

**Non destructive testing - Radiation methods - Computed tomography - Part 4: Qualification**

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## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 16016-4:2011 sisaldab Euroopa standardi EN 16016-4:2011 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.09.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 31.08.2011.

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This Estonian standard EVS-EN 16016-4:2011 consists of the English text of the European standard EN 16016-4:2011.

This standard is ratified with the order of Estonian Centre for Standardisation dated 30.09.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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ICS 19.100

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English Version

## Non destructive testing - Radiation methods - Computed tomography - Part 4: Qualification

Essais non destructifs - Méthodes par rayonnements -  
Tomographie numérisée - Partie 4 : Qualification

Zerstörungsfreie Prüfung - Durchstrahlungsverfahren -  
Computertomographie - Teil 4: Qualifizierung

This European Standard was approved by CEN on 29 July 2011.

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## Foreword

This document (EN 16016-4:2011) 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of an identical text or by endorsement, at the latest by February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

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 16016 consists of the following parts:

- *Non destructive testing — Radiation methods — Computed tomography — Part 1: Terminology;*
- *Non destructive testing — Radiation methods — Computed tomography — Part 2: Principle, equipment and samples;*
- *Non destructive testing — Radiation methods — Computed tomography — Part 3: Operation and interpretation;*
- *Non destructive testing — Radiation methods — Computed tomography — Part 4: Qualification.*

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## Introduction

This document gives guidelines for the general principles of X-ray computed tomography (CT) applicable to industrial imaging (in the context of this standard, industrial means non-medical applications); it also gives a consistent set of CT performance parameter definitions, including how these performance parameters relate to CT system specifications. This document deals with computed axial tomography and excludes other types of tomography such as translational tomography and tomosynthesis.

## 1 Scope

This European Standard specifies guidelines for the qualification of the performance of a CT system with respect to various inspection tasks.

## 2 Normative references

The following referenced documents are indispensable for the application 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 16016-1:2011, *Non destructive testing — Radiation method — Computed tomography — Part 1: Terminology*

EN 16016-3:2011, *Non destructive testing — Radiation methods — Computed tomography — Part 3: Operation and interpretation*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16016-1:2011 apply.

## 4 Qualification of the inspection

### 4.1 General

CT is used in industry both for defect testing and dimensional testing and measurement. Since CT does not directly provide measurement of desired quantities such as, for example, pore size or wall thickness, these quantities must be derived from the X-ray linear attenuation data represented by the CT grey values. The detectability of features and the degree of accuracy required depend on the inspection task, the specification of the available test equipment and the analysis and evaluation methods used. When determination of such quantities is required, a special task-specific qualification test of the CT system is required. The qualification measures are described in 4.2 and 4.3. The qualification should be carried out by trained personnel.

### 4.2 Qualification of defect testing

#### 4.2.1 General

Under test qualification, the suitability of the CT inspection technique for measuring a quantity to the required precision should be verified. The following steps described are typical of those for the successful verification of the suitability of CT for industrial applications.

#### 4.2.2 Quality feature

Typical quantities to be measured are the sizes of pores, cavities, cracks, inclusions, contaminants as well as studies of the material distribution and the assembly and installation position of components. Because the test sample and the type, position and size of the features to be detected determine the properties of a CT system to be used, information such as the following should be known:

a) test object :

1) dimensions;