TECHNICAL REPORT

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Our Ref: MA-109403-S4
Your Ref:
Date: 19th December 2025
Delivery Date: 11th December 2025
Pre-condition Date: 11th– 17th December 2025
Test Date: 17th– 19th December 2025

For the attention of Mr Trevor Spinks

SAMPLE FOR TEST

Panel supplied as: HDB 5434X PIGMENTED TWO COMPONENT WATER BASED COLOURED LACQUER
Construction: MDF panel, painted with HDB 5434x pigmented two component water-based coloured lacquer finish
Nominal size: 500mm x 500mm x 9mm
Finish system and supplier: Hesse GmbH & Co. KG

TEST REQUIREMENTS

BS 6222 - 3:2017 Domestic Kitchen Equipment - Part 3: Performance requirements for durability of surface and adhesion of surfacing and edging materials - Specification

Table 1(B) Requirements for 'Other Surfaces. Clause 6.2: Surface Finish performance

FIRA Standard 6250 2018 Specification: Furniture Materials (Interior):
Finish Performance - Horizontal Surfaces: Domestic use
Finish Performance - Horizontal Surfaces: Contract use

PERFORMANCE SUMMARY

BS 6222-3: 2017 Finish Performance – Other Surfaces	PASS
FS 6250: 2018 Finish Performance - Horizontal Surfaces: Domestic	PASS
FS 6250: 2018 Finish Performance - Horizontal Surfaces: Contract	PASS

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FINISH PERFORMANCE TESTS

Standard: BS 6222 – 3: 2017 Domestic Kitchen Equipment – Part 3 Performance requirements for durability of surface finish and adhesion of surfacing and edging materials-Specification'.

The standard specifies performance requirements for durability of surface finishes of worktops, facias and panel materials used in domestic kitchen units. In the case of worktops the standard states it is specifically applicable to plastics laminate surfaced worktop types. The tests could, as agreed, be used as a basis for an informative assessment of other worktop surfacing materials.

Types of Surface
Worktops – decorative plastics laminate top surfaces:
(a) Separate laminate edging e.g. square edged worktops. (b) One or more contoured edges covered by single laminate sheet e.g. post formed worktop. (c) Solid wood lipping or other material.
Other surfaces – surfaces of doors, drawer fronts carcase materials and interior and exterior shelving (e.g. paper foil, melamine impregnated paper (MFC), wrapped and formable plastic foils (PVC, ABS) bonded to wood based substrates) paint and lacquer applied to wood etc)

The surface finish is normally tested on the substrate on which it will be used, such that the durability of the finish/substrate combination is assessed rather than the finish in isolation.

Test procedures cited in BS 6222-3 2017 to assess the durability of furniture surface finishes are detailed in the following standards:

BS 3962-6: 1980 Methods of test for finishes for wooden furniture Part 6 Assessment of resistance to mechanical damage

Crosscut Test - A grid pattern of knife cuts, to a depth of 0.3mm, is made into the test surface and the test area then brushed and assessed and given a performance rating for chipping and delamination of the surface coating.

Impact Test - A 19.1mm diameter steel ball weighing 28g is dropped onto the test surface from a height of two metres and the test area assessed and given a performance rating for cracking.

Scrape Test - A radiused blade is traversed 200mm at a speed of 20 mm/sec over the test surface applying an increasing vertical force up to 26N. The scrape line is examined to determine (i) surface coating penetration and (ii) substrate penetration into substrate. The force is recorded in Newtons and converted into a performance rating.

BS 6222 – 3 2017 - Annex A (normative) Resistance to impact by large ball (kitchen worktops only).
Similar to the BS 3962 test above but with a ball diameter is 42.8 mm / weight 324g and the drop height 450mm.

BS EN 12721:2009 + A1:2013 Assessment of Surface Resistance to wet heat
A 100 mm diameter aluminium alloy block heated to the required test temperature is placed on a wetted polyamide cloth in contact with the test surface. The block is allowed to cool for 20 minutes and then removed. The tested area is wiped dry and left undisturbed for at least 16-24 hrs following which the tested area is assessed and given a performance rating.

BS EN 12722:2009 + A1:2013 Assessment of Surface Resistance to dry heat
The dry heat test is similar to the wet heat test except for the omission of the wetted cloth.

BS EN 12720:2009 + A1:2013 Furniture Assessment of surface resistance to cold liquids
An absorbent 25mm diameter paper disc is immersed in a test liquid and then placed in contact with the test surface and covered with a glass dish for a period of 1 hr. The excess liquid is then soaked, up without rubbing, with an absorbent material and left for a further 16 -24hrs after which the test area cleaned, assessed and given a performance rating.
In the case of cold oils and cold fats these are placed directly in contact with the test surface uncovered for a period of 24hrs then removed with an absorbent material and left for a further 16 -24hrs after which the test area is cleaned, assessed and given a performance rating.

Flexible rating allowance
BS 6222 - 3:2017 Table 1 note A - 'With the exception of the large ball impact a maximum of two results in any one column may fall below the ratings specified, provided that each is not more than 1 rating below the rating shown and that neither rating is less than a rating 2'.

Deviations and notes

BS 3962 – the viewing / illumination condition noted in BS 3962 using an adjustable desk lamp with a 60w frosted lamp is not used. The panel is generally examined at various angles from horizontal to vertical using the viewing light source noted in BS EN 12720/21/22.

Crosscut test- FIRA International uses 'Stanley 1991' brand knife blades directly from as supplied packs - this overrides any other specific requirements noted in the standard. The grid pattern of 2mm spacing with a particularly tight tolerance requirement of ± 0.01mm cannot be practically controlled with this type of equipment.

BS EN 12720 Cold Liquids – in the case of liquids such as tea, coffee, etc. specific consumer brands are used to make the liquids - details available on request.

BS EN 12720/1/2 states under: Assessment of results. *'Each test surface shall be rated by an experienced observer. In cases of doubt three observers shall be required.'* BS 3962 recommends 5 observers. FIRA international uses two experienced observers for assessment and any rating discrepancies are discussed and a consensus rating agreed.

FINISH PERFORMANCE TEST RATINGS

BS 3962 CROSSCUT - APPEARANCE OF TEST AREA	RATING
Cuts are smooth, no finish removed, except for small chips at the intersections of the cuts and an occasional small chip along the cut.	5
Finish removed at intersections and intermittently along the cuts.	4
Finish consistently removed along the cuts.	3
Finish removed along the cuts and completely from one or more of the squares, but from less than 50% of the squares.	2
Finish removed completely from more than 50% of the squares.	1

BS 3962 SCRAPE – FORCE AT SURFACE PENETRATION	RATING	BS 3962 SCRAPE – FORCE AT SUBSTRATE PENETRATION	RATING
Equal to or greater than 6N	5	Equal to or greater than 14N	5
Less than 6N but equal to or greater than 4.5N	4	Less than 14N but equal to or greater than 9N	4
Less than 4.5N but equal to or greater than 3N	3	Less than 9N but equal to or greater than 6N	3
Less than 3N but equal to or greater than 1.5N	2	Less than 6N but equal to or greater than 4N	2
Less than 1.5N	1	Less than 4N	1

BS 3962 IMPACT TEST - APPEARANCE OF TEST AREA	RATING
No surface cracking	5
Slight cracking e.g. one or two circular cracks around the edge of the indentation.	4
Moderate or severe cracking confined to the area of the indentation	3
Cracking extending outside the area of the indentation and/or slight flaking of the finish	2
More than 25% of finish removed from the area of indentation	1

BSEN 12720 COLD LIQUIDS - APPEARANCE OF TEST AREA / BSEN 12721&12722 WET AND DRY HEAT - APPEARANCE OF TEST AREA	RATING
No change - Test area indistinguishable from adjacent surrounding area	5
Minor change- Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discolouration, change in gloss and colour. No change in the surface structure, e.g. swelling, fibre raising, cracking, blistering	4
Moderate change - Test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discolouration, change in gloss and colour. No change in the surface structure, e.g. swelling, fibre raising, cracking, blistering	3
Significant change- Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions e.g. discolouration, change in gloss and colour. And /or structure of the surface slightly changed, e.g. swelling, fibre raising, cracking, blistering	2
Strong change - The structure of the surface being distinctly changed - and / or discolouration, change in gloss and colour, and / or the surface material being totally or partially removed, (Liquid attack test) and / or the filter paper adhering to the surface (Wet heat test) and/or the polyamide fibre cloth adhering to the surface	1

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RESULTS

FINISH PERFORMANCE BS 6222 - 3: 2017 OTHER SURFACES (B)			
SAMPLE: Panel supplied as: HDB 5434X PIGMENTED TWO COMPONENT WATER BASED COLOURED LACQUER			
TEST	**Minimum Performance Rating - Other Surfaces (B)**	**TEST RESULT (*rating fail)**	**COMMENTS**
Crosscut (paint & lacquer only)	3	5	
Impact	3	4	Partial crack
Scrape - surface penetration	2	3	3.6N
Scrape - substrate penetration	3	5	>25N
Wet heat 55°C	3	5	
Wet heat 70°C	2	5	
Ethanol (96%) (1hr)	2	3	Moderate gloss change
Ethanol (48%) (1hr)	3	4	Minor gloss change, borderline 3
Tea (1hr)	5	5	
Coffee (1hr)	5	5	
Disinfectant (Phenol) (1hr)	3	4	Minor change
Disinfectant (Chloro) (1hr)	3	5	
Paraffin Oil (1hr)	3	5	
Blackcurrant Juice (1hr)	3	5	
Ammonia Solution 10%) (1hr)	3	5	
Acetic Acid 4.4% (1hr)	3	5	
Olive Oil (1hr)	5	5	
Cold Oils (24hr)	4	5	
Cold Fats (24hr)	4	5	
STATUS: PASS			

FINISH PERFORMANCE TESTS FIRA STANDARD 6250 2018

Finish performance requirements for the assessment of furniture panels are specified in FIRA Standard 6250 2018.Specification: Furniture Materials (Interior).
The tests are generally applicable to all types of finishes including liquid based finishes, plastics laminate and surfacing foils such as paper, melamine and PVC bonded to wood based substrates. The finish is normally tested on the substrate on which it will be used, such that the durability of the finish/substrate combination is assessed rather than the finish in isolation.

Test procedures to assess the durability of furniture surface finishes are detailed in the following standards:

BS 3962-6: 1980 Methods of test for finishes for wooden furniture Part 6 Assessment of resistance to mechanical damage
Crosscut Test
A grid pattern of knife cuts, to a depth of 0.3mm, is made into the surface finish of the sample and the test area then brushed and examined for chipping and delamination of the surface coating.
Impact Test
A 19.1mm diameter steel ball weighing 28g is dropped on to the test panel from a height of two metres and the test area for cracking.

BS EN 12721:2009 + A1:2013 Assessment of Surface Resistance to wet heat
A 100 mm diameter aluminium alloy block is heated to the required test temperature and placed on a wetted nylon cloth in contact with the surface of the test panel. The block is allowed to cool for 20 minutes and then removed. The test area is wiped dry and left undisturbed for at least 16-24 hrs following which the test surface is assessed.

BS EN 12722:2009 + A1:2013 Assessment of Surface Resistance to dry heat
The dry heat test is similar to the wet heat test except for the omission of the wetted cloth.

BS EN 12720:2009 + A1:2013 Furniture Assessment of surface resistance to cold liquids
An absorbent 25mm diameter paper disc is immersed in a test liquid and placed in contact with the panel surface and covered with a glass dish for a period of 1 hr. The excess liquid is then soaked up by an absorbent material (but not rubbed clean) and left for further 16 -24hrs after which the test surface is cleaned and the area assessed. In the case of cold oil and cold fat these are placed on the panel uncovered for a period of 24hrs then removed with an absorbent material and left for a further 16 -24hrs after which the test area is cleaned, assessed and given a performance rating.

Flexible rating allowance
FIRA Standard 6250 contains the following flexible allowance "A maximum of two results in any column may fall below the ratings shown in the table, provided that each is not more than 1 rating below the rating shown and that neither rating is less than a rating 2".

Deviations
BS 3962 – the viewing / illumination condition noted in BS 3962 using an adjustable desk lamp with a 60w frosted lamp is not used. The panel is generally examined at various angles from horizontal to vertical using the viewing light source noted in BS EN 12720/21/22.
Crosscut test- FIRA uses ‘Stanley 1991’ brand knife blades directly from the pack and as currently supplied from time to time - this overrides any other specific requirements noted in the standard. The grid pattern of 2mm spacing with a particularly tight tolerance requirement of ± 0.01mm cannot reliably be controlled with this type of equipment.
BS EN 12720/1/2 states under: Assessment of results. *‘Each test surface shall be rated by an experienced observer. In cases of doubt three observers shall be required.’* BS 3962 recommends 5 observers. FIRA uses two experienced observers for assessment and any rating discrepancies are discussed and a consensus rating agreed.
BS 6222 references 1997 (withdrawn) versions of BS EN 12720/21/22. FIRA use the latest versions of the standards for carrying out test. Generally the tests have not changed in substance but procedures clarified and tightened to closely control test.

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FINISH PERFORMANCE TEST RATINGS

BS 3962 CROSSCUT - APPEARANCE OF TEST AREA	RATING
Cuts are smooth, no finish removed, except for small chips at the intersections of the cuts and an occasional small chip along the cut.	5
Finish removed at intersections and intermittently along the cuts.	4
Finish consistently removed along the cuts.	3
Finish removed along the cuts and completely from one or more of the squares, but from less than 50% of the squares.	2
Finish removed completely from more than 50% of the squares.	1

BS 3962 IMPACT TEST - APPEARANCE OF TEST AREA	RATING
No surface cracking	5
Slight cracking e.g. one or two circular cracks around the edge of the indentation.	4
Moderate or severe cracking confined to the area of the indentation	3
Cracking extending outside the area of the indentation and/or slight flaking of the finish	2
More than 25% of finish removed from the area of indentation	1

BSEN 12720 COLD LIQUIDS - APPEARANCE OF TEST AREA / BSEN 12721&12722 WET AND DRY HEAT - APPEARANCE OF TEST AREA	RATING
No change - Test area indistinguishable from adjacent surrounding area	5
Minor change- Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discolouration, change in gloss and colour. No change in the surface structure, e.g. swelling, fibre raising, cracking, blistering	4
Moderate change - Test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discolouration, change in gloss and colour. No change in the surface structure, e.g. swelling, fibre raising, cracking, blistering	3
Significant change- Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions e.g. discolouration, change in gloss and colour. And /or structure of the surface slightly changed, e.g. swelling, fibre raising, cracking, blistering	2
Strong change - The structure of the surface being distinctly changed - and / or discolouration, change in gloss and colour, and / or the surface material being totally or partially removed, (Liquid attack test) and / or the filter paper adhering to the surface (Wet heat test) and/or the polyamide fibre cloth adhering to the surface	1

RESULTS – FIRA STANDARD 6250 2018 FINISH PERFORMANCE – FOR DOMESTIC

SAMPLE: Panel supplied as: HDB 5434X PIGMENTED TWO COMPONENT WATER BASED COLOURED LACQUER

FIRA 6250 2018 TABLE 1 Finish performance - Horizontal Surfaces Domestic

TEST	FIRA 6250: 2018 Requirements - For domestic use	TEST RESULT	COMMENTS
Crosscut	3	5	Smooth cuts
Impact	3	4	Partial crack visible
Wet heat 55°C	3	5	
Wet Heat 70°C	2	5	
Dry Heat 85ºC	3	5	
Dry Heat 100ºC	2	5	
Ethanol 96% (1hr)	3	3	Moderate gloss change
Ethanol 48% (1hr)	4	4	Minor gloss change, borderline 3
Tea (1hr)	5	5	
Coffee (1hr)	5	5	
Cold Oils (24hr)	4	5	
Cold Fats (24hr)	4	5	

(* Indicates failed areas)

STATUS: PASS

Flexible rating allowance
FIRA Standard 6250: 2018 – contains the following flexible allowance – " A maximum of two results may fall by one rating below the ratings specified, provided the result is not less than a rating of 2".

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RESULTS – FIRA STANDARD 6250 2018 FINISH PERFORMANCE – FOR CONTRACT

SAMPLE: Panel supplied as: HDB 5434X PIGMENTED TWO COMPONENT WATER BASED COLOURED LACQUER

FIRA 6250 2018 TABLE 1 Finish performance - Horizontal Surfaces Contract

TEST	FIRA 6250: 2018 Requirements - For Contract use	TEST RESULT	COMMENTS
Crosscut	4	5	Smooth cuts
Impact	4(1)	4	Partial crack visible
Wet heat 55°C	4	5	
Wet Heat 70°C	3	5	
Wet Heat 85ºC	2	5	
Dry Heat 85ºC	4	5	
Dry Heat 100ºC	3	5	
Acetone (10mins)	3	4	Minor change, borderline 3
Ethanol 96% (1hr)	3	3	Moderate gloss change
Ethanol 48% (1hr)	4	4	Minor gloss change, borderline 3
Tea (1hr)	5	5	
Coffee (1hr)	5	5	
Cold Oils (24hr)	5	5	
Cold Fats (24hr)	5	5	

Note: (1) Rating 3 acceptable on solid wood substrate. (* Indicates failed areas)

STATUS: PASS

Flexible rating allowance
FIRA Standard 6250: 2018 – contains the following flexible allowance – " A maximum of two results may fall by one rating below the ratings specified, provided the result is not less than a rating of 2".

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SAMPLE FOR TEST

Sample reference details:

Panel supplied as: HDB 5434X PIGMENTED TWO COMPONENT WATER BASED COLOURED LACQUER

TEST & REPORT BY: B PELENTRIDES & J ERIBANKYA

APPROVED BY: J ERIBANKYA (SECTION HEAD - MATERIALS TECHNOLOGY)

********** END OF REPORT **********