AR 8

February 2022

# **Approval requirement 8**

Polyethylene pipes for carrying gaseous fuels





Trust
Quality
Progress

#### **Foreword**

This GASTEC QA Approval requirement has been approved by the Board of Experts product certification 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 GASTEC QA Approval requirement will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

Approved by Board of Experts : month, day/date, year

Accepted by Kiwa Nederland B.V. : month, day/date, year

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### 1 Introduction

#### 1.1 General

This GASTEC QA approval requirement in combination with the GASTEC QA general requirements include all relevant requirements, which are adhered by Kiwa as the basis for the issue and maintenance of a Gastec QA certificate for polyethylene pipes for carrying gaseous fuels.

This GASTEC QA Approval requirements replace the GASTEC QA Approval Requirements 8, polyethylene pipes for carrying gaseous fuels, dated May 2011.

#### List of changes:

- These approval requirement have been fully reviewed textually;
- Specification of the scope in line with EN 1555-2;
- Test matrix has been updated;

The product requirements have not been changed.

#### 1.2 Scope

These approval requirements specify the requirements for pipes made of polyethylene (PE) used in piping systems for the supply of gaseous fuels of the 2<sup>nd</sup> and 3<sup>rd</sup> family according to EN 437 with a maximum operation pressure of 10 bar and an operating temperature of 20°C as reference temperature.

In EN 1555-2:2021 the SDR 17,6 class is removed. Contrary to EN 1555-2: 2021, in approval requirement 8 it remains the possible to certify pipes in SDR 17,6.

### 2 Definitions

In this approval requirement, the following terms and definitions are applicable:

Board of Experts: The Board of Experts Gastec QA.

**Maximum operating pressure:** maximum pressure that a component is capable of withstanding continuously in service under normal operating conditions.

**Operating temperature:** Temperature or temperature range for which the product is designed to operate.



## 3 Product requirements

#### 3.1 General

The product shall comply with the requirements as specified in EN 1555-2 "Plastics piping systems for the supply of gaseous fuels – Polyethylene (PE) – Part 2: Pipes".

In addition to these requirements the below mentioned requirements shall be met.

#### 3.2 SDR class 17,6 pipes

Contrary to EN 1555-2:2021 it is possible to certify pipes with class SDR 17,6. These pipes shall comply with the requirements as specified in EN 1555-2: 2010.

#### 3.3 Identification stripes

identification stripes (On all SDR classes) are applied on a pipe, there shall be at least 4 stripes. The depth of the stripe shall not exceed 25 % of emin with a maximum of 2 mm. At least half of the number of test bars required for determining the elongation at break, as specified in Table 4 of EN 1555-2, shall be chosen in such a way that the transition from colour to black material is present in the test bar, and that the centre of the colour stripe coincides with the centre of the test bar.

## 4 Marking

#### 4.1 Marking

Supplementary to the required marking stated in EN 1555-2, clause 11, the polyethylene pipes shall be permanently marked with GASTEC QA, GASTEC QA word mark or logo.



## 5 Quality system requirements

The supplier shall make a risk assessment of the product and production process according to chapter 3.1.1.1 and 3.1.2.1 of the GASTEC QA general requirements.



## 6 Summary of tests

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

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

#### 6.1 Test matrix

Material   Compound   5.1	Description of requirement	Clause	Test within the scope of		
Material  Compound  Compound 5.1 X  Compound for identification stripes  Identification stripes  AR 8: 3.2 X  External reprocessable and recyclable material  General Characteristics  General Characteristics  Geometrical characteristics  Hydrostatic strength 20 °C, 100 h  Hydrostatic strength 80 °C, 165 h  Hydrostatic strength 80 °C, 165 h  Hydrostatic strength 80 °C, 1000 h  B.2 X  Ix/ year  Resistance to slow crack PE80 and PE100 (NPT)  Resistance to slow crack PE100RC  (SHT)  Resistance to slow crack PE100RC  (ANPT)  Resistance to slow crack PE100RC  (ANPT)  Resistance to rapid crack Propagation (RCP)  Physical characteristics  Oxidation induction time (thermal Stability)  Performance requirements  10		(EN 1555-2)	Initial		
Material   Compound   5.1			•	Verification	Frequency
Compound 5.1 X Compound for identification stripes 5.2 X Identification stripes AR 8: 3.2 X External reprocessable and recyclable material 5.3 X  General Characteristics 6 (including all sub clauses) X X 1x/ year  Geometrical characteristics 7 (including all sub clauses)  Mechanical characteristics 7 (including all sub clauses)  Hydrostatic strength 20 °C, 100 h 8.2 X Hydrostatic strength 20 °C, 100 h 8.2 X Hydrostatic strength 80 °C, 165 h 8.2 X Hydrostatic strength 80 °C, 165 h 8.2 X Elongation at break 8.2 X 1x/ year Resistance to slow crack PE80 and PE100 (NPT) Resistance to slow crack PE100RC 8.2 X Resistance to rapid crack PE100RC 8.2 X Resistance to rapid crack 8.2			assessment		
Compound for identification stripes   5.2					
AR 8: 3.2	'			A	
External reprocessable and recyclable material  General Characteristics  Geometrical characteristics  Foundation of the companies of the compa					
recyclable material  General Characteristics  Geometrical characteristics  Fincluding all sub clauses)  Mechanical characteristics  Hydrostatic strength 20 °C, 100 h  Hydrostatic strength 80 °C, 165 h  Hydrostatic strength 80 °C, 1000 h  B.2 X  Ix/ year  Resistance to slow crack PE80 and PE100 (NPT)  Resistance to slow crack PE100RC  (SHT)  Resistance to slow crack PE100RC  (ANPT)  Resistance to slow crack PE100RC  (CRB)  Resistance to rapid crack  propagation (RCP)  Physical characteristics  Oxidation induction time (thermal Stability)  Melt mass-flow rate (MFR)  9.2 X  X 1x/ year  Performance requirements  10	·	AR 8: 3.2	X		
General Characteristics  Geometrical characteristics  Figure 1	I	5.3	X		
Geometrical characteristics    Total characteristics	recyclable material				
Mechanical characteristics       Hydrostatic strength 20 °C, 100 h     8.2     X       Hydrostatic strength 80 °C, 165 h     8.2     X       Hydrostatic strength 80 °C, 1000 h     8.2     X       Hydrostatic strength 80 °C, 1000 h     8.2     X       Elongation at break     8.2     X       Resistance to slow crack PE80 and PE100 (NPT)     8.2     X       Resistance to slow crack PE100RC (SHT)     8.2     X       Resistance to slow crack PE100RC (ANPT)     8.2     X       Resistance to slow crack PE100RC (CRB)     8.2     X       Resistance to rapid crack propagation (RCP)     8.2     X       Physical characteristics       Oxidation induction time (thermal stability)     9.2     X       Melt mass-flow rate (MFR)     9.2     X     X       Performance requirements     10	General Characteristics	sub clauses)	X	X	1x/ year
Hydrostatic strength 20 °C, 100 h  Hydrostatic strength 80 °C, 165 h  Hydrostatic strength 80 °C, 1000 h  8.2	Geometrical characteristics		Х	Х	1x/ year
Hydrostatic strength 80 °C, 165 h  Hydrostatic strength 80 °C, 1000 h  8.2	Mechanical characteristics				
Hydrostatic strength 80 °C, 1000 h  8.2					
Elongation at break  Resistance to slow crack PE80 and PE100 (NPT)  Resistance to slow crack PE100RC (SHT)  Resistance to slow crack PE100RC (ANPT)  Resistance to slow crack PE100RC (ANPT)  Resistance to slow crack PE100RC (CRB)  Resistance to rapid crack propagation (RCP)  Physical characteristics  Oxidation induction time (thermal Stability)  Melt mass-flow rate (MFR)  Performance requirements  8.2	•	8.2			
Resistance to slow crack PE80 and PE100 (NPT)  Resistance to slow crack PE100RC (SHT)  Resistance to slow crack PE100RC (SHT)  Resistance to slow crack PE100RC (ANPT)  Resistance to slow crack PE100RC (CRB)  Resistance to rack PE100RC (CRB)  Resistance to rapid crack propagation (RCP)  Physical characteristics  Oxidation induction time (thermal Stability)  Melt mass-flow rate (MFR)  Longitudinal reversion  9.2  X  1x/ 2 years	Hydrostatic strength 80 °C, 1000 h	8.2		X	1x/ year
PE100 (NPT)  Resistance to slow crack PE100RC (SHT)  Resistance to slow crack PE100RC (SHT)  Resistance to slow crack PE100RC (ANPT)  Resistance to slow crack PE100RC (CRB)  Resistance to rapid crack PE100RC (CRB)  Resistance to slow crack	Elongation at break	8.2	X	X	1x/ year
SHT    S.2   X     1x/ 2 years     1x/ 2 years		8.2	X		
(ANPT)     8.2     X     1x/ 2 years       Resistance to slow crack PE100RC (CRB)     8.2     X     1x/ 2 years       Resistance to rapid crack propagation (RCP)     8.2     X       Physical characteristics     2     X       Oxidation induction time (thermal Stability)     9.2     X       Melt mass-flow rate (MFR)     9.2     X     X       Longitudinal reversion     9.2     X     X     1x/ year       Performance requirements     10     10		8.2	Х		1x/ 2 years
(CRB)     8.2     X       Resistance to rapid crack propagation (RCP)     8.2     X       Physical characteristics     Oxidation induction time (thermal Stability)     9.2     X       Melt mass-flow rate (MFR)     9.2     X     X     1x/ year       Longitudinal reversion     9.2     X     X     1x/ year       Performance requirements     10		8.2	Х		1x/ 2 years
Physical characteristics  Oxidation induction time (thermal Stability)  Melt mass-flow rate (MFR)  Longitudinal reversion  Performance requirements  8.2  X  9.2  X  X  1x/ year  10		8.2	Х		1x/ 2 years
Oxidation induction time (thermal Stability)  Melt mass-flow rate (MFR)  Longitudinal reversion  Performance requirements  9.2  X  X  1x/ year  X  1x/ year	·	8.2	X		
Stability)     9.2     X       Melt mass-flow rate (MFR)     9.2     X     X     1x/ year       Longitudinal reversion     9.2     X     X     1x/ year       Performance requirements     10	Physical characteristics				
Melt mass-flow rate (MFR)     9.2     X     X     1x/ year       Longitudinal reversion     9.2     X     X     1x/ year       Performance requirements     10	,	9.2	Х		
Longitudinal reversion     9.2     X     X     1x/ year       Performance requirements     10	• /	9.2	Х	Х	1x/ year
Performance requirements 10	` '				
			-	· · ·	, , , , , , , , , , , , , , , , , , ,
	•		х	Х	1x/ year
Additional marking GASTEC QA AR 8 : 4.1 X X 1x/ year	3				

Pipes with co-extruded layers				
General	A.1	X		
Material	A.2	X		
Geometrical characteristics	A.3	Х	X	1x/ year
Mechanical characteristics				
Resistance to slow crack	A.4	Х		
Resistance to rapid crack propagation	A.4	Х		
Physical characteristics				
Oxidation induction time (thermal Stability)	A.5	Х		
Melt mass-flow rate (MFR)	A.5	Х	X	1x/ year
Marking	A.6	Х	X	1x/ year
Delamination	A.7	Х	Х	1x/ year
Integrity of the structure	A.8	X		
Pipes with peelable layer				
Geometrical characteristics	B.2	X	X	1x/ year
Mechanical characteristics	B.3	X		
Physical characteristics	B.4	X		
Melt mass-flow rate (MFR)	B.4	Х	X	1x/ year
Oxidation induction time (thermal Stability)	B.4	Х		
Coating adhesion	B.5	X		
Marking	B.6	X	Х	1x/ year

### 7 List of referenced documents

#### 7.1 Standards / normative documents

All normative references in this Approval Requirement refer to the editions of the standards as mentioned in the list below.

EN 437: 2021 Test gases- test pressure – appliance categories

EN 1555-2:2021 Plastics piping systems for the supply of gaseous fuels

- Polyethylene (PE) - Part 2: Pipes

