



**NSAI**  
Standards

Irish Standard  
I.S. EN 13523-4:2014

## Coil coated metals - Test methods - Part 4: Pencil hardness

**I.S. EN 13523-4:2014**

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

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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English Version

## Coil coated metals - Test methods - Part 4: Pencil hardness

Tôles prélaquées - Méthodes d'essai - Partie 4: Dureté  
crayon

Bandbeschichtete Metalle - Prüfverfahren - Teil 4:  
Bleistifthärte

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## Foreword

This document (EN 13523-4:2014) has been prepared by Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2015 and conflicting national standards shall be withdrawn at the latest by January 2015.

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.

This document supersedes EN 13523-4:2001.

The main technical changes are:

- a) the definition of pencil hardness was amended;
- b) the term "remove the coating" was corrected to "scratch the coating" in the description of the result of the test;
- c) a remark on preconditioning was added;
- d) concerning the applicability of the pencil hardness test, a reference to EN ISO 15184 was added.

EN 13523, *Coil coated metals — Test methods*, consists of the following parts:

- *Part 0: General introduction*
- *Part 1: Film thickness*
- *Part 2: Gloss*
- *Part 3: Colour difference — Instrumental comparison*
- *Part 4: Pencil hardness*
- *Part 5: Resistance to rapid deformation (impact test)*
- *Part 6: Adhesion after indentation (cupping test)*
- *Part 7: Resistance to cracking on bending (T-bend test)*
- *Part 8: Resistance to salt spray (fog)*
- *Part 9: Resistance to water immersion*
- *Part 10: Resistance to fluorescent UV radiation and water condensation*
- *Part 11: Resistance to solvents (rubbing test)*
- *Part 12: Resistance to scratching*

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- *Part 13: Resistance to accelerated ageing by the use of heat*
- *Part 14: Chalking (Helmen method)*
- *Part 15: Metamerism*
- *Part 16: Resistance to abrasion*
- *Part 17: Adhesion of strippable films*
- *Part 18: Resistance to staining*
- *Part 19: Panel design and method of atmospheric exposure testing*
- *Part 20: Foam adhesion*
- *Part 21: Evaluation of outdoor exposed panels*
- *Part 22: Colour difference — Visual comparison*
- *Part 23: Resistance to humid atmospheres containing sulfur dioxide*
- *Part 24: Resistance to blocking and pressure marking*
- *Part 25: Resistance to humidity*
- *Part 26: Resistance to condensation of water*
- *Part 27: Resistance to humid poultice (Cataplasm test)*
- *Part 29: Resistance to environmental soiling (Dirt pick-up and striping)*

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## 1 Scope

This part of EN 13523 describes the procedure to assess the relative hardness of an organic coating on a metallic substrate, by means of pencils of known hardness.

Smooth surfaces will give more accurate results but the method is also applicable for textured surfaces. The more pronounced the texture, the greater the unreliability of results.

## 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 13523-0:2014, *Coil coated metals — Test methods — Part 0: General introduction*

EN 23270, *Paints and varnishes and their raw materials - Temperatures and humidities for conditioning and testing (ISO 3270)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13523-0:2014 and the following apply.

### 3.1

#### **pencil hardness**

resistance of the coating surface to scratching when a pencil with a specified dimension, shape and hardness of the lead is pushed across the surface

## 4 Principle

The coating is intentionally damaged by pencils of increasing hardness. The hardest lead which does not scratch the coating for a minimum of 3 mm length determines the degree of hardness.

## 5 Apparatus and materials

Ordinary laboratory apparatus, together with the following:

### 5.1 Set of Cretacolor™ or Faber Castell drawing pencils<sup>1)</sup> or their equivalents in the following range:

6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H

(softer)

(harder)

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<sup>1)</sup> Cretacolor is the trade name of a product supplied by Brevillier & Co. and A. Urban & Söhne. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of the product named. Equivalent products may be used if they can be shown to lead to the same results. Cretacolor™ and Faber Castell pencils have been found to be the most uniform and the most reproducible.

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