

1 - PURPOSE

1.1 - Field of application

This specification applies to the supply of layered panels with decorated surface, with a base of fibrous substances impregnated with heat-hardening resins, intended for the fitting or interior arrangement of passenger vehicles.

1.2 - List of reference documents

In the text of this specification, reference is made to the following documents :

- ISO 4586/I : Plastics - Decorative layered panels with a base of heat-hardening resins - Specifications.
- ISO 4586/II : Plastics - Decorative layered panels with a base of heat-hardening resins - Determination of properties
- ISO R 879 : Determination of resistance of plastics to colour change upon exposure to light of a xenon lamp
- UIC Leaflet 564-2 : Regulations relating to fire protection and fire fighting measures in passenger-carrying railway vehicles, or assimilated vehicles, used on international services.

1.3 - Classification

Layered panels with decorated surface are classified in two categories :

Category A - Layered panels made of impregnated sheets of Kraft paper. (A1 and A2)

These panels are intended either to be glued to a non-fragile base, in the case of currently-used preformed or post-forming qualities, or to be self-supporting, or kept in position by sections.

Post-forming panels in Category A must satisfy all the characteristics of this technical specification, except when it is clearly specified to the contrary.

Category B - Composite layered panels made of impregnated sheets of (B1 and B2) Kraft paper and of one or several fibrous sheets.

Panels in Categories A₁ and B₁ have a printed design, panels in Category A₂ and B₂ are plain.

2 - CHARACTERISTICS

2.1 - Characteristics required in all cases

2.1.1 - Physical characteristics

2.1.1.1 - Appearance and smell

The colour, design, surface finish and uniformity of the decorated surface of the panels must conform to the prototypes approved by the purchasing Railway.

According to the testing conditions specified in Paragraph 4.1.4.1.1, the upper face must be clean, free from creases, blisters, hair-line cracks and scratches, and must not vary in colour or design, from one panel to another, when such variations are likely to be detrimental to their use.

The edges shall be smooth, without splinters from the coating, likely to be detrimental to their use.

The panels must not give off any unpleasant smell.

2.1.1.2 - Dimensions

The panels shall be supplied dimensioned as stated on the order. The dimensional tolerances to be observed shall be those laid down in the standards or drawings ; failing any indication on the working documents, the following tolerances shall be applied :

- on the length and width $\left\{ \begin{array}{l} + 10 \text{ mm} \\ - 0 \text{ mm} \end{array} \right.$

- on the nominal thickness(e)

1.2 mm	<	e	∧	1.2 mm	.....	± 0.1	mm
1.5 mm	<	e	∧	1.5 mm	.....	± 0.12	mm
2.0 mm	<	e	∧	2 mm	.....	± 0.15	mm
3 mm	<	e	∧	3 mm	.....	± 0.2	mm
4 mm	<	e	∧	4 mm	.....	± 0.25	mm
6 mm	<	e	∧	6 mm	.....	± 0.3	mm
..... defined by agreement between the supplier and the purchasing Railway							

In addition, the variation in thickness of any one panel between two points less than 1 metre apart must not exceed 0.2 mm.

2.1.1.3 - Evenness

As regards panels in Categories A (preformed quality) and B, the deflection allowed must be less than or equal to the following values :

	Panel category	e < 0.9mm	0.9 mm ≤ e < 1.3 mm	1.3mm < e < 3 mm	3 mm ≤ e < 6 mm	6 mm ≤ e
When ready for submission - lengthwise - crosswise	A and B A and B	10 mm 15 mm	5 mm 8 mm	3 mm 6 mm	2 mm 3 mm	(1)
After baking at 70 °C - lengthwise - crosswise	A B A B	40 mm 60 mm	25 mm 45 mm	15 mm 12 mm 30 mm 24 mm	6 mm 5 mm 9 mm 7.5 mm	(1)

(1) Defined by agreement between the supplier and the purchasing Railway.

2.1.1.4 - Abrasion resistance

The abrasion resistance of the panels must be such that, under the experimental conditions described in Paragraph 4.1.4.1.5, the number of rotations of the test piece is above or equal to 400.

2.1.1.5 - Impact resistance

The impact resistance of the panels must be such that, under the experimental conditions described in Paragraph 4.1.4.1.6, the diameter of the ball imprint is less than 10 mm and that no flaking occurs in the case of the following drop heights :

Panel category	Nominal thickness e in mm	Drop height in m	Condition of the test piece
A postforming	any thickness	1.20	glued
A and B	$0.9 \leq e < 1.3$	0.80	glued
	$1.3 \leq e < 3$	1.00	glued
	$3 \leq e < 4$	1.75	glued
	$4 \leq e < 6$	0.70	not glued
	$4 \leq e \leq 6$	0.90	not glued
B	$6 < e \leq 10$	1.50	not glued
	$10 < e \leq 15$	2.00	not glued
	$e > 15$	2.50	not glued

2.1.1.6 - Resistance to cracking

The resistance to cracking of panels with a nominal thickness smaller than or equal to 2 mm must be such that, under the experimental conditions specified in Paragraph 4.1.4.1.7, the panel class is not above 1.

As regards panels with a thickness of more than 2mm, the verification of the resistance to cracking must be defined in an agreement between the supplier and the purchasing Railway.

2.1.1.7 - Resistance to scratching

Unless otherwise stipulated in the order or its appended documents, the resistance of the panels to scratching must be such that, under the conditions laid down in Paragraph 4.1.4.1.8, the first continuous scratch, visible to the naked eye and which cannot be removed with a dry cloth, only occurs under a load exceeding the following values :

- Glossy finish : category A, post-forming quality 2 N
- category A, fire-proof quality 2 N
- categories A and B, preformed quality 2 N

Medium-gloss and dull finish : the above-mentioned minimum values may be raised if so requested by the purchasing Railway.

2.1.1.8 - Suitability for shaping (post-forming panels in Category A)

The suitability for shaping of panels of the post-forming quality, with a thickness ≤ 1.5 mm, must be such that, under the experimental conditions described in Paragraph 4.1.4.1.9, the test piece can be formed up to an angle of 120° round a mandrel with a radius of 19 mm, without any crack, blister or peeling off occurring.

Furthermore, the maximum elastic covering of the test piece must not exceed 30°.

As regards post-forming panels with a thickness > 1.5 mm, the verification of the suitability for shaping must be defined in an agreement between the supplier and the purchasing Railway.

2.1.2 - Physico/chemical characteristics

2.1.2.1 - Dimensional stability

The overall dimensional variation of the test pieces taken from the layered panels, under the experimental conditions specified in Paragraph 4.1.4.1.10, must be less than or equal to the following values .

Nominal thickness <i>e</i> (mm)	Category A				Category B any thickness
	$0.5 \leq e < 0.7$	$0.7 \leq e < 0.9$	$0.9 \leq e < 1.2$	$e \geq 1.2$	
Preformed quality					
- lengthwise	0.70 %	0.55 %	0.50 %	0.45 %	0.60 %
- crosswise	1.20 %	1.00 %	0.95 %	0.90 %	0.80 %
Post-forming quality					
- lengthwise	0.70 %	0.70 %	0.70 %	0.70 %	—
- crosswise	1.20 %	1.20 %	1.20 %	1.20 %	—

2.1.2.2 - Behaviour in boiling water (panels in Category A)

The behaviour of Category A panels in boiling water must be such that, under the experimental conditions set out in Paragraph 4.1.4.1.11, the weight increase and the thickness increase at the edges are smaller than or equal to the following values :

Nominal thickness <i>e</i> (mm)	$0.5 \leq e < 0.7$	$0.7 \leq e < 1.5$	$1.5 \leq e < 3$	$3 \leq e < 5$	$e \geq 5$
Non-fireproof preformed quality	15 %	10 %	6 %	3 %	2 %
Fire-proof preformed quality	17 %	12 %	8 %	5 %	4 %
Post-forming quality	22 %	17 %	12 %	8 %	7 %

2.1.2.3 - Water absorption (panels in Category B)

The water absorbed by panels in Category B must be such that, under the experimental conditions described in Paragraph 4.1.4.1.12, the weight increase is smaller than or equal to 10 % of the initial weight, without any significant loss of cohesion, irrespective of the structural composition (wood-fibre, cardboard...).

2.1.2.4 - Resistance to water vapour

The resistance of the panels to water vapour must be such that, under the experimental conditions set out in Paragraph 4.1.4.1.13, the test piece does not reveal any permanent deformation. A slight decrease of gloss may, however, be allowed.

2.1.2.5 - Resistance to light

The index of resistance to light for the panels must be equal to 6 or above, under the experimental conditions described in Paragraph 4.1.4.1.14.

2.1.2.6 - Resistance to cleaning and household products

The resistance of the panels to ethanol, acetone, trichlorethane 111, 10 % acetic acid solution, 10 % carbonate of soda solution, must be such that, under the experimental conditions laid down in Paragraph 4.1.4.1.15, no change in colour or surface appearance are detected, after contact with the liquid.

2.1.2.7 - Resistance to cigarette burns

If the verification of this characteristic is prescribed in the order, the resistance of the panels to cigarette burns must be such that, under the experimental conditions described in Paragraph 4.1.4.1.16, no deterioration, apart from a slight decrease of gloss or small brown spots, is visible to the naked eye.

2.2 - Characteristics required by special stipulation in the order

2.2.1 - Resistance to fire

The resistance to fire characteristics of panels A and B must conform to the stipulations of the national standards of the purchasing Railway or failing these, to those stated in the order or its appended documents (see UIC Leaflet 564-2).

2.2.2 - Gloss

The gloss of the upper face of the panels in Categories A and B must conform to the requirements stipulated by the purchasing Railway.

2.3 - Marking

The following marks shall be applied directly or on a label, in indelible characters, on the non-decorated surface of each panel with one decorated surface only, or on one of the two surfaces of other panels :

- the supplier's mark ;
- the date of manufacture (last figures of the year and month),
- a symbol denoting the colour and design of the decoration,
- finally, if specified in the order, an operative serial number.

In addition, panels of the resistant-to-fire quality must bear a mark certifying this quality on their non-decorated surface. It must be possible to detect this mark on any sample taken from the panel.

3 - MANUFACTURE

3.1 - Manufacture of the material

No conditions are laid down concerning the nature and proportions of the heat-hardening resins, pigments and colouring matter used, subject to the fact that the characteristics stipulated in Paragraph 2 are complied with.

The sheets making up the structure of the panels in categories A and B shall be exclusively of Kraft paper.

The centre part of the structure of the panels in Category B shall be made of fibrous materials glued together with resins.

3.2 - Manufacture of layered panels with decorated surfaces

The panels shall be mainly composed of a combination of «decorated» paper and a base consisting of :

- sheets of Kraft paper in the case of Category A ;
- one or more centre sheets of fibrous material and sheets of Kraft paper in the case of Category B,

impregnated with heat-hardening resins ; they shall be stacked and then hot-compressed until complete polymerisation of the resin has taken place.

Panels in Categories A₁ and B₁ with a printed paper decoration must have a melamine overlay.

Failing instructions to the contrary on the order, panels intended for gluing shall be delivered with one surface prepared for gluing.

3.3 - Removal of surface defects, if any

Any retouching intended to conceal a defect shall constitute a reason for rejection.

The representative of the purchasing Railway may authorise the repair of small superficial defects which he considers unlikely to interfere with the satisfactory use of the panels.

4 - INSPECTION

4.1 - Inspection of panels

4.1.1 - Submission

4.1.1.1 - Condition of panels when they are submitted

Panels with decorated surface shall be submitted as ready for delivery.

4.1.1.2 - Grouping into batches

Panels of the same category, colour and dimensions shall constitute a batch.

4.1.1.3 - Notification of readiness for submission

The date of submission shall be brought to the knowledge of the representative of the purchasing Railway by a written notification signed by the Director of the factory or his authorised representative. This notification must state :

- the date of submission,
- the references of the order,
- the content of the batches submitted, specifying for each of them :
 - the quantity,
 - the nature,
 - the category of the panels submitted,

the results from the checks and tests which the supplier must have carried out beforehand on the products submitted in accordance with this specification.

4.1.2 - Nature and extent of the checks and tests

The panels shall be subjected to the checks and tests listed in Table 1 hereinafter

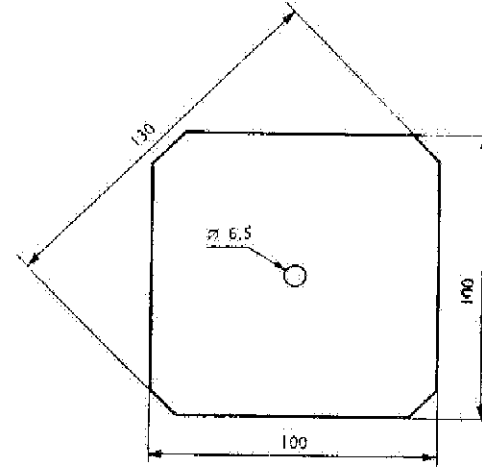
(see page 16)

Table 1

Nature of the tests	Number of test pieces	Categories	Dimensions of test pieces	Relevant paragraph in the leaflet
Appearance and dimensions	left to the choice of the representative of the purchasing Railway way	A and B	The panel itself	4.1.4.1.1 4.1.4.1.3
Gloss	See column 4 opposite	A and B	In accordance with the instructions of the purchasing Railway in the order or its appended documents	
Evenness	2	A and B	250 x 10 x e* cut along the panel	4.1.4.1.4
	2	A and B	250 x 10 x e*, cut transversally	
Abrasion resistance	3	A and B	Disc, 130 mm in diameter x e ₁ or measuring 120 x 120 x e*	4.1.4.1.5
Impact resistance	3	A and B	230 x 230 x e*	4.1.4.1.6
Resistance to cracking	2	A and B	120 x 50 x e*	4.1.4.1.7
Resistance to scratching	4	A and B	Test piece as shown in Figure 1 hereinafter	4.1.4.1.8
Suitability for shaping	4	A	200 x 50 x e* cut along the panel	4.1.4.1.9
	4		200 x 50 x e* cut transversally	

Dimensional stability	6	A and B	140 x 12.7 x e* cut along the panel 140 x 12.7 x e* cut transversally	4.1.4.1.10
Behaviour in boiling water	3	A	50 x 50 x e*	4.1.4.1.11
Water absorption	2	B	100 x 100 x e*	4.1.4.1.12
Resistance to water vapour	1	A and B	100 x 100 x e*	4.1.4.1.13
Resistance to light	3	A and B	in accordance with ISO R/879	4.1.4.1.14
Resistance to cleaning products	2	A and B	100 x 100 x e*	4.1.4.1.15
Resistance to cigarette burns	3	A and B	100 x 100 x e*	4.1.4.1.16
Resistance to fire	See Column 4 opposite	A	In accordance with the instructions of the purchasing Railway or, failing these, with those in the order or its appended documents	
Note : e* = panel thickness				

Figure 1 - Test for resistance to scratching



(dimensions in millimetres)

The number of series of tests to be carried out, in accordance with the size of batches, is given in Table 2 below :

Table 2

<i>Size of batches (1) (in m²)</i>	<i>Number of series of tests (1)</i>
up to 100	1
from 101 to 300	2
from 301 to 1000	3
above 1000	4

(1) The extent of tests for resistance to fire is that laid down in the national standards of the purchasing Railway or, failing these, in the order or its appended documents.

The verification of the dimensions and appearance may, however, be carried out on a larger number of panels, depending on the wishes of the representative of the purchasing Railway.

4.1.3 - Removal and preparation of samples and test pieces

4.1.3.1 - Removal of samples

The checks and tests mentioned in this specification shall be performed on each batch submitted.

The panels intended for checking and testing purposes shall be selected at random from each batch submitted and marked indelibly.

The samples to be taken for a series of tests shall consist of 4 panels measuring 500 x 500 x e (e being the panel thickness).

The number and dimensions of the test pieces to be used per series of tests are given in Table 1.

The test pieces for the test of resistance to fire and the checking of gloss shall, besides, be prepared in accordance with the instructions of the national standards of the purchasing Railway or, failing these, those in the order or its appended documents.

4.1.3.2 - Preparation of the samples and test pieces

The test pieces intended for the tests shall be obtained by cutting up the samples, taking sufficient care that their edges are even, not sharp and free from splintering.

The test pieces intended for the evenness test and the water absorption test shall be treated until the difference in weight recorded before and after a period of one hour is less than 2 %, for a minimum period of 24 hours in a room with a temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$, in which the atmosphere is regulated to $50\% \pm 5\%$ relative humidity.

The test pieces intended for the impact test shall be left, for at least 72 hours, in a room with a temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and a relative humidity of $50\% \pm 5\%$.

4.1.4 - Performance of the checks and tests

4.1.4.1 - Verification of the physical characteristics

4.1.4.1.1 - Verification of appearance

The layered panels with decorated surface must be checked under the conditions described in ISO Standard 4586/II, Chapter 5.

They must comply with the stipulations in Paragraph 2.1.1.1.

4.1.4.1.2 - Verification of gloss

The test must be carried out in accordance with the instructions of the national standards of the purchasing Railway or, failing these, with those in the order or its appended documents.

4.1.4.1.3 - Verification of dimensions

The dimensions shall be checked in accordance with the provisions of ISO Standard 4586/II, chapter 4.

The result must conform to the stipulations in Paragraph 2.1.1.2.

4.1.4.1.4 - Verification of evenness

The test piece shall be placed on a perfectly even horizontal surface (e.g. glass) on which it shall rest freely, with its concave surface pointing downwards.

The deflection shall be measured at the centre of the test piece by means of a precision rule or a carefully tensioned silk thread.

The panel deflection must comply with the stipulations in Paragraph 2.1.1.3.

4.1.4.1.5 - Verification of abrasion resistance

The test must be performed in accordance with the provisions of ISO Standard 4586/II, chapter 6.

The result must comply with the stipulations in Paragraph 2.1.1.4.

4.1.4.1.6 - Verification of impact resistance

The test shall be carried out by means of an apparatus including :

- a perfectly spherical steel ball, 42.8 mm in diameter ± 0.2 mm and weighing 324 g ± 5 g,
- a metal frame complying with Figure 2 below,
- an electro-magnet for retaining the ball in the raised position and allowing it to be released and to fall freely without initial speed. This device may move freely in front of a scale graduated in centimetres,
- a chipboard panel measuring 230 mm ± 5 mm on each side, 19 mm ± 0.3 mm in thickness, with a specific gravity of 650 ± 30 kg/m³
- vinyl glue with the following characteristics :
 - 50 % dry matter
 - Brookfield viscosity (8 ± 1) Pa . s
 - Load percentage : between 15 and 20 %
- used in the proportion of (180 ± 10) g/m²
- a sheet of carbon paper,
- if required, a magnifying glass with a magnification power of 6.

As regards panels of 3 mm or more in thickness, the test piece shall be tested as it stands.

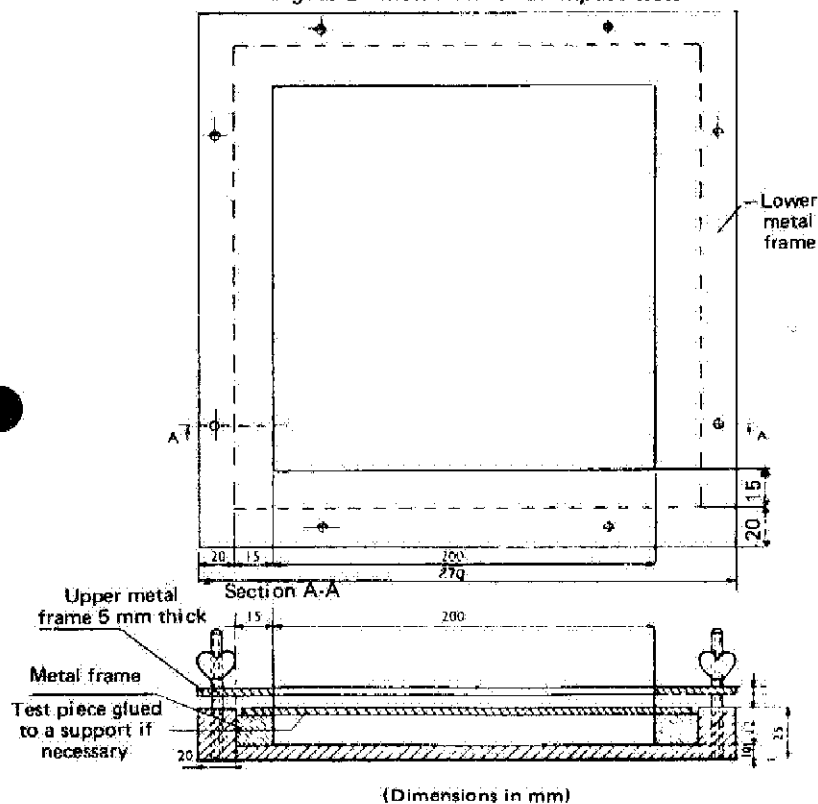
As regards panels less than 3 mm in thickness, the test pieces shall be glued, when cold, on the chipboard panel with the vinyl glue, using the weight of glue per square metre laid down above. The whole shall be left to dry for at least 7 days, free from any stresses, before starting the test.

Each test piece shall be fixed in the metal frame, with the decorated surface facing upwards. The upper frame shall be fitted into position and the whole shall be firmly tightened with wing nuts (the nuts situated on the same diagonal line shall be tightened simultaneously).

The frame, fitted with the test piece, shall be placed on an absolutely flat horizontal floor of a very rigid nature (e.g. cement surface, steel plate).

The centre of the frame shall be carefully arranged vertically in relation to the ball. The test piece shall then be covered with a sheet of carbon paper, with the carboned surface in contact with the decorated surface of the test piece.

Figure 2 - Metal frame for impact tests



The electro-magnet shall be positioned so that the distance from the centre of the steel ball to the upper surface of the test piece is equal to the minimum height laid down in Paragraph 2.1.1.5, in relation to the panel thickness.

The ball shall then be allowed to fall on to the test piece; the ball shall be caught on the rebound to prevent it from falling on to the test piece a second time.

The carbon paper shall be removed and the diameter of the imprint obtained shall be measured.

The mark left by the carbon paper shall be erased and the magnifying glass shall be used to examine the test piece for cracking or flaking.

The result must be in keeping with the stipulations in Paragraph 2.1.1.5.

4.1.4.1.7 - Verification of the resistance to cracking

The test must be carried out in accordance with the provisions of ISO Standard 4586/II, chapter 13.

The result must conform to the stipulations in Paragraph 2.1.1.6.

4.1.4.1.8 - Verification of the resistance to scratching

The test shall be performed by means of the following apparatus, which includes (see Figure 3) :

- a stand,
- a test-piece holder (A), which is able to turn, without play, round a vertical axis and which is either hand-driven or, preferably, motor-driven,

- a lever (B), driving the holder of the scratching point and ball-bearing mounted on an horizontal axis. This arrangement allows it to be adjustable in height, so that the lever is absolutely horizontal when the scratching point is in contact with the test piece.
- a device enabling a load, known to the nearest 0.01 N, to be applied to the scratching point, by means of the weights (C + D).
- a scratching point (E), comprising a diamond mounted on the tip of a cylindrical pin, which is fixed to the lever (B) through a holder (the weight of the pin must be less than 1 g).

The diamond point must be hemispherical, with a radius of $0.09 \text{ mm} \pm 0.003 \text{ mm}$ and an apex angle of $90^\circ \pm 1^\circ$. Its regularity must be checked by measuring its profile on a full rotation of 360° . Any curvature irregularity exceeding the tolerance of ± 0.003 must entail rejection of the point (all the points used must be checked again after 1000 tests). This specification must be strictly observed.

- A testing device including :
 - a light source comprising a 100 W -bulb, placed in a white reflector with an opening of about 140 mm in diameter and providing a light intensity of from 800 to 1000 lux at the test-piece surface.
 - a testing box with dull black faces, at the top of which the light source is placed. Its dimensions must be such that the test piece positioned vertically in relation to the light source is at a distance of 600 mm from it. An aperture must make it possible to examine the test piece, under a variable angle, from a distance of $250 \text{ mm} \pm 10 \text{ mm}$. The sketch of a suitable box is given, as an example, in Figure 4.
- it shall be checked that the stand of the apparatus is perfectly horizontal.

- the height of the lever (B) shall be adjusted to ensure that it is perfectly horizontal when the scratching point is in contact with the test piece.
- the lever (B) shall be placed in the vertical position,
- the test piece shall be placed with the securing disc (F) and shall be kept tight by means of a nut to prevent it from sliding.
- the lever (B) shall be lowered and the scratching point shall be placed gently in contact with the test piece.
- the test-piece holder-plate shall be rotated in an anti-clockwise direction, at a speed slower than one rotation per 10 seconds.
- the resistance of the test piece to scratching shall be assessed by applying a light load on the scratching point. If no scratch is visible, the load shall progressively be increased and the minimum load required to produce a continuous scratch shall be recorded.
- the test shall be repeated 3 times, using the same test piece and acting as follows :
 - the test piece shall be rubbed with a piece of very dry soft material (e.g. cotton).
 - the test piece shall be placed in the testing box at a distance of 600 mm from the light source and shall be examined from a distance of $250 \text{ mm} \pm 10 \text{ mm}$ under a variable angle, by turning the test piece by $\pm 40^\circ$ in relation to the horizontal.
- this check shall be made as soon as the test is finished and 24 h after storage in a normal laboratory atmosphere.

In the case of textured products, the examination must be carried out in the circle sectors of 90° , with the bisectrix parallel to the direction of the ribs.

The 3 test results obtained must be such that the extreme values be $\pm 20\%$ from the medial value. If this is not the case, the test should be carried out again until 3 values complying with this condition are obtained. The medial value rounded to the nearest 0.05 N should be taken as the value of the resistance to scratching for the layered panel concerned.

The value obtained must comply with the stipulations in Paragraph 2.1.1.7.

Figure 3 - Type of apparatus used to measure the resistance to scratching

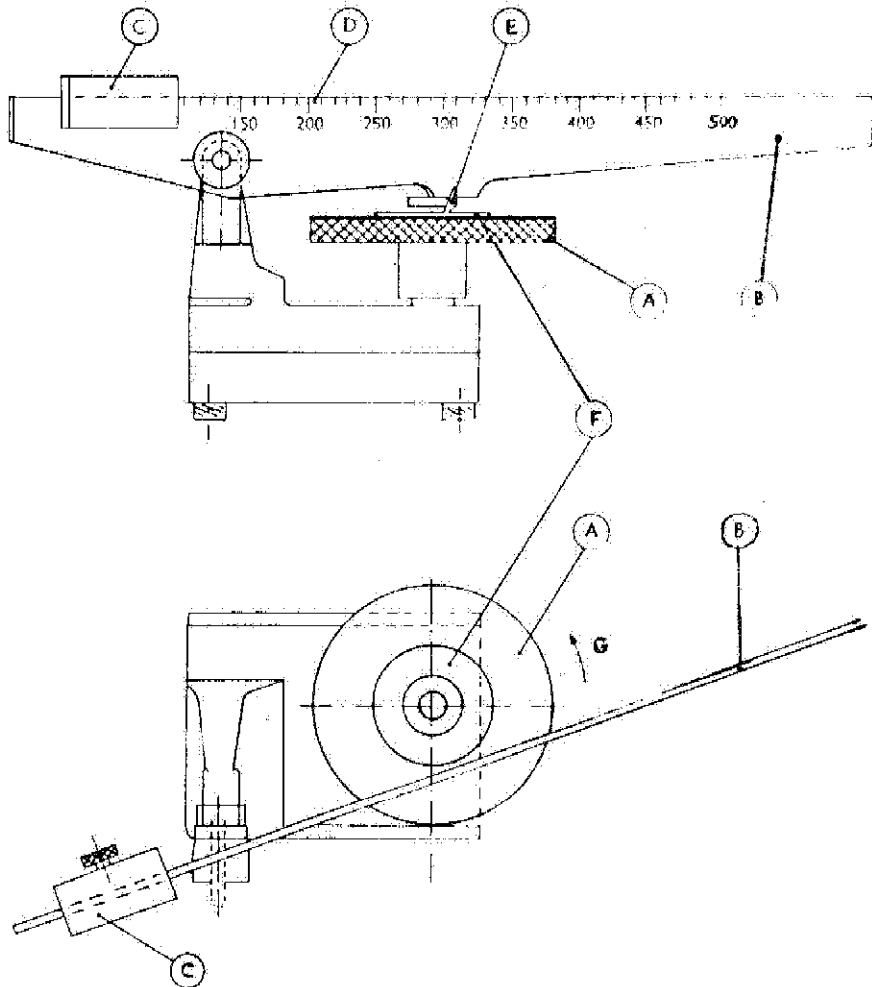
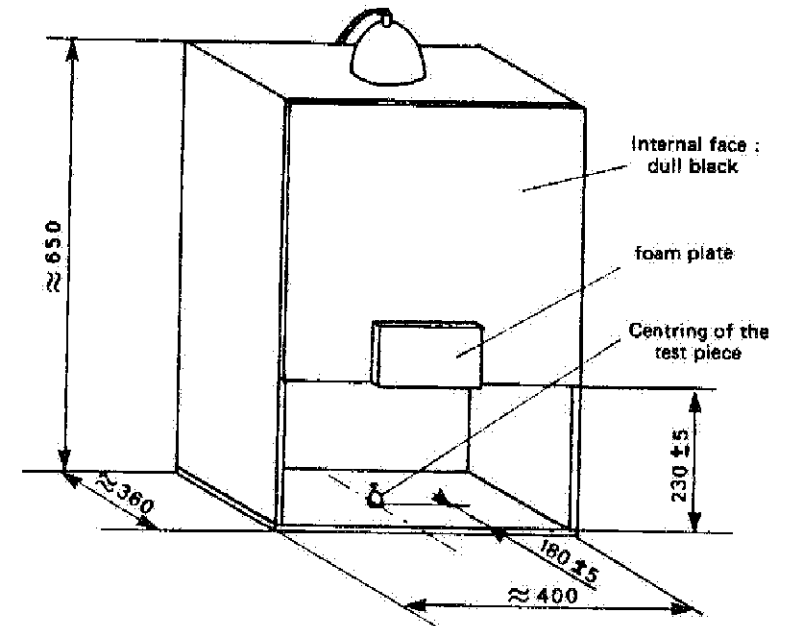


Figure 4 - Example of a suitable test box



Dimensions in millimetres

4.1.4.1.9 - Verification of the suitability for shaping as regards post-forming panels.

The verification must be conducted in accordance with the provisions of ISO Standard 4586/II, Chapter 21.

The result must conform to the stipulations in Paragraph 2.1.1.8.

4.1.4.1.10 - Verification of dimensional stability

The test must be performed in accordance with the provisions of ISO draft Standard DIS 4586/II, Chapter 9.

The entire dimensional variation must comply with the requirements in Paragraph 2.1.2.1.

4.1.4.1.11 - Test for resistance to boiling water

The test must be carried out in accordance with ISO Standard 4586/II, Chapter 7.

The weight and thickness increases must conform to the requirements in Paragraph 2.1.2.2.

4.1.4.1.12 - Water absorption test for panels in Category B

The test must be performed as follows :

After preparation, the test pieces shall be weighed (weight m1) and immersed vertically in distilled water at a temperature of 20° ± 2°C, in such a way that the upper edge of the test piece is 2 cm below the surface of the water.

The test pieces shall be withdrawn from the water after a period of 2 hours and placed to drip in a vertical position for approximately 2 minutes, before being dabbed with a dry cloth to remove all superficial traces of water and weighed separately immediately (weight m2).

The weight increase percentage is then calculated separately for each test piece :

$$\frac{m2 - m1}{m1} \times 100$$

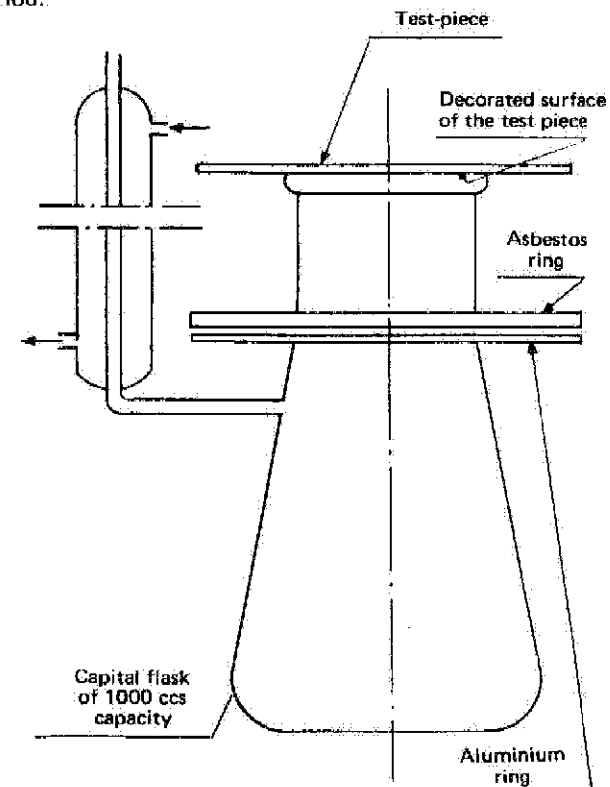
The weight increase must conform to the stipulations in Paragraph 2.1.2.3.

4.1.4.1.13 - Test for resistance to water vapour

The test piece shall be placed upon a conical flask with a large opening, filled with approximately 200 ml of distilled water. The test piece must be positioned centrally above the opening of the flask, so that its decorated surface is in contact with the flask and its edges are protected against the effect of heat or flame by means of a device as shown in the diagram below.

The water shall be brought to boiling point.

The test piece shall be withdrawn after one hour and wiped with non-fluffy filter paper and, then, examined through a magnifying glass, once immediately after wiping and again after a 24-hour period.



The appearance of test pieces after the test must comply with the requirements in Paragraph 2.1.2.4.

4.1.4.1.14 - Checking the resistance to light

The test must be carried out in accordance with the provisions of ISO Standard 4586/II, Chapter 16.

The result must comply with the requirements in Paragraph 2.1.2.5.

4.1.4.1.15 - Verification of the resistance to cleaning and household products

The test must be performed as follows :

A few drops of the following products shall be spilled in two different points of the decorated surface of the test piece :

- ethanol,
- acetone,
- trichlorethane 111,
- a 10 % acetic acid solution,
- a 10 % carbonate of soda solution,

and the surface shall be covered with a watch glass.

The whole shall be left at ambient temperature for a period of 16 hours.

The test piece shall then be washed first with water, and then with ethyl alcohol, and examined.

The surface appearance, after the test, must be in compliance with the requirements in Paragraph 2.1.2.6.

4.1.4.1.16 - Test for resistance to cigarette burns

The test must be performed in accordance with ISO Standard 4586/II, Chapter 18, using cigarettes of golden and brown tobacco.

The result must comply with the requirements set out in Paragraph 2.1.2.7.

4.1.4.1.17 - Test for reaction to fire

The test must be carried out in accordance with the instructions of the national standards of the purchasing Railway or, failing these, those in the order or its appended documents.

4.2 - Conclusions of the checks and tests

Any characteristic not in accordance with the required conditions detected during a series of tests, may incur rejection of the corresponding batch.

In cases where the purchasing Railway is able to agree to check-tests, the nature and number of the latter shall be defined by special agreement between the supplier and the Railway.

5 - DELIVERY

5.1 - Packing

The packing of layered panels with decorated surface must ensure their protection against any damage during conveyance.

5.2 - Labelling

Each package shall be fitted with a securely-fixed label bearing the following particulars :

- the supplier's full name or trade name,
- the consignee,
- the order number,
- the quantity of articles included in the package,
- the designation of the article,
- the symbol.

5.3 - Guarantee

The layered panels with decorated surface shall be guaranteed by the supplier, for one year, against any defect imputable to manufacture and not detected during acceptance at the factory.

In cases where panels for equipping new stock are involved, the delivery date of the vehicles to which they are fitted shall be considered as the delivery date of the panels.

Panels which are found to be defective during the guarantee period, thus rendering them unsuitable for use or likely to reduce their service life, shall be rejected.

Rejected panels shall be placed at the disposal of the supplier for replacement or reimbursement.

APPLICATION

All Railways in the Union.

RECORD REFERENCES

Headings under which the question has been dealt with :

- Preparation of a specification for layered panels used for the interior lining of the walls of coaches.
(5th Committee -J.C.- : Berne, May 1964).
- Specification for layered panels used for the interior lining of the walls of coaches - Possibility of its revision.
(5th Committee -J.C.- : Leipzig, May, 1965).
- Finalisation of technical specifications relating to pallets, plywood or layered panels, brake hoses, springs, coupling screws and running gear.
(Sub-Committee for Specifications : Paris, January 1973).
- Finalisation of existing Specifications.
- a)
- b) Harmonisation of guarantee clauses.
(Sub-Committee for Specifications : Paris, January 1975).
- *Question 5/SA/FIC* : Finalisation of UIC Leaflet 844-4.
(Sub-Committee for Specifications : Paris, January 1982).