



[www.himacs.com](http://www.himacs.com)

# HI-MACS®

Technical Report & Certificate



Acrylic Solid Surface

# HI-MACS® by LG Hausys



Kindergarten lavabo  
Location : Cadepezzo, Switzerland  
Architect/Designer : Herrmann Flavio  
Fabricator : IL Falegname Fabrizio Sagl  
Photo : Claudio Bader Photography  
Material : HI-MACS®

HI-MACS® is a solid surface material that can be moulded into any shape. It is widely used for architectural and interior applications, such as sculptural and high performance wall-cladding or kitchen, bathroom and furniture surfaces, in commercial, residential and public space projects. It is composed of acrylic, natural minerals and pigments that come together to provide a smooth, non-porous and visually seamless surface which meets the highest standards for aesthetics, fabrication, functionality and hygiene – offering manifold advantages over conventional materials.

HI-MACS® provides limitless possibilities for surfacing solutions and inspires creative minds from all over the world. Zaha Hadid, Jean Nouvel, Rafael Moneo, Karim Rashid and David Chipperfield, among others, have completed fabulous projects using HI-MACS®, from kitchens to bathrooms, including decorative items, in hotels as well as in museums, shopping centers and on external façades. LG Hausys' HI-MACS® uses a simple heating process to give three-dimensional thermoplastic forming capabilities, allows visually seamless designs, offers a virtually limitless range of colors and – for some shades - exhibits a special translucency when exposed to light. Although HI-MACS® is almost as robust as stone, it can be worked in a similar way as wood: it can be sawn, routed, drilled or sanded.

HI-MACS® is manufactured using a new generation technology, the thermal cure. The temperature reached during the manufacturing process sets HI-MACS® apart from other solid surfaces and creates a denser, even more homogeneous, sturdy, durable surface – with a better resistance and superior thermoforming performance.

As regards hygiene, HI-MACS® does not absorb humidity, is highly resistant to stains, and is easy to clean, maintain and repair. Countless internationally recognized certificates attest to the quality of HI-MACS® in terms of ecological commitment, hygiene and fire resistance – being the first Solid Surface in the market to receive the official European Technical Approval (ETA) for façades – for Alpine White S728 colour.

HI-MACS® The New Generation

## Numerous certificates award HI-MACS® top marks

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# Technical Report

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01. Test Report

02. Stain Resistance

03. Chemical Resistance

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# Technical Report

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## 01. Test Report

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- 1\_1) Test Report\_HI-MACS(Solid)
- 1\_2) Test Report\_HI-MACS(Granite)
- 1\_3) Test Report\_HI-MACS(Volcanics)
- 1\_4) Test Report\_HI-MACS(Volcanics Natural)
- 1\_5) Test Report\_HI-MACS(Galaxy\_Aster)
- 1\_6) Test Report\_HI-MACS(Marmo)



# Technical Report

1\_1) Test Report \_ HI-MACS (Solid)



YOUR PARTNER FOR THE BEST QUALITY

(Registered Copy)

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018789

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Solid)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.735	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	86	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	70	ASTM D2583-13a
Tensile Strength	MPa	-	45.7	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	11.1	ASTM D638-10(*)
Flexural Strength	MPa	-	67.7	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	10.5	ASTM D790-10(**)
Izod Impact Strength	J/m	-	15	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.03	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance(170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	99	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.8×10 <sup>-5</sup>	JIS K 6911 : 1995

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Apr.07.2015

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# Technical Report

1\_1) Test Report \_ HI-MACS (Solid)



YOUR PARTNER FOR THE BEST QUALITY

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## TEST REPORT

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Report No : TAS-018789

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Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Solid)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	9H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage.  
3. This test report includes the test result performed in accordance with the test method suggested by the client.  
4. Only original copy (including certified copy) of the test report is valid - electronic copy (hard and/or soft) is for your reference only.

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# Technical Report

1\_2) Test Report \_ HI-MACS (Granite)



YOUR PARTNER FOR THE BEST QUALITY

(Registered Copy)

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018790

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Granite)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.640	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	84	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	69	ASTM D2583-13a
Tensile Strength	MPa	-	38.6	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	9.83	ASTM D638-10(*)
Flexural Strength	MPa	-	64.1	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	8.96	ASTM D790-10(**)
Izod Impact Strength	J/m	-	18	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.03	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance(170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	99	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.5×10 <sup>-5</sup>	JIS K 6911 : 1995

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# Technical Report

1\_2) Test Report \_ HI-MACS (Granite)



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## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018790

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Granite)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	9H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
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# Technical Report

1\_3) Test Report \_ HI-MACS (Volcanics)



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## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018791

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Volcanics)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.667	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	86	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	68	ASTM D2583-13a
Tensile Strength	MPa	-	28.2	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	9.94	ASTM D638-10(*)
Flexural Strength	MPa	-	41.7	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	9.09	ASTM D790-10(**)
Izod Impact Strength	J/m	-	14	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.03	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance(170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	103	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.6×10 <sup>-5</sup>	JIS K 6911 : 1995

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# Technical Report

1\_3) Test Report \_ HI-MACS (Volcanics)



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## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018791

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Volcanics)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	9H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
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KTR-QP-T09-F01-02(02)



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# Technical Report

1\_4) Test Report \_ HI-MACS (Volcanics Natural)



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## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004061

Receipt Date : Jan.19.2015

Client : Oh Jang-Soo

Test Completion Date : Jan.23.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial Stone\_Volcanics Natural

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.694	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	92	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	70	ASTM D2583-13a
Tensile Strength	MPa	-	22.6	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	10.0	ASTM D638-10(*)
Flexural Strength	MPa	-	37.3	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	9.55	ASTM D790-10(**)
Izod Impact Strength	J/m	-	17	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.03	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance((170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	102	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.9×10 <sup>-5</sup>	JIS K 6911 : 1995

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# Technical Report

1\_4) Test Report \_ HI-MACS (Volcanics Natural)



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004061

Receipt Date : Jan.19.2015

Client : Oh Jang-Soo

Test Completion Date : Jan.23.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial Stone\_Volcanics Natural

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	8H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
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# Technical Report

1\_5) Test Report \_ HI-MACS (Galaxy, Aster)



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004058

Receipt Date : Jan.19.2015

Client : Oh Jang-Soo

Test Completion Date : Jan.23.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial Stone\_Galaxy

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.658	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	87	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	69	ASTM D2583-13a
Tensile Strength	MPa	-	28.2	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	9.71	ASTM D638-10(*)
Flexural Strength	MPa	-	40.3	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	8.45	ASTM D790-10(**)
Izod Impact Strength	J/m	-	15	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.02	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance((170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	100	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.8×10 <sup>-5</sup>	JIS K 6911 : 1995

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# Technical Report

1\_5) Test Report \_ HI-MACS (Galaxy, Aster)



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-004058

Receipt Date : Jan.19.2015

Client : Oh Jang-Soo

Test Completion Date : Jan.23.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial Stone\_Galaxy

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	6H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

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4. Only original copy (including certified copy) of the test report is valid - electronic copy (hard and/or soft) is for your reference only.

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Jan.23.2015

Korea Testing & Research Institute

President

Choi Hyeon-gil



QR Code to verify genuineness

2 of Total 2 Page(s)

# Technical Report

1-6) Test Report \_ HI-MACS (Marmo)



YOUR PARTNER FOR THE BEST QUALITY

(Registered Copy)

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018792

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Marmo)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Specific Gravity((23/23) °C)	-	-	1.654	ASTM D792-13(Method A)
Rockwell Hardness(HRM)	-	-	86	ASTM D785-08(Procedure A)
Barcol Hardness	-	-	69	ASTM D2583-13a
Tensile Strength	MPa	-	36.2	ASTM D638-10(*)
Tensile Modulus of Elasticity	GPa	-	9.88	ASTM D638-10(*)
Flexural Strength	MPa	-	52.0	ASTM D790-10(**)
Flexural Modulus of Elasticity	GPa	-	9.09	ASTM D790-10(**)
Izod Impact Strength	J/m	-	19	ASTM D256-10(Method A)
Water Absorption(24 h Immersion)	%	-	0.03	ASTM D570-98(2010)e1
Appearance(Discoloration) After Heat Resistance(170±2)	-	-	No Defects	By The Client
Hot Water Resistance Test	-	-	No Defects	JIS K 6902 : 2007
Deflection Temperature Under Load(1.82 MPa)	°C	-	104	ASTM D648-07(Method B)
Thermal Expansion	1/°C	-	2.7×10 <sup>-5</sup>	JIS K 6911 : 1995

- Next Page -

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Reviewed by You Seok  
Technical Manager  
E-mail: youseok@ktr.or.kr

Registered copy date: May.19.2015

Apr.07.2015

**Korea Testing & Research Institute**

President

*Choi Hyeon-gil*



QR Code to verify genuineness

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# Technical Report

1-6) Test Report \_ HI-MACS (Marmo)



YOUR PARTNER FOR THE BEST QUALITY

(Registered Copy)

## TEST REPORT

68, Gajaeul-ro, Seo-gu, Incheon, 404-817 Rep. of KOREA

TEL 82-32-5709-700 FAX 82-32-575-5613

Report No : TAS-018792

Receipt Date : Mar.24.2015

Client : Oh Jang-Soo

Test Completion Date : Apr.07.2015

LG HAUSYS Co., Ltd

(Yeouido-dong, One IFC)10, Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Sample : Artificial stone (Marmo)

### TEST RESULTS

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Pencil Hardness(Mitsu bishi pencil)	-	-	9H	KS M ISO 15184 : 2013

\* Specimen: Type I, Speed of Testing: 5 mm/min(Modulus: 1 mm/min)

\*\* Speed of Testing: 5.1 mm/min, Support Span: 190 mm

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage.  
3. This test report includes the test result performed in accordance with the test method suggested by the client.  
4. Only original copy (including certified copy) of the test report is valid - electronic copy (hard and/or soft) is for your reference only.

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Apr.07.2015

**Korea Testing & Research Institute**

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## Technical Report

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## 02. Stain Resistance

---

Stain Resistance Test\_by QAI

## Technical Report

Stain Resistance Test\_by QAI



### Test Report

1325 North 108th E. Ave.  
Tulsa, OK 74116  
918.437.8333 ph. | 918.437.8487 fx.

CLIENT: LG Hausys American, Inc.  
310 LG Drive  
Adairsville, GA 30103

Attn: Christopher Kim

Test Report No: TJ0941-R1 Date: January 3, 2013

SAMPLE ID: Fourteen (14) 12" x 12 tiles identified as: Arctic White, LG Hausys

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: The samples were received in good condition at QAI on November 8, 2012.

TESTING PERIOD: November 12 – January 3, 2013

AUTHORIZATION: Signed QAI Proposal No.: FB110112-1 Rev. 1 by Chul Jung of LG Hausys American, Inc., dated November 5, 2012

TEST PROCEDURE: CSA B45.5/IAPMO ANSI Z124.11, *Plastic Plumbing Fixtures (Stain Resistance) and Client Protocol on assorted chemicals and stains.*

TEST RESULTS: Detailed test results are presented in the subsequent pages of this report.

Prepared By

Linda Lewis  
Materials Testing Technician

Signed for and on behalf of  
QAI Laboratories, Inc.

Randall P. Baker, PE  
Plumbing and Materials Manager

Page 1 of 4  
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WWW.QAI.ORG  
info@qai.org

## Technical Report

Stain Resistance Test\_by QAI



Client: LG Hausys America, Inc.  
Report No.: TJ0941-R1  
Date: 1/3/13  
Page 2 of 4

ANSI Z124.11 (All ratings below are described in Section 5.11.2)  
5.11 Stain Resistance:

Pass

Reagent	Exposure Time	Covered Specimen Rating	Uncovered Specimen Rating
Black Crayon	16 hrs.	1	1
Black Liquid Shoe Polish	16 hrs.	1	1
Blue Washable Ink	16 hrs.	1	1
Lipstick	16 hrs.	1	1
Hair Dye	16 hrs.	1	1
Iodine, 1%	16 hrs.	1	1
Gentian Violet Solution	16 hrs.	1	1
Beet Juice	16 hrs.	1	1
Grape Juice	16 hrs.	1	1
Wet Tea Bag	16 hrs.	1	1
Total Each Section		10	10
Total Stain Resistance Rating (64 max.):		20	

Client Requested Reagents

Pass

	Reagent	Exposure Time	Covered Specimen Rating	Uncovered Specimen Rating
1	Acridine Orange	16 hrs.	2	1
2	AG Eosine Blue	16 hrs.	3	2
3	Amyl Acetate	16 hrs.	3	3
4	Amyl Alcohol	16 hrs.	3	2
5	Aromatic Ammonia	16 hrs.	1	1
6	B-4 Conditioner	16 hrs.	1	1
7	Benzalkonium Chloride	16 hrs.	1	1
8	Benzene	16 hrs.	1	1
9	"Benco Dental" Bite Registration, Accelerator and Base	16 hrs.	1	1
10	Butyl Alcohol	16 hrs.	2	2
11	Calcium Thiocyanate	16 hrs.	1	1
12	Carbon Disulphide	16 hrs.	1	2
13	Carbon Tetrachloride	16 hrs.	2	1
14	Caulk IRM (with or w/o ZnO)	16 hrs.	3	3
15	"Chloraseptic" (Phenol 1.5%)	16 hrs.	1	1
16	Crystal Violet	16 hrs.	2	2
17	Cupra Ammonia	16 hrs.	3	3
18	Debacterol	16 hrs.	1	1

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## Technical Report

Stain Resistance Test\_by QAI



Client: LG Hausys America, Inc.  
Report No.: TJ0941-R1  
Date: 1/3/13  
Page 3 of 4

	Reagent	Exposure Time	Covered Specimen Rating	Uncovered Specimen Rating
19	Dimethyl Formamide	16 hrs.	1	1
20	Dimethylene Blue	16 hrs	2	1
21	"Dry Bond" Dental Adhesive	16 hrs.	1	1
22	Eosin Y	16 hrs.	3	3
23	"Cavitec" Equalizing Accelerator & Base	16 hrs.	3	3
24	Ethyl Acetate	16 hrs.	3	3
25	Ethyl Ether	16 hrs.	1	1
26	Eucalyptol	16 hrs.	1	1
27	"Eugenol" (with or w/o ZnO)	16 hrs.	1	1
28	Ferric Chloride	16 hrs.	1	1
29	"Fisher" Formaldehyde	16 hrs.	1	1
30	Food Colouring	16 hrs.	1	1
31	Formaldehyde	16 hrs.	1	1
***	Household Soaps		See Below	See Below
32	Dawn Dish Soap	16 hrs.	1	1
33	Arm & Hammer Laundry Soap	16 hrs.	1	1
34	Introfiant Arterial	16 hrs.	1	1
35	Kelviscera Cavity Fluid	16 hrs.	1	1
36	Kerosene	16 hrs.	1	1
37	Lemon Juice	16 hrs.	1	1
38	"Limelite" Intermediary Varnish	16 hrs	1	1
39	Liquid shoe polish, Brown	16 hrs.	1	1
40	"Lysol" Brand Cleaner	16 hrs.	1	1
41	Methyl Ethyl Ketone	16 hrs.	3	2
42	Methyl Orange	16 hrs.	3	3
43	Methyl Red (1%)	16 hrs.	1	2
44	Mineral Oil	16 hrs.	1	1
45	MonseI's Solution	16 hrs.	1	1
46	Nail Polish	16 hrs.	1	1
47	n-Hexane	16 hrs.	2	1
48	Permaglo Arterial Fluid	16 hrs.	1	1
49	Permaflow Preinjection Fluid	16 hrs.	1	1

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## Technical Report

Stain Resistance Test\_by QAI



Client: LG Hausys America, Inc.  
Report No.: TJ0941-R1  
Date: 1/3/13  
Page 4 of 4

	Reagent	Exposure Time	Covered Specimen Rating	Uncovered Specimen Rating
50	Peroxide	16 hrs.	1	1
51	Phenolphthalein (1%)	16 hrs.	1	3
52	Phosphorus Pentoxide	16 hrs.	3	1
53	Potassium Permanganate (2%)	16 hrs.	3	3
54	Procaine	16 hrs.	1	3
55	Restorative Anti-Dehydration	16 hrs.	1	1
56	Rhodamine WT Powder	16 hrs.	3	3
57	Saffron	16 hrs.	1	1
58	Silica Dental Cement (liquid) "Calbra"	16 hrs.	2	2
59	Silver Nitrate (10%)	16 hrs.	3	1
60	Sodium Bisulphate	16 hrs.	1	3
61	Sodium Hydroxide Flake	16 hrs.	3	1
62	Sodium Hypochlorite (5%)	16 hrs.	1	1
63	Sodium Sulphate	16 hrs.	1	1
64	Solitime Solvent	16 hrs.	1	1
65	Soy Sauce	16 hrs.	1	1
66	Sugar (sucrose)	16 hrs.	1	1
67	Tannic Acid	16 hrs.	1	1
68	Tetrahydrofuran	16 hrs.	3	1
69	"Thymol" in Alcohol	16 hrs.	1	3
70	Tincture of Iodine	16 hrs.	1	1
71	Tomato Sauce	16 hrs.	1	1
72	Trichloroethane	16 hrs.	1	1
73	Trypan Blue	16 hrs.	3	3
74	Uric Acid	16 hrs.	1	1
75	Wright's Stain	16 hrs.	3	1
76	Zinc Chloride	16 hrs.	1	1
77	Zinc Oxide (paste, ointment)	16 hrs.	1	1

\*\*\*\*\*

END OF REPORT

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## 03. Chemical Resistance

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- 3\_1) Chemical Resistance Test.I\_HI-MACS(G34)\_by KTR
- 3\_2) Chemical Resistance Test.I\_HI-MACS(G47)\_by KTR
- 3\_3) Chemical Resistance Test.I\_HI-MACS(S104)\_by KTR
- 3\_4) Chemical Resistance Test.I\_HI-MACS(VB21)\_by KTR

# Technical Report

3\_1) Chemical Resistance Test\_HI-MACS (G34)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009373 Receipt Date : Dec.21.2010  
Client : Myung Ho Han Test Completion Date : Jan.03.2011  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Sample : Solid surface (L\_G34)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ammonia water)	-		No Defects	By The Client(*)
Chemicals Resistance Test (NaOCl 10 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Hydrogen Peroxide 3 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Silver nitrate 5 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Hydrochloric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Nitric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Sulfuric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Phosphoric acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Formic acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Acetic acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Lead Acetate 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Benzene)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Methanol)	-		No Defects	By The Client(*)


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전자문서본(Electronic)



# Technical Report

3\_1) Chemical Resistance Test\_HI-MACS (G34)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009373 Receipt Date : Dec.21.2010  
Client : Myung Ho Han Test Completion Date : Jan.03.2011  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Sample : Solid surface (L\_G34)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ethyl alcohol 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Glycerine)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Toluene)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Methyl ethyl ketone)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Acetone)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Soybean Oil)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Ammonium hydroxide 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Sodium hydroxide 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Potassium hydroxide 30 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Formaldehyde 37 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Sodium chloride, saturation)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Hydrogen Peroxide 30 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Iodine 10 %)	-		No Defects	By The Client(*)


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전자문서본(Electronic)





# Technical Report

3\_1) Chemical Resistance Test\_HI-MACS (G34)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009373  
Client : Myung Ho Han  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Receipt Date : Dec.21.2010  
Test Completion Date : Jan.03.2011

Sample : Solid surface (L\_G34)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
(*) Chemicals Resistance Test(Spot test) : Test conditions Sample × chemicals 2 mL × (23 ± 2) °C × 24 h, Identifying the Appearance(Discoloration) after contact USAGE : QUALITY CONTROL				
NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR do not guarantee the quality of all products of the customer. 2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage. 3. This test report includes the test result performed in accordance with the test method which is presented by client.				

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# Technical Report

3\_2) Chemical Resistance Test\_HI-MACS (G47)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009374  
Client : Myung Ho Han  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Receipt Date : Dec.21.2010  
Test Completion Date : Jan.03.2011

Sample : Solid surface (L\_G47)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ammonia water)	-		No Defects	By The Client(*)
Chemicals Resistance Test (NaOCl 10 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Hydrogen Peroxide 3 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Silver nitrate 5 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Hydrochloric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Nitric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Sulfuric Acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Phosphoric acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Formic acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Acetic acid 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Lead Acetate 20 %)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Benzene)	-		No Defects	By The Client(*)
Chemicals Resistance Test (Methanol)	-		No Defects	By The Client(*)

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전자문서본(Electronic)



# Technical Report

3\_2) Chemical Resistance Test\_HI-MACS (G47)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009374  
Client : Myung Ho Han  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Receipt Date : Dec.21.2010  
Test Completion Date : Jan.03.2011

Sample : Solid surface (L\_G47)

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ethyl alcohol 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Glycerine)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Toluene)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Methyl ethyl ketone)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Acetone)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Soybean Oil)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Ammonium hydroxide 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Sodium hydroxide 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Potassium hydroxide 30 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Formaldehyde 37 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Sodium chloride, saturation)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Hydrogen Peroxide 30 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Iodine 10 %)	-	-	No Defects	By The Client(*)

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- Next Page -


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Jan.03.2011

**Korea Testing & Research Institute**  
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전자문서본(Electronic)



# Technical Report

3\_2) Chemical Resistance Test\_HI-MACS (G47)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009374  
Client : Myung Ho Han  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Receipt Date : Dec.21.2010  
Test Completion Date : Jan.03.2011

Sample : Solid surface (L\_G47)

TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
(*) Chemicals Resistance Test(Spot test) : Test conditions Sample x chemicals 2 mL x (23 ± 2) °C x 24 h, Identifying the Appearance(Discoloration) after contact				
USAGE : QUALITY CONTROL				
NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR do not guarantee the quality of all products of the customer. 2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage. 3. This test report includes the test result performed in accordance with the test method which is presented by client.				

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Jan.03.2011

*Sung-Taeg Hong*


Reviewed by Sung-Taeg Hong  
Technical Manager  
E-mail: prohong@ktr.or.kr

**Korea Testing & Research Institute**  
President *Kiung Cho*

3 of Total 3 Page(s)




전자문서본(Electronic)



# Technical Report

3\_3) Chemical Resistance Test\_HI-MACS (S104)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

155, Beodeunaru-ro, Yeongdeungpo-gu, Seoul, 150-038 Rep. of KOREA TEL 82-2-2164-0011 FAX 82-2-2634-1008

Report No : TAK-005092  
Client : Oh Jang-Soo  
LG HAUSYS Co., Ltd  
(Yeouido-dong, One IFC)10, Gukjeumyung-ro, Yeongdeungpo-gu, Seoul, Korea

Receipt Date : May.20.2014  
Test Completion Date : May.29.2014

Sample : ARTIFICIAL STONE (S104)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Immersion Test(24h, Propanol)	-	-	No Defects	By The Client (*)
Immersion Test(24h, Isopropanol)	-	-	No Defects	By The Client (*)
Immersion Test(24h, Acetone)	-	-	No Defects	By The Client (*)
Immersion Test(24h, Lactic acid)	-	-	No Defects	By The Client (*)
Immersion Test(24h, Ethanol 96 %)	-	-	No Defects	By The Client (*)

\* By the client : Sample / Solution × (23 ± 1) °C × 24 h Immersion Test  
Appearance test (Discoloration, Crack, Swelling)

\* USAGE : QUALITY CONTROL

NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR does not guarantee the quality of all products of the customer, and you can confirm the authenticity of the test report online (www.ktr.or.kr) or by using the QR code.  
2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage.  
3. This test report includes the test result performed in accordance with the test method suggested by the client.

*Park Jungwoo*  
Prepared by Park Jungwoo  
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*Kim Changseong*  
Reviewed by Kim Changseong  
Technical Manager  
E-mail: hplcms@ktr.or.kr

May.29.2014


**Korea Testing & Research Institute**  
President *Choi Hyeonk*

1 of Total 1 Page(s)

전자문서본(Electronic Copy)




KTR-QP-T09-F01-02(02)



A4(210 × 297)

# Technical Report

3\_4) Chemical Resistance Test\_HI-MACS (VB21)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009375  
Client : Myung Ho Han  
LG HAUSYS Co., Ltd  
#20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Receipt Date : Dec.21.2010  
Test Completion Date : Jan.03.2011

Sample : Solid surface (L\_VB21)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ammonia water)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (NaOCl 10 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Hydrogen Peroxide 3 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Silver nitrate 5 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Hydrochloric Acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Nitric Acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Sulfuric Acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Phosphoric acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Formic acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Acetic acid 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Lead Acetate 20 %)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Benzene)	-	-	No Defects	By The Client(*)
Chemicals Resistance Test (Methanol)	-	-	No Defects	By The Client(*)

- Next Page -

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Jan.03.2011


**Korea Testing & Research Institute**  
President *Kwang Cho*

1 of Total 3 Page(s)

전자문서본(Electronic Copy)



KTR-QP-T09-F01-02(02)




A4(210 × 297)



# Technical Report

3\_4) Chemical Resistance Test\_HI-MACS (VB21)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009375 Receipt Date : Dec.21.2010  
 Client : Myung Ho Han Test Completion Date : Jan.03.2011  
 LG HAUSYS Co., Ltd  
 #20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Sample : Solid surface (L\_VB21)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
Chemicals Resistance Test (Ethyl alcohol 20 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Glycerine)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Toluene)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Methyl ethyl ketone)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Acetone)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Soybean Oil)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Ammonium hydroxide 20 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Sodium hydroxide 20 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Potassium hydroxide 30 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Formaldehyde 37 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Sodium chloride, saturation)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Hydrogen Peroxide 30 %)	-	-	No Defects: By The Client(*)	
Chemicals Resistance Test (Iodine 10 %)	-	-	No Defects: By The Client(*)	

- Next Page -

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Jan.03.2011

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2 of Total 3 Page(s)




전자문서본(Electronic)



# Technical Report

3\_4) Chemical Resistance Test\_HI-MACS (VB21)\_by KTR



YOUR PARTNER FOR THE BEST QUALITY

## TEST REPORT

7-6, Gomak-Ri, Wolgot-Myeon, Gimpo-Si, Gyeonggi-Do, KOREA TEL 82-31-999-3000 FAX 82-31-999-3001

Report No : TAH-009375 Receipt Date : Dec.21.2010  
 Client : Myung Ho Han Test Completion Date : Jan.03.2011  
 LG HAUSYS Co., Ltd  
 #20, Yeouido-dong, Youngdeungpo-gu, Seoul, Korea.

Sample : Solid surface (L\_VB21)

TEST RESULTS				
TEST ITEM	UNIT	SAMPLE	RESULT	TEST METHOD
(*) Chemicals Resistance Test(Spot test) : Test conditions Sample × chemicals 2 mL × (23 ± 2) °C × 24 h, Identifying the Appearance(Discoloration) after contact USAGE : QUALITY CONTROL				
NOTE : 1. The test results on this test report are only limited to the samples and sample names provided by the customer and KTR do not guarantee the quality of all products of the customer. 2. This test report shall not be used for public relation, advertisement, lawsuit and any other purposes outside the scope of its defined usage. 3. This test report includes the test result performed in accordance with the test method which is presented by client.				

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Jan.03.2011

**Korea Testing & Research Institute**  
 President *Kiung Cho*

3 of Total 3 Page(s)



전자문서본(Electronic)



# Environmental Certification

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01. HB\_Certificate

02. GreenGuard Certificate

03. SCS\_Certificate

04. NSF standards

05. HPD (Health Product Declaration)

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## Environmental Certification



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### 01. HB\_Certificate

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- 1\_1) HB\_Certificate of Environmental Building Material \_by KACA
- 1\_2) HB\_Certificate of Environmental Building Material\_Test Report\_by KACA

The Korean Air Cleaning Association certifies that HI-MACS® complies with the Korean regulations for environmental building materials.



## Environmental Certification

1\_1) HB\_Certificate of Environmental Building Material \_by KACA (Korean version)



### 친환경 건축자재 인증서

등	급	HB ❸❸❸❸❸❸ (최우수)							
인	증	번	호	분	류	기	타		
		HB014G04-01							
인증유효기간		2013 . 05 . 13 ~ 2016 . 05 . 12							
제	품	명	Z:IN 인테리어대리석	모	델 / 규	격	-		
회	사	명	(주)LG하우시스	대	표	자	오	장	수
주		소							
		서울시 영등포구 여의도동 23 원아이에프씨							

이 건축자재는 친환경 건축자재 단체품질인증 규정에 의해 시험한 결과  
위와 같은 등급으로 평가되었음을 인증합니다.

2013 년 04 월 25 일



**한국 공기청정협회**




## Environmental Certification

1\_1) HB\_Certificate of Environmental Building Material \_by KACA (English version)




### Certificate of Environmental Building Material


Grade	HB ❸❸❸❸❸❸ (Outstanding)		
Certificate Number	HB014G04-01	Classification	Others
Valid Period	May 13, 2013 ~ May 12, 2016		
Product Name	Z:IN HI-MACS	Model/Spec.	-
Manufacturer	LG Hausys, Ltd.	Representative	Jang-soo, Oh
Address	OneIFC 23, Yeouido-dong, Yeoungdeungpo-gu, Seoul, Korea		

We hereby certify that this building material has achieved the  
above mentioned grade in the test properly done in accordance  
with the regulation for environmental building materials provided  
by the Korea Air Cleaning Association

April 25, 2013

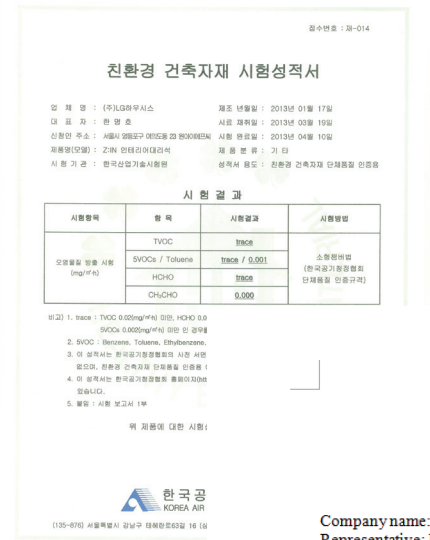


**Korea Air Cleaning Association**




# Environmental Certification

1\_2) HB\_Certificate of Environmental Building Material\_Test Report\_by KACA



**친환경 건축자재 시험성적서**

발주처명 : 18-014

발주처 : (주)LG하우시스      제조 연월일 : 2013년 01월 17일  
 대리인 : 한영호      시험 연월일 : 2013년 03월 19일  
 신청인 주소 : 서울특별시 강남구 테헤란로 63      시험 완료일 : 2013년 04월 10일  
 제품명(모델명) : Z-IN 인테리어 대리석      제품 분 류 : 기타  
 시험기관 : 한국환경기술시험원      시험자 : 김도      환경영향 건축자재 인증획득 인증원

시험항목	단위	시험결과	시험방법
TVOC	mg/m³	Trace	소용량시험 (한국환경기술시험원 인증획득 인증원)
5VOCs / Toluene	mg/m³	Trace / 0.001	
HCHO	mg/m³	Trace	
CH3CHO	mg/m³	0.000	

비고) 1. Trace : TVOC 0.002mg/m³ 이하, HCHO 0.005 mg/m³ 이하, 5VOCs 0.002mg/m³ 이하 인 결과  
 2. 5VOCs : Benzene, Toluene, Ethylbenzene,  
 3. Xylene, Styrene  
 4. 이 성적서는 한국환경기술시험원의 시험 성적서로, 환경영향 건축자재 인증획득 인증원 (KACA)에 의해 인증받은 제품입니다.  
 5. 유효기간 : 시험 결과서 1년

발주처명 : LG Hausys  
 Representative: Han Myeong-ho  
 Applicant's address: ONE IFC, 23, Yeouido-dong, Yeongdeungpo-gu, Seoul, Korea  
 Product name (model): Z-IN Interior Marble  
 Testing Institution: Korea Testing Laboratory

제조 연월일: January 17, 2013  
 Sample collection date: March 19, 2013  
 Test completion date: April 10, 2013

Product category: Others  
 Use of report: For collective quality certification of the eco-friendly building material

Receipt number: JAE-014

**Eco-friendly Building Material Test Report**

**Test Results**

Test item	Item	Test result	Test method
Pollutant emission test (mg/m³·h)	TVOC	Trace	Small Chamber Method (Collective quality certification standard of Korea Air Cleaning Association)
	5VOCs / Toluene	Trace / 0.001	
	HCHO	Trace	
	CH3CHO	0.000	

Remarks

- Trace: This refers to where TVOC is less than 0.02 (mg/m³·h), HCHO is 0.005 (mg/m³·h), CH3CHO is 0.005 (mg/m³·h), and the five VOCs are less than 0.002 (mg/m³·h).
- Five VOCs: This is the sum of Benzene, Toluene, Ethylbenzene, Xylene, and Styrene.
- This report cannot be used for publicity, flack, advertisement or lawsuits without prior written consent of the Korea Air Cleaning Association, and it is forbidden to use this report for anything other than collective quality certification of eco-friendly building material.
- This report can be verified via the homepage of the Korea Air Cleaning Association (<http://db.kaca.or.kr>).
- Attachment: One (1) copy of the Test Report

We hereby certify that this document is the test report of the above-mentioned product.

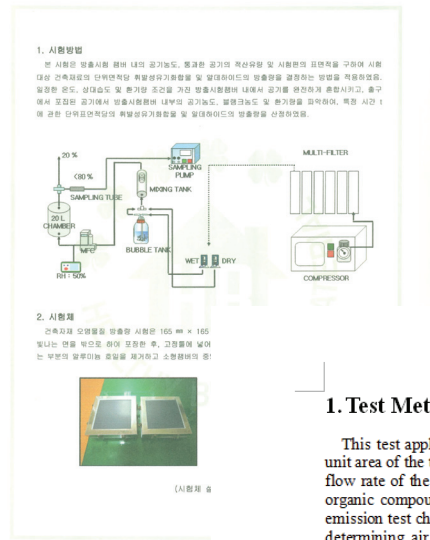
April 24, 2013

**한국 공기 청정 협회**  
KOREA AIR CLEANING ASSOCIATION

(135-876) 16, Teheran-ro 63-gil, (Samseong-dong) Gangnam-gu, Seoul, Republic of Korea  
 TEL: (02)553-4156 / <http://www.kaca.or.kr>

# Environmental Certification

1\_2) HB\_Certificate of Environmental Building Material\_Test Report\_by KACA



**친환경 건축자재 시험성적서**

발주처명 : 18-014

발주처 : (주)LG하우시스      제조 연월일 : 2013년 01월 17일  
 대리인 : 한영호      시험 연월일 : 2013년 03월 19일  
 신청인 주소 : 서울특별시 강남구 테헤란로 63      시험 완료일 : 2013년 04월 10일  
 제품명(모델명) : Z-IN 인테리어 대리석      제품 분 류 : 기타  
 시험기관 : 한국환경기술시험원      시험자 : 김도      환경영향 건축자재 인증획득 인증원

시험항목	단위	시험결과	시험방법
TVOC	mg/m³	Trace	소용량시험 (한국환경기술시험원 인증획득 인증원)
5VOCs / Toluene	mg/m³	Trace / 0.001	
HCHO	mg/m³	Trace	
CH3CHO	mg/m³	0.000	

비고) 1. Trace : TVOC 0.002mg/m³ 이하, HCHO 0.005 mg/m³ 이하, 5VOCs 0.002mg/m³ 이하 인 결과  
 2. 5VOCs : Benzene, Toluene, Ethylbenzene,  
 3. Xylene, Styrene  
 4. 이 성적서는 한국환경기술시험원의 시험 성적서로, 환경영향 건축자재 인증획득 인증원 (KACA)에 의해 인증받은 제품입니다.  
 5. 유효기간 : 시험 결과서 1년

발주처명 : LG Hausys  
 Representative: Han Myeong-ho  
 Applicant's address: ONE IFC, 23, Yeouido-dong, Yeongdeungpo-gu, Seoul, Korea  
 Product name (model): Z-IN Interior Marble  
 Testing Institution: Korea Testing Laboratory

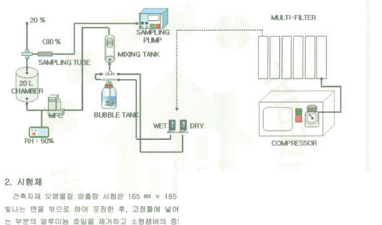
제조 연월일: January 17, 2013  
 Sample collection date: March 19, 2013  
 Test completion date: April 10, 2013

Product category: Others  
 Use of report: For collective quality certification of the eco-friendly building material

Receipt number: JAE-014

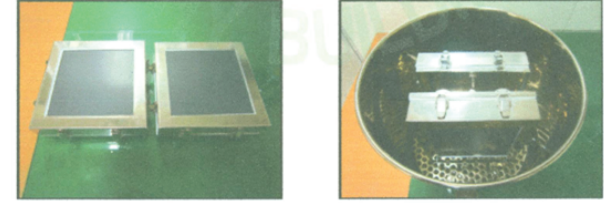
**Test Method**

This test applied the method of determining the emissions of volatile organic compounds and aldehyde per unit area of the tested building material by assessing the air concentration in the emission test chamber, the mass flow rate of the air passing through, and surface area of the specimen. We calculated the emissions of volatile organic compound and aldehyde per unit surface area at a specific time, by mixing the air completely in the emission test chamber having constant conditions of temperature, relative humidity and ventilation amount, and determining air concentration, blank concentration and ventilation amount of the inside of the emission test chamber from the air captured at the exit.



**Test Specimen**

In the pollutant emissions test of the building material, we packaged two test specimens cut by 165mm x 165mm respectively using the aluminum foil with its shiny side facing outward, and then put them in the frame and eliminated the aluminum foil of the relevant part in order to get only the area of 143mm x 143mm to be exposed, then secured them to the central part of the small chamber, and then measured the emission intensity after seven days.



(Installation figure of the test specimen)

(1 page of total 3 pages)



# Environmental Certification

1\_2) HB\_Certificate of Environmental Building Material\_Test Report\_by KACA

3. 측정조건

시험방법(표준)	ISO 16010	온도	25℃±1℃
상대습도	50%±3%	환기량	0.5회/시간
시험장비	2.0 m <sup>2</sup> / m <sup>2</sup>	시험구	165mm x 165mm
시험장비	- TVOC : Tenax TA		
시험장비	- Aldehyde : Ozone Scrubber(Waters 054420)→LP-DNPH(SUPECO 21014)		

4. 분석방법

가. 분석대상

(1) 총휘발성유기화합물(Total Volatile Organic Compounds)

가스크로마토그래피로 측정된 n-헥산에서 n-헥사데칸까지의 범위에서 검출되는 VOCs를 대상으로 하며, 각각의 휘발성을 고려하여 환산시켜 농도를 계산함.

(2) 알데하이드(Aldehyde)

시험에서 검출된 알데하이드는 흡수관(10cm)에서 검출된 알데하이드로 환산함.

(3) Trace

TVOC: 0.02(mg/m<sup>3</sup>) 이하, VOCs: 0.002(mg/m<sup>3</sup>), HCHO: 0.005(mg/m<sup>3</sup>), CH<sub>3</sub>CHO: 0.005(mg/m<sup>3</sup>) 이하의 한 값을 측정함.

나. 휘발성유기화합물(VOCs)의 분석

(1) Tenax TA 흡착관, 가열탈착장치, 냉각, 가열, 측정, 휘발성유기화합물 분리, 분석.

휘발성유기화합물과 흡착된 휘발성 유기화합물은 냉각, 가열, 측정, 휘발성유기화합물 분리, 분석.

스펙트로미터로 분석함.

(2) 질량 분석기 질량 분석법(MS)과 부속품 GC(Gas Chromatograph)와 휘발성 Total Ion Chromatograph (TIC)를 이용하여 분석함.

다. 알데하이드 분석

DNPH 카트리지에 DNPH 수용액은 아세트산으로 사용하며, 용해 및 용출시키고, 알데하이드를 고액액크로마토그래피(HPLC)를 써서 정량함.

5. 분석조건

시험장비	Split mode
열분해 장치	Splitless
GC/MS	DB-1
Column	DB-1
Carrier Gas and Flow	He(99.999%), 1.0 mL/min
Temperature	Initial Temperature
Program	Temperature Program
MS	Final Temperature
Condition	Mode
	Electron Energy
	Detection Mode
	HPLC
	Detector
	Column
	Mobile Phase
	Analysis Time
	Injection Volume
	Column Temperature
	Flow Rate

3. Test Conditions

Capacity of the small chamber	20ℓ	Temperature	25°C ± 1°C
Relative humidity	50% ± 3°C	Ventilation rate	0.5 times/h ± 3%
Sample load factor	2.0 m <sup>2</sup> / m <sup>2</sup>	Sample size	165mm x 165mm
Sampling tube	- TVOC: Tenax TA		
	- Aldehyde: Ozone Scrubber(Waters 054420)→LP-DNPH(SUPECO 21014)		

4. Analysis Method

A. Definition of the terms

(1) Total Volatile Organic Compounds

Targeting the VOCs detected in the range from the normal hexane to the n-hexadecane measured with the gas chromatogram, we calculated the concentration by converting each compound into toluene.

(2) Aldehyde

We defined the aldehyde detected at the air from the exit of the emission test chamber released from the test specimen as the aldehyde for the test.

(3) Trace

B. Analysis of the volatile organic compounds (VOCs)

(1) We eliminated the volatile organic compounds by putting the Tenax TA absorption tube into the heating desorption position and heating it.

When checking the type of the volatile organic compounds, we operated the mass spectrometer (MS) on scan mode, and distinguished the type based on the mass spectrum.

(2) As for the quantifying method, we used the Total Ion Chromatograph (TIC) by GC (Gas Chromatograph) attached to the mass spectrometer (MS).

C. Analysis of the aldehyde

We dissolved and eliminated the DNPH acceptor in the DNPH cartridge using acetonitrile, and quantified the eliminated solution using the high pressure liquid chromatography (HPLC).

5. Analysis Conditions

Cryogenic concentration system	Split mode 10: 1, -10°C (Low), 280 °C (High)
Thermal desorption system	Splitless mode, Flow: 40mL/min, 280°C (5 min)
Thermal Desorber	Markes, Unity
GC/MS	Shimadzu, GC 2010 / Shimadzu, QP2010
Column	DB-1 (60m Length, 0.32 mm I.D. Film 1.0 μm)
Carrier Gas and Flow	He(99.999%), 1.0 mL/min
Temperature Program	Initial Temperature: 50 °C (15 min)
	Temperature Program: 5 °C/min
	Final Temperature: 275°C (5 min)
MS Condition	Mode: EI (electron ionization)
	Electron Energy: 70 eV
	Detection Mode: TIC(Scan), 1260 Infinity
HPLC	Agilent, 1260 Infinity
Detector	UV/vis 360 nm
Column	Agilent, Eclipse XDB-C18 (150 mm Length, 4.6 mm I.D.)
Mobile Phase	ACA/Water(30/70,0min), (50/50,20min), (85/25, 35min)
Analysis Time	30 min
Injection Volume	20 uL
Column Temperature	25 °C
Flow Rate	1.0 mL/min

# Environmental Certification

1\_2) HB\_Certificate of Environmental Building Material\_Test Report\_by KACA

6. 분석결과

● Five VOCs (Five Volatile Organic Compounds)

No	항목	측정값
1	Benzene	0.000
2	Toluene	0.001
3	Ethylbenzene	0.000
4	Xylene	0.000
5	Styrene	0.000
Five VOCs Total		0.001

● 휘발성 유기화합물 실험결과를 참고하여

● 표준 휘발성 유기화합물 (Volatile Organic Compounds)

No	항목	측정값
1	Chloroform	0.000
2	1,2-Dichloroethane	0.000
3	1,1,1-Trichloroethane	0.000
4	Carbon tetrachloride	0.000
5	1,2-dichloropropane	0.000
6	Trichloroethylene	0.000
7	Cis-1,3-Dichloropropene	0.000
8	Trans-1,3-Dichloropropene	0.000
9	1,1,2-Trichloroethane	0.000
10	1,2-Dibromoethane	0.000
11	Tetrachloroethylene	0.000
12	Chlorobenzene	0.000
13	1,1,2,2-Tetrachloroethane	0.000
14	1,3,5-Trimethylbenzene	0.000
15	1,2,4-Trimethylbenzene	0.000
16	1,3-Dichlorobenzene	0.000
17	1,4-Dichlorobenzene	0.000
18	1,2-Dichlorobenzene	0.000
19	1,2,4-Trichlorobenzene	0.000
20	Hexachlorobutadiene	0.000
21	Unidentified	0.000

6. Analysis Results

● Five VOCs (Five Volatile Organic Compounds)

No	Item	Measurement value
		Emission intensity (mg/m <sup>3</sup> ·h)
1	Benzene	0.000
2	Toluene	0.001
3	Ethylbenzene	0.000
4	Xylene	0.000
5	Styrene	0.000
Five VOCs' Total		0.001

\* Standard material recommended by Ministry of Environment for the interior air quality of newly built apartment homes

● Standard Volatile Organic Compounds

No	Item	Measurement value
		Emission intensity (mg/m <sup>3</sup> ·h)
1	Chloroform	0.000
2	1,2-Dichloroethane	0.000
3	1,1,1-Trichloroethane	0.000
4	Carbon tetrachloride	0.000
5	1,2-dichloropropane	0.000
6	Trichloroethylene	0.000
7	Cis-1,3-Dichloropropene	0.000
8	Trans-1,3-Dichloropropene	0.000
9	1,1,2-Trichloroethylene	0.000
10	1,2-Dibromoethane	0.000
11	Tetrachloroethylene	0.000
12	Chlorobenzene	0.000
13	1,1,2,2-Tetrachloroethylene	0.000
14	1,3,5-Trimethylbenzene	0.000
15	1,2,4-Trimethylbenzene	0.000
16	1,3-Dichloropropene	0.000
17	1,4-Dichloropropene	0.000
18	1,2-Dichloropropene	0.000
19	1,2,4-Trimethylbenzene	0.000
20	Hexachlorobutadiene	0.000
21	Unidentified	0.000



## Environmental Certification



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## 02. GreenGuard Certificate

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- 2\_1) GreenGuard\_Certificate\_Gold Standard\_HI-MACS
- 2\_2) GreenGuard\_Certificate\_Gold Standard\_HI-MACS\_Volcanics
- 2\_3) GreenGuard\_Certificate\_Gold Standard\_HI-MACS\_Eden Plus
- 2\_4) GreenGuard\_Certificate\_Gold Standard\_HI-MACS\_Adhesive

HI-MACS® has been approved by Greenguard in the USA, as a “low emitting product”. The organisation establishes acceptable indoor air standards for indoor products, environments and buildings. The organisation’s goal is to improve public health and quality of life through programs that improve indoor air.

## Environmental Certification

2\_1) GreenGuard\_Certifiате\_Gold Standard\_HI-MACS

### CERTIFICATE OF COMPLIANCE



LG Hausys America, Inc.

LG Hausys HI-MACS®

Restrictions:with or without LG HI-MACS® joint adhesive

4007-420  
Certificate Number

08/13/2007 - 08/13/2016  
Certificate Period

Certified  
Status

UL 2818 -2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

Building products and interior finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V.1.1-2010 using the applicable exposure scenarios).



Environment

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

#### GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC <sup>(A)</sup>	-	0.22	mg/m <sup>3</sup>
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m <sup>3</sup>
Total Aldehydes <sup>(B)</sup>	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m <sup>3</sup>
Particle Matter less than 10 µm <sup>(C)</sup>	-	20	µg/m <sup>3</sup>
1-Methyl-2-pyrrolidinone <sup>(D)</sup>	872-50-4	160	µg/m <sup>3</sup>
Individual VOCs <sup>(E)</sup>	-	1/2 CREL or 1/100th TLV	-

<sup>(A)</sup> Defined to be the total response of measured VOCs falling within the C<sub>6</sub> – C<sub>10</sub> range, with responses calibrated to a toluene surrogate.

<sup>(B)</sup> The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

<sup>(C)</sup> Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

<sup>(D)</sup> Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m<sup>3</sup>/day

<sup>(E)</sup> Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.1 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



Environment

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

## Environmental Certification

2\_2) GreenGuard\_Certifiате\_Gold Standard\_HI-MACS\_Volcanics

### CERTIFICATE OF COMPLIANCE



LG Hausys America, Inc.

LG Hausys HI-MACS® Volcanics

Restrictions:with or without LG HI-MACS® joint adhesive

4009-420  
Certificate Number

08/13/2007 - 08/13/2016  
Certificate Period

Certified  
Status

UL 2818 -2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

Building products and interior finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V.1.1-2010 using the applicable exposure scenarios).



Environment

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

#### GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC <sup>(A)</sup>	-	0.22	mg/m <sup>3</sup>
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m <sup>3</sup>
Total Aldehydes <sup>(B)</sup>	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m <sup>3</sup>
Particle Matter less than 10 µm <sup>(C)</sup>	-	20	µg/m <sup>3</sup>
1-Methyl-2-pyrrolidinone <sup>(D)</sup>	872-50-4	160	µg/m <sup>3</sup>
Individual VOCs <sup>(E)</sup>	-	1/2 CREL or 1/100th TLV	-

<sup>(A)</sup> Defined to be the total response of measured VOCs falling within the C<sub>6</sub> – C<sub>10</sub> range, with responses calibrated to a toluene surrogate.

<sup>(B)</sup> The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

<sup>(C)</sup> Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

<sup>(D)</sup> Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m<sup>3</sup>/day

<sup>(E)</sup> Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.1 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



Environment

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

## Environmental Certification

2\_3) GreenGuard\_Certifiате\_Gold Standard\_HI-MACS\_Eden Plus

### CERTIFICATE OF COMPLIANCE



**LG Hausys America, Inc.**

**HI-MACS® Eden Plus**

Restrictions:with or without LG HI-MACS® joint adhesive

4008-420

Certificate Number

08/13/2007 - 08/13/2016

Certificate Period

Certified

Status

UL 2818 -2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

Building products and Interior finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V.1.1-2010 using the applicable exposure scenario(s).



**Environment**

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL E-Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

#### GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC <sup>(A)</sup>	-	0.22	mg/m <sup>3</sup>
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m <sup>3</sup>
Total Aldehydes <sup>(B)</sup>	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m <sup>3</sup>
Particle Matter less than 10 µm <sup>(C)</sup>	-	20	µg/m <sup>3</sup>
1-Methyl-2-pyrrolidinone <sup>(D)</sup>	872-50-4	160	µg/m <sup>3</sup>
Individual VOCs <sup>(E)</sup>	-	1/2 CREL or 1/100th TLV	-

<sup>(A)</sup> Defined to be the total response of measured VOCs falling within the C6 – C16 range, with responses calibrated to a toluene surrogate.

<sup>(B)</sup> The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

<sup>(C)</sup> Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

<sup>(D)</sup> Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m<sup>3</sup>/day

<sup>(E)</sup> Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.1 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



**Environment**

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL E-Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

## Environmental Certification

2\_4) GreenGuard\_Certifiате\_Gold Standard\_HI-MACS\_Adhesive

### CERTIFICATE OF COMPLIANCE



**LG Hausys America, Inc.**

**LG Adhesive**

Restrictions:

5949-420

Certificate Number

10/30/2007 - 08/13/2016

Certificate Period

Certified

Status

UL 2818 -2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

Building products and Interior finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V.1.1-2010 using the applicable exposure scenario(s).



**Environment**

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL E-Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

#### GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC <sup>(A)</sup>	-	0.22	mg/m <sup>3</sup>
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m <sup>3</sup>
Total Aldehydes <sup>(B)</sup>	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m <sup>3</sup>
Particle Matter less than 10 µm <sup>(C)</sup>	-	20	µg/m <sup>3</sup>
1-Methyl-2-pyrrolidinone <sup>(D)</sup>	872-50-4	160	µg/m <sup>3</sup>
Individual VOCs <sup>(E)</sup>	-	1/2 CREL or 1/100th TLV	-

<sup>(A)</sup> Defined to be the total response of measured VOCs falling within the C6 – C16 range, with responses calibrated to a toluene surrogate.

<sup>(B)</sup> The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

<sup>(C)</sup> Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

<sup>(D)</sup> Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m<sup>3</sup>/day

<sup>(E)</sup> Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.1 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



**Environment**

UL Environment investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL Environment and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Environment Mark for the identified Product(s) manufactured at the production site(s) covered by the UL E-Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

## Environmental Certification



### 03. SCS\_Certificate (LEED)

- 3\_1) SCS Certificate\_Recycled Content(35%)
- 3\_2) SCS Certificate\_Recycled Content(10%)
- 3\_3) SCS Certificate\_Recycled Content(6%)

Leadership in Energy and Environmental Design (LEED) is a standard voluntary system to certify high performance of buildings, from the US Green Building Council (USGBC).

LEED certifies buildings and systems using a credit system.

The use of the Eden Collection from HI-MACS® makes it possible to qualify a building for the IEQ Credit 4.1 "Low Emitting Materials - Adhesives and Sealants" (1 point), MR Credit 4.1 "Recycled Content 10%" (1 point) and MR Credit 4.2 "Recycled Content 20%" (1 point in addition to MR Credit 4.1) programmes.



## Environmental Certification

3\_1) SCS Certificate\_Recycled Content (35%)

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

### LG Hausys America, Inc.

310 LG Drive SE, P.O. Box 569, Adairsville, GA, USA

For the following product(s):

LG Eden Collection:

Birch Bark, Hickory, Horse Chestnut, Mountain Ash, Pecan,  
Poplar, Sugar Maple, and Walnut

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 35% Pre-consumer Recycled Resin Content  
Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-02322

Valid from: February 1, 2015 to January 31, 2016



**SCS**global  
SERVICES

*Robert J. Hrubes*

Robert J. Hrubes, Ph.D., Executive Vice President  
SCS Global Services  
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

## Environmental Certification

3\_2) SCS Certificate\_Recycled Content (10%)

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

### LG Hausys America, Inc.

310 LG Drive SE, P.O. Box 569, Adairsville, GA, USA

For the following product(s):

LG Eden Collection:

Cocoa, Honeysuckle, Ivy, Lemongrass, and Ripe Cotton

This product meets all of the necessary qualifications to be certified for the following claim:

Minimum 10% Pre-consumer Recycled Resin Content  
Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-01491

Valid from: February 1, 2015 to January 31, 2016



**SCS**global  
SERVICES

*Robert J. Hrubes*

Robert J. Hrubes, Ph.D., Executive Vice President  
SCS Global Services  
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

# Environmental Certification

3\_3) SCS Certificate\_Recycled Content (6%)

SCS Global Services does hereby certify that an independent assessment has been conducted on behalf of:

## LG Hausys America, Inc.

310 LG Drive SE, Adairsville, GA, United States

For the following product(s):

### LG Eden Collection:

Awaken, Balance, Barley, Beauty, Enchantment, Energy, Essence, Focus, Harmony, Imagination, Loyalty, Lunar Sand, Mature, Natural, Oatmeal, Pause, Pearl White, Pebble Pearl, Poppy Seed, Portland, Profound, Relieve, Rest, Saddlebow, Serenity, Silence, Simplicity, Stable, Tranquility, and Understanding

This product meets all of the necessary qualifications to be certified for the following claim:

### Minimum 6% Pre-Consumer Recycled Resin Content

Conforms to the SCS Recycled Content Standard V7-0

Registration # SCS-MC-02807

Valid from: February 1, 2015 to January 31, 2016



**SCS**global  
SERVICES

*Robert J. Hrubes*

Robert J. Hrubes, Ph.D., Executive Vice President  
SCS Global Services  
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

# Environmental Certification



## 04. NSF standards

- 4\_1) NSF International
- 4\_2) NSF\_Official Listings as of Oct. 26, 2015

NSF standards are generally accepted norms for a variety of public health related industries and fields. These include drinking water treatment and contact with materials, food equipment manufacturing etc. NSF recognizes that HI-MACS® complies with NSF norms

## Environmental Certification

4\_1) NSF International

### NSF International

789 N. Dixboro Road, Ann Arbor, MI 48105 USA

RECOGNIZES

LG Hausys, Ltd.

Facility: Cheong Ju City, Chung Buk, Korea, Republic of

AS COMPLYING WITH NSF/ANSI 51 AND ALL APPLICABLE REQUIREMENTS.

PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE  
AUTHORIZED TO BEAR THE NSF MARK.



This certificate is the property of NSF International and must be returned upon request. This certificate remains valid as long as this client has products in Listing for the referenced standards. For the most current and complete Listing information, please access NSF's website ([www.nsf.org](http://www.nsf.org)).

October 5, 2015  
Certificate# 73382 - 07

Sarah Krol  
Global Managing Director, Food Safety Product Certification

## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>



The Public Health and Safety Organization

### NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, October 26, 2015** at 12:15 a.m. Eastern Time. Please [contact NSF International](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information:  
<http://info.nsf.org/Certified/food/Listings.asp?Standard=051&Company=73380&>

### NSF/ANSI 51 Food Equipment Materials

LG Hausys, Ltd.  
One IFC(18F), #10 Gookjegeumyoong-ro  
Yeongdeungpo-gu  
Seoul 150-876  
Republic of Korea  
82 2 3773 7315

**Facility : Adairsville, GA**

Trade Designation	Color	Type of Food	Maximum Temperature
			of Use in °F
Solid Surfacing for Food Zone[1]			
LG Viatera	Nimbus	All food contact types	212°F
LG Viatera	Nocturne	All food contact types	212°
LG HI-MACS Go1	Desert Sand	All food contact types	212°
LG HI-MACS Go2	Grey Sand	All food contact types	212°
LG HI-MACS Go4	White Quartz	All food contact types	212°

## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G05	White Granite	All food contact types	212°
LG HI-MACS G06	Rose Quartz	All food contact types	212°
LG HI-MACS G07	Platinum Granite	All food contact types	212°
LG HI-MACS G08	Almond Pearl	All food contact types	212°
LG HI-MACS G09	Black Sand	All food contact types	212°
LG HI-MACS G10	Black Pearl	All food contact types	212°
LG HI-MACS G100	Peanut Butter	All food contact types	212°
LG HI-MACS G101	Crystal Beige	All food contact types	212°
LG HI-MACS G102	Crystal Granite	All food contact types	212°
LG HI-MACS G103	Graphite Granite	All food contact types	212°
LG HI-MACS G105	Brown Pearl	All food contact types	212°
LG HI-MACS G106	Riviera Sand	All food contact types	212°
LG HI-MACS G107	Pebble Pearl	All food contact types	212°
LG HI-MACS G108	Lunar Sand	All food contact types	212°
LG HI-MACS G111	Macchiato	All food contact types	212°
LG HI-MACS G114	CLAY	All food contact types	212°
LG HI-MACS G115	WHINSTONE	All food contact types	212°
LG HI-MACS G116	COOKIE	All food contact types	212°
LG HI-MACS G117	Cappuccino	All food contact types	212°
LG HI-MACS G118	Moon Haze	All food contact types	212°
LG HI-MACS G120	SWEETBARK	All food contact types	212°
LG HI-MACS G121	Maple Meadow	All food contact types	212°
LG HI-MACS G122	Bamboo Leaf	All food contact types	212°
LG HI-MACS G123	Cotton Dust	All food contact types	212°
LG HI-MACS G124	Birchwood	All food contact types	212°
LG HI-MACS G125	Coswal	All food contact types	212°
LG HI-MACS G126	Tybee	All food contact types	212°
LG HI-MACS G127	Edisto	All food contact types	212°
LG HI-MACS G128	Morel	All food contact types	212°
LG HI-MACS G129	Tisbury	All food contact types	212°
LG HI-MACS G15	Midnight Pearl	All food contact types	212°
LG HI-MACS G150	Mayan	All food contact types	212°
LG HI-MACS G151	Tanami	All food contact types	212°
LG HI-MACS G152	Nubian	All food contact types	212°
LG HI-MACS G153	Arabian	All food contact types	212°
LG HI-MACS G154	Karoo	All food contact types	212°
LG HI-MACS G155	Kalahari	All food contact types	212°
LG HI-MACS G156	Gobi	All food contact types	212°
LG HI-MACS G157	Wallowa	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G158	RAINSHINE	All food contact types	212°
LG HI-MACS G159	MOONDUST	All food contact types	212°
LG HI-MACS G16	Garnet Sand	All food contact types	212°
LG HI-MACS G17	Grey Granite	All food contact types	212°
LG HI-MACS G170	COCONUT	All food contact types	212°
LG HI-MACS G18	Rose Granite	All food contact types	212°
LG HI-MACS G180	SUGAR MAGNOLIA	All food contact types	212°
LG HI-MACS G181	BIG RIVER	All food contact types	212°
LG HI-MACS G182	RIPPLE	All food contact types	212°
LG HI-MACS G183	MORNING DEW	All food contact types	212°
LG HI-MACS G19	Natural Quartz	All food contact types	212°
LG HI-MACS G20	Green Sand	All food contact types	212°
LG HI-MACS G201	Blue Sand	All food contact types	212°
LG HI-MACS G22	Beige Sand	All food contact types	212°
LG HI-MACS G221	PINK PEARL	All food contact types	212°
LG HI-MACS G223R	Maui Quartz	All food contact types	212°
LG HI-MACS G23	Natural Granite	All food contact types	212°
LG HI-MACS G233	Indian Red	All food contact types	212°
LG HI-MACS G235	Candy White	All food contact types	212°
LG HI-MACS G237	Siberian Blue	All food contact types	212°
LG HI-MACS G24	Aqua Granite	All food contact types	212°
LG HI-MACS G26	Apple Green Sand	All food contact types	212°
LG HI-MACS G27	Turquoise Sand	All food contact types	212°
LG HI-MACS G29	Terra Quartz	All food contact types	212°
LG HI-MACS G30	Ivory Quartz	All food contact types	212°
LG HI-MACS G31	Black Granite	All food contact types	212°
LG HI-MACS G32	Steel Sand	All food contact types	212°
LG HI-MACS G33	Aztec Quartz	All food contact types	212°
LG HI-MACS G34	Arctic Granite	All food contact types	212°
LG HI-MACS G36	GRAVITY	All food contact types	212°
LG HI-MACS G38	Sea Oat Quartz	All food contact types	212°
LG HI-MACS G39	Azure Quartz	All food contact types	212°
LG HI-MACS G40	Celebration Granite	All food contact types	212°
LG HI-MACS G41	Confetti Quartz	All food contact types	212°
LG HI-MACS G42	Venetian Sand	All food contact types	212°
LG HI-MACS G43	Verde Quartz	All food contact types	212°
LG HI-MACS G44	Seafoam Quartz	All food contact types	212°
LG HI-MACS G47	Black Bird	All food contact types	212°
LG HI-MACS G48	Beach Sand	All food contact types	212°



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Listing Category Search Page | NSF International <http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G50	Tapioca Pearl	All food contact types	212°
LG HI-MACS G501R	Cocoa	All food contact types	212°
LG HI-MACS G502R	Ivy	All food contact types	212°
LG HI-MACS G503R	Lemongrass	All food contact types	212°
LG HI-MACS G504R	Honeysuckle	All food contact types	212°
LG HI-MACS G505R	Jasmine	All food contact types	212°
LG HI-MACS G506R	Juniper	All food contact types	212°
LG HI-MACS G507R	Palm	All food contact types	212°
LG HI-MACS G508R	Wallflower	All food contact types	212°
LG HI-MACS G51	Atlantic Quartz	All food contact types	212°
LG HI-MACS G510R	Sugar Maple	All food contact types	212°
LG HI-MACS G511R	Poplar	All food contact types	212°
LG HI-MACS G512R	Horse Chestnut	All food contact types	212°
LG HI-MACS G513R	Walnut	All food contact types	212°
LG HI-MACS G514R	Birch Bark	All food contact types	212°
LG HI-MACS G515R	Pecan	All food contact types	212°
LG HI-MACS G516R	Hickory	All food contact types	212°
LG HI-MACS G517R	Mountain Ash	All food contact types	212°
LG HI-MACS G518R	Ripe Cotton	All food contact types	212°
LG HI-MACS G519R	Pure Snow	All food contact types	212°
LG HI-MACS G520R	Pure Frost	All food contact types	212°
LG HI-MACS G53	Stardust Granite	All food contact types	212°
LG HI-MACS G58	Moonscape Quartz	All food contact types	212°
LG HI-MACS G59	Spiced Java Sand	All food contact types	212°
LG HI-MACS G60	Greystone Granite	All food contact types	212°
LG HI-MACS G602	Storm Granite	All food contact types	212°
LG HI-MACS G603	Saddle Granite	All food contact types	212°
LG HI-MACS G604	Timberwolf Granite	All food contact types	212°
LG HI-MACS G605	Umber Granite	All food contact types	212°
LG HI-MACS G606	Annato Granite	All food contact types	212°
LG HI-MACS G62	Oregano Sand	All food contact types	212°
LG HI-MACS G63	Allspice Quartz	All food contact types	212°
LG HI-MACS G64	Foliage Quartz	All food contact types	212°
LG HI-MACS G65	Tundra Quartz	All food contact types	212°
LG HI-MACS G70	Delta Sand	All food contact types	212°
LG HI-MACS G710	Sugar Maple NR	All food contact types	212°
LG HI-MACS G711	Poplar NR	All food contact types	212°
LG HI-MACS G712	Horse Chestnut NR	All food contact types	212°
LG HI-MACS G713	Walnut NR	All food contact types	212°

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Listing Category Search Page | NSF International <http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G714	Birch Bark NR	All food contact types	212°
LG HI-MACS G715	Pecan NR	All food contact types	212°
LG HI-MACS G716	Hickory NR	All food contact types	212°
LG HI-MACS G717	Mountain Ash NR	All food contact types	212°
LG HI-MACS G72	Sienna Quartz	All food contact types	212°
LG HI-MACS G73	Mesa Granite	All food contact types	212°
LG HI-MACS G74	Mocha Granite	All food contact types	212°
LG HI-MACS G75	Sonoran Granite	All food contact types	212°
LG HI-MACS GT901	Sapphire Pearl	All food contact types	212°
LG HI-MACS GT902	Wicker Sand	All food contact types	212°
LG HI-MACS GT903	Amsterdam Quartz	All food contact types	212°
LG HI-MACS GT904	Bahia	All food contact types	212°
LG HI-MACS GT905	Opaque	All food contact types	212°
LG HI-MACS GT906	Milkweed	All food contact types	212°
LG HI-MACS GT907	Stonewall	All food contact types	212°
LG HI-MACS GT908	Harvest	All food contact types	212°
LG HI-MACS GT909	Armadillo	All food contact types	212°
LG HI-MACS GT910	Egg White	All food contact types	212°
LG HI-MACS GT911	Cork	All food contact types	212°
LG HI-MACS GT912	Trail Gray	All food contact types	212°
LG HI-MACS GT913	Vanilla Sugar	All food contact types	212°
LG HI-MACS GT914	Merino	All food contact types	212°
LG HI-MACS GT915	Meteor	All food contact types	212°
LG HI-MACS GT916	Cougar	All food contact types	212°
LG HI-MACS GT917	Goshen Gray	All food contact types	212°
LG HI-MACS GT918	Volcanic Ice	All food contact types	212°
LG HI-MACS GT919	Snowdrift	All food contact type	212°
LG HI-MACS GT920	Jayco	All food contact types	212°
LG HI-MACS GT921	Chamois	All food contact types	212°
LG HI-MACS GT922	Mudslide	All food contact types	212°
LG HI-MACS GT923	Snowbird	All food contact types	212°
LG HI-MACS GT924	Pepper Blanco	All food contact types	212°
LG HI-MACS GT925	Starry Night	All food contact types	212°
LG HI-MACS GT926	Infinity	All food contact types	212°
LG HI-MACS GT927	Cayenne	All food contact types	212°
LG HI-MACS GT928	Stoneybrook	All food contact types	212°
LG HI-MACS GT929	Éclair	All food contact types	212°
LG HI-MACS GT930	Moroccan Night	All food contact types	212°
LG HI-MACS GT931	Azure Pearl	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

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<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS GT932	Obsidian Quartz	All food contact types	212°
LG HI-MACS GT933	Balleny	All food contact types	212°
LG HI-MACS GT934	Hazelnut Shell	All food contact types	212°
LG HI-MACS GT935	Deep Frost	All food contact types	212°
LG HI-MACS GT936	Talus	All food contact types	212°
LG HI-MACS GT937	Barley	All food contact types	212°
LG HI-MACS GT938	Oatmeal	All food contact types	212°
LG HI-MACS GT939	Poppy Seed	All food contact types	212°
LG HI-MACS GT940	Rio Grande	All food contact types	212°
LG HI-MACS GT941	Bridgepoint White	All food contact types	212°
LG HI-MACS GT942	Sable	All food contact types	212°
LG HI-MACS GT943	Amberglow Quartz	All food contact types	212°
LG HI-MACS GT944	Pearl White	All food contact types	212°
LG HI-MACS GT945	Portland	All food contact types	212°
LG HI-MACS GT946	Saddlebow	All food contact types	212°
LG HI-MACS GT947	White Flannel	All food contact types	212°
LG HI-MACS GT948	Carya	All food contact types	212°
LG HI-MACS GT949	Populus	All food contact types	212°
LG HI-MACS GT950	Gold Rush	All food contact types	212°
LG HI-MACS Lo1	Sugarloaf	All food contact types	212°
LG HI-MACS Lo2	Pinnacle	All food contact types	212°
LG HI-MACS Lo3	Hawksbill	All food contact types	212°
LG HI-MACS Lo4	Swanee	All food contact types	212°
LG HI-MACS Lo5	COTOPAXI	All food contact types	212°
LG HI-MACS Lo6	PARADISO	All food contact types	212°
LG HI-MACS Lo7	ANETO	All food contact types	212°
LG HI-MACS Lo8	NEPHIN	All food contact types	212°
LG HI-MACS Lo9	TUSCARORA	All food contact types	212°
LG HI-MACS L10	RAINER	All food contact types	212°
LG HI-MACS L11	BERKSHIRE	All food contact types	212°
LG HI-MACS L12	ANGTO	All food contact types	212°
LG HI-MACS L13	GOLDEN MOUNTAIN	All food contact types	212°
LG HI-MACS L14	GEYSER	All food contact types	212°
LG HI-MACS L15	VULCAN	All food contact types	212°
LG HI-MACS L16	LUSTER	All food contact types	212°
LG HI-MACS L17	KAMET	All food contact types	212°
LG HI-MACS Mo1	Firenze White	All food contact types	212°
LG HI-MACS Mo2	Venice Ivory	All food contact types	212°
LG HI-MACS Mo3	Verona Grey	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

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LG HI-MACS Mo4	Vigaria Brown	All food contact types	212°
LG HI-MACS Ro09	Pause	All food contact types	212°
LG HI-MACS Ro41	Imagination	All food contact types	212°
LG HI-MACS R118	Rest	All food contact types	212°
LG HI-MACS R530	Relieve	All food contact types	212°
LG HI-MACS R531	Stable	All food contact types	212°
LG HI-MACS R532	Loyalty	All food contact types	212°
LG HI-MACS R533	Mature	All food contact types	212°
LG HI-MACS R534	Tranquility	All food contact types	212°
LG HI-MACS R535	Energy	All food contact types	212°
LG HI-MACS R536	Essence	All food contact types	212°
LG HI-MACS R537	Awaken	All food contact types	212°
LG HI-MACS R538	Understanding	All food contact types	212°
LG HI-MACS R539	Focus	All food contact types	212°
LG HI-MACS R540	Balance	All food contact types	212°
LG HI-MACS R541	Enchantment	All food contact types	212°
LG HI-MACS R542	Harmony	All food contact types	212°
LG HI-MACS R543	Beauty	All food contact types	212°
LG HI-MACS R544	Serenity	All food contact types	212°
LG HI-MACS R545	Profound	All food contact types	212°
LG HI-MACS R640	Silence	All food contact types	212°
LG HI-MACS R913	Natural	All food contact types	212°
LG HI-MACS R943	Simplicity	All food contact types	212°
LG HI-MACS So1	Satin White	All food contact types	212°
LG HI-MACS So2	Almond	All food contact types	212°
LG HI-MACS So3	Rose	All food contact types	212°
LG HI-MACS So4	Apricot	All food contact types	212°
LG HI-MACS So5	Grey	All food contact types	212°
LG HI-MACS So6	Arctic White	All food contact types	212°
LG HI-MACS So9	Cream	All food contact types	212°
LG HI-MACS S100	Coffee Brown	All food contact types	212°
LG HI-MACS S101	Jasmine Green	All food contact types	212°
LG HI-MACS S102	Babylon Beige	All food contact types	212°
LG HI-MACS S103	Concrete Grey	All food contact types	212°
LG HI-MACS S104	Toffee Brown	All food contact types	212°
LG HI-MACS S105	Midnight Grey	All food contact types	212°
LG HI-MACS S108	Phantom White	All food contact types	212°
LG HI-MACS S201	Nougat Cream	All food contact types	212°
LG HI-MACS S203	Sky Blue	All food contact types	212°

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LG HI-MACS S204	Venus Green	All food contact types	212°
LG HI-MACS S205	Florida Orange	All food contact types	212°
LG HI-MACS S206	Iowa Blue	All food contact types	212°
LG HI-MACS S207	Marta Grey	All food contact types	212°
LG HI-MACS S208	Festival Pink	All food contact types	212°
LG HI-MACS S209	Steel Grey	All food contact types	212°
LG HI-MACS S211	Lemon Squash	All food contact types	212°
LG HI-MACS S212	Light Green	All food contact types	212°
LG HI-MACS S214	Nordic White	All food contact types	212°
LG HI-MACS S215	Marzarin Blue	All food contact types	212°
LG HI-MACS S216	Lilac Haze	All food contact types	212°
LG HI-MACS S22	Black	All food contact types	212°
LG HI-MACS S25	Fiery Red	All food contact types	212°
LG HI-MACS S26	Banana	All food contact types	212°
LG HI-MACS S27	Orange	All food contact types	212°
LG HI-MACS S28	Alpine White	All food contact types	212°
LG HI-MACS S29	Ivory White	All food contact types	212°
LG HI-MACS ST020	Pan 186	All food contact types	212°
LG HI-MACS ST901	Arizona Pink	All food contact types	212°
LG HI-MACS ST902	Indiana Apricot	All food contact types	212°
LG HI-MACS ST903	Hazelnut	All food contact types	212°
LG HI-MACS ST905	Apple Gray	All food contact types	212°
LG HI-MACS ST907	Ghost White	All food contact types	212°
LG HI-MACS ST908	Mist Gray	All food contact types	212°
LG HI-MACS ST909	Smoke Gray	All food contact types	212°
LG HI-MACS ST910	Flame Red	All food contact types	212°
LG HI-MACS To1	Venus	All food contact types	212°
LG HI-MACS To2	Cosmos	All food contact types	212°
LG HI-MACS To3	Saturn	All food contact types	212°
LG HI-MACS To4	Mercury	All food contact types	212°
LG HI-MACS To5	Pluto	All food contact types	212°
LG HI-MACS To6	Phobos	All food contact types	212°
LG HI-MACS To7	Jupiter	All food contact types	212°
LG HI-MACS To8	Blackhole	All food contact types	212°
LG HI-MACS To9	Milky Way	All food contact types	212°
LG HI-MACS T17	Andromeda	All food contact types	212°
LG HI-MACS T18	Carina	All food contact types	212°
LG HI-MACS T20	Hercules	All food contact types	212°
LG HI-MACS T24	Murano	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

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LG HI-MACS T30	Mars	All food contact types	212°
LG HI-MACS T31	Titan	All food contact types	212°
LG HI-MACS VA01	Santa Ana	All food contact types	212°
LG HI-MACS VA21	Pinnacles	All food contact types	212°
LG HI-MACS VA22	Frosty	All food contact types	212°
LG HI-MACS VA23	Vesuvio	All food contact types	212°
LG HI-MACS VB01	Merapi	All food contact types	212°
LG HI-MACS VB02	CIMA	All food contact types	212°
LG HI-MACS VB21	Taos	All food contact types	212°
LG HI-MACS VB22	Baker	All food contact types	212°
LG HI-MACS VB03	MAKIAN	All food contact types	212°
LG HI-MACS VE01	Tambora	All food contact types	212°
LG HI-MACS VE02	Mikeno	All food contact types	212°
LG HI-MACS VE11	Amberglow	All food contact types	212°
LG HI-MACS VE12	Moonmist	All food contact types	212°
LG HI-MACS VE13	Kaffa	All food contact types	212°
LG HI-MACS VE21	Lattitude	All food contact types	212°
LG HI-MACS VE22	Colima	All food contact types	212°
LG HI-MACS VE23	Mayon	All food contact types	212°
LG HI-MACS VE24	Casera	All food contact types	212°
LG HI-MACS VG01	Etna	All food contact types	212°
LG HI-MACS VG11	Vetro	All food contact types	212°
LG HI-MACS VG21	Maui	All food contact types	212°
LG HI-MACS VG22	Basil	All food contact types	212°
LG HI-MACS VG23	Marin	All food contact types	212°
LG HI-MACS VLo1	Caldera	All food contact types	212°
LG HI-MACS VL21	Santorini	All food contact types	212°
LG HI-MACS VL22	Merea	All food contact types	212°
LG HI-MACS VN01	Metis	All food contact types	212°
LG HI-MACS VN02	Late	All food contact types	212°
LG HI-MACS VN21	Cameroon	All food contact types	212°
LG HI-MACS VN22	Dominica	All food contact types	212°
LG HI-MACS VN23	Castle	All food contact types	212°
LG HI-MACS VN24	Kohala	All food contact types	212°
LG HI-MACS VR01	Pacaya	All food contact types	212°
LG HI-MACS VR21	Steller	All food contact types	212°
LG HI-MACS VW01	Gemini	All food contact types	212°
LG HI-MACS VW11	Powder	All food contact types	212°
LG HI-MACS VW21	Fresh	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

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LG HI-MACS VY11	Zaffre	All food contact types	212°
LG Viatera	Antella	All food contact types	212°
LG Viatera	Antico Pearl	All food contact types	212°
LG Viatera	Antigua	All food contact types	212°
LG Viatera	Antique	All food contact types	212°
LG Viatera	Antique Limestone	All food contact types	212°
LG Viatera	Aria	All food contact types	212°
LG Viatera	Artesia	All food contact types	212°
LG Viatera	Baracoa	All food contact types	212°
LG Viatera	Barbados	All food contact types	212°
LG Viatera	Bellemonte	All food contact types	212°
LG Viatera	Bourbon	All food contact types	212°
LG Viatera	Brown Granite	All food contact types	212°
LG Viatera	Cabrillo	All food contact types	212°
LG Viatera	Cabo	All food contact types	212°
LG Viatera	Cairo	All food contact types	212°
LG Viatera	Caldera	All food contact types	212°
LG Viatera	Caspian	All food contact types	212°
LG Viatera	Charcoal Mist	All food contact types	212°
LG Viatera	Cirrus	All food contact types	212°
LG Viatera	Clarino	All food contact types	212°
LG Viatera	Coconino	All food contact types	212°
LG Viatera	Copper Patina	All food contact types	212°
LG Viatera	Cortez	All food contact types	212°
LG Viatera	Cortina	All food contact types	212°
LG Viatera	Cove	All food contact types	212°
LG Viatera	Crystal White	All food contact types	212°
LG Viatera	Cypress	All food contact types	212°
LG Viatera	Denali	All food contact types	212°
LG Viatera	Desert Storm	All food contact types	212°
LG Viatera	Domingo	All food contact types	212°
LG Viatera	Everest	All food contact types	212°
LG Viatera	Flagstone	All food contact types	212°
LG Viatera	Flaked Pearl	All food contact types	212°
LG Viatera	Ft. Hood	All food contact types	212°
LG Viatera	Geneva	All food contact types	212°
LG Viatera	Grey	All food contact types	212°
LG Viatera	Himalaya	All food contact types	212°
LG Viatera	Intermezzo	All food contact types	212°

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4\_2) NSF\_Official Listings as of Oct. 26, 2015

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LG Viatera	Juniper Trail	All food contact types	212°
LG Viatera	Kenai	All food contact types	212°
LG Viatera	Kilauea	All food contact types	212°
LG Viatera	Laguna	All food contact types	212°
LG Viatera	Magnolia	All food contact types	212°
LG Viatera	Mahogany	All food contact types	212°
LG Viatera	Mesquite Moon	All food contact types	212°
LG Viatera	Midnight	All food contact types	212°
LG Viatera	Minuet	All food contact types	212°
LG Viatera	Monet	All food contact types	212°
LG Viatera	Montego	All food contact types	212°
LG Viatera	Monterey	All food contact types	212°
LG Viatera	Morocco	All food contact types	212°
LG Viatera	Mulholland	All food contact types	212°
LG Viatera	Nassau	All food contact types	212°
LG Viatera	Natural Limestone	All food contact types	212°
LG Viatera	Niagara	All food contact types	212°
LG Viatera	Nova	All food contact types	212°
LG Viatera	Oahu	All food contact types	212°
LG Viatera	Obsidian	All food contact types	212°
LG Viatera	Octave	All food contact types	212°
LG Viatera	Oyster	All food contact types	212°
LG Viatera	Olive Rust	All food contact types	212°
LG Viatera	Palermo	All food contact types	212°
LG Viatera	Pisgah	All food contact types	212°
LG Viatera	Redwood	All food contact types	212°
LG Viatera	River Shoal	All food contact types	212°
LG Viatera	Rococo	All food contact types	212°
LG Viatera	Rosegu	All food contact types	212°
LG Viatera	Royal Teak	All food contact types	212°
LG Viatera	Safari	All food contact types	212°
LG Viatera	San Tropez	All food contact types	212°
LG Viatera	Sand	All food contact types	212°
LG Viatera	Santiago	All food contact types	212°
LG Viatera	Santo Domingo	All food contact types	212°
LG Viatera	Sapporo	All food contact types	212°
LG Viatera	Sella	All food contact types	212°
LG Viatera	Shadow	All food contact types	212°
LG Viatera	Sienna Sand	All food contact types	212°

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## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG Viatera	Sierra	All food contact types	212°
LG Viatera	Silver Lake	All food contact types	212°
LG Viatera	Snowcap	All food contact types	212°
LG Viatera	Snow Storm	All food contact types	212°
LG Viatera	Solano	All food contact types	212°
LG Viatera	Solar Canyon	All food contact types	212°
LG Viatera	Soprano	All food contact types	212°
LG Viatera	Spanish Bay	All food contact types	212°
LG Viatera	Sugar Sand	All food contact types	212°
LG Viatera	Sugar Storm	All food contact types	212°
LG Viatera	Symphony	All food contact types	212°
LG Viatera	Thunder Storm	All food contact types	212°
LG Viatera	Trentino	All food contact types	212°
LG Viatera	Truffle	All food contact types	212°
LG Viatera	Ultra White	All food contact types	212°
LG Viatera	Vintage Limestone	All food contact types	212°
LG Viatera	Volcanic Rock	All food contact types	212°
LG Viatera	Wild Wood	All food contact types	212°

[1] For use as a table or countertop. Not intended for food storage.

**Facility :** Cheong Ju City, Chung Buk, Korea, Republic of

Trade Designation	Color	Type of Food	Maximum Temperature of Use in °F
<b>Solid Surfacing for Food Zone[1]</b>			
LG HI-MACS G01	Desert Sand	All food contact types	212°
LG HI-MACS G02	Grey Sand	All food contact types	212°
LG HI-MACS G03	Strawberry Sand	All food contact types	212°
LG HI-MACS G04	White Quartz	All food contact types	212°
LG HI-MACS G05	White Granite	All food contact types	212°
LG HI-MACS G06	Rose Quartz	All food contact types	212°
LG HI-MACS G07	Platinum Granite	All food contact types	212°
LG HI-MACS G08	Almond Pearl	All food contact types	212°
LG HI-MACS G09	Black Sand	All food contact types	212°
LG HI-MACS G10	Black Pearl	All food contact types	212°

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## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G11	Plum Pearl	All food contact types	212°
LG HI-MACS G12	Emerald Pearl	All food contact types	212°
LG HI-MACS G13	Rose Sand	All food contact types	212°
LG HI-MACS G14	White Pearl	All food contact types	212°
LG HI-MACS G15	Midnight Pearl	All food contact types	212°
LG HI-MACS G16	Garnet Sand	All food contact types	212°
LG HI-MACS G17	Grey Granite	All food contact types	212°
LG HI-MACS G18	Rose Granite	All food contact types	212°
LG HI-MACS G19	Natural Quartz	All food contact types	212°
LG HI-MACS G20	Green Sand	All food contact types	212°
LG HI-MACS G201	Blue Sand	All food contact types	212°
LG HI-MACS G202	Brown Pearl	All food contact types	212°
LG HI-MACS G203	Violet Pearl	All food contact types	212°
LG HI-MACS G21	Ocean Pearl	All food contact types	212°
LG HI-MACS G210	Apple Bee	All food contact types	212°
LG HI-MACS G211	Brown Amber	All food contact types	212°
LG HI-MACS G212	Deep Purple Pearl	All food contact types	212°
LG HI-MACS G213	White Crystal	All food contact types	212°
LG HI-MACS G214	Ivory Crystal	All food contact types	212°
LG HI-MACS G215	Pacific Sand	All food contact types	212°
LG HI-MACS G216	Dark Sand	All food contact types	212°
LG HI-MACS G217	Ashy Sand	All food contact types	212°
LG HI-MACS G218	Caramel Stone	All food contact types	212°
LG HI-MACS G219	Praline	All food contact types	212°
LG HI-MACS G22	Beige Sand	All food contact types	212°
LG HI-MACS G220	Red Bean	All food contact types	212°
LG HI-MACS G221	Pick Pearl	All food contact types	212°
LG HI-MACS G223 R	Maui Quartz	All food contact types	212°
LG HI-MACS G23	Natural Granite	All food contact types	212°
LG HI-MACS G234	Polaris	All food contact types	212°
LG HI-MACS G24	Aqua Granite	All food contact types	212°
LG HI-MACS G25	Mauve Sand	All food contact types	212°
LG HI-MACS G26	Apple Green Sand	All food contact types	212°
LG HI-MACS G27	Turquoise Sand	All food contact types	212°
LG HI-MACS G28	Lapis Granite	All food contact types	212°
LG HI-MACS G29	Terra Quartz	All food contact types	212°
LG HI-MACS G30	Ivory Quartz	All food contact types	212°
LG HI-MACS G31	Black Granite	All food contact types	212°
LG HI-MACS G32	Steel Sand	All food contact types	212°

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## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G33	Aztec Quartz	All food contact types	212°
LG HI-MACS G34	Arctic Granite	All food contact types	212°
LG HI-MACS G34AB	Milky White	All food contact types	212°
LG HI-MACS G35	Capital Blue	All food contact types	212°
LG HI-MACS G36	Imperial Quartz	All food contact types	212°
LG HI-MACS G37	World White	All food contact types	212°
LG HI-MACS G38	Sea Oat Quartz	All food contact types	212°
LG HI-MACS G38AB	Topaz	All food contact types	212°
LG HI-MACS G39	Azure Quartz	All food contact types	212°
LG HI-MACS G40	Celebration Granite	All food contact types	212°
LG HI-MACS G41	Confetti Quartz	All food contact types	212°
LG HI-MACS G42	Venetian Sand	All food contact types	212°
LG HI-MACS G43	Verde Quartz	All food contact types	212°
LG HI-MACS G44	Seafoam Quartz	All food contact types	212°
LG HI-MACS G44AB	Sugar White	All food contact types	212°
LG HI-MACS G45	Accent White	All food contact types	212°
LG HI-MACS G45AB	Accent White	All food contact types	212°
LG HI-MACS G46	Almond Quartz	All food contact types	212°
LG HI-MACS G46AB	Almond Quartz	All food contact types	212°
LG HI-MACS G47	Black Bird	All food contact types	212°
LG HI-MACS G48	Beach Sand	All food contact types	212°
LG HI-MACS G49	Hanvit Sand	All food contact types	212°
LG HI-MACS G50	Tapioca Pearl	All food contact types	212°
LG HI-MACS G51	Atlantic Quartz	All food contact types	212°
LG HI-MACS G52	Shadow Quartz	All food contact types	212°
LG HI-MACS G53	Stardust Granite	All food contact types	212°
LG HI-MACS G54	Pican	All food contact types	212°
LG HI-MACS G55AB	Indian White	All food contact types	212°
LG HI-MACS G56AB	Roman Quartz	All food contact types	212°
LG HI-MACS G57AB	Noble White	All food contact types	212°
LG HI-MACS G58	Moonscape Quartz	All food contact types	212°
LG HI-MACS G59	Spiced Java Sand	All food contact types	212°
LG HI-MACS G60	Greystone Granite	All food contact types	212°
LG HI-MACS G61	Indigo Granite	All food contact types	212°
LG HI-MACS G62	Oregano Sand	All food contact types	212°
LG HI-MACS G63	Allspice Quartz	All food contact types	212°
LG HI-MACS G64	Foliage Quartz	All food contact types	212°
LG HI-MACS G65	Tundra Quartz	All food contact types	212°
LG HI-MACS G66	Himalaya	All food contact types	212°

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## Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

<http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...>

LG HI-MACS G67	Snowfield	All food contact types	212°
LG HI-MACS G68	Vanilla White	All food contact types	212°
LG HI-MACS G69	Sugar Sand	All food contact types	212°
LG HI-MACS G70	Delta Sand	All food contact types	212°
LG HI-MACS G71	Dalmation	All food contact types	212°
LG HI-MACS G72	Sienna Quartz	All food contact types	212°
LG HI-MACS G73	Mesa Granite	All food contact types	212°
LG HI-MACS G74	Mocha Granite	All food contact types	212°
LG HI-MACS G75	Sonoran Granite	All food contact types	212°
LG HI-MACS G76	Coral Granite	All food contact types	212°
LG HI-MACS G81	White Sand	All food contact types	212°
LG HI-MACS G82	Ash Sand	All food contact types	212°
LG HI-MACS G83	Sesami Pearl	All food contact types	212°
LG HI-MACS G84	Sahara Pearl	All food contact types	212°
LG HI-MACS G85	Nut Quartz	All food contact types	212°
LG HI-MACS G86	Almond Pearl	All food contact types	212°
LG HI-MACS G87	Granite Sugar	All food contact types	212°
LG HI-MACS G88	Granite Azul	All food contact types	212°
LG HI-MACS G89	Granite Graige	All food contact types	212°
LG HI-MACS G90	Granite Sepia	All food contact types	212°
LG HI-MACS G91	Granite Pearl Gray	All food contact types	212°
LG HI-MACS G92	Granite Coral	All food contact types	212°
LG HI-MACS G93	Granite Perulla	All food contact types	212°
LG HI-MACS M01	Firenze White	All food contact types	212°
LG HI-MACS M02	Venice Ivory	All food contact types	212°
LG HI-MACS M03	Verona Grey	All food contact types	212°
LG HI-MACS M04	Vigaria Brown	All food contact types	212°
LG HI-MACS P01	Perna White	All food contact types	212°
LG HI-MACS P02	Perna Gray	All food contact types	212°
LG HI-MACS P03	Perna Ocean Blue	All food contact types	212°
LG HI-MACS P04	Perna Black	All food contact types	212°
LG HI-MACS P05	Perna Charcoal	All food contact types	212°
LG HI-MACS S01	Satin White	All food contact types	212°
LG HI-MACS S02	Almond	All food contact types	212°
LG HI-MACS S03	Rose	All food contact types	212°
LG HI-MACS S04	Apricot	All food contact types	212°
LG HI-MACS S05	Grey	All food contact types	212°
LG HI-MACS S06	Arctic White	All food contact types	212°
LG HI-MACS S07	Sage Green	All food contact types	212°

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Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...

LG HI-MACS S08	Egg Shell	All food contact types	212°
LG HI-MACS S09	Cream	All food contact types	212°
LG HI-MACS S201	Nougat Sand	All food contact types	212°
LG HI-MACS S202	Rain Gray	All food contact types	212°
LG HI-MACS S203	Sky Blue	All food contact types	212°
LG HI-MACS S204	Venus Green	All food contact types	212°
LG HI-MACS S205	Peach Cream	All food contact types	212°
LG HI-MACS S206	Light Pink	All food contact types	212°
LG HI-MACS S207	Midnight Gray	All food contact types	212°
LG HI-MACS S23	Cream	All food contact types	212°
LG HI-MACS S24	Almond	All food contact types	212°
LG HI-MACS S25	Fiery Red	All food contact types	212°
LG HI-MACS S26	Banana	All food contact types	212°
LG HI-MACS S27	Orange	All food contact types	212°
LG HI-MACS S28	Alpine White	All food contact types	212°
LG HI-MACS S29	Ivory White	All food contact types	212°
LG HI-MACS VA01	Santa Ana	All food contact types	212°
LG HI-MACS VA21	Pinnacles	All food contact types	212°
LG HI-MACS VA22	Frosty	All food contact types	212°
LG HI-MACS VA23	Vesuvio	All food contact types	212°
LG HI-MACS VB01	Merapi	All food contact types	212°
LG HI-MACS VB21	Taos	All food contact types	212°
LG HI-MACS VB22	Baker	All food contact types	212°
LG HI-MACS VE01	Tambora	All food contact types	212°
LG HI-MACS VE02	Mikeno	All food contact types	212°
LG HI-MACS VE21	Lattitude	All food contact types	212°
LG HI-MACS VE22	Colima	All food contact types	212°
LG HI-MACS VE23	Mayon	All food contact types	212°
LG HI-MACS VE24	Casera	All food contact types	212°
LG HI-MACS VG01	Etna	All food contact types	212°
LG HI-MACS VG21	Maui	All food contact types	212°
LG HI-MACS VG22	Basil	All food contact types	212°
LG HI-MACS VG23	Marin	All food contact types	212°
LG HI-MACS VLo1	Caldera	All food contact types	212°
LG HI-MACS VL21	Santorini	All food contact types	212°
LG HI-MACS VL22	Merea	All food contact types	212°
LG HI-MACS VN01	Metis	All food contact types	212°
LG HI-MACS VN02	Late	All food contact types	212°
LG HI-MACS VN21	Cameroon	All food contact types	212°

Environmental Certification

4\_2) NSF\_Official Listings as of Oct. 26, 2015

Listing Category Search Page | NSF International

http://info.nsf.org/Certified/Food/Listings.asp?Company=7338...

LG HI-MACS VN22	Dominica	All food contact types	212°
LG HI-MACS VN23	Castle	All food contact types	212°
LG HI-MACS VN24	Kohala	All food contact types	212°
LG HI-MACS VR01	Pacaya	All food contact types	212°
LG HI-MACS VR21	Stellar	All food contact types	212°
LG HI-MACS VW01	Gemini	All food contact types	212°
LG HI-MACS VW21	Fresh	All food contact types	212°

[1] For use only as a table or countertop. Not intended for food storage.

Number of matching Manufacturers is 1

Number of matching Products is 586

Processing time was 1 seconds

## Environmental Certification



### 05. HPD (Health Product Declaration)

- 5\_1) LG Hausys\_HI-MACS\_HPD
- 5\_2) LG Hausys\_HI-MACS\_Volcanics\_HPD
- 5\_3) LG Hausys\_HI-MACCS\_Eden Plus\_HPD

This Health Product Declaration was generated following the requirements of the noted Standard version and is valid for a total of three years after date of issue or three months after a substantive change of product contents occurs.

Users should verify that this Health Product Declaration is compliant with the most current version of the HPD Standard. Accuracy of claims made in this Health Product Declaration is the sole responsibility of the listed manufacturer and certifier (if applicable). The HPD Collaborative does not warrant any claim made herein, explicit or implicit.

The HPD Standard is an “open standard” developed and managed by the HPD Collaborative, a nonprofit organization. For more information, visit [hpdcollaborative.org](http://hpdcollaborative.org).



## 5\_1) LG Hausys\_HI-MACS\_HPD



## 5\_1) LG Hausys\_HI-MACS\_HPD



## Environmental Certification

5\_1) LG Hausys\_HI-MACS\_HPD

Notes				
VOC Emissions	GreenGuard - Gold (previously Children & Schools)		GreenGuard Environmental Institute (GEI)	
	3rd party independent certification	2007-08-13	2015-08-13	<a href="https://productguide.ulenvironment.com/ProductDetail.aspx?productID=4007&amp;CertificationID=2&amp;BrandID=475">productguide.ulenvironment.com/ProductDetail.aspx?productID=4007&amp;CertificationID=2&amp;BrandID=475</a>
	Adairsville, GA			
VOC Content	N/A			
Recycled Content	Not tested			
Other				

### ACCESSORY MATERIALS


This section is for additional products required by warranty or recommended by the manufacturer for installation (such as adhesives, fasteners, or factory coatings) or for maintenance, cleaning, or operations. Refer to Health Product Declarations, published separately, for a complete view of these products. Note: This declaration is not intended to address hazards of the installation process.

Required or Recommended Product	URL for Companion Health Product Declaration
Condition when required or recommended and/or other notes	

### NOTES

## Environmental Certification

5\_2) LG Hausys\_HI-MACS\_Volcanics\_HPD

Name	HI-MACS® - Volcanics			
Product ID	VE01, VE21, VE24, VN21, VE26, VL22, VG22, VB24, VN24, VB01	Classification	12 36 61.19 Furnishings: Quartz Agglomerate Countertops	
Website	<a href="http://www.lghimacsusa.com/">www.lghimacsusa.com/</a>			
Manufacturer Address	LG Hausys America, Inc. 310 LG Drive Adairsville, GA 30103 USA	Contact Name	Daniel Shin Product Manager 678-486-8230 <a href="mailto:danielshin@lghausys.com">danielshin@lghausys.com</a>	
Description	Stronger surface with durability similar to that of natural stone - HI-MACS® stands up to everyday scratches. HI-MACS® is seamless & non-porous without crevices or surface irregularities where harmful bacteria and mold may reside. Built to last a lifetime, HI-MACS® endures its everyday wear and tear with higher resistance to stains, chemical & heat. With proper care and maintenance, HI-MACS® will remain beautiful and durable for many years for your children and grandchildren. This Health Product Declaration covers all product lines in the HI-MACS collection.			
Release Date	2014-12-12	<input checked="" type="checkbox"/> Self-declared		
Expiry Date	2017-12-12	<input type="checkbox"/> Second Party	Certifier	
HPD URL	<a href="https://tool.hpdcollaborative.org/uploads/files/hpds/1014/2506-20141212135354.pdf">https://tool.hpdcollaborative.org/uploads/files/hpds/1014/2506-20141212135354.pdf</a>	<input type="checkbox"/> Third Party	Certificate #	
SUMMARY DISCLOSURE				
The content of this product was assessed for health hazard warnings as required using Pharos				
Residuals Disclosure		Full Disclosure of Intentional Ingredients <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<input type="checkbox"/> Measured 100 ppm (ideal)		Full Disclosure of Known Hazards <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<input type="checkbox"/> Measured 1000 ppm		Disclosure Notes		
<input type="checkbox"/> Predicted by process chemistry				
<input checked="" type="checkbox"/> As per MSDS (1,000 & 10,000 ppm)				
<input type="checkbox"/> Not disclosed				
<input type="checkbox"/> Other				
Contents in Descending Order of Quantity				
Alumina trihydrate , Methyl methacrylate, copolymer with butyl acrylate , Undisclosed (Copolymer colorants)				
Hazards		Highest concern GreenScreen score - unknown		
<input type="checkbox"/> PBT (Persistent Bioaccumulative Toxic)	<input type="checkbox"/> Development	<input type="checkbox"/> Neurotoxicity	<input type="checkbox"/> Land toxicity	<input type="checkbox"/> Multiple
<input type="checkbox"/> Cancer	<input type="checkbox"/> Reproductive	<input type="checkbox"/> Mammal	<input type="checkbox"/> Physical hazard	<input checked="" type="checkbox"/> Unknown
<input type="checkbox"/> Gene Mutation	<input type="checkbox"/> Endocrine	<input type="checkbox"/> Skin or Eye	<input type="checkbox"/> Global warming	
	<input checked="" type="checkbox"/> Respiratory	<input type="checkbox"/> Aquatic toxicity	<input type="checkbox"/> Ozone depletion	
Total VOC Content		Does the product contain exempt VOCs? <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No		
Material (g/L)	N/A	Are there VOC-free tints available? <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No		
Regulatory (g/L)	N/A			
Notes				
Certifications + Compliance				
VOC Emissions	GreenGuard - Gold (previously Children & Schools)		VOC Content	N/A

# Environmental Certification

5\_2) LG Hausys\_HI-MACS\_Volcanics\_HPD

The HPD Standard is solely a declaration of product content and direct health hazards associated with exposure to its individual contents. It is not a full assessment of environmental impacts from the life cycle of this product. It is not an assessment of risks associated with actual use of the product. It does not address the potential health impacts of substances used or created during manufacture that do not appear in the final product as residuals, nor substances created during combustion or other degradation processes.

This Health Product Declaration was generated following the requirements of the noted Standard version and is valid for a total of three years after date of issue or three months after a substantive change of product contents occurs. Users should verify that this Health Product Declaration is compliant with the most current version of the HPD Standard. Accuracy of claims made in this Health Product Declaration is the sole responsibility of the listed manufacturer and certifier (if applicable). The HPD Collaborative does not warrant any claim made herein, explicit or implicit. The HPD Standard is an "open standard" developed and managed by the HPD Collaborative, a nonprofit organization. For more information, visit [hpdcollaborative.org](http://hpdcollaborative.org).

### CONTENT IN DESCENDING ORDER OF QUANTITY

All ingredients must be assessed for health warnings against Priority Hazard Lists, regardless of disclosure level. Priority Hazard Lists and information on the GreenScreen Benchmarks can be found at [www.hpdcollaborative.org/hazardlists](http://www.hpdcollaborative.org/hazardlists).  
**GS:** GreenScreen Benchmark; **RC:** Recycled Content, **PC:** Post Consumer, **PI:** Post Industrial (Pre-consumer), **BO:** Both; **Nano:** comprised of nanoscale particles or nanotechnology

Name	CAS RN	% weight	GS	RC	Nano	Role
Hazard A	Warning A					
Hazard B	Warning B					
Hazard C	Warning C					
Hazard D	Warning D					
Hazard E	Warning E					
Notes						
Alumina trihydrate	21645-51-2	52 - 62 %	2	N	N	Filler
RESPIRATORY	AOEC: Asthmagen (ARs) - sensitizer-induced - inhalable forms only					
The material inputs for the HI-MACS product are reacted in the manufacturing process preventing any exposure of health hazards of the input materials to the final customer.						
Methyl methacrylate, copolymer with butyl acrylate	25852-37-3	30 - 50 %	LT-U	N	N	Binder
None found	No warnings found on HPD Priority lists					
The material inputs for the HI-MACS product are reacted in the manufacturing process preventing any exposure of health hazards of the input materials to the final customer.						
Undisclosed (Copolymer colorants)	Undisclosed	1 - 5 %		N	N	Colorant
None found	No warnings found on HPD Priority lists					
The material inputs for the HI-MACS product are reacted in the manufacturing process preventing any exposure of health hazards of the input materials to the final customer.						

### CERTIFICATIONS AND COMPLIANCE

**Certifying Party** = First: Manufacturer's self-declaration; Second: Verification by trade association or other interested party; Third: Verification by independent certifier (ideal).

**Applicable facilities** = Manufacturing sites to which testing applies.

Type	Standard or Certification			Certifier or Laboratory
	Certifying Party	Issue Date	Expiry Date	Certificate URL
	Applicable Facilities			

# Environmental Certification

5\_2) LG Hausys\_HI-MACS\_Volcanics\_HPD

Notes				
VOC Emissions	GreenGuard - Gold (previously Children & Schools)		GreenGuard Environmental Institute (GEI)	
	3rd party independent certification	2007-08-13	2015-08-13	<a href="http://productguide.ulenvironment.com/ProductDetail.aspx?productID=4009&amp;CertificationID=2&amp;BrandID=475">productguide.ulenvironment.com/ProductDetail.aspx?productID=4009&amp;CertificationID=2&amp;BrandID=475</a>
	Adairsville, GA			
VOC Content	N/A			
Recycled Content	Not tested			
Other				

### ACCESSORY MATERIALS

This section is for additional products required by warranty or recommended by the manufacturer for installation (such as adhesives, fasteners, or factory coatings) or for maintenance, cleaning, or operations. Refer to Health Product Declarations, published separately, for a complete view of these products. Note: This declaration is not intended to address hazards of the installation process.

Required or Recommended Product	URL for Companion Health Product Declaration
Condition when required or recommended and/or other notes	

### NOTES

5\_3) LG Hausys\_HI-MACCS\_Eden Plus\_HPD



5\_3) LG Hausys\_HI-MACCS\_Eden Plus\_HPDP





## 5\_3) LG Hausys\_HI-MACCS\_Eden Plus\_HPD

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## 5\_3) LG Hausys\_HI-MACCS\_Eden Plus\_HPDP

Health Product Declaration v1.0 - hpdcollaborative.org - Page 4 of 4

# Fire Resisting Test

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01. Building Material Class B1

02. M1

03. Test\_by warringtonfire

04. Test\_Marine Equipment Directive\_MED B

05. Test\_Marine Equipment Directive\_MED D

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## Fire Resisting Test

**DIN 4102-1**  
Building Material Class B1 in all colours

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# 01. Building Material Class B1

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1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)  
1\_2) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 12mm)

DIN 42102-1 - Class B1

Class B1 certifies that HI-MACS® has a low flammability.

B1 class is the European fire resistance requirement.

This test applies to the following ranges: Solids, Lucent, Granite (Sand & Pearl, Quartz), with a thickness of 12mm.

## Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Siemens AG A&D AS SP, Brandhaus Höchst, Industriepark Höchst C369, 65926 Frankfurt a.M., e-mail : brandhaus. aud@siemens.com

### Test report no. 2008-1345 issued 27.05.2008 for applying of a required "Verwendbarkeitsnachweis"

**Applicant:** Marta Trede  
LG HI-MACS® Project Management  
Gladiolenweg 3b  
65451 Kelsterbach

**Date of order:** 18.04.2008  
**Date of sampling:** no official taking out of the specimen  
from a representative of the Brandhaus  
Höchst  
**Date of arrival:** 18.04.2008  
**Date of test:** 27.05.2008

**Order**

Testing of the flammability (building class B1) according to DIN 4102-1 (Mai 1998)

**Description / designation of the test object**

Natural Acryl Stone ( Acryl Solid Surface )

**Description of the relevant test procedure**

DIN 4102 Teil 1 (Mai 1998)

This test report did not replace the required „Verwendbarkeitsnachweis“. It is only used for issuing the “Verwendbarkeitsnachweis”.

This testreport is valid until 05.05.2013.  
The results of the tests relate only to the behaviour of the test specimen which is designated on the top.  
Test reports are only allowed to be published or reproduced, not changed in form and tenor without permission of the Brandhauses Höchst.  
The abridged account of a test report is only allowed with the agreement of the Brandhauses Höchst.  
This testreport is a translation of the german version 2008-1345 (issued 27.05.2008). In case of doubt only the german version is valid  
This test report contains 8 pages and 1 annex.

2008-1345\_drap\_Solid.doc

## Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

page2 fom 8

**1. Description of the test material**

LG HI-MACS®

General description Generelle Beschreibung	Natural Acrylic Stone (Acrylic Solid Surface)
Trade name / product reference Handelsname / Produkt Referenz	LG HI-MACS®
Detailed description / composition details Detaillierte Beschreibung / Rezepturdtails	
Name of manufacturer Name des Herstellers	LG Chem, Ltd.
Density / weight per unit area Dichte / Gewicht pro cm³	1.64 ~ 1.71 g/cm³
Material thickness Materialstärke	9mm
Colour Farbe	S28 Alpine White
Trade name of flame retardant	Non
Generic type of flame retardant	Non
Amount of flame retardant	Non
Brief description of manufacturing process Beschreibung des generellen Herstellungsprozesses	Blending components → Curing in the oven → Cutting to standard size→ Sanding Process

**1.2 At the specimen preparation in the Brandhaus Höchst determined values:**

**Fabric**

Thickness: ca. 9 mm

Total square weight : -

Tested colours : white

Before testing the material was stored under climatic conditions 23°C / 50 % relative humidity.



Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

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2. Test results  
2.1 Brandschachtprüfung according to DIN 4102-1

Test results of the Brandschacht tests part 1					
line no.		Measurements test specimen			
			A	B	
1	no. test arrangement according to DIN 4102 part 15, table 1		1		
2	flame height max. over lower specimen edge time <sup>1)</sup>	cm	30		
		min : s	0:03		
3	ascertainments on the front side Flaming/glowing time <sup>1)</sup>	min : s	0:05		
4	melting / burning through time <sup>1)</sup>	min : s	0:07		
5	ascertainments on the back side Flaming/glowing time <sup>1)</sup>	min : s	not occurred		
6	discolouring time <sup>1)</sup>	min : s	not occurred		
7	burning droplets begin <sup>1)</sup>	min : s	not occurred		
8	extent				
9	occasional dropping of material				
	constant dropping of material				
10	separating from burning sample parts begin <sup>1)</sup>	min : s	not occurred		
11	occasional separating parts				
12	constant separating parts				
13	duration of burning on the sieve tray (max.)	min : s	not occurred		
14	influnce on the burner flame by dropping of / separating material time <sup>1)</sup>	min : s	no		
15	earlier end of test end of the fire scenario on the specimen <sup>1)</sup>	min : s	no		
16	time of a possible resulted test stop <sup>1)</sup>	min : s			

<sup>1)</sup> time from start of test

2008-1345 englisch.doc

Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

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Test results of the Brandschacht tests part 2					
line no.		Measurements test specimen			
			A	B	
17	flaming after end of test duration		yes		
18	number of specimen	min : s	1:09		
19	front side of specimen		4		
20	backside of specimen		4		
21	flame length	cm	--/--		
22	glowing after end of test duration	min . s	not occurred		
23	number of specimen		--/--		
24	place of occurrence		--/--		
25	lower specimen part		--/--		
26	upper specimen part		--/--		
27	front side of specimen		--/--		
	backside of specimen		--/--		
28	smoke density < 400 % x min		1		
29	> 440 % x min		--/--		
30	diagram in annex no.		1		
31	residual length single results	cm	49 / 45		
32	average of the single results	cm	48 / 45		
33	foto of the specimen on page		46		
			5		
34	smoke temperature max. of the average results	°C	169		
35	time <sup>1)</sup>	min : s	9:54		
36	diagram in annex no.		1		

<sup>1)</sup> time from start of test

Remarks : no special observations.

Because of the residual length of > 45 cm, the quantity of tests could be reduced, according to DIN 4102-16, to one test.

2008-1345 englisch.doc

Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

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Appearance of specimen A  
after the "Brandschacht" test

Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

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2.2 Normal flammability test according to DIN 4102-1

Test with edge ignition without deposit  
Flame application on: lower specimen edge

Specimen-no.	1	2	3	4	5
Time from start of test					
Ignition point [s]	3	4	3	3	4
Reaching the measuring mark within 20 seconds	no	no	no	no	no
Self extinguishing of the flame [s]	5	5	5	5	5
Max. flame height [mm]	5	5	5	5	5
Time [s]	4	4	4	4	4
End of afterflaming [s]	-	-	-	-	-
End of afterglowing [s]	-	-	-	-	-
Flames extinguished after [s]	-	-	-	-	-
Smoke development (visuell impression)	low smoke production				
Separating from burning material	no	no	no	no	no
Time [s]	-	-	-	-	-

Remarks: none

Test direction:

Specimen-no.	1	2	3	4	5
Time from start of test					
Ignition point [s]					
Reaching the measuring mark within 20 seconds					
Self extinguishing of the flame [s]					
Max. flame height [mm]					
Time [s]					
End of afterflaming [s]					
End of afterglowing [s]					
Flames extinguished after [s]					
Smoke development (visuell impression)					
Separating from burning material					
Time [s]					

Remarks :



## Fire Resisting Test

1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Testreport no. Nr. 2008-1345 dated 27.05.2008

page8 fom 8

### Assessment

The in chapter one described material fulfile the requirements of the building class B2 according to DIN 4102-1 (Mai 1998).  
The determined test results show that the material fulfil also the requirements of the building class

**B1**

according to DIN 4102-1 (Mai 1998).

### Special comment

The fire test result is only valid for the in chapter one described material in free hanging configuration.  
The distance to other plane material must be more then 40 mm.

The material wasn't tested after a outside storage.

In the composition with other materials (for example coatings, deposits) the burning behaviour could be influenced unfavourable that the above classification is not any longer valid. According to DIN 4102-1 the burnig behaviour in composition with other materials has to be tested separately.

This test certificate did not replace the required „Verwendbarkeitsnachweis“. It is only used for issuing the "Verwendbarkeitsnachweis".

Frankfurt, the 27.05.2008

*Walter / Schmid*

Walter / Schmid  
Tester in charge

*K. Bauer*

Dipl.-Ing. K. Bauer  
Deputy leader of Brandhaus Höchst

## Fire Resisting Test

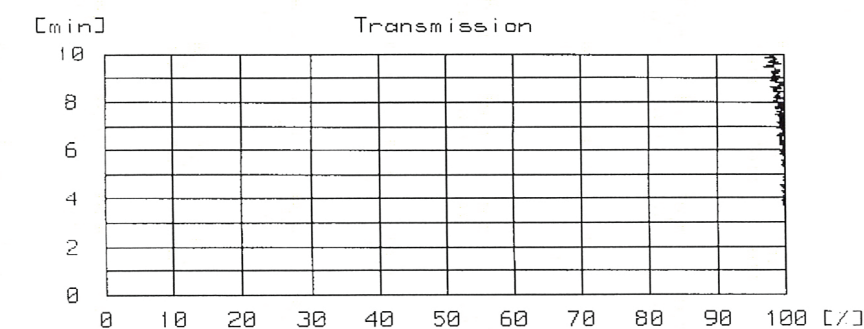
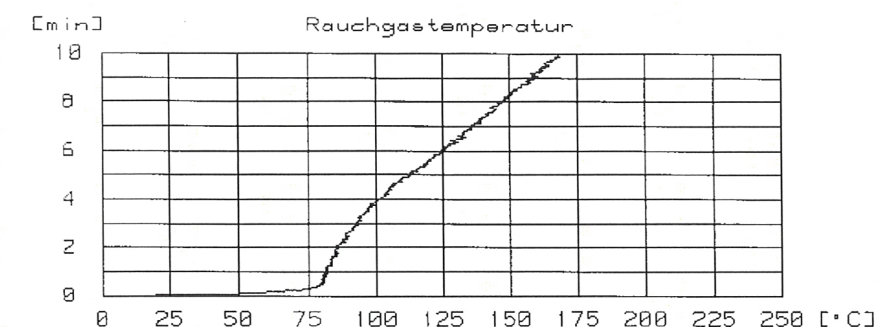
1\_1) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 9mm)

SIEMENS



Annex 1 to the testreport no. Nr. 2008-1345 dated 27.05.2008

Test sample A:



## Fire Resisting Test

1\_2) Fire Resisting Test\_Building Material\_Class B1(HI-MACS 12mm)



Aussenstelle Erwitte • Auf den Thränen 2 • 59597 Erwitte • Telefon (02943) 897-0 • Telefax (02943) 897 33 • E-Mail: erwitte@mpanrw.de

### TEST CERTIFICATE

No. 230009654

Requested as basis for the application for the proof of usability

English version

#### Sponsor

LG Hausys Europe GmbH  
12 Avenue des Mogines  
1213 Petit-Lancy  
Schweiz

**Date of order:** 21.08.2014  
**Date of sampling:** Samples for the test were sent in by the sponsor.  
**Receipt of the specimens:** 19.08.2014  
**Date of the tests:** 09.10.2014, 13.10.2014

#### Order

Testing concerning „Schwerentflammbarkeit“ (building material class B1) according to DIN 4102-1 (May 1998)

#### Description / name of the test specimen

Solid, acrylic mineral material boards named "HI-MACS®"

#### Applied test procedure

DIN 4102-1 (May 1998)

The validity of this test certificate ends on 09.11.2019.  
This test certificate does not replace the „allgemeines bauaufsichtliches Prüfzeugnis“ that is possibly required.  
The test results only relate to the above named product.  
Any change in form or content to a test certificate can only be made by the approval of MPA NRW.  
A reproduction in parts of a test certificate is only allowed with permission of MPA NRW.  
This test certificate includes 7 pages and 1 annex.

## Fire Resisting Test



## 02. M1

Fire Resisting Test\_M1

LNE tests the reactivity to fire of a material.  
Class M1 certifies that HI-MACS® FR benefits from  
advanced resistance to fire.  
This certificate is notably recommended in France



# Fire Resisting Test

Fire Resisting Test\_M1



Dossier P114258 - Document DE/1 - Page 1/5

## PROCES-VERBAL DE CLASSEMENT DE REACTION AU FEU D'UN MATERIAU

prévu à l'article 5 de l'arrêté du 21 novembre 2002

**VALABLE 5 ANS à compter du 10 octobre 2013**

N° P114258 - DE/1

et annexe de 4 pages

**Matériau présenté par :** LG HAUSYS EUROPE GmbH  
12 Avenue des Morgines  
1213 PETIT-LANCY  
SUISSE

**Marque commerciale :** HI-MACS®

**Description sommaire :**

**Composition globale :** Matériau à base de résine acrylique et de charges.  
**Application :** Divers aménagements d'intérieur et façades intérieures et extérieures  
**Masse :** ( 21000 ± 357 ) g/m²  
**Epaisseur :** ( 12 ± 0,5 ) mm  
**Coloris :** Blanc "S728 Alpine White"  
**Rapport d'essais :** N° P114258 - DE/1 du 10 octobre 2013  
**Nature des essais :** Essai par rayonnement.

**Classement :** **M1**

**VALABLE POUR TOUTE APPLICATION POUR LAQUELLE LE PRODUIT N'EST PAS SOUMIS AU MARQUAGE CE**

**Durabilité du classement (NF P 92-512 : 1986) : NON LIMITÉE A PRIORI**

compte tenu des critères résultant des essais décrits dans le rapport d'essai N° P114258 - DE/1 annexé.

Ce procès verbal atteste uniquement des caractéristiques de l'échantillon soumis aux essais et ne préjuge pas des caractéristiques de produits similaires. Il ne constitue pas une certification de produits, au sens de l'article L. 115-27 du code de la consommation et de la loi du 3 juin 1994.

Est seule autorisée la reproduction intégrale soit du présent Procès-verbal de classement qui comprend 1 page soit l'intégralité du Procès-Verbal et rapport annexé qui comporte 5 pages.

Trappes, le 10 octobre 2013

La Responsable du Département  
Comportement au Feu et Sécurité Incendie

Sophie THIEFRY



Réalisation de l'essai  
Marc LE QUERE  
La Responsable de l'essai

Emilie DENIAU



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**Laboratoire national de métrologie et d'essais**

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# Fire Resisting Test

Fire Resisting Test\_M1

Dossier P114258 - Document DE/1 - Page 2/5

Annexe page 1

## RAPPORT D'ESSAI DE REACTION AU FEU D'UN MATERIAU

prévu à l'article 5 de l'arrêté du 21 novembre 2002

**VALABLE 5 ANS à compter du 10 octobre 2013**

N° P114258 - DE/1

### 1. BUT DES ESSAIS

Les essais auxquels se rapporte ce rapport d'essai ont pour but de déterminer le classement des matériaux, conformément aux prescriptions de l'Arrêté du ministère de l'Intérieur en date du 21 novembre 2002 relatif à leur réaction au feu.

### 2. PROVENANCE ET CARACTERISTIQUES DES ECHANTILLONS

Demandeur de l'essai : LG HAUSYS EUROPE GmbH  
Date et référence de la commande : Bon pour accord du 09/08/2013 sur devis N° 2013/8889  
Producteur : LG HAUSYS EUROPE GmbH  
Marque commerciale et référence : HI-MACS®  
Composition globale : Matériau à base de résine acrylique et de charges.  
Caractéristiques attestées par le demandeur :  
Masse : ( 21000 ± 357 ) g/m²  
Epaisseur : ( 12 ± 0,5 ) mm  
Coloris : Blanc "S728 Alpine White"

suite du rapport page suivante



# Fire Resisting Test

Fire Resisting Test\_M1

Dossier P114258 - Document DE/1 - Page 3/5

Annexe page 2

MODALITES DES ESSAIS DE CLASSEMENT DES MATERIAUX RIGIDES OU RENDUS TELS (REVETEMENTS COLLES) DE TOUTE EPAISSEUR ET DES MATERIAUX SOUPLES D'UNE EPAISSEUR SUPERIEURE A 5 MM (SAUF LES MEDIAS FILTRANTS)

1. ESSAI PRINCIPAL : ESSAI PAR RAYONNEMENT (NFP 92-501 : 1995)
- L'éprouvette disposée à 45° est soumise à un rayonnement défini, émis par un radiateur électrique dont la surface est à 30 mm du plan du matériau. Les gaz dégagés passent au contact d'inflammeurs disposés de part et d'autre de l'éprouvette. Chaque épreuve dure 20 minutes. Les éléments déterminants sont la hauteurs des flammes, les temps d'inflammation et les durées de combustion.
2. ESSAIS COMPLEMENTAIRES
- Néant.
3. CONDITIONNEMENT DES EPROUVETTES
- Les éprouvettes sont maintenues dans une enceinte climatique conditionnée (23 ± 2 °C et 50 ± 5 % d'humidité relative) jusqu'à masse constante, soit quand deux pesées successives à 24 h d'intervalle ne diffèrent pas de plus de 0,1 % ou de 0,1 g.
4. CLASSEMENT DES MATERIAUX (NFP 92-507 : 2004)
- Il est établi à la suite des essais décrits ci-dessus. Les matériaux sont classés en catégories M1, M2, M3 ou M4.  
Seuls les matériaux pour lesquels il n'y a pas d'inflammation effective à l'essai par rayonnement, peuvent prétendre au classement M0.
5. EPREUVES DE DURABILITE (NFP 92-512 : 1986)
- Selon la NF P 92-512, ce matériau ne fait pas l'objet a priori de l'épreuve de durabilité.

suite du rapport page suivante



# Fire Resisting Test

Fire Resisting Test\_M1

Dossier P114258 - Document DE/1 - Page 4/5

Annexe page 3

6. RESULTATS
- 6.1. ESSAI PAR RAYONNEMENT

	Eprouvette 1	Eprouvette 2	Eprouvette 3	Eprouvette 4	
Moment de la 1ère inflammation (s) face exposée (ti1)	488	370	396	384	
Moment de la 1ère inflammation (s) face non exposée (ti2)	—	—	—	—	
Somme des hauteurs de flamme ΣH (cm)	135	216	180	180	
Somme des durées de combustion effective ΣΔT	712	830	804	816	Moyenne =
$\varnothing = \frac{100 \times \sum H}{n \sqrt{\sum \Delta T}}$	1	2	1.6	1.6	1.6
Chute de gouttes non enflammées	Non	Non	Non	Non	
Chute de gouttes enflammées	Non	Non	Non	Non	

suite du rapport page suivante



## Fire Resisting Test

Fire Resisting Test\_M1

Dossier P114258 - Document DE/1 - Page 5/5

Annexe page 4

### 7. OBSERVATIONS CONCERNANT LES ESSAIS

NEANT.

Date de réception des éprouvettes : 12/09/2013

Date de réalisation des essais : 30/09/2013

### 8. CONCLUSION ET CLASSEMENT

A la suite de ces résultats d'essais, le matériau présenté ayant les caractéristiques décrites en première page de ce rapport d'essais obtient le classement :

**M1**

VALABLE POUR TOUTE APPLICATION POUR LAQUELLE LE PRODUIT N'EST PAS SOUMIS AU MARQUAGE CE

### 9. DURABILITE DU CLASSEMENT

NON LIMITÉE A PRIORI

Trappes, le 10 octobre 2013

La Responsable du Département  
Comportement au Feu et Sécurité Incendie



Sophie THIEFRY



Réalisation de l'essai  
Marc LE QUERE  
La Responsable de l'essai



Emilie DENIAU

L'attention est attirée sur le fait que les résultats obtenus avec l'échantillon objet du présent rapport d'essai ne sont pas généralisables sans justification de la représentativité des échantillons et des essais.



## Fire Resisting Test



## 03. Test\_by warringtonfire

Fire Resisting Test\_by warringtonfire

HI-MACS® successfully passed the European test EN 13501 – Class B-s1, d0, equivalent to the class 0 from Warrington Fire certification.



# Fire Resisting Test

Fire Resisting Test\_by warringtonfire



**Title:**

EXTENDED APPLICATION  
REPORT IN ACCORDANCE  
WITH EN/TS 15117

**Notified Body No:**

0833

**Product Name:**

LG HI-MACS

**Report No:**

167468

**Issue No:**

1

**Prepared for:**

LG Chem Europe GmbH,  
Frankfurt Am Main, Lancy  
Branch, Petit-Lancy, 1213,  
Switzerland

**Date:**

19<sup>th</sup> October 2007



# Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

Page 2 of 7

**1. Introduction**

This report extends the field of application of test results obtained for 'LG HI-MACS', a family of acrylic solid surface sheets. Extended application enables the prediction of fire performance, on the basis of one or more test results to the same test standard.

**2. Details of Product Family**

A product family is a group of products, which differ only in aspects that do not influence the properties required in the relevant product standard and, if relevant, end-use parameters, for which the reaction to fire performance remains unchanged (i.e. does not get worse).

The product family for which extended application is to be used is 'LG HI-MACS'. There is only one product property which varies within this product family and that is colour. This property has been assessed to determine its influence on the fire performance of the product when tested in accordance with EN 13823 and EN ISO 11925-2, and classified in accordance with EN 13501-1.

**2.1 Product description**

The products, 'LG HI-MACS', a family of acrylic solid surface sheets, are fully described below and in the test reports provided in support of classification listed in Clause 3.1.

General description	Acrylic solid surface sheet
Trade name / product reference	"LG HI-MACS"
Detailed description / composition details	
Name of manufacturer	LG Chem, Ltd.
Density / weight per unit area	1.64 to 1.71 g/m³ (stated by sponsor) 1.71 (determined by Bodycote warringtonfire)
Thickness	12mm 12.2mm (determined by Bodycote warringtonfire)
Colour	Any colour variation allowed
Flame retardant details	The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the product / component.
Brief description of manufacturing process	Blending components. Oven curing. Cutting to standard size. Sanding process.





Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

Page 3 of 7

3. Test reports/extended application reports & test results in support of classification

3.1 Test reports/extended application reports

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
Bodycote warringtonfire	LG Chem Europe GmbH	WF 166566	EN ISO 11925-2
Bodycote warringtonfire	LG Chem Europe GmbH	WF 166569, 166571, 166570	EN 13823
Bodycote warringtonfire	LG Chem Europe GmbH	WF 167467	EN 13501-1

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN ISO 11925-2 (30s exposure - surface)	F <sub>s</sub>	6	0	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure – edge)	F <sub>s</sub>	6	0	Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823	FIGRA <sub>0.2MJ</sub>	3	57.93, 50.95, 41.37	Compliant
	THR <sub>600s</sub>		7.06, 6.87, 5.98	Compliant
	LFS		N, N, N	Compliant
	SMOGRA		1.29, 0, 0	Compliant
	TSP <sub>600s</sub>		28.90, 26.59, 35.38	Compliant



Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

Page 4 of 7

4. Classification and field of application

4.1 Definition of Limits of Extended Application

Three tests have been conducted in accordance with EN 13823 and one test in accordance with EN ISO 11925-2. The tests were conducted on three different colours to assess what influence this product property has on the fire performance of 'LG HI-MACS'.

EN ISO 11925-2

From the data generated during the EN 13823 testing it was apparent which colour and thickness gave the worst fire performance. This product was tested formally in accordance with EN ISO 11925-2 using surface and edge flame application, no flame spread was observed from either application.

4.2 EN 13823

The SBI test measures the following fire parameters, Fire Growth Rate (FIGRA), Total Heat Release (THR<sub>600s</sub>), Smoke Growth Rate (SMOGRA) and Total Smoke Production (TSP<sub>600s</sub>). Each of these parameters were evaluated to assess what influence colour has on the fire performance of 'LG HI-MACS'. This evidence is shown in Figures 1 and 2.

The average FIGRA values were approximately 40% below the maximum value allowed for Class B, (EN 13501-1). The average THR<sub>600s</sub> values were approximately 10% below the maximum value allowed for Class B, (EN 13501-1). As the results indicate, colour has little or no effect on the overall fire performance of the product.

The measured results relating to smoke parameters, SMOGRA and TSP<sub>600s</sub>, fall comfortably within the s1 criteria.

In no instance were flaming droplets/particles in evidence during the fire tests.

4.4 Reference of classification

This classification has been carried out in accordance with clause 8 of EN 13501-1:2007

4.5 Classification

The products, 'LG HI-MACS', a family of acrylic solid surface sheets, in relation to their reaction to fire behaviour are classified:

B

The additional classification in relation to smoke production is:

s1

The additional classification in relation to flaming droplets / particles is:

d0



# Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

Page 5 of 7

The format of the reaction to fire classification for construction applications, excluding flooring and linear pipe thermal insulation:

Fire Behaviour		Smoke Production		Flaming Droplets		
B	-	s	1	,	d	0

i.e. B – s1 , d0

Reaction to fire classification: B – s1, d0

4.3 Field of application

This classification is valid for the following end use applications:

- i) Construction applications, excluding flooring and linear pipe thermal insulation.
- ii) Installed with a minimum air gap of 120mm, without the presence of a substrate.

This classification is also valid for the following product parameters:

Product thickness	No variation allowed
Product weight per unit area	No variation allowed
Product colour	Any colour variation allowed
Product composition	No variation allowed
Product construction	No variation allowed



# Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

Page 6 of 7

SIGNED

*L.S. Hill*

Leigh Hill  
Technical Consultant  
Technical Department

APPROVED

*Janet Murrell*

Janet Murrell  
Technical Manager  
Technical Department  
on behalf of:  
Bodycote warringtonfire

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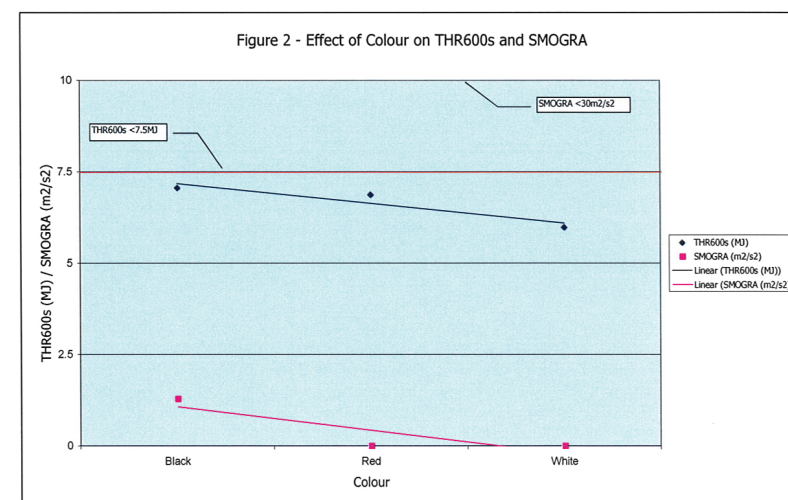
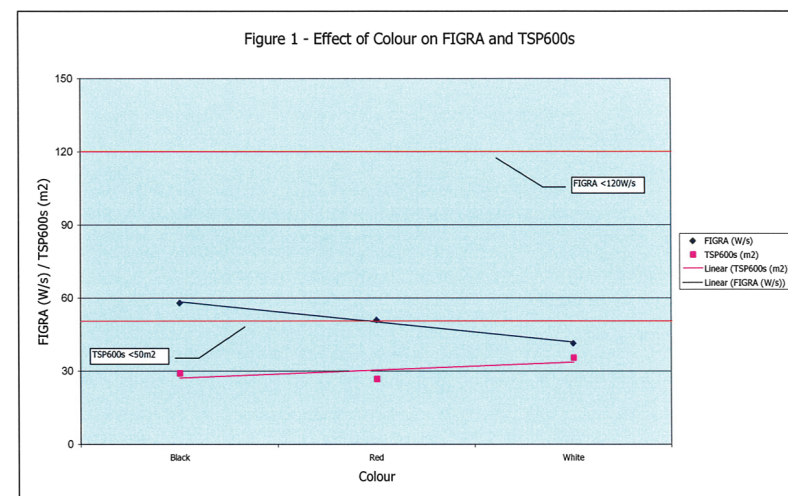


## Fire Resisting Test

Fire Resisting Test\_by warringtonfire

WF Extended Application Report  
No. 167468

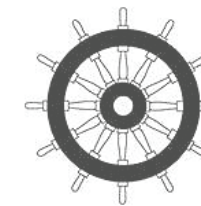
Page 7 of 7



Commercial in confidence  
Bodycote



## Fire Resisting Test



## 04. Test\_Marine Equipment Directive\_MED B

Fire Resisting Test\_Marine Equipment Directive\_MED B

MED stands for Marine Equipment Directive. Both modules are extremely important for the shipbuilding industry, as they are mandatory for fabrication materials used in ships. IMO B covers the fire resistance of the material per se and certifies that the material has low flame spread characteristics and is not capable of producing excessive quantities of smoke and toxic combustion products. Module D covers the overall production capacity and checks, among other production processes, the management and systems used.

## Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED B




### CERTIFICATE OF FIRE APPROVAL

This is to certify that

The product detailed below will be accepted for compliance with the applicable Lloyd's Register Rules and Regulations and with the International Convention for the Safety of Life at Sea, (SOLAS), 1974, as amended, for use on ships and offshore installations classed with Lloyd's Register, and for use on ships and offshore installations when authorised by contracting governments to issue the relevant certificates, licences, permits etc.

Manufacturer	LG Hausys Ltd
Address	Surface Materials Division Strategy Team One IFC 18F 10 Gookjegeumyoong_Ro, Yeongdeungpo_Gu, Seoul, 150-876 Republic of Korea
Type	MATERIAL HAVING LOW FLAME SPREAD CHARACTERISTICS & NOT CAPABLE OF PRODUCING EXCESSIVE QUANTITIES OF SMOKE & TOXIC PRODUCTS OF COMBUSTION
Description	Fire Resisting Material - Type: "HI-MACS FR SOLID" Decorative Covering Product Nos S705, S706, S728, S729, S801
Specified Standard	IMO Res. MSC.61(67) - (FTP Code) Annex 1, Part 5 and Annex 2 IMO MSC/Circ 1120 IMO Res. MSC.307(88) - (2010 FTP Code) Section 8

The attached Design Appraisal Document forms part of this certificate.  
This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

Date of issue	10 December 2013	Expiry date	9 December 2018
Certificate No.	SAS F140002	Signed	
Sheet No	1 of 2	Name	B. McDonald Surveyor to Lloyd's Register EMEA A Member of the Lloyd's Register Group

Note:

This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register of any modification or changes to the equipment in order to obtain a valid Certificate.

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

## Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED B



**Lloyd's Register EMEA**  
71 Fenchurch Street, London, EC3M 4BS  
Telephone 020 7423 2416 Fax 020 7423 2053  
Email [med@lr.org](mailto:med@lr.org)

Page
2 of 2
Document number
SAS F140002
Issue number
1

### DESIGN APPRAISAL DOCUMENT

Date	Quote this reference on all future communications
10 December 2013	MTES/TA/SFS/JE/BM/WP16182701

#### ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. SAS F140002

This Design Appraisal Document forms part of the Certificate.

#### APPROVAL DOCUMENTATION

Fire Insurer's Laboratories of Korea (FILK), Gyeonggi-Do, Korea; Fire Test Report No. 2008-0317 dated June 2008.

#### CONDITIONS OF CERTIFICATION

- When bonded to a non-combustible substrate with an approved adhesive.
- HI-MACS FR-Solid decorative covering for furniture and bulkheads applied to a maximum thickness of 12mm.
- Composition of individual materials to be maintained in production in accordance with originally tested composition formula.
- Smoke and toxicity criteria is satisfied by meeting the total heat release ( $Q_t$ ) and peak heat release rate ( $q_p$ ) as stated in IMO Fire Test Procedures Code, Annex 2, Section 2.2.
- Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure that items are of the same standard as the approved prototype.

#### PLACE OF PRODUCTION

LG Hausys Ltd  
Surface Materials Production Team  
LG Hausys Cheongju Factory  
Songjeong-dong  
Heungdeok-gu  
Cheongju-si  
Chungbuk  
361-721, Korea



Bruce McDonald  
Technical Manager  
Statutory Fire & Safety  
Marine Technology and Engineering Services  
Lloyd's Register EMEA

#### Supplementary Type Approval Terms and Conditions

*This certificate and Design Appraisal Document relates to type approval, it certifies that the prototype(s) of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein, it does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said prototype(s).*



## Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED B



Lloyd's  
Register

USCG-EU MRA



Notified Body authorised by the MCA

### EC TYPE EXAMINATION (MODULE B) CERTIFICATE

This is to certify that:

LLOYD'S REGISTER VERIFICATION LIMITED (LRV), specified as a "notified body" under the terms of The Merchant Shipping (Marine Equipment) Regulations S.I. 1999 No. 1957, did undertake the relevant type approval procedures for the equipment identified below which was found to be in compliance with the essential Fire protection requirements of Marine Equipment Directive (MED) 96/98/EC as modified by Commission Directives 98/85/EC, 2001/53/EC, 2002/75/EC, 2002/84/EC, 2008/67/EC, 2009/26/EC, 2010/68/EU, 2011/75/EU and 2012/32/EU subject to any conditions in the Design Appraisal Document attached hereto.

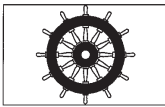
Manufacturer	LG Hausys Ltd
Address	Surface Materials Division Strategy Team One IFC 18F 10 Gookjegeumyoong_Ro, Yeongdeungpo_Gu, Seoul, 150-876 Republic of Korea
Annex A1 Item	A.1/3.18a SURFACE MATERIALS & FLOOR COVERINGS WITH LOW FLAME-SPREAD CHARACTERISTICS - DECORATIVE VENEERS
USCG Category Number	164.112 - SURFACE MATERIALS AND FLOOR COVERINGS WITH LOW FLAME-SPREAD CHARACTERISTICS (Interior Finish)
Type	MATERIAL HAVING LOW FLAME SPREAD CHARACTERISTICS & NOT CAPABLE OF PRODUCING EXCESSIVE QUANTITIES OF SMOKE & TOXIC PRODUCTS OF COMBUSTION
Description	Fire Resisting Material - Type: "HI-MACS FR SOLID" Decorative Covering Product Nos S705, S706, S728, S729, S801
Specified Standard	IMO Res. MSC.61(67) - (FTP Code) Annex 1, Part 5 and Annex 2 IMO MSC/Circ 1120 IMO Res. MSC.307(88) - (2010 FTP Code) Section 8

The attached Design Appraisal Document (schedule) forms part of this certificate.  
This certificate remains valid unless cancelled or revoked, provided the conditions in the attached schedule are complied with and the equipment remains satisfactory in service.

Date of issue	10 December 2013	Expiry date	9 December 2018
Certificate No.	MED 1450003/M1	Signed	
Sheet No	1 of 3	Name	B. McDonald For and on behalf of Lloyd's Register Verification LRV EC Distinguishing No. 0038

Note:

This certificate is not valid for equipment; the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify the notified body named on this certificate of any modification or changes to the equipment in order to obtain a valid Certificate.



0038/yy

USCG-EU MRA

This certificate is issued under the authority of the MCA.

Lloyd's Register Verification Limited (Reg. no. 4929226) is a limited company registered in England and Wales. Registered office: 71 Fenchurch Street, London, EC3M 4BS, UK. A subsidiary of Lloyd's Register Group Limited.

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Fire Resisting Test\_Marine Equipment Directive\_MED B 3/5

## Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED B



Lloyd's  
Register

Lloyd's Register Verification Limited

71 Fenchurch Street, London, EC3M 4BS  
Telephone 020 7423 2416 Fax 020 7423 2053  
Email med@lr.org

Page	2 of 3
Document number	MED 1450003/M1
Issue number	1

### DESIGN APPRAISAL DOCUMENT

Date	Quote this reference on all future communications
10 December 2013	MTES/TA/SFS/JE/BM/WP16182701

#### ATTACHMENT TO EC TYPE EXAMINATION (MODULE B) CERTIFICATE No. MED 1450003/M1

The undernoted documents have been appraised for compliance with the relevant requirements of International Conventions and European Union legislation for the EC Type Examination of Marine Equipment for use on Merchant Ships Registered in the European Economic Area.

This Design Appraisal Document (schedule) forms part of the Certificate.

#### APPROVAL DOCUMENTATION

Fire Insurer's Laboratories of Korea (FILK), Gyeonggi-Do, Korea; Fire Test Report No. 2008-0317 dated June 2008.

#### CONDITIONS OF CERTIFICATION

- When bonded to a non-combustible substrate with an approved adhesive.
- HI-MACS FR-Solid decorative covering for furniture and bulkheads applied to a maximum thickness of 12mm.
- Composition of individual materials to be maintained in production in accordance with originally tested composition formula.
- Smoke and toxicity criteria is satisfied by meeting the total heat release ( $Q_t$ ) and peak heat release rate ( $q_p$ ) as stated in IMO Fire Test Procedures Code, Annex 2, Section 2.2.
- Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure that items are of the same standard as the approved prototype.
- Production items are to be manufactured in accordance with either an approved Production Quality Assurance system (Module D) or Product Quality Assurance (Module E) or Product Verification (Module F) of the Marine Equipment Directive.
- Each item, batch or lot of the equipment is to have the "Mark of Conformity" affixed and be issued with a "Declaration of Conformity".
- This product has been assigned a U.S. Coast Guard Module B number USCG Approval Category 164.112/EC0038 to note type approval to Module B only as it pertains to obtaining U. S. Coast Guard approval as allowed by the "Corrigendum to Council Decision 2004/425/EC of 21 April 2004 on the conclusion of an Agreement between the European Community and the United States of America on the mutual recognition of certificates of conformity for marine equipment".

In those instances where the Notified Body conducting the conformity assessment in accordance with either Module D, E or F of the Marine Equipment Directive is not Lloyd's Register Verification Ltd., such Notified Body would use the above U.S. Coast Guard Module B number to provide the manufacturer with the U.S. Coast Guard approval number by noting it on the Certificate of Conformity, thereby authorizing the manufacturer to mark the product accordingly.

Note: For products placed on board U.S. flagged ships there is no declaration of conformity required to meet U.S. Coast Guard requirements.

Fire Resisting Test\_Marine Equipment Directive\_MED B 4/5

# Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED B



**Lloyd's Register Verification Limited**  
71 Fenchurch Street, London, EC3M 4BS  
Telephone 020 7423 2416 Fax 020 7423 2053  
Email [med@lr.org](mailto:med@lr.org)

Page 3 of 3
Document number MED 1450003/M1
Issue number 1

DESIGN APPRAISAL DOCUMENT

Date 10 December 2013	Quote this reference on all future communications MTES/TA/SFS/JE/BM/WP16182701
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ATTACHMENT TO EC TYPE EXAMINATION (MODULE B) CERTIFICATE No. MED 1450003/M1

PLACE OF PRODUCTION

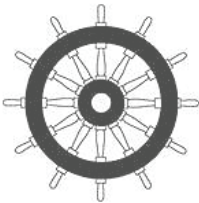
LG Hausys Ltd  
Surface Materials Production Team  
LG Hausys Cheongju Factory  
Songjeong-dong  
Heungdeok-gu  
Cheongju-si  
Chungbuk  
361-721, Korea

Bruce McDonald  
Technical Manager  
Statutory Fire and Safety  
Marine Technology and Engineering Services  
For and on behalf of Lloyd's Register Verification  
LRV EC Distinguishing No. 0038

# Fire Resisting Test



Lloyd's  
Register



## 05. Test\_Marine Equipment Directive\_MED D

Fire Resisting Test\_Marine Equipment Directive\_MED D

MED stands for Marine Equipment Directive. Both modules are extremely important for the shipbuilding industry, as they are mandatory for fabrication materials used in ships. IMO B covers the fire resistance of the material per se and certifies that the material has low flame spread characteristics and is not capable of producing excessive quantities of smoke and toxic combustion products. Module D covers the overall production capacity and checks, among other production processes, the management and systems used.

# Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED D



Notified Body authorised by the MCA

## EC (MODULE D) CERTIFICATE OF CONFORMITY

LLOYD'S REGISTER VERIFICATION LIMITED (LRV), is appointed by the MCA as a "notified body" under the terms of The Merchant Shipping (Marine Equipment) Regulations S.I. 1999 No. 1957 and Article 9 of Council Directive 96/98/EC as amended by Commission Directives 96/85/EC, 2001/55/EC, 2002/75/EC, 2002/84/EC, 2006/67/EC, 2009/26/EC, 2010/68/EU, 2011/75/EU and 2012/32/EU for Marine Equipment and does hereby certify that LRV did undertake an assessment of the subject manufacturer's Quality System against the requirements of said Directive in accordance with Annex B, Conformity Assessment Module D, which was found to conform with the requirements for the Product Types below.

**Manufacturer** LG Hausys Ltd  
**Address** 8th Floor East Building, LG Twin Tower  
Yeouido-dong, Yeongdeungpo-gu  
Seoul, 150-721  
Republic of Korea

**Annex A1 Product Type** A.1/3.18 Surface materials and floor coverings with low flame-spread characteristics (a) decorative veneers

Approval is subject to continued maintenance of the requirements of the above mentioned Directives and to all products continuing to comply with the standards and conditions of EC Type Examination Certificates issued by Lloyd's Register Verification or other Notified Body when they are of the above Designation(s).

Approval is further subject to continued maintenance of the certified quality management system in accordance with the requirements of DNV certificate number 50967-2009-AQ-KOR-KAB or an equivalent replacement thereof.

Authorisation is hereby given to the manufacturer to use the LRV Notified Body Registration Number 0038 in accordance with the requirements of the specified Directives in relation to the described products.

This certificate remains valid unless cancelled or revoked, provided that products manufactured under this Certificate remain satisfactory in service and the above quality management system continues to be approved.

**First issue** 24 September 2012

**Date of issue** 14 April 2014

**Expiry date** 23 September 2015

**Certificate No.** MED 1250197/M1

**Signed**

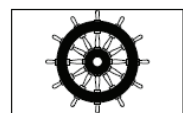
**Sheet No** 1 of 2

**Name** B. McDonald  
For and on behalf of Lloyd's Register Verification  
LRV EC Distinguishing No. 0038

**Note:**

No product shall be manufactured under this Certificate unless a valid EC Type Examination Certificate (Module B) is held on that product's Technical File.

The manufacturer shall advise the Notified Body of all proposed modifications or changes to a product for which an EC Type Examination Certificate (Module B) has been issued, and of proposed changes of manufacturing location or process, and shall retain copy of their written authorisation or Certification of such changes.



0038/yy

Subject to the Manufacturer's compliance with the foregoing, and those conditions of Articles 10.1(1) and 11 of the Directive, the Manufacturer is allowed to affix the 'Mark of Conformity' to products of the types shown above.

yy = Last two digits of year mark affixed.

**This certificate is issued under the authority of the MCA.**

Lloyd's Register Verification Limited (Reg. no. 4929226) is a limited company registered in England and Wales. Registered office: 71 Fenchurch Street, London, EC3M 4BS, UK.

A subsidiary of Lloyd's Register Group Limited.

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

# Fire Resisting Test

Fire Resisting Test\_Marine Equipment Directive\_MED D



**Lloyd's Register Verification Limited**

71 Fenchurch Street, London, EC3M 4BS

Telephone 020 7423 2416

Email [med@lr.org](mailto:med@lr.org)

Page	2 of 2
Document number	MED 1250197/M1
Issue number	1

Date	Quote this reference on all future communications
14 April 2014	MTES/TA/QA-MED/BM

## EC QUALITY SYSTEM (MODULE D) CERTIFICATE No. MED 1250197/M1

The manufacturer is also allowed to affix the US Coast Guard approval number(s) (as detailed below or subsequent revisions thereof) as allowed by the "Corrigendum to Council Decision 2004/425/EC of 21 April 2004 on the conclusion of an Agreement between the European Community and the United States of America on the mutual recognition of certificates of conformity for marine equipment".

Place of Production				
LG Hausys Ltd Surface Materials Production Team LG Hausys Cheongju Factory Songjeong-dong Heungdeok-gu Cheongju-si Chungbuk, 361-721 Republic of Korea				
Module B No.	Annex A.1 product number	USCG Approval Number	Date of issue / revision	Notified body
MED 1450003/M1	A.1/3.18(a)	164.112/EC0038/MED 1450003/M1	10 December 2013	0038

## ISO/OHSAS

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01. ISO\_LG Hausys, Ltd.\_SE\_9001

02. ISO\_LG Hausys, Ltd.\_SE\_14001

03. OHSAS\_LG Hausys, Ltd.\_SE\_1800

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## 01. ISO\_LG Hausys, Ltd.\_SE\_9001

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ISO\_LG Hausys, Ltd.\_SE\_9001

ISO 9001 criteria can guarantee the following points:  
The whole fabrication process, ensuring a good product quality  
Quality control, with an appropriate corrective procedure,  
when needed and regular control of quality control procedures.  
Process, which aims to continuously improve global efficiency

MANAGEMENT  
SYSTEM CERTIFICATE

Certificate No.: 50967 -2009 -AQ-KOR -KAB Initial Certification Date: 26 September 1997 Valid : 11 December 2014 - 01 December 2015

This is to certify that the management system of

LG Hausys, Ltd. Cheongju Plant

9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea and the sites as mentioned in the Appendix accompanying this Certificate

has been found to conform to quality management system standard(s): ISO 9001:2008, KS Q ISO 9001:2009

This certificate is valid for the following Scope:  
Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer), Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite , Insulation Materials , PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated Fabric & PVC Laminated Fabric and High - Performance Adhesive Film

Place and date:  
Seoul 12 December 2014



KAB -QC -10

For the issuing office:  
DNV GL - Business Assurance  
18th Floor, Kyobo Building, 1, Jong  
ro, Jongno -gu, Seoul, Republic of  
Korea. Tel. : +82 2 723 7596

*Ahmin*

In Kyoon Ahn  
Man agement Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance Korea Ltd., 18<sup>th</sup> Floor, Kyobo Building, 1, Jong -ro, Jongno -gu, Seoul, Republic of Korea. +82 2 723 7593  
www.dnv-ba.co.kr

Certificate No.: 50967 -2009 -AQ-KOR -KAB  
Place and date: Seoul 12 December 2014

Appendix I to Certificate

LG Hausys, Ltd. Cheongju Plant  
Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
LG Hausys, Ltd. Cheongju Plant	9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer), Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite and Insulation Materials
LG Hausys, Ltd. Cheongju. Windows/PSAA Plant	39, Baekbong -ro, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated Fabric & PVC Laminated Fabric and High Performance Adhesive Film

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance Korea Ltd., 18<sup>th</sup> Floor, Kyobo Building, 1, Jong -ro, Jong no -gu, Seoul, Republic of Korea. +82 2 723 7593  
www.dnvba.co.kr



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## 02. ISO\_LG Hausys, Ltd.\_SE\_14001

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ISO\_LG Hausys, Ltd.\_SE\_14001

The ISO 14000 family concerns the management of environmental quality.  
The most popular certificate in this group is ISO 14001.  
It encourages the minimisation of damage caused by our own activity  
to the environment and the continuous improvement of environmental performance.  
The objective is to contribute to protecting and stabilising our planet's environment.  
This test certifies that the environment management  
system of HI-MACS® conforms to ISO 14001 standards.

DNV·GL

# MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 50969 - 2009 - AE - KOR - RvA Initial Certification Date: 26 September 1997 Valid : 11 December 2014 - 01 December 2015

This is to certify that the management system of

## LG Hausys, Ltd. Cheongju Plant

9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea  
and the sites as mentioned in the Appendix accompanying this Certificate

has been found to conform to environmental management system standard(s):  
ISO 14001:2004, KS I ISO 14001:2009

This certificate is valid for the following Scope:  
Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer),  
Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite, Insulation  
Materials, PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated  
Fabric & PVC Laminated Fabric and High - Performance Adhesive Film

Place and date:  
Seoul 12 December 2014



For the issuing office:  
DNV·GL - Business Assurance  
18th Floor, Kyobo Building, 1, Jong  
ro, Jongno -gu, Seoul, Republic of  
Korea. Tel.: +82 2 723 7596  
  
In Kyoon Ahn  
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance B.V., Zwolseweg 1, 2994 LB Barendrecht, The Netherlands .Tel.: +31 10 2922 689 . www.dnvgl.com

DNV·GL

Certificate No.: 50969 - 2009 - AE - KOR - RvA  
Place and date: Seoul 12 December 2014

## Appendix I to Certificate

LG Hausys, Ltd. Cheongju Plant  
Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
LG Hausys, Ltd. Cheongju Plant	9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer), Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite and Insulation Materials
LG Hausys, Ltd. Cheongju Windows/PSAA Plant	39, Baekbong -ro, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated Fabric & PVC Laminated Fabric and High - Performance Adhesive Film

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance B.V., Zwolseweg 1, 2994 LB Barendrecht, The Netherlands .Tel.: +31 10 2922 689 . www.dnvgl.com



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## 03. OHSAS\_LG Hausys, Ltd.\_SE\_1800

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OHSAS\_LG Hausys, Ltd.\_SE\_1800

DNV·GL

# MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 50958 -2009 -HSO -KOR -DNV Initial date: 02 December 1999 Valid : 11 December, 2014 - 01 December, 2015

This is to certify that the management system of  
**LG Hausys, Ltd. Cheongju Plant**  
9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea  
and the sites as mentioned in the Appendix accompanying this Certificate

has been found to conform to occupational health and safety management system  
standard(s):  
OHSAS 18001:2007

This certificate is valid for the following Scope:  
Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer),  
Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite, Insulation  
Materials, PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated  
Fabric & PVC Laminated Fabric and High Performance Adhesive Film

Place and date:  
Seoul 12 December 2014



For the issuing office:  
DNV GL - Business Assurance  
18th Floor, Kyobo Building, 1, Jong  
ro, Jongno -gu, Seoul, Republic of  
Korea. Tel.: +82 2 723 7596  
*Ahmyeok*  
In Kyoon Ahn  
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance Korea Ltd. , 18<sup>th</sup> Floor, Kyobo Building, 1, Jong ro, Jongno -gu, Seoul, Republic of Korea. Tel.: +82 2 723 7593 . www.dnv ba.co.kr

DNV·GL

Certificate No.: 50958 -2009 -HSO -KOR -DNV  
Place and date: Seoul 12 December 2014

## Appendix I to Certificate

LG Hausys, Ltd. Cheongju Plant  
Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
LG Hausys, Ltd. Cheongju Plant	9, Oksansandan 3 -ro, Oksan -myeon, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of Floor Covering(Wood, Polymer), Tiles(Polymer), Carpet Tiles, Acrylic Solid Surface, Wood Polymer Composite and Insulation Materials
LG Hausys, Ltd. Cheongju. Windows/PSAA Plant	39, Baekbong -ro, Heungdeok -gu, Cheongju -si, Chungcheongbuk -do, Korea	Design and Manufacture of PVC Profiles, PVC Windows, Flexible Sign Faces, PVC Coated Fabric & PVC Laminated Fabric and High Performance Adhesive Film

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.  
ACCREDITED UNIT: DNV GL Business Assurance Korea Ltd. , 18<sup>th</sup> Floor, Kyobo Building, 1, Jong ro, Jong no-gu, Seoul, Republic of Korea . Tel.: +82 2 723 7593 . www.dnvba.co.kr

# Fabrication tools & equipment

Recommended brands for Solid Surface fabrication tools & equipment.

## POWER TOOLS

FESTOOL : [www.festool.com](http://www.festool.com)

BOSCH : [www.Boschtools.com](http://www.Boschtools.com)

MAKITA : [www.makitatools.com](http://www.makitatools.com)

BLACK & DECKER : [www.blackanddecker.com](http://www.blackanddecker.com)

ALBIN KRAUS : [www.albinkraus.at/english.html](http://www.albinkraus.at/english.html)

## AIR TOOLS

DYNA BRADE : [www.dynabrade.com](http://www.dynabrade.com)

FESTOOL : [www.festool.com](http://www.festool.com)

## SAW BLADES & BITS

LEITZ : [www.leitzindia.com](http://www.leitzindia.com)

ALBIN KRAUS : [www.albinkraus.at](http://www.albinkraus.at)

TITMAN : [www.titman.co.uk](http://www.titman.co.uk)

## DIAMOND BLADES & CUTTERS

HERCO : [www.3d-diamond.com](http://www.3d-diamond.com)

LEITZ : [www.leitzindia.com](http://www.leitzindia.com)

## V-GROOVING MACHINE

STAR V : [www.starvmachinery.com](http://www.starvmachinery.com)

## CLEANING AGENT FOR SHEET SEAMING

ACETONE : [Avalable in local Market no need website](#)

## CNC ROUTERS MANUFACTURERS

BIESSE : [www.biesse.com](http://www.biesse.com)

SCM : [www.scmgroup.com](http://www.scmgroup.com)

MORBIDELLI : <http://gabbett.com/morbidelli-nc-cnc/>

## SAW MANUFACTURERS

ALTENDORF : [www.altendorf.de](http://www.altendorf.de)

ROBLAND : [www.robland.com](http://www.robland.com)

MARTIN : [www.martin.info](http://www.martin.info)

## DUST COLLECTION MANUFACTURERS

FESTOOL : [www.festool.com](http://www.festool.com)

EUROVAC : [www.eurovac.com](http://www.eurovac.com)

NEDERMAN : [www.nederman.com](http://www.nederman.com)

## VACCUM PRESS & THERMOFORMING

ELKOM : [www.elkom.de](http://www.elkom.de)

## ABRASIVES

TITAN 2 RANGE : [www.festool.com](http://www.festool.com)

3M Micro finishing system : [www.3m.com](http://www.3m.com)

ABRANET / ABRALON / MIRLON : [www.mirka.com](http://www.mirka.com)

SIAFAST-BLUE LINE : [www.sia.com](http://www.sia.com)

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