

Non-destructive testing - Ultrasonic testing -
Examination for loss of thickness due to erosion and/or
corrosion using the TOFD technique

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 17290:2021 sisaldab Euroopa standardi EN 17290:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 17290:2021 consists of the English text of the European standard EN 17290:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.10.2021.	Date of Availability of the European standard is 13.10.2021.
Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 19.100

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autoriõiguse kaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about standards copyright protection, please contact the Estonian Centre for Standardisation and Accreditation: Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Non-destructive testing - Ultrasonic testing - Examination
for loss of thickness due to erosion and/or corrosion using
the TOFD technique**

Essais non destructifs - Contrôle par ultrasons -
Examen de la perte d'épaisseur due à l'érosion et/ou à
la corrosion par la technique TOFD

Zerstörungsfreie Prüfung - Ultraschallprüfung -
Prüfung für den Verlust der Dicke aufgrund von
Erosion und/oder Korrosion unter Anwendung der
Beugungslaufzeittechnik (TOFD)

This European Standard was approved by CEN on 5 March 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword.....	3
1 Scope.....	4
2 Normative references.....	4
3 Terms and definitions	5
4 General specifications	5
4.1 General.....	5
4.2 Limits of the test technique	5
5 Qualification of personnel	5
6 Test equipment.....	5
6.1 Instrument.....	5
6.2 Probes and TOFD set-up	5
6.3 Encoder	6
6.4 Combined equipment	6
6.5 Reference blocks	6
6.6 Couplant.....	6
7 Application of the technique	6
7.1 Surface condition	6
7.2 Temperature.....	6
7.3 Marking.....	6
7.4 Selection of probes and PCS	7
7.5 Instrument settings	8
7.6 Testing.....	9
8 Interpretation and analysis of TOFD images	10
8.1 Validation of TOFD images	10
8.2 Relevant indications	10
8.3 Determination of dimensions and location	11
9 Test report.....	15
Annex A (informative) Example of a reference block	17
Annex B (informative) Examples of typical TOFD images of loss of thickness due to erosion and/or corrosion	19
Bibliography.....	22

European foreword

This document (EN 17290:2021) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing”, the secretariat of which is held by AFNOR.

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 April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

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

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document specifies the application of the time-of-flight diffraction (TOFD) technique in testing of metals for quantifying loss of thickness due to erosion and/or corrosion.

This document applies to all types of corrosion and/or erosion damage, particularly those defined in EN ISO 16809.

This document applies to unalloyed or low-alloyed steels.

It applies to components with a nominal thickness ≥ 6 mm. For smaller thicknesses, feasibility tests are performed to validate the test technique.

For other materials, feasibility tests are essential, too.

The TOFD technique can be used as a stand-alone technique or in combination with other non-destructive testing techniques, for in-service testing, in order to detect material loss caused by erosion and/or corrosion.

This technique is based on analysis of TOFD images using reflected and/or diffracted ultrasonic signals.

This document does not specify acceptance levels.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 5577, *Non-destructive testing — Ultrasonic testing — Vocabulary (ISO 5577)*

EN ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 10863:2020, *Non-destructive testing of welds — Ultrasonic testing — Use of time-of-flight diffraction technique (TOFD) (ISO 10863:2020)*

EN ISO 16828:2014, *Non-destructive testing — Ultrasonic testing — Time-of-flight diffraction technique as a method for detection and sizing of discontinuities (ISO 16828:2012)*

EN ISO 17659, *Welding — Multilingual terms for welded joints with illustrations (ISO 17659)*

EN ISO 22232-1, *Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 1: Instruments (ISO 22232-1)*

EN ISO 22232-2, *Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 2: Probes (ISO 22232-2)*

EN ISO 22232-3, *Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 3: Combined equipment (ISO 22232-3)*