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**Cevni sistemi iz polimernih materialov za odpadno vodo in kanalizacijo pod tlakom, položeni v zemljo - S steklenimi vlakni okrepljeni duromerni materiali (GRP), ki temeljijo na nenasičeni poliestrski smoli (UP) - 1. del: Splošno**

Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 1: General

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Kunststoff-Rohrleitungssysteme für erdverlegte Druckentwässerung und Druckabwasserleitungen - Glasfaserverstärkte duroplastische Kunststoffe (GFK) auf der Basis von ungesättigtem Polyesterharz (UP) - Teil 1: Allgemeines

[SIST EN 1115-1:1999](https://standards.iteh.ai/catalog/standards/sist/ca800a73-2ef9-4546-968e-1a1c1e201819/sist-en-1115-1-1999)

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Systemes de canalisations en plastique pour l'évacuation et l'assainissement enterrés sous pression - Plastiques thermodurcissables renforcés de verre (PRV) a base de résine de polyester non saturé (UP) - Partie 1: Généralités

**Ta slovenski standard je istoveten z: EN 1115-1:1997**

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**ICS:**

23.040.20	Cevi iz polimernih materialov	Plastics pipes
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

**SIST EN 1115-1:1999**

**en**

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EUROPEAN STANDARD

EN 1115-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 23.040.01

Descriptors: sanitation, water removal, buried pipes, pressure pipes, plastic tubes, reinforced plastics, glass reinforced plastics, thermosetting resins, polyester resins, generalities

English version

## Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 1: General

Systèmes de canalisations en plastique pour l'évacuation et l'assainissement enterrés sous pression - Plastiques thermodurcissables renforcés de verre (PRV) à base de résine de polyester non saturé (UP) - Partie 1: Généralités

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This European Standard was approved by CEN on 16 August 1997.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NNI.

This standard is a part of a System Standard for plastics piping systems, which is a standard for glass-reinforced polyester plastics piping systems for underground drainage and sewerage under pressure.

System Standards are based on the results of the work being undertaken in ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids", which is a Technical Committee of the International Organization for Standardization (ISO). They are supported by separate standards on test methods, to which references are made throughout the System Standard.

Annex A, which is informative, describes the primary functions of the inner, structural and outer layers of the pipe wall.

Annex B, which is informative, gives a bibliography which identifies the documents upon which this System Standard is based.

System Standards are consistent with standards on general functional requirements and on practices for installation.

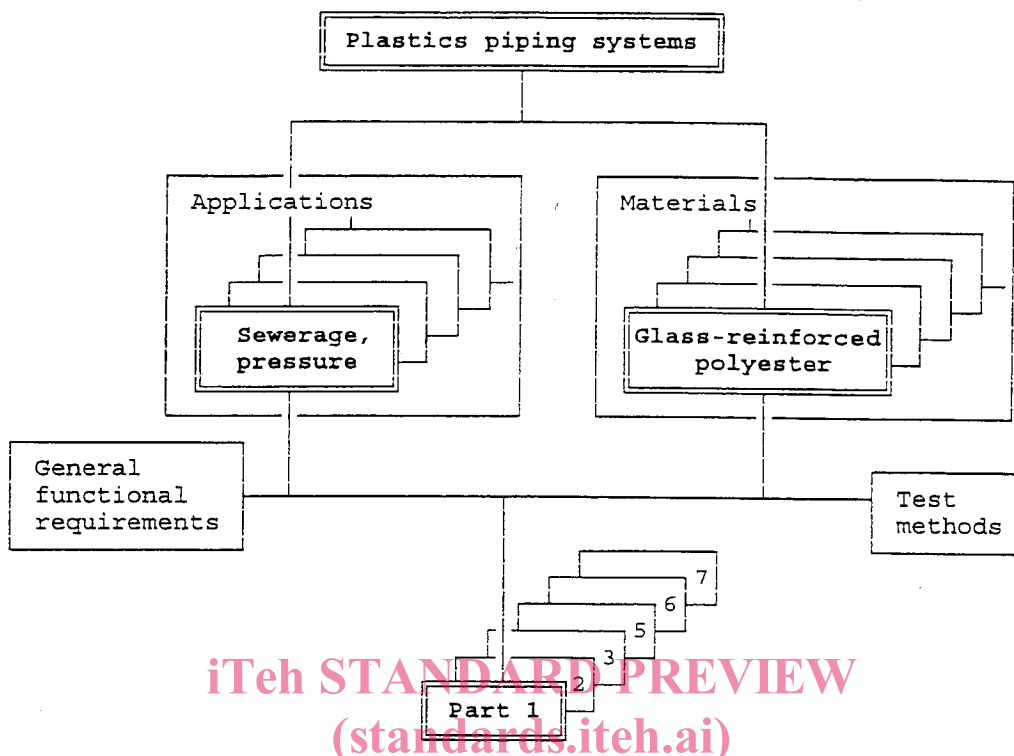
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EN 1115 consists of the following parts, under the general title *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

- Part 1: General (this standard)
- Part 2: Pipes with flexible, reduced-articulation or rigid joints
- Part 3: Fittings
- Part 5: Fitness for purpose of the joints
- Part 6: Practices for installation
- Part 7: Assessment of conformity



The following diagram indicates the place of this standard within the CEN framework for plastics piping systems:



At the date of publication of this standard, 999 System Standards for piping systems of other plastics materials used for the same application are the following:

NOTE: All listed System Standards are under preparation.

- |               |   |
|---------------|---|
| EN 1456       | <i>Plastics piping systems for underground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U)</i>                            |
| EN [155wi017] | <i>Plastics piping systems for underground drainage and sewerage under pressure - Polyethylene (PE)</i>   |
| EN [155wi136] | <i>Plastics piping systems for drainage and sewerage with or without pressure - Glass-reinforced thermosetting plastics (GRP) based on epoxy resin (EP)</i> |

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 June 1998, and conflicting national standards shall be withdrawn at the latest by June 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Introduction

The System Standard, of which this is Part 1, specifies the properties of a piping system and its components when made from glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) intended to be used for underground drainage and sewerage under pressure. The System Standard includes practices for installation and guidance on the assessment of conformity.

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## 1 Scope

This Part of EN 1115 specifies the general aspects of glass-reinforced thermosetting plastics based on unsaturated polyester resin (GRP-UP) piping systems in the field of underground drainage and sewerage under pressure.

In conjunction with Parts 2, 3, 5, 6 and 7 of EN 1115 it is applicable to GRP-UP piping systems with flexible, reduced-articulation or rigid joints primarily intended for use in buried installations.

NOTE 1: Piping systems conforming to EN 1115 can also be used for above ground applications provided the influence of the environment and the supports is considered in the design of the pipes and joints.

It is applicable to pipes and fittings, as well as their connection and the method of jointing to components of other plastics and non-plastics materials, when intended to be used for the conveyance of surface water or sewage under pressure, at temperatures up to 50 °C (subject to the limitations contained in clause 7).

This standard is applicable to pipes and fittings of nominal sizes from DN 100 to DN 3000.

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This standard covers a range of nominal sizes, nominal stiffnesses and nominal pressures. <https://standards.iteh.ai/catalog/standards/sist/ca800a73-2ef9-4546-968e-bb3edfb69120/sist-en-1115-1-1999>

NOTE 2: It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

## 2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

For dated references, subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by amendment or revision.

For undated references the latest edition of the publication referred to applies.

- EN 637 *Plastics piping systems - Glass-reinforced plastics components - Determination of the amounts of constituents using the gravimetric method*
- prEN 681-1 *Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 1: Vulcanised rubber*
- prEN 681-2 *Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 2: Thermoplastic elastomers*
- prEN 681-3 *Elastomeric seals - Material requirements for pipe joint seals used in drainage and sewerage applications - Part 3: Cellular materials of vulcanised rubber*
- prEN 681-4 *Elastomeric seals - Material requirements for pipe joint seals used in drainage and sewerage applications - Part 4: Cast polyurethane sealing elements*
- prEN 1046 *Plastics piping and ducting systems - Systems outside building structures for the conveyance of water or sewage - Practices for installation above and below ground*
- prEN 1115-2 *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 2: Pipes with flexible, reduced-articulation or rigid joints*
- EN 1115-3 *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 3: Fittings*
- EN 1115-5 *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 5: Fitness for purpose of the joints*
- prEN 1115-6 *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 6: Practices for installation*



prEN 1115-7	<i>Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 7: Assessment of conformity</i>
EN 1225	<i>Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the creep factor under wet conditions and calculation of the long-term specific ring stiffness</i>
EN 1228	<i>Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness</i>
EN ISO 75-2:1996	<i>Plastics - Determination of temperature of deflection under load - Part 2: Plastics and ebonite (ISO 75-2:1993)</i>
ISO 2078:1993	<i>Textile glass-yarns - Designation</i>

### 3 Definitions **iTeh STANDARD PREVIEW**

For the purposes of this standard, the following definitions apply:

**3.1 nominal size (DN):** An alphanumeric designation of size, which is common to all components in a piping system. It is a convenient round number for reference purposes and is related only loosely to manufacturing dimensions.

**3.2 declared diameter:** The diameter which a manufacturer states to be the internal or external diameter produced in respect of a particular nominal size DN.

**3.3 nominal stiffness (SN):** An alphanumeric designation for stiffness classification purposes (see 4.3), which has the same numerical value as the minimum value required, when expressed in newtons per square metre.

**3.4 specific ring stiffness (S):** A physical characteristic of the pipe, expressed in newtons per square metre. It is a measure of the resistance to ring deflection per metre length under external load and is defined by the following equation:

$$S = \frac{E \times I}{d_m^3}$$

where:

- E* is the apparent modulus of elasticity as determined in the ring stiffness test, i.e. EN 1228, in newtons per square metre;
- I* is the moment of inertia (the second moment of area of the pipe wall cross section) in the longitudinal direction per metre length, in metres to the fourth power per metre, i.e.

$$I = \frac{e^3}{12}$$

where:

- e* is the wall thickness, in metres;
- $d_m$  is the mean diameter of the pipe, in metres (see 3.5).

**3.5 mean diameter ( $d_m$ ):** The diameter of the circle corresponding with the middle of the pipe wall cross section.

It is given, in metres, by either of the following equations:

$$d_m = d_i + e$$

$$d_m = d_e - e$$

where:

- $d_i$  is the internal diameter, in metres;
- $d_e$  is the external diameter, in metres;
- e* is the wall thickness of the pipe, in metres.

**3.6 initial specific ring stiffness ( $S_0$ ):** The value of *S* obtained when tested in accordance with EN 1228, in newtons per square metre.

**3.7 wet creep factor ( $\alpha_{x, \text{wet}}$ ):** The average value of the results from two test pieces when tested in accordance with EN 1225.

**3.8 calculated long-term specific ring stiffness ( $S_{x, \text{wet}}$ ):** The calculated value of *S* at *x* years obtained by the following equation:

$$S_{x,wet} = S_0 \times \alpha_{x,wet}$$

where:

- $x$  is the elapsed time in years specified in this System Standard;
- $\alpha_{x,wet}$  is the wet creep factor (see 3.7);
- $S_0$  is the initial specific ring stiffness, in newtons per square metre (see 3.6).

**3.9 rating factor ( $R_{RF}$ ):** A multiplier that quantifies the relation between a mechanical, physical or chemical property at the service condition compared to its value at 23 °C and 50 % relative humidity.

**3.10 nominal pressure (PN):** An alphanumeric designation of pressure (see 4.4) loosely related to the resistance of a component of a piping system to internal pressure.

NOTE 1: The designation for reference or marking purposes consists of the letters PN plus a number.

NOTE 2: Unless otherwise specified in this System Standard, the number does not represent a measurable value.

NOTE 3: The value assigned to PN does not necessarily equate to any limiting pressure applicable to the component.

**3.11 normal service conditions:** The conveyance of clean or dirty water at 23 °C, under pressure, for 50 years.

**3.12 working pressure:** Internal pressure excluding surge. It is expressed in bars.

**3.13 maximum working pressure:** Maximum internal pressure excluding surge at which the system can be continuously operated. It is expressed in bars.

**3.14 surge:** Rapid change in internal pressure, either positive or negative, caused by a change in the flow velocity. It is expressed in bars.

**3.15 surge allowance:** The value, expressed in bars or as a percentage of the pressure rating of the pipe, that can be added to the maximum working pressure to allow for occasional fluctuations in pressure. The value may vary depending upon the anticipated frequency of the surge conditions.

**3.16 static design pressure:** The maximum working pressure for the system, taking into account current and future use, fixed by the designer. It is expressed in bars.

**3.17 maximum design pressure:** Maximum working pressure plus surge that the designer anticipates in the system. It is expressed in bars.