

ICS 83.140.30

CCS G 33



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 20221-2023

Replacing GB/T 20221-2006

**Unplasticized poly(vinyl chloride) (PVC-U) pipes for
non-pressure buried drainage and sewerage systems**

Issued on: September 7, 2023

Implemented on: April 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
1 Scope	1
2 Normative reference documents	1

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document replaces GB/T 20221-2006 "Rigid polyvinyl chloride (PVC-U) pipes for pressureless buried sewage and drainage" and is consistent with GB/T 20221-

Compared with 2006, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

---The range of the outer diameter of the pipe has been changed, and the outer diameter of the elastic sealing ring connecting pipe has been adjusted from dn110mm to dn1000mm.

dn110mm~dn1600 mm, the outer diameter of adhesive connection pipe is adjusted from dn110mm~dn200mm to

dn110mm~dn450mm (see Chapter 1, Chapter 1 of the 2006 edition);

---Added pressureless sewage and drainage pipes also suitable for pipe corridors (see Chapter 1);

---Added terms, definitions, symbols and abbreviations (see Chapter 3);

--- Added that lead-containing additives should not be used (see 4.1);

---Added requirements for PVC resin (see 4.2);

--- Added requirements for the physical and mechanical properties of the compound (see 4.4);

---Deleted the classification of pipes according to nominal ring stiffness (see 4.2 of the 2006 edition);

---The color of the pipe should be white, green or gray (see 6.1);

---Changed the pipe length diagram (see 6.3.1, 5.3.1 of the 2006 edition);

---Added the average outer diameter and out-of-roundness requirements for pipes from

dn1200mm to dn1600mm (see 6.3.2);

---Added the wall thickness requirements for SN12.5 and SN16 pipes (see 6.3.3);

---Changed the size requirements for the elastic sealing ring connection socket (see 6.4.1, 5.3.6.1 of the.2006 edition);

---Changed the size requirements for adhesive connection sockets (see 6.4.2, 5.3.6.2 of the.2006 edition);

---Changed the socket size requirements (see 6.4.3, 5.3.6.1 and 5.3.6.2 of the.2006 edition);

---Added the ring stiffness requirements of SN12.5 and SN16 in the physical and mechanical properties of pipes (see 6.5); deleted the dichloromethane of pipes

Alkane immersion test requirements (see 6.9 of the.2006 edition); the flatness properties, tensile yield stress and elongation at break requirements of the pipe are added.

(see 6.5); added a footnote that the longitudinal retraction rate is only applicable to $en \leq 16$ mm pipes (see 6.5); added a footnote for $dn >$

For 630mm pipes, acetone impregnation can be used to replace the footnote of elongation at break (see 6.5);

---Added lead limit requirements for pipes (see 6.6);

---Added provisions for drop weight impact specimens (see 7.6.1);

---Added flat performance test method (see 7.9);

---Added tensile yield stress test method (see 7.10);

--- Added test method for elongation at break (see 7.11);

---Added acetone immersion test method (see 7.12);

--- Added lead limit test method (see 7.13);

---Changed the connection sealing test method for elastic sealing ring connection pipes (see 7.14, 6.10 of the.2006 edition);

---Changed the group batch requirements (see 8.2.1, 7.2 of the.2006 version);

---Added pipe size grouping (see 8.2.2);

---Added stereotype testing (see 8.3);

---Changed the factory inspection requirements (see 8.4, 7.3 of the.2006 edition);

---Changed the type inspection requirements (see 8.5, 7.4 of the.2006 edition);

---Changed the judgment rules (see 8.6, 7.5 of the.2006 version);

---Changed the requirements for marking (see 9.1, 8.1 of the.2006 version);

---Changed the storage requirements (see 9.3, 8.3 of the.2006 edition).

This document is modified to adopt ISO 4435.2003 "Plastic piping systems for unpressurized underground drainage and sewage discharge, unplasticized polyvinyl chloride (PVC-U)".

Compared with ISO 4435.2003, this document has many structural adjustments. Comparison list of structure number changes between the two files

See Appendix A.

Compared with ISO 4435.2003, this document has many technical differences. Vertical single words are used in the outer margins of the clauses involved.

Lines (I) are marked. A list of these technical differences and their causes is provided in Appendix B.

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

1 Scope

This document stipulates the extrusion molding of rigid polyvinyl chloride (PVC-U) compounds for use in pressureless buried sewage and drainage applications.

Terms, definitions, symbols and abbreviations, materials, product classifications, colors, appearances, and specifications of vinyl (PVC-U) pipes (hereinafter referred to as "pipes") requirements such as dimensions and physical and mechanical properties, describes the corresponding test methods, and stipulates inspection rules, marking, transportation and storage.

This document is applicable to the connection of elastic sealing rings with an outer diameter of dn110mm~dn1600mm and an outer diameter of dn110mm~

dn450mm adhesive connected pipes.

This document is applicable to buried pressureless sewage and drainage pipes whose transport medium temperature is not greater than 45°C. In meeting the chemical resistance of the pipe and

Under application conditions such as heat resistance, it is also suitable for pressureless sewage and drainage pipes for industrial or pipe corridors.

This document does not apply to sewage and drainage rigid polyvinyl chloride (PVC-U) pipe systems laid underground in buildings.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations

For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to

this document.

GB/T 1033.1 Determination of density of plastic non-foam plastics Part 1. Dip method, liquid pycnometer method and titration method

(GB/T 1033.1-2008, ISO 1183-1:2004, IDT)

GB/T 1040.2 Determination of tensile properties of plastics Part 2. Test conditions for molded and extruded plastics (GB/T 1040.2-

2022, ISO 527-2:2012, MOD)

GB/T 1633 Determination of Vicat softening temperature (VST) of thermoplastics (GB/T 1633-2000, idt ISO 306:1994)

GB/T 2828.1 Enumeration sampling inspection procedures Part 1. Batch-by-batch inspection sampling plan retrieved by acceptance quality limit (AQL)

(GB/T 2828.1-2012, ISO 2859-1:1999, IDT)

GB/T 2918 Standard environment for conditioning and testing of plastic specimens (GB/T 2918-2018, ISO 291:2008, MOD)

GB/T 5761 Suspension method general-purpose polyvinyl chloride resin

GB/T 6111 Determination of internal pressure resistance of thermoplastic piping systems for fluid transportation (GB/T 6111-2018,

ISO 1167-1:2006, ISO 1167-2:2006, ISO 1167-3:2007, ISO 1167-4:2007, NEQ)

GB/T 6671 Determination of longitudinal shrinkage of thermoplastic pipes (GB/T 6671-2001, eqv ISO 2505:1994)

GB/T 8802 Determination of Vicat softening temperature of thermoplastic pipes and fittings (GB/T 8802-2001, eqv ISO 2507.

1995)

GB/T 8804.2 Determination of tensile properties of thermoplastic pipes Part 2. Rigid polyvinyl chloride (PVC-U), chlorinated polyvinyl chloride

(PVC-C) and high-impact polyvinyl chloride (PVC-HI) pipes (GB/T 8804.2-2003, ISO