International Standard 4627

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Paints and varnishes — Evaluation of the compatibility of a product with a surface to be painted — Methods of test

Peintures et vernis — Évaluation de la compatibilité d'un produit avec la surface à peindre — Méthodes d'essai

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4627 was developed by Technical Committee ISO/TC 35, *Paints and varnishes*, and was circulated to the member bodies in November 1979.

It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Poland
Austria	India	Romania
Brazil	Ireland	South Africa, Rep. of
Canada	Italy	Sweden
Chile	Kenya	Switzerland
China	Korea, Rep. of	United Kingdom
Egypt, Arab Rep. of	Netherland	USSR
France	Norway	

No member body expressed disapproval of the document.

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Paints and varnishes — Evaluation of the compatibility of a product with a surface to be painted — Methods of test

0 Introduction

This International Standard is one of a series of standards dealing with the sampling and testing of paints, varnishes and related products.

This International Standard describes procedures for assessing the compatibility of a product with a surface to be coated.

The methods of test specified require to be completed, for any particular application, by the following supplementary information. This information shall be derived from the national standard or other documents for the product under test or, where appropriate, shall be the subject of agreement between the interested parties.

a) Whether the product or system under test shall be tested by laboratory or "on-site" procedures or both.

b) Whether the product or system under test is to be applied to unpainted, specially treated, painted (unaged) or painted (aged) substrates.

c) Material and surface preparation of the substrate to be painted (see 5.2 and 5.3).

d) Material and surface preparation of the reference substrate.

e) As appropriate, material and method for any special treatment of the substrate, including duration and conditions of drying (or stoving and ageing) (see 5.2.2).

f) Paint or paint system for the painting of the substrate, including method of application, spreading rate (or film thickness), and duration and conditions of drying (or stoving and ageing), if appropriate (see 5.2.3).

g) Method and duration of ageing of the painted substrate, if appropriate (see 5.2.4).

h) Method of application of the product or system under test, including spreading rates (or film thickness), and duration and conditions of drying (or stoving and ageing).

j) Method (or methods) of test for the determination of the degree of drying using the procedures specified in ISO 1517, ISO 3678 and/or ISO 4622, as appropriate.

k) Laboratory tests for the evaluation of the coated substrate (see 7.1), if appropriate.

m) Supplementary information necessary for conducting the test specified in ISO 3668, if appropriate.

n) Method of measurement of gloss in accordance with ISO 2813, if appropriate.

p) Supplementary information necessary for conducting the test specified in ISO 4624, if appropriate.

q) Methods of test, and supplementary information necessary, for assessing the environmental resistance of the coating system including the substrate (see 7.1.6), if appropriate.

r) Method of test for the "on-site" assessment of adhesion, if appropriate.

s) The period of exposure to "on-site" natural weathering and the criteria to be used (see ISO 4628) in assessing degradation of the coating, if appropriate.

1 Scope and field of application

This International Standard specifies procedures for the assessment of compatibility of a paint or paint system with a substrate. The substrate may be unpainted, or specially treated, or painted, or painted and aged, before application of the paint or paint system under test. The method defines procedures appropriate to either laboratory or "on-site" application and assessment.

2 References

ISO 1512, *Paints and varnishes — Sampling.*

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

ISO 1514, *Paints and varnishes — Standard panels for testing.*

ISO 1517, *Paints and varnishes — Surface-drying test — Ballotini method.*

ISO 2808, *Paints and varnishes — Determination of film thickness.*

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

ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints.*

ISO 3678, *Paints and varnishes — Print-free test.*

ISO 4622, *Paints and varnishes — Pressure test for stackability.*

ISO 4624, *Paints and varnishes — Pull-off test for adhesion.*

ISO 4628, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of common types of defect.*

ISO/TR 6272, *Paints and varnishes — Falling weight test.*

3 Definitions

3.1 compatibility (of a product with the substrate) : The ability of a product to be applied to a substrate without causing undesirable effects.

3.2 substrate : The surface on which the paint or varnish system is applied or is to be applied.

4 Sampling

Take a representative sample of the material to be tested (or of each material in the case of a multicoat system) as specified in ISO 1512. Examine and prepare the sample(s) for testing as specified in ISO 1513.

5 Substrates

The substrate(s) shall be representative of that (those) for which the product is intended to be used.

5.1 Reference substrate

In order that the compatibility of the paint or paint system under test with the specified substrate(s) may be evaluated, it is desirable that the paint or paint system be applied also to a specified reference substrate with which it is known to be compatible. Unless otherwise specified, the reference substrate shall be steel prepared as described in ISO 1514.

5.2 Preparation of substrates in the laboratory

5.2.1 Unpainted substrate

Prepare the substrate(s) as specified, using the appropriate section of ISO 1514 where applicable. After preparation, the substrate(s) shall be sound, dry, free from oil and dust.

5.2.2 Specially treated substrate

Treat the substrate (5.2.1) with the specified material(s) by the specified method and allow to dry (or stove and age) for the specified time under the specified conditions.

NOTE — The treatment may be, for example, phosphating (metal), impregnation (wood), fungicidal wash (concrete or wood) or stoppers and knotting (wood).

5.2.3 Painted substrate (unaged coating)

Coat the substrate (5.2.1) by the specified method with the specified paint or paint system and dry (or stove and age) for the specified time under the specified conditions.

5.2.4 Painted substrate (aged coating)

Age the painted substrate (5.2.3) by the specified method for the specified period.

NOTE — Heating in an oven or the use of natural or artificial weathering are methods which may be specified.

5.3 Preparation of substrates on-site

The substrate shall consist of an area of the structure representative of the whole. For large structures or those with a complex configuration or aspect, it may be necessary to select more than one area to be tested. The choice of the test area(s) should be by agreement of the interested parties, if appropriate.

Unless otherwise specified, the selected test area(s) shall be cleaned by swabbing with a lint-free cloth, moistened with a specified solvent. The test area(s) shall then be lightly abraded with silicon carbide paper (grade 220), wetted with water, washed with clean water and allowed to dry.

NOTE — The standard of preparation of the substrate will markedly affect the performance of subsequently applied coatings. It is necessary, therefore, that the preparative procedures specified be representative of those to be used for the structure as a whole. Consideration should be given particularly to the degree of preparation which will be achieved in areas such as joints, seams, welds, bolts or edges.

6 Application of test product

6.1 In the laboratory

6.1.1 Application and drying

Coat the reference panels (5.1) and the specified substrate(s) (5.2) with the product or system under test by the specified method at the specified spreading rate (or film thickness). Compare and report any difference in behaviour during application (for example excessive drag, cissing or lifting).

Then dry (or stove and age) the coated substrates for the specified period and under the specified conditions.

Determine the degree of drying of the coated substrates by one or more of the following methods and report the results :

- ISO 1517 (surface dry test);
- ISO 3678 (print-free test);
- ISO 4622 (pressure test).

Carry out the appropriate evaluation as soon as possible.

6.1.2 Thickness of coating(s) (if appropriate)

Determine the film thickness of the dry coating, in micrometres, by one of the procedures specified in ISO 2808.

NOTE — With previously painted or treated surfaces and with certain methods of determination, it may be necessary first to determine the thickness of the original prepared and painted substrate and then to calculate the thickness of the freshly applied coating by difference.

6.2 On-site

6.2.1 Application and drying

Coat the reference panel (5.1) and the selected area(s) with the product or system under test by the specified method at the specified spreading rate (or film thickness). Compare and report any difference in behaviour during application (for example excessive drag, cissing or lifting).

If practicable, record the ambient temperature and relative humidity and other relevant data throughout the drying period (see the note).

Determine the degree of drying of the coated reference and test area(s) by the specified method and report the results.

Carry out the appropriate evaluation as soon as possible.

NOTE — Adverse ambient conditions during application and drying may invalidate the assessment of compatibility.

6.2.2 Thickness of coating(s)

Determine the film thickness of the dry coating, in micrometres, by one of the procedures specified in ISO 2808.

See the note to 6.1.2 for measurement of coatings applied to previously painted surfaces.

7 Evaluation of the coated substrate

7.1 Laboratory tests

Carry out a laboratory evaluation by an appropriate selection of the tests described in 7.1.1 to 7.1.6.

7.1.1 Appearance

Compare the film with that of the coated reference panel for any non-uniformity of appearance, for example bleeding, or other surface imperfection such as crazing, wrinkling or pinholing.

7.1.2 Colour comparison

Compare the colour with that of the coated reference panel in accordance with the requirements of ISO 3668.

7.1.3 Gloss

Determine the gloss of the coated substrate and that of the coated reference panel by the specified method, using one of the procedures described in ISO 2813.

7.1.4 Rapid film deformation (metal substrates only)

Determine the resistance to rapid film deformation of the coated substrate and that of the coated reference panel using the method specified in the annex to ISO/TR 6272.

NOTE — Resistance to rapid film deformation may be repeated after a specified period of exposure to artificial weathering or other accelerated test (see 7.1.6).

7.1.5 Adhesion

Assess the adhesion of the coated substrate and that of the coated reference panel by the specified method, using one of the procedures described in ISO 4624.

NOTE — Assessment may be repeated after a specified period of exposure to artificial weathering or other accelerated test (see 7.1.6).

7.1.6 Other tests (environmental)

Assess the environmental resistance of the coating system, including the substrate, by comparing it with that of the coated or other reference panel when tested in accordance with the specified methods. Evaluate the degradation of the paint films using the methods described in ISO 4628.

NOTE — Examples of methods of test which may be appropriate are resistance to humidity, resistance to salt spray, resistance to thermal cycling, artificial weathering, resistance of thermoplastic substrates to stress cracking etc.

7.2 Site tests

7.2.1 Appearance

Compare the film with that of the coated reference panel for any non-uniformity of appearance, for example bleeding, or other surface imperfection such as crazing, wrinkling or pinholing.

7.2.2 Colour

Compare the colour with that of the coated reference panel.

7.2.3 Gloss

Compare the gloss with that of the coated reference panel.

7.2.4 Adhesion

Assess the adhesion of the coating and that of the coated reference panel by the specified method.

NOTE — Assessment may be repeated after a specified period of exposure to natural weathering (see 7.2.5).

7.2.5 Natural weathering

Visually examine the coating after a specified period of natural weathering and evaluate any degradation in the coating as specified, using the methods described in ISO 4628.

8 Test report

The test report shall contain at least the following information :

a) the type and identification of the product(s) tested;

b) a reference to this International Standard;

c) the items of supplementary information referred to in the introduction to this International Standard;

d) the results of the tests in terms of the stated requirements;

e) any deviation, by agreement or otherwise, from the procedure specified;

f) the prevailing conditions for site applications and evaluations (5.3, 6.2 and 7.2), if appropriate;

g) the date(s) of the test(s).

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