NOTE. Zinc alloys are normally supplied in ingot form, but may be available in liquid form.

3.5 cast

3.5.1 cast from non-continuous casting

Product of one furnace or crucible melt.

3.5.2 cast from continuous casting

Identified quantity of liquid metal.

3.6 batch

Number of ingots or identified quantity of liquid metal, taken from a single cast.

4 Alloy designation

4.1 General

Zinc alloys conforming to this standard are designated either by symbol (see **4.2**) or by number (see **4.3**). For marking and labelling purposes only (see clause **9**) the short designation and/or colour code may be used (see **4.4** and **4.5**).

NOTE. Informative annex A gives the relationship between the former national alloy designations and those designations used in this standard.

4.2 Designation of zinc alloys by symbol

The designation by symbol is derived from the designation system given in ISO 301 : 1981.

EXAMPLE:

ZnAl4Cu1 designates a zinc alloy containing, nominally, 4 % aluminium and 1 % copper.

4.3 Designation of zinc alloys by number

The designation by number shall consist of two letters ZL (denoting zinc alloy) and four numerals, having the following significance:

– the first two numerals indicate the nominal aluminium content;

– the third numeral indicates the nominal copper content; and

– the fourth numeral indicates the nominal content of the next highest alloying element. If this is less than 1 %, the fourth numeral shall be '0'.

4.4 Colour code

The alloy colour code shall consist of two colours. The colours shall be as given in table 1, in relation to the alloy symbols or alloy numbers.

4.5 Short designation

The short designation of the alloy shall consist of the two letters ZL, followed by one or two numerals. The short designations shall be as indicated in table 1, in relation to the alloy symbol or alloy number.

NOTE. For a transitional period of five years from the date of publication of this standard, the short designation, when used as an ingot mark (see **9.1**), may be composed in a different form from that given in **4.5**, provided that the numerals specified in the short designation in table 1 are used.

5 Manufacture

The zinc alloy shall be manufactured from:

a) zinc ingots or liquid zinc conforming to grade Z1 of EN 1179, with the addition of appropriate alloying elements (see table 1); and/or

b) identifiable casting process returns, e.g. sprues, runners and overflows; and/or

c) identifiable castings rejected from the foundry, or after secondary operations.

Used, recycled materials and all other materials, which could cause contamination, such as shredder scrap, shall not be used.

6 Ordering information

In order to facilitate the enquiry, order and confirmation of order procedures between the supplier and the purchaser, the purchaser shall state on the enquiry and order the following information:

a) the number of this European Standard (EN 1774);

b) the designation of the zinc alloy required, by either symbol or number (see **4.2** and **4.3**);

c) the total mass required, and whether ingot or liquid form is required;

d) whether a specific ingot shape is required (see **7.2**);

e) whether a certificate of chemical composition or a declaration of conformity is required (see clause **10**).

7 Requirements

7.1 Chemical composition

The ingots or liquid shall conform to the requirements for chemical composition given for the appropriate alloy in table 1.

NOTE. Methods of analysis, for use in cases of dispute, are given in prEN 12019.

In expressing the results for the analysis, the values obtained shall be rounded in one step to the same number of figures used to express the specified limit in table 1. The following rules shall be used for rounding.

a) If the figure immediately after the last figure to be retained is less than five, the last figure to be retained shall be kept unchanged.

b) If the figure immediately after the last figure to be retained is equal to or greater than five, the last figure to be retained shall be increased by one.

7.2 Shape of ingots

The shape of ingots shall be at the discretion of the supplier, unless a specific shape is agreed between the purchaser and the supplier at the time of ordering (see clause **6**d).

7.3 Surface condition of ingots

The surface condition of the ingots shall be such that it does not affect the chemical composition and is not detrimental to the use of the ingots.

8 Sampling

Sampling of zinc alloy ingots and liquid, for verification of compliance with the chemical composition requirements shall be in accordance with prEN 12060.

9 Marking and labelling

9.1 Ingot

Each ingot shall be marked with the following minimum information:

a) name or identification of manufacturer;

b) the zinc alloy designation, by alloy symbol and/or number, and/or colour code, and/or short designation (see clause **4** and table 1).

NOTE. If the ingots are permanently marked with the letters ZL and are to be colour coded, then the first colour (white) may be omitted and only the second colour, as given in table 1, is needed in order to identify the alloy.

9.2 Bundle and jumbo

Each bundle of ingots, each bundle of small jumbos and each individually supplied jumbo shall be marked, or labelled, with the following minimum information:

a) name or identification of manufacturer;

b) the zinc alloy designation, by alloy symbol, and/or alloy number, and/or colour code, and/or short designation (see clause **4** and table 1);

NOTE. If the ingots are permanently marked with the letters ZL and are to be colour coded, then the first colour (white) may be omitted and only the second colour, as given in table 1, is needed in order to identify the alloy.

c) the batch or cast reference;

d) total mass of the bundle, or the mass of each individual jumbo.

10 Inspection documents

If requested by the purchaser at the time of ordering, the supplier shall furnish inspection documents with each consignment. The documentation shall be as chosen by the purchaser (see clause **6**e), and shall be in accordance with either a) or b) as follows:

a) *a certificate of chemical composition*, giving the results obtained on the specific casts in the consignment;

b) *a declaration of conformity*, of the consignment with the order requirements. This declaration shall include the following information:

1) name and address of supplier;

2) date of declaration of conformity;

3) name and address of purchaser;

4) purchaser's order number;

5) a description of the goods and the quantity supplied;

6) identification of this standard and the designation(s) of the alloy(s) supplied;

7) the following declaration:

The goods detailed hereon have been manufactured to conform with the requirements of the purchaser's order and to the description, quantity and specification detailed thereon.

Signed : .....

(Supplier's authorized representative)

Table 1. Chemical composition of zinc alloy ingot and liquid

Composition in % (mass fraction)

Alloy symbol	Colour code	Alloy number	Short designation	Element	Al	Cu	Mg	Cr	Ti	Pb	Cd	Sn	Fe	Ni	Si	Zn
ZnAl4	white/yellow	ZL0400	ZL3	min. max.	3,8 4,2	– 0,03	0,035 0,06	–	– –	– 0,003	– 0,003	– 0,001	– 0,020	– 0,001	– 0,02	Remainder
ZnAl4Cu1	white/black	ZL0410	ZL5	min. max.	3,8 4,2	0,7 1,1	0,035 0,06	– –	– –	– 0,003	– 0,003	– 0,001	– 0,020	– 0,001	– 0,02	Remainder
ZnAl4Cu3	white/green	ZL0430	ZL2	min. max.	3,8 4,2	2,7 3,3	0,035 0,06	– –	– –	– 0,003	– 0,003	– 0,001	– 0,020	– 0,001	– 0,02	Remainder
ZnAl6Cu1	white/white	ZL0610	ZL6	min. max.	5,6 6,0	1,2 1,6	– 0,005	– –	– –	– 0,003	– 0,003	– 0,001	– 0,020	– 0,001	– 0,02	Remainder
ZnAl8Cu1	white/blue	ZL0810	ZL8	min. max.	8,2 8,8	0,9 1,3	0,02 0,03	– –	– –	– 0,005	– 0,005	– 0,002	– 0,035	– 0,001	– 0,035	Remainder
ZnAl11Cu1	white/orange	ZL1110	ZL12	min. max.	10,8 11,5	0,5 1,2	0,02 0,03	– –	– –	– 0,005	– 0,005	– 0,002	– 0,05	– –	– 0,05	Remainder
ZnAl27Cu2	white/violet	ZL2720	ZL27	min. max.	25,5 28,0	2,0 2,5	0,012 0,02	– –	– –	– 0,005	– 0,005	– 0,002	– 0,07	– –	– 0,07	Remainder
ZnCu1CrTi	white/brown	ZL0010	ZL16	min. max.	0,01 0,04	1,0 1,5	– 0,02	0,1 0,2	0,15 0,25	– 0,005	– 0,004	– 0,003	– 0,04	– –	– 0,04	Remainder

Annex A (informative)

Relationship between the alloy designations used in this standard and the corresponding designations previously used in a number of countries

Table A.1 Former national alloy designations and corresponding designations in this standard

Alloy symbol	Alloy number	UK BS 1004	France NF A55-102	Germany DIN 1743/1	Spain UNE 37302-88	Italy UNI 3717 UNI 9408*)	Norway NS 16930	Sweden SIS 147020	Portugal NP 1632/31	USA ASTM B240 B669
ZnAl4	ZL0400	Alloy A	Z-A4	Z400	ZnAl4	G-ZnAl4	ZnAl4	ZnAl4	FZnAl4Mg	AG40A
ZnAl4Cu1	ZL0410	Alloy B	Z-A4U1	Z410	ZnAl4Cu1	G-ZnAl4Cu1	ZnAl4Cu1	ZnAl4Cu1	FZnAl4Cu1Mg	AG41A
ZnAlCu3	ZL0430	–	Z-A4U3	Z430	ZnAl4Cu3	G-ZnAlCu3	–	–	–	AG43A
ZnAl6Cu1	ZL0610	–	–	Z610	ZnAl16Cu1	–	–	–	–	–
ZnAl8Cu1	ZL0810	–	Z-A8U1	–	–	G-ZnAl8Cu1*)	–	–	–	ZA8
ZnAl11Cu1	ZL1110	–	–	–	ZnAl11Cu1	G-ZnAl11Cu1*)	–	–	–	ZA12
ZnAl27Cu2	ZL2720	–	–	–	–	G-ZnAl27Cu2 *)	–	–	–	ZA27
ZnCu1CrTi	ZL0010	–	–	–	–	–	–	–	–	–

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