



BSI Standards Publication

Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE)

Part 4: Valves

National foreword

This British Standard is the UK implementation of EN 1555-4:2025. It supersedes BS EN 1555-4:2021, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/88, Plastics piping systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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distribution de combustibles gazeux - Polyéthylène
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Kunststoff-Rohrleitungssysteme für die Gasversorgung
- Polyethylen (PE) - Teil 4: Armaturen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 1555-4:2025) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2026, and conflicting national standards shall be withdrawn at the latest by April 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1555-4:2021.

EN 1555-4:2025 includes the following significant technical changes with respect to EN 1555-4:2021:

- reference to information related to the suitability of PE pipe systems for 100 % hydrogen and its admixtures with natural gas has been made.

EN 1555 consists of the following parts:

- EN 1555-1, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*;
- EN 1555-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*;
- EN 1555-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*;
- EN 1555-4, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 4: Valves* (this document);
- EN 1555-5, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system*;

In addition, the following document provides guidance on the assessment of conformity:

- CEN/TS 1555-7, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 7: Guidance for assessment of conformity*.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document, specifies the requirements for a piping system and its components made from polyethylene (PE) and which is intended to be used for the supply of gaseous fuels.

Requirements and test methods for material and components, other than valves, are specified in EN 1555-1, EN 1555-2 and EN 1555-3.

Characteristics for fitness for purpose are covered in EN 1555-5. CEN/TS 1555-7 [1] gives guidance for assessment of conformity. Recommended practice for installation is given in EN 12007-2 [2] prepared by CEN/TC 234.

This part of EN 1555 covers the characteristics of valves.

1 Scope

This document specifies the characteristics of valves made from polyethylene (PE) for piping systems in the field of the supply of gaseous fuels.

It is applicable to isolating unidirectional and bi-directional valves with spigot ends or electrofusion sockets intended to be fused with PE pipes or fittings conforming to EN 1555-2 and EN 1555-3 respectively.

Valves made from materials other than PE, designed for the supply of gaseous fuels conforming to the relevant standards can be used in PE piping systems according to EN 1555 (all parts), provided that they have PE connections for butt fusion or electrofusion ends, including integrated material transition joints, conforming to EN 1555-3.

It also specifies the test parameters for the test methods referred to in this document.

In conjunction with EN 1555-1, EN 1555-2, EN 1555-3 and EN 1555-5, this document is applicable to PE pipes, fittings and valves, their joints and, joints with components of PE and other materials intended to be used under the following conditions:

- a) a maximum operating pressure, MOP, up to and including 10 bar¹ at a design reference temperature of 20 °C;

NOTE 1 For the purpose of this document and the references to ISO 8233, MOP is considered to be nominal pressure.

- b) an operating temperature between -20 °C to 40 °C.

For operating temperatures between 20 °C and 40 °C, derating coefficients are specified in EN 1555-5.

The EN 1555 series covers a range of MOPs and gives requirements concerning colours.

It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

This document covers valve bodies designed for connection with pipes with a nominal outside diameter $d_n \leq 400$ mm.

NOTE 2 Additional information related to the installation of PE 100-RC systems is given in EN 1555-1:2025, Annex A.

NOTE 3 Additional information about the suitability of PE pipe systems for hydrogen and its admixtures is given in EN 1555-1:2025, Annex B.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 682, *Elastomeric Seals — Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

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

¹ 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm².

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

EN 1555-1:2025, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

EN 1555-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

EN 1555-3:2025, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

EN 1555-5, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

EN 1680, *Plastics piping systems — Valves for polyethylene (PE) piping systems — Test method for leaktightness under and after bending applied to the operating mechanisms*

EN 1704, *Plastics piping systems — Thermoplastics valves — Test method for the integrity of a valve after temperature cycling under bending*

EN 1705, *Plastics piping systems — Thermoplastics valves — Test method for the integrity of a valve after an external blow*

EN 12100, *Plastics piping systems — Polyethylene (PE) valves — Test method for resistance to bending between supports*

EN 12119, *Plastics piping systems — Polyethylene (PE) valves — Test method for resistance to thermal cycling*

EN ISO 1133-1, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method (ISO 1133-1)*

EN ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method (ISO 1167-1)*

EN ISO 1167-4, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies (ISO 1167-4)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126)*

EN ISO 3127, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method (ISO 3127)*

EN ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6)*

EN ISO 17778, *Plastics piping systems — Fittings, valves and ancillaries — Determination of gaseous flow rate/pressure drop relationships (ISO 17778)*

ISO 8233, *Thermoplastics valves — Torque — Test method*

ISO 18488, *Polyethylene (PE) materials for piping systems — Determination of Strain Hardening Modulus in relation to slow crack growth — Test method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1555-2 and EN 1555-3, EN 736-1, EN 736-2 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 General

3.1.1

external leaktightness

leaktightness of the valve body enveloping the space containing the gas, with respect to the atmosphere

3.1.2

internal leaktightness

leaktightness between the inlet and the outlet of the valve, with the valve in the closed position

3.1.3

leakage

emission of gas from a valve body, or any component of a valve

3.1.4

valve body

main part of a valve which consists of an operating stop system and contains the obturator, seat(s), stem(s) or shaft(s) and packing seals, and provides the terminal ends for connection to the PE pipe/fittings as applicable

3.1.5

operating device

part of a valve for connection with the operating key which allows the opening and the closing of the valve

3.2 Terms relating to design

3.2.1

isolating valve

valve intended for use only in the closed or fully open position

[SOURCE: EN 736-1:2018]

3.2.2

full bore valve

valve with a flow section equal to or greater than 80 % of the section corresponding to the nominal inside diameter of the body end port

[SOURCE: EN 736-3:2008, 3.3.1 – modified: Note has been omitted] [3]

3.2.3

clearway valve

valve designed to have an unobstructed flow way, which allows for the passage of a theoretical sphere with a diameter that is not less than the nominal inside diameter of the body end port

[SOURCE: EN 736-3:2008, 3.3.1 – modified: Note has been omitted] [3]

3.2.4

reduced bore valve

valve with a flow section equal to or greater than 36 % of the section corresponding to the nominal inside diameter of the body end port and which does not correspond to the full bore valve

[SOURCE: EN 736-3:2008, 3.3.1 – modified: Note has been omitted] [3]

4 Symbols and abbreviations

For the purpose of this document the symbols and abbreviations given in EN 1555-2 and EN 1555-3 apply.

5 Material

5.1 PE compound for valves

The stress-bearing PE parts of injection moulded valve components, for example the main body of the valve, shall only be made from virgin material conforming to EN 1555-1.

NOTE Virgin material, see definition in EN 1555-2.

The stress bearing PE parts of valves made from pipe shall be made from pipe conforming to EN 1555-2, except for the geometrical characteristics.

Other materials may be used for non-stress-bearing parts.

A valve can only be designated as a PE 100-RC valve if the stress bearing part is produced from PE 100-RC materials which fulfil the requirements of EN 1555-1:2025, Tables 1 and 2, and are declared as PE 100-RC by the raw material producer, and it fulfils the requirements of Table 1 of this document for PE 100-RC.

5.2 Material for non-polyethylene components

5.2.1 General

All components shall conform to the relevant EN standard(s). Alternative standards may be applied in cases where the suitable EN standard(s) do not exist. In all cases, fitness for purpose of the components shall be demonstrated.

The materials and the constituent elements used in making the valve (including elastomers, greases and any metal parts as may be used) shall be as resistant to the external and internal environments as the other elements of the piping system, and shall have an expected lifetime under the following conditions at least equal to that of the PE pipes conforming to EN 1555-2, with which they are intended to be used:

- a) during storage;
- b) under the effect of gaseous fuels conveyed therein;
- c) with respect to the service environment and operating conditions.

The requirements for the level of material performance of non-polyethylene parts shall be at least as stringent as that of the PE compound for the piping system. Reworked materials shall not be used for stress bearing polymeric parts.

Other materials used in valves in contact with the PE pipe shall not adversely affect pipe performance or initiate stress cracking.

The valve manufacturer shall ensure that any transition joint between polyethylene and non-polyethylene parts and the valve body fulfil the requirements of EN 1555-3.

5.2.2 Metal parts

All metal parts susceptible to corrosion shall be adequately protected, providing this is necessary for the durability and function of the system.

When dissimilar metallic materials are used which may be in contact with moisture, steps shall be taken to avoid the possibility of galvanic corrosion.

5.2.3 Sealing materials

Elastomeric seals shall conform to EN 682.

The temperature range is specified by the sealing materials product standard.

Other sealing materials are permitted if proven suitable for gas supply systems.

5.2.4 Greases and lubricants

Greases or lubricants shall not exude onto fusion areas and shall not affect the long term performance of the valve materials.

5.2.5 Assembly

Ancillary components of valves shall be assembled according to manufacturer's procedures and any component used in the assembly shall not prevent conformity of the valve to this document.

6 General characteristics

6.1 Appearance of the valve

When viewed without magnification, the internal and external surfaces of valves shall be smooth, clean and shall have no scoring, cavities or other surface defects to an extent that would prevent conformity to this document.

No component of the valve shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks to an extent that would prevent conformity of the valves to the requirements of this document.

6.2 Colour

The colour of the PE parts of valves shall be either black, yellow or orange.

6.3 Design

6.3.1 General

The valve shall be designed to provide the fluid flow passageway and the body ends.

The pressure resistance of the valve shall be specified by the manufacturer according to the design SDR and material classification.

6.3.2 Valve body

The valve body shall be such that it cannot be dismantled.

An operating stop system shall be provided at the fully open and closed positions.

6.3.3 Valve ends

PE spigot ends or electrofusion sockets shall comply with the requirements of EN 1555-3.

6.3.4 Operating device

The operating device shall be integral with or connected to the stem in such a way that disconnection is impossible without special equipment.

The valve shall close by turning the operating device clockwise. For a quarter-turn valve, the position of the obturator shall be clearly indicated on the top side of the operating device.

It is recommended that the position of the obturator is marked on the access point for a quarter turn valve.

Stops shall be provided at the fully open and closed positions.

6.3.5 Seals

The seals shall be mounted in a way, that they are resistant to normally occurring mechanical loads, see 5.2.3. Creep and cold flow effects shall be taken into account. Any mechanism that puts a loading on the seals shall be permanently locked. Line pressure shall not be used as the sole means of seal activation.

7 Geometrical characteristics

7.1 General

Each valve shall be characterized by its dimensions and associated end connections.

7.2 Measurement of dimensions

The dimensions of the valve shall be measured in accordance with EN ISO 3126 and rounded to the next 0,1 mm. In case of dispute, the measurement shall not be made less than 24 h after manufacture, and after being conditioned for at least 4 h at $(23 \pm 2) ^\circ\text{C}$.

Additionally, for spigot end valves provided with temporary supports, perform dimensional measurement at least 1 h after removal of the supports.

Indirect measurement at the stage of production is allowed at shorter time periods providing evidence is shown of correlation.

7.3 Dimensions of spigot ends for valves

The dimensions of spigot ends shall conform to EN 1555-3:2025, Table 3, up to and including d_n 400 mm.

7.4 Dimensions of valves with electrofusion sockets

The dimensions of electrofusion sockets shall conform to EN 1555-3:2025, Table 1, up to and including d_n 400 mm.

7.5 Dimensions of the operating device

For a quarter-turn valve, the dimension of the operating devices shall be designed so it can be operated with a $(50_0^{+0,5})$ mm square socket, (40 ± 2) mm depth.

NOTE For a multi-turn operated valve, attention is drawn to the requirements specified in EN ISO 5210 [4].

8 Mechanical characteristics of assembled valves

8.1 General

All tests shall be carried out on valves assembled with pipe conforming to EN 1555-2 from the same SDR as the SDR of the valve ends, in accordance with the technical instructions of the manufacturer and taking into account the extreme conditions of utilization described in EN 1555-5.

NOTE The properties of an assembled valve depend on the properties of the pipes and the valve and on the conditions of their installation (i.e. geometry, temperature, type, method of conditioning, assembly and fusion procedures).

8.2 Requirements

8.2.1 General

When tested in accordance with the test methods as specified in Table 1 using the indicated parameters, the valves shall have mechanical characteristics conforming to the requirements given in Table 1.

Unless otherwise specified by the applicable test method the conditioning temperature shall be 23 °C. The temperature tolerance shall be ± 2 °C, or in accordance with Table 1.

Table 1 — Mechanical characteristics

Characteristic	Requirements	Test parameters		Test method	
		Parameter	Value		
Hydrostatic strength (20 °C, 100 h) g	No failure during the test period of any test piece	Conditioning time ^a		EN ISO 1167-1 and EN ISO 1167-4	
		Number of test pieces ^b			3
		Type of test			Water-in-water
		Circumferential (hoop) stress ⁱ	PE 80		10,0 MPa
			PE 100 and PE 100-RC		12,0 MPa
		Test period			100 h
		Test temperature			20 °C
Hydrostatic strength (80 °C, 165 h) g	No failure during the test period of any test piece ^c	Conditioning time ^a		EN ISO 1167-1 and EN ISO 1167-4	
		Number of test pieces ^b			3
		Type of test			Water-in-water
		Circumferential (hoop) stress ⁱ	PE 80		4,5 MPa
			PE 100 and PE 100-RC		5,4 MPa
		Test period			165 h
		Test temperature			80 °C

Characteristic	Requirements	Test parameters		Test method	
		Parameter	Value		
Hydrostatic strength (80 °C, 1 000 h) g	No failure during the test period of any test piece	Conditioning time a		EN ISO 1167-1 and EN ISO 1167-4	
		Number of test pieces b			3
		Type of test			Water-in-water
		Circumferential (hoop) stress i	PE 80		4,0 MPa
			PE 100 and PE 100-RC		5,0 MPa
		Test period			1 000 h
		Test temperature			80 °C
Resistance to slow crack growth PE 100-RC Strain – Hardening test	$<G_p> \geq 50$ MPa	Test sample j		ISO 18488	
		Test temperature			80 °C
		Thickness			300 µm
		Test speed			Shall conform to ISO 18488
		Number of test pieces			5
Leaktightness of seat(s) and packing	No leakage during the test period	Test temperature		Annex A	
		Test fluid			Air or nitrogen l
		Number of test pieces b			1
		Test pressure			25 mbar
		Duration of the test			1 h
Leaktightness of seat(s) and packing	No leakage during the test period	Test temperature		Annex A	
		Test fluid			Air or nitrogen l
		Number of test pieces b			1
		Test pressure			1,5 MOP
		Duration of the test			30 s
SAFETY PRECAUTIONS — Safety precautions need to be taken when testing with air or nitrogen up to 1,5 MOP. For testing with air or nitrogen a pressure of a maximum of 6 bar should be used. For MOP > 4 bar, testing with water should be considered, and the test conditions shall be agreed between the manufacturer and end user.					

Characteristic	Requirements	Test parameters		Test method
		Parameter	Value	
Operating torque d	Torque range for: $d_n \leq 63$ mm: $5 \text{ Nm} < M \leq 35 \text{ Nm}$ $63 \text{ mm} < d_n \leq 125$ mm: $10 \text{ Nm} < M \leq 70 \text{ Nm}$ $125 \text{ mm} < d_n \leq 400$ mm: $10 \text{ Nm} < M \leq 150 \text{ Nm}$	Test temperatures	-20 °C, +23 °C ^f and +40 °C	ISO 8233
		Number of test pieces ^b	1	
Stop resistance	a) No failure at stops in closing and opening position	Test temperature	-20 °C and +40 °C	ISO 8233
		Number of test pieces ^b	1	
		Torque	150 Nm or 2 times the value of the maximum measured operating torque whichever is the greater	
		Duration	15 s	
	Followed by:			
b) No leakage at seat(s) and packing		Test temperature	23 °C ^f	Annex A
		Test fluid	Air or nitrogen ^l	
		Number of test pieces ^b	1	
		Test pressure	1,5 MOP	
		Duration	30 s	

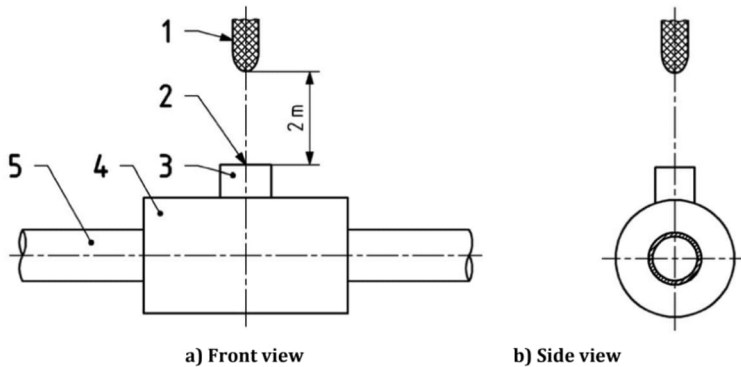
Characteristic	Requirements	Test parameters		Test method
		Parameter	Value	
Actuation mechanism resistance ^h	a) No failure	For: $d_n \leq 63$ mm	1,5 × measured torque 1,2 × 35 Nm (whichever higher) or is	ISO 8233
		For: 63 mm < $d_n \leq 125$ mm	1,5 × measured torque 1,2 × 70 Nm (whichever higher) or is	
		For: 125 mm < $d_n \leq 400$ mm	1,5 × measured torque 1,2 × 150 Nm (whichever higher) or is	
		Test temperature	23 °C	
		Number of test pieces ^b	1	
		Duration	15 s	
	b) No external leakage	Test pressure	6 bar	
	Duration	30 s		
Resistance to bending between supports	No leakage and maximum value for operating torque (see examination of operating torque)	Load applied for:		EN 12100
		63 mm < $d_n \leq 125$ mm	3,0 kN	
		125 mm < $d_n \leq 400$ mm	6,0 kN	
		Number of test pieces ^b	1	
Thermal cycling resistance $d_n > 63$ mm	No leakage and maximum value for operating torque (see examination of operating torque)	Number of test pieces ^b	1	EN 12119
Leaktightness under bending with thermal cycling $d_n \leq 63$ mm	No leakage	Number of cycles	50	EN 1704
		Temperature of cycling	-20 °C to +40 °C	
		Number of test pieces ^b	2	
Leaktightness after tensile load ^k	No leakage, maximum value for operating torque (see examination of operating torque)	Test temperature	23 °C	Annex B
		Test fluid	Air or nitrogen ^l	
		Test pressure	25 mbar	
		Number of test pieces ^b	1	

Characteristic	Requirements	Test parameters		Test method	
		Parameter	Value		
Leaktightness under and after bending applied to the operating mechanism	No leakage	Number of test pieces ^b	1	EN 1680	
Impact loading resistance	No leakage and maximum value for operating torque and stop resistance (see examination of operating torque and stop resistance)	Position of test piece	Vertical, see Figure 1	EN 1705	
		Drop height	2 m		
		Mass of the striker	2,5 kg		
		Type of the striker	d90 conforming to EN ISO 3127		
		Test temperature	-20 °C		
		Number of test pieces ^b	1		
Multiple tests ^e					
1) Resistance to long-term internal pressure loading ^g	No leakage during the test period	Conditioning time ^a	Shall conform to EN ISO 1167-1	EN ISO 1167-1 and EN ISO 1167-4	
		Type of test	Water-in-water		
		Number of test pieces ^b	1		
		Circumferential hoop stress ⁱ	PE 80		8,0 MPa
			PE 100 or PE 100-RC		10,0 MPa
		Test period	1 000 h		
		Test temperature	20 °C		
2) Leaktightness of seat(s) and packing	No leakage during the test period	Test temperature	23 °C ^f	Annex A	
		Test fluid	Air or nitrogen ^l		
		Number of test pieces ^b	1		
		Test pressure	25 mbar		
		Duration of the test	1 h		
3) Leaktightness of seat(s) and packing	No leakage during the test period	Test temperature	23 °C ^f	Annex A	
		Test fluid	Air or nitrogen ^l		
		Number of test pieces ^b	1		
		Test pressure	1,5 MOP		
		Duration of the test	30 s		
SAFETY PRECAUTIONS — Safety precautions need to be taken when testing with air or nitrogen up to 1,5 MOP. For testing with air or nitrogen a pressure of a maximum of 6 bar should be used. For MOP > 4 bar, testing with water should be considered, and the test conditions shall be agreed between the manufacturer and end user.					

Characteristic	Requirements	Test parameters		Test method
		Parameter	Value	
4) Operating torque ^d	Torque range for: $d_n \leq 63$ mm: $5 \text{ Nm} < M \leq 35 \text{ Nm}$ $63 \text{ mm} < d_n \leq 125$ mm: $10 \text{ Nm} < M \leq 70 \text{ Nm}$ $125 \text{ mm} < d_n \leq 400$ mm: $10 \text{ Nm} < M \leq 150 \text{ Nm}$	Test temperatures	-20 °C, +23 °C ^f and +40 °C	ISO 8233
		Number of test pieces ^b	1	
5) Impact loading resistance	No leakage and maximum value for operating torque and stop resistance (see examination of operating torque and stop resistance)	Position of sample	Vertical, Figure 1	see EN 1705
		Drop height	2 m	
		Mass of the striker	2,5 kg	
		Type of the striker	d90 conforming to EN ISO 3127	
		Test temperature	-20 °C	
		Number of test pieces ^b	1	
<p>^a The valves shall not be pressurized within 24 h after fusion jointing.</p> <p>^b The numbers of test pieces given indicate the numbers required to establish a value for the characteristic described in the table. The numbers of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan. For guidance, see CEN/TS 1555-7 [1].</p> <p>^c Only brittle failures shall be taken into account. If a ductile failure occurs before 165 h, the test may be repeated at a lower stress. The stress and the associated minimum test period shall be selected from Table 2 or from a line based on the stress/time points given in Table 2.</p> <p>^d The maximum operating torque recorded at the 3 testing temperatures shall be within the torque range given in this table, i.e. opening and closing torque.</p> <p>^e Tests 2) to 5) shall be carried out on the valve in the order stated, and as soon as possible after 24 h from the completion of the internal pressure test according to 1).</p> <p>^f For the purpose of factory production control the test temperature is 23 ± 8 °C and the preconditioning of opening and closing the valve is not required.</p> <p>^g The valves shall be in open or partially open position.</p> <p>^h The test shall be performed by locking the obturator.</p> <p>ⁱ The test pressure shall be calculated using the design SDR of the valve.</p> <p>^j The sample for the SHT test shall be taken across the valve body wall, or the whole circumference in case of small diameter. The outer surface shall be scraped to remove any contamination present before regrinding.</p> <p>^k B.4.4 is not applicable to diameters > 160 mm unless requested by the end user.</p> <p>^l Testing of leaktightness under pressure with air/nitrogen is appropriate for all gaseous fuels (e.g. methane and hydrogen), because no leakage is permitted [5].</p>				

Table 2 — Circumferential (hoop) stress at 80 °C and associated minimum test period

PE 80		PE 100 and PE 100-RC	
Stress MPa	Minimum test period h	Stress MPa	Minimum test period h
4,5	165	5,4	165
4,4	233	5,3	256
4,3	331	5,2	399
4,2	474	5,1	629
4,1	685	5,0	1 000
4,0	1 000	—	—



Key

- 1 striker
- 2 impact point
- 3 operating device
- 4 valve body
- 5 spigot or electrofusion ends

Figure 1 — Position of the test piece for the impact loading test

8.2.2 Air flow rate

The manufacturer shall indicate in the technical documentation the value of the air flow rate for reduced bore valves. This value shall be determined according to EN ISO 17778 at pressure drop for $d_n \leq 63$ mm of 0,5 mbar and $d_n > 63$ mm of 0,1 mbar on 1 test piece.

9 Physical characteristics

9.1 Conditioning

Conditioning of the test pieces for MFR and OIT as specified in Table 3 is not applicable.

9.2 Requirements

When tested in accordance with the test methods specified in Table 3 using the indicated parameters, the valves shall have physical characteristics conforming to the requirements given in Table 3.

Table 3 — Physical characteristics

Characteristic	Requirements	Test parameters		Test method
		Parameter	Value	
Oxidation induction time (thermal stability)	≥ 10 min	Test temperature	210 °C ^b	EN ISO 11357-6
		Number of test pieces ^a	3	
		Test environment	Oxygen	
		Specimen weight	(15 ± 2) mg	
Melt mass-flow rate (MFR)	After processing maximum deviation of ± 20 % of the value measured on the batch used to manufacture the valve ^c	Loading mass	5 kg	EN ISO 1133-1
		Test temperature	190 °C	
		Time	10 min	
		Number of test pieces ^a	Shall conform to EN ISO 1133-1	

^a The number of test pieces given indicate the numbers required to establish a value for the characteristic described in the table. The number of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan, for guidance see CEN/TS 1555-7 [1].

^b Alternatively the test may be carried out at 200 °C with a minimum requirement of ≥ 20 min. The sample thickness is free and not in accordance with EN ISO 11357-6.

^c The value given by the material supplier can be used, but in case of dispute the measurement on granules shall be carried out by the manufacturer.

10 Performance requirements

When valves conforming to this document are assembled with each other or with components conforming to other parts of EN 1555, the joints shall conform to EN 1555-5.

11 Technical file

The manufacturer of the valves shall ensure the availability of a technical description (generally confidential) containing all relevant data necessary to prove the conformity of the valves to this part of EN 1555. The file shall include all results of type-testing. It shall also include all data necessary to implement a traceability system where required.

The characteristic of the fluid flow shall be such that the manufacturer will declare the valve as full bore or clearway or reduced bore.

The technical file given by the manufacturer shall include at least the following information:

- a) dimensional characteristics, by working drawings;
- b) assembly and operating instructions;
- c) service conditions (e.g. valve temperature limits);
- d) fusion instructions for valves with electrofusion sockets (power requirements or fusion parameters with limits);
- e) air flow rate value.

12 Marking

12.1 General

12.1.1 Unless otherwise stated in Table 4, the marking elements shall be printed or formed directly on the valve in such a way that after storage, weathering, handling and installation legibility is maintained during use of the valve.

NOTE The manufacturer is not responsible for marking being illegible due to actions caused during installation and use such as painting, scratching, covering of the components or using detergents etc. on the components unless agreed or specified by the manufacturer.

12.1.2 Marking shall not initiate cracks or other types of defects which adversely influence the performance of the valve.

12.1.3 If printing is used, the colour of the printed information shall differ from the basic colour of the valve.

12.1.4 The size of the marking shall be such that it is legible without magnification.

12.1.5 There shall be no marking over the spigot length according to EN 1555-3:2025, Table 3.

12.2 Minimum required marking

The marking of an EN standard reference on a component requires conformance with all mandatory requirements of the standard, and that the component comes within the scope of standard.

The minimum required marking shall conform to Table 4.

Table 4 — Minimum required marking

Aspects	Mark or symbol
Number of the System Standard ^a	EN 1555
Manufacturer's name and/or trademark	Name or symbol
Nominal outside diameter(s) of pipe, d_n	e.g. 110
Material and designation	e.g. PE 100, PE 100-RC ^a
Design application series	e.g. SDR 11
Manufacturer's information ^b	
Intended use ^a	Gas
Flow direction (only for unidirectional valve)	Arrow
^a This information may be printed on a label associated with the valve or on an individual bag. ^b For providing traceability, the following details shall be given: — the production period, year, month and/or week, in figures or in code; — a name or code for the production site if the manufacturer is producing in different sites.	

NOTE ISO 12176-4 [6] and ISO 12176-5 [7] provide information for traceability data coding.

12.3 Additional marking

Valves conforming to this document, which are third-party certified by a certification body, may be marked accordingly.

13 Delivery conditions

The valves shall be packaged in bulk or individually protected where necessary in order to prevent deterioration and contamination. Whenever possible, they shall be placed in individual bags, in cardboard boxes or cartons.

It is recommended to protect the spigot ends, e.g. by external caps.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, type and dimensions of the valve, number of units in the box, and any special storage conditions and storage time limits.

It is recommended that valves are stored in their original packing, until ready for installation.

Annex A (normative)

Determination of the leaktightness of seat(s) and packing

A.1 General

This annex specifies the test method to verify the leaktightness of the seat and packing of a valve/valve body made from PE.

A.2 Test piece

The test piece shall be a complete valve with the open ends closed off by, for example, covers, plugs, flexible seals or end connectors.

The setting time of moulded or fusion-jointed components, as specified by the manufacturer, shall be completed before commencing conditioning.

A.3 Procedure

A.3.1 Conditioning

Condition the test piece in accordance with this document, see 8.2.

A.3.2 Internal leaktightness test (fully closed valve)

Conduct the following procedure; in case of bi-directional valves, both sides of the valves shall be tested:

- a) connect one end of the test piece to the pressure line and the other end(s) to a device capable of detecting leakage;
- b) fill the closed test piece with air or nitrogen at the specified temperature;
- c) close the valve;
- d) raise the pressure progressively and smoothly in such a way that the test pressure specified in this document is attained within 30 s;
- e) maintain the pressure and temperature for the length of time specified in this document;
- f) observe and records any signs of leakage;
- g) depressurize the test piece.

Valves with independent double seating (such as two-piece obturator or double-seated valves) can be tested by applying pressure between the seats, and each side of the closed valve checked for leakage.

A.3.3 External leaktightness test (half open valve)

Conduct the following procedure:

- a) put the valve in half open position;
- b) connect one end of the test piece to the pressure supply and close the other end;

- c) fill the test piece with air or nitrogen at the specified temperature;
- d) raise the pressure progressively and smoothly in such a way that the test pressure specified in this document, is attained within 30 s;
- e) maintain the pressure and temperature for the length of time specified in this document;
- f) observe and records any signs of external leakage;
- g) depressurize the test piece.

A.4 Test report

The test report shall include the following information:

- a) dated reference to this document and the test method used, i.e. EN 1555-4:2025, Annex A;
- b) full identification of the valve under test;
- c) test pressure(s), applied to the test piece;
- d) test duration;
- e) results of internal and external leaktightness testing;
- f) any conditions or incidents not detailed by this test method and which might have affected the results;
- g) date of test.

Annex B (normative)

Test method for leaktightness and ease of operation after tensile loading

B.1 Apparatus

B.1.1 Tensile test machine, capable of applying to a test piece and maintaining for a specified time period t , a tensile force corresponding to a specified longitudinal tensile stress σ_x , in the walls of pipes joined to the valve, and then if relevant producing a specified rate of extension. The tensile testing machine shall be sufficiently powerful to allow tests to be carried out up to the yield point of the pipe.

B.1.2 Grips or couplings, to enable the test machine (B.1.1) to apply the appropriate force, directly or through intermediate fittings.

B.1.3 Pressurizing equipment, to enable a specified internal pressure p , to be applied via suitable connections to the test piece while it is subject to the tensile force.

B.2 Test piece

The test piece shall comprise the valve under test assembled in accordance with 8.1 between two PE pipes, each of the nominal outside diameter, d_n , and the SDR series with which the valve is designed to be used, and each pipe having a length of either $2d_n$ mm or 250 mm, whichever is the shorter.

B.3 Conditions

The valves shall be tested using the following conditions:

- nominal longitudinal tensile stress, σ_x , in the connected pipe wall shall be 12 MPa for PE 100 or PE 100-RC, and 10 MPa for PE 80;
- internal pressure, p , shall be 25 mbar maintained for the specified duration of the test;
- tensile force shall be calculated using the nominal pipe dimensions;
- time period t , for which the tensile force is maintained steady shall be 1 h;
- rate of extension between the grips shall be 25 mm/min \pm 1 mm/min.

B.4 Procedure

B.4.1 The valve shall be tested by closing the obturator in the normal manner while maintaining an ambient test temperature of (23 ± 2) °C.

Apply the specified internal pressure p , for internal leaktightness assessment before tensile testing (Annex A). In case of bi-directional valves, apply pressure to both sides. Ensure that all relevant parts of the valve are subject to the pressure.

B.4.2 After completion of the leaktightness test, mount the test piece in the tensile testing machine. Apply an increasing force smoothly until the applicable longitudinal stress, σ_x , is induced in the walls of the pipes in the test assembly.

B.4.3 Maintain the force for the specified time period t .

B.4.4 Continue the tensile test by applying the specified rate of extension until one of the valve spigot ends or one of the pipes yields.

NOTE Yield is specified as a visible necking and elongation or a decrease of the load during the tensile test.

B.4.5 Remove the tensile load and, without any intervening operation of the valve, submit the valve to torque testing in accordance with ISO 8233, and leaktightness testing of the seat and packing according to Annex A.

Yielded pipe test pieces can be removed in order to perform the torque and leaktightness tests.

B.5 Test report

The test report shall include the following information:

- a) dated reference to this document and the test method used, i.e. EN 1555-4:2025, Annex B;
- b) full identification of the valve under test;
- c) dimensions of the pipes used in the test piece;
- d) longitudinal tensile stress, σ_x ;
- e) tensile force applied to the test piece;
- f) internal pressure p , applied to the test piece;
- g) time period t , for which the tensile force was maintained;
- h) results of torque testing in accordance with ISO 8233;
- i) results of leaktightness testing in accordance with Annex A;
- j) any conditions or incidents not detailed by this test method and which might have affected the results;
- k) date of testing.

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389 Chiswick High Road London W4 4AL UK