INTERNATIONAL STANDARD

**ISO 11922-1**

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# Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances —

## Part 1: Metric series

*Tubes en matières thermoplastiques pour le transport des fluides — Dimensions et tolérances —*

*Partie 1: Série métrique*

Reference number
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# 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*.

This second edition cancels and replaces the first edition (ISO 11922-1:1997), which has been technically revised.

The main changes are:

— Tolerance values for diameters up to 3000 mm are included;

— Diameter tolerance grade E has been deleted.

A list of all the parts in the ISO 11922 series, can be found on the ISO website.


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# Introduction

In the past, International Standards specifying the tolerances to be applied to thermoplastics pipes have covered individual materials separately. The philosophy of the ISO 11922 series is to combine these already published standards into a single two-part standard covering the tolerances for extruded pipes manufactured from all thermoplastics materials, thus avoiding the need for a standard to be developed for each individual material.

The ISO 11922 series therefore contains a number of tolerance grades covering the mean outside diameter, the out-of-roundness of the outside diameter, the wall thickness at any point and the mean wall thickness. The bodies responsible for writing the various product and system standards will choose, from the specified tolerance grades, that grade which is suitable for the application and material involved.

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# Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances —

# Part 1: Metric series

## 1 Scope

This document specifies tolerance grades for the outside diameter, out-of-roundness and wall thickness of metric thermoplastics pipes for the conveyance of fluids and manufactured with nominal outside diameters and nominal pressures in accordance with ISO 161-1 and nominal wall thicknesses in accordance with ISO 4065.

It is applicable to smooth thermoplastics pipes of constant circular cross-section along the whole length of the pipe, whatever the method of manufacture, the pipe material or the intended application.

NOTE It is intended that the tolerance grades specified in product standards are selected from this document taking into account the material and the intended application.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 4065, *Thermoplastics pipes — Universal wall thickness table*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

**3.1**
**nominal outside diameter**
$d_n$
numerical designation of the size of a component, other than a component designated by thread size, which is approximately equal to the manufacturing dimension

Note 1 to entry: Nominal outside diameter is expressed in millimetres (mm).

Note 2 to entry: For metric pipes conforming to ISO 161, the nominal outside diameter, expressed in millimetres, is the minimum mean outside diameter *dem.min* specified in the applicable pipe standard.

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**3.2**
**outside diameter**
$d_e$

**3.2.1**
**mean outside diameter**
$d_{em}$
measured length of the outer circumference of the pipe divided by π, rounded up to the nearest 0,1 mm

Note 1 to entry: The value of π is taken to be 3,142.

**3.2.2**
**minimum mean outside diameter**
$d_{em\ min}$
minimum value of the mean outside diameter specified in the applicable pipe standard, equal to the nominal outside diameter $d_n$

Note 1 to entry: Minimum mean outside diameter is expressed in millimetres.

**3.2.3**
**maximum mean outside diameter**
$d_{em\ max}$
maximum value of the mean outside diameter specified in the applicable pipe standard

**3.2.4**
**outside diameter at any point**
$d_e$
measured outside diameter through the cross-section at any point of the pipe, rounded up to the nearest 0,1 mm

**3.2.5**
**out-of-roundness**
difference between the measured maximum outside diameter and the measured minimum outside diameter in the same cross-sectional plane of the pipe

### 3.3 Terms relating to tolerances

**3.3.1**
**tolerance**
difference between the limit deviation and the nominal value

**3.3.2**
**limit deviation**
difference between upper limit of size minus nominal size

**3.3.3**
**tolerance grade**
group of tolerances for linear sizes characterized by a common identifier

Note 1 to entry: A specific tolerance grade is considered as corresponding to the same level of accuracy for all nominal sizes.

### 3.4 Wall thickness

**3.4.1**
**wall thickness at any point**
$e$
measured wall thickness at any point around the circumference of the pipe, rounded to the nearest 0,1 mm


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**3.4.2**
**minimum wall thickness**
$e_{min}$
minimum wall thickness for the pipe specified in the applicable pipe standard

**3.4.3**
**maximum wall thickness**
$e_{max}$
maximum wall thickness for the pipe specified in the applicable pipe standard

**3.4.4**
**mean wall thickness**
$e_m$
arithmetic mean of at least four measurements regularly spaced around the same cross-sectional plane of the pipe, including the measured minimum and maximum values obtained, rounded up to the nearest 0,1 mm.

Note 1 to entry: The minimum number of measurements will be specified in the applicable pipe standard. The actual number of measurements will then depend on the fact that the measurement points have to be regularly spaced round the cross-sectional plane and, in addition, have to include both the minimum and the maximum measured values.

**3.4.5**
**nominal wall thickness**
$e_n$
wall thickness, as tabulated in ISO 4065, corresponding to the minimum wall thickness at any point $e_{,min}$

Note 1 to entry: Nominal wall thickness is expressed in millimetres.

# 4 Tolerances on outside diameters

## 4.1 Mean outside diameter

For pipes conforming to ISO 161-1, the values specified therein as nominal outside diameters are minimum mean outside diameters, expressed in millimetres, and the limit deviations from these diameters shall be positive. Hence the tolerances shall be expressed in the form $+x/-0$ mm, where $x$ is the value of the tolerance from Table 1 appropriate to the tolerance grade.

The values in Table 1 are based on the $d_n$ specified in the applicable product standard, all dimensions being expressed in millimetres.

**Grade A:** For all nominal outside diameters, the tolerance equals $0{,}009d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 0,3 mm.

**Grade B:** For all nominal outside diameters, the tolerance equals $0{,}006d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 0,3 mm.

**Grade C:** For all nominal outside diameters, the tolerance equals $0{,}003d_n$, rounded up to the nearest 0,1 mm. with a minimum value of 0,3 mm.

**Grade D:** For nominal outside diameters from 10 to 1 000, the tolerances have been based on practical experience where tighter tolerances than those specified for grade C are required.

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