



BSI Standards Publication

Non-destructive testing - Lighting in penetrant and magnetic particle testing, good practice

National foreword

This Published Document is the UK implementation of CEN/TS 17108:2017.

The UK participation in its preparation was entrusted to Technical Committee WEE/46, Non-destructive testing.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

© The British Standards Institution 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 97009 2

ICS 19.100

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 September 2017.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

CEN/TR 17108

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

June 2017

ICS 19.100

English Version

Non-destructive testing - Lighting in penetrant and magnetic particle testing, good practice

Essais non destructifs - Bonnes pratiques d'éclairage
lors des contrôles par ressuage et par magnétoscopie

Zerstörungsfreie Prüfung - Beleuchtung in Eindring-
und Magnetpulverprüfung, bewährte Verfahren

This Technical Report was approved by CEN on 28 May 2017. It has been drawn up by the Technical Committee CEN/TC 138.

CEN members are the national standards bodies of 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, 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: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	3
1 Scope	4
2 Normative references.....	4
3 Terms and definitions	4
4 Fluorescent techniques, inspection booth, lights and visual ergonomics	5
4.1 Lights: UV-A beam spectral characteristics	5
4.1.1 General.....	5
4.1.2 Symmetry of the spectrum around the centroid wavelength	5
4.1.3 Unwanted visible light of the UV-A spectrum: limitation of the emission > 380 nm	6
4.1.4 Radiometric specifications: UV-A/violet ratio	6
4.1.5 Thermal management (cooling), sustaining performances	8
4.2 UV-A beam geometrical characteristics.....	9
4.2.1 General.....	9
4.2.2 Geometric consideration for use	9
4.2.3 Large parts.....	10
4.2.4 Small parts	10
4.3 Identification and repair	11
4.4 Health and safety when using UV-A sources	11
4.4.1 Precautions for use.....	11
4.4.2 Warning panels.....	11
4.4.3 Eyewear	13
4.5 Visual ergonomics.....	14
4.5.1 General.....	14
4.5.2 Visual adaptation, general.....	14
4.5.3 Visible light before inspection.....	15
4.5.4 Visible light during inspection	16
4.5.5 Visible light after inspection: focus recovery/preserving	17
4.5.6 Transition zones: avoid visual tiredness.....	18
4.5.7 General irradiance.....	18
5 Colour and luminous contrast method.....	18
5.1 White beam spectral characteristics.....	18
5.2 Viewing of coloured materials: choosing the source.....	19
5.3 Precautions for use.....	20
5.3.1 High-luminance type LED sources	20
5.3.2 Eyewear	22
5.4 Illuminance levels of the inspection area and of the surrounding area: visual ergonomics	23
5.4.1 General.....	23
5.4.2 Fixed inspection areas.....	23
5.4.3 On-site inspections	23
5.4.4 Case study	23
6 Measurements.....	25
6.1 Radiometers and luxmeters characteristics/specifications	25
6.2 Irradiance measurement.....	25
7 Actinic Blue.....	26

European foreword

This document (CEN/TR 17108:2017) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing”, the secretariat of which is held by AFNOR.

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.

1 Scope

This Technical Report describes the good practices of lighting under UV-A radiation and in white light as used for penetrant testing (PT) and magnetic particle testing (MT) for improved probability of detection (POD).

This informative document deals with the irradiance and the illuminance used in PT and MT. It is intended for:

- manufacturers, who are encouraged to supply the criteria and the restrictions on use of their products, as well as detailed characteristics for the appropriate choice and the optimum use of sources available on the market;
- users, to enable them to make the best use of lighting sources for efficient inspection in working conditions;
- supervision and training personnel, who may design and optimally arrange inspection areas, recommend the principles of visual ergonomics for ensuring inspector efficiency, comfort and safety.

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 170, *Personal eye-protection — Ultraviolet filters — Transmittance requirements and recommended use*

EN 12464-1, *Light and lighting — Lighting of work places — Part 1: Indoor work places*

CEN/TR 16638, *Non-destructive testing — Penetrant and magnetic particle testing using blue light*

EN 62471, *Photobiological safety of lamps and lamp systems (IEC 62471)*

EN ISO 12706, *Non-destructive testing — Penetrant testing — Vocabulary (ISO 12706)*

EN ISO 12707, *Non-destructive testing — Magnetic particle testing — Vocabulary (ISO 12707)*

ISO/CIE 19476 (CIE S 023/E), *Characterization of the performance of illuminance meters and luminance meters*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN ISO 12706, EN ISO 12707 and the following apply.

3.1

centroid wavelength

mathematically weighted mean output wavelength sharing in two equal parts the spectrum emitted by a source