SLOVENSKI STANDARD
SIST ISO 4433:1995

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Poliolefinske cevi - Odpornost na tekoče kemikalije - Preskus z metodo potapljanja - Sistem za predhodno razvrstitev

Polyolefin pipes -- Resistance to chemical fluids -- Immersion test method -- System for preliminary classification

Tubes en polyoléfines -- Résistance aux fluides chimiques -- Méthode d'essai par immersion -- Système de classification préliminaire

Ta slovenski standard je istoveten z: **ISO 4433:1984**

ICS:

23.040.20 Cevi iz polimernih materialov Plastics pipes

SIST ISO 4433:1995 **en**

International Standard 4433

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Polyolefin pipes — Resistance to chemical fluids — Immersion test method — System for preliminary classification

Tubes en polyoléfines — Résistance aux fluides chimiques — Méthode d'essai par immersion — Système de classification préliminaire

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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 4433 was developed by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, and was circulated to the member bodies in May 1983.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Austria	Israel	South Africa, Rep. of
Belgium	Italy	Spain
Canada	Japan	Sweden
Czechoslovakia	Morocco	Switzerland
Finland	Netherlands	United Kingdom
France	Norway	USA
Germany, F. R.	Poland	USSR

No member body expressed disapproval of the document.

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Polyolefin pipes — Resistance to chemical fluids — Immersion test method — System for preliminary classification

0 Introduction

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

Under the action of a liquid, the wall of a polyolefin 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 (temperature, pressure, wall thickness, etc.).

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

The extrapolation of the results obtained with this method, to any kind of pipes, can be made only when strong internal stresses are not induced in the pipes.

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

The purpose of this International Standard is to provide :

— a procedure;

— a standardized system for preliminary classification relating to the behaviour of pipes in relation to the chemical agents directly applicable to the transport of fluids in the absence of pressure.

If the pipes are to be used under stress, for example for transporting fluids under pressure, the method only allows incompatibilities between the fluid and the material to be detected; a "satisfactory" or "limited" result must be confirmed by subsequent tests according to a method under study in TC 138/SC 3, with the "corrosion factor" being determined under stress.

Some fluids may induce environmental stress-cracking effects.[1)]

1 Scope and field of application

1.1 This International Standard specifies a method to be used when carrying out a preliminary evaluation of the behaviour of polyolefin pipes in relation to the chemical fluids transported.

1.2 This standardized method of classification provides information on the suitability of pipes for transporting chemical fluids in the absence of pressure or stresses (earth loads, dynamic stresses, internal stresses, etc.).

1.3 A full procedure for carrying out the test is also reported in ISO 175, devoted to plastics in general, not in particular to polyolefin pipes.

2 References

ISO 175, *Plastics — Determination of the action of liquid chemicals, including water.*

ISO 527, *Plastics — Determination of tensile properties.*[2)]

ISO 1516, *Paints, varnishes, petroleum and related products — Flash/no flash test — Closed cup equilibrium method.*

ISO 3680, *Paints, varnishes, petroleum and related products — Flash/no flash test — Rapid equilibrium method.*

ISO 4451, *Polyethylene (PE) pipes and fittings — Determination of reference density of uncoloured and black polyethylene.*

ISO 6259, *Polyethylene (PE) pipes — Determination of tensile properties.*[3)]

1) For these cases, see ISO 4600 and ISO 4652.

2) At present at the stage of draft. (Revision of ISO/R 527-1966.)

3) At present at the stage of draft.

3 Symbols

The following symbols are used to indicate the behaviour of pipes in contact with chemical agents :

"S" : satisfactory resistance

The pipes can be used for applications where there is no pressure or other stress; for applications where there is pressure, the final evaluation shall be on the basis of a subsequent test under pressure.

"L" : limited resistance

The pipes can be used for applications where there is no pressure or other stress, but a certain amount of corrosion can be accepted; for applications where there is pressure, the final evaluation shall be on the basis of a subsequent test under pressure.

"NS" : non-satisfactory resistance

The pipes are severely attacked : they shall not be used for either pressure or non-pressure applications; there is no purpose in conducting tests under pressure as the results would certainly be unfavourable.

4 Principle of method

4.1 Standardized specimens (of the type used for tensile tests) are taken from pipes with normal wall thickness and made from the material to be tested.

4.2 The specimens are completely immersed in the chemical fluid being tested.

4.3 The immersion periods are standardized and chosen according to the change in mass of the specimens as a function of time.

4.4 The classification is based on the variation in certain properties of the specimens in the standardized tensile test when they have been immersed in the fluid for the standard times.

NOTE — Additional information is required when

— the pipes are permeable to the fluids transported;

— surface electrostatic charges can present a risk (fluids the flash point of which is less than 55 °C; the flash point can be determined according to ISO 1516 or ISO 3680);

— the immersion liquid can produce particular effects, such as stress cracking phenomena, which this method does not cover.

Section one : Test method

5 General test conditions

The general test conditions are those described in ISO 175 with the following more detailed specifications.

5.1 Test liquids

5.1.1 When information is required on the behaviour of a polyolefin pipe used to transport a specific liquid, this liquid shall normally be used.

5.1.2 The composition of industrial liquids is not, in general, absolutely constant; whenever possible, therefore, the test shall be carried out in defined chemical fluids used on their own or in mixtures and as representative as possible of the action of the products in question.

5.2 Test temperatures

Maintain the test liquid by suitable means at one of the temperatures in the table below.

NOTE — In the case of liquid having a boiling point below a temperature given in the table, the test must be carried out at the boiling point of the liquid.

5.3 Specimens

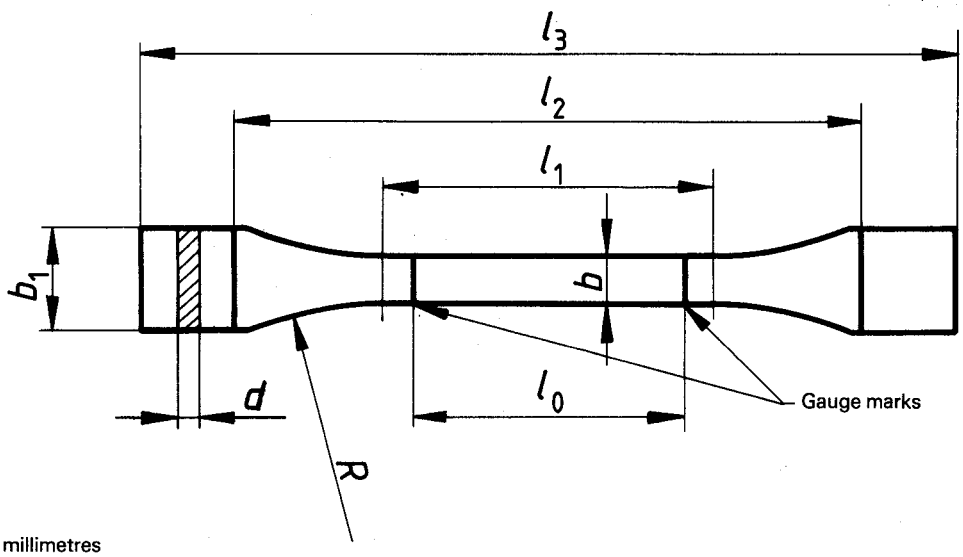
5.3.1 Type of specimen

The shape and dimensions of this test piece are given in figure 1.

This test piece is half the size of test piece type 1 specified in ISO 527.

Table — Test temperatures

Material \ Temperature, °C	23 ± 2	60 ± 2	80 ± 2	100 ± 2	120 ± 2
HDPE	x	x	x	x	—
LDPE	x	x	x	—	—
PP	x	—	x	x	x
PB	x	—	x	x	—



Dimensions in millimetres

l_3 Overall length, min. : 75

b_1 Width at ends : 10 ± 0,5

l_1 Length of narrow parallel portion : 30 ± 0,5

b Width of narrow parallel portion : 5 ± 0,5

R Radius, min. : 30

l_0 Distance between gauge marks : 25 ± 0,5

l_2 Initial distance between grips : 60 ± 5

d Thickness (see ISO 6259)

Figure 1 — Test piece