

Transformed

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION
R 1167**

PLASTICS PIPES FOR THE TRANSPORT OF FLUIDS

DETERMINATION OF THE RESISTANCE TO INTERNAL PRESSURE

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1167, *Plastics pipes for the transport of fluids – Determination of the resistance to internal pressure*, 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 led to the adoption of a Draft ISO Recommendation.

In November 1967, this Draft ISO Recommendation (No. 1334) 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 :

Australia	India	South Africa, Rep. of
Belgium	Ireland	Spain
Canada	Israel	Sweden
Chile	Italy	Switzerland
Czechoslovakia	Japan	Turkey
Denmark	Korea, Dem. P. Rep. of	U.A.R.
France	Netherlands	United Kingdom
Germany	Norway	U.S.S.R.
Greece	Poland	Yugoslavia

One Member Body opposed the approval of the Draft :

New Zealand

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1970, to accept it as an ISO RECOMMENDATION.

PLASTICS PIPES FOR THE TRANSPORT OF FLUIDS

DETERMINATION OF THE RESISTANCE TO INTERNAL PRESSURE

1. SCOPE

This ISO Recommendation describes the testing apparatus and the test procedure to be applied for determining the resistance of plastics pipes to a constant internal pressure and the bursting time of these pipes.

The test requirements are given in the specification concerning the types of pipes under test.

2. PRINCIPLE OF METHOD

The method consists in subjecting specified lengths of pipe to a specified constant internal pressure for a specified period of time, or until the test piece bursts.

The test pieces are conditioned before testing, and throughout the test they are kept at a specified constant temperature equal to the conditioning temperature. The tests are carried out "with water under water" (see clause 7.6).

NOTE. – The method is based on the correlation between the circumferential stress exerted on the pipe and the time after which bursting is observed.

Consequently, it is based also on the shape of the circumferential stress/bursting time curve, which can be obtained by submitting a number of test pieces to various pressures. The shape of this curve depends on

- the nature of the product used (PVC; PE, high-density; PE, low-density; etc.);
- the processing conditions of the material.

If the tests are performed at elevated temperature, the circumferential stresses required to produce bursting decrease, but the shape of the curve is maintained.

At elevated temperatures, singularities in this curve, in particular points of flexion, develop sooner. This circumstance is utilized to facilitate extrapolation.

The extrapolation, by suitable methods, of the circumferential stress/bursting time curve, determined at 20 °C in accordance with the test conditions fixed by this method, allows approximate estimation of the maximum circumferential stress which the pipe can withstand, without bursting, over a reasonably long period, say 50 years.

The ratio between this maximum circumferential stress obtained by extrapolation and the circumferential stress to which the pipe will be subjected in continuous service defines what is called a "factor of safety", which is only applicable when water under pressure at a temperature of 20 °C is transported. It makes allowance for the service conditions of the pipe, its handling qualities, etc.

For applications where higher temperatures and/or higher aggressiveness of the fluids to be transported are to be expected, special tests can be considered.

Two types of test are provided for :

- *Acceptance tests*, carried out at a temperature of 20 °C.
These allow a fast verification of the conformity of a batch of pipes to a specified type.
- *Quality tests*, carried out at an elevated temperature as a function of the nature of the pipe tested. These allow evaluation of the standard of the production and the pipe material used.

The first type of test may be applied by the manufacturer for the continuous inspection of his products and/or by the consumer for the acceptance of a batch of pipes.