

# TECHNICAL REPORT



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For the attention of Ms Line Moeller Maersk

## SAMPLE (S) FOR TEST

Kitchen worktop  
Lundhs Emerald - Polished Finish Stone Worktop (gloss finish).  
Size: 19 x 602 x 301mm.

## TEST REQUIREMENTS

BS 6222 - 3: 1999 Domestic Kitchen Equipment - Part 3: Performance requirements for durability of surface and adhesion of surfacing and edging materials - Specification Table 1(A) Requirements for 'Kitchen Worktops'. Clause 7

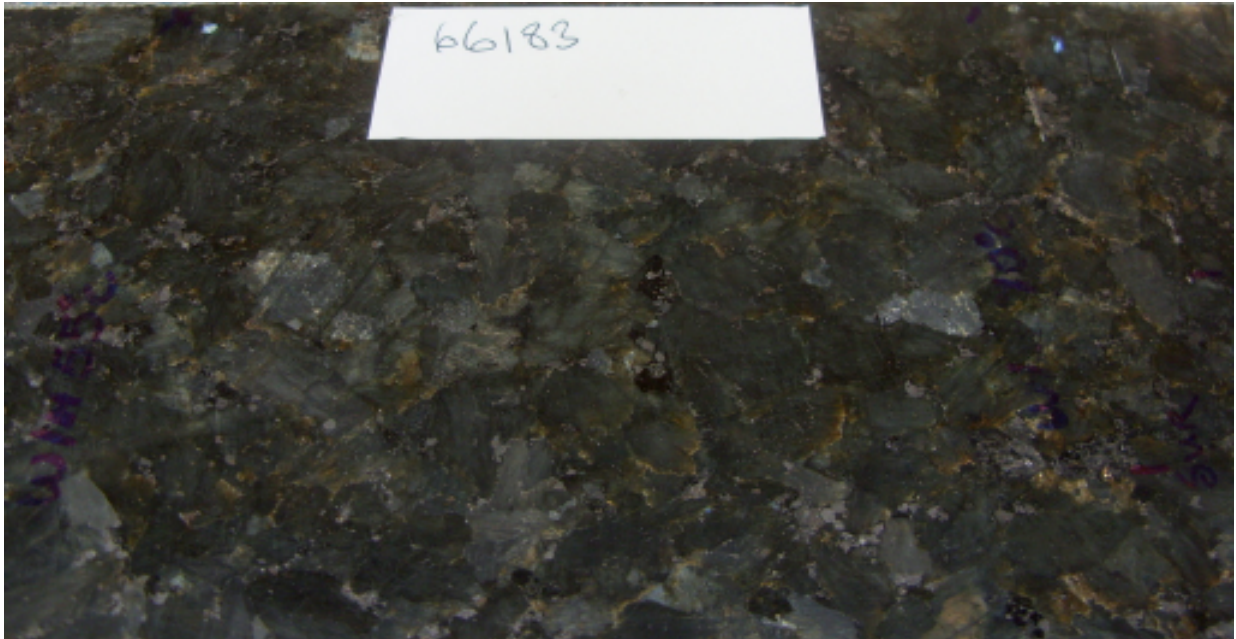
## PERFORMANCE SUMMARY

BS 6222 Part 3 Finish Performance - Worktops **PASS**

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## SAMPLE FOR TEST



**Kitchen worktop**  
**Lundhs Emerald - Polished Finish Stone Worktop (gloss finish).**  
**Size: 19 x 602 x 301mm.**

BS 6222 Part 3 1999 Domestic Kitchen Equipment - Performance requirements for durability of surface finish and adhesion of surfacing and edging materials-Specification'. is the general standard used for assessing worktops in the UK and under definitions 3.1 a worktop is defined as manufactured from a 'wood based material .... with any surface finish'. The finish performance tests detailed in BS 6222 Part 3 are however considered to be generally applicable to the assessment of any domestic kitchen worktop and the tests simulate a range of service use hazards.

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## FINISH PERFORMANCE TESTS (BS6222 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).

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.

#### **Scrape Test**

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

### **BS 6222 Part 3 Domestic Kitchen Equipment - Annex A Resistance to impact by large ball (kitchen worktops only).**

Similar to the BS 3962 test above but 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 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 fully removed and the area cleaned and then left for further 16 - 24hrs before assessment.

### **Flexible rating allowance**

BS 6222 Part 3:1999 contains the following flexible allowance - Table 1 "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  $\pm 0.01$ mm 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.

Large ball impact – BS 6222 states the large ball shall have a mass of  $324 \pm 0.5$ g. BS EN 438 describing the same large ball test apparatus states a mass  $324 \pm 5$ g. FIRA's large ball equipment complies with the latter specification.

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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 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 BS 6222 PART 3 1999

<b>SAMPLE : Kitchen worktop</b> <b>Lundhs Emerald - Polished Finish Stone Worktop (gloss finish).</b> <b>Size: 19 x 602 x 301mm.</b>			
<b>BS 6222 Part 3 1999 Kitchen worktops</b>			
TEST	BS6222 KITCHEN WORKTOPS	TEST RESULT	COMMENTS
Table 1			
Scrape surface penetration	5	5	12.4N
Scrape penetration to substrate	5	5	>26N
Wet heat 55°C	5	5	
Wet Heat 70°C	4	5	
Wet Heat 85°C	4	5	
Dry Heat 120°C	5	5	
Dry Heat 140°C	4	5	
Dry Heat 160°C	3	5	
Acetone	5	5	
Ethanol 96%	5	5	
Ethanol 48%	5	5	
Tea	5	5	
Coffee	5	5	
Disinfectant (Phenol)	5	5	
Disinfectant (Chloro)	5	5	
Paraffin Oil	5	5	
Blackcurrant Juice	5	5	
Ammonia Solution	5	5	
Acetic Acid	5	5	
Olive Oil	5	5	
Cold Oils(24h)	5	5	
Cold Fats(24h)	5	5	
Annex A Large Ball Impact (450mm drop)	No cracking & 10mm max indent	3.3mm. no cracks or visible marking	
<b>STATUS/COMMENTS</b>  <b>PASS</b>			

\*Failed Areas

REPORT BY: J ERIBANKYA

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

\*\*\*\*\* (END OF REPORT) \*\*\*\*\*