INTERNATIONAL STANDARD

ISO 10466

Second edition
2021-04

Glass-reinforced thermosetting plastics (GRP) pipes — Test method to prove the resistance to initial ring deflection

Tubes en plastiques thermodurcissables renforcés de verre (PRV) — Méthode d'essai pour établir la résistance à la déflexion annulaire initiale

Reference number
ISO 10466:2021(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications.*

This second edition cancels and replaces the first edition (ISO 10466:1997), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 2, "Normative references", has been added;

— subclause 5.3, "Dimension-measuring instruments, capable of determining", has been amended;

— subclause 6.3, "Determination of dimensions", has been amended.

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Glass-reinforced thermosetting plastics (GRP) pipes — Test method to prove the resistance to initial ring deflection

1 Scope

This document specifies a method for testing the ability of glass-reinforced thermosetting plastics (GRP) pipes to withstand specified levels of initial ring deflection without displaying surface damage and/or structural failure.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
vertical deflection
y
vertical change in diameter of a pipe in a horizontal position in response to a vertical compressive load

Note 1 to entry: It is expressed in metres.

3.2
relative vertical deflection
y/d_m
ratio of the *vertical deflection, y*, (3.1) to the *mean diameter,* d_m (3.3), of the pipe

3.3
mean diameter
d_m
diameter of the circle corresponding to the middle of the pipe wall cross-section and given, in metres (m), by either of the following formulae:

$$d_m = d_i + e$$

$$d_m = d_e - e$$

where

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d_i is the internal diameter, in metres;

d_e is the external diameter, in metres;

e is the wall thickness of the pipe, in metres.

3.4
visual evidence of structural failure
unless otherwise specified by the referring standard, a failure apparent in any of the following forms:

— interlaminar separation;

— tensile failure of the glass fibre reinforcement;

— buckling of the pipe wall;

— if applicable, separation of the thermoplastic liner from the structural wall.

3.5
strength-reduction evidence of structural failure
unless otherwise specified by the referring standard, a failure apparent in any of the following ways:

a) during the two-minute inspection period, there is an instantaneous drop in load in excess of 10 % of the maximum load applied;

b) when an instantaneous drop in load of up to 10 % has occurred and the test piece cannot sustain an increase in load equal to twice the reduction in load.

3.6
compressive load
F_1 or F_2
load applied to a pipe to cause a diametric deflection

Note 1 to entry: Compressive load is expressed in newtons.

4 Principle

A length of pipe supported horizontally is loaded throughout its length to compress it diametrically to two successive specified levels of vertical deflection (see Figure 2). The pipe is inspected at the first deflection level for visual evidence of surface damage and/or structural failure and at the second deflection level for visual evidence of structural failure (see 3.4). A performance test for structural integrity is also carried out, as a function of the resistance to loading.

NOTE It is assumed that the following test parameters are set by the standard making reference to this document:

a) the two pipe deflection limits (see 5.1 and 8.3);

b) the length of the test piece (see Clause 6);

c) the number of test pieces (see Clause 6);

d) the test temperature (see 8.1);

e) the surface(s) of the test piece to be inspected for surface damage (see 8.3);

f) the visual characteristics of surface damage and structural failure (see 8.3).

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