



BSI Standards Publication

**Plastics piping systems for
water supply or drainage
and sewerage — Glass-
reinforced thermosetting
plastics (GRP) based on
unsaturated polyester resin
(UP) — Recommended practice
for installation**

National foreword

This Published Document is the UK implementation of CEN/TS 14578:2013. It supersedes DD CEN/TS 14578:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/88/2, Plastics piping for pressure applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013.
Published by BSI Standards Limited 2013

ISBN 978 0 580 82219 3
ICS 23.040.20; 83.140.99

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 December 2013.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

English Version

**Plastics piping systems for water supply or drainage and
sewerage - Glass-reinforced thermosetting plastics (GRP) based
on unsaturated polyester resin (UP) - Recommended practice for
installation**

Systèmes de canalisations plastiques pour l'adduction
d'eau et l'assainissement - Plastiques thermodurcissables
renforcés de verre (PRV) à base de résine de polyester non
saturé (UP) - Pratique recommandée pour la pose

Kunststoff-Rohrleitungssysteme für die Wasserversorgung
und Ableitung von Abwasser - Glasfaserverstärkte
duroplastische Kunststoffe (GFK) auf der Basis von
ungesättigtem Polyesterharz (UP) - Empfehlungen für die
Verlegung

This Technical Specification (CEN/TS) was approved by CEN on 10 September 2013 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Procedures	6
4.1 General.....	6
4.2 Special conditions for pipes having a nominal stiffness less than SN 1250	6
5 Specific information and recommendations.....	6
5.1 General.....	6
5.2 Special transportation requirements	6
5.3 Maximum storage heights on site	6
5.4 Maximum storage period in direct sunlight	6
5.5 Climatic conditions requiring special storage.....	6
5.6 Limiting deflections	6
5.7 Coefficient of linear expansion	7
5.8 Longitudinal tensile modulus and strength	7
5.9 Appropriate jointing system	7
5.10 Cold bending	7
5.11 Permitted rates of loss of water and/or pressure	7
Bibliography	8

Foreword

This document (CEN/TS 14578:2013) has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

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

This document supersedes CEN/TS 14578:2003.

The following is a list of the major technical changes that have been made since the previous edition:

- a) removed reference to ENV 1046 which will be revised to become applicable only to thermoplastic pipes;
- b) reference is made to ISO/TS 10465-1 which is specifically addressing installation of GRP piping;
- c) revised wording to improve clarity and to reflect revisions to GRP product standards EN 1796 and EN 14364.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

System Standards EN 1796 and EN 14364 specify 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 pressure and non-pressure water or sewerage applications. A System Standard includes specifications for pipes, fittings and joints and makes reference to supporting standards covering test methods, recommended practices for installation (this Technical Specification) and procedures for assessment of conformity.

Matters such as design procedures, determination of long-term safety factors based on a semi-probabilistic approach, surge allowance and allowable negative pressures for buried GRP pipe applications are covered in CEN/TS 14807 [1].

This supporting Technical Specification, which covers practices for installation, is intended to be used in conjunction with ISO/TS 10465-1 by, amongst others, end-users, authorities, design engineers, testing and certification institutes and manufacturers.

In this Technical Specification, much of the guidance is expressed as requirements, e.g. by use of “shall” or by instructions in the imperative. It is strongly recommended that these be followed whenever applicable.

Other guidance is presented for consideration as a matter of judgement in each case, e.g. by use of “should”.

1 Scope

This Technical Specification (CEN/TS) specifies recommended practices for the underground installation of piping systems made of glass-reinforced thermosetting plastics based on unsaturated polyester resin (GRP-UP), intended to be used for pressure or non-pressure water or sewerage applications and complying with, as applicable, EN 14364 and/or EN 1796. It is applicable to GRP-UP piping systems of nominal sizes from DN 100 to DN 4000 which are intended to be used for the conveyance of liquids at temperatures up to 50 °C and at pressures of 0,5 bar and greater.

Design procedures, the determination of long-term safety factors based on a semi-probabilistic approach, surge allowance and allowable negative pressures for buried GRP pipe applications are addressed in CEN/TS 14807 [1].

Piping systems conforming to EN 1796 or EN 14364 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 recommended to refer to ISO/TR 10986 [4] for guidelines for the installation of above-ground flexible jointed pipes.

NOTE 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

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 805, *Water supply - Requirements for systems and components outside buildings*

EN 1610, *Construction and testing of drains and sewers*

EN 1796:2013, *Plastics piping systems for water supply with or without pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

EN 14364:2013, *Plastics piping systems for drainage and sewerage with or without pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Specifications for pipes, fittings and joints*

ISO/TS 10465-1:2007, *Underground installation of flexible glass-reinforced pipes based on unsaturated polyester resin (GRP-UP) - Part 1: Installation procedures*

3 Terms and definitions

For the purposes of this document the terms and definitions given in ISO/TS 10465-1:2007 apply. In addition, see also EN 1796:2013 and EN 14364:2013 for general terms and definitions relating to GRP pipes.

4 Procedures

4.1 General

Pipes and fittings covered by EN 1796 or EN 14364 shall be installed in accordance with ISO/TS 10465-1 taking into account the following information and guidance. In conditions not covered thereby, the engineer shall make his own recommendations.

Attention is drawn to the limitations that may apply to negative pressure in service, in particular if the pipe zone backfill material is removed and to mechanical compaction requirements during installation. This is of particular concern for pipe stiffness up to and including SN 5000 (see also ISO/TS 10465-1).

4.2 Special conditions for pipes having a nominal stiffness less than SN 1250

Pipes having a nominal stiffness less than SN 1250 are not intended for laying directly in the ground. When installed in the ground, they shall be encased in concrete.

5 Specific information and recommendations

5.1 General

In ISO/TS 10465-1 reference is made to ISO product standards ISO 10639 [3] and ISO 10467 [2]. These ISO product standards are similar to EN 1796 and EN 14364 respectively. For any such reference, substitute the respective EN product standard.

5.2 Special transportation requirements

When following the guidance given in ISO/TS 10465-1 particular care shall be taken to avoid impact damage. Pipes and fittings shall be secured before transporting them to or around the site.

5.3 Maximum storage heights on site

Guidelines for the number of layers in a storage stack are given in ISO/TS 10465-1. The manufacturer may also supply specific storage recommendations.

5.4 Maximum storage period in direct sunlight

When materials such as ultraviolet inhibitors have been incorporated or other protective pipe constructions have been used, pipes and fittings may be stored in direct sunlight for their design lives. Care should be taken to protect rubber-sealing profiles from prolonged exposure to sunlight. Consult the manufacturer for all storage guidelines and recommendations.

5.5 Climatic conditions requiring special storage

Apart from high winds, there are no climatic conditions that require special storage conditions for products conforming to EN 1796 or EN 14364.

5.6 Limiting deflections

In no case shall the vertical diameter increase by more than 1,5 % of the mean diameter due to installation procedures, e.g. the relative initial ovalization shall not exceed 1,5 %. This may be verified by measurements when the pipe zone backfilling operation is completed. The initial deflection should be measured and monitored to assist in achieving a satisfactory installation.

The property requirements for GRP-UP pipes made in accordance with EN 1796 and EN 14364 assume that maximum permissible initial deflection is 3 % and the maximum long term deflection is 6 %. If the recommendations for installation in ISO/TS 10465-1 are followed it is expected that the deflections achieved will be less than these limiting values. If the maximum long term deflection is different than 6 % the requirements are adjusted proportionally as covered in EN 1796 and EN 14364.

5.7 Coefficient of linear expansion

A typical range for the coefficient of linear expansion in the axial direction, α , is $20 \times 10^{-6}/^{\circ}\text{C}$ to $50 \times 10^{-6}/^{\circ}\text{C}$. This property varies with the nature, orientation and quantity of reinforcement in any particular pipe. The manufacturer shall provide the relevant information when requested by the purchaser.

5.8 Longitudinal tensile modulus and strength

These properties vary with the nature, orientation and quantity of reinforcement in any particular pipe. The manufacturer shall provide this information when requested by the purchaser.

5.9 Appropriate jointing system

Joints described in and conforming to EN 1796 or EN 14364, as applicable, should be used.

5.10 Cold bending

GRP-UP pipes are not suitable for cold bending. Changes in direction should be achieved either by using fittings conforming to EN 1796 or EN 14364 or by utilizing the flexibility of the joint.

5.11 Permitted rates of loss of water and/or pressure

Guidelines for testing both pressure and non-pressure systems is given in ISO/TS 10465-1. In addition, attention shall also be given to the requirements given in EN 805 and EN 1610 as may be applicable.

Bibliography

- [1] CEN/TS 14807, *Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Guidance for the structural analysis of buried GRP-UP pipelines*
- [2] ISO 10467, *Plastics piping systems for pressure and non-pressure drainage and sewerage - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin*
- [3] ISO 10639, *Plastics piping systems for pressure and non-pressure water supply - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin*
- [4] ISO/TR 10986, *Plastics piping systems for pressure and non-pressure applications - Installation of pipes above ground - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin*

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

Useful Contacts:

Customer Services

Tel: +44 845 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 845 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com



...making excellence a habit.™