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**Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings — Styrene copolymer blends (SAN + PVC)**

*Systèmes de canalisations en plastique pour l'évacuation des eaux-vannes et des eaux usées (à basse et à haute température) à l'intérieur des bâtiments — Mélanges de copolymères de styrène (SAN + PVC)*

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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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 19220 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 1, *Plastics pipes and fittings for soil, waste and drainage (including land drainage)*.

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## Introduction

Pipes and fittings conforming to this International Standard also meet the corresponding requirements of EN 1565-1 which are applicable to those pipes and fittings which, according to EN 1565-1, are intended to be used inside buildings (application area code "B", see EN 1565-1) only.

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# Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings — Styrene copolymer blends (SAN + PVC)

## 1 Scope

This International Standard specifies the requirements for solid-wall styrene copolymer blend (SAN + PVC) pipes and fittings for soil and waste discharge (low and high temperature) above ground inside buildings, as well as the system itself. It does not include buried pipework.

It also specifies the test parameters for the test methods referred to in this International Standard.

This International Standard is applicable to SAN + PVC pipes and fittings, as well as assemblies of such pipes and fittings, intended to be used for the following purposes:

- a) soil and waste discharge pipework for the conveyance of domestic waste waters (low and high temperature);
- b) ventilation pipework associated with a);
- c) rainwater pipework inside the building.

It is applicable to pipes and fittings designed for jointing by means of elastomeric sealing rings, solvent cementing or integral dual-purpose sockets, i.e. for elastomeric ring seal joints and/or for solvent cement joints.

## 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 265-1, *Pipes and fittings of plastics materials — Fittings for domestic and industrial waste pipes — Basic dimensions: Metric series — Part 1: Unplasticized poly(vinyl chloride) (PVC-U)*

ISO 3126:—<sup>1)</sup>, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 8361-1, *Thermoplastics pipes and fittings — Water absorption — Part 1: General test method*

EN 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 681-2, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

EN 727, *Plastics piping and ducting systems — Thermoplastics pipes and fittings — Determination of Vicat softening temperature (VST)*

EN 743:1994, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of the longitudinal reversion*

<sup>1)</sup> To be published. (Revision of ISO 3126:1974)

EN 744, *Plastics piping and ducting systems — Thermoplastics pipes — Test method for resistance to external blows by the round-the-clock method*

EN 763:1994, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Test method for visually assessing effects of heating*

EN 1053, *Plastics piping systems — Thermoplastics piping systems for non-pressure applications — Test method for watertightness*

EN 1054, *Plastics piping systems — Thermoplastics piping systems for soil and waste discharge — Test method for airtightness of joints*

EN 1055:1996, *Plastics piping systems — Thermoplastics piping systems for soil and waste discharge inside buildings — Test method for resistance to elevated temperature cycling*

EN 1411, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method*

EN 1565-1, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Styrene copolymer blends (SAN + PVC) — Part 1: Specifications for pipes, fittings and the system*

### 3 Symbols and abbreviations

#### 3.1 Symbols

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$A$	length of engagement
$B$	length of lead-in
$C$	depth of sealing zone
$d_e$	outside diameter (at any point)
$d_{em}$	mean outside diameter
$d_n$	nominal outside diameter
$d_s$	inside diameter of the socket
$d_{sm}$	mean inside diameter of the socket
DN	nominal size
DN/OD	nominal size (outside-diameter related)
$e$	wall thickness (at any point)
$e_m$	mean wall thickness
$e_2$	wall thickness of the socket
$e_3$	wall thickness at the groove
$L_1$	length of spigot
$L_2$	length of solvent cement socket
$l$	effective length of a pipe

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$N$	effective insertion depth
$R$	radius of swept fittings
$z$	design length ( $z$ -length) of a fitting
$\alpha$	nominal angle of a fitting

### 3.2 Abbreviations

PVC	poly(vinyl chloride)
SAN	styrene-acrylonitrile
SAN + PVC	styrene copolymer blends
TIR	true impact rate

## 4 Material

### 4.1 SAN + PVC compound

The compound for pipes and fittings shall be a styrene copolymer blend consisting of SAN and PVC to which may be added those additives that are needed to facilitate the manufacture of components conforming to the requirements of this International Standard.

In order to conform to national requirements on fire regulations, other additives may be used.

Fabricated fittings or parts of fabricated fittings shall be made from pipes and/or mouldings conforming to this International Standard, except for the requirements for the wall thickness of fabricated fittings and/or mouldings made from SAN + PVC which conform to material, mechanical and physical characteristics as required in this International Standard.

NOTE Material conforming to this requirement generally contains 40 % to 60 % of SAN.

### 4.2 Reprocessable and recyclable material

In addition to virgin material, the use of reprocessable material obtained during the production and testing of products conforming to this International Standard is permitted. External reprocessable or recyclable material shall not be used.

NOTE Definitions concerning materials are given in EN 1565-1.

### 4.3 Sealing ring retaining means

Sealing rings may be retained using means made from plastics other than SAN + PVC, provided the joints conform to the requirements given in Clause 9.

### 4.4 Fire behaviour

No specific requirements are set by this International Standard for fire behaviour. Attention is drawn to the need to comply with any relevant national regulations in this respect.

## 5 General characteristics

### 5.1 Appearance

When viewed without magnification, the following requirements shall be met:

- the internal and external surfaces of pipes and fittings shall be smooth, clean and free from grooving, blistering, impurities, pores or any other surface irregularity likely to prevent conformity of pipes and fittings to this International Standard;
- each end of a pipe or fitting shall be cleanly cut, if applicable, and shall be square to its axis.

### 5.2 Colour

Pipes and fittings shall be uniformly coloured through the whole wall.

The recommended colour for pipes and fittings is grey or black.

## 6 Geometrical characteristics

### 6.1 General

All dimensions shall be measured in accordance with ISO 3126.

The figures given in this International Standard are schematic sketches only, to indicate the relevant dimensions. They do not necessarily represent manufactured components. The dimensions given shall be conformed to however.

### 6.2 Dimensions of pipes

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#### 6.2.1 Outside diameters

The mean outside diameter,  $d_{em}$ , shall conform to Table 1 or Table 2, as applicable.

Table 1 — Mean outside diameters (metric series)

Dimensions in millimetres

Nominal size DN/OD	Nominal outside diameter $d_n$	Mean outside diameter	
		min.	max.
32	32	32,0	32,3
40	40	40,0	40,3
50	50	50,0	50,3
63	63	63,0	63,3
75	75	75,0	75,4
80	80	80,0	80,4
90	90	90,0	90,4
100	100	100,0	100,4
110	110	110,0	110,4
125	125	125,0	125,4
160	160	160,0	160,5

Table 2 — Mean outside diameters (series based on inch dimensions)

Dimensions in millimetres

Nominal size DN/OD	Nominal outside diameter $d_n$	Mean outside diameter	
		min.	max.
36	36	36,1	36,5
43	43	42,7	43,1
55	55	55,7	56,1

### 6.2.2 Effective length of pipes

The effective length,  $l$ , of a pipe shall not be less than that declared by the manufacturer and shall be measured as shown in Figure 1. For pipes with sockets, the effective length is considered to be the distance between the pipe ends minus the socket length. For practical reasons, this length is measured to the outside of the socket.

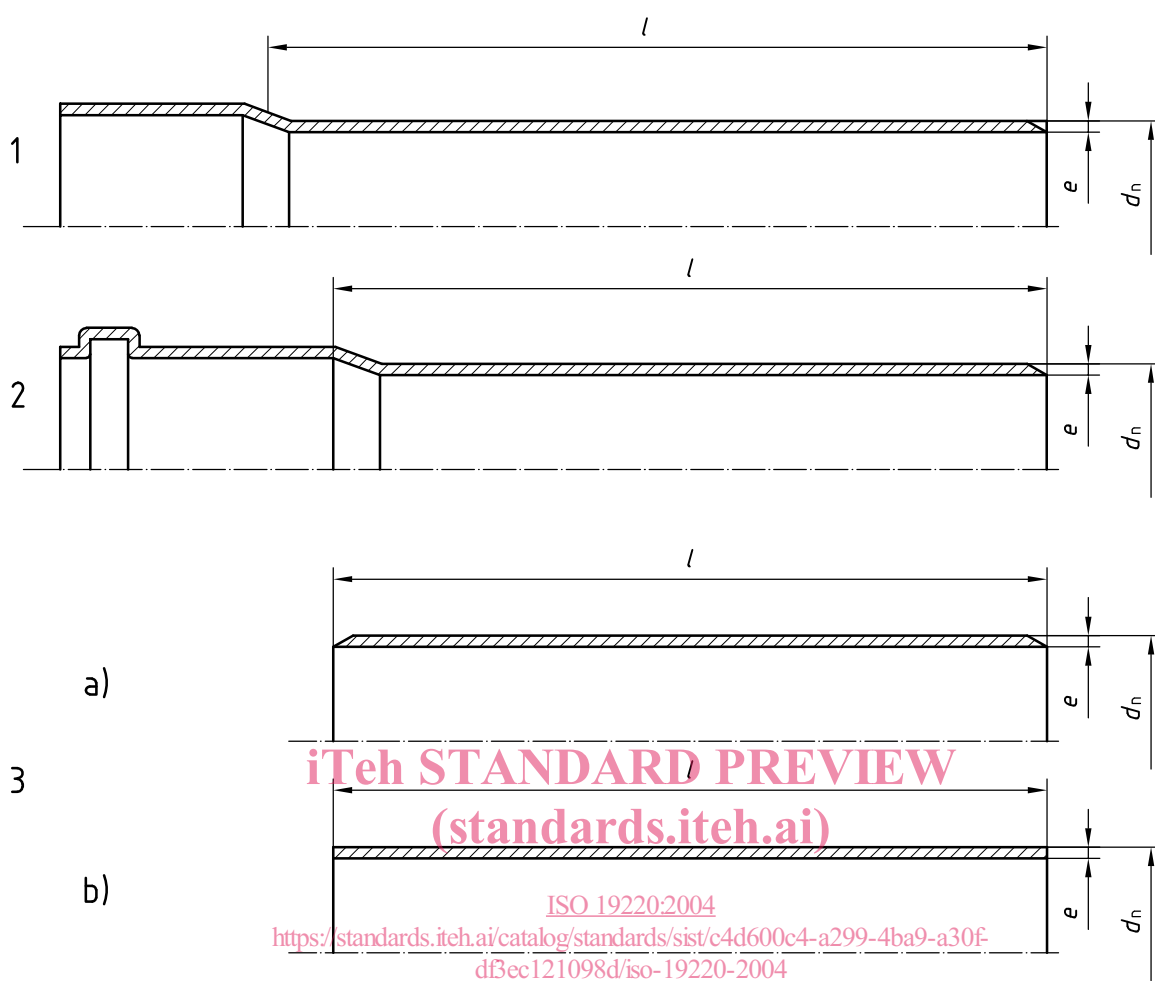
### 6.2.3 Chamfering

If a chamfer is applied, the angle of chamfering shall be between  $15^\circ$  and  $45^\circ$  to the axis of the pipe (see Figure 3). When pipes without chamfer are used, the pipe ends shall be deburred.

The remaining wall thickness of the end of the pipe shall be at least  $1/3$  of  $e_{\min}$ .

### 6.2.4 Wall thickness

The wall thickness,  $e$ , shall conform to Table 3 or Table 4, as applicable, but for the metric series a maximum wall thickness at any point of up to  $1,25e_{\min}$  is permitted, provided that the mean wall thickness,  $e_m$ , is less than or equal to the specified  $e_{m,\max}$ .



**Key**

- 1 solvent cement pipe
- 2 ring seal pipe
- 3 plain-ended pipes
  - a) with chamfer
  - b) without chamfer

**Figure 1 — Effective lengths of pipes**

Table 3 — Wall thicknesses (metric series)

Dimensions in millimetres

Nominal size DN/OD	Nominal outside diameter $d_n$	Wall thickness			
		Pipe series			
		S 25 <sup>a</sup>		S 16,7 <sup>a</sup>	
		$e$ min.	$e_m$ max.	$e$ min.	$e_m$ max.
32	32	1,8	2,2	2,2	2,7
40	40	1,8	2,2	2,2	2,7
50	50	1,8	2,2	2,2	2,7
63	63	1,8	2,2	2,2	2,7
75	75	1,8	2,2	2,5	3
80	80	1,8	2,2	2,6	3,1
90	90	1,8	2,2	2,7	3,3
100	100	2	2,5	3	3,6
110	110	2,2	2,7	3,2	3,8
125	125	2,5	3	3,7	4,3
160	160	3,2	3,8	4,7	5,3

<sup>a</sup> Pipe series are defined in ISO 4065.

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Table 4 — Wall thicknesses (series based on inch dimensions)

Dimensions in millimetres

Nominal size DN/OD	Nominal outside diameter $d_n$	Wall thickness	
		$e$ min.	$e_m$ max.
36	36	1,8	2,2
43	43	1,9	2,3
55	55	2	2,4

## 6.3 Dimensions of fittings

### 6.3.1 Outside diameters

The mean outside diameter,  $d_{em}$ , of the spigot end shall conform to Table 1 or Table 2, as applicable.

### 6.3.2 $z$ -lengths

The design length(s) [ $z$ -length(s)] of fittings (see Figure 8 to Figure 21) shall be as given by the manufacturer.

NOTE The  $z$ -length(s) of a fitting are intended to assist in the design of moulds and are not intended to be used for quality control purposes. ISO 265-1 may be used as a guideline.

### 6.3.3 Wall thickness

The minimum wall thickness,  $e_{min}$ , of the body or the spigot end of a fitting shall conform to Table 3 or Table 4, as applicable, except that a reduction of 5 % resulting from core shifting is permitted. In such cases, the average