
**Fine ceramics (advanced ceramics,
advanced technical ceramics) —
Weibull statistics for strength data**

*Céramiques techniques — Analyse statistique de Weibull des données
de résistance à la rupture*

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 20501:2019

<https://standards.iteh.ai/catalog/standards/iso/0327eef8-38d8-4e32-9eb1-80ff0d215b19/iso-20501-2019>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 20501:2019

<https://standards.iteh.ai/catalog/standards/iso/0327eef8-38d8-4e32-9eb1-80ff0d215b19/iso-20501-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Defect populations.....	1
3.2 Mechanical testing.....	3
3.3 Statistical terms.....	3
3.4 Weibull distributions.....	4
4 Symbols	5
5 Significance and use	6
6 Method A: maximum likelihood parameter estimators for single flaw populations	7
6.1 General.....	7
6.2 Censored data.....	8
6.3 Likelihood functions.....	8
6.4 Bias correction.....	8
6.5 Confidence intervals.....	10
7 Method B: maximum likelihood parameter estimators for competing flaw populations	13
7.1 General.....	13
7.2 Censored data.....	14
7.3 Likelihood functions.....	14
8 Procedure	15
8.1 Outlying observations.....	15
8.2 Fractography.....	15
8.3 Graphical representation.....	16
9 Test report	18
Annex A (informative) Converting to material-specific strength distribution parameters	19
Annex B (informative) Illustrative examples	21
Annex C (informative) Test specimens with unidentified fracture origin	28
Annex D (informative) Fortran program	31
Bibliography	36

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 206, *Fine ceramics*.

This second edition cancels and replaces the first edition (ISO 20501:2003), which has been technically revised. It also incorporates the Technical Corrigendum ISO 20501:2003/Cor.1:2009.

The main changes compared to the previous edition are as follows:

- the terms and definitions in [Clause 3](#) have been updated and modified;
- a method to treat a higher number of specimens ($N > 120$) has been introduced for method A: maximum likelihood parameter estimators for single flaw populations;
- in [Annex D](#), example codes have been added for calculating the maximum likelihood parameters of the Weibull distribution with modern analysis software.

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

Measurements of the strength at failure are taken for one of two reasons: either for a comparison of the relative quality of two materials regarding fracture strength, or the prediction of the probability of failure for a structure of interest. This document permits estimates of the distribution parameters which are needed for either. In addition, this document encourages the integration of mechanical property data and fractographic analysis.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 20501:2019](https://standards.iteh.ai/catalog/standards/iso/0327eef8-38d8-4e32-9eb1-80ff0d215b19/iso-20501-2019)

<https://standards.iteh.ai/catalog/standards/iso/0327eef8-38d8-4e32-9eb1-80ff0d215b19/iso-20501-2019>

