Irish Standard
I.S. EN 15605:2010

Copper and copper alloys - Inductively coupled plasma optical emission spectrometry

I.S. EN 15605:2010

Incorporating amendments/corrigenda/National Annexes issued since publication:

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EUROPEAN STANDARD

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EN 15605

July 2010

ICS 77.120.30

Supersedes CEN/TS 15605:2007

English Version

Copper and copper alloys - Inductively coupled plasma optical emission spectrometry

Cuivre et alliages de cuivre - Analyse par spectrométrie d'émission optique avec source à plasma induit par haute fréquence

Kupfer und Kupferlegierungen - Optische Emissionsspektrometrie mit induktiv gekoppelter Plasmaanregung

This European Standard was approved by CEN on 12 June 2010.

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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 CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 15605:2010) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 15605:2007.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 10 "Methods of Analysis" to revise the following Technical Specification:

CEN/TS 15605, *Copper and copper alloys — Inductively coupled plasma optical emission spectrometry*

In comparison with the first edition of CEN/TS 15605:2007, the following significant technical changes were made:

— Revision from a Technical Specification to a European Standard;

— Method G (specifying the analysis of Copper-tin-lead alloys) is edited under an informative basis (see Annex B), taking into account the mediocrity of the precision criteria related to this method;

— Precision criteria for methods A and E were added;

— Precision criteria for methods B, C, D and F were improved and up-dated.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard specifies six inductively coupled plasma emission spectrometry methods (A to F) for the determination of alloying elements and impurities in copper and copper alloys in the form of unwrought, wrought and cast products.

A complementary method, for the analysis of Copper-tin-lead alloys, is described in Annex B (informative). The precision criteria concerning this method do not reach the suitable level, for all the elements specified (zinc and phosphorus, namely).

These methods are applicable to the elements listed in Tables 1 to 6 within the composition ranges shown:

Table 1 — Coppers

Element	Mass fraction %	
	min.	max.
Sn	0,02	0,60
Pb	0,02	0,60
Zn	0,02	0,60
Fe	0,01	0,60
Ni	0,01	0,60
Mn	0,01	0,60
Al	0,02	0,60
P	0,01	0,40
Be	0,01	0,60
Co	0,01	0,60
Cd	0,01	0,60

Table 2 — Copper-zinc alloys

Element	Mass fraction %	
	min.	max.
Sn	0,05	2,00
Pb	0,03	4,00
Zn	10,00	42,00
Fe	0,01	5,00
Ni	0,02	4,00
Mn	0,01	6,00
P	0,01	0,40
Al	0,02	9,00
As	0,01	0,20

Table 3 — Copper-tin alloys

Element	Mass fraction %	
	min.	max.
Sn	3,00	16,00
Pb	0,01	9,00
Zn	0,03	6,00
Fe	0,01	1,00
Ni	0,05	7,00
Mn	0,01	0,40
P	0,01	0,60
Al	0,01	0,50
Sb	0,02	1,60
As	0,02	0,25

Table 4 — Copper-aluminium alloys

Element	Mass fraction %	
	min.	max.
Sn	0,02	0,50
Pb	0,03	0,50
Zn	0,03	1,00
Fe	0,05	7,00
Ni	0,10	8,00
Mn	0,01	5,00
Al	6,00	14,00
Cd	0,01	0,50
Mg	0,002	0,15

Table 5 — Copper-beryllium alloys

Element	Mass fraction %	
	min.	max.
Sn	0,02	0,20
Pb	0,01	0,20
Zn	0,03	0,20
Fe	0,03	0,30
Ni	0,04	2,50
Mn	0,006	0,15
Al	0,03	0,20
Be	0,08	4,00
Co	0,03	4,00

Table 6 — Copper-nickel alloys

Element	Mass fraction %	
	min.	max.
Sn	0,10	0,50
Pb	0,03	0,50
Zn	0,04	2,00
Fe	0,10	4,00
Ni	7,00	35,00
Mn	0,02	3,00
Al	0,02	0,50

NOTE 1 The ranges specified for each method can be extended or adapted, for the determination of lower mass fractions.

NOTE 2 Other elements may be included. However such elements and their mass fractions should be carefully checked, taking into account interference, sensitivity, resolution and linearity criteria for each instrument and each wavelength.

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.

ISO 1811-1, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 1: Sampling of cast unwrought products*

ISO 1811-2, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 2: Sampling of wrought products and castings*

3 Principle

Dissolution of a test portion with hydrochloric and nitric acids. After suitable dilution and addition of an internal reference element, nebulization of the solution into an inductively coupled plasma emission spectrometer and measurement of the intensity of the emitted light, including that of the internal reference element.

4 Reagents

During the analysis, use only reagents of recognised analytical grade and only distilled water or water of equivalent purity.

The same reagents should be used for the preparation of calibration solutions and of sample solutions.

4.1 Hydrochloric acid, HCl (ρ = 1,19 g/ml)