

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 531

CAST IRON SANITARY PIPES AND FITTINGS
FOR WASTE WATER AND VENTILATION

1st EDITION
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BRIEF HISTORY

The ISO Recommendation R 531, *Cast Iron Sanitary Pipes and Fittings for Waste Water and Ventilation*, was drawn up by Technical Committee ISO/TC 5, *Pipes and Fittings*, the Secretariat of which is held by the Association Suisse de Normalisation (SNV).

Work on this question by the Technical Committee began in 1955 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In November 1964, this Draft ISO Recommendation (No. 743) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Belgium	India	Sweden
Canada	Iran	Turkey
Czechoslovakia	Israel	R.A.U.
Finland	Italy	United Kingdom
France	New Zealand	U.S.S.R.
Greece	Poland	Yugoslavia
Hungary	Portugal	
Korea, Rep. of	Spain	

Five Member Bodies opposed the approval of the Draft:

Germany
Netherlands
Norway
Switzerland
U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1966, to accept it as an ISO RECOMMENDATION.

CAST IRON SANITARY PIPES AND FITTINGS FOR WASTE WATER AND VENTILATION

INTRODUCTION

This ISO Recommendation comprises three parts:

- I. Technical specification
- II. Spigot and socket dimensions for pipes and fittings
- III. Pipes and short connecting pipes.

Comments on Part I — Technical specification

This specification applies to cast iron sanitary pipes and fittings used in the building industry for pipe-lines for carrying away waste water and for ventilation, excluding rain water and drain pipe-lines which will, if necessary, be the subject of a separate study.

The distinguishing characteristic of waste water pipe-lines is that they are traversed in a single direction by products flowing under the influence of gravity. For this reason they are laid with a certain amount of slope in the direction of flow. They therefore include portions that descend vertically, obliquely or with a slight slope, excluding any horizontal or ascending portion.

This peculiarity in use and in laying explains why sanitary pipes and fittings always have a "socket" at their upper end (upstream side) and a "spigot" at their lower end (downstream side). Such an arrangement makes it easier to seal the joints between successive elements of the line, in particular when they are placed vertically or with a steep slope.

Among the nominal diameters used in various countries, four have been selected, a given thickness having been allotted to each. The figures and tables in Part III give full information in this connection.

NOTE. — The nominal diameter is a number used only to classify pipes and fittings and to enable them to be associated. It corresponds approximately to the internal diameter of the pipes.

For each casting, the masses have been determined by calculation, taking the density of cast iron as 7.15 kg/dm^3 . This value is intermediate between the values previously specified in various countries which ranged between 7 and 7.25 kg/dm^3 . The value of 7.15 gives good practical agreement between calculated masses and actual masses.

Comments on Part II — Spigot and socket dimensions for pipes and fittings

An annular space has been provided for making the sealed joint between the spigot of one element and the socket of the adjoining element.

The size of the annular space has been so determined, allowing for the tolerances permitted on the dimensions of castings, as to make it easy to make a tight, economical and durable joint.

To ensure a regular joint thickness, provision has been made for a centring surface, either on the outer surface of the spigot or on the inside of the socket, depending on manufacturing processes. In addition, in accordance with the technique used in some countries, provision has been made for an optional groove on the inside of the socket.

These latter provisions, like the details of the external contour of the sockets, do not affect the interchangeability of sanitary pipes and fittings, and it has therefore seemed preferable to leave them to the discretion of the manufacturers.

Comments on Part III — Pipes and short connecting pipes

For each nominal diameter, various lengths have been selected and the corresponding masses of the pipes and short connecting pipes have been determined by calculation from these lengths.

PART I
TECHNICAL SPECIFICATION

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1. SCOPE

This ISO Recommendation applies to cast iron sanitary pipes and fittings used in the building industry for the laying of waste water and ventilation pipe-lines.

2. TYPE OF ENDS

Sanitary pipes and fittings are of the spigot and socket type. They may be supplied with or without the following:

- (a) centring surface at the bottom of the socket or on the outer surface of the spigot,
- (b) bead on the spigot,
- (c) circular groove on the inner surface of the socket near the entry.

3. GRADE OF CAST IRON

The cast iron used for sanitary pipes and fittings should be of good quality. When fractured, it should reveal a close, regular grey grain.

4. QUALITY OF PIPES AND FITTINGS

Sanitary pipes and fittings should be sound and free from surface and other defects.

Pipes and fittings having slight imperfections, which are inevitable as a consequence of the manufacturing processes and are in no way harmful to their use, should not be rejected.

Sanitary pipes and fittings should be such that they can be cut and drilled.

5. MARKS

The nominal diameter and, if necessary, the angle of divergence, should be marked on sanitary pipes and fittings by casting or painting.

6. SPIGOT AND SOCKET DIMENSIONS AND TOLERANCES

The spigot and socket dimensions of sanitary pipes and fittings of all diameters are given in Table J 1 in Part II of this ISO Recommendation.

The spigot and socket tolerances are as follows:

Dimensions	Tolerances on socket and spigot dimensions for nominal diameter <i>DN</i> of			
	50 mm	75 mm	100 mm	150 mm
	mm	mm	mm	mm
External diameter of barrel <i>DE</i>	±3.0	±3.0	±3.5	±4.0
Internal diameter of socket <i>DI</i>	±3.0	±3.0	±3.0	±3.0
Internal depth of socket <i>P</i>	+ 15 - 10	+ 15 - 10	+ 15 - 10	+ 15 - 10

The maximum or minimum clearances resulting from these tolerances are such that sanitary pipes and fittings can be assembled without difficulty.

7. THICKNESSES AND TOLERANCES

Thicknesses of sanitary pipes and fittings are as follows:

Nominal diameter <i>DN</i> mm	Thickness mm
50	3.5
75	3.5
100	4
150	5

Fittings having different internal diameters have a uniform thickness corresponding to the thickness of the larger nominal internal diameter.

The negative tolerance on the standard thickness is specified uniformly as -15% .

No positive tolerance has been specified (see section 9).

8. LENGTHS AND TOLERANCES

Standard manufacturing lengths of pipes and of short connecting pipes are given in the tables of Part III of this ISO Recommendation.

The tolerances on these lengths are as follows:

- Pipes ± 20 mm
- Connecting pipes ± 10 mm

9. MASSES AND TOLERANCES

The standard masses of pipes and of short connecting pipes are given in the tables of Part III of this ISO Recommendation.

The negative tolerance on the standard mass is specified uniformly as -10% .

No positive tolerance has been specified.

NOTE. — Castings whose mass is greater than the standard mass should be accepted provided that they comply with all the other sections in this ISO Recommendation.

10. COATING

Unless otherwise specified, sanitary pipes and fittings should be supplied with external and internal coating.

This coating should dry quickly, adhere well and not flake.

11. INSPECTION

If the buyer wishes to inspect the sanitary pipes and fittings, such inspection should be undertaken at the manufacturer's works.

The buyer or his representative accredited to the manufacturer should be advised in advance of the time when acceptance testing can be done.

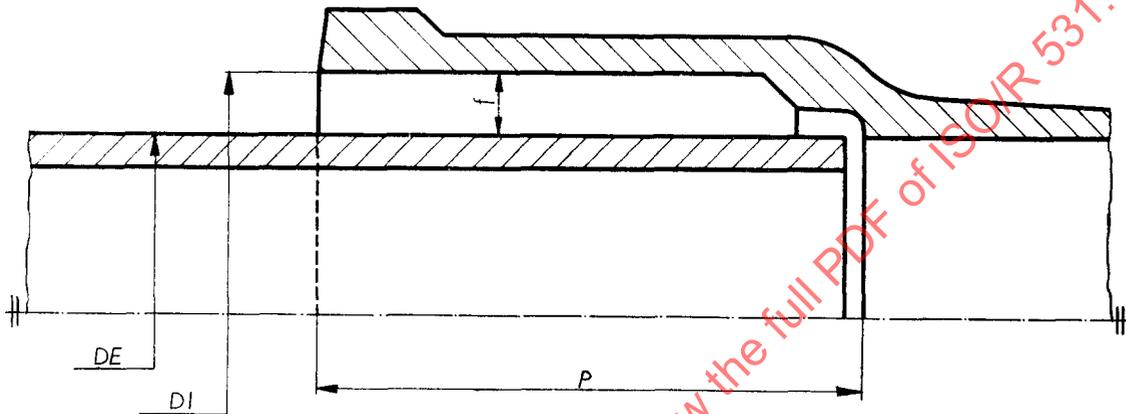
PART II

SPIGOT AND SOCKET DIMENSIONS FOR PIPES AND FITTINGS

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Spigot and Socket Dimensions for Pipes and Fittings

Table
J 1



Dimensions in millimetres

Nominal diameter <i>DN</i>	Barrel	Socket		Joint thickness
	<i>DE</i>	<i>DI</i>	<i>P</i>	<i>f</i>
50	57	73	60	8
75	83	99	65	8
100	109	126	70	8.5
150	161	179	75	9

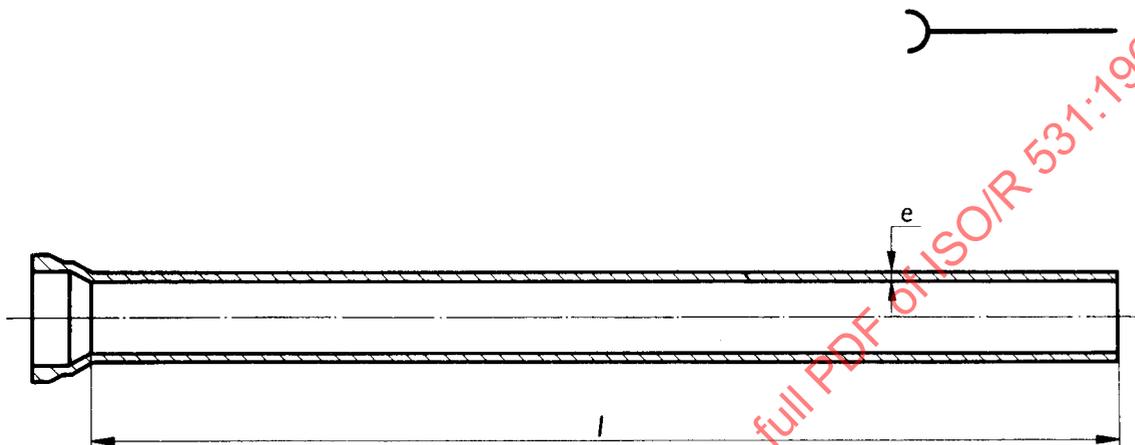
NOTE. — The external profile of the socket is given only as an illustration; it will vary according to the method of manufacture.

PART III

PIPES AND SHORT CONNECTING PIPES

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Pipes

Table
T 1

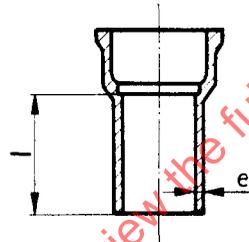
Nominal diameter DN	Thickness e	(Approximate) mass for an effective length l * of						
		3.000 m	2.500 m	2.000 m	1.750 m	1.500 m	1.000 m	0.500 m
mm	mm	kg	kg	kg	kg	kg	kg	kg
50	3.5	—	—	9.2	8.2	7.1	5	2.9
75	3.5	20	16.8	13.8	12.2	10.6	7.4	4.3
100	4	30	25.5	21	18.4	16	11.2	6.5
150	5	56	47	38.5	34	29.5	21	12

* Pipes of intermediate lengths are obtained by cutting a longer pipe.

NOTE. — For spigot and socket dimensions, see Table J 1.

Short Connecting Pipes

Table
T 2



Nominal diameter <i>DN</i>	Thickness <i>e</i>	(Approximate) mass for an effective length <i>l</i> of	
		0.250 m	0.150 m
mm	mm	kg	kg
50	3.5	1.9	1.4
75	3.5	2.7	2.1
100	4	4.1	3.2
150	5	7.6	5.8

NOTE. — For spigot and socket dimensions, see Table J 1.