



National Standards Authority of Ireland

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**GLASS IN BUILDING - PROCEDURES FOR
GOODNESS OF FIT AND CONFIDENCE
INTERVALS FOR WEIBULL DISTRIBUTED
GLASS STRENGTH DATA**

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Glass in building - Procedures for goodness of fit and confidence intervals for Weibull distributed glass strength data

Verre dans la construction - Procédures de validité de l'ajustement et intervalles de confiance des données de résistance du verre au moyen de la loi de Weibull

Glas im Bauwesen - Bestimmung der Biegefestigkeit von Glas - Schätzverfahren und Bestimmung der Vertrauensbereiche für Daten mit Weibull-Verteilung

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Contents

| | page |
|--|------|
| Foreword..... | 3 |
| Introduction | 4 |
| 1 Scope | 5 |
| 2 Normative references | 5 |
| 3 Terms and definitions..... | 5 |
| 4 Symbols and abbreviated terms..... | 5 |
| 5 Goodness of fit..... | 6 |
| 6 Point estimators for the parameters β and θ of the distribution | 7 |
| 6.1 Censored sample | 7 |
| 6.2 Uncensored (complete) sample..... | 9 |
| 7 Assessment of data and tests | 11 |
| 7.1 The Weibull diagram..... | 11 |
| 7.2 Graphical representation of the estimated distribution function | 11 |
| 7.3 Plotting of sample data in the Weibull diagram..... | 11 |
| 7.3.1 Single values | 11 |
| 7.3.2 Classified values..... | 12 |
| 7.4 Assessment of sample data..... | 12 |
| 8 Confidence intervals..... | 12 |
| 8.1 Confidence interval for the shape parameter β | 12 |
| 8.2 Confidence interval for the value of the distribution function $G(x)$ at a given value of x , of the attribute X | 15 |
| 8.3 Confidence interval for the scale parameter θ | 18 |
| 8.3.1 Method for all samples | 18 |
| 8.3.2 Method for uncensored samples..... | 18 |
| 8.4 Confidence interval for the value x of the attribute X at a given value $G(x)$ of the distribution function | 21 |
| 8.4.1 Method for all samples | 21 |
| 8.4.2 Method for uncensored samples..... | 22 |
| Annex A (informative) Examples..... | 23 |
| A.1 Uncensored sample | 23 |
| A.1.1 Data | 23 |
| A.1.2 Statistical evaluation | 24 |
| A.2 Censored sample | 27 |
| A.2.1 Data | 27 |
| A.2.2 Statistical evaluation | 29 |
| Annex B (informative) Weibull graph..... | 32 |
| Bibliography | 33 |

Foreword

This document (EN 12603:2002) has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by IBN.

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 May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

In this standard the annexes A, B and C are informative.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

EN 12603:2002 (E)**Introduction**

This European Standard is based on the assumption that the statistical distribution of the attribute taken into consideration can be represented by one single Weibull distribution function, even where in certain cases (e.g. lifetime measurements) mixed distributions have frequently been observed. For this reason, the user of the standard has to check by a goodness of fit test whether the measured data of a sample can be represented by means of one single Weibull function. Only in this case can the hypothesis be accepted and the procedures described in this standard be applied.

The user decides on this question also considering all previous relevant data and the general state of knowledge in the special field. Every extrapolation into ranges of fractiles not confirmed by measured values requires utmost care, the more so the farther the extrapolation exceeds the range of measurements.

NOTE The three-parameter Weibull function is:

$$G(x) = 1 - \exp\left[-\left(\frac{x - x_0}{\theta}\right)^\beta\right] \quad (1)$$

If $x_0 = 0$ is assumed, the two-parameter Weibull function results:

$$G(x) = 1 - \exp\left[-\left(\frac{x}{\theta}\right)^\beta\right] \quad (2)$$

which can be written as:

$$x = \theta \left[\ln\left(\frac{1}{1 - G(x)}\right) \right]^{\frac{1}{\beta}} \quad (3)$$

The calculation can be based either on an uncensored or a censored sample. There are several methods of censoring. In this standard only the following method of censoring is considered:

- given a number $r < n$ of specimens of which attribute values x_i were measured.

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