



**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**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN ISO 16526-3:2020

*Published:*

2020-03-04

*This document was published  
under the authority of the NSAI  
and comes into effect on:*

2020-03-22

ICS number:

19.100

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## 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)

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

**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.

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**

**EN ISO 16526-3:2020 (E)**

## **Contents**

Page

<b>European foreword.....</b>	<b>3</b>
-------------------------------	----------

## **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.

This page is intentionally left blank



# 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  
ISO 16526-3:2011(E)

© ISO 2011

**ISO 16526-3:2011(E)**



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## **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.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-