

International Standard



5832/7

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

**Implants for surgery — Metallic materials —  
Part 7: Forgeable and cold-formed  
cobalt-chromium-nickel-molybdenum-iron alloy**

*Implants pour la chirurgie — Produits à base de métaux — Partie 7: Alliage à forger mis en forme à froid à base de cobalt-chrome-nickel-molybdène-fer*

**ITeH STANDARD PREVIEW**

First edition — 1984-03-15

**(standards.iteh.ai)**

ISO 5832-7:1984

<https://standards.iteh.ai/catalog/standards/sist/ba12d59a-ce79-4684-8ac3-7c85773a42b4/iso-5832-7-1984>

**UDC 615.465 : 669.255.26.24.28.15**

**Ref. No. ISO 5832/7-1984 (E)**

**Descriptors :** surgical implants, cold formed products, alloys, cobalt containing alloys, chromium containing alloys, molybdenum containing alloys, nickel containing alloys, iron alloy, material specifications, chemical composition, microstructure, mechanical properties, tests.

Price based on 2 pages

## 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 5832/7 was developed by Technical Committee ISO/TC 150, *Implants for surgery*, and was circulated to the member bodies in March 1983.

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

Australia  
Belgium  
France  
Germany, F.R.

India  
Mexico  
Poland  
Romania

Spain  
Switzerland  
USSR

No member body expressed disapproval of the document.

# Implants for surgery — Metallic materials — Part 7: Forgeable and cold-formed cobalt-chromium-nickel-molybdenum-iron alloy

## 1 Scope and field of application

This International Standard specifies the characteristics of, and corresponding test methods for, forgeable and cold-formed cobalt-chromium-nickel-molybdenum-iron alloy for use in the manufacture of surgical implants.

NOTE — The mechanical properties of a sample obtained from a finished product made of this alloy may not necessarily comply with those specified in this International Standard.

## 2 References\*

ISO 82, *Steel — Tensile testing.*

ISO 86, *Steel — Tensile testing of sheet and strip less than 3 mm and not less than 0,5 mm thick.*

ISO 89, *Steel — Tensile testing of wire.*

ISO 643, *Steels — Micrographic determination of the ferritic or austenitic grain size.*

ISO 4967, *Steel — Determination of content of non-metallic inclusions — Micrographic method using standard diagrams.*

## 3 Chemical composition

The heat analysis of the alloy shall comply with the chemical composition specified in table 1. The analysis of samples taken from products manufactured from the alloy shall also comply with table 1 (for test methods, see clause 6).

Table 1 — Chemical composition

Element	Composition limits, % (m/m)
Cobalt	39,0 to 42,0
Chromium	18,5 to 21,5
Nickel	15,0 to 18,0
Molybdenum	6,5 to 7,5
Manganese	1,0 to 2,0
Carbon	0,15 max.
Beryllium	0,001 max.
Iron	Balance

## 4 Microstructure

### 4.1 Inclusion content

The non-metallic inclusion content of the alloy, determined as specified in clause 6, shall not exceed the limits given in table 2.

Table 2 — Inclusion content limits

Type of inclusion	Inclusion content Thin
A — Sulphides	1
B — Aluminates	3
C — Silicates	1
D — Oxides, globular	3

There shall be no thick inclusions.

### 4.2 Grain size

The microscopic structure shall be uniform. The grain size, determined as specified in clause 6, shall be no coarser than grain size No. 5.

\* International Standards concerning steel are referenced although this material is not iron based.

## 5 Mechanical properties

The mechanical properties, determined as specified in clause 6, shall be in accordance with the requirements of table 3.

## 6 Methods of test

The methods of test to be used in determining compliance with the requirements of this International Standard shall be those given in table 4.

Table 3 — Mechanical properties of the alloy

Condition	Ultimate tensile strength min.	Yield strength (0,2 % offset) min.	Elongation <sup>1)</sup> min.
	MPa	MPa	%
Annealed	950	450	65
30 % cold worked	1 450	1 300	8

1) Gauge length =  $5,65 \sqrt{S_0}$  or 50 mm, where  $S_0$  is the original cross-sectional area in square millimetres.

Table 4 — Methods of test

Requirement	Relevant clause or sub-clause	Method of test
Chemical composition	3	Recognized analytical procedures (ISO methods where these exist)
Inclusion content	4.1	ISO 4967
Grain size	4.2	ISO 643
Mechanical properties		
Ultimate tensile strength	5	For non-cold worked states : ISO 82 For cold worked states : ISO 86 or ISO 89 as appropriate to the form of alloy