
**Thermoplastics pipes — Resistance
to liquid chemicals — Classification —**

Part 1:
Immersion test method

*Tubes en matières thermoplastiques — Résistance aux liquides
chimiques — Classification —*

Partie 1: Méthode d'essai d'immersion



Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 4433-1 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 3, *Plastics pipes and fittings for industrial applications*.

Together with the other parts (see below), this part of ISO 4433 cancels and replaces ISO 4433:1984, which has been technically revised.

ISO 4433 consists of the following parts, under the general title *Thermoplastics pipes — Resistance to chemical fluids — Classification*:

- *Part 1: Immersion test method*
- *Part 2: Polyolefin pipes*
- *Part 3: Unplasticized poly(vinyl chloride) (PVC-U), high-impact poly(vinyl chloride) (PVC-HI) and chlorinated poly(vinyl chloride) (PVC-C) pipes*
- *Part 4: Poly(vinylidene fluoride) (PVDF) pipes*

Annexes A to C of this part of ISO 4433 are for information only.

© ISO 1997

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Introduction

Because of their varied applications, thermoplastics pipes are frequently required to convey or be in contact with materials such as chemical products, fuels, lubricants, and sometimes their vapours.

Under the action of a liquid, the wall of a thermoplastics pipe can be the location for several concurrent phenomena; on the one hand, absorption of liquid and/or extraction of its soluble constituents from the pipe walls into the liquid; on the other hand, a chemical reaction usually involving a significant change in the properties of the pipe. The phenomena also differ according to the external and internal stresses affecting the pipes conveying the products (e.g. temperature, pressure, wall thickness).

By stresses are meant those forces caused by internal or external factors such as temperature, variation of temperature, inside pressure, bending, internal stresses. Internal stresses could be caused, for instance, by fast quenching of thick-walled pipes.

As the conditions of use vary a great deal, it is important to carry out a preliminary determination of the chemical resistance of thermoplastics pipes by means of simple, straightforward tests.

The purpose of this International Standard is to provide a procedure for the experimental test methods.

Some liquids (e.g. wetting agents) may cause cracking in specimens subject to tensile stress, whilst not affecting the properties of specimens not under stress. The strip bending test as specified in ISO 4599^[3] (see annex C) or the constant tensile stress method as specified in ISO 6252^[4] will give an indication of the susceptibility of the material to stress cracking. For polyolefin materials, attention is also drawn to ISO 13480^[7].

The extrapolation of the results obtained with this method, expressed as:

satisfactory resistance	S
limited resistance	L
non-satisfactory resistance	NS

for any kind of pipe or fitting may be made only when high internal stresses are not induced in the pipe.

In order to assess the behaviour of pipes and fittings for the conveyance of liquids under pressure or in the presence of other stresses, in cases when the preliminary classification is S or L, it will be necessary to carry out further tests as specified in ISO 8584-1^[5].

NOTES

1 This International Standard is also applicable to thermoplastics sheet as appropriate.

2 A collection of results obtained by this method for several types of plastics is contained in ISO/TR 10358.

This document is a preview generated by EVS

Thermoplastics pipes — Resistance to liquid chemicals — Classification —

Part 1: Immersion test method

1 Scope

1.1 This part of ISO 4433 specifies a method for carrying out a preliminary evaluation of the behaviour of thermoplastics pipes in relation to the liquid chemicals transported.

1.2 This method of classification provides information on the suitability of pipes for transporting liquid chemicals in the absence of pressure or stresses such as earth loads, dynamic stresses and internal stresses.

1.3 A full procedure for carrying out the test is also reported in ISO 175, which is devoted to plastics in general, and not specifically to thermoplastics pipes.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4433. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4433 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 175:1981, *Plastics — Determination of the effects of liquid chemicals, including water.*

ISO 527-2:1993, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics.*

ISO 5893:1993, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Description.*

ISO 6259-2:—¹), *Thermoplastics pipes — Determination of tensile properties — Part 2: Pipes made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C) and high-impact poly(vinyl chloride) (PVC-HI).*

ISO 6259-3:—¹), *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes.*

1) To be published.