

<b>STN</b>	<b>Potrubné systémy z plastov na tlakové a beztlakové zásobovanie vodou, kanalizčné potrubia alebo stoky</b> <b>Sklom vystužené termosetové systémy (GRP) na báze nenasýtenej polyesterovej (UP) živice (ISO 23856: 2021)</b>	<b>STN EN ISO 23856</b>  64 0653
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Plastics piping systems for pressure and non-pressure water supply, drainage or sewerage - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin (ISO 23856:2021)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/21

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Plastics piping systems for pressure and non-pressure water supply, drainage or sewerage - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin (ISO 23856:2021)

Systèmes de canalisations en matières plastiques pour l'alimentation en eau, les branchements et les collecteurs d'assainissement avec ou sans pression - Systèmes en plastiques thermodurcissables renforcés de verre (PRV) à base de résine de polyester non saturé (UP) (ISO 23856:2021)

Kunststoff-Rohrleitungssysteme für Wasserversorgung, Entwässerungssysteme und Abwasserleitungen mit und ohne Druck - Glasfaserverstärkte duroplastische Kunststoffe (GFK) auf der Basis von ungesättigtem Polyesterharz (UP) (ISO 23856:2021)

This European Standard was approved by CEN on 16 May 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN ISO 23856:2021 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

This document (EN ISO 23856:2021) has been prepared by Technical Committee ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids" in collaboration with Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2021, and conflicting national standards shall be withdrawn at the latest by December 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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## **Endorsement notice**

The text of ISO 23856:2021 has been approved by CEN as EN ISO 23856:2021 without any modification.

# INTERNATIONAL STANDARD

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## **Plastics piping systems for pressure and non-pressure water supply, drainage or sewerage — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin**

*Systèmes de canalisations en matières plastiques pour l'alimentation en eau, les branchements et les collecteurs d'assainissement avec ou sans pression — Systèmes en plastiques thermodurcissables renforcés de verre (PRV) à base de résine de polyester non saturé (UP)*



Reference number  
ISO 23856:2021(E)

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# Contents

Page

<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>3</b>
<b>4 General</b> .....	<b>12</b>
4.1 Classification.....	12
4.1.1 Categories.....	12
4.1.2 Nominal size.....	12
4.1.3 Nominal stiffness.....	12
4.1.4 Nominal pressure.....	12
4.2 Materials.....	13
4.2.1 General.....	13
4.2.2 Reinforcement.....	13
4.2.3 Resin.....	14
4.2.4 Aggregates and fillers.....	14
4.2.5 Thermoplastics liners.....	14
4.2.6 Elastomers.....	14
4.2.7 Metals.....	14
4.3 Wall construction.....	14
4.3.1 Inner layer.....	14
4.3.2 Structural layer.....	14
4.3.3 Outer layer.....	15
4.4 Appearance.....	15
4.5 Reference conditions for testing.....	15
4.5.1 Temperature.....	15
4.5.2 Properties of water for testing.....	15
4.5.3 Loading conditions.....	15
4.5.4 Conditioning.....	15
4.5.5 Measurement of dimensions.....	15
4.6 Elapsed time, $x$ , for determination of long-term properties.....	16
4.7 Joints.....	16
4.7.1 General.....	16
4.7.2 Types of joint.....	16
4.7.3 Flexibility of the joint.....	16
4.7.4 Sealing ring.....	16
4.7.5 Adhesives.....	17
4.8 Effect on water quality.....	17
4.9 Assessment of conformity.....	17
<b>5 Pipes</b> .....	<b>17</b>
5.1 Type of pipes.....	17
5.2 Geometrical characteristics.....	17
5.2.1 Diameter.....	17
5.2.2 Wall thickness.....	23
5.2.3 Length.....	23
5.3 Mechanical characteristics.....	24
5.3.1 Initial ring stiffness.....	24
5.3.2 Long-term creep ring stiffness.....	24
5.3.3 Initial resistance to failure in a deflected condition.....	25
5.3.4 Ultimate long-term resistance to failure in a deflected condition.....	27
5.3.5 Initial longitudinal tensile strength.....	28
5.3.6 Initial design and failure pressures for pressure pipes.....	30

**ISO 23856:2021(E)**

5.3.7	Long-term failure pressure.....	32
5.4	Resistance to chemical attack.....	33
5.4.1	General.....	33
5.4.2	Procedure using failure points.....	33
5.4.3	Procedure using specified levels of strain.....	34
5.4.4	Test piece length.....	35
5.4.5	Test solution.....	35
5.5	Marking.....	35
<b>6</b>	<b>Fittings.....</b>	<b>36</b>
6.1	All types.....	36
6.1.1	General.....	36
6.1.2	Diameter series.....	36
6.1.3	Nominal pressure (PN).....	36
6.1.4	Nominal stiffness (SN).....	36
6.1.5	Fitting type.....	36
6.1.6	Mechanical characteristics of fittings.....	36
6.1.7	Installed leaktightness of fittings.....	37
6.1.8	Dimensions.....	37
6.2	Bends.....	37
6.2.1	Classification of bends.....	37
6.2.2	Dimensions and tolerances of bends.....	38
6.3	Branches.....	41
6.3.1	Classification of branches.....	41
6.3.2	Dimensions and tolerances of branches.....	41
6.4	Reducers.....	44
6.4.1	Classification of reducers.....	44
6.4.2	Dimensions and tolerances of reducers.....	44
6.5	Non-pressure saddles.....	46
6.5.1	Classification of saddles.....	46
6.5.2	Dimensions of saddles and associated tolerances.....	47
6.6	Flanges.....	47
6.6.1	Classification of flanges.....	47
6.6.2	Dimensions and tolerances for adaptors.....	48
6.7	Marking.....	49
<b>7</b>	<b>Joints.....</b>	<b>50</b>
7.1	General.....	50
7.1.1	Interchangeability.....	50
7.1.2	Requirements.....	50
7.1.3	Test temperature.....	51
7.1.4	Non-pressure joints.....	51
7.1.5	Dimensions.....	51
7.2	Flexible joints.....	51
7.2.1	General.....	51
7.2.2	Maximum allowable draw.....	51
7.2.3	Maximum allowable angular deflection.....	51
7.2.4	Flexible non-end-load-bearing joints with elastomeric sealing rings.....	51
7.2.5	Flexible end-load-bearing joints with elastomeric sealing rings.....	52
7.3	Rigid joints.....	52
7.3.1	Wrapped or cemented.....	52
7.3.2	Bolted flange joints.....	53
7.4	Marking.....	54
	<b>Annex A (normative) Principles used to establish the design requirements based on regression testing and consideration of the variability of the product.....</b>	<b>55</b>
	<b>Bibliography.....</b>	<b>60</b>



## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition cancels and replaces ISO 10639:2017 (second edition) and ISO 10467:2018 (second edition), which have been technically revised.

The main changes compared to the previous editions are as follows:

- documents combined;
- editorial changes throughout.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# ISO 23856:2021(E)

## Introduction

This document has been produced by merging ISO 10639, ISO 10467, EN 1796 and EN 14364. As these standards were almost identical, apart from the requirements for chemical resistance of sewer pipes on the one hand, and no negative impact on water quality of drinking water pipes on the other hand, it was decided that it would be beneficial for users to be able to refer to a single document, irrespective of application or region.

The content of this document is summarized as follows:

[Clause 4](#) specifies the general aspects of GRP UP piping systems.

[Clause 5](#) specifies the characteristics of pipes made from GRP UP with or without aggregates and/or fillers. The pipes can have a thermoplastics or thermosetting resin liner. [Clause 5](#) also specifies the test parameters for the test methods referred to in this document. For pipes intended for sewer applications, the resistance to chemical attack is stated in [5.4](#). For other applications, the requirements in [5.3.4](#) apply.

[Clause 6](#) specifies the characteristics of fittings made from GRP UP, with or without a thermoplastics or thermosetting resin liner. [Clause 6](#) specifies the dimensional and performance requirements for bends, branches, reducers, saddles and flanged adaptors. [Clause 6](#) covers requirements to prove the structural design of fittings. It is applicable to fittings made using any of the following techniques:

- fabrication from straight pipes;
- moulding by
  - 1) filament winding,
  - 2) tape winding,
  - 3) contact moulding, and
  - 4) hot or cold compression moulding.

[Clause 7](#) is applicable to joints to be used in the GRP UP piping systems, both buried and non-buried. It covers requirements to prove the design of the joint. [Clause 7](#) specifies type test performance requirements for the following joints as a function of the declared nominal pressure rating of the pipeline or system:

- a) socket-and-spigot (including double-socket) joints or mechanical joints;
- b) locked socket-and-spigot joints;
- c) cemented or wrapped joints;
- d) bolted flange joints.

# Plastics piping systems for pressure and non-pressure water supply, drainage or sewerage — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

## 1 Scope

This document specifies the properties of piping system components made from glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP). It is suited for all types of water supply, drainage and sewerage with or without pressure. Types of water supply include, but are not limited to, raw water, irrigation, cooling water, potable water, salt water, sea water, penstocks in power plants, processing plants and other water-based applications. This document is applicable to GRP UP piping systems, with flexible or rigid joints with or without end thrust load-bearing capability, primarily intended for use in direct buried installations.

NOTE 1 For the purpose of this document, the term polyester resin (UP) also includes vinyl-ester resins (VE).

NOTE 2 Piping systems conforming to this document can also be used for non-buried applications, provided the influence of the environment and the supports are considered in the design of the pipes, fittings and joints.

NOTE 3 This document can also apply for other installations, such as slip-lining rehabilitation of existing pipes.

NOTE 4 ISO 10467 and ISO 10639, which are replaced by this document, are also referenced in ISO 25780, which specifies requirements for GRP-pipes used for jacking installation.

The requirements for the hydrostatic pressure design of pipes referring to this document meet the requirements of ISO/TS 20656-1 and the general principle for the reliability of structures detailed in ISO 2394 and in EN 1990. These International Standards provide procedures for the harmonization of design practices and address the probability of failure, as well as possible consequences of failures. The design practices are based on a partial safety factor concept, as well as on risk management engineering.

This document is applicable to circular pipes, fittings and their joints of nominal sizes from DN 50 to DN 4000, which are intended to be used for the conveyance of water, sewage and drainage at normal service conditions, with or without pressure.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 75-2:2013, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 527-4, *Plastics — Determination of tensile properties — Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

ISO 527-5, *Plastics — Determination of tensile properties — Part 5: Test conditions for unidirectional fibre-reinforced plastic composites*

**ISO 23856:2021(E)**

ISO 1452-3, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 3: Fittings*

ISO 2394:2015, *General principles on reliability for structures*

ISO 2531, *Ductile iron pipes, fittings, accessories and their joints for water applications*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 4200, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ISO 4633, *Rubber seals — Joint rings for water supply, drainage and sewerage pipelines — Specification for materials*

ISO 7432, *Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of locked socket-and-spigot joints, including double-socket joints, with elastomeric seals*

ISO 7509, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Determination of time to failure under sustained internal pressure*

ISO 7685, *Glass-reinforced thermosetting plastics (GRP) pipes — Determination of initial ring stiffness*

ISO 8483, *Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of bolted flange joints*

ISO 8513:2016, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Test methods for the determination of the initial longitudinal tensile strength*

ISO 8521:2020, *Glass-reinforced thermosetting plastic (GRP) pipes — Test methods for the determination of the initial circumferential tensile wall strength*

ISO 8533, *Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of cemented or wrapped joints*

ISO 8639, *Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods for leaktightness and proof of structural design of flexible joints*

ISO 10466, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Test method to prove the resistance to initial ring deflection*

ISO 10468, *Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the ring creep properties under wet or dry conditions*

ISO 10471, *Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the long-term ultimate bending strain and the long-term ultimate relative ring deflection under wet conditions*

ISO 10928:2016, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Methods for regression analysis and their use*

ISO 10952, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Determination of the resistance to chemical attack for the inside of a section in a deflected condition*

ISO 11922-1, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 18851, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test method to prove the structural design of fittings*

CEN/TS 14632, *Plastics piping systems for drainage, sewerage and water supply, pressure and non-pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) — Guidance for the assessment of conformity*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**