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English version

Approval requirement 70

Mechanical fittings for plastic piping systems

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Preface Kiwa

This approval requirement (AR) is approved by the Board of Experts (BoE) GASTEC QA, in which relevant parties in the field of gas related products are represented. This Board of Experts supervises the certification activities and where necessary require the GASTEC QA approval requirement to be revised. All references to Board of Experts in this GASTEC QA approval requirement pertain to the above-mentioned Board of Experts.

This AR will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

In this AR is established which requirements a product and the requestor/ certificate holder of the GASTEC QA product certificate should meet and the matter to which Kiwa evaluates this.

Kiwa has a method which is established in the certification procedure for the execution of:

- The investigation for provisioning and maintaining a GASTEC QA product certificate based on this AR.
- The periodic evaluations of the certified products for the purpose of maintaining a provided GASTEC QA product certificate based on this AR.

Approved by the Board of Experts: 23/01/2026

Accepted by Kiwa Nederland B.V.: 09/02/2026

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Content

1. Introduction

1.1. General

This GASTEC QA approval requirement (AR) in combination with the GASTEC QA general requirements, is applied by Kiwa as the basis for the issuing and maintaining the GASTEC QA product certificate for mechanical fittings for plastic piping systems.

With this product certificate, the certificate holder can demonstrate to his or her customers that an expert independent organization monitors the production process of the certificate holder, the quality of the product and the related quality assurance.

Next to the requirements established in this AR and the general requirements, Kiwa has additional requirements in the sense of general procedural requirements for certification, as laid down in the internal certification procedures.

This GASTEC QA approval requirement replaces the version of April 2021.

Overview of changes:

- Table 1 is extended with other types of pipes, the relevant AR's are mentioned, and where needed the values are adjusted.
- The list of definitions is adjusted.
- Updated footnotes of table 6 making it possible to certify full end load mechanical fittings in diameters greater than DN 63.
- Paragraph 3.2.2 is adjusted with the reference to ISO 17885.
- Paragraph 3.4 is extended with the color for PE fittings.
- Paragraph 3.5 is extended on the end stop requirements.
- Paragraph 3.5.2 is adjusted with the reference to ISO 17885.
- Paragraph 3.6.2 is extended with the requirements for other types of pipes.
- The tables in paragraph 3.6.4 have been extended with larger diameters.
- Paragraph 3.7.2 is adjusted with a reference to ISO 17885 and therefore table 5 is revised with only the additional requirements listed.
- Chapter 4 has been adjusted with references to ISO 17885 where applicable.
- Chapter 5 has been adjusted in line with the changes in the AR and reference to ISO 17885.
- Test requirements have been adapted with reference to the relevant test standards
- Update of bibliography
- The approval requirement is textually reviewed.

The product requirements have changed.

1.2. Scope

The approval requirements specify the requirements for mechanical fittings up to and including DN 400 made of for polyethylene (PE) and polyvinylchloride (PVC-HI) plastic piping systems for the supply of gaseous fuels of the 2nd and 3rd family according to EN 437.

De mechanical fittings can be full-end-load or non-end-load and are made from plastic or metal. The maximum operating temperature is -20 °C up to and including to 40 °C.

The maximum operating pressure for each application is mentioned in the table below.

Type of pipe	AR	MOP	MOP NEN 7244
PE 80 SDR 17.6	8	4.8 bar	4 bar
PE 80 SDR 17	8	5 bar	4 bar
PE 80 SDR 11	8	8 bar	4 bar
PE 100 (RC) SDR 17.6	8	6 bar	4 bar
PE 100 (RC) SDR 17	8	6.2 bar	4 bar
PE 100 (RC) SDR 11	8	10 bar	8 bar
PVC-HI SDR 33 or 41	10	4.5 bar	200 mbar
Multilayer	198	5 bar	200 mbar
PVC-O	207	8 bar	200 mbar

Table 1: MOP (mathematic and according to NEN 7244) for each pipe type

2. Definitions

In this approval requirement, the following definitions are applicable:

Appearance, signs of damage: Visible deformation, broken parts and signs of cutting and boring which are not in the design of any component of the unused fitting.

Board of Experts (BoE): The Board of Experts GASTEC QA.

DN/OD: Numerical designation of the size of a component related to the outside diameter.

d_n: Specified outside diameter assigned to a nominal size DN/OD.

End-load resistance: Resistance to end load transmitted via the connecting pipe and generated by internal pressure, pipeline internal interference, and thermally induced stress in any combination.

Full-end-load resistance: Combination of component and joint design and characteristics such that under any load the plastic pipe will fail first

Maximum operating pressure (MOP): Maximum pressure that a component is capable of withstanding continuously in service under normal operating conditions.

Mechanical fittings: fittings for assembling plastics pipes with each other, which includes one or more compression zones to provide pressure integrity, leak tightness and resistance to end loads.

Non-end-load resistance: Lack of resistance to axial loads without additional external mechanical axial support.

SDR: Standard Dimension Ratio.

Transition fittings: A construction element which is designed to join different pipe materials.

See also the definitions mentioned in the GASTEC QA general requirements.

3. Material and product requirements

This chapter contains the material and product requirements that the raw materials, materials and products used shall meet.

3.1. Field of application for mechanical fittings

The manufacturer shall declare, depending on the intended use, that the fittings are suitable for the medium supplied as described in paragraph 1.2, the Maximum Operating Pressure (MOP), installation and operating temperature limits and the pipe material(s) to be jointed to the mechanical fittings. Also the manufacturer shall mention, if applicable, the required torque for the fittings.

Also, the use of an insert, the end load resistance class, the corrosion resistance, the use of lubricants or greases, and ash content for glass reinforced materials as applicable shall be declared. This information shall be included in the installation manual of the fitting in the Dutch language.

3.2. Materials

3.2.1. General

The suitability of the materials below can be demonstrated by providing test reports or by reference to relevant product standards of similar products in which the material is specified as being suitable for use.

3.2.2. Plastic materials

Mechanical couplings, made of plastic materials, shall be made from suitable materials for gas application, according to table 1 of ISO 17885.

The suitability of the materials with “no experience” or other materials, which are not mentioned in Table 1, shall be demonstrated in agreement between the manufacturer and with Kiwa Nederland B.V.

Pressure-bearing components shall be produced from virgin materials, own reprocessable material or a combination of virgin and own reprocessable material. Recycled materials shall not be used. The same applies for glass-reinforced materials with a fibre length up to 3 mm. For glass-reinforced materials with glass fibres longer than 3 mm, only virgin materials shall be used.

3.2.3. Metal materials

Mechanical couplings, made of metals, shall be made from suitable materials for gas application, according to table 2 of ISO 17885.

The metal materials for producing mechanical fittings shall be demonstrable suitable for its application (pressure, ambient temperature range, long term behavior) and shall be specified by the manufacturer according to the relevant material standard.

The metal materials for producing mechanical fittings should be corrosion resistant or should be protected against corrosion, according to their intended end-use conditions unless otherwise stated in manufacturer’s declaration (see paragraph 3.1).

3.2.4. Elastomers

The type of elastomeric sealing used in mechanical fittings shall be in accordance with EN 682, type GAL or GBL.

3.3. Appearance

When viewed without magnification, the internal and external surfaces of fittings shall be smooth, clean and shall have no scoring, cavities and other surface defects.

No component of the fitting shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks.

The transitions in shapes or dimensions shall be without sharp edges to avoid the effects of notch.

For injection moulded fittings, the edges of chambers (e.g., for sealing components) shall be rounded.

Edges in the chambers of the mechanical fittings shall not damage the rubber sealings or result in unacceptable stress in the fitting which affect the functionality and lifetime of the mechanical fitting.

3.4. Colour

The color of PVC-HI mechanical fittings shall be yellow, preferably RAL 1004 according to NEN 3050. The color of PE mechanical fittings shall be black, yellow, or orange according to EN 1555-3. The color for other used materials shall conform to the requirements given in the relevant product standards. In case the color is not mentioned in a standard, it shall be clearly stated on the product that the application of the product is for gas application.

3.5. Design

The mechanical fittings should have an end stop for the pipe when inserted into the mechanical fitting to avoid passing through the fitting. Only when the functional application of the fitting specially requires the absence of an end stop this can be accepted after assessing the product on their related aspects/requirements. The manufacturer shall than include information related to the insertion depth in their instructions (see paragraph 5.2).

Parts of mechanical fittings produced from (moulded) PE material can be assembled by butt-welding. The butt-welding shall be in accordance with NEN 7200.

Rubber elements used in the mechanical fittings to make a coupling with the pipe shall be fixated, as declared by the manufacturer, to avoid movement of the rubber elements.

The construction of the fixation shall be made to withstand normal installation forces and without pushing the rubber element out of the construction. This aspect shall be tested in accordance with NEN 7231, Annex A.

3.5.1. Inserts

An insert is required for connecting mechanical fittings. The inserts shall comply with the requirements of ISO 17885, annex B and additionally to the below.

The derived minimal and maximum internal bore diameter of the pipe shall be in accordance with EN 1555-2 and stated by the manufacturer in his installation manual.

The manufacturer shall declare the minimum insertion depth of the to be applied insert.

When necessary to cut thread or grooves in the pipe for mounting the fitting, it is only allowed on parts of the pipes without tangential stress due to inner pressure.

3.5.2. Connections

When on one side of the mechanical coupling a different connection, other than meant by this approval requirement (e.g., threads, flanges and butt- or electrofusion welding), this connection shall be in accordance with the relevant GASTEC QA approval requirements and/or national or international standards.

3.5.3. Transition couplers

Transition couplers from plastic pipe to a different pipe material is allowed, these pipes shall fulfil the relevant GASTEC QA approval requirements.

3.5.4. Twisting

The mechanical fitting shall not induce twisting of pipes during assembly.

3.6. Geometrical aspects

3.6.1. General

Mechanical fittings and inserts shall meet the dimensions and tolerances of the technical drawings supplied by the manufacturer. These drawings shall be added to the certification report of the certification body and used for annual product verification.

For non-end-load fittings made of PVC-HI and PE the additional requirements of clause 3.6.3 or 3.6.4 shall be fulfilled.

3.6.2. Pipes for mechanical fittings

Mechanical fittings for connecting the type of pipes mentioned in table 1 of this AR, shall be manufactured with such dimensions and within such tolerances as will permit their use the declared application and use).

3.6.3. Non-end-load fittings made of PVC-HI

Dimensions and tolerances of non-end-load mechanical fittings made of PVC-HI for connecting PVC-HI pipes shall meet the geometrical specifications of the manufacturer and the requirements of NEN 7231.

3.6.4. Non-end-load fittings made of PE

Dimensions and tolerances of non-end-load mechanical fittings made of PE for connecting PVC-HI pipes shall meet the geometrical specifications of the manufacturer.

For the connection which is made by means of butt welding, the allowable minimum required depth of insertion of the pipe and the minimum required wall thickness of the coupling shall be taken into account according to table 2 and 3.

Connection size (mm)	Minimum depth of insertion (mm) [1)]
63	40
75	42
90	44
110	47
160	54
200	60
250	63,5
315	74
400	104
[1)] *the shortest distance between the stop and rubber sealing.*	

Table 2: Depth of insertion of the pipe for fittings made of PE.

Connection size (mm)	Minimum wall thickness fitting (e_1) (mm)	Minimum wall thickness in welding area (e) (mm)	Maximum length of the welding area (L) (mm)
63 – 110	10	7	14
160	13	10	17
200	14	13	19
250	24,5* // 16,7**	24,5* // 16,7**	20
315	29* // 19**	29* // 19**	23
400	37* // 24**	37* // 24**	23

Table 3: Minimum wall thickness for fittings made of PE.
**Applies to SDR 11 fittings*
***Applies to SDR 17 fittings*

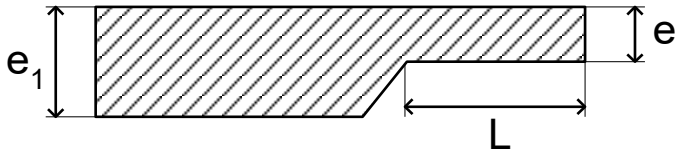

Figure 1: cross section of the pipe wall at the side of the butt weld.

In any section of the socket the difference between the largest and smallest measured inner diameter of the socket shall not exceed 0.007 x d_e (d_e = nominal outer diameter of the corresponding pipe) the accuracy of the calculated value is 0.1 mm.

The deviation of the given angle for bends and elbows shall not exceed 3°.

3.6.5. Insert dimensions

The minimum wall thickness of Polyethylene (PE) pipes with a DN ≤ 32 mm used in existing gas distribution systems in the Netherlands can vary in the sizing.

The sizing which will be followed are mentioned in EN 1555-2 “Plastic piping systems for the supply of gaseous fuels – Polyethylene (PE) – Part 2: Pipes” version 2021. For wall thickness with SDR 17.6 EN 1555-2 version 2010 will be followed, see also table 4.

DN	EN 1555-2-2021, Table 2		EN 1555-2-2010, Table 2	
	Wall thickness		Wall thickness	
	SDR 17	SDR 11	SDR 17.6	SDR 11
25 mm	2.3 mm	3.0 mm	2.0 mm*	2.3 mm*
32 mm	2.3 mm	3.0 mm	2.0 mm*	3.0 mm

Table 4: Minimum wall thickness of existing gas distribution systems.

*In the Netherlands a wall thickness of 2.3 mm is applied since 2003, prior to 2003 this was 2.0 mm.

Inserts of fittings intended to be used in existing gas distribution systems (e.g., repair fittings) shall, for the mentioned DN sizes, accommodate with table 4.

3.7. Physical aspect

3.7.1. Plastic material

The physical aspects of plastic material shall meet the requirements of ISO 17885 clause 8.1 (evaluation of the MRS value) and 8.2 (verification of the long-term behavior).

3.7.2. *Material related characteristics*

The fitting material shall meet the requirements of table 5 of ISO 17885 and annex D of ISO 17885 with the following additional requirements:

Plastic materials				
Material	**Aspect**	**Requirement**	**Parameters**	**Test method**
PVC-HI (injection moulded)	K-value	> 57	Dissolution in THF	ISO 13229
PVC-HI (produced from pipe)[a]	DCMT	No visual damage at 15 °C	Immersion in dichloromethane 30 minutes	EN 580
PE	OIT	≥ 20 min.	200 °C	ISO 11357-6
	Influence of heating	≤ 3% (≤ 5% for bend and T-pieces) No signs of bubbles and cracks	110 ± 2 °C 60 ± 5 minutes	
[a] PVC-HI fittings made of pipe shall meet the following aspects of NEN 7230 before production of the fitting: appearance, material, heating and hydrostatic pressure.				

Table 5: Material related characteristics of the fitting

3.7.3. *Resistance to gas constituents*

Gas bearing fitting material shall be resistance to gas constituent in accordance with ISO 17885, clause 8.4.2.

4. Performance requirements and test methods

This chapter contains the performance requirements and associated test methods that the products shall meet. This chapter also specifies the limit values, if applicable.

4.1. Test samples

The tests shall be carried out on pipe and fitting assembled in accordance with the manufacturer's instructions. The tests shall include all types of joint design.
The pipe(s) used in the test assemblies shall conform to the corresponding product standard.

A test assembly contains a (straight) fitting with a connected plastic pipe on both ends with a free length of 250 mm, unless otherwise stated in the test methods.

All tests are performed on three test assemblies.

PVC-HI non-end-load fittings shall be assembled without the use of lubricants or greases on PVC-HI pipes according to AR10 (based on NEN 7230).

NOTE Some countries and markets use different PE (polyethylene) materials (PE 63 for example). The performance requirements are applicable on these materials as well. When the product meets the requirements, they can be certified for that specific application.

4.2. Summary of test

For initial testing (type testing), all relevant characteristics mentioned in table 6 should be carried out per size group. The largest evaluated dimension of the largest size group is considered as maximum allowed dimension. This applies to each pressure class (PN) and type of connection.

Size groups for execution of the tests:

	1	2	3	4	5
Pipe diameter (mm)	≤ 40	>40 - ≤63	>63 - ≤110	>110 - ≤250	>250 ≤ 400

Some of the performance requirements and test methods mentioned in the following paragraphs are based on ISO 17885.

Characteristic	Fitting		Test method
	Full-end-loaded	Non-end-loaded	Clause
Pressure resistance of the plastic fitting body	X	X	4.3
Leak tightness under internal pressure	X	X	4.4
Leak tightness under external pressure	X	X	4.5
Long-term hydrostatic strength	X	X	4.6
Tensile load at 23 °C	X	--	4.7
Tensile load on the weld at 23 °C [a]	X	X	4.8
Tensile load after relaxation[b]	X	--	4.9
Tensile load at 0 °C[b]	X	--	4.10
End load at 80 °C [cd]	X	--	4.11
Tensile load 800h [c]	X	--	4.12
Leak tightness after temperature cycling	X	X	4.13
Leak tightness while subjected to bending [chi]	X	X	4.14
Angular deflection / deformation [c,e]	--	X	4.15
Resistance to impact at 0 °C[e]	X	X	4.16
Repeated assembly [g]	X	--	4.17
Flow rate / pressure drop	X	X	4.18
Stress corrosion [h]	X	X	4.19

X	Applicable
--	not tested or not applicable
[a]	Only valid for welded fittings
[b]	Only valid for full-end-loaded PVC-HI fittings for PE pipes
[c]	Test of joint design. Normally performed on uniaxial fitting assemblies
[d]	Not valid for PVC-HI fittings
[e]	Only valid for elastomeric sealing ring type sockets
[f]	Only valid for PVC-HI fittings
[g]	When applicable
[h]	Only valid for fittings containing brass components
[i]	Not valid for transition fittings

Table 6: summary of test

4.3. Pressure resistance of the fitting body

To fulfill this requirement, Pressure resistance of the fitting body, clause 9.2 of ISO 17885 will be followed and completed with positive outcome.

4.4. Leak tightness under internal pressure

To fulfill this requirement, Leak tightness under internal pressure, clause 9.3.3.1 of ISO 17885 will be followed and completed with positive outcome.

For this requirement, the declared MOP by the manufacturer in paragraph 3.1 of this AR, shall be taken. Non-tensile resistant PVC-HI fittings shall undergo this requirement with 25 mbar and 1 bar.

4.5. Leak tightness under external pressure

When the test assemblies, assembled according to paragraph 4.1, are tested according to the test method below, the test assemblies shall be leak tight.

Subject the assembled test specimens (system) to an external water pressure of 10 ± 1 kPa for 2 hours.
Subsequently, subject the same system to an external water pressure of 80 ± 8 kPa for 2 hours.
The temperature of the water shall be 23 ± 2 °C.

Pipes made of PVC-HI assembled to the test samples shall be deformed 10 ± 2 % at a distance of d_n ± 2 mm of the fitting.

The test assembly is placed in a water reservoir and then the leak tightness is determined by simulating the water column by negative pressure and this negative pressure is applied using a vacuum pump and manometer. By assessing the pressure on the manometer, it is determined whether there is water ingress into the system. Afterwards the system is visually assessed for water ingress.

4.6. Long-term hydrostatic strength

To fulfill requirement of 4.6, Long-term hydrostatic strength, clause 9.3.3.2 of ISO 17885 will be followed and completed with positive outcome. Non-end-load fittings shall be tested with end caps intended for that purpose (see ISO 1167).

4.7. Tensile load at 23°C

To fulfill this requirement, tensile load at 23 °C, clause 9.3.3.3 of ISO 17885 will be followed and completed with positive outcome.

4.8. Tensile load on the weld at 23°C

This requirement is only applicable to welded fittings.

When the fitting that is assembled by welding is tested in accordance with ISO 13953, the fitting shall not show any sign of brittle fractures in the welding zone.

The tensile testing shall be done at a temperature of 23 ± 2 °C and a speed of 5 ± 1 mm/min on three straight fittings.

4.9. Tensile load after relaxation

This requirement is only applicable for PVH-HI fittings for PE pipes.

When the test assemblies are conditioned for 1000 (+72/-0) hours in water at 60 ± 0.5 °C and followed by 16 hours at 23 ± 2 °C in air, the test assemblies shall meet the requirements of clause 4.7.

4.10. Tensile load at 0°C

This requirement is only applicable for PVH-HI fittings for PE pipes.

When the fitting and pipes are conditioned at least for 16 hours at 0 ± 2 °C and mounted at 0 ± 2 °C, the test assemblies shall be placed in a tensile machine within 2 minutes at 23 ± 2 °C.

The test assemblies shall resist a tensile force which result in yield of the pipe. The tensile speed shall be (0.1 ± 0.05) x L in mm/min.

Where

L is the free length of the pipe (3 x d_n) (mm)
PE pipes according to AR 8 with a maximum yield strength of 24.8 N/mm^2.
None of the following shall occur:

- Pull out of the pipe

Positioning of the fitting and the pipe shall not be considered as pull-out.

4.11. End load at 80°C

This requirement is not applicable for PVC-HI fittings.

To fulfill requirement of 4.11, end load at 80 °C, clause 9.3.3.5 of ISO 17885 will be followed and completed with positive outcome.

4.12. Tensile load 800h

When the test assemblies are tested according to ISO 19899 and the constant end load *F*(N) is calculated from formula:

$$F = 10 \cdot \frac{\pi}{4} \cdot (d_n^2 - (d_n - 2e_n)^2)$$

Where

d_n is the nominal outside diameter of the pipe (mm).
e_n is the nominal wall thickness of the pipe (mm)

None of the following shall occur:

- Breaking of the pipe or fitting.
- Pull-out of the pipe.
- Leakage before and after the test.

The accuracy of the load shall be 5%.

Perform a leak tightness test at 10 ± 1 kPa at 23 ± 2°C before placing the end load at the test assemblies and at the end of the test, before removing the end load. Determine leakage by using a soap solution.

4.13. Leak tightness after temperature cyling

To fulfill requirement of 4.13, leak tightness after temperature cycling, clause 9.3.3.6 of ISO 17885 will be followed and completed with positive outcome.

4.14. Leak tightness under internal pressure while subjected to bending

To fulfill this requirement, leak tightness under internal pressure while subjected to bending, clause 9.3.3.7 of ISO 17885 will be followed and completed with positive outcome.

4.15. Angular delfection and deformation

4.15.1. Test pieces

The test piece is a straight fitting with connected pipe on both sides. The free length of the pipe on both sides of the fitting is 5 x d_e. See also ISO 17885 clause 9.3.3.9.

4.15.2. Apparatus

The apparatus must be able to install a test assembly and is preventing the axial displacement of the pipes out of the fitting. The apparatus has a construction to make an angular deflection between the fitting and the pipe and diametric deformation at distance d_e ± 2 mm on the pipe.

4.15.3. Leak tightness under internal pressure with angular delfection and deformation

When the test assemblies are tested according to table 8, the test assemblies shall be leak tight during the test.

Test	**Angular displacement (°)**	**Deformation (mm)**	**Pressure (bar)**	**Time ± 20% (min)**
Leak tightness	0	0	0.025 ± 0.005	10
Leak tightness	0	0	1 ± 0.02	10
Depressurize	0	0	0	5
Apply deformation	0	10 ± 2%	0	
Leak tightness	0	10 ± 2%	0.025 ± 0.005	10
Leak tightness	0	10 ± 2%	1 ± 0.02	10
Depressurize	0	0	0	5
Apply angular displacement	5 ± 1°	0	0	
Leak tightness	5 ± 1°	0	0.025 ± 0.005	10
Leak tightness	5 ± 1°	0	1 ± 0.02	10
Depressurize	0	0	0	5
Apply deformation	0	10 ± 2%	0	
Apply angular displacement	5 ± 1°	10 ± 2%	0	
Leak tightness	5 ± 1°	10 ± 2%	0.025 ± 0.005	10
Leak tightness	5 ± 1°	10 ± 2%	1 ± 0.02	10
Depressurize	0	0	0	5
Leak tightness	0	0	0.025 ± 0.005	10
Leak tightness	0	0	1 ± 0.02	10

Table 8: Parameters for leak tightness under internal pressure with angular deflection and deformation.

4.15.4. Leak tightness at external water pressure and mechanical load

When the test assemblies are tested according to table 9, the test assemblies shall be leak tight during the test.

Test	Angular displacement (°)	Deformation (mm)	Pressure external (bar)	Time ± 20% (min)
Leak tightness	0	10 ± 2%	0.8 ±0.02	120

Table 9: Parameters for leak tightness under external pressure with angular deflection and deformation.

4.16. Resistance to impact at 0°C

This requirement is only applicable for PVC-HI fittings.

When the test pieces are tested in accordance with ISO 3127 and table 10 with a mass with a spherical nose diameter of 25 ± 0.5 mm, only two failures are allowed in 100 strokes. If no failure occurs after 60 strokes the test can be stopped, and the test pieces meet the requirements.

All strokes shall be performed random on the test piece, including on the injection point, seams and (sharp) edges.

T-pieces shall be supported by a flat plate in such a position where all sockets are in a horizontal plane. All other positions should be supported by a V-block. Sockets shall only be supported in axial direction.

Note 1: for reducer fittings a mass is used according to the connection size of the socket. Strokes at the transition of the reducer shall be performed with a mass according to the smallest connection size.

Note 2: The bottom of endcaps with a profiled bottom shall be excepted for resistance to impact at 0 °C.

Connection size (DN) (mm)	Mass (g)	Height (mm)
≤ 40	750 (+5 / -0)	
50	750 (+5 / -0)	2000 (+5 / -0)
63	1000 (+10 / -0)	
75	1250 (+10 / -0)	
90	1500 (+15 / -0)	
110	1750 (+15 / -0)	
125	2000 (+15 / -0)	
160	2500 (+15 / -0)	
≥200	3000 (+15 / -0)	

Table 10: Parameters for resistance to impact at 0 °C.

4.17. Repeated assembly

When the test assemblies are ten times mounted and demounted according to the instructions of the manufacturer, the test assemblies shall be leak tight according to clause 4.4.

Test assembly:
One straight fitting with on both sides a pipe. The free length of pipes shall be at least 250 mm.

Note: This test shall be carried out if repeated assembly is declared by the manufacturer.

4.18. Flow rate / pressure drop

To fulfill requirement of 4.18, flow rate / pressure drop, clause 9.3.3.11 of ISO 17885 will be followed and completed with positive outcome.

4.19. Stress corrosion

To fulfill requirement of 4.19, Stress corrosion test, clause 9.3.3.12 of ISO 17885 will be followed and completed with positive outcome.

5. Marking, instructions and packaging

5.1. Marking

Plastic fittings shall be colored in accordance with clause 3.4 or clearly marked as a fitting for gas application conform the scope of this approval requirements.

Metal fittings shall be marked by punch or cast or a non-erasable method to the product for gas application conform the scope of this approval requirements.

Fittings shall be marked in a clear and permanent method with the following aspects:

- GASTEC QA, GASTEC QA logo or punchmark*.
- Name of the manufacturer.
- Material*.
- Nominal connection size(s).
- The maximum operating pressure for which the fitting is designed*.
- Type of pipes to be used:
- In case of PE or PVC: SDR class*.
- Production date or code*.
- Dmean x wall thickness on separate inserts and packages up to and including 32 mm. From 32 mm Dmean and SDR class for PE pipe*.

*This information may be on the product, on a label attached to the product or on the smallest packaging.

5.2. Instructions

The manufacturer shall supply an installation manual with the fittings in the Dutch language, the English language, and in the language of the country in which the product will be used. The installation manual shall at least consist of the information as mentioned in paragraph 3.1 and the following:

- Use of lubricants or greases.
- The insertion depth (when the absence of the end stop is related to the functionality of the product.
- Use of inserts.
- Required torque, if applicable
- If suitable for repeated assembly.

5.3. Packaging

Fittings and additional components required for its assembly shall be packaged according to clause 11 of ISO 17885 and protected to UV at delivery. Influence of UV is considered damage as well.

Note: a decline of quality because of the influence of UV is also considered as damaging.

6. Quality system requirements

The requirements for the quality system are described in the GASTEC QA general requirements. An important part of this are the requirements for drawing up a risk analysis (e.g., an FMEA) of the product design and the production process in accordance with chapters 3.1.1.1 and 3.1.2.1. This risk analysis shall be available for inspection by Kiwa.

7. Summary of evaluation

This chapter contains a summary of the evaluation to be carried out during:

- The initial product assessment;
- The periodic product verification;

7.1. Evaluation matrix

Description of requirement	Clause	Investigation within the scope of		
		Initial product assessment	Product verification	
			Inspection	Frequency
General aspects				
Field of application	3.1	X		
Materials	3.2			
General	3.2.1	X	X	Once a year
Plastic materials	3.2.2	X	X	Once a year
Metal materials	3.2.3	X	X	Once a year
Elastomers	3.2.4	X	X	Once a year
Appearance	3.3	X	X	Once a year
Colour	3.4	X	X	Once a year
Construction	3.5	X		
Inserts	3.5.1	X		
Connections	3.5.2	X		
Transition couplers	3.5.3	X		
Twisting	3.5.4	X		
Geometrical aspects	3.6			
Fittings	3.6.1	X	X	Once a year
Pipes for mechanical fittings	3.6.2	X	X	Once a year
Non-end-load fittings made of PVC-HI	3.6.3	X	X	Once a year
Non-end-load fittings made of PE	3.6.4	X	X	Once a year
Insert dimensions	3.6.5	X	X	Once a year
Physical aspects	3.7			
Plastic material	3.7.1	X		
PVC-HI – Vicat	3.7.2	X	X	Once a year
PVC-HI – Influence of heating	3.7.2	X	X	Once a year
PVC-HI – K-value	3.7.2	X	X	Once a year
PVC-HI – DCMT	3.7.2	X	X	Once a year
PE – OIT	3.7.2	X	X	Once a year
PE – MFR	3.7.2	X	X	Once a year
PE – Influence of heating	3.7.2	X	X	Once a year
POM – MFR	3.7.2	X	X	Once a year
PA – Viscosity number	3.7.2	X	X	Once a year
PA – Ash content	3.7.2	X	X	Once a year
PPSU – MFR	3.7.2	X	X	Once a year
CU alloys – Dezincification resistance	3.7.2	X	X	Once a year
FE alloys – Corrosion resistance	3.7.2	X	X	Once a year
Resistance to gas constituents	3.7.3	X		

Description of requirement	Clause	Investigation within the scope of		
		Initial product assessment	Product verification	
			Inspection	Frequency
Performance requirements				
Pressure resistance of the plastic body material	4.3	X		
Leak tightness under internal pressure	4.4	X	X	Once a year
Leak tightness under external pressure	4.5	X		
Long-term hydrostatic strength	4.6	X	X	Once a year
Tensile load at 23 °C	4.7	X	X	Once a year
Tensile load on the weld at 23 °C	4.8	X	X	Once a year
Tensile load after relaxation	4.9	X		
Tensile load at 0 °C	4.10	X		
End load 80 °C	4.11	X		
Tensile load 800h	4.12	X		
Leak tightness after temperature cycling	4.13	X		
Leak tightness while subjected to bending	4.14	X		
Angular deflection / deformation	4.15	X	X	Once a year
Resistance to impact at 0 °C	4.16	X	X	Once a year
Repeated assembly	4.17	X		
Flow rate / pressure drop	4.18	X		
Resistance to corrosion	4.19	X		
Marking, instructions and packaging	5			
Marking	5.1	X	X	Once a year
Instruction	5.2	X	X	Once a year
Packaging	5.3	X		

8. List of referenced documents and source

8.1. Standards/ normative documents

Number	Title	Version *
EN 682	Elastomeric seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids	2002 +A1
EN 1555-2	Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 2: Pipes	2010
EN 1555-2	Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 2: Pipes	2021
ISO 580	Plastics piping and ducting systems - Injection-moulded thermoplastics fittings - Methods for visually assessing the effects of heating	2005
ISO 1133-1	Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method	2011
ISO 1167-1	Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 1: General method	2006
ISO 1167-3	Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 3: Preparation of components	2007
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	2007
ISO 2507-2	Thermoplastics pipes and fittings - Vicat softening temperature - Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) or chlorinated poly(vinyl chloride) (PVC-C) pipes and fittings and for high impact resistance poly (vinyl chloride) (PVC-HI) pipes	2017
ISO 3127	Thermoplastics pipes - Determination of resistance to external blows - Round-the-clock method	2017
ISO 3458	Plastics piping systems - Mechanical joints between fittings and pressure pipes - Test method for leaktightness under internal pressure	2015
ISO 3503	Plastics piping systems - Mechanical joints between fittings and pressure pipes - Test method for leaktightness under internal pressure of assemblies subjected to bending	2015
ISO 6509-1	Corrosion of metals and alloys - Determination of dezincification resistance of copper alloys with zinc - Part 1: Test method	2014

ISO 6957	Copper alloys - Ammonia tests for stress corrosion resistance	1988
ISO 9080	Plastics piping and ducting systems - Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation	2012
ISO 11357-6	Plastics - Differential scanning calorimetry (DSC) - Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)	2018
ISO 13229	Thermoplastics piping systems for non-pressure applications - Unplasticized poly(vinyl chloride) (PVC-U) pipes and fittings - Determination of the viscosity number and K-value	2011
ISO 13951	Plastics piping systems - Test method for the resistance of plastic pipe/pipe or pipe/fitting assemblies to tensile loading	2015
ISO 13953	Polyethylene (PE) pipes and fittings - Determination of the tensile strength and failure mode of test pieces from a butt-fused joint	2001/Amd:1 2020
ISO 17885	Plastics piping systems - Mechanical fittings for pressure piping systems - Specifications	2021
ISO 17778	Plastics piping systems - Fittings, valves and ancillaries - Determination of gaseous flow rate/pressure drop relationships	2015
ISO 19899	Plastics piping systems - Polyolefin pipes and mechanical fitting assemblies - Test method for the resistance to end load (AREL test)	2010
NEN 3050	Identification colours for pipes conveying fluids in liquid or gaseous condition in land installations and on board ships	1972/C1: 2002
NEN 7200:	Plastics pipelines for the transport of gas, drinking water and waste water - Buttwelding of PE pipes and PE fittings	2017 +A1: 2024
NEN 7230	Plastics piping systems for gas supply - Pipes of high-impact poly(vinyl chloride) (PVC-HI) - Requirements and test methods	2020
NEN 7231	Plastics piping systems for gas supply - Fittings of modified poly(vinyl chloride) (modified-PVC) - Requirements and test methods	2020
NEN 7240	Plastics piping systems for gas supply - Tensile resistant couplings of high-impact poly(vinyl chloride) (PVC-HI) - Requirements and test methods	2011

*) If no date of issuance is specified in this column, the current version of the document applies.

8.2. Source of informative documents

Number	Title	Version *
EN 437	Test gases- test pressure – appliance category	2021
Approval requirement 8		
Approval requirement 10		
Approval requirement 198		
Approval requirement 207		
General requirements GASTEC QA		

*) If no date of issuance is specified in this column, the current version of the document applies.