



NSAI
Standards

Irish Standard
I.S. EN ISO 16526-3:2020

Non-destructive testing - Measurement and evaluation of the X-ray tube voltage - Part 3: Spectrometric method (ISO 16526-3:2011)

I.S. EN ISO 16526-3:2020

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National Foreword

I.S. EN ISO 16526-3:2020 is the adopted Irish version of the European Document EN ISO 16526-3:2020, Non-destructive testing - Measurement and evaluation of the X-ray tube voltage - Part 3: Spectrometric method (ISO 16526-3:2011)

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EUROPEAN STANDARD

EN ISO 16526-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2020

ICS 19.100

Supersedes EN 12544-3:1999

English Version

**Non-destructive testing - Measurement and evaluation of
the X-ray tube voltage - Part 3: Spectrometric method (ISO
16526-3:2011)**

Essais non destructifs - Mesurage et évaluation de la
tension des tubes radiogènes - Partie 3: Méthode
spectrométrique (ISO 16526-3:2011)

Zerstörungsfreie Prüfung - Messung und Auswertung
der Röntgenröhrenspannung - Teil 3: Spektrometer-
Verfahren (ISO 16526-3:2011)

This European Standard was approved by CEN on 6 January 2020.

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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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EN ISO 16526-3:2020 (E)

Contents	Page
European foreword.....	3

European foreword

The text of ISO 16526-3:2011 has been prepared by Technical Committee ISO/TC 135 "Non-destructive testing" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 16526-3:2020 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of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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.

This document supersedes EN 12544-3:1999.

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, 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.

Endorsement notice

The text of ISO 16526-3:2011 has been approved by CEN as EN ISO 16526-3:2020 without any modification.

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INTERNATIONAL STANDARD

**ISO
16526-3**

First edition
2011-12-15

Non-destructive testing — Measurement and evaluation of the X-ray tube voltage —

Part 3: Spectrometric method

*Essais non destructifs — Mesurage et évaluation de la tension des
tubes radiogènes —*

Partie 3: Méthode spectrométrique



Reference number
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Contents

Page

Foreword	i v
Introduction	v
1 Scope	1
2 Definitions	1
3 Test method	1
4 Test report	5
Annex A (informative) Selection of filters	6

ISO 16526-3:2011(E)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 16526-3 was prepared by CEN (as EN 12544-3:1999) and is submitted for approval under a special “fast-track procedure”, by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 5, *Radiation methods*, in parallel with its approval by the ISO member bodies (see the *ISO/IEC Directives*, Part 1, “Fast-track procedure”).

ISO 16526 consists of the following parts, under the general title *Non-destructive testing — Measurement and evaluation of the X-ray tube voltage*:

- *Part 1: Voltage divider method*
- *Part 2: Constancy check by the thick filter method*
- *Part 3: Spectrometric method*

Introduction

In order to cover the different requirements for the measurement of the X-ray tube voltage, three different methods are described in ISO 16526-1 to ISO 16526-3.

The voltage divider method (ISO 16526-1) enables a direct and absolute measurement of the average high voltage of constant potential X-ray systems on the secondary side of the high voltage generator.

The thick filter method (ISO 16526-2) describes a constancy check. This method is recommended for the regular stability check of an X-ray system.

The spectrometric method (ISO 16526-3) is a procedure for non-invasive measurement of the X-ray tube voltage using the energy spectrum of the X-rays. This method can be applied for all X-ray systems and is the recommended method whenever the voltage divider method is not applicable, e. g. in case of tank units where it is not possible to connect the voltage divider device.

Non-destructive testing — Measurement and evaluation of the X-ray tube voltage —

Part 3: Spectrometric method

1 Scope

This part of ISO 16526 specifies the test method for a non-invasive measurement of X-ray tube voltages using the energy spectrum of X-rays (spectrometric method). It covers the voltage range from 10 kV to 500 kV.

The intention is to check the correspondence of the actual voltage with the indicated value on the control panel of the X-ray unit. It is intended to measure the maximum energy only and not the complete X-ray spectrum.

The procedure is applicable for tank type and constant potential X-ray units.

2 Definitions

For the purposes of this part of ISO 16526, the following definitions apply:

2.1 Energy dispersive photon detector

A photon detector, e. g. Ge based detector, which responds to incident photons with electric pulses, whose amplitude are a measure for the energy of the photons.

2.2 Multi channel analyser

An electronic device which is capable of sorting incoming electric pulses according to their amplitude.

NOTE The pulses are sorted into storage registers or channels in such a way that the contents of a register or channel is increased by one if a pulse occurs with the corresponding amplitude.

2.3 Energy spectrum

The graphical representation of the contents of the channels versus the energy.

2.4 Pile-up

Effect of two or more pulses which are too close to each other and which causes their amplitude to be added in the spectrum.

3 Test method

3.1 Principle

An energy dispersive photon detector is located in the collimated direct beam of the X-ray tube under test (figure 1). The output pulses of the detector are counted and analysed by a multichannel analyzer.

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