

**Non-destructive testing - Radiographic inspection of  
corrosion and deposits in pipes by X- and gamma rays -  
Part 1: Tangential radiographic inspection**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

|                                                                                                                     |                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| See Eesti standard EVS-EN 16407-1:2014 sisaldab Euroopa standardi EN 16407-1:2014 inglisekeelset teksti.            | This Estonian standard EVS-EN 16407-1:2014 consists of the English text of the European standard EN 16407-1:2014.                  |
| 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. |
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ICS 19.100; 23.040.01

English Version

**Non-destructive testing - Radiographic inspection of corrosion  
and deposits in pipes by X- and gamma rays - Part 1: Tangential  
radiographic inspection**

Essais non destructifs - Examen radiographique de la  
corrosion et des dépôts dans les canalisations, par rayons  
X et rayons gamma - Partie 1: Examen radiographique  
tangential

Zerstörungsfreie Prüfung - Durchstrahlungsprüfung auf  
Korrosion und Ablagerungen in Röhren mit Röntgen- und  
Gammastrahlen - Teil 1: Tangentiale  
Durchstrahlungsprüfung

This European Standard was approved by CEN on 26 October 2013.

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.

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COMITÉ EUROPÉEN DE NORMALISATION  
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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (EN 16407-1:2014) 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 July 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.

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.

EN 16407 consists of the following parts, under the general title *Non-destructive testing — Radiographic inspection of corrosion and deposits in pipes by X- and gamma rays*:

- *Part 1: Tangential radiographic inspection;*
- *Part 2: Double wall radiographic inspection.*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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.

## 1 Scope

This European Standard specifies fundamental techniques of film and digital radiography with the object of enabling satisfactory and repeatable results to be obtained economically. The techniques are based on generally recognized practice and fundamental theory of the subject.

This European Standard applies to the radiographic examination of pipes in metallic materials for service induced flaws such as corrosion pitting, generalized corrosion and erosion. Besides its conventional meaning, “pipe” as used in this standard should be understood to cover other cylindrical bodies such as tubes, penstocks, boiler drums and pressure vessels.

Weld inspection for typical welding process induced flaws is not covered, but weld inspection is included for corrosion/erosion type flaws.

The pipes may be insulated or not, and can be assessed where loss of material due, for example, to corrosion or erosion is suspected either internally or externally.

This part of EN 16407 covers the tangential inspection technique for detection and through-wall sizing of wall loss, including:

- a) with the source on the pipe centre line, and
- b) with the source offset from it by the pipe radius.

Part 2 of EN 16407 covers double wall radiography, and note that the double wall double image technique is often combined with tangential radiography with the source on the pipe centre line.

This European Standard applies to tangential radiographic inspection using industrial radiographic film techniques, computed digital radiography (CR) and digital detector arrays (DDA).

## 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 14784-1, *Non-destructive testing — Industrial computed radiography with storage phosphor imaging plates — Part 1: Classification of systems*

EN ISO 11699-1, *Non-destructive testing — Industrial radiographic films — Part 1: Classification of film systems for industrial radiography (ISO 11699-1)*

EN ISO 11699-2, *Non-destructive testing — Industrial radiographic films — Part 2: Control of film processing by means of reference values (ISO 11699-2)*

EN ISO 17636-1:2013, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film (ISO 17636-1:2013)*

EN ISO 19232-5, *Non-destructive testing — Image quality of radiographs — Part 5: Determination of the image unsharpness value using duplex wire-type image quality indicators (ISO 19232-5)*