

# Australian Standard™

AS 3572.8

## Plastics—Glass filament reinforced plastics (GRP)—Methods of test

### Method 8: Determination of long-term ring stiffness of glass filament reinforced plastic pipes

#### 1 SCOPE

This Standard sets out a method for determining the long-term ring stiffness of glass filament reinforced plastics pipes.

#### 2 PRINCIPLE

A section of pipe is subjected to a constant, diametral, compressive load and the deflection is measured as a function of time.

#### 3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- |         |                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------|
| 3572    | Plastics —Glass filament reinforced plastics (GRP) —Methods of test                                |
| 3572.1  | Method 1: Preparation of glass filament reinforced plastics test specimens                         |
| 3572.3  | Method 3: Determination of loss on ignition of glass filament reinforced plastics pipes            |
| 3572.4  | Method 4: Determination of the dimensions of glass filament reinforced plastics pipes              |
| 3572.10 | Method 10: Determination of the initial ring stiffness of glass filament reinforced plastics pipes |

#### 4 APPARATUS

The following is required:

- (a) *General* Apparatus consisting of two parallel bearing plates or beam bars between which the specimen is compressed by an external load. This specimen is submerged in a water bath and the load is applied to the specimen with only negligible friction losses (see Figure 1).
- (b) *Loading plates* Loading plates, if used, shall be not less than 5 mm thick and shall not bend or deform during the test. Their length shall be equal to, or greater than, the specimen length.
- (c) *Beam bars* For pipe specimens with a nominal diameter less than 300 mm, beam bars, if used, shall be  $20 \pm 5$  mm in diameter. For larger diameter pipes, the bars shall be  $50 \pm 5$  mm in diameter.
- (d) *Force and deflection measuring equipment* The accuracy of measurement of force shall be  $\pm 1.0\%$  of the indicated value. For measurement of deflection, the accuracy shall be within  $\pm 1.0\%$  of the maximum measured value of change or 0.1 mm, whichever is the greater.



- (e) *Water bath* A water bath containing tap water, which shall be capable of being maintained at a temperature of  $23 \pm 2^\circ\text{C}$ .

## 5 NUMBER OF TEST SPECIMENS

One test specimen shall be tested.

## 6 PREPARATION OF TEST SPECIMEN

The test specimen shall be taken from normal production pipes. The length of the test specimen shall be as specified in Table 1.

Before testing, the test specimen shall have its ends squared and cleaned. It shall not have any burrs, notches or other markings which may affect the test result.

A tolerance of  $\pm 5\%$  on the length is permitted.

**TABLE 1**  
**LENGTH OF TEST SPECIMEN**

| millimetres                  |               |
|------------------------------|---------------|
| Nominal size of pipe<br>(DN) | Length<br>(L) |
| <300                         | DN            |
| $\geq 300, \leq 1500$        | 300           |
| >1500                        | 0.2DN         |

## 7 CONDITIONING

The test specimen shall be conditioned in accordance with AS 3572.1. Except for referee tests, conditioning shall be at ambient conditions.

## 8 TEST CONDITIONS

The test shall be conducted in a water bath maintained at a temperature of  $23 \pm 2^\circ\text{C}$ . To allow for frequent deflection measurements, the initial period of test, of not more than 51 h, may be conducted in air.

## 9 MEASUREMENT OF LENGTH AND INTERNAL VERTICAL DIMENSION, DETERMINATION OF DEFLECTION

The length of the test specimen shall be measured to an accuracy of 1 mm at six places equally spaced around the circumference. The length ( $L$ ) of the test specimen shall be the mean length of these measurements.

During the test, the change in vertical dimension of the test specimen shall be measured at points within 10 mm from each end. The change of internal vertical dimension shall be the average value of these two measurements.

The deflection shall be the difference between the original value of vertical dimension prior to loading, and the value of measured vertical dimension after application of load, taken after the appropriate time interval (see Clause 11(d) of this method).

## 10 DETERMINATION OF INITIAL STIFFNESS

Determine the initial ring stiffness in accordance with AS 3572.10.

## 11 PROCEDURE

The procedure shall be as follows:

- (a) From the initial ring stiffness of the test specimen, determine the load required to compress the test piece by 1.5% of the mean diameter. Measure the outside diameter and wall thickness of the specimen in accordance with AS 3572.4.
- (b) Place the test specimen in the testing machine with diametrically opposite marked lines in contact with the respective upper and lower bearing plates or bars. The contact between the test specimen and the bearing plate or bars shall be as uniform as possible.
- (c) Apply a compressive force in three approximately equal steps, so that a total deflection of  $1.5 \pm 0.5\%$  of the mean diameter is reached within  $2 \pm 0.2$  min. Record the compressive force.
- (d) Maintain the compressive force and determine the deflection of the test specimen after approximate time intervals following commencement of test, of 1, 2, 5, 8, 25, 50, 100, 200, 500, 1 000, 2 000, 5 000 and 10 000 h.

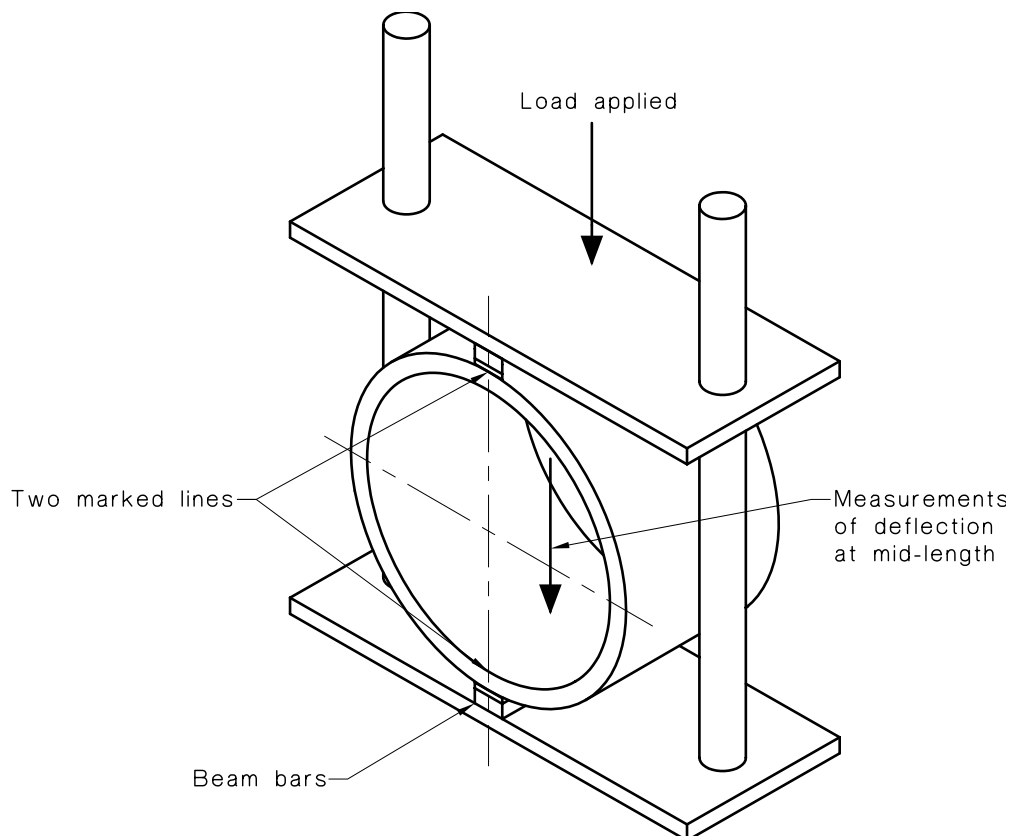


FIGURE 1 TYPICAL APPARATUS WITH BEAM BARS