NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 15558.1-2023

Buried polyethylene(PE) piping systems for the supply of gaseous fuels - Part 1: General

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document is Part 1 of GB/T 15558 "Buried polyethylene (PE) piping systems for the supply of gaseous fuels". GB/T 15558 has published the following parts:

- Part 1: General;
- Part 2: Pipes;
- Part 3: Fittings;
- Part 4: Valves;
- Part 5: Fitness for purpose of the system.

This document modifies and adopts ISO 4437-1:2014 "Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 1: General".

Compared with ISO 4437-1:2014, this document has more structural adjustments. See Appendix A for a comparison of the structural number changes between the two documents.

Compared with ISO 4437-1:2014, this document has more technical differences; the outer margins of the involved clauses are marked with a vertical single line (?). A list

of these technical differences and their reasons is given in Appendix B.

This document has made the following editorial changes:

- To coordinate with the existing standard, CHANGE the name of the standard to "Buried polyethylene (PE) piping systems for the supply of gaseous fuels - Part 1: General";

- To facilitate the understanding and use of the standard, DELETE the notes that do not conform to China's national conditions, changing or adding some notes;

- ADD Appendix C (Informative) "Relationship between maximum working pressure and working temperature and RCP critical pressure";

- ADD Appendix D (Informative) "Additional information on PE 100-RC materials";

- DELETE Appendix A (Informative) of ISO 4431-1:2014.

1 Scope

This document specifies the material requirements and inspection report requirements for buried polyethylene (PE) piping systems for the supply of gaseous fuels; describes the corresponding test methods.

This document, together with other parts of GB/T 15558, is applicable to buried polyethylene (PE) piping systems for the supply of gaseous fuels, which have an operating temperature of -20 °C ~ 40 °C and a maximum operating pressure (MOP) not exceeding 1.0 MPa.

Note 1: The maximum operating pressure of the pipeline system is related to the operating temperature and the critical pressure of the material's resistance to rapid crack propagation (RCP), see Appendix C. The reference operating temperature is 20 °C.

Note 2: The MOP of polyethylene pipes is determined based on the design stress sigmaD, the influence of RCP performance is considered; the MOP depends on the minimum required strength (MRS) of the material type, the standard dimension ratio (SDR), the overall service (design) factor (C >= 2), etc.

Note 3: The relevant parties are responsible for appropriately selecting the products specified

in GB/T 15558 (all parts) according to specific application requirements and in combination with relevant regulations, standards or specifications.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for referenced documents with dates, only the version corresponding to that date applies to this document; for referenced documents without dates, the latest version (including all amendments) applies to this document.

GB/T 1033.1 Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (GB/T 1033.1-2008, ISO 1183-1:2004, IDT)

GB/T 1033.2 Plastics - Methods for determining the density of non-cellular plastics - Part 2: Density gradient column method (GB/T 1033.2-2010, ISO 1183-2:2004,

It is tested by direct calcination method according to GB/T 9345.1.

5.10 Tensile fracture nominal strain and tensile yield stress

Prepare specimens according to GB/T 1845.2 and test according to GB/T 1040.2.

5.11 Trace metal element content

It is tested according to GB/T 39994. During arbitration, prepare specimens by dry ashing method and test by inductively coupled plasma spectrometer (ICP-OES method).

5.12 Strain hardening test (SHT)

It is tested according to GB/T 40919. The number of specimens is 5.

5.13 Accelerated full-notch creep test (AFNCT)

It is tested according to GB/T 32682. The length x width x thickness of the specimen is 100 mm x 10 mm x 10 mm; the notch depth is 1.6 mm. The number of specimens is 4.

5.14.1 Specimens

Use dn32 mm, SDR 11 pipe specimens, the number of specimens is 3. If there is a clear relationship with the test results of dn32 mm, SDR 11 pipes, other specifications of pipe specimens can be used.

5.14.2 Condensate

The condensate is composed of a mixture of 50% by mass of n-decane (99%) and 50% by mass of 1,3,5-trimethylbenzene.

5.14.3 Conditioning

Fill the pipe with condensate; place it in an air environment at (23 +/- 2) °C for 1500 h for conditioning.

5.14.4 Test

It is tested according to GB/T 6111. The internal medium of the specimen is condensate, the external medium is water, the A-type joint is used.

5.15.1 Test specimen

Use pipe specimens with dn110 mm, SDR 11, length of 1 m.

5.15.2 Test steps

Mark the exposed surface of the pipe sample; test according to GB/T 3681.2. After sun exposure with a total energy of at least 3.5 GJ/m2, remove the specimen and test:

a) Conduct a fusion strength test on the socket end of the electric fusion pipe fitting according to GB/T 19808, where the electric fusion joint is prepared at (23 +/- 2) °C; the number of specimens is 4;

b) Conduct a break elongation test and a hydrostatic strength test. The break elongation test is conducted according to GB/T 8804.3; the specimen is prepared from the exposed surface of the pipe; the hydrostatic strength test is conducted according to GB/T 6111.

5.16 Rapid crack propagation resistance (RCP)