

---

**Cevni sistemi iz polimernih materialov za podzemno drenažo in kanalizacijo pod tlakom - S steklenimi vlakni ojačeni duromerni materiali (GRP), ki temeljijo na nenasičenih poliestrskih smolah (UP) - 3. del: Fitingi**

Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 3: Fittings

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)  
Kunststoff-Rohrleitungssysteme für erdverlegte Druckentwässerung und Druckabwasserleitungen - Glasfaserverstärkte duroplastische Kunststoffe (GFK) auf der Basis von ungesättigtem Polyesterharz (UP) - Teil 3: Formstücke

[SIST EN 1115-3:1997](https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-1115-3:1997)

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-1115-3:1997>  
Systeme 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 3: Raccords

**Ta slovenski standard je istoveten z: EN 1115-3:1996**

---

**ICS:**

23.040.45	Fitingi iz polimernih materialov	Plastics fittings
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

**SIST EN 1115-3:1997**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 1115-3:1997](#)

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-0fcf57a850fe/sist-en-1115-3-1997>

EUROPEAN STANDARD

EN 1115-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1996

ICS 23.040.20; 23.040.45

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

English version

**Plastics piping systems for underground drainage  
and sewerage under pressure - Glass-reinforced  
thermosetting plastics (GRP) based on  
unsaturated polyester resin (UP) - Part 3: Fittings**

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 3: Raccords

Kunststoff-Rohrleitungssysteme für erdverlegte Druckentwässerung und Druckabwasserleitungen - Glasfaserverstärkte duroplastische Kunststoffe (GFK) auf der Basis von ungesättigtem Polyesterharz (UP) - Teil 3: Formstücke

SIST EN 1115-3:1997

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-0fc157a8350e/sist-en-1115-3-1997>

This European Standard was approved by CEN on 1996-01-14. 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 Central Secretariat or to any CEN member.

The European Standards exist 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.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

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 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 1996, and conflicting national standards shall be withdrawn at the latest by December 1996.

This standard is 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.

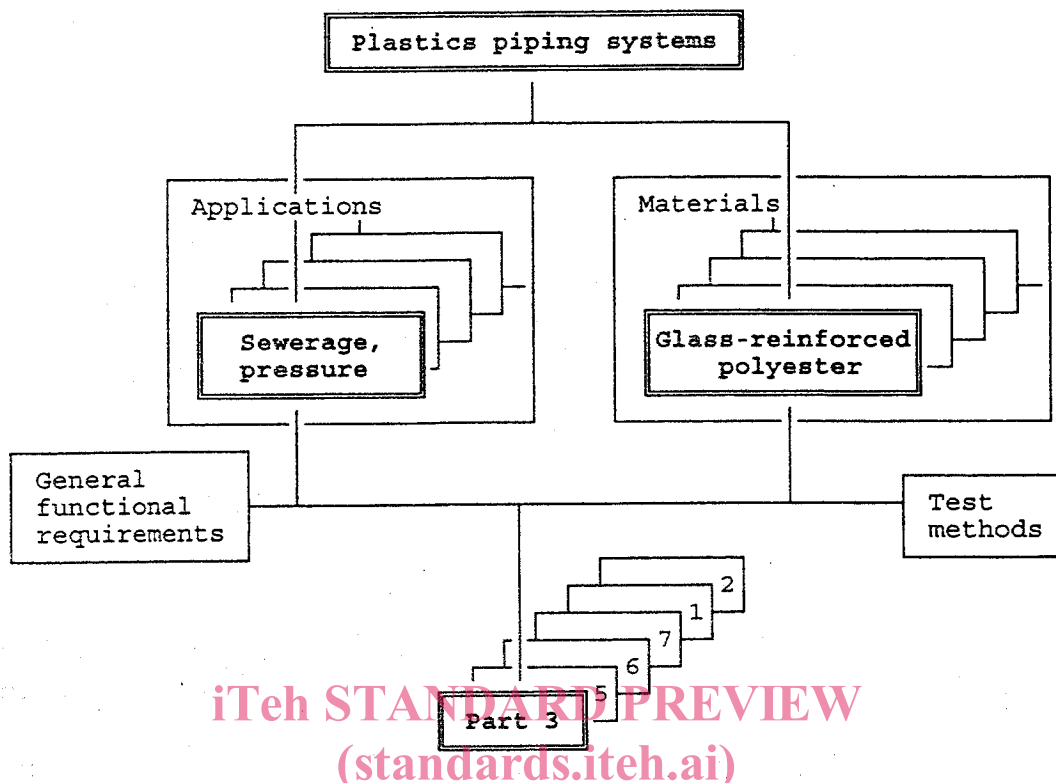
System Standards are consistent with standards on general functional requirements and on practices for installation.

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
- Part 2: Pipes with flexible, reduced articulation or rigid joints
- Part 3: Fittings (this standard)
- 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 of plastics piping systems:



At the date of publication of this standard, 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	Plastics piping systems for underground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U)
EN [155wi017]	Plastics piping systems for underground drainage and sewerage under pressure - Polyethylene (PE)
EN [155wi136]	Plastics piping systems for drainage and sewerage with or without pressure - Glass-reinforced thermosetting plastics (GRP) based on epoxy resin (EP)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 3, specifies the requirements for a piping system and its components 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 procedures for assessment of conformity.

The committee is preparing further design regulations and related test procedures which will be included in the document when available (see clause 5).

This Part of EN 1115 which covers the characteristics of fittings, is intended to be used by amongst others, end-users, authorities, design engineers, testing and certification institutes and manufacturers.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 1115-3:1997](#)

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-0fcf57a850fe/sist-en-1115-3-1997>

## 1 Scope

This Part of EN 1115 specifies the characteristics of fittings made from glass-reinforced thermosetting plastics pipes or moulded based on unsaturated polyester resin (GRP-UP) intended to be used in underground drainage and sewerage under pressure. It also specifies the test parameters for the test methods referred to in this standard.

It is applicable to fittings intended to be used for the conveyance of surface water or sewerage under pressure, below ground, outside buildings, at temperatures up to 50 °C.

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.

This standard specifies the dimensional and performance requirements for bends, branches, reducers and flanged adaptors made from GRP-UP, with or without thermoplastic liners.

NOTE 2: When specifying the use of ductile iron fittings with GRP pipes care should be taken to ensure their compatibility with the GRP pipe.

This standard is applicable to fittings fabricated from straight pipe or moulded by filament or tape winding, or by using hand lay-up or contact moulding or hot or cold press moulding.

NOTE 3: The performance requirements for various types of GRP joints are given EN 1115-5.

## 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 63

Glass-reinforced plastics - Determination of  
flexural properties - Three point method

- prEN 496                    *Plastics piping systems - Plastics pipes and fittings - Measurements of dimensions and visual inspection of surfaces*
- prEN 1115-1                *Plastics piping systems for underground drainage and sewerage under pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Part 1: General*
- 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 1115-5                    *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 system*
- prEN 1515-1                *Flanges and their joints - Selection of bolting*

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

### **3 Material**

The material from which the fitting is made shall conform to prEN 1115-1.

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-0fcf57a850fe/sist-en-1115-3-1997>

### **4 Appearance**

Both internal and external surfaces shall be free from irregularities which would impair the ability of the fitting or joint to conform to the other requirements of EN 1115.

### **5 Mechanical characteristics of fittings**

Fittings shall be designed and manufactured in accordance with relevant design regulations to have a mechanical performance equal to or greater than that of a GRP pipe of the same pressure and stiffness rating when installed in a piping system, and, if appropriate, supported by anchor blocks or encasements.

Sections of fabricated bends, branches and reducers shall be mitred, cemented, reinforced externally and, if necessary, internally.

NOTE: Additional requirements for the tapered part of reducers are given in 11.3.



## 6 Leaktightness of fittings when installed

The fitting and joint when installed in a piping system shall be capable of withstanding a pressure of 1,5 times the nominal pressure, [PN], in bars without leakage or visible damage.

## 7 Long-term chemical resistance of fittings

GRP fittings shall be designed and fabricated to have resistance to chemical attack from the inside which shall not be inferior to the requirements for GRP pipes for the corresponding application.

## 8 Measurement of dimensions

The dimensions of GRP-UP fittings shall be determined at the temperature specified in prEN 1115-1. Measurements shall be made in accordance with prEN 496 or otherwise using any method of sufficient accuracy to determine conformity to the applicable limits.

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

## 9 Bends

SIST EN 1115-3:1997

<https://standards.iteh.ai/catalog/standards/sist/0e7bc3f5-47ad-48fa-800c-0fcf57a850fe/sist-en-1115-3-1997>

### 9.1 Classification of bends

#### 9.1.1 General

Bends shall be designated in respect of the following:

- a) nominal size (DN);
- b) diameter series;
- c) pressure rating (PN);
- d) stiffness rating (SN);
- e) joint type;
- f) fitting angle;
- g) bend type;
- h) pipe specification, if applicable.

### 9.1.2 Nominal size

The nominal size, DN, of the fitting shall be that of the pipe to which it is intended to be joined in the piping system and shall be one of the nominal sizes given in prEN 1115-2.

### 9.1.3 Diameter series

The diameter series of the fitting shall be the same as the diameter series of the pipes to which it is intended to be joined in the piping system and shall be in accordance with prEN 1115-2.

### 9.1.4 Pressure rating

The pressure rating, PN, of the fitting shall be selected from the values given in prEN 1115-1.

### 9.1.5 Stiffness rating

The stiffness rating, SN, of the fitting shall be selected from the values given in prEN 1115-1 (see also clause 14).

### 9.1.6 Joint type

The type of joint shall be designated as rigid, flexible or reduced articulation, as appropriate, in accordance with clause 13.

### 9.1.7 Bend type

The type of bend shall be designated as either moulded or fabricated, as shown by figure 1 and figure 2.

### 9.1.8 Pipe and fitting compatibility

The type of pipe or pipes with which the fitting is intended to be used shall be designated, if required, by reference to prEN 1115-2.

## 9.2 Dimensions and tolerances of bends

### 9.2.1 Tolerance on diameter

The tolerance on the diameter of the bend at the joint positions shall conform to prEN 1115-2.

### 9.2.2 Fitting angle and angular tolerances

The fitting angle  $\theta$ , in degrees, shall be the angular change in the direction of the axis of the bend (see figure 1 and figure 2).

The deviation of the actual change in direction of a bend from the designated fitting angle shall not exceed the maximum angular deflection for the joint with which it is to be used.

NOTE: In the interests of rationalization, preferred values for the fitting angles for bends are 11,25°; 15°; 22,5°; 30°; 45°; 60° and 90°, but fitting angles other than these may be supplied by agreement between the customer and the manufacturer.

### 9.2.3 Radius of curvature

#### 9.2.3.1 Moulded bends

The radius of curvature of moulded bends (see figure 1) shall be not less than the nominal size, DN, in millimetres of the pipe to which it is to be joined in the piping system.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

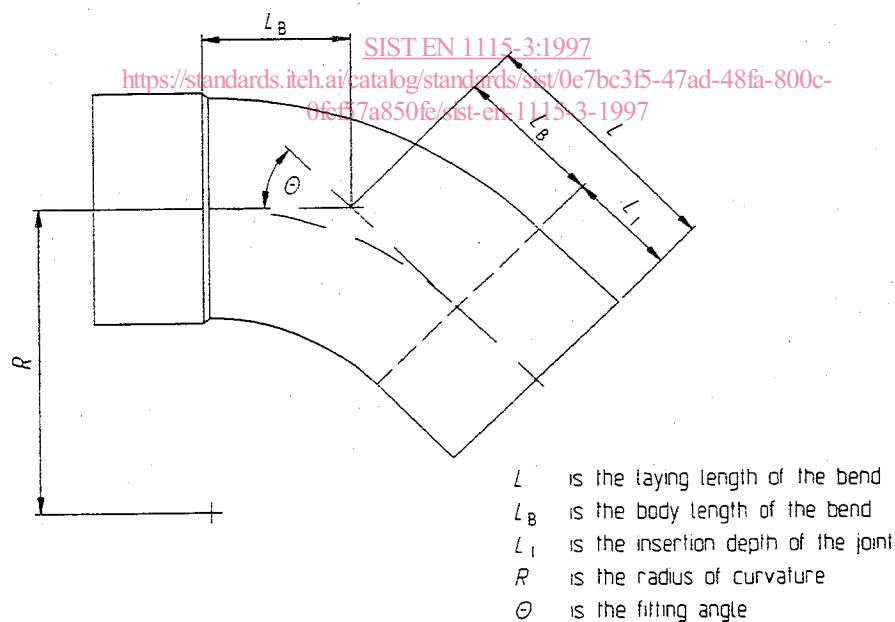


Figure 1: Typical moulded bend