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Industrial valves - Ball valves of thermoplastic materials (ISO/DIS 16135:2004,IDT)

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Postbus 5059, 2600 GB Delft
Telefoon (015) 2 690 390, Fax (015) 2 690 190

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English version

Industrial valves - Ball valves of thermoplastic materials (ISO/DIS 16135:2004)

Robinetterie industrielle - Robinets à tournant sphérique en matériaux thermoplastiques (ISO/DIS 16135:2004)

Industriearmaturen - Kugelhähne aus Thermoplasten (ISO/DIS 16135:2004)

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Foreword

This document (prEN ISO 16135:2004) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 138 “Plastics pipes, fittings and valves for the transport of fluids”.

This document is currently submitted to the third parallel Enquiry.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with the EU Directives 97/23/EC (Pressure Equipment) and 89/106/EC (Construction Products), see annexes ZA and ZB, which are integral parts of this standard.

1 Scope

1.1 Valves for general use

This European Standard specifies requirements and tests for ball valves of thermoplastic materials for isolating service, for control service, and to divert/mix fluids.

This standard is applicable to hand or power operated valves to be installed in industrial pipe systems, irrespective of the field of application and the fluids to be conveyed.

NOTE 1 Industrial pipe systems include systems for water supply for general purposes, drainage and sewerage.

NOTE 2 Special requirements may apply to systems for water for human consumption.

The range of DN is:

DN 8, DN 10, DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 and DN 150.

The range of PN and Class is:

PN 6, PN 10, PN 16, PN 25, Class 150 and Class 300.

The requirements specified by this standard concern the design, functional characteristics and manufacture of ball valves, their connection to the pipe system, the body materials and their pressure/temperature rating between – 40 °C up to + 120 °C, for a lifetime of 25 years.

1.2 Valves for special use

Additional regulatory requirements, see 4.2.2, 4.3.2 and 4.8.4 are included in this standard for valves installed in

— drainage systems for liquids from highways,

— drainage and disposal systems for buildings,

— supply to and distribution in buildings of liquids, including liquid fuels,

— supply to and distribution in buildings of gas, including gaseous fuels.

Valves of thermoplastic materials shall not be used in fire extinguishing pipe systems installed in buildings.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

EN 558-1, *Industrial valves — Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems — Part 1: PN-designated valves.*

EN 558-2, *Industrial valves — Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems — Part 2: Class-designated valves.*

EN 736-1, *Valves — Terminology — Part 1: Definition of types of valves.*

EN 736-2, *Valves — Terminology — Part 2: Definition of components of valves.*

EN 736-3, *Valves — Terminology — Part 3: Definition of terms.*

EN 805, *Water supply — Requirements for systems and components outside buildings*.

EN ISO 898-1*, Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs (ISO 898-1:1999).*

EN 1092-1, *Flanges and their joints-circular flanges for pipes, values, fittings and accessories, PN designated — Part 1: Steel flanges.*

EN 1267, *Valves — Test of flow resistance using water as test fluid.*

EN 1333, *Pipework components — Definition and selection of PN.*

prEN 1759-1:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, class designated — Part 1: Steel flanges, NPS ½ to 24.*

prEN 1759-3:1994, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, class designated — Part 3: Copper alloy and composite flanges.*

EN ISO 5211, *Industrial valves — Part-turn actuator attachments (ISO 5211:2001)*.

EN ISO 6708, *Pipework components — Definition and selection of DN (nominal size) (ISO 6708:1995).*

EN 12107, *Plastics piping systems — Injection-moulded thermoplastics fittings, valves and ancillary equipment — Determination of long-term hydrostatic strength of thermoplastics materials for injection moulding of piping components.*

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

EN 12266-1, *Industrial valves — Testing of valves — Part 1: Pressure tests, test procedures and acceptance criteria – Mandatory requirements.*

EN 12570, *Industrial valves — Method for sizing the operating element.*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests.*

prEN ISO 15493:2002, *Plastics piping systems for industrial application — ABS, PVC-U and PVC-C — Specifications for components and piping systems — Part 1: Metric series (ISO/DIS 15493-1:1999).*

prEN ISO 15494:2002, *Plastics piping systems for industrial applications — PE, PB and PP — Specifications for components and piping systems — Part 1: Metric series (ISO/DIS 15494-1:1999).*

EN 28233, *Thermoplastics valves — Torque — Test method (ISO 8233:1988).*

EN 28659, *Thermoplastic valves — Fatigue strength — Test method (ISO 8659:1989).*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation.*

ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation.*

ISO 9393-2:1997, *Thermoplastics valves — Pressure test methods and requirements — Part 2: Test conditions and basic requirements for PE, PP, PVC-U and PVDF valves.*

ISO 10931-1*, Plastics piping systems for industrial applications — Poly(vinylidene fluoride) (PVDF) — Part 1: General*.

ISO 12092, *Fittings, valves and other piping system components, made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C) acrylonitrile-butadiene-styrene (ABS) and acrylonitrile-styrene-acrylester (ASA) for pipes under pressure — Resistance to internal pressure — Test method.*

3 Terms and definitions

For the purposes of this European Standard the definitions given in EN 736-1, EN 736-2 and EN 736-3 and the following apply:

3.1
DN
see EN ISO 6708

3.2
PN
see EN 1333

3.3
Class
see prEN 1759-3:1994

NOTE This definition is for flanges only. Other definitions of Class may be used, e.g. for the resistance to fire (EN 13501-1).

3.4
PMA
see EN 805

NOTE EN 805 defines PMA as maximum allowable pressure at 20 °C. The PED designates PS (maximum allowable pressure) irrespective of temperature. The values of PMA and PS are identical at 20 °C.

3.5
trim
trim (see EN 736-2) is all inside parts of the valve in contact with the fluid

3.6
f_r
is the rating factor used in the relationship between PMA and PN or Class. It is used to calculate the maximum allowable pressure PMA at temperatures other than 20 °C

3.7
F and F_s
see EN 12570

Additional definitions for thermoplastic materials are given in prEN ISO 15493:2002 and prEN ISO 15494:2002.

4 Requirements

4.1 Design

4.1.1 Valve function

2-way ball valves in accordance with this standard shall be suitable for isolating service and may be used for control service.

Multi-way ball valves in accordance with this standard shall be suitable to divert/mix the flow. They may be suitable also for isolating one or more ways.

4.1.2 Design characteristics

4.1.2.1 The valve type design shall be the responsibility of the manufacturer. Annex B gives possible guidance on type alternatives for multi-way ball valves.

4.1.2.2 Valves shall have the following design characteristics:

a) For 2-way ball valves only:

a design of valve obturation suitable for flow in both directions;

If the sealing capability is in one direction only, this shall be marked by an arrow on the outside of the valve body as specified in item 10 of Table 2.

b) A ball that is turned by a shaft and that is fixed by friction in the end position and in all intermediate positions, so that the hydraulic forces of the flow cannot turn the ball from the actual position.

In accordance with EN 736-3, the ball bore shall be:

— either full bore, i.e. not less than 90 % of DN expressed in millimetres (mm):
or
— reduced bore, in which case the manufacturer shall specify the actual bore diameter.

c) A shaft that

— is fixed in the body and blow-out proof according to EN 736-3;
— has a shaft sealing system by self-sealing elastomeric elements;
— indicates by design or marking at the visible end the orientation of the ball bore (2-way ball valves only) or the pattern of the flow passage in the ball (multi-way ball valves only);
— is connected to the ball in such design that the position indication or the marking (as described above) cannot be changed, even after disassembling and re-assembling.

4.1.2.3 Valves may have:

a) a soft seat method of obturation with sealing element(s) in the valve body.

4.1.3 Types of valve end connections

The types of valve end connections shall be chosen from the following alternatives:

— butt fusion ends;

— spigot ends for cementing;

— socket ends for electro-fusion;

— socket ends for heated tool welding;

— socket ends for cementing;

— socket ends for/with elastomeric seal rings;

— flanged ends;

— wafer type ends;

— threaded ends;

— union ends.

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