

# Gasunie Technical Standard

Material Specification Mechanical

MSW-01-E/2

## **Pipe for gas piping**

*Seamless pipe  $15 \leq DN \leq 400$*

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Intern/Internal

## FOREWORD

This specification is an adaptation of the fourth version of MSW-01-E/2.

With respect to version 3 the following has been changed:

*(see also documentation 2, clause 5 of this specification MSW-01-E/2)*

- Transport media assessed and table 1 Transport media added;
- Extension of the scope with hydrogen, carbon dioxide and nitrogen gas;
- Update of ASTM A333 to version 2018.

Alterations are marked with a left margin line.

This specification is to be read in conjunction with the ASTM specification A 333/A 333M (2018). The background of this specification is given in documentation 1 (see clause 5).

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## 1. SCOPE AND APPLICATION

This specification only relates to the ASTM A333 Grade 6 for use in natural gas, nitrogen, hydrogen or carbon dioxide piping systems with a maximum operating pressure of 140 bar (e) and a temperature from -45 °C up to and including +150 °C.

This specification shall not be used for linepipe.

### 1.1 Transport media

Table 1 shows the transport media (i.e. media to be transported) to which this specification applies.

Table 1: Transport media

Transport medium <sup>1</sup>	Natural gas	Hydrogen	Carbon dioxide	Nitrogen	(Hot) water	Ammonia
	Applicable	Applicable	Applicable	Applicable	Not judged <sup>2</sup>	Not judged <sup>2</sup>

- 1 This table is based on applicability to the transport medium concerned.  
The scope and media to which this specification applies are not automatically the same as the scope and media of underlying specifications. The scope and applicability to a medium are described for each specification.
- 2 Applicability shall be determined on the basis of an impact analysis. The requirements that do emerge as being applicable shall be observed.

## 2. REFERENCES

This specification makes prescriptive reference to the documents mentioned in this clause.

If the documents in this specification are mentioned with a date, that specific edition applies.

### 2.1 Gasunie specification

This specification refers to the following Gasunie specification:

[MSA-32-E](#)

Requirements for inspection certificates of pressure parts.

### 2.2 Standards

This specification refers to the standards mentioned in this subclause. Any supplements and errata notices also apply.

The following applies to all NEN-EN standards: depending on the country where the standard will be applied, DIN-EN or BS-EN, for example, shall be chosen.

ASTM A333/A333 M (2018)	Standard specification for seamless and welded steel pipe for low-temperature service and other applications with required notch toughness.
ASTM A999/A999 M	Standard specification for general requirements for alloy and stainless steel pipe.
NEN-EN-ISO 10893-5 (April 2011)	Non-destructive testing of steel tubes - Part 5: Magnetic particle inspection of seamless and welded ferromagnetic steel tubes for the detection of surface imperfections.

### **3. GENERAL REQUIREMENTS**

Seamless carbon steel line pipe for pressure purposes shall conform to ASTM A333 and modifications and supplements as stated in this specification.

Sections not mentioned remain unaltered.

Additional requirements, which are not stated in ASTM A333, are indicated with "addition".

Sections of ASTM A333, which are not valid, are indicated with "deletion".

Requirements which are stated in ASTM A333, that shall be replaced, are indicated with "substitution".

Gasunie choices are indicated as "choice".

The numberings and (sub)clauses in italics in this specification correspond to that in ASTM A333, where the subject is covered by that specification and any additional (sub)clauses are numbered sequentially.

## 4. MODIFICATIONS AND SUPPLEMENTS TO ASTM A333

### SECTION 1 SCOPE

Substitution *Substitute the first sentence with the following:*  
This specification covers nominal (average) wall seamless carbon steel pipe intended for use at low temperatures and elevated temperatures up to 150 °C.

### SECTION 3 ORDERING INFORMATION

#### 3.1.2 Name of material

choice Seamless pipe

#### 3.1.3 Grade

choice Grade 6

#### 3.1.7 Optional requirements

choice Chemical composition  $C \leq 0,21 \%$ ,  $Ceq \leq 0,45 \%$

choice Weld repair is not allowed.

choice Hydrostatic test

#### 3.1.8 Test report required

choice The required inspection certificate in accordance with MSA-32-E route 5 or 7, depending on the nominal diameter.

#### 3.1.9 Specification designation

choice The designation shall be "M".

#### 3.1.10 Special requirements

addition Each length of pipe shall be marked with the heat number and purchase order number.

addition The pipe ends will be examined by magnetic particle testing (see section 18).

### SECTION 4 MATERIALS AND MANUFACTURE

#### 4.1 Manufacture

The Grade 6 pipe shall be made by the seamless process.

**SECTION 5 CHEMICAL COMPOSITION**

substitution 5.1

The steel shall conform to the requirements as to chemical composition prescribed in table 2 (of this specification MSW-01-E/2).

substitution *Table 2: Chemical requirements*  
(maximum values unless a range is given)

Element	Grade 6 weight %
C	0,21
Mn	0,29 - 1,35
P	0,025
S	0,025
Si	0,10 - 0,40
Ni	0,40
Cr	0,30
Cu	0,40
V	0,08
Nb (Cb)	0,02
Mo	0,12
$C + \frac{Mn}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Cu + Ni)}{15}$	0,45

**SECTION 6 PRODUCT ANALYSIS**

6.1

delete "At the request of the purchaser".

**SECTION 7 TENSILE REQUIREMENTS**

substitution Table 2: yield strength shall be minimum 245 MPa and maximum 440 MPa.

addition The yield to tensile ratio shall be maximum 0,90.

addition The hot yield strength at 300 °C shall be minimum 149 MPa.

**SECTION 10 WORKMANSHIP, FINISH AND APPEARANCE**

substitution 10.6

Weld repair is not permitted.

**SECTION 15 HYDROSTATIC OR NONDESTRUCTIVE ELECTRIC TEST**

substitution 15.1

Each length of pipe shall be subjected to the hydrostatic test.



**SECTION 16 PRODUCT MARKING****16.1**

addition

In addition to the requirements of ASTM A999 each length of pipe shall be marked with the heat number and purchase order number. For reference with magnetic particle testing results (Section 18) each pipe shall have a unique number.

**16.2 (additional subsection)**

The required markings shall be applied by low-stress die-stamping and placed on the outside pipe surface between 20 mm and 150 mm from one pipe end. The height of the markings shall be at least 4 mm and the minimum impression shall be 0,2 mm. The die-stamped marks shall be placed within a frame of white paint (weld primer).

**SECTION 18 MAGNETIC PARTICLE TESTING OF PIPE ENDS****(additional section)**

Pipe ends and bevel faces shall be examined by magnetic particle testing in accordance with NEN-EN-ISO 10893-5 (April 2011).

**5.1 General (NEN-EN-ISO 10893-5)**

Addition

Demagnetisation is not required.

**5.3 Testing the end/bevel face (NEN-EN-ISO 10893-5)**

Addition

The accessible inside and outside surfaces including the weld bevel of the pipes shall be examined for a distance up to 300 mm from the pipe ends.

Choice

Electromagnetic yokes and magnetic particle suspensions with black or fluorescent particles shall be used.

**6.2 Special requirements for evaluation of indications in the pipe body (NEN-EN-ISO 10893-5)**

Choice

For the pipe surface, acceptance level M1 is applicable.

**8 Test report (NEN-EN-ISO 10893-5)**

Choice

A test report is required.

## 5. DOCUMENTATION

This specification refers informatively to the following documentation:

- 1 N.V. Nederlandse Gasunie, memorandum [VS 12.0350](#) "Eisen aan buizen van A333 grade 6" d.d. 02-07-2012, A.H.M. Krom  
(not available for external parties).
- 2 N.V. Nederlandse Gasunie, memorandum [VA 21.0311](#) "MSW-01-E/2 versie 4: wijzigingen t.o.v. versie 3", d.d. 27-08-2021, A.H.M. Krom  
(not available for external parties).