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Irish Standard Recommendation
S.R. CEN/TS 14807:2013

# Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Guidance for the structural analysis of buried GRP-UP pipelines

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

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# CEN/TS 14807

December 2013

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Supersedes CEN/TS 14807:2004

English Version

# Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Guidance for the structural analysis of buried GRP-UP pipelines

Systèmes de canalisations en plastiques - Plastiques thermodurcissables renforcés de verre (PRV) à base de résine polyester non saturé (UP) - Guide pour l'analyse structurale de conduites PRV-UP enterrées

Kunststoff-Rohrleitungssysteme - Glasfaserverstärkte duroplastische Kunststoffe (GFK) auf der Basis von ungesättigtem Polyesterharz (UP) - Anleitung für die statische Berechnung von erdverlegten GFK-UP-Rohrleitungen

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.

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# Foreword

This document (CEN/TS 14807:2013) 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 14807:2004.

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

a) revised wording to reflect the revisions to GRP product standards EN 1796 and EN 14364;

b) revised wording to improve clarity of presentation.

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.

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# Introduction

The purpose of this document is to provide guidance for the selection of a suitable structural analysis procedure for buried glass-reinforced thermosetting plastics (GRP) pipes. The design approach should be founded on accepted engineering principles and have been demonstrated through field experience. The procedure should satisfy the requirements of GRP pipes and should provide dependable long-term performance.

The limiting performance criteria for buried glass-reinforced thermosetting plastics (GRP) pipes are different than other pipe products, including thermoplastics pipes. Consequently, any recommendations on the use of GRP products should take these differences into consideration. Additionally, the method of structural analysis should accommodate these limiting performance criteria, so guidance on suitable design limits are given. Any structural analysis procedure may be used provided it includes the assessment of short and long-term deflection and buckling resistance. Established structural analysis procedures, although found satisfactory for other materials, may not meet the needs of GRP.

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# 1 Scope

This Technical Specification, which is a guidance document for use with a structural analysis procedure for below ground installations, covers limits applicable to glass-reinforced thermosetting plastics (GRP) pipes used for the conveyance of liquids under pressure or gravity conditions.

This document does not specify a particular structural analysis procedure but gives guidance on the selection of a structural analysis procedure. It concludes that any established structural analysis procedure may be used provided it includes the assessment of short and long-term deflection and buckling resistance.

Products complying to the applicable GRP product standards EN 1796 or EN 14364, which are not subject to internal pressure, are suitable as long as the analysis shows that the long-term deflection of the installed pipes is limited to 6 %, which is the basic assumption of the GRP pipe product standards. Products complying with the applicable system standards (EN 1796 or EN 14364), which are subject to internal pressure, are suitable as long as the analysis shows that the initial deflection of the installed pipes does not exceed 3 %.

NOTE The approach followed when preparing a general structural analysis procedure does not depend on the nominal size(s) of the pipe(s).

A suitable structural analysis procedure should normally be capable of being used for pipes operating at different temperatures provided that the corresponding temperature re-rating factors for the relevant pipe properties are applied, as specified in the referring standard(s). Nevertheless, high service temperatures may require an additional analysis of the longitudinal stresses and strains and/or a special design of the joints.

Normal structural analysis procedures are intended to cover normal soil installation conditions. Pipes to be designed for installations in abnormal or unusual conditions, e.g. in quick soils or a marine sea-bed, may require special engineering. Some structural analysis procedures may include axial effects depending upon the type of joint used.

# 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 7685, *Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness*

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

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

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