Paints and varnishes - Determination of the scratch resistance of a coating system using a laboratory-scale car-wash (ISO 20566:2013)

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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 20566:2013 sisaldab Euroopa standardi EN ISO 20566:2013 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 20566:2013 consists of the English text of the European standard EN ISO 20566:2013.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.02.2013.	Date of Availability of the European standard is 20.02.2013.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 43.020, 87.040

EUROPEAN STANDARD

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EN ISO 20566

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English Version

Paints and varnishes - Determination of the scratch resistance of a coating system using a laboratory-scale car-wash (ISO 20566:2013)

Peintures et vernis - Détermination de la résistance à la rayure d'un système de peinture sur un poste de lavage automobile de laboratoire (ISO 20566:2013)

Beschichtungsstoffe - Bestimmung der Kratzbeständigkeit von Beschichtungen mit einer Labor-Automobilwaschanlage (ISO 20566:2013)

This European Standard was approved by CEN on 9 February 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 20566:2013) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with 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of an identical text or by endorsement, at the latest by August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

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 ISO 20566:2006.

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Endorsement notice

The text of ISO 20566:2013 has been approved by CEN as EN ISO 20566:2013 without any modification.

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Introduction

With this test procedure, it is important to note that the test results will not, over time, remain constant, as a result of changes to the brush material. As the brush ages, the test will become more severe. As a result, the test procedure is suitable only for comparative tests carried out at any one time and using relatively short runs. Readings obtained using equipment which has accumulated different total numbers of operating hours are not comparable with each other.

Paints and varnishes — Determination of the scratch resistance of a coating system using a laboratory-scale car-wash

1 Scope

This International Standard describes a test procedure for assessing the scratch resistance of organic paint coatings[1)], in particular paint coatings used in the automotive industry (i.e. for assessing their car-wash resistance). Machine-based washing is simulated in the laboratory environment using a rotating brush and synthetic dirt. The test conditions have been designed to be as close as possible to the real conditions in a car-wash. If the test parameters are suitably chosen, the method can also be used for testing protective plastics films and plastics components.

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.

ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°*

ISO 4618, *Paints and varnishes — Terms and definitions*

ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

ISO 7724-1, *Paints and varnishes — Colorimetry — Part 1: Principles*

ISO 7724-2, *Paints and varnishes — Colorimetry — Part 2: Colour measurement*

ISO 7724-3, *Paints and varnishes — Colorimetry — Part 3: Calculation of colour differences*

ISO 13076, *Paints and varnishes — Lighting and procedure for visual assessments of coatings*

ISO 13803, *Paints and varnishes — Determination of reflection haze on paint films at 20°*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 and the following apply.

3.1
mar, n
blemish on the surface of a coating, extending over a particular area of the coating and visible due to the difference in the light-reflection properties of the area affected compared with the light-reflection properties of adjacent areas

1) For the term “coating”, see ISO 4618.

3.2
scratch, n
cut or gouge through the surface of a coating, made by contact with a sharp object

3.3
double pass
one back-and-forward movement of the test panel holder

3.4
test area
area which is evaluated

3.5
reflow effect
ability of the coating surface to revert to its original appearance after damage such as scratching

4 Apparatus

The apparatus[2)] shall comprise at least the following individual components:

4.1 **Washing brush**:

Diameter	(1 000 ± 40) mm
Width	min. 300 mm
Material	polyethylene
Profile	x-shaped, spliced
Bristle thickness	(0,8 ± 0,2) mm
Bristle length	(440 ± 20) mm visible
Penetration depth	(100 ± 20) mm (see Figure 1)
Speed of brush rotation	(127 ± 5) min^{-1}, in the direction opposite to the direction of travel of the test panel holder

The replacement of washing brushes is decided by testing a control panel. The control panel material shall be chosen to reflect changes in the washing brush, so that it is possible to differentiate between a new and a used brush. In practice, the maximum lifetime of the washing brush is often specified as between 30 h and 50 h.

It is recommended that a control panel coated with a black non-metallic paint and a clear coating on top be used. Gloss shall be > 80 gloss units, measured at 20°. The washing brush shall be replaced by a new brush if the gloss of the control panel changes by more than 6 gloss units compared with a new brush.

4.2 **Spray nozzles**, made of stainless steel:

Spread of jet	65°
Rate of flow of washing suspension	(2,2 ± 0,2) l/min at (300 ± 50) kPa

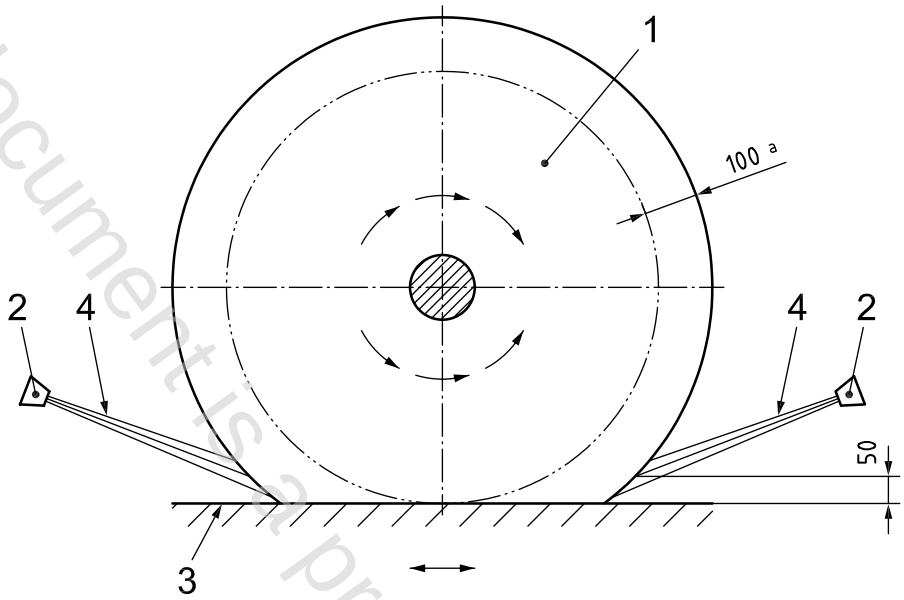
The two nozzles shall spray alternately, against the direction of travel of the test panel holder. They shall produce the specified spray pattern (see Annex A).

2) Information on procuring the equipment is available from: DIN Deutsches Institut für Normung e.V., NAB, Burggrafenstrasse 6, 10787 Berlin, Germany.

4.3 Test panel holder:

Feed speed	(5,0 ± 0,2) m/min
Pattern of movement	If the brush is rotating clockwise, the right nozzle is spraying and the test panel holder travels from left to right (and *vice versa*) — see Figure 1.

Dimensions in millimetres



Key

1 washing brush
2 spray nozzle
3 test panel holder
4 spray jet (centreline of jet strikes brush directly, 50 mm above test panel holder)

a Penetration depth.

Figure 1 — Pattern of movement of washing brush and spray nozzles with respect to test panel holder

4.4 Container, suitable for holding the washing suspension during the test.

5 Washing suspension

Prepare a suspension consisting of (1,50 ± 0,05) g of silica powder (silica micro-powder having a mean particle size of 24 µm)[3)] per litre of tap water in a suitable container, mixing it by stirring vigorously. The water temperature shall be between 15 °C and 30 °C.

The suspension shall be stirred continuously during the test in such a way that the silica powder does not settle on the bottom of the container as this would result in variations in the concentration.

The suspension may be reused once the test equipment has come to a standstill. However, it is essential that the suspension be stirred thoroughly again before being reused.

3) Information on procuring the silica powder is available from: DIN Deutsches Institut für Normung e.V., NAB, Burggrafenstrasse 6, 10787 Berlin, Germany.