
**Plastics piping systems for the supply
of gaseous fuels for maximum
operating pressures up to and
including 2 MPa (20 bar) —
Polyamide (PA) —**

Part 2:
Pipes

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*Systèmes de canalisations en matières plastiques pour la distribution
de combustibles gazeux pour des pressions maximales de service
inférieures ou égales à 2 MPa (20 bar) — Polyamide (PA) —*

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Partie 2: Tubes 22621-2-2007



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 22621-2 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*.

ISO 22621 consists of the following parts, under the general title *Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) — Polyamide (PA)*:

— Part 1: General

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— Part 2: Pipes

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— Part 3: Fittings

Fitness for purpose of the system is to form the subject of a future part 5.

Introduction

As polyamide material is used for piping systems for the supply of gaseous fuels both at low and high pressure, ISO/TC 138/SC 4 experts decided to split the standardization programme into two series of International Standards, with one series covering low pressures up to 0,4 MPa (4 bar), and ISO 22621 high pressures up to 2 MPa (20 bar).

Thin wall thickness pipes and solvent cement joints are used typically for pressures up to 0,4 MPa (4 bar), while thicker wall thickness pipes and butt fusion, electrofusion and mechanical joints are typically used for pressures up to 2 MPa (20 bar). For technical and safety reasons, it is not possible to mix the components of the two types of piping system (thin wall thickness pipes cannot be jointed by butt fusion or mechanical joints and vice versa). In particular, solvent cement joints must not be used for jointing for high pressure piping systems.

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Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) — Polyamide (PA) —

Part 2: Pipes

1 Scope

This part of ISO 22621 specifies the physical and mechanical properties of pipes made from polyamide (PA) in accordance with ISO 22621-1, intended to be buried and used for the supply of gaseous fuels at maximum operating pressures (MOP) up to and including 20 bar ¹⁾.

It also specifies the test parameters for the test methods to which it refers.

In addition, it lays down dimensional characteristics and requirements for the marking of pipes.

Pipes conforming to this part of ISO 22621 are jointed typically by using mechanical, electrofusion or butt fusion (see Annex A) techniques, but not by solvent cement jointing.

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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 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 307, *Plastics — Polyamides — Determination of viscosity number*

ISO 1133:2005, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces*

ISO 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters*

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm²

ISO 22621-2:2007(E)

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

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

ISO 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method*

ISO 6259-3, *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes*

ISO 11922-1:1997, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 13477, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Small-scale steady-state test (S4 test)*

ISO 13479, *Polyolefin pipes for the conveyance of fluids — Determination of resistance to crack propagation — Test method for slow crack growth on notched pipes (notch test)*

ISO 22621-1, *Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) — Polyamide (PA) — Part 1: General*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in ISO 22621-1 apply.

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4 Compound

The pipes shall be made from virgin material. Rework material shall not be used.

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The compound from which the pipes are made shall be in accordance with ISO 22621-1.

5 Appearance

When viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects which can affect pipe performance. The pipe ends shall be cut cleanly and square to the axis of the pipe.

6 Geometrical characteristics

6.1 Measurement of dimensions

Dimensions shall be measured in accordance with ISO 3126 at (23 ± 2) °C, after being conditioned for at least 4 h. The measurement shall not be made less than 24 h after manufacture.

6.2 Mean outside diameters, out-of-roundness and their tolerances

The mean outside diameter of the pipe, d_{em} , and the out-of-roundness and their tolerances shall be in accordance with Table 1.

For maximum mean outside diameter grade B tolerances, ISO 11922-1 shall apply.

Table 1 — Mean outside diameters and out-of-roundness

Dimensions in millimetres

Nominal outside diameter d_n	Mean outside diameter		Maximum of absolute out-of-roundness ^a	
	$d_{em,min}$	$d_{em,max}$	Grade K ^b	Grade N
16	16,0	16,3	1,2	1,2
20	20,0	20,3	1,2	1,2
25	25,0	25,3	1,5	1,2
32	32,0	32,3	2,0	1,3
40	40,0	40,4	2,4	1,4
50	50,0	50,4	3,0	1,4
63	63,0	63,4	3,8	1,5
75	75,0	75,5	—	1,6
90	90,0	90,6	—	1,8
110	110,0	110,7	—	2,2
125	125,0	125,8	—	2,5
140	140,0	140,9	—	2,8
160	160,0	161,0	—	3,2
180	180,0	181,1	—	3,6
200	200,0	201,2	—	4,0
225	225,0	226,4	—	4,5
250	250,0	251,5	—	5,0

^a Measurement of out-of-roundness shall be made at the point of manufacture according to ISO 3126.

^b For coiled pipe with $d_n \leq 63$ mm, grade K applies; for pipe with $d_n \geq 75$ mm, the maximum out-of roundness shall be specified by agreement.

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6.3 Wall thicknesses and tolerances

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6.3.1 Minimum wall thickness

The minimum wall thickness, e_{min} , shall be in accordance with Table 2. Small diameter pipes are characterized by wall thickness. Large diameter pipes are characterized by their standard dimension ratio (SDR).

The use of any SDR derived from the pipe series S given according to ISO 4065 and ISO 161-1 is permitted.

NOTE In order to minimize the possibility of damage to small-diameter gas pipes by external influences, the use of pipes having a wall thickness of not less than 3,0 mm — even if higher than the minimal SDR value — can be considered.