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# International Standard



# 3304

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

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## Plain end seamless precision steel tubes — Technical conditions for delivery

*Tubes de précision en acier, sans soudure, à extrémités lisses — Conditions techniques de livraison*

Second edition — 1985-11-15

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**Descriptors** : pipes (tubes), metal tubes, steel tubes, seamless tubes, specifications, dimensions, tests, designation, chemical composition, mechanical properties, delivery conditions, acceptance testing.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3304 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*.

This second edition cancels and replaces the first edition (ISO 3304-1975), of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

# Plain end seamless precision steel tubes — Technical conditions for delivery

## 1 Scope and field of application

This International Standard specifies the technical conditions for delivery of seamless tubes with plain ends, manufactured from the grades of steel shown in table 2, with precision dimensional tolerances and in those dimensions shown in table 9 which have been selected from ISO 4200.

Tubes in accordance with this International Standard are used mainly for purposes where importance attaches to dimensional accuracy and, if required, small thicknesses and surface finish.

If such tubes are intended for use in hydraulic piping equipment, they shall be used only in the annealed or normalized delivery condition.

## 2 References

ISO 404, *Steel and steel products — General technical delivery requirements.*

ISO 2604/2, *Steel products for pressure purposes — Quality requirements — Part 2: Wrought seamless tubes.*

ISO 3545, *Steel tubes and tubular shaped accessories with circular cross-section — Symbols to be used in specifications.*

ISO 4200, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length.*

ISO 6892, *Metallic materials — Tensile testing.*

ISO 8492, *Metallic materials — Tubes — Flattening test.*<sup>1)</sup>

ISO 8493, *Metallic materials — Tubes — Drift expanding test.*<sup>2)</sup>

## 3 Symbols

$D$	= Outside diameter of the tube
$T$	= Thickness of the tube wall
$R_m$	= Tensile strength in newtons per square millimetre
$R_{eH}$	= Upper yield strength in newtons per square millimetre

$A$	= Elongation after fracture, as a percentage, of original gauge length ( $L_0$ ), $L_0 = 5,65 \sqrt{S_0}$
$S_0$	= Cross-sectional area of the gauge length
BK	= Cold-finished as-drawn
BKW	= Lightly cold-worked
GBK	= Annealed in controlled atmosphere
GZF	= Annealed in controlled atmosphere and descaled
NBK	= Normalized in controlled atmosphere
NZF	= Normalized in controlled atmosphere and descaled

## 4 Information to be supplied by the purchaser

### 4.1 Mandatory information

The purchaser shall state the following details in his enquiry and order:

- quantity;
- reference to this International Standard;
- grade of steel;
- required condition of tubes at delivery;
- outside diameter and thickness;
- length.

### 4.2 Optional conditions

Certain alternatives are permitted; other supplementary requirements may be specified and the purchaser shall state his requirements in his enquiry and order; if he does not do so, supply will be made at the option of the manufacturer.

### 4.3 Designation

The tubes shall be designated in the following sequence by

- the name of the product;
- reference to this International Standard;
- the grade of steel, the condition of tubes at delivery;
- the outside diameter and the thickness.

1) At present at the stage of draft. (Revision of ISO/R 202-1961 which remains in force until publication of ISO 8492.)

2) At present at the stage of draft. (Revision of ISO/R 166-1960 which remains in force until publication of ISO 8493.)