ICS 23.040.20, 23.040.45 SLOVENSKÁ TECHNICKÁ NORMA Jún 2025

STN	**Potrubné systémy z plastov Rúry a tvarovky z termosetov vystužených sklom (GRP) Metódy regresnej analýzy a ich použitie (ISO 10928: 2024)**	**STN EN ISO 10928** 64 0633

Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Methods for regression analysis and their use (ISO 10928:2024)

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. 05/25

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Oznámením tejto normy sa ruší
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English Version

Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Methods for regression analysis and their use (ISO 10928:2024)

Systèmes de canalisations en matières plastiques - Tubes et raccords plastiques thermodurcissables renforcés de verre (PRV) - Méthodes pour une analyse de régression et leurs utilisations (ISO 10928:2024)

Kunststoff-Rohrleitungssysteme - Rohre und Formstücke aus glasfaserverstärkten Kunststoffen (GFK) - Verfahren zur Regressionsanalyse und deren Anwendung (ISO 10928:2024)

This European Standard was approved by CEN on 24 February 2025.

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

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Contents

Page

European foreword

The text of ISO 10928:2024 has been prepared by Technical Committee ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10928:2025 by 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of an identical text or by endorsement, at the latest by August 2025, and conflicting national standards shall be withdrawn at the latest by August 2025.

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Endorsement notice

The text of ISO 10928:2024 has been approved by CEN as EN ISO 10928:2025 without any modification.

International Standard

ISO 10928

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

Systèmes de canalisations en matières plastiques — Tubes et raccords plastiques thermodurcissables renforcés de verre (PRV) — Méthodes pour une analyse de régression et leurs utilisations

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

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 document 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).

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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.

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.*

This fourth edition cancels and replaces the third edition (ISO 10928:2016), which has been technically revised.

The main changes are as follows:

— Annex B, “Non-linear relationships”, has been removed due to its complexity and highly specialized and limited application;

— Formula (B.3) [Formula (C.3) in ISO 10928:2016] has been corrected to include a factor 2 before $Bx_{L.}$

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.

Introduction

This document describes the procedures intended for analysing the regression of test data, usually with respect to time, and the use of the results in the design and assessment of conformity with performance requirements. Its applicability is limited to use with data obtained from tests carried out on samples. Referring standards require estimates to be made of the long-term properties of the pipe for such parameters as circumferential tensile strength, long-term ring deflection, strain corrosion and creep or relaxation stiffness.

A range of statistical techniques that can be used to analyse the test data produced by destructive tests were investigated in the preparation of this document. Many of these simple techniques require the logarithms of the data to:

a) be normally distributed;

b) produce a regression line having a negative slope; and

c) have a sufficiently high regression correlation (see Table 1).

Analysis of data from several tests showed that in the destructive test context, while conditions b) and c) can be satisfied, there is often a skew to the distribution and hence condition a) is not satisfied. Further investigation into techniques that can handle skewed distributions resulted in the adoption of the covariance method (method A, see 5.2) for the analysis of such data within this document.

The results from non-destructive tests, such as long-term creep or relaxation stiffness, often satisfy all three conditions. Therefore, a simpler procedure, using time as the independent variable (method B, see 5.3), can also be used in accordance with this document.

These two analysis procedures (method A and method B) are limited to analysis methods specified in ISO product standards or test methods. Other analysis procedures can be useful for the extrapolation and prediction of long-term behaviour of some properties of glass-reinforced thermosetting plastics (GRP) piping products. For example, a second-order polynomial analysis is sometimes useful in the extrapolation of creep and relaxation data. This is particularly the case for analysing shorter term data, where the shape of the creep or relaxation curve can deviate considerably from linear. A second-order polynomial analysis is included in Annex A.

International Standard **ISO 10928:2024(en)**

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

1 Scope

This document specifies procedures suitable for the analysis of data which, when converted into logarithms of the values, have either a normal or a skewed distribution. It is intended for use with test methods and referring standards for glass-reinforced thermosetting plastics (GRP) pipes or fittings for the analysis of properties as a function of time. However, it can also be used for the analysis of other data.

Two methods are specified, which are used depending on the nature of the data. Extrapolation using these techniques typically extends a trend from data gathered over a period of approximately 10 000 h to a prediction of the property at 50 years, which is the typical maximum extrapolation time.

This document only addresses the analysis of data. The test procedures for collecting the data, the number of samples required and the time period over which data are collected are covered by the referring standards and/or test methods. Clause 6 discusses how the data analysis methods are applied to product testing and design.

2 Normative references

There are no normative references in this document.