TECHNICAL REPORT

# ISO/TR 20436

First edition
2017-07

# Buildings and civil engineering works — Sealants — Paintability and paint compatibility of sealants

*Bâtiments et ouvrages de génie civil — Mastics — Peignabilité et compatibilité des mastics avec les peintures*



Reference number
ISO/TR 20436:2017(E)



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

# Contents

Page

# 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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*.

# Introduction

There are current International Standards to classify sealants for façade, glazing and pedestrian walkways. These International Standards refer to a number of established test methods relating to the performance of the sealants, but until now, no methodology has been developed to evaluate claims regarding paintability and paint compatibility of sealants.

This is a complex subject and generally, although the expert opinion is that ideally it is not recommended that sealants are overpainted, it is recognized internationally that manufacturers are marketing sealants that are actively promoted as being "paintable" in marketing and sales literature and that for many refurbishment projects, sealants will be overpainted or overcoated rather than be removed and fresh sealant reapplied. It is therefore important to review the current state-of-the-art methods and characteristics relating to overpainting sealants, ultimately to at least standardize the test methods used when manufacturers make claims relating to this characteristic in future. This document can then be used in the development of future international standards relating to paintability of sealants, if required.

This document considers ways of defining sealant and coating performance and aesthetics in order to be able to suggest the aspects that are relevant when referring to a sealant as "overpaintable". There is also guidance over the form that reporting of the results should take.

The intention is that, if required, this document can be followed with the publication of a set of standard test methods leading to the possible drafting of a technical specification if necessary.

# Buildings and civil engineering works — Sealants — Paintability and paint compatibility of sealants

## 1 Scope

This document reviews and evaluates the methodology that can be employed to assess the paintability of or paint compatibility with sealants used in building and construction. The term "paintability" is used throughout this document and is a generic term to refer to the application of paint or a coating to a sealant.

## 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 6927, *Buildings and civil engineering works — Sealants — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6927 apply.

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

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

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

## 4 Evaluation of paintability of a sealant

A number of characteristics can be part of an evaluation to determine the overall compatibility of any sealant with a specified paint or coating applied to the sealant.

Any claims of paintability will only relate to a combination of a specific paint and a specific sealant when tested together, as the coatings themselves may be subject to frequent changes in formulation. Also, the sealants may be subject to reformulation, thus necessitating regular rechecks regarding continued paintability performance. Generic claims regarding paintability are unlikely to be substantiated unless it can be guaranteed that no formulation changes have occurred since the initial evaluation.

The performance is usually evaluated as a broad assessment of overpaintability, focusing on certain aspects; see Figure 1.

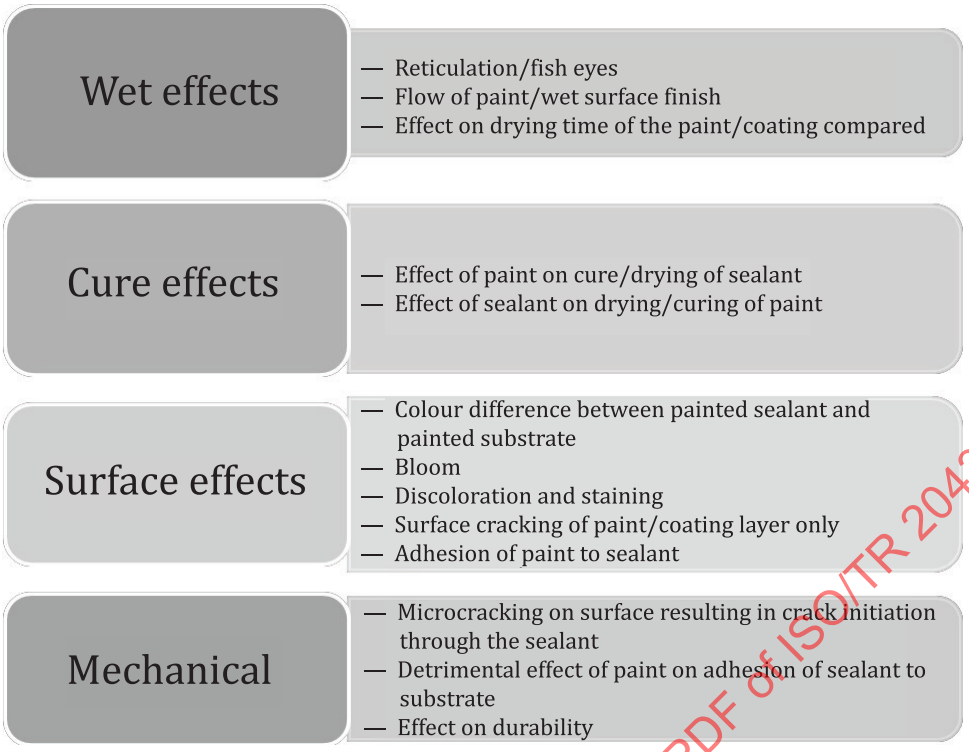



**Figure 1 — Characteristics of overpaintability**

These characteristics are evaluated and the overall results are used to make an assessment of paintability. Not all characteristics are used by all sealant manufacturers, but to standardize any claims, it would be important to establish a suitable overall assessment schedule that could be used if sealants carry claims that they can be overpainted/coated. It is unlikely that this will be a blanket claim for all paints, and would need to be specific to a paint or coating and sealant combination, so it is important to consider this aspect when deciding the test protocol to avoid excessive testing.

It would be desirable to combine the characteristics so that they can be evaluated on a reduced number of test pieces if possible.

There are no comprehensive specifications available that define paintability of sealants; however, there are a variety of standards available internationally that cover various aspects of paintability and compatibility.

There are also manufacturers' test methods that have been developed to allow them to substantiate their own claims and to verify any recommendations they make to their customers.

In terms of reporting results, the following should be included in any test report in addition to any specific requirements listed in each individual test:

a) specific sealant details including manufacturer, type of product, product name, batch number or date of manufacturing;

b) specific coating or paint: manufacturer, type of product, colour of product system/specification of product, name of product, batch number or date of manufacturing;

c) barrier primer (if applied): manufacturer, type of product, system/specification of product, name of product, batch number or date of manufacturing;

d) length of time between application of wet/uncured sealant and any paint or coating;

e) details of substrate that sealant is applied onto including specific details of the test pieces used;

f) information regarding how paint or coating was applied including coat weight or thickness applied;

g) time after coating before test evaluation is carried out.

# 5 Methods for assessment of initial coating application

## 5.1 General

Assessment of the actual application of the paint/coating to the sealant is unlikely to be made when the sealant will be fully dry or cured and therefore the application time before overcoating is recommended and will be specified by the manufacturer. Typical claims are "overpaintable 1 h after sealant application" and so the first aspect that needs to be specified in any testing is how long after sealant application the coating is applied.

On application of the coating, initially, an assessment of the visual appearance of the freshly applied coating is made in terms of the quality of the applied coating and the appearance of the sealant surface relative to the surrounding substrate.

## 5.2 Reticulation/fish eyes

### 5.2.1 Principle

"Fish eyes" are round spots, resembling fish eyes, in a newly applied coating that appear to be pulling away from the sealant surface. Reticulation is a similar effect and is a surface defect that creates a net-like appearance in the coating surface.

### 5.2.2 Evaluation

This is assessed via a visual inspection after the paint is applied to the sealant at the time claimed by the sealant manufacturer that his sealant will be overpaintable. It might involve brush application of the paint/coating to the sealant at a specified time point after sealant application or it might be a more controlled application method. It is possible that the sealant could be applied to a flat substrate and then after a specified time, the paint/coating is applied over this, overlapping at the sides so that the coating is only applied to the substrate in some areas. An assessment of the appearance of the coated and uncoated sealant areas is then made subjectively, perhaps with photographic record being taken.

### 5.2.3 Reporting

This is normally in the form of a comment and will either be that faults are observed (reticulation or pin holes or other incomplete coating surfaces observed) or that an even coating with no defects is observed.

## 5.3 Flow of paint/wet surface finish

### 5.3.1 Principle

There may be a difference in the coating of the sealant and surrounding substrate. It is possible to carry out a determination of recoatability at the time point claimed by the sealant manufacturer that the sealant is overpaintable.

### 5.3.2 Evaluation

This involves the application of the coating, by brush, to the newly through-dried film or bead of sealant.

The evaluation would involve applying either a defined layer of sealant or a bead of sealant onto a substrate allowing the sealant to dry or cure for the time recommended by the sealant manufacturer

regarding overpaintability and then applying the paint or coating under evaluation using a paint brush or roller.

#### 5.3.3 Reporting

Any drag on the brush experienced while applying the coating is noted.

### 5.4 Effect of sealant on curing/drying time of paint/coating

#### 5.4.1 Principle

Once an even coating is applied, the next stage is to examine the effect that the sealant may have on the drying/curing of the coating due to any chemical incompatibility or migration of substances that might interfere with the drying, film formation or curing of the coating. The coating itself may also retard any drying or curing of the sealant for the same reasons.

#### 5.4.2 Evaluation

The evaluation would involve applying either a defined layer of sealant or a bead of sealant onto a substrate allowing the sealant to dry or cure for the time recommended by the sealant manufacturer regarding overpaintability and then applying the paint or coating under evaluation using a paint brush or roller. The paint would be applied so that it overlapped the sealant, thus allowing both the coated substrate and coated sealant to be assessed at the same time.

Assessment of the overpainted sealant is made and compared with the painted substrate for properties like tack/drying time/cure time. There are defined methods for measuring surface tack; however, a subjective assessment is sufficient for evaluation purposes.

#### 5.4.3 Reporting

Any differences between the coating applied to the sealant and the coating applied only to the substrate are noted. The drying time of the coated neutral substrate and the coated sealant should be mentioned in the test report.

## 6 Test methods for assessment relating to cure effects

### 6.1 Principle

Once an even coating is applied, the next stage is to examine the effect that the coating may have on the drying/curing of the sealant due to any chemical incompatibility or migration of substances that might interfere with the drying or curing of the sealant. The application of the paint at an early stage in the drying/curing of the sealant can have a detrimental effect on the final performance of the sealant. This can result in adhesion failure or retarded cure, which could mean that the performance of the sealant does not meet any claims made.

### 6.2 Evaluation

Assessment of the effect of the paint on the curing of the sealant is more complex and is likely to involve a mechanical test of the painted sealant at time intervals to determine if any retarded cure behaviour is observed as a result of the overpainting.

As the surface of the sealant is no longer available because of the coating, the traditional hardness determination methods common when cure behaviour is investigated cannot be used. It may be necessary to measure the modulus of the sealant after overpainting.

The measurement of modulus is already assessed as part of the ISO 11600 classification system using ISO 8339. This method can therefore be used to measure the modulus at the standard time point, but



also at interim intervals, typically using Method A conditioning. For water-based sealants, interim measurements may not be appropriate, but curing sealants could be evaluated at 7 days, 14 days and 28 days conditioning.

### 6.3 Reporting

The modulus values should be reported for both the uncoated and coated tested sealants

## 7 Test methods to assess surface appearance of dried coating

### 7.1 General

Once the wet and cure aspects are considered, the next important criterion for a sealant to be overpaintable is the appearance of the dry/cured coating.

### 7.2 Colour difference between painted sealant and painted substrate

#### 7.2.1 Overview

This colour difference can be due to absorption differences or due to some form of chemical incompatibility. It can also be a result of migration of substances from the sealant into the paint and this migration can result in only a surface sheen or can be more substantial staining.

#### 7.2.2 Principle

There are test methods available for paints and varnishes. Visual assessment is possible using typical substrates and painting the sealant and substrate and making a subjective assessment.

#### 7.2.3 Evaluation

An existing paint assessment method is available (see ISO 3668). Alternatively, a simple subjective visual assessment can be made once the paint or coating is cured or dried and is normally sufficient. See Table 1.

**Table 1 — Colour between painted sealant and painted substrate**

| Surface change compared with surrounding painted substrate | Change description (painted sealant compared with painted substrate) |
|---|---|
| None | No change from surroundings |
| Very, very slight | Change so slight that it is barely perceptible |
| Very slight | Faint colour shade difference between painted sealant and surrounding painted substrate |
| Slight | Slight colour shade difference between painted sealant and surrounding painted substrate |
| Severe | Distinct colour shade difference between painted sealant and surrounding painted substrate |
| Very severe | Colour of painted sealant is completely different from the painted surrounding substrate |

#### 7.2.4 Reporting

Indicate in the report any ageing conditions used but care should be taken not to induce any effects using artificial ageing that would not be seen in normal use.

## 7.3 Surface wrinkling

### 7.3.1 Overview

Surface wrinkling is a defect in a gloss film of paint or varnish taking the appearance of wrinkles which appear during the drying period. This effect is also referred to as rivelling within paint terminology. This is often not immediately apparent and the assessment should be made once the paint or coating is dry.

### 7.3.2 Principle

This involves the application of the coating, by brush, to the newly through-dried film or bead of sealant and an assessment made of the appearance of the coated sealant with the coated substrate surface.

### 7.3.3 Evaluation

The evaluation would involve applying either a defined layer of sealant or a bead of sealant onto a substrate allowing the sealant to dry or cure for the time recommended by the sealant manufacturer before applying the paint or coating under evaluation using a paint brush or roller to both the sealant and to the area of the substrate surrounding the sealant bead or layer.

Assessment of the overpainted sealant is made and compared with the painted substrate area.

### 7.3.4 Reporting

Any wrinkling observed on the coating applied to the sealant is noted provided no wrinkling is observed on the coating applied only to the substrate.

## 7.4 Surface sheen or bloom

### 7.4.1 Overview

It is possible that substances in the sealant can migrate from the sealant into the paint and this can result in sheen or bloom being visible on the overcoated sealant that is not acceptable.

### 7.4.2 Principle

This involves the application of the coating, by brush, to the newly through-dried film or bead of sealant and an assessment made of the appearance of the coated sealant with the coated substrate surface.

### 7.4.3 Evaluation

The evaluation would involve applying either a defined layer of sealant or a bead of sealant onto a substrate allowing the sealant to dry or cure for the time recommended by the sealant manufacturer before applying the paint or coating under evaluation using a paint brush or roller to both the sealant and to the area of the substrate surrounding the sealant bead or layer.

Assessment of the overpainted sealant is made and compared with the painted substrate. See Table 2.



**Table 2 — Surface sheen or bloom between painted sealant and painted substrate**

| Surface change compared with surrounding painted substrate | Change description (painted sealant compared with painted substrate) |
|---|---|
| None | No change from surroundings |
| Very, very slight | Change so slight that it is barely perceptible |
| Very slight | Faint sheen seen on surface of painted sealant, nothing seen on painted substrate |
| Slight | Slight sheen on surface of painted sealant, nothing seen on painted substrate |
| Severe | Distinct shiny surface of painted sealant, nothing seen on painted substrate |
| Very severe | Almost or actual wet appearance on surface of painted sealant, nothing seen on painted substrate |

#### 7.4.4 Reporting

This type of visual effect is not easy to classify and quantify and is usually a descriptive rating of the surface change observed.

### 7.5 Surface tack

#### 7.5.1 Overview

This may occur when chemicals leaching from the sealant effectively plasticize the coating producing a tacky surface. This may also cause bloom or shine on the surface, but the two effects do not always occur together.

#### 7.5.2 Principle

The test involves overpainting a sealant after the time prescribed as appropriate by the manufacturer and after a set time using a test to determine whether the surface is tacky enough to pick up dirt.

#### 7.5.3 Evaluation

Test specimens are prepared by applying the sealant to be tested in a suitable mould (an example would be a C-shaped channel). The specimens are conditioned in a laboratory-controlled climate before being coated or painted with the coating or paint under evaluation. The coated/painted specimens are conditioned in a laboratory-controlled climate. The coated/painted and conditioned specimens can then be placed in an oven for accelerated ageing/migration. Care should be taken that the temperature and time of this ageing process does not artificially induce effects that are not seen in use. Specimens are allowed to cool down before being sprinkled with volcanic ash or other suitable powder with contrast colour for assessing the migration of any plastic/softening additives. The rate of migration or softening is assessed by evaluating the differential dirt pick-up by eye, comparing the coated sealant area with the coated substrate areas of the test piece. A grey scale differential can be used if using volcanic ash. With other powders, a simple visual assessment is possible. See Table 3.

**Table 3 — Surface tack between painted sealant and painted substrate**

| Surface change compared with surrounding painted substrate | Change description (painted sealant compared with painted substrate) |
|---|---|
| None | No change from surroundings |
| Very, very slight | Difference in dirt pick-up between painted sealant and painted substrate so slight that it is barely perceptible |
| Very slight | Faintly more dirt pick-up on painted sealant compared with painted substrate |
| Slight | Slightly more dirt pick-up on surface of painted sealant seen compared with painted substrate |
| Severe | Distinct difference in dirt pick-up observed comparing the surface of the painted sealant and painted substrate |
| Very severe | Substantially more dirt pick-up observed on the surface of the painted sealant compared with the painted substrate |

### 7.5.4 Reporting

The test report should also include the following information:

a) testing condition: type of specimen;

b) results: assessment of dirt pick-up.

## 7.6 Staining

### 7.6.1 Overview

Due to migration, it is possible that rather than a simple bloom or shine on the surface, actually staining can occur. This effect is more pronounced than the blooming effect but again can be difficult to quantify.

### 7.6.2 Principle

This involves the application of the coating, by brush, to the newly through-dried film or bead of sealant and a visual assessment made by comparing the appearance of the coated sealant with the coated substrate surface.

### 7.6.3 Evaluation

The evaluation would involve applying either a defined layer of sealant or a bead of sealant onto a substrate allowing the sealant to dry or cure for the time recommended by the sealant manufacturer regarding overpaintability and then applying the paint or coating under evaluation using a paint brush or roller to both the sealant and to the area of the substrate surrounding the sealant bead or layer. Assessment of the overpainted sealant is made and compared with the painted substrate. See Table 4.

**Table 4 — Staining between painted sealant and painted substrate**

| Surface change compared with surrounding painted substrate | Change description (painted sealant compared with painted substrate) |
|---|---|
| None | No change from surroundings |
| Very, very slight | Change so slight that it is barely perceptible |
| Very slight | Faint discolouration on surface |
| Slight | Slight discolouration on surface |
| Severe | Distinct staining on surface |
| Very severe | Substantial staining seen on painted sealant surface and colour is very different from surrounding surface |

### 7.6.4 Reporting

The result of test.

## 7.7 Surface cracking of paint only

### 7.7.1 Overview

When sealants are overcoated, then any shrinkage likely to occur during the cure/drying of the sealant potentially has a negative effect on the adhesion of the coating to the sealant. Any differential shrinkage could result in minor or major cracking of the coating. In this subclause, we are dealing with the aesthetic effects which are the surface cracking and this subclause will look at the adhesion of the paint to the sealant. An evaluation of surface cracking involves a visual subjective assessment, perhaps with a photographic reference rather than simply a descriptive comment. The descriptive elements of ISO 11528 can be used to look at any observed surface cracking.

### 7.7.2 Principle

The visual appearance of the coated sealant is inspected and an assessment is made of any surface cracking.

### 7.7.3 Evaluation

The sealant under evaluation is applied and after the time for overpainting is reached (sealant manufacturer's recommendation), the sealant is overpainted with the recommended coating. After 28 days, a visual assessment is made of the appearance of the coated sealant and the cracking is noted. See Table 5.

**Table 5 — Surface cracking of paint**

| Surface cracking observed in paint only | Change description (painted sealant compared with painted substrate) |
|---|---|
| None | No change from surroundings |
| Very, very slight | Change so slight that it is barely perceptible |
| Very slight | Faint cracking on surface |
| Slight | Slight cracking on surface |
| Severe | Distinct cracking on surface |
| Very severe | Substantial cracking seen in the coating |

### 7.7.4 Reporting

The more detailed reporting in ISO 11528 can be used to report any observed surface cracking. Alternatively, a very simple change description can be reported.

## 7.8 Adhesion of coating to sealant

### 7.8.1 Principle

This can be assessed using common paint cross-cut or X-cut adhesion tests and assessment can be made using a table of classification defining different levels of failure.

There are two tests used for paints that can be adapted to assess an overcoated sealant:

— ISO 2409;

— ISO 16276-2.

Adhesion of the coating to the sealant can be evaluated using a simple cross-cut (lattice) or X-cut test. The cross-cut test is suitable for film thicknesses up to 250 µm. The X-cut test is not limited by thickness. Manufacturers will select the most appropriate test to use for the specific sealant/coating combination under evaluation.

The test methods assess the resistance of paint coatings to separation from substrates when an X-cut or cross-cut is made into the coating, penetrating through to the sealant. This allows a simple method to assess the adhesion of the coating to sealant

The method may be used either to simply report when adhesion is adequate or not or, where circumstances are appropriate, as a six-step classification test.

### 7.8.2 Evaluation

Initially, a suitable test panel should be prepared. This can be a single panel to evaluate only the interlayer adhesion or could form part of the larger evaluation described in Clause 5. It could even be made on a larger style channel test piece as described in Annex A.

For the single-panel test piece, an applicator is used to prepare a basic sealant test piece applying a sealant film of 1 mm wet coat thickness over a 5 cm × 10 cm area. The sealant is allowed to dry for a defined time (manufacturer's recommended overpainting time) before application of the recommended coating.

The test is carried out at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) % and the test panels are conditioned at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) % for a minimum of 16 h before the test.

For coatings up to 250 µm, six cuts of the lattice pattern are made in each direction at an equal spacing of 2 mm or 3 mm determined by the thickness of the paint or coating applied. For coating thicknesses up to 120 µm, 2 mm spacing is recommended; for coating thicknesses of 121 µm to 250 µm, 3 mm spacing is recommended. If the coating is to be applied at >250 µm then the cross-cut method is normally replaced by the X-cut method described in ISO 16276-2.

For these thicker coatings, an X-cut is made through the coating using a single-blade cutter. Each cut is 40 mm long and the angle between the cuts at the intersection is between 30° and 45°.

For cross-cut cut samples, the centre of the tape is placed over the lattice in a direction parallel to one set of cuts as shown and is smoothed into place over the area of the lattice. To ensure good contact with the coating, the tape is rubbed firmly with a fingertip or fingernail. Within 5 min after applying the tape, it is removed by grasping the free end and pulling it off steadily in 0,5 s to 1,0 s at an angle which is as close as possible to 60°.



For the X-cut, a 75 mm length of pressure-sensitive adhesive tape is applied with a firm force to the cut and pulled off within 5 min.

### 7.8.3 Reporting

The following references are applicable for the cross-cut (lattice) and X-cut test and should be stated in the report. See Figure 1 and Figure 2.

## 8 Test methods to assess effects of overcoating on sealant performance

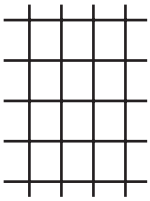
### 8.1 General

It is important to understand the effects when overpainting a sealant on the final performance of the cured/dry sealant. Aspects to be evaluated might be:

— crack propagation through the sealant resulting in cohesive failure;

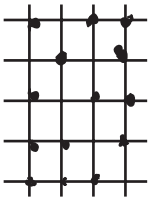
— reduction of adhesion of the sealant to the substrate due to retarded/accelerated cure or chemical incompatibility;

— reduction in movement capability due to mismatch in mechanical performance of the coating and sealant.



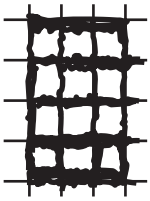
Level 0

The edges of the cuts are completely smooth; none of the squares of the lattice is detached.



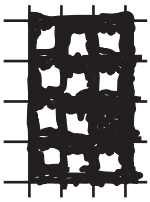
Level 1

Detachment of small flakes of the coating at the intersections of the cuts. A cross-cut area not greater than 5 % is affected.



Level 2

The coating has flaked along the edges and/or at the intersections of the cuts. A cross-cut area greater than 5 % but not greater than 15 % is affected.



Level 3

The coating has flaked along the edges of the cuts partly or wholly in large ribbons and/or it has flaked partly or wholly on different parts of the squares. A cross-cut area greater than 15 % but not greater than 35 % is affected.

Level 4

The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross-cut area greater than 35 % but not greater than 65 % is affected.

Level 5

Any degree of flaking that cannot even be classified by Level 4.

NOTE These figures are examples for a cross-cut within each step of the possible levels. The percentages are based on visual impression given by the pictures and the same percentages will not necessary be reproduced with digital imaging.

**Figure 2 — Rating for adhesion of paint to sealant using a cross-cut (lattice cut)**

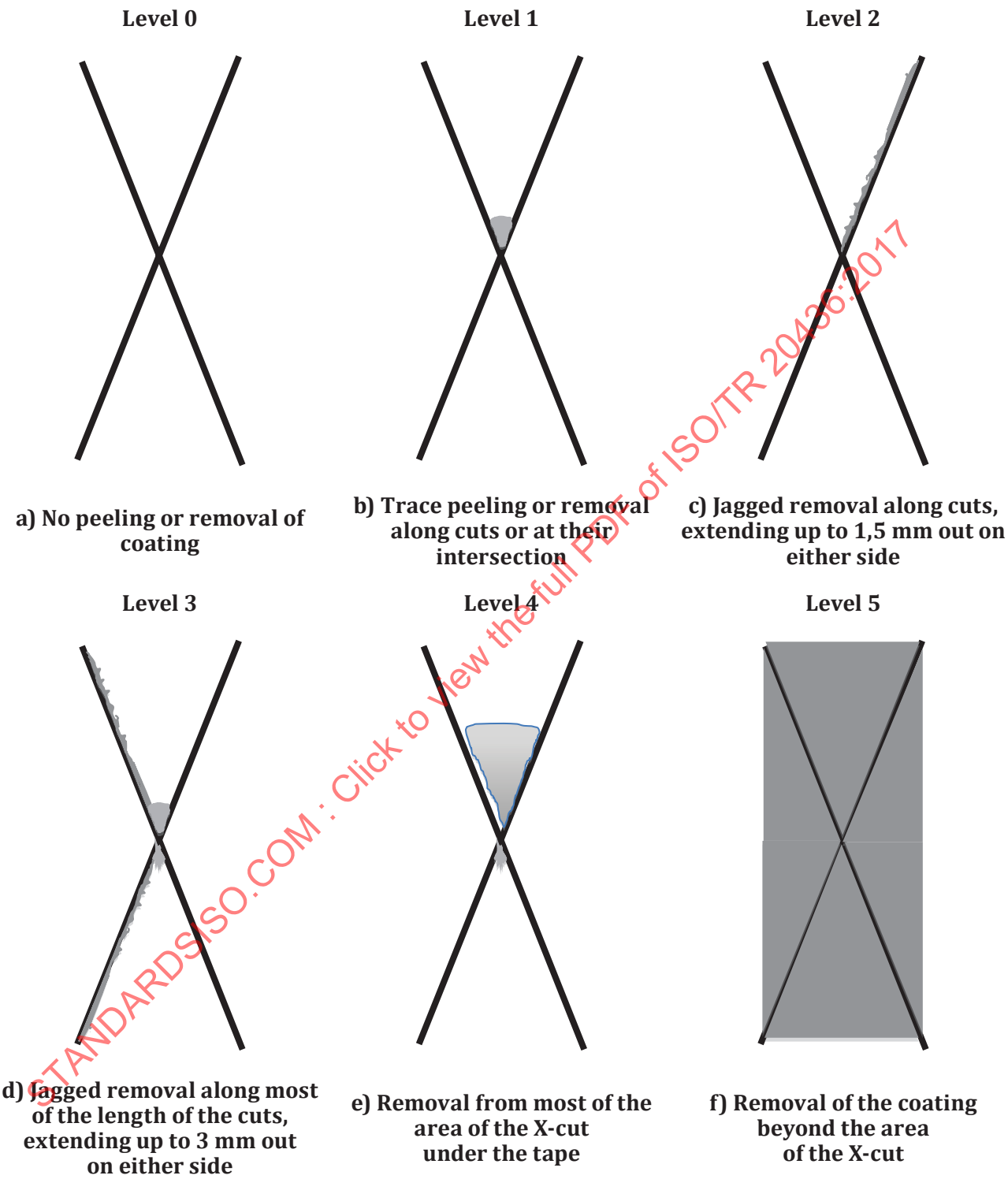



**Figure 3 — Rating for adhesion of paint to sealant using an X-cut**

## 8.2 Surface microcracking resulting in crack initiation in the sealant

### 8.2.1 Overview

When sealants are overcoated, then any restriction in shrinkage likely to occur during the cure/drying of the sealant due to the paint application potentially has a negative effect on the sealant itself. Any differential shrinkage could result in adhesion failure or could result in major cracking of the coating that propagates into the sealant itself. As the coating could also restrict the surface shrinkage of the sealant, it could also potentially negatively affect the performance of the sealant as it may induce unusual stresses.

### 8.2.2 Evaluation

If surface cracking has already been observed under 7.6, then a more detailed visual assessment, perhaps using a magnifying glass or microscope, is made of the overcoated sealant to assess whether any surface cracking penetrates into the actual body of the sealant. Once again, the descriptive elements in ISO 11528 can be used to look at any observed surface cracking.

### 8.2.3 Reporting

If a penetrating crack is observed, this should be mentioned in the test report, but generally if this type of effect were observed, it would indicate that the sealant and paint/coating were incompatible and no further testing would be necessary.

## 8.3 Effect of coating the sealant on final mechanical and adhesion characteristics

### 8.3.1 Overview

This characteristic can simply be evaluated by applying the coating under evaluation to ISO 11600 H-block test pieces and evaluating the appropriate adhesion/cohesion test.

### 8.3.2 Principle

The various applicable tests specified in ISO 11600 can be used to assess the combination of sealant and coating using a composite test piece (sealant test piece overpainted with paint/coating combination under evaluation).

### 8.3.3 Evaluation

The tests selected relate to the nature of the sealant (elastic or plastic) and typically the same procedure is followed as specified in the individual test methods; however, the test piece preparation is modified so that a layer of the coating or paint under evaluation is applied to the sealant at the recommended time after sealant application. Subsequent assessment would be made as specified in the ISO test methods and an observation is made as to the performance of the coating in respect to the sealant performance. In addition, the second aspect is whether the application of the coating (likely before the full dry/cure of the sealant) has impaired the sealant performance such that it no longer meets the requirement for the original classification. This would involve a large number of additional test pieces and it would need to be evaluated whether it is necessary to carry out such a full characterization of the coating performance in conjunction with the sealant:

— ISO 7389;

— ISO 8339;

— ISO 8340;

— ISO 9046;



— ISO 9047;

— ISO 10590;

— ISO 10591.

#### 8.3.4 Reporting

The values obtained with the standard and coated test pieces should be reported.

### 8.4 Elasticity

#### 8.4.1 Overview

The elasticity of the coating may not (indeed probably will not) match that of the sealant. This is the case also with plastic sealants, not just elastic.

#### 8.4.2 Principle

An evaluation of the extensibility difference between the sealant and the coating is made and an assessment of whether the differences are significant enough to mean that the paint is not compatible with the sealant in this respect.

#### 8.4.3 Evaluation

The following are the options for assessment of this property.

a) Carry out a simple elongation to failure test on a film of the coating. This can then be compared with the performance of the sealant similarly tested.

b) Fabricate a composite sample, with the coating applied over the sealant at a defined timepoint, and then after a further period of time, cut samples out from the composite-coated sealant film and test to failure.

c) Use a Mandrel test, which involves bending a composite sealant/coating test piece around a mandrel.

#### 8.4.4 Reporting

Report the any differences observed when testing the sealant in isolation and in combination with the paint/coating under evaluation.

## 9 Durability assessment

In exterior joints, it may be desirable to assess whether the sealant/coating combination affects any long-term performance. In some cases, overcoating a sealant can improve the durability, but it can also have a negative effect.

As durability of sealants is a complex matter, until an accepted test for this is validated then it may be hard to accurately assess. ISO 19862 specifies a method for the determination of classification of durability of sealants used in exterior joints in building construction and it is possible to produce composite test pieces (sealant and paint/coating) and evaluate any differences between painted and unpainted sealant samples.

In practice, any coating applied over the sealant is unlikely to negatively impact sealant durability without negatively affecting the cure properties or the mechanical properties, which will be apparent in the previous tests.

## 10 Methodology to reduce test pieces

Sealant manufacturers will already be using test pieces required for ISO 11600 classification purposes. These range from the H-block test pieces using aluminium, glass or concrete to aluminium channels for flow tests and rings for the shrinkage tests. It would make sense if additional standard test pieces, where appropriate, could be used to assess paintability but some tests like adhesion and movement accommodation may also be assessed using simpler methods. The aesthetic evaluation can be difficult if the smaller ISO 11600 test piece dimensions were to be used.

Aesthetic evaluation is commonly carried out using a special moulded channel of a substrate like wood, plaster or mortar so that both the sealant-coated area and the substrate-coated area can be evaluated at the same time. Examples of such channels are given in Annex A.

## 11 Overall assessment of compatibility of the coating with sealant

An absolute measure of compatibility is difficult and may also be unnecessary because of the varied aspects described previously. In some cases, it may be that colour differences are relatively unimportant for some intended applications. Aspects of adhesion and effects on cure rate and movement capability may be fundamental to the intended end application and therefore would be a priority.

It is therefore not useful to have a single "rating" for coating compatibility, but rather to summarize the results measured separately for only the relevant characteristics.