INTERNATIONAL STANDARD

ISO 9393-2

First edition
1997-04-15

Thermoplastics valves — Pressure test methods and requirements —

Part 2:
Test conditions and basic requirements for PE, PP, PVC-U and PVDF valves

Robinets en matériaux thermoplastiques — Méthodes d'essai de pression hydrostatique et exigences —

Partie 2: Conditions d'essai et exigences de base pour les robinets en PE, PP, PVC-U et PVDF

Reference number
ISO 9393-2:1997(E)

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 9393-2 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 7, *Valves and auxiliary equipment of plastics materials*.

ISO 9393 consists of the following parts, under the general title *Thermoplastics valves — Pressure test methods and requirements*:

— *Part 1: General*

— *Part 2: Test conditions and basic requirements for PE, PP, PVC-U and PVDF valves*

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Printed in Switzerland

Thermoplastics valves — Pressure test methods and requirements —

Part 2:
Test conditions and basic requirements for PE, PP, PVC-U and PVDF valves

1 Scope

This part of ISO 9393 specifies the test parameters and conditions for hydrostatic-pressure tests on valves made of the following thermoplastic materials:

— **polyethylene (PE)**

PE 100, PE 80, as defined in ISO 12162

— **polypropylene (PP)**

homopolymer (PP-H)
block copolymer (PP-B)
random copolymer (PP-R)
glass-reinforced polypropylene (PP-R-GR)

— **unplasticized poly(vinyl chloride) (PVC-U)**

material having an MRS equal to or greater than 25 MPa as defined in ISO 12162 (PVC-UH) (see ISO 4422-3)

— **poly(vinylidene fluoride) (PVDF) homopolymer** as defined in ISO 12162

The tests cover the following aspects:

— the material used for manufacturing valves;
— the pressurized valve components;
— the complete valve.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9393. 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 9393 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 4422-3:1996, *Pipes and fittings made of unplasticized poly(vinyl chloride) (PVC-U) for water supply — Specifications — Part 3: Fittings and joints.*

ISO/TR 9080:1992, *Thermoplastics pipes for the transport of fluids — Methods of extrapolation of hydrostatic stress rupture data to determine the long-term hydrostatic strength of thermoplastics pipe materials.*

ISO 9393-1:1994, *Thermoplastics valves — Pressure test methods and requirements — Part 1: General.*

ISO 12162:1995, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient.*

3 Material test

3.1 The material shall be tested in accordance with the conditions and requirements given in ISO/TR 9080 or equivalent and classified in accordance with ISO 12162.

3.2 It is not necessary to retest material which has already been tested by the material supplier.

4 Shell test

4.1 Test conditions

The test specimen described in 5.2 of ISO 9393-1:1994 shall be subjected to the applicable test conditions given in table 1.

Table 1 — Conditions for shell test

Material	Minimum test time	Test pressure[1)]	σ_s [2)]	Temperature	Test fluid	
	h	bar		°C	Inside	Outside
PE 100	100	1,55 × PN	8	20 ± 2	Water	Water
	165	0,69 × PN		80 ± 2	Water	Water
	1 000	0,62 × PN		80 ± 2	Water	Water
PE 80	100	1,59 × PN	6,3	20 ± 2	Water	Water
	165	0,73 × PN		80 ± 2	Water	Water
	1 000	0,63 × PN		80 ± 2	Water	Water
PP-H and PP-R-GR	1	4,2 × PN	5	20 ± 2	Water	Water
	1 000	0,7 × PN		95 ± 2	Water	Water or air
PP-B	1	3,2 × PN	5	20 ± 2	Water	Water
	1 000	0,52 × PN		95 ± 2	Water	Water or air
PP-R	1	3,2 × PN	5	20 ± 2	Water	Water
	1 000	0,7 × PN		95 ± 2	Water	Water or air
PVC-U	1	4,2 × PN	10	20 ± 2	Water	Water
	1 000	3,2 × PN		20 ± 2	Water	Water
PVC-UH						
$d_n < 160$	1	4,2 × PN	10	20 ± 2	Water	Water
	1 000	3,2 × PN		20 ± 2	Water	Water
$d_n \geqslant 160$	1	3,36 × PN	12,5	20 ± 2	Water	Water
	1 000	2,56 × PN		20 ± 2	Water	Water
PVDF	200	0,72 × PN	16	95 ± 2	Water	Water or air

1) The test pressures p_{test} were calculated from the following equation:

$$p_{test} = PN \times \frac{\sigma_t}{\sigma_s}$$

where

σ_t is the induced stress under the test conditions;

σ_s is the design stress in megapascals.

2) σ_s = design stress in megapascals.

1 bar = 0,1 MPa = 0,1 N/mm^2 = 10^5 N/m^2