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Paints and varnishes — On-site test methods on quality assessment for interior wall coatings

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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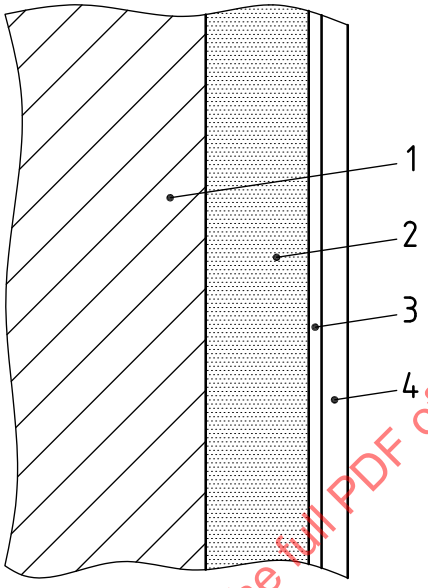
For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Typical interior wall coating systems (see Figure 1) are comprised of a thick filler, one coat primer and two top coats. Thus, the quality of the final interior wall is dependent on the whole coating system from filler to primer to top coat. Besides, the quality of the application conditions, such as film thickness and paint-water dilution ratio, contribute to the final wall coating system significantly.



Key

1 substrate (wall)
2 filler
3 primer (1 coat)
4 top coat (2 coats)

Figure 1 — Typical interior wall coating system

There is no standardized on-site test method on the market to check the performance of the whole system worldwide. Currently, so-called "on-site test methods" are relying on visual tests, on fingernail scrubbing and on touching. These methods are very subjective since results can vary from person to person, even for the same wall coating system and these results are not repeatable. As a result, this document provides standardized test methods for on-site wall coatings assessment. Using these standardized test methods could help distinguish between high-quality and low-quality interior wall coatings.

Paints and varnishes — On-site test methods on quality assessment for interior wall coatings

1 Scope

This document specifies two on-site test methods (on-site cleanability [stain removal] and on-site wet-scrub resistance) for the evaluation of the quality assessment for interior wall coatings.

These test methods are applicable to white coatings and light-coloured coatings of tristimulus value Y_{10} greater than 25 measured on a test specimen consisting of a coating applied to a black substrate.

The cleanability test can differentiate the coating quality between 18 % of the pigment volume concentration (PVC) and the critical pigment volume concentration (CPVC). The on-site wet-scrub resistance test method can differentiate the coating quality when the PVC is nearly equal to the CPVC or above.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3696, *Water for analytical laboratory use — Specification and test methods*

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

ISO 6504-3:2019, *Paints and varnishes — Determination of hiding power — Part 3: Determination of hiding power of paints for masonry, concrete and interior use*

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
paint-water dilution ratio
ratio of water to the paint, given as percentage by mass

3.2
light-coloured coating
coating with tristimulus values Y_{10} greater than 25, measured with a spectrophotometer on a test specimen consisting of a coating applied to a black substrate

Note 1 to entry: The test shall be in accordance with ISO 6504-3.

3.3
cleanability
ability of a dry coating film to withstand penetration by soiling agents and to be freed from them through the cleaning process without removing more than a defined film thickness

[SOURCE: ISO 11998:2006, 3.1]

3.4
on-site wet-scrub resistance
ability of a dry coating film to sustain less than a specified loss in film thickness, averaged over a defined area, when exposed to specified wet-*scrub cycles* (3.5)

Note 1 to entry: In ISO 11998, wet-scrub resistance is based on a lab test with 200 wet-scrub cycles.

3.5
scrub cycle
one reciprocal movement of the scrub pad over the *scrub length* (3.6) in both directions

[SOURCE: ISO 11998:2006, 3.2]

3.6
scrub length
stroke length (3.7) plus the length of the pad

[SOURCE: ISO 11998:2006, 3.3]

3.7
stroke length
distance traversed by one stroke of the apparatus

[SOURCE: ISO 11998:2006, 3.4]

4 Symbols

Y_{10}	tristimulus value in accordance with CIE 1964 colour space
$Y_{10,u}$	tristimulus value of the untreated (index "u") test stripe
$\bar{Y}_{10u,x}$	mean tristimulus value of the untreated (index "u") test stripe x (x = 1, 2 and 3 for respectively test stripes 1, 2 and 3)
$Y_{10,u,x,y}$	tristimulus value measured in untreated (index "u") test stripe x (for example x = 1, 2 and 3 for respectively test stripes 1, 2 and 3 on test stripe 1) on point y (y = 1, 2 and 3 for respectively measuring points 1, 2 and 3)
$Y_{10,t}$	tristimulus value of the treated (index "t") test stripe
$\bar{Y}_{10,t,x}$	mean tristimulus value of the treated (index "t") test stripe x (x = 1, 2 and 3 for respectively test stripes 1, 2 and 3)
$Y_{10,t,x,y}$	tristimulus value measured in treated (index "t") test stripe x (for example x = 1, 2 and 3 for respectively test stripes 1, 2 and 3 on test stripe 1) on point y (y = 1, 2 and 3 for respectively measuring points 1, 2 and 3)
C_{10}	cleanability
$\bar{C}_{10}$	mean value for the cleanability
$\bar{C}_{10,x}$	mean cleanability for test stripe x (x = 1, 2 and 3 for respectively test stripe 1, 2 and 3)

$\bar{C}_{10,w}$ mean cleanability of the water-soluble black solution (index “w”)

$\bar{C}_{10,a}$ mean cleanability of the alcohol soluble black solution (index “a”)

$\bar{C}_{10,v}$ mean cleanability of the table vinegar (index “v”)

$\bar{C}_{10,b}$ mean cleanability of the black tea (index “b”)

$\bar{C}_{10,k}$ mean cleanability of the blue-black ink (index “k”)

R_a resistance class for an alcohol soluble black solution

R_i resistance class for each tested soiling agent *i*

R_s mean value of resistance against all tested soiling agents

R_w resistance class for a water soluble black solution

n number of soiling agents tested

5 On-site cleanability (stain removal) test

5.1 Principle

The standardized stains are applied on interior wall coatings and dried for 10 min. Then the cleanability test is run with the specified test apparatus (wet-scrub tester). The tristimulus value of the coating is measured before and after exposure.

5.2 Apparatus

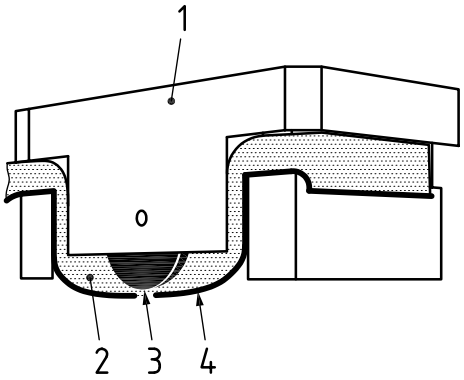
5.2.1 Wet-scrub tester.

The scrub testing machine is operated manually upwards and downwards with a stroke length of (180 ± 10) mm and operating at approximately (20 ± 1) scrub cycles per minute. The number of scrub cycles is recorded manually. Do not mix up the stroke length with the scrub length.

The apparatus for determination of cleanability and wet-scrub resistance of interior wall coatings is shown in Figure 2. The apparatus can give consistent pressure and contact area when running the test through the below designs. Three wheels are used to control the track when running the test. The height of the wheel is designed to be lower than the height of sponge plus the black cloth, to ensure certain deformation and to provide a certain friction.

NOTE The force provided by the deformation of sponge has been determined by dynamic mechanical analysis (DMA) to be (2,6 ± 0,2) N.

A sponge height of 15 mm is recommended to deliver the reasonable result. The contact area which is set by the location of the wheels is about 60 mm × 35 mm. The sponge (cleanability test) or the sponge covered by the black cloth (wet-scrub resistance test) is fixed by one balance bolt with two screws on each side. When the sponge is used under the black cloth, the purpose is to provide some damping when rubbing, not to bring extra damage to the coating due to the hardness of the main material. When determining “cleanability”, the black cloth does not need to be used; when determining “wet-scrub resistance”, the black cloth needs to be used.



Key

1 main body
2 sponge
3 wheel
4 black cloth

Figure 2 — Example of a wet-scrub tester

5.2.2 Spectrophotometer, as specified in ISO 6504-3:2019, 6.5.

5.2.3 Gauze, of absorbent cotton.

5.2.4 Adhesive tape, with a width of 20 mm.

5.2.5 Sponge, with a size of 100 mm × 35 mm, a thickness of (15 ± 1) mm, a hardness of (55 ± 5) kPa and a density of (41 ± 2) kg/m^3. For the effects of different sponges on cleanability test results, see Annex B.

5.2.6 Stirrer, for preparing homogeneous solutions.

5.2.7 Timer.

5.2.8 Lint-free tissues.

5.2.9 Blow drier.

5.3 Reagents

5.3.1 Cleaning medium for test

Use a 2,5 g/l solution of sodium n-dodecylbenzenesulfonate (CAS-No 25155-30-0) in water in accordance with grade 3 of ISO 3696. Allow the solution to stand before use until all air-bubbles and foam have dissipated.

5.3.2 Soiling agents

5.3.2.1 Water soluble black solution

Put water in accordance with grade 3 of ISO 3696, into a vessel, then add Nigrosin black (CAS-No 8005-03-6), at a mass ratio of water : Nigrosin black of 97:3. Mix thoroughly till all the Nigrosin black is dissolved totally. Prepare this solution 24 h in advance before test. Its shelf life is seven days.

5.3.2.2 Alcohol soluble black solution

Put water in accordance with grade 3 of ISO 3696, into a vessel, then add ethanol (CAS-No 64-17-5, analytical reagent grade) and mix thoroughly. Then add the alcohol soluble black (solvent black 7, CAS-No 8005-02-5) at a mass ratio of water : ethanol : solvent black 7 63:27:10 and mix thoroughly. Prepare this solution 24 h in advance before test. Its shelf life is 7 days.

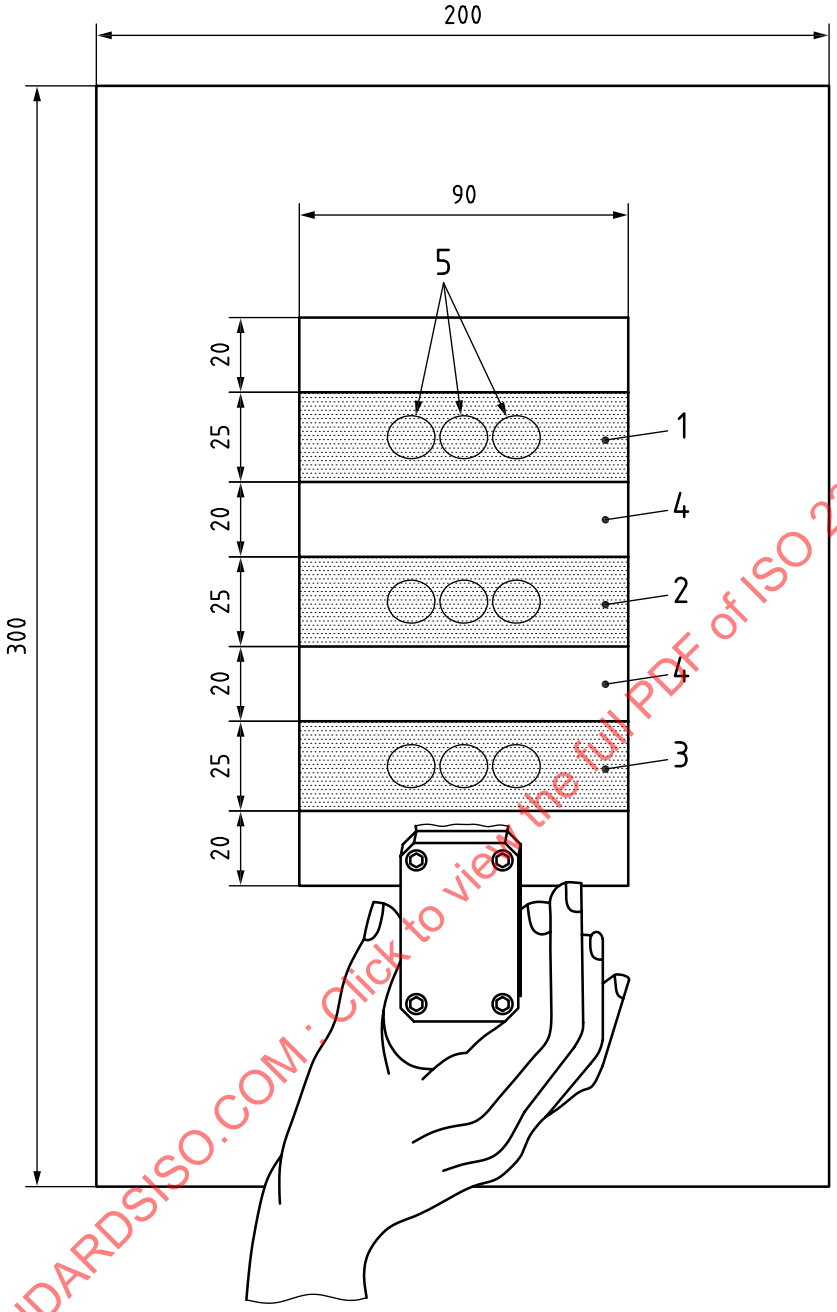
NOTE For specific needs, other soiling agents such as vinegar, black tea, blue ink, can also be used. See Annex A.

5.4 Procedure

5.4.1 Division of test area

Select two vertical wall areas for the test. Each area shall be larger than 200 mm × 300 mm. Apply two 90 mm stripes of adhesive tape (5.2.4) with the size of 90 mm × 20 mm horizontally on each area on the wall as spacers (see Figure 3). One soiling agent is tested on one test area with three test strips, two soiling agents are chosen in the procedure. If more soiling agents are to be tested, then the number of test areas shall be increased accordingly. Tested area is in the middle of the selected area.

Dimensions in millimetres



Key

1 test stripe (gauze) 1
2 test stripe (gauze) 2
3 test stripe (gauze) 3
4 spacer (adhesive tape)
5 measuring point

Figure 3 — Example of a test area for one soiling agent

5.4.2 Determination of the initial tristimulus value of the untreated coating

Measure with the spectrophotometer (5.2.2) the tristimulus value Y_{10} (as described in the colour space of CIE 1964) of the coating in each uncoated test stripe $Y_{10,u}$ before the gauze is applied.

Take three measurements on the test area of each untreated test stripe (see Figure 3) and calculate the mean tristimulus values $\bar{Y}_{10,u,x}$ for each test stripe:

untreated test stripe 1 $$\bar{Y}_{10,u,1} = \frac{Y_{10,u,1,1} + Y_{10,u,1,2} + Y_{10,u,1,3}}{3}$$

untreated test stripe 2 $$\bar{Y}_{10,u,2} = \frac{Y_{10,u,2,4} + Y_{10,u,2,5} + Y_{10,u,2,6}}{3}$$

untreated test stripe 3 $$\bar{Y}_{10,u,3} = \frac{Y_{10,u,3,7} + Y_{10,u,3,8} + Y_{10,u,3,9}}{3}$$

where

$\bar{Y}_{10,u,1}$ is the mean tristimulus value measured in untreated test stripe 1;

$\bar{Y}_{10,u,2}$ is the mean tristimulus value measured in untreated test stripe 2;

$\bar{Y}_{10,u,3}$ is the mean tristimulus value measured in untreated test stripe 3;

$Y_{10,u,1,1}$ is the tristimulus value measured in untreated test stripe 1 on point 1;

$Y_{10,u,1,2}$ is the tristimulus value measured in untreated test stripe 1 on point 2;

$Y_{10,u,1,3}$ is the tristimulus value measured in untreated test stripe 1 on point 3;

$Y_{10,u,2,4}$ is the tristimulus value measured in untreated test stripe 2 on point 4;

$Y_{10,u,2,5}$ is the tristimulus value measured in untreated test stripe 2 on point 5;

$Y_{10,u,2,6}$ is the tristimulus value measured in untreated test stripe 2 on point 6;

$Y_{10,u,3,7}$ is the tristimulus value measured in untreated test stripe 3 on point 7;

$Y_{10,u,3,8}$ is the tristimulus value measured in untreated test stripe 3 on point 8;

$Y_{10,u,3,9}$ is the tristimulus value measured in untreated test stripe 3 on point 9.

5.4.3 Application of soiling agent

Cut the gauze (5.2.3) into 90 mm × 50 mm, fold into two layers along the long side (90 mm × 25 mm).

With the adhesive tape fix the gauze onto the wall. The black area is gauze; adhesive tape is used to fix the gauze on to the wall, setting at the edge of gauze.

Before application, make sure the soiling agents (5.3.2) is uniform, then take about 1,5 ml of soiling agent with a pipette and drop evenly onto the gauze on the wall. Repeat the above application method of liquid stains on other two stripes, and then leave it for 10 min.

Remove the gauze and the adhesive tapes (spacers) carefully without contaminating the coating outside the soiled area.

5.4.4 Cleaning of soilings

5.4.4.1 Preparation of the sponge

Dip the sponge (5.2.5) into the cleaning medium (5.3.1), take it out and fix it with the screws in the wet-scrub tester (5.2.1).

NOTE Absorption of cleaning medium has minimum effect on the results.

5.4.4.2 Scrubbing

Move the wet-scrub tester for 10 scrub cycles on the same track vertically across the three test stripes, ensuring the three wheels of the wet-scrub tester always have contact to the wall when running the test.

5.4.4.3 Drying of the coating

Carefully dry the surface of the coating using a lint-free tissue (5.2.8) and then dry by blow drier (5.2.9) for about 10 min or dry at room temperature for at least 2 h.

5.4.5 Determination of the tristimulus value after soil removal

Measure with the spectrophotometer (5.2.2) the tristimulus value Y_{10} of the coating in each treated test stripe $Y_{10,t}$.

Take three measurements at the same points as before soiling on the middle of each treated test stripe where have been scrubbed (see Figure 3) and calculate the mean tristimulus values $\bar{Y}_{10,t,x}$ for each test stripe:

treated test stripe 1 $$\bar{Y}_{10,t,1} = \frac{Y_{10,t,1,1} + Y_{10,t,1,2} + Y_{10,t,1,3}}{3}$$

treated test stripe 2 $$\bar{Y}_{10,t,2} = \frac{Y_{10,t,2,4} + Y_{10,t,2,5} + Y_{10,t,2,6}}{3}$$

treated test stripe 3 $$\bar{Y}_{10,t,3} = \frac{Y_{10,t,3,7} + Y_{10,t,3,8} + Y_{10,t,3,9}}{3}$$

where

$\bar{Y}_{10,t,1}$ is the mean tristimulus value measured in treated test stripe 1;

$\bar{Y}_{10,t,2}$ is the mean tristimulus value measured in treated test stripe 2;

$\bar{Y}_{10,t,3}$ is the mean tristimulus value measured in treated test stripe 3;

$Y_{10,t,1,1}$ is the tristimulus value measured in treated test stripe 1 on point 1;

$Y_{10,t,1,2}$ is the tristimulus value measured in treated test stripe 1 on point 2;

$Y_{10,t,1,3}$ is the tristimulus value measured in treated test stripe 1 on point 3;

$Y_{10,t,2,4}$ is the tristimulus value measured in treated test stripe 2 on point 4;

$Y_{10,t,2,5}$ is the tristimulus value measured in treated test stripe 2 on point 5;

$Y_{10,t,2,6}$ is the tristimulus value measured in treated test stripe 2 on point 6;

$Y_{10,t,3,7}$ is the tristimulus value measured in treated test stripe 3 on point 7;

$Y_{10,t,3,8}$ is the tristimulus value measured in treated test stripe 3 on point 8;

$Y_{10,t,3,9}$ is the tristimulus value measured in treated test stripe 3 on point 9.

5.4.6 Calculation of the cleanability

The cleanability, C_{10}, as a percentage, is defined as the mean value of the quotient of the tristimulus value $\bar{Y}_{10,t,x}$ (with x = 1, 2, 3) after treating and the untreated tristimulus value $\bar{Y}_{10,u,x}$:

test stripe 1 $$\bar{C}_{10,1} = \frac{\bar{Y}_{10,t,1}}{\bar{Y}_{10,u,1}} \cdot 100$$

test stripe 2 $$\bar{C}_{10,2} = \frac{\bar{Y}_{10,t,2}}{\bar{Y}_{10,u,2}} \cdot 100$$

test stripe 3 $$\bar{C}_{10,3} = \frac{\bar{Y}_{10,t,3}}{\bar{Y}_{10,u,3}} \cdot 100$$

Calculate the mean value for the cleanability, $\bar{C}_{10}$, of all three test stripes:

$$\bar{C}_{10} = \frac{\bar{C}_{10,1} + \bar{C}_{10,2} + \bar{C}_{10,3}}{3}$$

where

$\bar{C}_{10,1}$ is the mean cleanability for test stripe 1;

$\bar{C}_{10,2}$ is the mean cleanability for test stripe 2;

$\bar{C}_{10,3}$ is the mean cleanability for test stripe 3.

5.4.7 Evaluation with different soiling agents

The measurements and calculations shall be done for each soiling agent, for cleanability of the water-soluble black solution $\bar{C}_{10,w}$ and for the alcohol soluble black solution $\bar{C}_{10,a}$.

To evaluate the resistance against soil with multipurpose soiling agents, the cleanability of each soil shall be categorized in resistance classes (see Table 1).

Table 1 — Resistance classes for water soluble black solution and alcohol soluble black solution

Water soluble black solution		Alcohol soluble black solution	
Resistance class[a] R_w	Cleanability $\bar{C}_{10,w}$	Resistance class[a] R_a	Cleanability $\bar{C}_{10,a}$
0,0	$\bar{C}_{10,w} = 100$	0,0	$\bar{C}_{10,a} = 100$
0,5	$96 \leq \bar{C}_{10,w} < 100$	0,5	$95 \leq \bar{C}_{10,a} < 100$
1,0	$91 \leq \bar{C}_{10,w} < 96$	1,0	$89 \leq \bar{C}_{10,a} < 95$
1,5	$85 \leq \bar{C}_{10,w} < 91$	1,5	$82 \leq \bar{C}_{10,a} < 89$

NOTE The resulting resistance class is different for each soiling agent.

[a] Following the general classification system described in ISO 4628-1.

Table 1 *(continued)*

Water soluble black solution		Alcohol soluble black solution	
Resistance class[a] R_w	**Cleanability** $\overline{C}_{10,w}$	**Resistance class**[a] R_a	**Cleanability** $\overline{C}_{10,a}$
2,0	$78 \leq \overline{C}_{10,w} < 85$	2,0	$74 \leq \overline{C}_{10,a} < 82$
2,5	$70 \leq \overline{C}_{10,w} < 78$	2,5	$65 \leq \overline{C}_{10,a} < 74$
3,0	$61 \leq \overline{C}_{10,w} < 70$	3,0	$55 \leq \overline{C}_{10,a} < 65$
3,5	$51 \leq \overline{C}_{10,w} < 61$	3,5	$44 \leq \overline{C}_{10,a} < 55$
4,0	$40 \leq \overline{C}_{10,w} < 51$	4,0	$32 \leq \overline{C}_{10,a} < 44$
4,5	$28 \leq \overline{C}_{10,w} < 40$	4,5	$19 \leq \overline{C}_{10,a} < 32$
5,0	$\overline{C}_{10,w} < 28$	5,0	$\overline{C}_{10,a} \leq 19$

NOTE The resulting resistance class is different for each soiling agent.

[a] Following the general classification system described in ISO 4628-1.

5.4.8 Comprehensive evaluation of stain removal of wall coating films

After classification, calculate for the resistance against soiling agents, R_s, the mean value over all tested soils

$$R_s = \frac{\sum_i^n R_i}{n}$$

where

R_i is the resistance class of each tested soiling agent;

n is the total number of tested soiling agents.

6 On-site wet-scrub resistance test

6.1 Principle

The scrub resistance ability of a wet coating is tested on-site after the coating has cured at least for 7 days at room temperature after application. The coating is wetted using a wet towel. Then the wet coating is scrubbed with a black cloth and either chalking or colour difference is measured.

6.2 Apparatus

6.2.1 Wet-scrub tester, as specified in 5.2.1.

6.2.2 Towel with the size of 240 mm × 320 mm. The towel shall absorb (200 ± 20) g water.

6.2.3 Black cloth, as agreed between the interested parties, to rub against the surface being tested.

6.2.4 Adhesive tape, as specified in 5.2.4.

6.2.5 Sponge, as specified in 5.2.5.

6.2.6 Balance, accurate to 0,1 g.

6.2.7 Timer.

6.2.8 Plastics film.

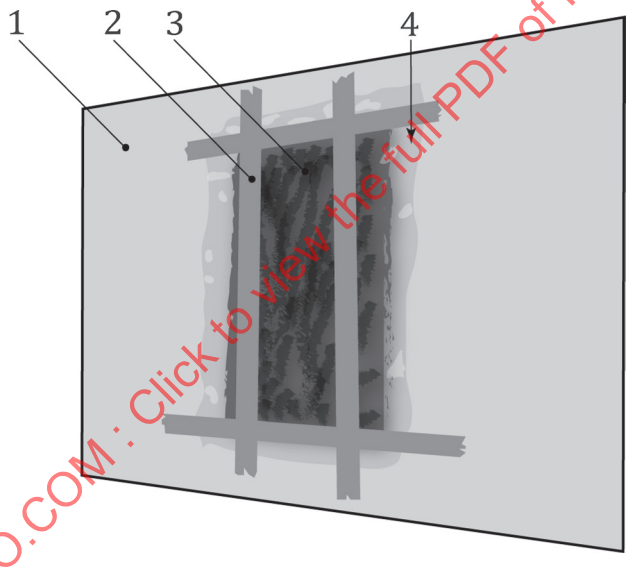
6.3 Procedure

6.3.1 Division of test area

A wall area is selected for the test. The area should be larger than 200 mm × 300 mm.

6.3.2 Wetting of the wall

Weigh the dry towel (6.2.2) on the balance (6.2.6) to the nearest 1 g. Soak the towel with tap water and weigh on the balance again. The towel shall absorb (200 ± 20) g water. Fold the towel twice to obtain three layers. The size of each layer is 80 mm × 320 mm. Cover the folded towel with a plastics film (6.2.8) and fix it on the centre of the tested wall area with adhesive tape (6.2.4) (see Figure 4).

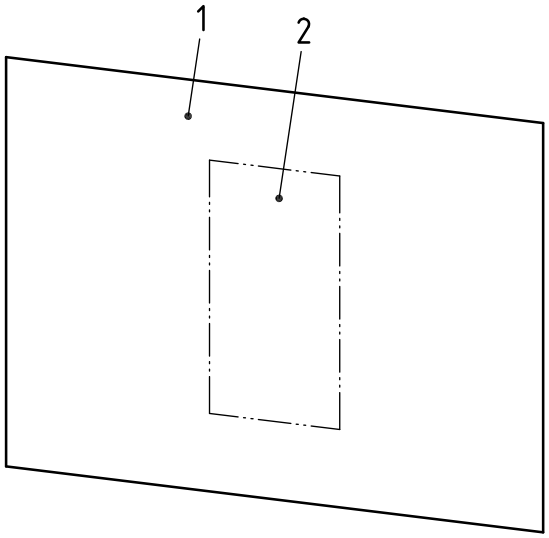


Key

1 wall
2 adhesive tape
3 towel folded to 80 mm × 320 mm fixed on the test area
4 plastics film

Figure 4 — Towel on the wall for wetting the wall

Take off the towel together with the adhesive tape and plastics film after 10 min. The wetted wall is shown in Figure 5.



Key

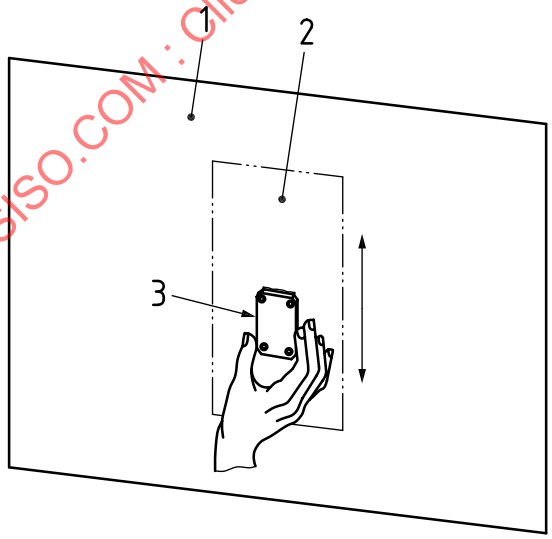
1 wall

2 wetted test area

Figure 5 — Wetted test area on the wall

6.3.3 Scrubbing

Use the wet-scrub tester covered by the sponge (6.2.5) and the black cloth (6.2.3) with the size of 100 mm × 35 mm to wipe on the coating for 20 back and forth cycles vertically on the towel wetted area, the whole running distance is kept (180 ± 10) mm, and make sure that the three wheels of the wet-scrub tester always have contact to the wall during testing (see Figure 6).



Key

1 wall

2 wetted test area

3 movement of the wet-scrub tester

Figure 6 — Scrubbing the wetted wall

6.3.4 Determination of wet-scrub resistance properties

6.3.4.1 Wet chalking

Observe the powder on the black cloth. Carry out the assessment under good illumination, as specified in ISO 13076.

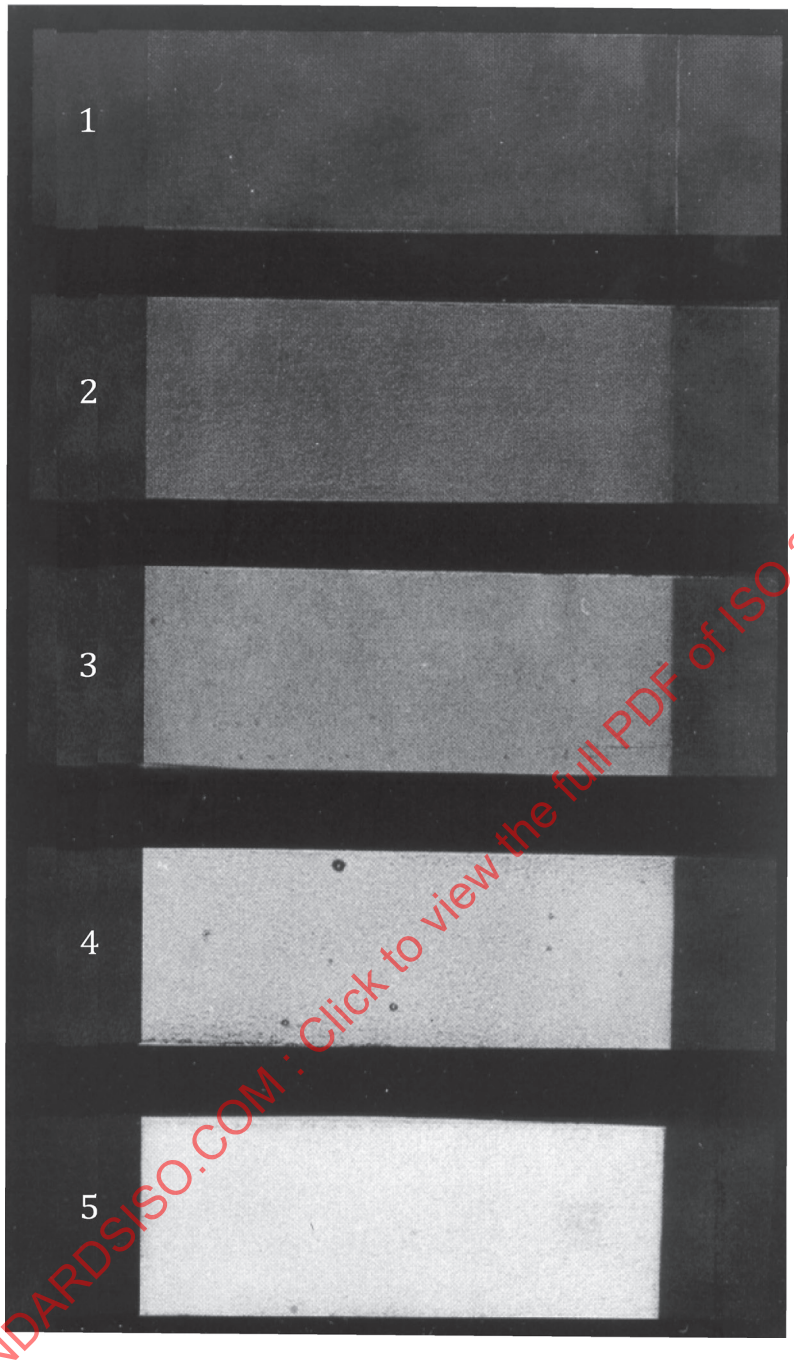
Rank the coating by the amount of powder on the cloth according to Table 2.

Table 2 — Rating scheme for designating the degree of chalking (adopted from ISO 4628-7:2016, Table 1)

Rating[a]	Degree of chalking
0	unchanged, i.e. no perceptible chalking
1	very slight, i.e. just perceptible chalking
2	slight, i.e. clearly perceptible chalking
3	moderate, i.e. very clearly perceptible chalking
4	considerable, i.e. pronounced chalking
5	severe, i.e. intense chalking

[a] If specified or agreed, a simpler rating system can be used. However, in such cases, the meanings of the ratings in this table which are used shall not be changed in order to avoid confusion.

Examples of pictorial standards for assessing the degree of chalking are given in Figure 7. The figure is obtained with the tape method specified in ISO 4628-6:2011, but the degrees of chalking 1 to 5 are comparable to those specified in Table 2.



NOTE The right-hand end of each tape corresponds to a chalking rating of 0.

Figure 7 — Pictorial reference standards for numerical chalking ratings 1 to 5

7 Precision

Precision data are currently not available.

For information on repeatability of cleanability test results, see Annex C.

8 Test report

The test report shall contain at least the following information:

a) details for identification of the product tested;

b) a reference to this document, i.e. ISO 23169:2020;

c) the on-site cleanability (stain removal) test results, including the type of the stains;

d) the on-site wet scrub resistance test results;

e) the test conditions including temperature/humidity;

f) any unusual features (anomalies) observed during the test;

g) any deviation from the test method specified;

h) the persons responsible for testing and approval;

i) the date of the test.

Annex A
(informative)

Other types of stains used for evaluating stain removal performance of coatings

A.1 Type of stains

A.1.1 Table vinegar

The table vinegar shall be agreed by the interested parties.

A.1.2 Black tea

The black teas shall be agreed by the interested parties.

Put 2 g of black tea into 100 ml boiling water, where the quality of the water shall be in accordance with the requirement specified in grade 3 of ISO 3696. Take out the tea bag and cool down for use. Prepare the tea solution before test.

A.1.3 Blue-black ink

The blue-black ink shall be agreed by the interested parties.

A.2 Test procedure

As specified in 5.4.

A.3 Evaluation criteria of stain removal performance of coatings for three stain types

Examples of evaluation criteria for the resistance of three types of stains are listed in Table A.1.

Table A.1 — Examples of resistance classes for three different soiling agents

Resistance class[a] R_i	Cleanability		
	Table vinegar[b] (index "v")	**Black tea**[b] (index "b")	**Blue-black ink**[b] (index "k")
0,0	$\overline{C}_{10,v} = 100$	$\overline{C}_{10,b} = 100$	$\overline{C}_{10,k} = 100$
0,5	$99 \leq \overline{C}_{10,v} < 100$	$98 \leq \overline{C}_{10,b} < 100$	$96 \leq \overline{C}_{10,k} < 100$
1,0	$98 \leq \overline{C}_{10,v} < 99$	$95 \leq \overline{C}_{10,b} < 98$	$91 \leq \overline{C}_{10,k} < 96$
1,5	$97 \leq \overline{C}_{10,v} < 98$	$91 \leq \overline{C}_{10,b} < 95$	$85 \leq \overline{C}_{10,k} < 91$
2,0	$96 \leq \overline{C}_{10,v} < 97$	$86 \leq \overline{C}_{10,b} < 91$	$78 \leq \overline{C}_{10,k} < 85$
2,5	$95 \leq \overline{C}_{10,v} < 96$	$80 \leq \overline{C}_{10,b} < 86$	$70 \leq \overline{C}_{10,k} < 78$

NOTE The resulting resistance class is different for each soiling agent.

[a] Following the general classification system described in ISO 4628-1.

[b] Example for a special product used in an interlaboratory test.