INTERNATIONAL STANDARD

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AMENDMENT 7
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High-pressure decorative laminates — Sheets made from thermosetting resins —

Part 2:
Determination of properties

AMENDMENT 7: Stain resistance and cleanability

Stratifiés décoratifs haute pression — Plaques à base de résines thermodurcissables —

Partie 2: Détermination des caractéristiques

AMENDEMENT 7: Résistance aux taches et aptitude au nettoyage

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Foreword

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Amendment 7 to ISO 4586-2:1997 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

High-pressure decorative laminates — Sheets made from thermosetting resins —

Part 2: Determination of properties

AMENDMENT 7: Stain resistance and cleanability

Page 1

Update the normative references clause (Clause 2) as follows:

Replace ISO 4586-1:1995 by ISO 4586-1:1997 (same title).

Replace ISO 6506:1981 by ISO 6506-1:1999, *Metallic materials — Brinell hardness test — Part 1: Test method*.

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Add the following test method:

27 Stain resistance and cleanability

27.1 Principle

Test specimens are left in contact with a serie of staining agents that are likely to be encountered in everyday household use. At the end of the prescribed contact period, the specimens are subjected to a specified cleaning programme and examined for any residual surface marks.

This test method may also be used with staining agents other than those specified, to cover specific requirements agreed between supplier and purchaser.

27.2 Materials

27.2.1 Commercially available non-abrasive cleaner, containing approximately 4 % of butyl cellosolve.

27.2.2 Commercially available bleach, containing (5 ± 0,5) % of sodium hypochlorite.

27.2.3 Baking soda.

27.2.4 Supply of clean, soft, white cloth.

27.2.5 Supply of cotton balls.

27.2.6 Acetone.

27.2.7 Distilled water.

27.2.8 Staining agents, as listed in Table 1.

Table 1 — Staining agents and their application

Agent number	Description	Preparation notes	Application
1	Distilled water	—	Apply 2 drops (an approximately 6-mm-diameter spot) and cover with a watch-glass
2	Ethyl alcohol	A mixture of 50 % ethyl alcohol and 50 % distilled water	
3	Acetone	—	
4	Household ammonia	Non-sudsing type	
5	10 % citric acid	A solution of 10 % citric acid in distilled water	
6	Vegetable oil	—	
7	Fresh coffee	One teaspoon instant coffee per 180 ml distilled water	
8	Fresh tea	Brew 1 tea bag per 120 ml boiling distilled water for two minutes	
9	Tomato ketchup	—	
10	Yellow mustard	—	
11	Iodine	—	
12	Black permanent marker	—	Apply a spot approximately 6 mm in diameter; do not cover
13	HB pencil	—	
14	Wax crayon	—	
15	Black paste shoe polish	—	
NOTE Staining agents shall be kept in closed containers to avoid any change in concentration. Perishable food items shall be kept refrigerated.			

27.3 Apparatus

27.3.1 Glass covers, approximately 25 mm in diameter (for example watch-glasses), one for each test requiring a cover.

27.3.2 Overhead white fluorescent lights, with bulb(s) positioned parallel to the line of sight and providing an intensity of 800 lux to 1 100 lux at the specimen surface.

27.3.3 Cellulose sponge, measuring approximately 75 mm × 100 mm × 50 mm.

27.3.4 Hard polyamide (nylon) bristle brush, for example a nail brush.

27.3.5 Weight, of one kilogram mass.

27.4 Test specimen

The test specimen shall have a surface area sufficient to permit all 15 test reagents to be placed on the surface in two lines with the individual stains about 50 mm apart. A 100 mm × 400 mm specimen is adequate.

27.5 Procedure

27.5.1 Staining procedure

Clean the surface of the test specimen using the cleaner (27.2.1) and water on a clean cloth (27.2.4). Rinse the specimen thoroughly and dry using another clean, soft cloth. Allow to dry completely at room temperature.

Position the test specimen on a flat, level, horizontal surface and fix it down (e.g. with tape or weights) to keep it in a horizontal plane.

Place a small quantity of each staining agent (to give a spot approximately 6 mm in diameter) on the surface of the test specimen. The staining agents shall be at room temperature.

Cover each staining agent with a glass cover (27.3.1), concave side down, and move the glass cover gently while in contact with the surface of the test specimen until the entire circular rim of the glass cover is wetted by the staining agent and the staining agent covers an area both under and outside the glass cover. Mark the test specimen suitably so that each staining agent is identified.

Leave the test specimen undisturbed for a period of 16 h to 24 h, then remove the glass covers and subject the test specimen to the cleaning procedures prescribed in 27.5.2.

27.5.2 Cleaning procedures and ratings

Stage 1: Flush the surface of the specimen with water and wipe gently with the sponge (27.3.3) moistened with water. Blot the specimen dry with a clean, soft cloth (27.2.4) and examine the surface in accordance with the inspection procedure described in 27.5.3. If a staining agent is completely removed by stage 1 cleaning (i.e. no visible marks remain), then give that agent a rating of 0. If any stains remain, proceed to stage 2.

Stage 2: Wet the surface of the specimen with the non-abrasive cleaner (27.2.1). Moisten the sponge (27.3.3) with water and place it on the surface, then place the 1 kg weight (27.3.5) centrally on top of the sponge. Push the weighted sponge back and forth (without any additional downward pressure) over the area to be cleaned, for 25 cycles (see NOTE). Rinse the specimen with water and wipe dry using a clean, soft cloth (27.2.4), then examine the surface in accordance with the inspection procedure (see 27.5.3). If a staining agent is completely removed by stage 2 cleaning (i.e. no visible marks remain), then give that agent a rating of 1. If any stains remain, proceed to stage 3.

NOTE In stages 2 and 3, one cycle is a movement forward across the area to be cleaned and back again to the starting position.

Stage 3: Wet the surface of the specimen with the non-abrasive cleaner (27.2.1) and add baking soda to achieve a pasty consistency. Using the stiff-bristle brush (27.3.4), scrub any areas where traces of the staining agents are still visible, for 25 cycles (see NOTE). Rinse the specimen with water and wipe dry using a clean, soft cloth (27.2.4), then examine the surface in accordance with the inspection procedure (see 27.5.3). If a staining agent is completely removed by stage 3 cleaning (i.e. no visible marks remain), then give that agent a rating of 2. If any stains remain, proceed to stage 4.

Stage 4: Using a cotton ball (27.2.5) saturated with acetone (27.2.6), rub the stain gently for two minutes. Rinse the specimen with water and wipe dry using a clean, soft cloth (27.2.4), then examine the surface in accordance with the inspection procedure (see 27.5.3). If a staining agent is completely removed by stage 4 cleaning (i.e. no visible marks remain), then that agent shall be given a rating of 3. If any stains remain, proceed to stage 5.

Stage 5: Place a cotton ball (27.2.5) saturated with hypochlorite bleach (27.2.2) on the stain, and allow it to remain in contact for a period of two minutes. Rinse the specimen with water and wipe dry using a clean, soft cloth (27.2.4), then examine the surface in accordance with the inspection procedure (see 27.5.3). If a staining agent is completely removed by stage 5 cleaning (i.e. no visible marks remain) then give that agent a rating of 4.

Give any staining agent that remains visible after stage 5 a rating of 5.

27.5.3 Inspection procedure

After each stage of cleaning, place the specimen on a horizontal surface under the inspection lights (27.3.2) and view it at an eye-to-specimen distance of 750 mm to 900 mm, and at an angle of 45° to 75° to the horizontal plane. Rotate the specimen on the horizontal surface and view it from all directions. Direct sunlight or other light sources which might accentuate or minimize the visual effect shall be avoided.

27.6 Expression of results

27.6.1 Cleanability

Add up the ratings given to the 15 staining agents, and report the cleanability of the test specimen as the sum of the ratings of the 15 agents.

A typical example, showing a specimen with a cleanability of 16, is shown in Table 2.

Table 2 — A typical example of cleanability

Agent number	Stain	Rating
1	Distilled water	0
2	Ethyl alcohol	0
3	Acetone	0
4	Household ammonia	0
5	10 % citric acid	0
6	Vegetable oil	0
7	Fresh coffee	0
8	Fresh tea	0
9	Tomato ketchup	1
10	Yellow mustard	2
11	Iodine	2
12	Black permanent marker	2
13	HB pencil	2
14	Wax crayon	3
15	Black paste shoe polish	4
		Total: 16