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**International Standard****197/3**

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Copper and copper alloys — Terms and definitions — Part 3: Wrought products**

*Cuivre et alliages de cuivre — Termes et définitions — Partie 3: Produits corroyés*

**First edition — 1983-12-15**

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 197/3 was developed by Technical Committee ISO/TC 26, *Copper and copper alloys*, and was circulated to the member bodies in August 1982.

It has been approved by the member bodies of the following countries:

Australia	France	South Africa, Rep. of
Austria	Germany, F.R.	Spain
Belgium	Hungary	Sweden
Brazil	Iran	Switzerland
Canada	Japan	Turkey
Chile	Korea, Dem. P. Rep. of	United Kingdom
China	Netherlands	USA
Czechoslovakia	Poland	USSR
Egypt, Arab Rep. of	Romania	Venezuela

No member body expressed disapproval of the document.

This International Standard cancels and replaces ISO Technical Report ISO/TR 197/3-1976, of which it constitutes a technical revision.

# Copper and copper alloys — Terms and definitions — Part 3: Wrought products

## 0 Introduction

Terms and definitions listed in this part of ISO 197 have been approved in principle by the Customs Co-operation Council (CCC) to form the basis of the Harmonized Commodity Description and Coding System (Harmonized System) for the revision of chapter 74 "Copper" of the CCC-Nomenclature.

## 1 Scope and field of application

This part of ISO 197 gives terms for and definitions of wrought products of copper and copper alloys.

## 2 Terms and definitions

**2.1 wrought:** A general term for products obtained by hot and/or cold plastic deformation processes such as extruding, forging, hot rolling, cold rolling or drawing, either exclusively or in combination.

Examples of wrought products are rod, bar, wire, tube, profile, sheet, strip, forging.

NOTE — For classification principles of wrought products, see the annex.

## ISO 197/3-1983 (E)

**2.2 rod/bar** : A solid wrought product of uniform cross-section along its whole length, supplied in straight lengths. The cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons (see figure 1). Products with a square, rectangular, triangular or polygonal cross-section may have corners rounded along their whole length.

## NOTE

For rectangular bars

- the thickness exceeds one-tenth of the width.
- the term "rectangular bar" includes "flattened circles" and "modified rectangles", of which two opposite sides are convex arcs, the other two sides being straight, of equal length and parallel.

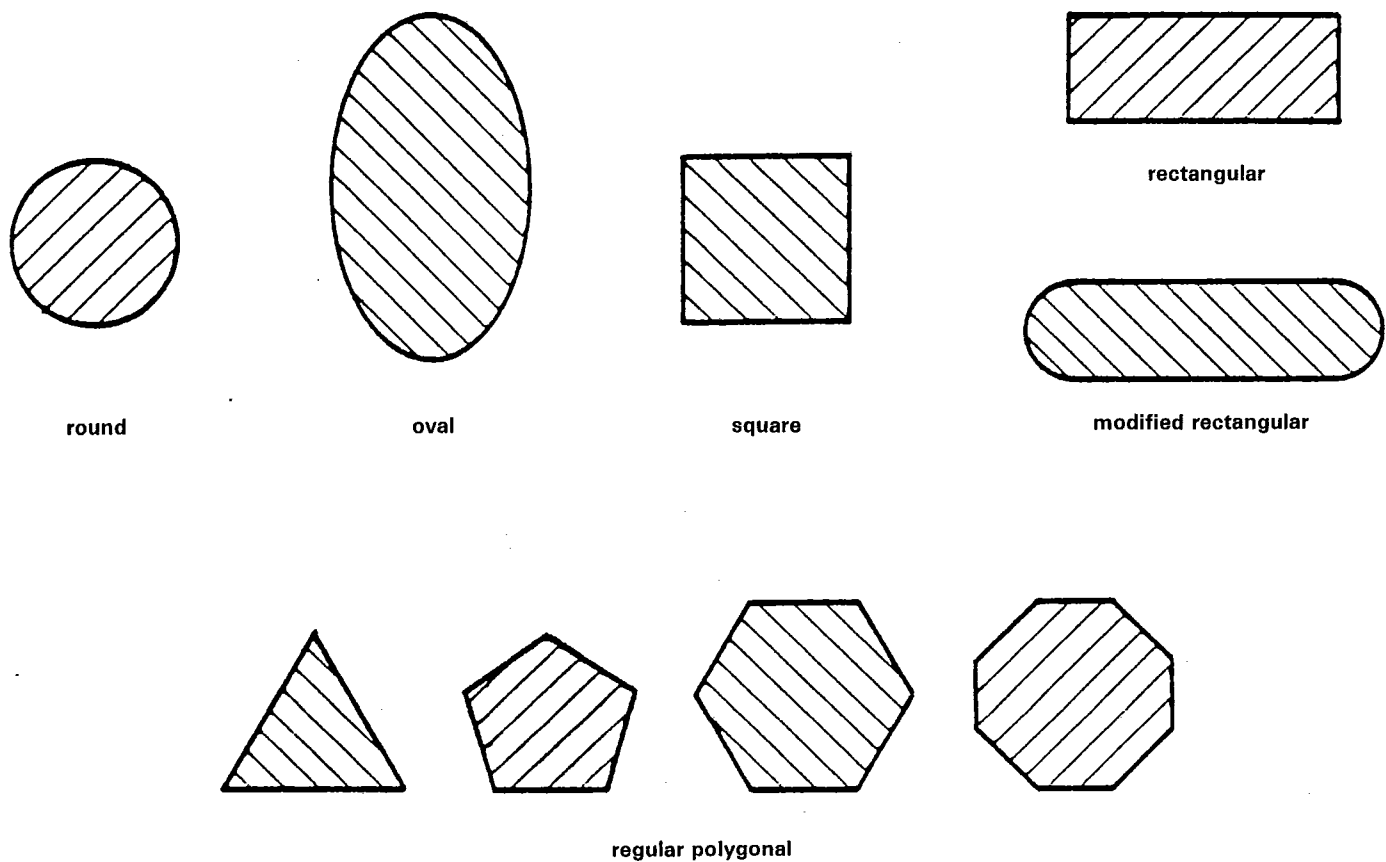


Figure 1 — Rod/bar and wire cross-sections

**2.3 wire** : A solid wrought product of uniform cross-section along its whole length, supplied in coiled form. The cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons (see figure 1). Products with a square, rectangular, triangular, or polygonal cross-section may have corners rounded along their whole length.

## NOTE

For rectangular wires

- the thickness exceeds one-tenth of the width.
- the term "rectangular wire" includes "flattened circles" and "modified rectangles", of which two opposite sides are convex arcs, the other two sides being straight, of equal length and parallel.

**2.4 drawing stock (wire rod)** : An intermediate solid wrought product of uniform cross-section along its whole length supplied in coils.

The cross-sections are approximately round, triangular or regular polygonal with a maximum cross-section dimension usually exceeding 6 mm, see figure 2.

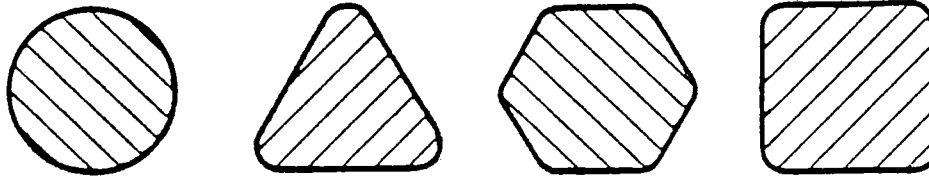


Figure 2 — Drawing stock cross-sections

**2.5 tube** : A hollow wrought product of uniform cross-section with only one enclosed void along its whole length, and with a uniform wall thickness, supplied in straight lengths or in coiled form.

The cross-sections are in the shape of circles, ovals, squares, rectangles, equilateral triangles or regular polygons (see figure 3). Hollow products with a square, rectangular, equilateral triangular or regular polygonal cross-section, which may have corners rounded along their whole length, are also to be considered as tubes, provided that the inner and outer cross-sections are concentric and have the same form and orientation.

#### NOTES

- 1 Tubes can also be formed by piercing and by forming and joining sheet or strip.
- 2 Bent, threaded, drilled, waisted, expanded and cone-shaped hollow products in this general form when derived from tubes as defined above are classified as tubes.

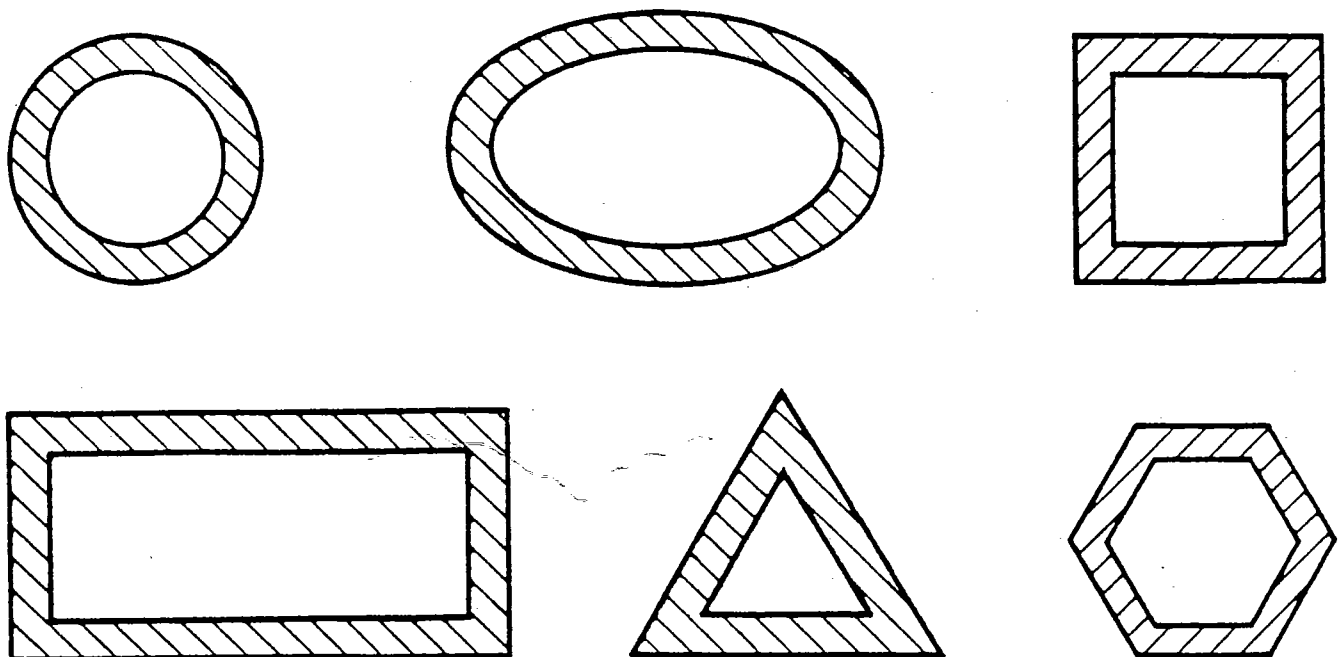


Figure 3 — Tube cross-sections

## ISO 197/3-1983 (E)

**2.6 profile** : A wrought product of uniform cross-section along its whole length, with a cross-section other than rod, bar, wire, tube, sheet or strip, supplied in straight lengths or in coiled form.

According to the form of its cross-section, it is called

## a) Hollow profile

The cross-section encloses

either one enclosed void, provided that the cross-section is other than tube,

or more than one enclosed void

(Examples for cross-sections are given in figure 4.)

## b) Solid profile

The cross-section does not include any enclosed void.

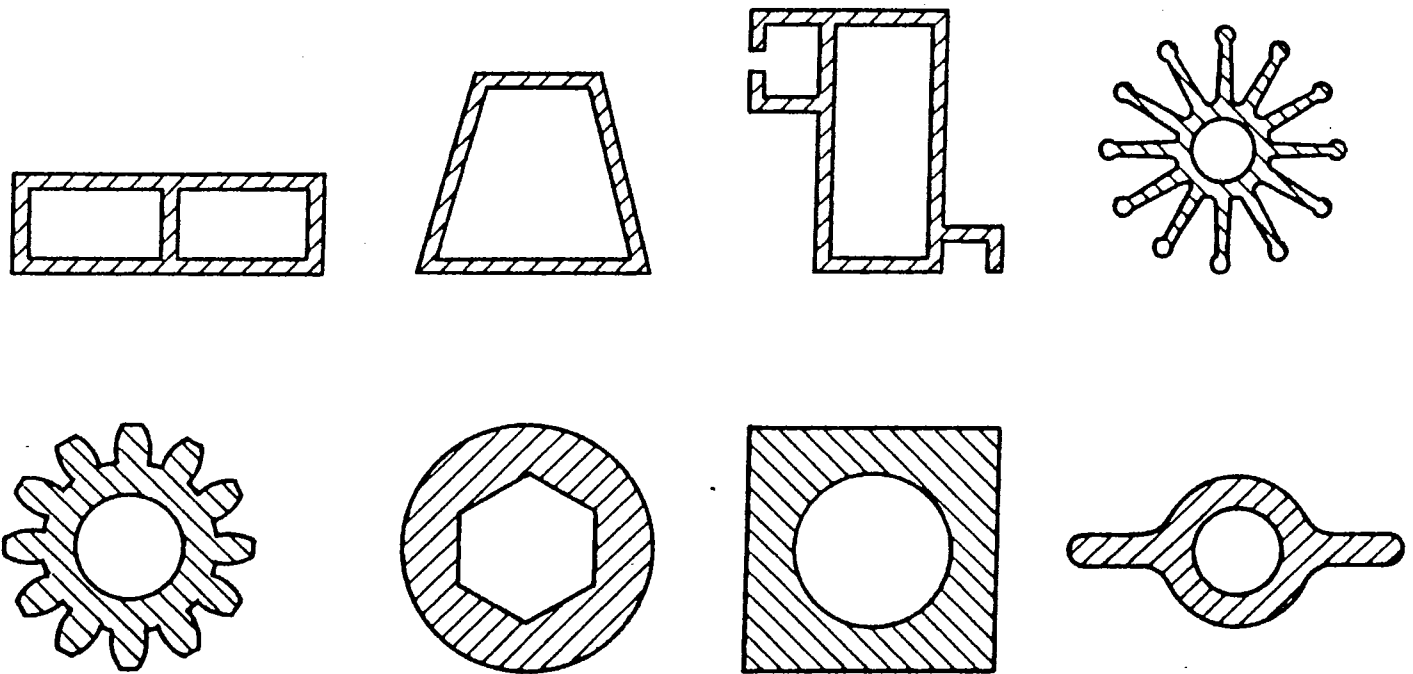


Figure 4 — Hollow profile cross-sections

**2.7 sheet** : A flat rolled product of rectangular cross-section with uniform thickness at least 0,10 mm, supplied in straight lengths (i.e. flat) usually with sheared or sawn edges. The thickness does not exceed one-tenth of the width.

## NOTES

1 Corrugated, embossed, coated, edge-conditioned and perforated products in this general form when derived from sheet as defined above are classified as sheet.

2 In some countries, "sheet" of a thickness greater than 6 mm is called "plate".

**2.8 strip** : A flat rolled product of rectangular cross-section with uniform thickness of at least 0,10 mm, supplied in coils usually with slit edges. The thickness does not exceed one-tenth of the width.

## NOTES

1 Corrugated, embossed, coated, edge-conditioned and perforated products in this general form when derived from strip as defined above are classified as strip.

2 In some countries, "strip" is called "coiled sheet".

**2.9 foil** : A flat rolled product of rectangular cross-section with uniform thickness less than 0,10 mm.

NOTES

1 In some countries, the term "foil" covers two different products :

**foil** : A flat rolled product of rectangular cross-section with uniform thickness less than 0,10 mm, supplied in straight lengths with sheared edges.

**thin strip** : A flat rolled product of rectangular cross-section with uniform thickness less than 0,10 mm, supplied in coils with slit edges.

2 For special purposes, foil can also be produced by electrolytic deposition.

**2.10 forging stock** : A hot-worked intermediate solid wrought product, for example rod, bar, or any other cross-section, suitable for forging.

NOTE — Forging stock may also be a cast product, for example billet (see ISO 197/2).

**2.11 forging** : A wrought product formed by hammering or pressing — usually when hot — between open dies (hand forging) or closed dies (drop or die forging).

**2.12 blank** : A piece of metal of regular or irregular shape taken from a flat wrought product intended for subsequent processing such as bending, stamping, deep drawing or forming.

**2.13 circle** : A circular blank.

**2.14 slug** : A piece of metal of uniform thickness and of regular or irregular shape taken from a wrought product, usually for impact extrusion.

Slugs are supplied with or without a centre hole.

NOTE — Slugs may also be taken from a cast product.

## Annex

### Explanatory notes concerning the definitions of wrought products

(This annex forms an integral part of the body of ISO 197/3.)

#### A.1 Classification principles

In order to simplify the definitions and to avoid difficulties which might be caused by further technical developments, all references to sizes have been deleted, with the exception of rolled flat products, i.e. the definitions are to be based on the forms of delivery only.

#### A.2 Dividing lines

##### A.2.1 Rod and bar : Wire

While rod and bar are generally supplied in straight lengths and wire in coils, the current dividing line of the CCCN at 6 mm diameter was replaced by the usual form of delivery.

##### A.2.2 Tube : Hollow profile

The dividing line between "Tube" and "Hollow Profile" shall be drawn not only by the uniform wall thickness, but also by an "only one enclosed void" for the tube. Furthermore, figures of cross-sections for tubes as well as examples for hollow profiles have been included. It was agreed that the term "hollow bar" should not be used.

##### A.2.3 Sheet : Strip : Foil

In order to overcome the various limitations on thickness, which differ from country to country, it was agreed to provide the three following terms :

sheet : at least 0,10 mm thick in straight lengths;

strip : at least 0,10 mm thick in coils;

foil : less than 0,10 mm thick.

##### A.2.4 English term "Drawing Stock"

Taking into account different manufacturing processes, e.g. extruding, hot rolling, continuous casting with subsequent hot rolling, the term "Drawing stock" for the intermediate product was selected as the preferred term to replace the term "Wire rod".

a) Drawing stock : This term was derived by analogy with "forging stock", in order to express that this intermediate product is intended to be drawn.

b) Wire rod : This term — used in some countries — has been rejected on the basis of terminology principles : "wire" and "rod" are terms for two different products, which shall not be combined to name a third product.

#### A.2.5 Changes relative to the Technical Report

a) The general term "Wrought product" shall include a general reference to the various plastic deformation processes and all references to manufacturing processes and/or surface appearance from all individual product definitions as appropriate shall be deleted.

b) The dividing line between sheet and strip on the one hand and rectangular bar and wire on the other hand was defined : the thickness to be one-tenth of the width, because the existing CCC-definitions were considered as an acceptable compromise.

c) The definitions of the agreed Addendum were incorporated.

d) The English term "Drawing stock" was elected as the preferred term to replace the English term "Wire rod".

e) It was considered reasonable

1) to complete the definitions by figures for rod/bar wire and drawing stock.

2) that the cross-sections of rods and bars, of wires and of tubes be identical, except for being solid or hollow and for their form of delivery.

#### A.2.6 Differences between ISO 197 and CCC-Nomenclature

Differences between ISO 197 and CCC-Doc. 29.790 (Febr. 1983) will be concerned only with

a) editorial layout, e.g. omission of the reference to the production method of the product which is covered by the general definition for "Wrought Products" as well as editorial rearrangement of some definitions for easy day-to-day use;

b) the omission of cross-references to other products or to heading numbers resulting from the necessities of the "Structured CCC Nomenclature".