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## SAMPLES FOR TEST

Kitchen cabinet door

Shaker Design Door (Solid MFC Frame with solid MFC Centre Panel)

Construction: 5 piece construction - weathered oak effect melamine faced particleboard frame enclosing a flat centre panel. Matching plastic perimeter edging. Shaker design.

Nominal: 1258 x 495 x 18mm

MFC: Egger H1146 ST10 Grey Bardolino Oak

Edging: Egger H1146 ST10 Grey Bardolino Oak edging 23 x 0.8mm

Edge banding adhesive: Henkel Dorus KS217 Natural Hotmelt Adhesive

Frame joint adhesive: PROTAK Fast Setting PVA

## TEST REQUIREMENTS AND PERFORMANCE SUMMARY

Workmanship FIRA Standard 41	PASS
Finish Performance BS 6222 Part 3	PASS
Adhesion Performance BS 6222 Part 3	PASS
Environmental Performance (High Humidity only) FIRA Standard 48	PASS

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# TECHNICAL REPORT

## WORKMANSHIP ASSESSMENT (FIRA STANDARD 41)

The submitted samples were assessed for workmanship as follows:

### FIRA Requirements

#### 1) Freedom from Sharp Edges

Finished components shall not have any sharp edges or splinters that are likely to cause discomfort or injury to persons during normal use of the furniture.

#### 2) Freedom from Visual Defects

When components are viewed with normal or corrected vision at arms length there shall be no obvious defects that would detract from the appearance of the furniture in its normal position of use. For example components shall be free of the following:

Machining Imperfections - torn grain, sanding marks, inaccurate edge trimming  
General - excessive variations in colour, mismatch in appearance of wood grain  
Poor Finishing - lacquer runs, pimples, sinkage  
Irregular Joints - poor jointing, gaps

### RESULTS - WORKMANSHIP

SAMPLE	COMMENTS	STATUS
SHAKER STYLE DOOR	All surfaces cleanly machined and smoothly finished.	PASS



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## FINISH PERFORMANCE TESTS (BS 6222 PART 3 1999)

Finish performance requirements for the assessment of domestic kitchen worktops\*, doors and other panel elements are specified in BS 6222 Part 3 1999 Domestic Kitchen Equipment - Performance requirements for durability of surface finish and adhesion of surfacing and edging materials-Specification'. (\*Plastics laminate used for worktops should also comply with the relevant requirements of BSEN 438).

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

BS 3962-6: 1980 Methods of test for finishes for wooden furniture Part 6 Assessment of resistance to mechanical damage, BS 6222 Part 3 Annex A Resistance to impact by large ball worktops, BSEN 12720:2009 Furniture Assessment of surface resistance to cold liquids, BSEN 12721: 2009 Furniture Assessment of surface resistance to wet heat and BSEN 12722: 2009 Furniture Assessment of surface resistance to dry heat

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.

### Assessment of Resistance to Mechanical Damage (BS 3962 Part 6: 1980)

#### Crosscut Test

A grid pattern of knife cuts, to a depth of 0.3mm, is made into the surface finish of the sample. The test area is then brushed and examined with a x3 magnification hand lens.

#### Impact Test

A 19.1mm diameter steel ball weighing 28g is dropped on to the test panel from a height of two metres; the ball is caught to prevent multiple impacts. The test area examined with a x3 magnification hand lens.

#### Large ball impact BS 6222 kitchen worktops.

Similar to above but ball diameter 42.8 mm, weight 324g and drop height 450mm.

#### Scrape Test

A radiused blade is traversed 200mm over the panel surface at a speed of 20 mm/sec applying an increasing vertical force from 1.5N to 26N. The scrape line is examined with a x3 magnification hand lens to determine i) point of surface penetration of the coating and iii) point of substrate penetration. The force in Newtons is recorded and also converted into a rating.

### Assessment of Surface Resistance to Wet Heat (BS EN 12721:2009)

A 100 mm diameter aluminium alloy block is heated to a specified 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 hours, following which the test surface is examined.

### Assessment of Surface Resistance to Dry Heat (BS EN 12722:2009)

The dry heat test is similar to the wet heat test except for the omission of the wetted cloth.

### Assessment of Surface Resistance to Cold Liquids (BS EN 12720:2009)

A 25mm disc of absorbent paper is immersed in a test liquid and placed on the surface of the panel and covered with a glass dish for a period of 1 hour, except cold oil and fats which are

# TECHNICAL REPORT

placed on the panel uncovered for a period of 24hr. The excess liquid is then soaked up by an absorbent material (but not rubbed clean) and left undisturbed for further 16 hours after which the test surface is full cleaned with standard 'cleaning' solution.

## General

Test areas are carefully examined both in diffuse daylight and reflected light.

## Flexible rating allowance

BS 6222 Part 3:1999 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".

## 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
<b>No change</b> - Test area indistinguishable from adjacent surrounding area		5
<b>Minor change</b> - 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
<b>Moderate change</b> - 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
<b>Significant change</b> - 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
<b>Strong change</b> - 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 (British Standard 6222: Part 3:1999 Clause 8.2 and 8.3)

SAMPLE: SHAKER STYLE DOOR			
TEST	REQUIREMENT - OTHER PANELS	TEST RESULT	COMMENTS
Crosscut	3	5	Smooth cuts
Scrape surface penetration	2	5	>26N
Scrape substrate penetration	3	5	>26N
Impact	3	5	No cracks
Wet heat 55°C	3	5	No change
Wet heat 70°C	2	5	No change
Ethanol 96%	2	5	No change
Ethanol 48%	3	5	No change
Tea	5	5	No change
Coffee	5	5	No change
Disinfectant (Phenol)	3	5	No change
Disinfectant (Chloro)	3	5	No change
Paraffin Oil	3	5	No change
Blackcurrant Juice	3	5	No change
Ammonia Solution	3	5	No change
Acetic Acid	3	5	No change
Olive Oil	5	5	No change
Cold Oils	4	5	No change
Cold Fats	4	5	No change
<b>STATUS</b>	<b>PASS</b>		

\*Failed Areas

Note: BS 6222 Part 3:1999 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".

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## ADHESION PERFORMANCE BS 6222 PART 3

The submitted samples were tested for adhesion according to the method described in BS 6222 Domestic Kitchen Equipment Part 3:1999 Performance requirements for durability of surface finish and adhesion of surfacing and edging materials-Specification.

Clause 8/8.3 Performance of other surfaces

## TEST PROCEDURE SUMMARY

The samples were exposed for  $84 \pm 12$  hr at  $40^\circ\text{C}$  in a dry air circulating oven. After this exposure period the bonds were examined and a given a performance rating the significance of which is described in Table 1. The temperature of the oven was raised in  $10^\circ\text{C}$  steps up to either  $60^\circ\text{C}$  or  $70^\circ\text{C}$ (<sup>1</sup>), depending on panel type, with the panels remaining at each temperature for  $84 \pm 12$  hr.

**TABLE 1**

RATING	SIGNIFICANCE
5	No spontaneous delamination, will not peel
4	No spontaneous delamination, peels with difficulty
3	No spontaneous delamination, peels with ease
2	Some spontaneous delamination
1	Complete spontaneous delamination

## REQUIREMENTS - BS 6222 PART 3 1999 TABLE 2

SURFACE AND EDGING MATERIALS	MINIMUM PERFORMANCE
Rigid and semi-rigid surface Materials( e.g. plastics laminate, wood veneer, paper foil and PVC rigid or semi-rigid foil)	$40^\circ\text{C}$ - rating 4 $50^\circ\text{C}$ - rating 4 $60^\circ\text{C}$ - rating 4 $70^\circ\text{C}$ - rating 4(a)
Edgings, lipping and continuous strip handles	$40^\circ\text{C}$ - rating 4 $50^\circ\text{C}$ - rating 4 $60^\circ\text{C}$ - rating 3

(a) Only applies to the surface laminate on worktops

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## RESULTS

### ADHESION PERFORMANCE BS 6222 PART 3:1999

SAMPLE: SHAKER STYLE DOOR				
BOND TYPE	PERFORMANCE RATING			
	AS RECEIVED	40°C	50°C	60°C
Centre panel	5	5	5	5
Wrapped side frame 1	5	5	5	5
Wrapped side frame 2	5	5	5	5
Wrapped side frame 3	5	5	5	5
Wrapped side frame 4	5	5	5	5
End caps 1-4	5	5	5	5
Reverse	5	5	5	5
STATUS	<b>PASS</b> All surface and edge bonds remained satisfactorily bonded throughout the test			

\*Failed Area

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## ENVIRONMENTAL TEST - (FIRA STANDARD 48)

The submitted fascias were subjected to environmental conditioning treatments in order to determine the effects of low relative humidity and high relative humidity conditions on the construction of the fascias. The test principally applies to solid wood type fascias although other types may be assessed where there is considered to be moisture related effect on the construction of the fascia.

### Low Relative Humidity Test - 28 days at 35%rh, 25°C

This test simulates exposure to dry conditions such as those found in well heated buildings when heating systems are operational.

### High Relative Humidity Test - 28 days at 85%rh, 25°C

This test simulates exposure to damp conditions such as those found in new buildings which have not fully dried out following 'wet' trade works e.g. plastering, screeding, painting etc. The duration of the test is not designed to simulate the effects of prolonged or continuous exposure to damp conditions which may occur in damp new buildings which have remained unoccupied for long periods.

## REQUIREMENTS

- (i) There shall be no obvious joint opening when the fascias are viewed with normal or corrected vision at arms length. (Minor hairline cracks at joints are permitted provided that they do not detract from the visual appearance of the fascia).
- (ii) Provided the integrity of the joints are not obviously affected the maximum permitted change in levels between stile and cross rails shall be as follows:-
  - (i) 1.0 mm maximum after test at high relative humidity
  - (ii) 0.5 mm maximum after test at low relative humidity
- (iii) There shall be no obvious degradation such as splits, distortion or other defects likely to affect the performance or appearance of the fascias.

Where appropriate the following measurements are made on fascias before and after test:

- a) Moisture Content - meter measurement.
- b) Stile/Centre panel gaps - the allowance for wood movement between the centre panel edges and the groove in the frame stiles.
- c) Stile/Cross rail levels - the difference in heights between the stile and cross rails forming the frame joints of a fascia.
- d) Maximum bow 1mm over 600mm span. (Equivalent 0.45mm over 400 mm span)



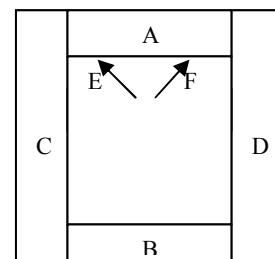
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## RESULTS

### FIRA ENVIRONMENTAL RESPONSE TEST (STANDARD 48)

<b>Sample:</b>	<b>SHAKER STYLE DOOR</b>					
<b>Conditions:</b>	<b>ENVIRONMENTAL PERFORMANCE TEST (FIRA STANDARD 48)</b>					
Construction As received	No obvious constructional defects. No obvious twist or distortion over door frame. No obvious delamination or looseness of edging. Framing joints secure. Bow levels generally satisfactory and within acceptable levels.					
Construction 85% rh, 25°C	No obvious degradation . No development of twist or distortion over door frame. No delamination of edgings. Frame joints satisfactory. Bow levels within acceptable levels.					
<b>BOW</b>	<b>Bow mm deflection over bow meter span</b>					
	<b>A 200mm</b>	<b>B 200mm</b>	<b>C 1000mm</b>	<b>D 1000mm</b>	<b>E 1000mm</b>	<b>F 1000mm</b>
As received	0.0	0.0	-1.2	-1.05	-1.0	-1.1
85% rh, 25°C	-0.05	-0.05	-0.1	-0.1	-0.4	-0.3
<b>STATUS</b>	<b>PASS</b>					

(-) indicates concave bow  
(+) indicates convex bow  
Bow measured on face of the door



TESTED BY: J ERIBANKYA

APPROVED BY: V TAYLOR (SECTION HEAD CABINET MATERIALS TECHNOLOGY)