

Australian/New Zealand Standard™

Methods of test for plastics pipes and fittings

Method 1: Method for determining the dimensions of pipes and fittings

1 SCOPE

This Standard sets out a method for determining the dimensions of plastics pipes and fittings (i.e. outside diameter, wall thickness, length, squareness of pipe ends and internal length, mouth diameter and root diameter of sockets).

NOTE: Other methods, which can be shown to provide an accuracy of the same or of a higher degree, may be used.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1290	Linear measuring instruments used in construction
1290.4	Part 4: Retractable steel pocket rules
1290.5	Part 5: Coated and etched steel measuring tapes
1984	Vernier callipers (metric series)
2101	Internal micrometers (including stick micrometers) (metric series)
2102	Micrometer callipers for external measurement

3 RELEVANCE OF TEST

The dimensions of pipes and fittings are specified in product Standards. This test method sets out procedures for determining the dimensions in a consistent manner.

4 APPARATUS

The following apparatus may be required:

- Diameter tape.*
- Micrometer*—having a fixed spherical end of radius not less than 2 mm and providing an accuracy not less than that specified in the relevant Clauses of AS 2102.
- Internal micrometer*—complying with AS 2101 or telescopic gauge accurate to within ± 0.02 mm.
- External micrometer*—complying with AS 2102.
- Suitable pipe support*—e.g. V-block.
- Steel tape*—complying with AS 1290.4 or AS 1290.5.
- Try square or T-square.*
- Vernier callipers*—complying with AS 1984.
- Vernier depth gauge*—accurate to ± 0.1 mm to measure socket internal length (L).

Other suitable instruments, which can be shown to provide an accuracy of the same or higher degree, may be used.

5 TEMPERATURE OF MEASUREMENT

Field measurements may be taken at ambient temperature, provided dimensions are adjusted to equivalent dimensions at 20°C. For the purpose of this Standard, the coefficient of thermal expansion of plastics pipes and fittings shall be as given in Table 1. For reference purposes only, all measurements shall be taken at 20 ±2°C.

TABLE 1
COEFFICIENT OF THERMAL EXPANSION

Material	Coefficient of thermal expansion
PE	$20.0 \times 10^{-5}/\text{K}$
PVC	$7.0 \times 10^{-5}/\text{K}$
ABS	$10.1 \times 10^{-5}/\text{K}$
PP	$15.0 \times 10^{-5}/\text{K}$

NOTE: For other plastics materials, refer to manufacturers' specifications.

6 CONDITIONING OF TEST SPECIMENS

Immediately prior to measurement test specimens shall be conditioned at 20 ±2°C in either air or water for a period of not less than that indicated in Table 2.

TABLE 2
CONDITIONING TIMES OF TEST SPECIMENS

Minimum wall thickness mm (see Note 1)	Conditioning time in water or moving air (see Note 2)	Conditioning time in still air (see Note 3)
≤5	5 min	15 min
>5 ≤10	15 min	35 min
>10 ≤20	30 min	90 min
>20	2.5 h	5 h

NOTES:

- 1 Minimum wall thickness for the nominal size under test can be determined by reference to the dimensional table(s) in the relevant pipe or fitting Standard.
- 2 These conditioning times apply when the test specimens are immersed in water or a circulating air current is produced by means of a fan or other device.
- 3 This is considered to be a normal laboratory atmosphere.

7 ROUNDING RULES

In this Standard, exactly intermediate values shall be rounded up except where specified otherwise.

NOTE: For instance, values ending in 0.05 are rounded up to 0.1

8 PROCEDURE AND REPORT FOR DETERMINING OUTSIDE DIAMETER

8.1 Maximum and minimum outside diameters, ($D_{o \max.}$ and $D_{o \min.}$)

The procedure shall be as follows:

- Using a micrometer or vernier callipers at right angles to the axis of the pipe or fitting, take a continuous series of diameter measurements on the same cross-section.
- Determine and record the maximum and minimum outside diameters obtained. Values shall be rounded off to the nearest 0.1 mm (see Clause 7).

8.2 Mean outside diameter (D_m)

Calculate and record the mean of the maximum and minimum measurements determined in Clause 8.1 (b).

Direct measurement of mean outside diameter may be made using a diameter tape. Values shall be rounded off to the nearest 0.1 mm (see Clause 7).

8.3 Out-of-roundness

Calculate and record the out-of-roundness as the difference between the maximum outside diameter ($D_{o \max.}$) and the minimum outside diameter ($D_{o \min.}$).

8.4 Report

The following shall be reported:

- The complete identification of the pipe or fitting tested.
- The maximum outside diameter.
- The minimum outside diameter.
- The out-of-roundness.
- The mean outside diameter.
- Reference to this test method, i.e. AS/NZS 1462.1.

9 PROCEDURE AND REPORT FOR DETERMINING WALL THICKNESS

9.1 Maximum and minimum wall thickness ($T_{\max.}$ and $T_{\min.}$)

The procedure shall be as follows:

- Using a micrometer as specified in Clause 4(b), take a series of wall thickness measurements around the circumference at right angles to the axis of the pipe or fitting.
- Determine and record the maximum and minimum wall thickness obtained. Values shall be rounded off in accordance with Table 3 unless otherwise specified in the referring product standard.

TABLE 3
MEASUREMENT OF WALL THICKNESS

Dimensions in millimetres		
Wall thickness	Required accuracy of individual result	Round arithmetic mean value to the nearest: ¹⁾
≤10	0.03	0.05
>10, ≤30	0.05	0.1
>30	0.1	0.1

¹⁾ Exactly intermediate values rounded up (see Clause 7).

9.2 Mean wall thickness

Where required, the mean wall thickness shall be calculated by calculating the arithmetic mean of six measurements taken at approximately equal spacing around the pipe circumference including the minimum and maximum wall thickness from Clause 9.1 (b).

9.3 Report

The following shall be reported:

- (a) The complete identification of the pipe or fitting tested.
- (b) The maximum wall thickness.
- (c) The minimum wall thickness.
- (d) The average wall thickness where required.
- (e) Reference to this test method, i.e. AS/NZS 1462.1.

10 PROCEDURE AND REPORT FOR DETERMINING EFFECTIVE PIPE LENGTH

10.1 Procedure

The procedure shall be as follows:

- (a) Ensure that the pipe is fully supported along its length.
- (b) Measure the overall length of the pipe along a line parallel to the pipe axis using a steel tape.
- (c) For solvent cement socket depth measure as per Figure 1.
- (d) For elastomeric seal joint, measure from the spigot end of the pipe to the furthest edge of the witness mark (see Figure 2).
- (e) Calculate the effective length by subtracting either the socket depth for solvent cement jointing or the distance of the witness mark from the overall pipe length. Record the value rounded down to the nearest 10 mm.

10.2 Report

The following shall be reported:

- (a) The complete identification of the pipe tested
- (b) The overall length in metres
- (c) Where required, the effective length in metres; and,
- (d) Reference to this test method, i.e. AS/NZS 1462.1.