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Paints and varnishes — Standard panels for testing

Peintures et vernis — Panneaux normalisés pour essai

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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 document 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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This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This sixth edition cancels and replaces the fifth edition (ISO 1514:2016), which has been technically revised.

The main changes are as follows:

- [Clause 3](#) (terms and definitions) has been added;
- the preparation of plastics substrate including glass-fibre reinforced plastic composite panels (GRP) and carbon-fibre reinforced plastic composite panels (CFRP) has been updated;
- concrete test panels have been added;
- the normative references have been updated.

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

For many of the most widely used test methods for paints and varnishes, the type of panel used and the particular way in which it is prepared for use can affect the test results to a significant degree. Consequently, it is important to standardize as carefully as possible both the panels and the procedures used to prepare the panels prior to painting.

It is not possible to include in this document all the types of panels and preparation needed for paint testing. Thus, this document describes preparation procedures that are known to be reproducible and gives additional guidance and requirements in instances where there can still be doubt, due to lack of international uniformity of the procedure.

Common substrate panels and the documents which specify their technical delivery conditions are listed in [Table B.1](#).

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Paints and varnishes — Standard panels for testing

1 Scope

This document specifies several types of standard panels and provides guidance and requirements on the procedures for their preparation prior to painting. The standard panels described in this document are intended for use in general methods of test for paints, varnishes and related products.

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 1268-1, *Fibre-reinforced plastics — Methods of producing test plates — Part 1: General conditions*

ISO 1268-2, *Fibre-reinforced plastics — Methods of producing test plates — Part 2: Contact and spray-up moulding*

ISO 1268-3, *Fibre-reinforced plastics — Methods of producing test plates — Part 3: Wet compression moulding*

ISO 1268-4, *Fibre-reinforced plastics — Methods of producing test plates — Part 4: Moulding of prepregs*

ISO 1268-5, *Fibre-reinforced plastics — Methods of producing test plates — Part 5: Filament winding*

ISO 1268-6, *Fibre-reinforced plastics — Methods of producing test plates — Part 6: Pultrusion moulding*

ISO 1268-7, *Fibre-reinforced plastics — Methods of producing test plates — Part 7: Resin transfer moulding*

ISO 1268-8, *Fibre-reinforced plastics — Methods of producing test plates — Part 8: Compression moulding of SMC and BMC*

ISO 1268-9, *Fibre-reinforced plastics — Methods of producing test plates — Part 9: Moulding of GMT/STC*

ISO 1268-10, *Fibre-reinforced plastics — Methods of producing test plates — Part 10: Injection moulding of BMC and other long-fibre moulding compounds — General principles and moulding of multipurpose test specimens*

ISO 1268-11, *Fibre-reinforced plastics — Methods of producing test plates — Part 11: Injection moulding of BMC and other long-fibre moulding compounds — Small plates*

ISO 2409, *Paints and varnishes — Cross-cut test*

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

ISO 4618, *Paints and varnishes — Vocabulary*

ISO 8336, *Fibre-cement flat sheets — Product specification and test methods*

ISO 11949, *Cold-reduced tinmill products — Electrolytic tinplate*

ISO 21920-2, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 2: Terms, definitions and surface texture parameters*

EN 520, *Gypsum plasterboards — Definitions, requirements and test methods*

EN 622-1, *Fibreboards — Specifications — Part 1: General requirements*

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EN 622-2, *Fibreboards — Specifications — Part 2: Requirements for hardboards*

EN 622-3, *Fibreboards — Specifications — Part 3: Requirements for medium boards*

EN 622-4, *Fibreboards — Specifications — Part 4: Requirements for softboards*

EN 622-5, *Fibreboards — Specifications — Part 5: Requirements for dry process boards (MDF)*

EN 1396, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

EN 1766, *Products and systems for the protection and repair of concrete structures — Test methods — Reference concretes for testing*

EN 10205, *Cold reduced tinmill products — Blackplate*

EN 13523-1, *Coil coated metals — Test methods — Part 1: Film thickness*

EN 13523-22, *Coil coated metals — Test methods — Part 22: Colour difference — Visual comparison*

EN 15283-2, *Gypsum boards with fibrous reinforcement — Definitions, requirements and test methods — Part 2: Gypsum fibre boards*

EN 16245-1, *Fibre-reinforced plastic composites — Declaration of raw material characteristics — Part 1: General requirements*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Steel panels

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4.1 Properties

Steel panels intended for general testing (as opposed to panels intended for testing particular applications and uses) shall be free from rust, scratches, staining, discoloration and other surface defects. The physical dimensions of the panel shall be as specified in the description of the test method, or as otherwise agreed.

4.2 Storage prior to preparation

Prior to preparation, panels shall be stored in a manner that protects them from corrosion.

4.3 Preparation by solvent cleaning

Wipe the panel to remove any excess oil and then wash it thoroughly with a suitable solvent to remove all excess of oil.

Ensure that any small fibres deposited by cleaning cloths are removed in the cleaning process and that cloths are changed at predetermined intervals to avoid redistribution of oily residues. Do not contaminate the cleaned panels. Suitable methods of drying include allowing the solvent to evaporate, lightly wiping the panels with a clean linen cloth and subjecting the panels to a stream of warm dry air. If necessary, lightly warm the panels to remove any traces of condensed moisture.

If it is not feasible to apply the paint coating immediately after cleaning, the cleaned panels shall be stored in a dry and clean atmosphere, such as a desiccator containing an active desiccant, until required for use. It is also acceptable practice to wrap the panels in suitable paper.

Contaminated surfaces may be cleaned using a solvent which evaporates rapidly, is residue-free, and does not alter the material chemically.

4.4 Preparation by aqueous cleaning (spray or immersion process)

Clean the panels with a commercially available aqueous alkaline cleaner. A spray cleaning process is recommended, but an immersion cleaning process is also acceptable. Maintain the cleaner concentration and temperature in accordance with the recommendations of the cleaner manufacturer.

Cleaning by a spraying method is performed in four steps.

- a) Clean each side of the plates for at least 10 s. Set the temperature and the spray pressure as recommended by the manufacturer of the cleaning agent.
- b) Rinse each side of the plates with tap water. Ensure that the wash water is not significantly contaminated during the cleaning process. This can be achieved by flooding the reservoir for the wash water continuously or from time to time with fresh tap water.
- c) Rinse each side of the plates with deionized water, which has a conductivity of max. 20 $\mu\text{S}/\text{cm}$.
- d) Dry the plates immediately after rinsing in an oven or with a hot air stream.

Steps b) to d) shall also be applied after the cleaning in an immersion process.

If it is not feasible to apply the paint coating immediately after cleaning, the cleaned panels shall be stored in a dry and clean atmosphere, such as a desiccator containing an active desiccant, until required for use. It is also acceptable to wrap the panels in suitable paper.

Contaminated surfaces may be cleaned using a solvent which evaporates rapidly and is residue-free, which does not alter the material chemically.

4.5 Preparation by abrasion

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4.5.1 General

Some testing applications require a more uniform and reproducible surface than is available on steel, as rolled by the mill. In such cases, it is necessary to remove surface variability and contamination through mechanical abrasion. To ensure complete removal of contamination and variability, it is necessary to completely remove the original mill surface.

Prior to abrading, panels should be cleaned as described in 4.3 of 4.4. Unless otherwise agreed, the surface removal shall be accomplished as described in 4.5.2 and 4.5.3.

4.5.2 Hand abrasion

This involves abrading the panel by hand using preferably P220 silicon carbide paper. The following is a suitable sequence of operations for use in hand abrasion.

- a) Abrade the panel uniformly straight across its face in a direction parallel to any one side.
- b) Abrade the panel at a right angle to the initial direction until all signs of the original abrasion have been removed.
- c) Abrade the panel using a circular motion, until a pattern is produced consisting solely of circular abrasion marks, superimposed one upon another.

4.5.3 Circular mechanical abrasion

This involves burnishing the panel by mechanical means using preferably P220 silicon carbide paper. When this method is employed, the panel shall be burnished using a circular motion. The operation shall be considered complete when no sign of the original surface or any undulations are visible.

4.5.4 Linear grinding

This involves a conveyor system using an abrasive belt mounted on a vertical grinding head to remove the original mill surface and produce a linear scratch finish on the panel. Grinding the surface with abrasive belts removes contamination and provides a surface that is more uniform and reproducible than a typical mill finish. A P100 aluminium oxide abrasive belt is suitable for use in this operation.

4.6 Inspection and cleaning

Inspect the abraded panels to ensure that the original surface has been completely removed. Clean the panels thoroughly as described in [4.3](#) or [4.4](#) to remove any loose grit, steel particles or other contaminants.

If it is not feasible to apply the subsequent coating immediately, store the clean panels in a clean and dry atmosphere, such as a desiccator containing an active desiccant, or wrap the panels in suitable paper.

4.7 Preparation by phosphate treatment

4.7.1 General

Phosphate conversion coatings are available from a number of sources, as proprietary compounds or processes, for application by spray or immersion. Follow the manufacturer's directions as to the application of the conversion coating. Preparation of test panels may consist of one or more steps of cleaning, rinsing and conditioning prior to the application of the conversion coating. Additional rinsing will usually be required after the conversion coating has been applied. If phosphate-treated panels are required, use the method of preparation described in [4.7.2](#).

4.7.2 Amorphous iron phosphate treatment

This conversion coating method consists of reacting the steel surface in an acid phosphate solution containing oxidizing agents and accelerating salts. The steel surface is converted to an amorphous iron phosphate coating which improves the adhesion of subsequently applied coatings and inhibits corrosion to a lesser degree than the crystalline zinc phosphate coating. This treatment can be applied by spraying or immersion. Solution temperatures, concentrations and contact times will vary with the method of application and should be maintained according to the chemical manufacturer's recommendations. Iron phosphate coatings typically range in colour from yellow-blue to purple.

4.8 Preparation by blast-cleaning

Before blast-cleaning, clean the panels using the procedure described in [4.3](#) or [4.4](#).

General guidelines on the preparation of steel panels by blast-cleaning are given in [Annex A](#).

It is emphasized, however, that this preparation by blast-cleaning is not intended for cold-rolled steel panels that are specified in [4.1](#) for general testing purposes.

5 Tinplate panels

5.1 Properties

The panel shall be bright-finish standard grade tinplate conforming to the requirements of ISO 11949 for electrolytic tinplate or EN 10205 for blackplate. The panel shall be of nominal thickness between 0,2 mm and 0,3 mm. When the tinplate panels prepared in accordance with this document are subsequently used in