

**AR 58**

April 2024

validated Dutch version

# Approval requirement 58

Saddles with clamp connections of modified polyvinyl chloride (PVC-HI)



CONCEPT

**Trust  
Quality  
Progress**

# Foreword

This, translated from English, 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, translated from English, 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.

This, translated from English, AR, is used as supporting document. In case of doubt of interpretation of this AR, the English version is leading.

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The use of this approval requirement by third parties, for any purpose whatsoever, is only allowed after a written agreement is made with Kiwa Nederland B.V. to this end

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# 1 Introduction

## 1.1 General

This GASTEC QA approval requirement (AR) 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 saddles with clamp connection of impact resistant polyvinyl chloride (PVC-HI).

This GASTEC QA approval requirements replaces the version of February 2018.

List of changes:

- The approval requirement has been textually reviewed
- Paragraph 3.2 has been removed, NEN 7232: 2020 describes the full requirements of the material used
- Chapter 4 (Test methods) has been removed, size groups are included in NEN 7232: 2020
- Extension of the field of application with PE pipes
- Addition with a test related to the relaxation
- Addition with a test related to the clamps
- Update of the referring list of standards

The product requirements are extended with a test focused on the relaxation and clamps.

## 1.2 Scope

This approval requirement describes the requirements for saddles with clamp connection of modified polyvinyl chloride (PVC-HI) intended for pipe systems made of high-impact polyvinyl chloride (PVC-HI) which shall comply to NEN 7230 and/or polyethylene pipes (PE) which shall comply to the EN 1555-2 for underground gas distribution of natural gas (according the 'Ministeriele Regeling Gaskwaliteit') with a maximum operating pressure of 200 mbar.

## 2 Definitions

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

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

**Clamps:** conical mounting aid for mounting saddle halves (closure sliders)

**Impact-resistant PVC:** impact-resistant polyvinyl chloride or PVC-HI, a mixture of unplasticized PVC and an impact improver

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

**Natural gas:** 2nd family gas in accordance with EN 437

**SDR (Standard Dimension Ratio):** Numerical designation of a pipe that is equal to the ratio between the nominal outside diameter and the nominal wall thickness of a pipe.

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

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## 3 Material and product requirements

### 3.1 General

The product shall comply with the requirements in NEN 7232: Plastics piping systems for gas supply – Saddles with clamp connection of modified polyvinyl chloride (modified PVC) - Requirements and test methods.

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## 4 Performance requirements and test methods

### 4.1 General

The product shall comply with the performance requirements of NEN 7232: "NEN 7232: Plastics piping systems for gas supply – Saddles with clamp connection of impact resistant polyvinyl chloride (modified PVC) – Requirements and test methods".

In addition to NEN 7232, requirements are defined related to the relaxation (See paragraph 4.2) and the clamps (see paragraph 4.3).

### 4.2 Ageing - relaxation

In addition to NEN 7232, the impact-resistant PVC saddles shall, before being assessed on functional requirements, first be relaxed. Depending to the field of application the relaxation takes place on the mounted saddle on a PE and/or PVC pipe.

The relaxation will be simulated by exposing the mounted PVC-HI saddle to 60 °C with a duration of 500 hours. After relaxation the saddles shall be leak tight.

With respect to the test parameters there is no distinguish made in SDR class of the pipe.

#### 4.2.1 Test method

The impact-resistant PVC saddle will be mounted on a PE and/or impact-resistant PVC pipe (depending on the intended field of application) according to the instruction manual of the producer.

The composed saddle will be conditioned in fluid without any additional resistances, at 60 °C ± 1 °C with a duration of 500 hour (+72 hour / - 0 hour) after which cooled in air at 23 °C ± 2 °C for 16 hours.

After the cooling the relaxation has been completed and the composed saddle continues with the leak tightness test according to paragraph 5.1 and 5.2 of NEN 7232

#### 4.2.2 Number of Samples

The relaxation will be performed on a number of samples needed to perform the leak tightness test (see paragraphs 5.1 and 5.2 of NEN 7232).

### 4.3 Resistance to impact of het clamps

In addition to NEN 7232, the clamps of a saddle will also be assessed on the impact resistance.

The impact test is carried out in triplicate (so on three different saddles) according to paragraph 4.3.1 whereby the test method differs from the installation manual of the producer.

### 4.3.1 Test method

- 3 sets will be assembled for the test. At each set a impact-resistant PVC saddle is placed on a high-impact PVC pipe.
- The clamp is unlike the installation manual of the producer, fully mounted on one side until the clamp is equal to the saddle.
- The clamp on the other side is secured with a small tap (see photos below) and protrudes well above the saddle.  
This causes that the saddle is maximally open on this side and maximum tension will be created on the closing seal during the stroke.
- Conditioning takes place according to appendix C.3 of NEN 7232.
- The tube section with the saddle is then placed on a steel core under the fall device. The pipe section is placed in such a way that the clamp that has not yet been struck is positioned directly under the falling weight.
- In contradiction to NEN 7232 a falling weight of 4kg at a falling height of 2.5m will be taken into account. The bottom of the falling mass will be flat, as described in NEN 7232.
- Then the second clamp is placed using the falling weight hit the saddle with one strike, see the right.
- When a rupture occurs on the clamp or saddle the test failed.



Example set 63-110 mm



Example set 160-250mm



Example impact test

- After the first strike, the struck clamp will be knocked back until the stop side is equal with the saddle (the correct position as stated in the instruction manual).
- The other clamp is tapped back to the start position of the impact test, so that it is still just on the saddle.
- The still mounted saddle will be conditioned according to appendix C.3 of NEN 7232. After at least 15 minutes conditioning (in the refrigerator for example)
- the other clamp is struck with the falling device.
- When a rupture occurs on the clamp or saddle the test failed.

# 5 Marking and instructions

## 5.1 Marking

In addition to the marking as described in NEN 7232 the impact resistance PVC saddles shall be marked with GASTEC QA or the GASTEC QA logo.

## 5.2 Instructions

The supplier shall provide user instructions in the Dutch language. These instructions shall have the following information included:

- The use and installation of the product and of the saddle is suitable for PE and / or PVC.
- The way to check if the product is installed correctly.
- The way the product should be stored.
- The maximum storage period.

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## 6 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. The risk assessments shall be available to Kiwa for review.

In addition to paragraphs 3.1.2 and 4.1 of the general requirements GASTEC QA the manufacturer shall include a relevant test on the clamps as specific part in the quality plan.

The manufacturer is free to deviate from the test method described in paragraph 4.3 of this approval requirement, as long as the high product quality (of the clamp) is guaranteed.

In any case, the test shall be carried out with a falling mass and height as described in NEN 7232, appendix C.2.

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# 7 Summary of tests

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

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

## 7.1 Test matrix

Description of requirement	Clause (NEN 7232) or AR 58	Test within the scope of		
		Initial product assessment	Product verification Verification	Frequency
Product requirements	4			
Implementation of the saddles	4.1	X		
Appearance and finish of the saddles	4.2	X		
Connection of the saddles	4.3	X		
Material of the saddles	4.4			
General	4.4.1	X		
Colour	4.4.2	X		
Vicat softening temperature	4.4.3	X	X	1 x per year
K-value	4.4.4	X		
Rubber seals	4.4.5	X		
Resistance to gas	4.4.6	X		
Dimensions and admissible dimensional deviation of the saddles	4.5			
General	4.5.1	X		
Wall thickness and surface of the saddles	4.5.2	X	X	1 x per year
Sealing of the saddles	4.6	X		
Connections in the saddles	4.7	X		
Connection pieces	4.8	X		
Functional requirements	5			
Leak tightness at internal pressure with and without mechanical load	5.1.1*	X	X	1 x per year
Leak tightness at external pressure with and without mechanical load	5.1.2*	X		
Resistance to impact at 0°C on the saddle	5.2*	X	X	1 x per year
Influence of heating on the saddles and parts of the saddles	5.3	X	X	1 x per year
Tensile strength and strength of full-end load coupling	5.4.1	X	X	1 x per year
Leak tightness of the rubber seal of non-end-load connection piece	5.4.2	X		
Marking and documentation	7	X	X	1 x per year
Additional GASTEC QA requirements*				
Ageing – simulating the relaxation	AR 58: H4.2*	X	X	1 x per year
Resistance to impact at 0°C on the clamp	AR 58: H4.3	X	X	1 x per year
Marking and user instructions	AR 58: H 5	X	X	1 x per year

\*for certification first AR 58: H4.2 takes place after which the test mentioned in paragraphs 5.1 and 5.2 of NEN 7232 will be performed

# 8 List of referenced documents and source

## 8.1 Standards / normative documents

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

NEN 7232: 2020

Plastics piping systems for gas supply - Saddles with clamp connections of modified polyvinyl chloride (PVC-HI) - Requirements and test methods

## 8.2 Source of informative documents

EN 437: 2021

Test gases- test pressure – appliance categories

EN 682: 2002 +A1: 2005

Elastomeric seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluid.

Part of the additional requirements (paragraphs 4.2 and 4.3 of this approval requirement) for GASTEC QA are based on:

Netbeheer Nederland – onderzoeksrapport  
Kiwa Technology GT – 220199: 2022

Een veilige verbinding voor lagedruk toepassingen

Netbeheer Nederland – onderzoeksrapport  
Kiwa Technology GT – 220070: 2023

Falende PVC zadelsystemen