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British Standard Method of specifying

# Outside diameters and pressure ratings for pipe of thermoplastics materials (inch series)

Méthode de spécification du diamètre extérieur et de la pression nominale des tuyaux en matières thermoplastiques (série en inches)

Verfahren zur Bestimmung des Außendurchmessers und der Druckstufen bei Röhren aus thermoplastischem Material (Inch-Reihe)

## Foreword

This British Standard has been prepared under the direction of the Plastics Standards Committee and is a revision of BS 3867 : 1969, which was withdrawn in 1978.

The purpose of reinstating this British Standard, which was withdrawn on publication of BS 5556, is to provide a method of specifying the nominal sizes, outside diameters and classification by pressure ratings of plastics pipe that complies with British Standard product specifications where the outside diameters and pressure ratings are based on inch dimensions, e.g. BS 3505. It provides for designation of the sizes by using a nominal size description which corresponds to the old nominal size values in inches. This standard establishes a selection of values from which manufacturers or specifiers may select in specifying thermoplastics pipes. It cannot be used as a product specification as no claim of compliance for pipes can be made to this standard. The manufacturer, however, may claim that pipes have been specified in accordance with this standard. It is intended that this method of specifying be used with the appropriate product specification for the pipe.

The outside diameters given in table 1 and the pressure ratings given in table 2 are in accordance with ISO 161/2-1977, except that table 2 does not include a pressure rating equivalent to 3 bar\*.

The main differences between this revision and the 1969 edition are as follows:

- (a) the series 2 table of nominal sizes and outside diameters has been deleted because this information is now given in BS 5556;
- (b) the pressure rating 'class AA 4.5 bar' has been deleted;

- (c) the pressure ratings are expressed in bar\* with the option of adding a classification letter;
- (d) references to other standards have been updated;
- (e) marking characteristics similar to those of BS 5556 have been introduced.

Attention is drawn to BS 5556, which gives outside diameters and pressure ratings which correspond with or extend those given in ISO 161/1.

Attention is also drawn to CP 312 : Part 1, CP 312 : Part 2 and CP 312 : Part 3, which give guidance on the use of thermoplastics pipes for pressure applications.

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## 1 Scope

This British Standard describes a method of specifying nominal sizes, outside diameters and pressure ratings for circular-section pipes made of thermoplastics materials to inch series sizes, irrespective of their composition or method of manufacture or the purpose for which they are used.

NOTE. The titles of the publications referred to in this standard are listed on page 3.

## 2 Definitions

For the purposes of this British Standard the following definitions apply.

**2.1 working pressure.** The maximum pressure that the pipe can sustain in continuous use.

NOTE. This definition corresponds to the term 'working pressure' used in ISO 161/2.

\* 1 bar =  $10^5$  N/m<sup>2</sup> = 0.1 MPa.

**2.2 pressure rating.** The working pressure of the pipe conveying water at a temperature of 20 °C.

NOTE. This definition corresponds to the term 'nominal pressure' used in ISO 161/2. It is consistent with the use of the term 'pressure rating' in BS 5556 and avoids conflict with the definition of nominal pressure established in ISO 7268.

### 3 Nominal size

The nominal size of the pipe shall be specified as one of the sizes given in table 1.

### 4 Outside diameter of the pipe

**4.1** The outside diameter of the pipe shall be specified in accordance with the nominal size given in table 1.

**4.2** The limits on diameters for each size of pipe shall be specified as a positive and/or negative tolerance, relative to the nominal outside diameter appropriate to the application and material in question, in the form of either:

- (a) limiting values; or
- (b) a positive and/or negative permissible deviation.

NOTE. Values for tolerances are given in the relevant British Standard.

### 5 Pressure rating

The pressure rating of the pipe shall be specified in bar as one of the ratings given in table 2. If required, the class shall also be specified in accordance with table 2.

NOTE. Attention is drawn to the fact that, in comparison with the 1969 edition and in accordance with BS 5556, the pressure rating is expressed in bar without a decimal point and following zero. This is to avoid the possibility of misinterpretation of the pressure rating, and hence the working pressure, through the decimal point becoming obscured in the marking. In accordance with BS 5555, the correct format for 'bar' is lower case lettering. Reference to a classification letter, as shown in column 2 of table 2 and consistent with the 1969 edition, is an optional addition.

### 6 Markings

It shall be specified that the markings on the pipe shall be imprinted in colour in accordance with table 2 to show the manufacturer's identification and, as applicable, the number and date of the appropriate British Standard, the nominal size (see clause 3) and the pressure rating in bar, e.g. 9 bar (see clause 5). It shall also be specified that such markings shall be repeated at intervals of not more than 3 m.

NOTE. Marking intervals of not more than 1 m are preferred.

Table 1. Nominal size and outside diameter

Nominal size	Outside diameter	Nominal size	Outside diameter	Nominal size	Outside diameter
	mm		mm		mm
$\frac{1}{8}$	10.2	3	88.9		
$\frac{1}{4}$	13.5	$3\frac{1}{2}$	101.6	18	457.2
$\frac{3}{8}$	17.2	4	114.3	20	508.0
		5	140.3	22	558.8
$\frac{1}{2}$	21.3	6	168.3	24	609.6
		7	193.7	26	660.4
$\frac{3}{4}$	26.9	8	219.1	28	711.2
1	33.7	9	244.5	30	762.0
$1\frac{1}{4}$	42.4	10	273.0	32	812.8
$1\frac{1}{2}$	48.3	12	323.9	34	863.6
2	60.3	14	355.6	36	914.4
$2\frac{1}{2}$	75.3	16	406.4	40	1016

Table 2. Pressure rating and colour marking

Pressure rating	Class	Colour marking	Nominal pressure in accordance with ISO 161/2*
bar†			MPa
6	B	red	0.6
9	C	black‡ or dark blue	0.9
12	D	green	1.2
15	E	brown	1.5

\* This column is provided for information only and is derived from ISO 161/2-1977.

† 1 bar =  $10^5$  N/m<sup>2</sup> = 0.1 MPa.

‡ This option is at variance with BS 5556 but is included for clarity, especially for use on pipes up to and including nominal size 2 in blue for buried installations for conveying potable water.

### Publications referred to

- BS 3505\* Specification for unplasticized polyvinyl chloride (PVC-U) pressure pipes for cold potable water
- BS 5555\* Specification for SI units and recommendations for the use of their multiples and of certain other units
- BS 5556\* Specification for general requirements for dimensions and pressure ratings for pipe of thermoplastics materials (metric series)
- CP 312\* Code of practice for plastics pipework (thermoplastics materials)
- Part 1 General principles and choice of material
- Part 2 Unplasticized PVC pipework for the conveyance of liquids under pressure
- Part 3 Polyethylene pipes for conveyance of liquids under pressure
- ISO 161/1\* Thermoplastics pipes for the transport of fluids — Nominal outside diameters and nominal pressures — Part 1 Metric series
- ISO 161/2\* Thermoplastics pipes for the transport of fluids — Nominal outside diameters and nominal pressures — Part 2 Inch series
- ISO 7268\* Pipe components — Definition of nominal pressure

\* Referred to in the foreword and/or in a note for information only.

This British Standard, having been prepared under the direction of the Plastics Standards Committee, was published under the authority of the Board of BSI and comes into effect on 23 December 1987.

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The preparation of this British Standard was entrusted by the Plastics Standards Committee (PLM/—) to Technical Committee PLM/9 upon which the following bodies were represented:

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British Plastics Federation  
British Valve Manufacturers' Association Ltd.  
Copper Tube Fittings Manufacturers' Association  
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Department of Transport (Highways)  
Electricity Supply Industry in England and Wales  
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Institution of Gas Engineers  
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Plastics Land Drainage Manufacturers' Association  
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Water Authorities' Association  
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The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Institute of Plumbing  
Ministry of Agriculture, Fisheries and Food  
National Brassfoundry Association  
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