
International Standard



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Unplasticized polyvinyl chloride (PVC) pipes — Longitudinal reversion — Test methods and specification

Tubes en polychlorure de vinyle (PVC) non plastifié — Retrait longitudinal à chaud — Méthodes d'essai et spécification

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2505 was developed by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*.

This second edition was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It results from the combination into one single document of International Standard ISO 2505-1974 and of draft International Standards ISO/DIS 4449 and ISO/DIS 4450, which were circulated to the member bodies in March 1976 and in July 1977 respectively.

It cancels and replaces the first edition of ISO 2505, which had been approved by the member bodies of the following countries :

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Unplasticized polyvinyl chloride (PVC) pipes — Longitudinal reversion — Test methods and specification

1 Scope and field of application

This International Standard specifies the methods to be used for the determination of the longitudinal reversion of unplasticized polyvinyl chloride (PVC) pipes and lays down the maximum permissible value of this reversion.

This International Standard applies to all unplasticized PVC pipes, whatever their purpose.

2 Test methods

2.1 Method A — Liquid bath immersion test

2.1.1 Principle

Immersion of a test portion of pipe of given length in an inert liquid maintained at a temperature of 150 °C for a period determined in relation to the wall thickness of the pipe.

Measurement, under the same conditions, of a marked length of this portion of pipe, before and after immersion.

Calculation of the reversion as the percentage change in length in relation to the initial length.

2.1.2 Apparatus

2.1.2.1 Heating bath, thermostatically controlled at 150 ± 2 °C.

The volume of the bath shall be such that there is practically no temperature variation while the test pieces are immersed.

Glycerine, glycol, silicone oil, vaseline oil free of aromatic hydrocarbons, or a solution of calcium chloride, may constitute appropriate heating media, but other liquids may also be used.

It must be ensured in all cases that the liquid chosen is stable at the temperatures required, and that it does not affect the product being examined.

Provision shall be made for effective agitation to ensure that the temperature tolerance is maintained throughout the heating medium.

2.1.2.2 Device for suspending the test pieces

2.1.2.3 Thermometer, graduated in 0,5 °C.

2.1.3 Test pieces

2.1.3.1 Take as a test piece a length of pipe of 300 ± 20 mm.

2.1.3.2 Using, for example, a scribe, trace on this test piece two circumferential marks 100 mm apart, so that one of them is at least 10 mm from one of the ends.

2.1.3.3 Prepare three similar test pieces per pipe.

2.1.4 Conditioning

Condition the test pieces for at least 2 h at 23 ± 2 °C.

2.1.5 Procedure

2.1.5.1 Measure at 23 ± 2 °C the distance between the two marks to within 0,25 mm.

2.1.5.2 Regulate the temperature of the heating medium at 150 ± 2 °C.

2.1.5.3 Suspend the test pieces vertically in the heating medium by the end farthest from the marks, so that the portion of the test pieces which is immersed is at least 200 mm long.

The test pieces shall be placed so that they touch neither the walls nor the base of the bath.

2.1.5.4 Leave the test pieces immersed for

- 15 min for pipes of up to 8 mm in thickness;
- 30 min for pipes with thickness of more than 8 mm.

2.1.5.5 Remove the test pieces from the bath, suspend them vertically and, after complete cooling, by exposure to the air, at 23 ± 2 °C, measure, under the same conditions as in 2.1.5.1, the distance between the marks along the maximum and minimum generating lines (diametrically opposed).

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2.2 Method B — Oven test

2.2.1 Principle

Maintenance of a piece of pipe of given length in an oven at 150 °C for a period determined in relation to the wall thickness of the pipe.

Measurement, under the same conditions, of a marked length of this piece of pipe, before and after heating in the oven.

Calculation of the reversion as the percentage variation in length in relation to the initial length.

2.2.2 Apparatus

Air oven, thermostatically controlled, of a heating power such that it can operate at 150 °C and be capable of re-establishing this temperature within 15 min after the introduction of the test pieces.

The oven shall be equipped with a thermostat capable of maintaining the temperature at 150 ± 2 °C.

2.2.3 Test pieces

2.2.3.1 Take as a test piece a minimum length of 200 mm of pipe.

2.2.3.2 Using, for example, a scribe, trace on this test piece two circumferential marks 100 mm apart, so that one of them is at least 10 mm from one end of the test piece.

2.2.3.3 Prepare three similar test pieces per pipe.

2.2.4 Conditioning

Condition the test pieces for at least 2 h at 23 ± 2 °C.

2.2.5 Procedure

2.2.5.1 Measure, at 23 ± 2 °C, the distance between the two marks to within 0,25 mm.

2.2.5.2 Set the oven temperature at 150 ± 2 °C.

2.2.5.3 Place the test pieces in the oven in such a manner that they do not touch the sides or the bottom of the oven.

If the test pieces are suspended, the point of suspension shall be chosen at the end furthest from the reference marks.

If the test pieces are placed horizontally, it is recommended that they be laid on a talc bed.

2.2.5.4 Maintain the test pieces in the oven for :

- 60 min for pipes having a wall thickness less than or equal to 8 mm;

- 120 min for pipes having a wall thickness greater than 8 mm and less than or equal to 16 mm;

- 240 min for pipes having a wall thickness greater than 16 mm.

These periods shall be measured from the time when the temperature of the oven has returned to 150 ± 2 °C.

2.2.5.5 Remove the test pieces from the oven and after complete cooling, by exposure to the air, to 23 ± 2 °C, measure, under the same conditions as in 2.2.5.1, the distance between the marks along the maximum and minimum generating lines (diametrically opposed).

3 Expression of results

3.1 For each test piece, calculate the longitudinal reversion, T , as a percentage, by means of the formula

$$T = \frac{|\Delta L|}{L_0} \times 100$$

where

$$\Delta L = L_0 - L;$$

L_0 is the distance, in millimetres, between the marks before the test;

L is the distance, in millimetres, between the marks after the test, measured along the generatrices, which are usually no longer rectilinear after the test.

Choose the measurement of L which gives the greatest value of $|\Delta L|$ where ΔL could be positive or negative.

3.2 Take, as the value for the longitudinal reversion of the pipe, the arithmetic mean of the values obtained for each of the three test pieces.

4 Test report

The test report shall include the following information :

- a) reference to this International Standard;
- b) full identification of the pipe;
- c) the test temperature; in the case of method A : nature of the heating medium used;
- d) the length variation of each test piece, ΔL , together with its sign (+ or -);
- e) any changes in appearance of the test pieces during the test, or immediately afterwards;
- f) the value for the longitudinal reversion of the pipe, calculated as in clause 3;
- g) all operating details not specified in this International Standard, as well as any incidents likely to have influenced the results.

5 Specification

Using the test conditions in accordance with method A or method B, the value of the longitudinal reversion shall be no greater than 5 %.

After the test, the pieces shall have no bubbles or cracks.

For special applications requiring more stringent specifications, a value different from that laid down above may be adopted, provided that it is lower than the above value.

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