
**Thermoplastics pipes — Determination of
resistance to external blows — Staircase
method**

*Tubes en matières thermoplastiques — Détermination de la résistance aux
chocs extérieurs — Méthode en escalier*



Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11173 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Thermoplastics pipes — Determination of resistance to external blows — Staircase method

1 Scope

This International Standard specifies a method for determining the resistance to external blows of thermoplastic pipes of circular cross-section; it is called the staircase method.

This method is applicable to isolated batches of pipe to be tested at 0 °C.

NOTE 1 If testing below 0 °C is necessary, the temperature of – 20 °C is recommended.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6603-1:1985, *Plastics — Determination of multi-axial impact behaviour of rigid plastics — Part 1: Falling dart method*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 drop height for 50 % failure, H_{50} : Height of fall of a striker of specified mass, which provokes failure of 50 % of test pieces from samples of pipe taken to represent a batch.

NOTE 2 In practice, test pieces are drawn at random from the batch and the result is only an estimate of the H_{50} for that batch.

3.2 failure: Unless otherwise specified in the product standard, shattering or any crack or split on the inside of the pipe that was caused by the impact and that can be seen by the naked eye (lighting devices may be used to assist in examining the specimens).

Indentation of the test piece or a crease on the surface shall not be considered a failure.

4 Principle

Test pieces, comprising cut lengths of pipe, are each subjected to a single blow by a falling striker of specified mass and shape dropped from one of a sequence of different heights onto a random position around the circumference of the pipe.

If a test piece fails, the drop height for the next blow is decreased by a predetermined amount. If a test piece does not fail, the drop height for the next blow is increased accordingly. If sufficient test pieces are used, the H_{50} value of a batch, or a production run from an extruder, can be calculated.

The severity of this test method can be adjusted by changing the mass of the striker and/or the test temperature.

5 Apparatus

5.1 Falling-weight testing machine, incorporating the following basic components (see figure 1).

5.1.1 Main frame, with guide rails or a guiding tube rigidly fixed in the vertical position, to accommodate a striker (5.1.2) and release it to fall vertically and freely. When calibrated, the speed of the striker at the moment of impact shall be not less than 95 % of the theoretical speed.