

FABRICATION GUIDELINES



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Foreword

This manual has been created to provide clear, simple and authoritative instructions with regard to the techniques to be used for the successful fabrication of HI-MACS[®] Natural Acrylic Stone[™].

The intention of this manual is to provide the most effective and time efficient methods.

It is important that you take into account that the techniques listed in this manual have been designed to optimise the performance of HI-MACS[®] Natural Acrylic Stone[™] in accordance with its chemical formulation and exclusive performance.

It is impossible to cover all the existing fabrication techniques in this manual. However, we have described and explained the basic elements of fabrication which comply with our LG Hausys warranty program.

The Fabrication Guidelines do not intend to replace any testing you may need to conduct to determine the suitability of our products for your particular purpose and needs.

LG Hausys assumes no responsibility for the use of the instructions and techniques mentioned in the Fabrication Guidelines on other products.

How to use this manual

The Fabrication Guidelines are organised into sections, each section covering a major element of HI-MACS[®] fabrication.

Within each section you will find defined divisions covering each aspect of the mentioned subject.

For easy reference a comprehensive index is included at the beginning of the Fabrication Guidelines.

Technical bulletins

Technical bulletins may be published from time to time by LG Hausys. At the end of the Fabrication Guidelines manual, you will find some empty sections where those technical bulletins can be inserted.

Introduction

LG Hausys, as part of LG Group, a leading global company, has the vision to exceed customer expectations through advanced technology and innovative solutions.

HI-MACS[®] is one of those products.

Creating a safe working environment is the most important goal in the markets where HI-MACS[®] is distributed and manufactured. At LG Hausys, we share this aim. Many different tools are used to manufacture, fabricate and install HI-MACS[®]. Following these simple safety rules will help to prevent any accident.

As a HI-MACS[®] Fabricator, we would ask and strongly recommend that you apply these safety rules as well as fabrication and installation guidelines.

HI-MACS[®] is the ideal choice for a wide range of applications including sink units, shower trays and shower walls, furniture, kitchen work surfaces, shop fitting in commercial and residential environments – let your imagination run wild!

HI-MACS[®] has a natural look and feel that evokes quality, strength and durability valued by consumers, architects and designers alike. Offering endless freedom, it can be sculpted into unique shapes and features from the simple to the sophisticated.

HI-MACS[®] - Creativity unlimited!

Safety Rules

- 1.1 For your own safety, read the HI-MACS[®] Fabrication Guidelines manual before operating the different tools.**
- 1.2 Earth tools.** If a tool is equipped with a three-prong plug, it should be plugged into a three-hole electrical socket. If an adapter is used to accommodate a two-prong socket, the adapter lug must be connected to a true earth ground. Never remove the third prong.
- 1.3 Remove adjusting keys and wrenches.** Form the habit of checking to see that keys and adjusting wrenches are removed from the tool before turning to "on".
- 1.4 Keep work area neat and clean.**
- 1.5 Damp environment.** No tools should be used in wet and damp environments or exposed to rain. Keep your working area clean, dry and well ventilated, with adequate lighting.
- 1.6 Visitors and children.** Keep all visitors and children at a safe distance from the work area. Make the workshop childproof by removing starter keys, putting master switches and padlocks out of reach.
- 1.7 Wear proper clothing.** No loose clothing, gloves, neckties, scarves, rings, bracelets or other jewellery that can get caught in moving parts should be worn. We recommend that you wear safety and non-slip footwear. Wear a protective hair covering to contain long hair as well as noise protectors.
- 1.8 Use visors, goggles.** Standard glasses are not recommended as they do not have impact resistant lenses.
- 1.9 Use a face or dusk mask if the cutting operation is dusty.**
- 1.10 Secure work.** Use clamps or vices to hold work. It is safer than using your hands when operating a tool.
- 1.11 Keep your proper footing and balance.** Do not overreach!

When handling HI-MACS[®]

- 1.12 Use the right tools and do not force tools.** Each tool has been designed to work at a specific speed. The job will be safer and better done.
- 1.13 Tool maintenance.** Maintain tools in top condition: sharp and clean for the best and safest performance.
- 1.14 Tool disconnection.** Disconnect tools before changing accessories such as blades, bits, cutters or before servicing.
- 1.15 Accessories.** Use all recommended accessories. Hazards may be caused by the use of improper accessories.
- 1.16 Switch.** Make sure the switch is in the off position before plugging in.
- 1.17 Unattended tools.** Never leave tools running unattended – turn them off until they come to a complete stop.
- 1.18 Alcohol, medication, drugs.** Do not use any tools under the influence of alcohol, medication or drugs.
- 1.19 HI-MACS[®] sheets** should be carried by two persons, one at each end of the sheet. Do not flex the sheets. Wear heavy duty gloves and if appropriate, use lifting straps.
- 1.20 Boxed products.** Do not stack them too high. Stack them in a way that is easy and safe to reach.
- 1.21 Alcohol, adhesives, other toxic or flammable products.** Keep them in a safe, dry and well ventilated area.

Products

HI-MACS[®] Sheets



Further information on HI-MACS[®]-3mm sheet material: Technical Bulletin 13

Sheet thickness in mm	Sheet width in mm		Sheet length in mm	
3		930		3000*
6	760		2490	
6		910	2490*	
9	760			3680
9		910		3680*
12	760			3680
12		910		3680*
19	760			3680*

* only available in S28 Alpine White

Size	Grade
3 x 930 x 3000 mm (40 sheets/pallet)	Solids
6 x 760 x 2490 mm (30 sheets/pallet)	Lucent
	Granite
	Quartz
	Sands & Pearls
9 x 760 x 3680 mm (20 sheets/pallet)	Solids
	Granite
	Quartz
	Sands & Pearls
12 x 760 x 3680 mm (16 sheets/pallet)	Solids
	Galaxy
	Marmo
	Lucent
	Granite
	Quartz
	Sands & Pearls
	Solids
19 x 760 x 3680 mm (10 sheets/pallet)	Sparkle
	Solids

Custom colour of HI-MACS[®]

- HI-MACS[®] can be supplied in custom colours based as follows.
 - If a colour is to be matched, we need a target sample of min. 20 cm x 30 cm and preferably an A4 size sample.
 - An HI-MACS[®] sample will be made and returned for approval to the customer.
- During the manufacturing of custom colours, we can incur an overrun of up to 10%. Therefore, a production order for 32 sheets may produce a total 35 sheets or in the case of an order for 200 sheets, we may produce a total of 220 sheets. In each case, the additional sheets within the overrun will be delivered and will be invoiced to the originator of the order to LG Hausys.

Colour index

HI-MACS® enhances the elegance and harmony of your living environment with its natural beauty and the synthesis of design and creativity.

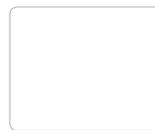
19 mm: S28 Alpine White available in stock. All other solid colours on special order only.

3 mm: S28 Alpine White available in stock. S06 Arctic White, S09 Cream, S201 Nougat Cream, S25 Fiery Red and S22 Black on special order only.

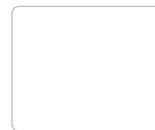
Solids



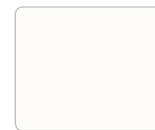
Nordic White
S033 [19/12 mm] ΔE4



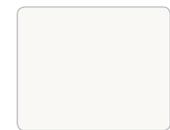
Alpine White
S28 [19/12/9/6/3 mm]
ΔE3



Diamond White
S034 [19/12 mm] ΔE4



Arctic White
S06 [19/12/9/6/3 mm]



Ivory White
S29 [19/12/9/6 mm] ΔE4



Satin White
S01 [19/12/9/6 mm]



Cream
S09 [19/12/6/3 mm]
ΔE3



Nougat Cream
S201 [19/12/3 mm]



Almond
S02 [19/12 mm] ΔE3



Babylon Beige
S102 [19/12 mm]



Concrete Grey *
S103 [19/12 mm]



Carmenere *
S110 [19/12 mm]



Jasmine Green *
S101 [19/12 mm]



Toffee Brown *
S104 [19/12 mm]



Marta Grey *
S108 [19/12 mm]



Mill Olive *
S114 [19/12 mm]



Light Green *
S212 [19/12 mm]



Lemon Squash *
S106 [19/12 mm]



Banana *
S26 [19/12 mm]



Orange *
S27 [19/12 mm]



Florida Orange *
S105 [19/12 mm]



Fiery Red *
S25 [19/12/3 mm]



Festival Pink *
S116 [19/12 mm]



Chiffon
S113 [19/12 mm]



Steel Grey *
S109 [19/12 mm]



Grey
S05 [19/12/9/6 mm]



Midnight Grey *
S117 [19/12 mm]



Greenish Gray *
S112 [19/12 mm]



Sky Blue
S203 [19/12 mm]



Mazarin Blue *
S107 [19/12 mm]



Deep Indigo *
S115 [19/12 mm]



Dark Night *
S111 [19/12 mm]



Coffee Brown *
S100 [19/12 mm]



Black *
S22 [19/12/9/3 mm]

Lucent



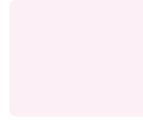
Further information:
Technical Bulletin 10



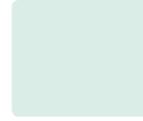
Opal
S 302 [12/6 mm], Δ E4



Sapphire
S 303 [12 mm]

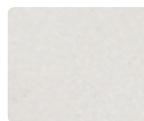


Ruby
S 304 [12 mm]



Emerald
S 305 [12 mm]

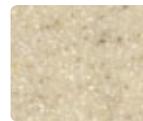
Pearl



Pebble Pearl
G 107 [12/9 mm]



Tapioca Pearl
G 50 [12 mm]



Almond Pearl
G 08 [12 mm]



Brown Pearl *
G 105 [12 mm]



Midnight Pearl *
G 15 [12 mm]



Black Pearl *
G 10 [12/6 mm]

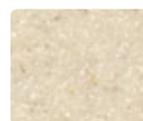
Sand



Lunar Sand
G 108 [12/9 mm]



Riviera Sand
G 106 [12/9 mm]



Beach Sand
G 48 [12/9 mm] ΔE3



Desert Sand
G 01 [12/9 mm]



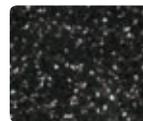
Grey Sand
G 02 [12/6 mm] ΔE4



Venetian Sand
G 42 [12 mm]



Oregano Sand
G 62 [12 mm]



Black Sand
G 09 [12 mm]

Quartz



White Quartz
G04 [12/9/6 mm] ΔE4



Crystal Beige
G101 [12 mm]



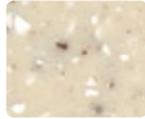
Moonscape Quartz
G58 [12/9 mm]



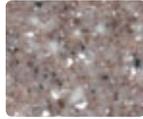
Confetti Quartz
G41 [12 mm] ΔE4



Sea Oat Quartz
G38 [12 mm] ΔE3



Ivory Quartz
G30 [12 mm] ΔE4



Rose Quartz
G06 [12 mm]

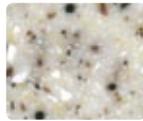


Allspice Quartz
G63 [12 mm]

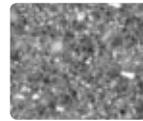
Granite



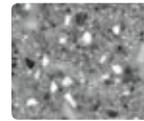
Arctic Granite
G34 [12/9/6 mm] ΔE3



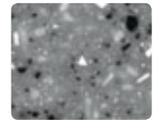
White Granite
G05 [12 mm] ΔE4



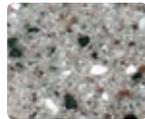
Natural Granite
G23 [12/9 mm]



Grey Granite
G17 [12 mm]



Greystone Granite
G60 [12 mm]



Platinum Granite
G07 [12 mm]



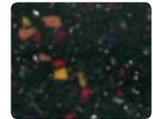
Grey Crystal
G102 [12 mm]



Peanut Butter
G100 [12 mm]



Mocha Granite
G74 [12 mm]



Celebration Granite *
G40 [12 mm]

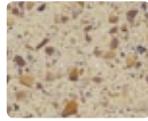


Black Granite *
G31 [12/9 mm]

Galaxy



Further information:
Technical Bulletin 12



Uranus
T 02 [12 mm]



Nebula
T 10 [12 mm]



Venus
T 11 [12 mm]



Mars
T 16 [12 mm]



Andromeda
T 17 [12 mm]



Carina
T 18 [12 mm]



New Moon
T 19 [12 mm]



Hercules *
T 20 [12 mm]

Marmo



Further information:
Technical Bulletin 12



Bologna
M 103 [12 mm]



Roma *
M 104 [12 mm]



Verona *
M 105 [12 mm]

Eden

The Eden collection is available upon special request.



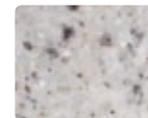
Cocoa
G 501R [12 mm]
12% Recycled Content



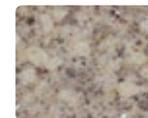
Sugar Maple
G 510R [12 mm]
40% Recycled Content



Poplar
G 511R [12 mm]
40% Recycled Content



Birch Bark
G 514R [12 mm]
40% Recycled Content



Pecan
G 515R [12 mm]
41% Recycled Content



Hickory
G 516R [12 mm]
40% Recycled Content



Mountain Ash
G 517R [12 mm]
40% Recycled Content



Ripe Cotton
G 518R [12 mm]
12% Recycled Content

Volcanics



Gemini
VW01 [12 mm]



Tambora
VE01 [12 mm]



Mayon
VE23 [12 mm]



Santa Ana
VA01 [12 mm]



Frosty
VA22 [12 mm]



Maui
VG21 [12 mm]



Taos*
VB21 [12 mm]

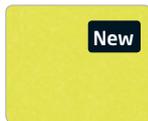


Cima*
VB02 [12 mm]

Sparkle



Further information:
Technical Bulletin 14



Key Lime*
P100 [12 mm]



Kreemy Grey
P101 [12 mm]



Kold Silver
P102 [12 mm]



Kandy Pink*
P103 [12 mm]



Kanada Violet*
P104 [12 mm]

Handwritten signature

The basic HI-MACS[®] material is identical for every colour but it is important to note that darker and more heavily pigmented colours will show dust, scratches, haziness, marks left by hard water and other ordinary wear and tear more noticeably than lighter textured colours. Therefore colours marked with a * are less suitable for applications that are exposed to extensive surface contact such as worktops located in heavy traffic area as an example. Due to specific characteristics and properties of the Marmo colours, which have a veined effect, special consideration has to be taken into account with jointing and the use of covered up-stands. Veining may vary from sheet to sheet. There may be deviations between the illustrated and actual colours owing to printing techniques. To receive the detailed availability, please contact us at www.himacs.eu.

15 HI-MACS[®] colours are particularly suitable for outdoor applications because of their good UV-resistance. HI-MACS[®] offers a 5 years warranty on colours' UV resistance for a tolerance of $\Delta E3$ to $\Delta E4$ and loss of gloss over 40%, 10 years on colour leaching and 20 years on colour peeling, swelling or delaminating. The warranty is applicable after the first installation and is only valid for the sheet material; adhesives are excluded. The conditions for this warranty are based on practical experience and on-going tests.

Product availability (1/3)

2014 HI-MACS® STANDARD STOCK ITEMS				
Code	Colours	12x760x3680mm	9x760x3680mm	6x760x2490mm
G-01	DESERT SAND	x	x	
G-02	GREY SAND	x		x
G-04	WHITE QUARTZ	x	x	x
G-05	WHITE GRANITE	x		
G-06	ROSE QUARTZ	x		x
G-07	PLATINUM GRANITE	x		x
G-08	ALMOND PEARL	x		
G-09	BLACK SAND	x		
G-10	BLACK PEARL	x		x
G-15	MIDNIGHT PEARL	x		
G-17	GREY GRANITE	x	x	
G-23	NATURAL GRANITE	x	x	
G-30	IVORY QUARTZ	x		x
G-31	BLACK GRANITE	x	x	
G-34	ARCTIC GRANITE	x	x	x
G-38	SEA OAT QUARTZ	x		x
G-40	CELEBRATION GRANITE	x		
G-41	CONFETTI QUARTZ	x		
G-42	VENETIAN SAND	x		
G-48	BEACH SAND	x	x	
G-50	TAPIOCA PEARL	x		
G-58	MOONSCAPE QUARTZ	x	x	
G-60	GREYSTONE GRANITE	x		
G-61	INDIGO GRANITE	x		
G-62	OREGANO SAND	x		
G-63	ALLSPICE QUARTZ	x		x
G-74	MOCHA GRANITE	x		
G-100	PEANUT BUTTER	x		
G-101	CRYSTAL BEIGE	x		
G-102	GRAY CRYSTAL	x		
G-105	BROWN PEARL	x		
G-106	RIVIERA SAND	x		
G-107	PEBBLE PEARL	x		
G-108	LUNAR SAND			

Product availability (2/3)

2014 HI-MACS® STANDARD STOCK ITEMS				
Code	Colours	12x760x3680mm	9x760x3680mm	6x760x2490mm
M-103	BOLOGNA	x		
M-104	ROMA	x		
M-105	VERONA	x		
P-100	KEY LIME	x		
P-101	KREEMY GREY	x		
P-102	KOLD SILVER	x		
P-103	KANDY PINK	x		
P-104	KANADA VIOLET	x		
S-01	SATIN WHITE	x	x	x
S-02	ALMOND	x		
S-05	GREY	x	x	x
S-06	ARCTIC WHITE	x	x	x
S-09	CREAM	x		x
S-22	BLACK	x	x	
S-25	FIERY RED	x		
S-26	BANANA	x		
S-27	ORANGE	x	x	
S-29	IVORY WHITE	x	x	x
S-33	NORDIC WHITE	x		
S-34	DIAMOND WHITE	x		
S-100	COFFEE BROWN	x		
S-101	JASMIN GREEN	x		
S-102	BABYLON BEIGE	x		
S-103	CONCRETE GREY	x		
S-104	TOFFEE BROWN	x		
S-105	FLORIDA ORANGE	x		
S-106	LEMON SQUASH	x		
S-107	MAZARIN BLUE	x		
S-108	MARTA GREY	x		
S-109	STEEL GREY	x		
S-110	CARMENERE	x		
S-111	DARK NIGHT	x		
S-112	GREENISH GRAY	x		
S-113	CHIFFON	x		
S-114	MILL OLIVE	x		
S-115	DEEP INDIGO	x		
S-116	FESTIVAL PINK	x		
S-117	MIDNIGHT GREY	x		
S-201	NOUGAT CREAM	x		
S-203	SKY BLUE	x		

Product availability (3/3)

2014 HI-MACS® STANDARD STOCK ITEMS				
Code	Colours	12x760x3680mm	9x760x3680mm	6x760x2490mm
S-212	LIGHT GREEN	x		
S-302	OPAL	x		x
S-303	SAPPHIRE	x		
S-304	RUBY	x		
S-305	EMERALD	x		
T-02	URANUS	x		
T-10	NEBULA	x		
T-11	VENUS	x		
T-16	MARS	x		
T-17	ANDROMEDA	x		
T-18	CARINA	x		
T-19	NEW MOON	x		
T-20	HERCULES	x		
VA01	SANTA ANA	x		
VE01	TAMBORA	x		
VW01	GEMINI	x		
VA22	FROSTY	x		
VB02	CIMA	x		
VB21	TAOS	x		
VE23	MAYON	x		
VG21	MAUI	x		

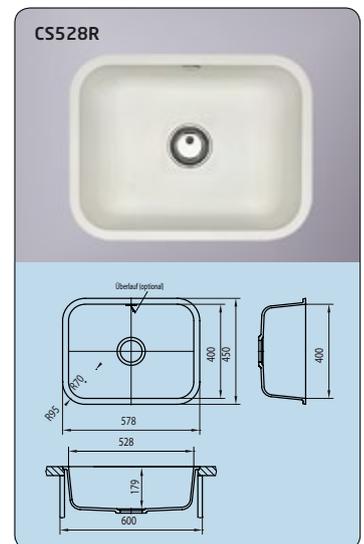
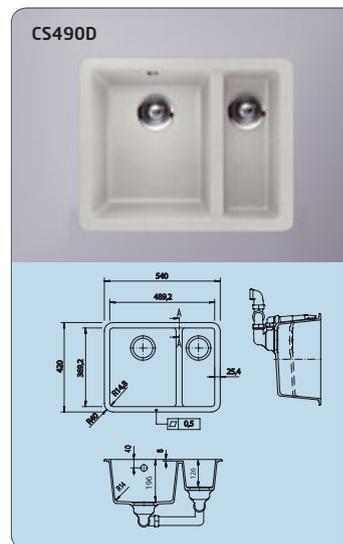
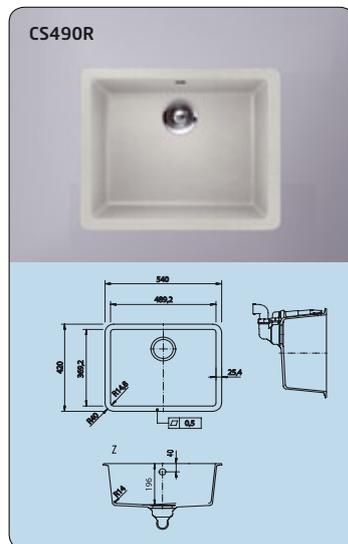
2014 HI-MACS® STANDARD STOCK ITEMS S-28 ALPINE WHITE			
	Sheet thickness	Sheet width	Sheet length
Code: S-28 Colour: Alpine White	3 mm	930 mm	3000 mm
	6 mm	910 mm	2490 mm
	9 mm	910 mm	3680 mm
	12 mm	910 mm	3680 mm
	19 mm	760 mm	3680 mm

Sinks

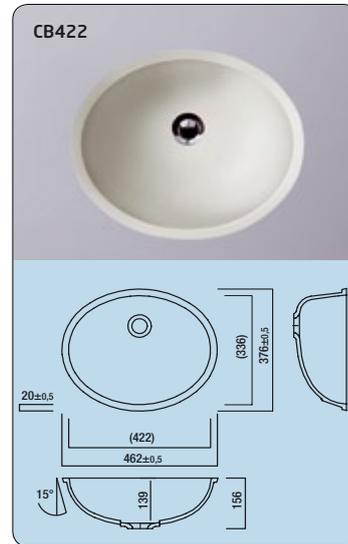
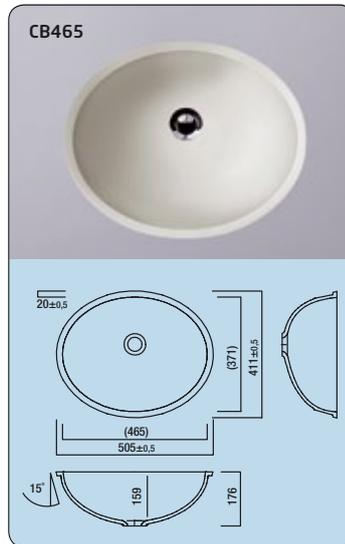
A comprehensive selection of standard-sized HI-MACS[®] Natural Acrylic Stone[™] sinks, basins and shower trays is readily available in a wide range of colours and patterns. Manufactured with care and precision, HI-MACS[®] units are delivered ready for installation and, for optimal hygiene and aesthetics, can be integrated with no visible joints into sink units and work surfaces.

Some of the dark, heavily pigmented colours of HI-MACS[®] may require special care and may show scratches, dust and ordinary wear and tear more readily than lighter, textured colours. For information on selecting the ideal colour for your application, please consult with your HI-MACS[®] representative. Printed representation of colours may vary from actual samples.

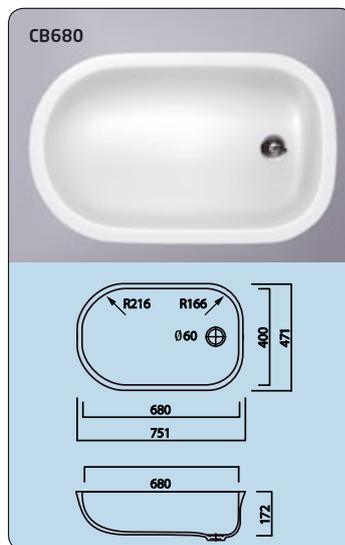
Sinks (1/2)



Bowls

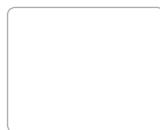


Baby Bath



HI-MACS[®] sinks and HI-MACS[®] washstands are available in Alpine White S28 and Nougat Cream S201. HI-MACS[®] Baby Bath is available only in Alpine White S28.

Warranty: 15 years on all precast HI-MACS[®] bowls and sinks.



Alpine White
S 28



Nougat Cream
S 201

Only by special order: S01, S02, S05, S06, S09, S29, S214

Adhesive colours (1/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
G-01	DESERT SAND	H04	PEANUT
G-02	GREY SAND	H03	GREY
G-04	WHITE QUARTZ	H36	SILVER
G-05	WHITE GRANITE	H03	GREY
G-06	ROSE QUARTZ	H06	PINK
G-07	PLATINUM GRANITE	H03	GREY
G-08	ALMOND PEARL	H04	PEANUT
G-09	BLACK SAND	H42	MERAPHI
G-10	BLACK PEARL	H07	BLACK
G-15	MIDNIGHT PEARL	H10	BLUE
G-17	GREY GRANITE	H03	GREY
G-23	NATURAL GRANITE	H03	GREY
G-30	IVORY QUARTZ	H04	PEANUT
G-31	BLACK GRANITE	H07	BLACK
G-34	ARCTIC GRANITE	H36	SILVER
G-38	SEA OAT QUARTZ	H04	PEANUT
G-40	CELEBRATION GRANITE	H07	BLACK
G-41	CONFETTI QUARTZ	H01	SATIN WHITE
G-42	VENETIAN SAND	H26	SAND BROWN
G-48	BEACH SAND	H04	PEANUT
G-50	TAPIOCA PEARL	H36	SILVER
G-58	MOONSCAPE QUARTZ	H04	PEANUT
G-60	GREYSTONE GRANITE	H03	GREY
G-62	OREGANO SAND	H13	OLIVE YELLOW
G-63	ALLSPICE QUARTZ	H14	SEPHIA
G-74	MOCHA GRANITE	H37	MOCCA
G-100	PEANUT BUTTER	H04	PEANUT
G-101	CRYSTAL BEIGE	H01	SATIN WHITE
G-102	GREY CRYSTAL	H03	GREY
G-105	BROWN PEARL	H35	DARK
G-106	RIVIERA SAND	H04	PEANUT
G-107	PEBBLE PEARL	H03	GREY
G-108	LUNAR SAND	H36	SILVER
G-501R	COCOA	H47	STELLER
G-510R	SUGAR MAPLE	H52	BABYLON BEIGE
G-511R	POPLAR	H01	SATIN WHITE
G-514R	BIRCH BARK	H36	SILVER
G-515R	PECAN	H04	PEANUT
G-516R	HICKORY	H03	GREY
G-517R	MOUNTAIN ASH	H26	SAND BROWN
G-518R	RIPE COTTON	H36	SILVER
M-103	BOLOGNA	H34	IVORY CRYSTAL

Adhesive colours (2/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
M-104	ROMA	H22	PERNA GREY
M-105	VERONA	H61	VERONA
P-100	KEY LIME	H110	KEY LIME
P-101	KREEMY GREY	H112	KREEMY GREY
P-102	KOLD SILVER	H111	KOLD SILVER
P-103	KANDY PINK	T14	KANDY PINK
P-104	KANADA VIOLET	H10	BLUE
S-01	SATIN WHITE	H01	SATIN WHITE
S-02	ALMOND	H04	PEANUT
S-05	GREY	H03	GREY
S-06	ARCTIC WHITE	H02	ARCTIC WHITE
S-09	CREAM	H20	CREAM
S-22	BLACK	H07	BLACK
S-25	FIERY RED	H18	RED
S-26	BANANA	H17	BANANA
S-27	ORANGE	H19	ORANGE
S-28	ALPINE WHITE	H16	ALPINE WHITE
S-29	IVORY WHITE	H32	IVORY
S-33	NORDIC WHITE	H16	ALPINE WHITE
S-34	DIAMOND WHITE	H113	DIAMOND WHITE
S-100	COFFEE BROWN	H37	MOCCA
S-101	JASMIN GREEN	H51	JASMIN GREEN
S-102	BABYLON BEIGE	H52	BABYLON BEIGE
S-103	CONCRETE GREY	H53	CONCRETE GREY
S-104	TOFFEE BROWN	H54	TOFFEE BROWN
S-105	FLORIDA ORANGE	H108	FLORIDA ORANGE
S-106	LEMON SQUASH	H104	LEMON SQUASH
S-107	MAZARIN BLUE	H102	MAZARIN BLUE
S-108	MARTA GREY	H107	MARTA GREY
S-109	STEEL GREY	H101	STEEL GREY
S-110	CARMENERE	T11	CARMENERE
S-111	DARK NIGHT	T09	DARK NIGHT
S-112	GREENISH GRAY	T13	GREENISH GRAY
S-113	CHIFFON	T10	CHIFFON
S-114	MILL OLIVE	T12	MILL OLIVE
S-115	DEEP INDIGO	T08	DEEP INDIGO
S-116	FESTIVAL PINK	H106	FESTIVAL PINK
S-117	MIDNIGHT GRAY	H35	DARK
S-201	NOUGAT CREAM	H04	PEANUT
S-203	SKY BLUE	H30	DAWN MISTY
S-212	LIGHT GREEN	H56	LIGHT GREEN

Adhesive colours (3/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
S-302	OPAL	T02	OPAL
S-303	SAPPHIRE	T03	SAPPHIRE
S-304	RUBY	T04	RUBY
S-305	EMERALD	T05	EMERALD
T-02	URANUS	H60	URANUS
T-10	NEBULA	H02	ARCTIC WHITE
T-11	VENUS	H01	SATIN WHITE
T-16	MARS	H34	IVORY CRYSTAL
T-17	ANDROMEDA	H16	ALPINE WHITE
T-18	CARINA	H02	ARCTIC WHITE
T-19	NEW MOON	H01	SATIN WHITE
T-20	HERCULES	H22	PERNA GREY
VA01	SANTA ANA	H03	GREY
VB02	CIMA	H45	V/BLACK
VE01	TAMBORA	H20	CREAM
VW01	GEMINI	H36	SILVER
VA22	FROSTY	H03	GREY
VB21	TAOS	H48	TAOS
VG21	MAUI	H49	MAUI
VE23	MAYON	H06	PINK

Sheet Specification

Product Specifications

Sheet thickness in mm	Sheet width in mm		Sheet length in mm		
3		930		3000*	
6	760		2490		
6		910	2490*		
9	760				3680
9		910			3680*
12	760				3680
12		910			3680*
19	760				3680*

* only available in S28 Alpine White

Weight/m ²	Thickness	Solids/Lucent	Unit	Textured colours*	Unit
	3 mm	5,25	kg		
	6 mm	10,50	kg	9,9	kg
	9 mm	15,64	kg	14,85	kg
	12 mm	21	kg	19,80	kg
	19 mm	33,25	kg		

* Pearls, Sands, Quartz, Granite, Volcanics, Marmo, Galaxy, Sparkle, Eden

Weight/Sheet	Thickness	Width/Length	m ² /Sheet	kg/Sheet
Solid	3mm	930 / 3000	2,790	14,65
	6 mm	760 / 2490	1,8924	19,87
	9 mm	760 / 3680	2,7968	43,75
	12 mm	760 / 3680	2,7968	58,74
	19 mm	760 / 3680	2,7968	93
Pearl, Sand, Quartz, Granite	6 mm	760 / 2490	1,8924	18,73
	9 mm	760 / 3680	2,7968	41,53
	12 mm	760 / 3680	2,7968	55,38
Volcanics	12 mm	760 / 3680	2,7968	56,60
Lucent	6 mm	760 / 2490	1,8924	19,87
	12 mm	760 / 3680	2,7968	58,74
Marmo, Galaxy	12 mm	760 / 3680	2,7968	55,38
Eden	12 mm	760 / 3680	2,7968	55,38
Sparkle	12 mm	760 / 3680	2,7968	55,38

Specification Data Sheet (1/2)

Specification	Unit	Result		Test methods
		Solids	Granite	
Flexural-E-modulus	MPa	8900	7730	DIN EN ISO 178
Flexural strength	MPa	70.1	64.3	ASTM D638
Breaking elongation	%	1	1.1	DIN EN ISO 178
Tensile strength	MPa	69.5	56.3	DIN EN ISO 527
Density	g/cm ³ kg/m ³	1.75 1750	1.65 1650	ISO 1183 ISO 1183
Ball indentation hardness	N/mm ²	257	239	DIN EN ISO 2039-1
Mohs hardness		2 to 3	2 to 3	EN 101
Pencil hardness		>9H	>9H	ISO 15184
Water absorption weight strength/thickness		<0,1 % <0,1 %	<0,1 % <0,1 %	DIN EN 438 Part 12
Impact resistance impactor drop ball test (fall height)	N mm	≥25 ≥1500	≥25 ≥1500	E DIN EN 438, 02/02 Part 2/20 E DIN EN 438, 02/02 Part 2/21
Slip resistance		>0,32 – 0,9		GMG100 (replaces R9)
Slip resistance		angle of acceptance of more than 10° to 19° = R10		DIN 51130
Climate change resistance	°C	≥0,05	≥0,05	AMK
Dry heat (pan base)	°C	≥100 (7C)		DIN 68 861, Part 7, 04-'85
Damp heat (pan base)	°C	≥100 (7C)		DIN 68 861, Part 8, 04-'85
Temperature change resistance	°C	no change		UNI 9429
Resistance to cigarette burns		6C	6B	DIN 68 861, Part 6, 11-'82
Scratch resistance		4D	4B	DIN 68 861, Part 4, 11-'81
Electrostatics conductivity resistance	>1x10 ¹² Ω	insulating non-conductive		DIN IEC 1340-4-1, 04-'92 EN 61340-5-1
Thermal conductivity	W/mK	0.636	0.55	DIN EN 12664
Thermal resistance	m ² K/W	0.038	0.045	DIN EN 12664
Thermal expansion co-efficient	mm/mK m/m/°C	0.048 30.0 x 10 ⁻⁶	0.055	DIN EN 14581
Water vapor transmission properties – diffusion resistance factor	μ	18607	16150	DIN EN ISO 12572

Specification Data Sheet (2/2)

Specification	Unit	Result		Test methods
		Solids	Granite	
Dimensional change by change in relative humidity				DIN EN 318, edit. 5, 1998
length	%	-0.03	-0.02	
thickness	%	0.06	0.03	
mass	%	0.05	0.05	
Resistance to boiling water				E DIN EN 438, 02/02 Part 2/12
increase in weight	%	<0,1	>0,1	
increase in thickness	%	<0,1	<0,1	
Light fastness (Xenon)	scale 0 – 10	better than 6	better than 6	DIN 53 387, 04-'89
Food tolerance		suitable for all colours		LMBG § 31
Hygiene		suitable	suitable	LGA Hygiene Certificate
Fire protection classification Flame-retardant properties MPA/NRW		B1		DIN 4102-1
HI-MACS [®] MPA/NRW (BAM) 12 mm		non-dripping material		DIN 5510
(BAM) 9 mm + back-up		B1 for all colours*		DIN 4102-1
(Bodycote/Warrington) 12 mm		B1 for all colours*		BS EN ISO 11925-2 : 2002
		B-s1 , d0 for all HI-MACS [®] colours*		BS EN 13823: 2002
		complies with BS 476 class 0		
* not currently applicable to Marmo, Galaxy, Volcanics, Lucent, Eden, and Sparkle				

Chemical Resistance

According to DIN 68861 & DIN 68930 Tab.1

Test material	Application time	Evaluation of G02 changes	Evaluation of S02 changes
Acetic acid (vinegar)	16 hrs	no change	no change
Citric acid (lemon)	16 hrs	no change	no change
Sodium carbonate	16 hrs	no change	no change
Ammonium hydroxide	16 hrs	no change	no change
Ethyl alcohol	16 hrs	no change	no change
White wine, red wine	16 hrs	no change	no change
Beer	16 hrs	not tested	not tested
Cola drinks	16 hrs	no change	no change
Instant coffee	16 hrs	no change	no change
Black tea	16 hrs	no change	no change
Blackcurrant juice	16 hrs	no change	no change
Cream	16 hrs	no change	no change
Water	16 hrs	no change	no change
Petrol	16 hrs	no change	no change
Acetone	16 hrs	3	3
Ethyl butyl acetate	16 hrs	3	3
Butter	16 hrs	no change	no change
Olive oil	16 hrs	no change	no change
Mustard	16 hrs	no change	no change
Salt	16 hrs	no change	no change
Onion	16 hrs	no change	no change
Lipstick	16 hrs	no change	no change
Disinfectant	16 hrs	no change	no change
Black ballpoint	16 hrs	2	2-3
Stamping ink	16 hrs	1	1
Household cleaner	16 hrs	no change	no change
Cleaning agent	16 hrs	no change	no change
Wear resistance group to DIN 68861		1B	1B
Evaluation according to DIN 68930 Tab. 1 Other work surfaces: wear resistance group: "1C"		Requirement met +	according to DIN 68861 & DIN 68930

* 1A = Excellent; 1F = very bad

0 = no visible result; 5 = damaged

Health & Safety

Material Safety Data Sheet

4.1 Chemical Product and Company Identification
LG Hausys, LTD.
One IFC Building 23F
10 Gookjegeumyoong-Ro, Yeongdeunngpo-Gu,
Seoul 150-876, Korea
Tel.: 82 (0)2 3773 7760
Fax: 82 (0)2 3773 7972

4.2 Composition and Information on Ingredients

	Product no.	% by weight	TLV/PE	LC50/LD50
Alumina Trihydrate	21645-51-2	52-62	15mg/m3 OSHA PEL 10mg/m3 ACGIH TLV	not available
MMA – Methyl Methacrylate	80-62-6	30-50	not available	not available
Copolymer colourants	not available	1-5	not available	not available

4.3 Section 03 Hazard Identification Overview

With solid sheets of all colours, dust caused by machining may cause irritation to the skin, eyes and respiratory system. Routes of Entry: inhalation (dust during machining), eyes, skin contact

Potential ACUTE Health effects	The product will not easily enter the human body. The product is supplied as a solid sheet. As such, there would not be any health hazards with it however, if any cutting, sanding or routing takes place, dust may be generated that may cause mechanical irritation to the eyes and respiratory tract.
Eyes :	Dust generated during fabrication may irritate the eyes.
Skin :	Any sharp edge will cut or abrade the skin. Dust generated by fabrication may cause skin sensitization . High concentrations of methacrylate have been shown to cause allergic reactions.
Respiratory Tract:	Dust generated during fabrication may cause irritation to the respiratory tract, characterized by sneezing and coughing. May cause headache in case of long term exposure.

Sheet (continued)

Potential CHRONIC health effects	Non-hazardous to skin (non-corrosive and non-permeating) or by ingestion.
Carcinogenic effects:	None
Mutagenic effects:	No substance present
Teratogenic effects:	None. Is NOT toxic to the blood, kidneys, lungs, nervous system, reproductive system, liver, mucous members.
Symptoms of over-exposure:	None
Medical problems	None

4.4 First Aid Measures

Eye Contact	Upon contact with dust particles, flush eyes immediately with large amounts of water for a minimum of 15 minutes. Seek medical attention.
Skin Contact	Not expected to be a problem. May cause skin sensitisation. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. If irritation persists, seek medical attention.
Inhalation	Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Allow the victim to rest in a well ventilated area. Oxygen may be administered if breathing is difficult. Seek medical attention
Ingestion	Not applicable
Notes to Physician	No additional information

Sheet (continued)

4.5 Fire and Explosion Data

Flammability of the Product	Non-flammable
Flash Points	Not available L.E.L. & U.E.L.-not available.
Self-combustion Temperature	Not available
Combustible Products	Some metallic oxides.
Fire Risks in the Presence of Various Substances (Flammability)	Substances (Flammability) Non-flammable in the presence of shocks, heat, oxidizing materials, reducing materials combustible materials, organic materials, metals, acids, alkalis, moisture
Explosion Risk with Different Substances	Not considered an explosion-risk product
Fire Fighting Media and Instructions	
Small Fire :	Use DRY chemicals, CO ₂ , water spray or
Large Fire :	Use water spray, fog, or foam, DO NOT use water jet.
Special Remarks on Fire Hazards	No additional remarks
Special Remarks on Explosion	No additional remarks

4.6 Accidental Release Measures

Small Spill	Use appropriate tools to transfer the dropped solid into a convenient waste disposal container. No additional information.
Large Spill	No additional information

4.7 Handling and Storage

Precautions	Do not breathe in the dust. If work creates dust, ventilate the area to keep exposure to airborne contaminants below the exposure limit.
Storage	No specific storage is required. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Sheet (continued)

4.8 Physical and Chemical Properties

Engineering Controls	If work (machining, routing, sanding) creates dust, ventilate the area to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Safety glasses. Gloves to protect against cuts and abrasions are highly recommended. Wear appropriate breathing apparatus if ventilation is inadequate (NIOSH approved).
Exposure Control	Not available.

4.9 Exposure Controls/Personal Protection

Odour/Odourless	Taste not available	Colour varies	Not available
Physical state and appearance	Solid	Volatility	Not available
Molecular Weight	applicable	Odour Threshold	Not available
PH (1% soln/water)	applicable	Evaporation rate	Not available
Boiling Point	Not available	Viscosity	Not available
Melting Point	Not available	Water Oil Dist.Coeff	Insoluble in water and oil
Specific Gravity	0.04 (water = 1) based on information available	Solubility in water	Insoluble in water
Vapor Pressure	Not available	Solubility in solvents	Insoluble in methanol, diethyl ether, n-octanol acetone

Sheet (continued)

4.10 Stability and Reactivity Data

Stability	The product is stable.
Conditions of Instability	No additional remarks
Chemical Instability/ Materials to Avoid	Not considered to be reactive according to our database.
Corrosivity	Not considered to be corrosive for metals and glass according to our database..
Special Remarks/ Conditions of Reactivity	No additional remarks
Special Remarks on Corrosivity	No additional remarks
Hazardous Decomposition	Not available
Hazardous Polymerisation	Yes

4.11 Toxicological Information

Mechanical Controls	This product has not been tested for its effects on animals. See Section 11 for ingredient information.
Personal Protection	The substance is not toxic to the blood, kidneys, lungs, nervous system, reproductive system, liver, mucous membranes. No additional information.
Exposure Limits	

4.12 Ecological Information

Ecotoxicity	Not available
BODS and COD	Not available
Toxicity of the Biodegradable Products	Not available
Special Remarks on the Biodegradable Products	No additional remarks

Sheet (continued)

4.13 Disposal

Waste Disposal

Use appropriate tools to put the solid in a convenient waste disposal container.

4.14 Transport Information

DOT/TDG Classification

Not a DOT controlled material (United States)

DOT/TDG Proper Shipping Name

Not regulated.

DOT/Identification Number TDGPIN

Not applicable.

Packing group

No reportable quantity of hazardous substance (RQ).



DOT (Pictogram)



TOG (Pictogram)



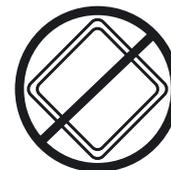
ADR (Europe, Pictogram)

Special Provision For Transport

IATA (Air Transport)		IMDC (Ocean Transport)	
Proper Shipping Name	Not regulated	Proper Shipping Name	Not regulated
Hazard Class	Not controlled under IATA	Hazard Class	Not controlled under IMDG
Identification Number	Not applicable	Identification Number	Not applicable
Packing Group	None	Packing Group	Not applicable



IATA (Pictogram)



IMDF (Pictogram)

Sheet (continued)

4.15 Other Regulatory Information and Pictograms

Federal Regulations	TSCA (Toxic Substance Control Act): All components of this product are listed on the TSCA Inventory.
	Resource Conservation & Recovery Act (RCRA)
	(40 CFR 261) Regulated; not Available
	CERCLA Reportable Quantity (RQ) amount; none (lbs)
	This product may contain one or more of the following chemicals subject to the reporting requirements of SECTION 313 of TITLE III of the SUPERFUND AMENDMENT AND REAUTHORIZATION ACT of 1986 (SARA) and 40 CFR Part 372
	Cas Number, Chemical Name: NONE

Other Classifications

WHMIS STATEMENT	This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR
WHMIS (Canada) (Pictogram)	 Not controlled under WHMIS (Canada)
DSCL (ECC) (Europe) (Pictogram)	 Not controlled under USCL (Europe)
Japan	Not available
Australia	Not available
Additional Information	No additional remarks
HMIS (U.S.A.)	Health Hazard : 1 Reactivity : 0 Fire Hazard : 0 Personal Protection: A
National Fire Protection Association (USA)	 <p>Health 2 Fire Hazard 0 Reactivity 0 Specific Hazard 0</p> <p>Hazard Rating : 4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Minimal (Insignificant)</p>
Protective Clothing (Pictogram)	

Sheet (continued)

4.16 Other Information

References	SAX, N.I Dangerous Properties of Industrial Materials, Toronto, Van Nostrand Reinold, 60 cd. 1984 Industrial Hygiene and Toxicology. Manufacturer's Material Safety Data Sheet.
Glossaire	
AGC:	American Conference of Governmental Industrial Hygienists
ASTM:	American Society for Testing and Materials
BODS:	Biological Oxygen Demand in 5 days
CAS:	Chemical Abstract Services
CEPA:	Canadian Environmental Protection Act
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
CFR:	Code of Federal Regulations
DOT:	Department of Transportation
DIN:	Deutsche Institut für Normung
DSL:	Domestic Substance List (Canada)
HCS:	Hazardous Communication System
HMTS:	Hazardous Material Information System
IARC:	International Agency for Research on Cancer
ISO:	ISO International Organisation for Standardisation
DL50/CL50:	Lethal Dose/Concentration kill 50%
DLLo/LCLo:	Lowest Published Lethal Dose/Concentration
NFPA:	National Fire Prevention Association
NIOSH:	National Institute for Occupational Safety & Health
NTP:	National Toxicology Program
OSHA:	Occupational Safety & Health Administration
PEL:	Permissible Exposure Limit (15 minutes)
RCRA:	RESOURCE Conservation and Recovery Act
STEL:	Short Term Exposure Limit (15 minutes)
TDG:	Transportation of Dangerous Goods (Canada)
TLV:	Threshold Limit Value
TWA:	Time Weighted Average
TSCA:	Toxic Substances Control Act
WHMIS:	Workplace Hazardous Material Information System
Consideration	No additional Remark
Revision	Annual update.
Comments	Telephone number changes.
Notice to reader	The data contained in the MSDS and recommendations presented herein are based upon information considered to be accurate, as of this date. However, LG Hausys makes no guarantee or warranty, either expressed or implied, of the completeness of this data and recommendations, and assumes no liability in connection with any use of this information.

Adhesive

1. Products

HI-MACS[®] joint adhesive

2. Manufacturer

LG Hausys, LTD.

One IFC Building 23F

10 Gookjegeumyoong-Ro, Yeongdeunngpo-Gu,

Seoul, 150-876, Korea

Tel.: 82 (0)2 3773 7760

Fax: 82 (0)2 3773 7972

3. Chemical family

Solid surface adhesive (contains peroxide initiator)

4. Hazardous ingredient

Hazardous mixtures of other liquids, solids or gases	CAS	%
Part A		
Methyl methacrylate	80-62-6	30 to 60
Part B		
Benzoyl peroxide	94-36-0	Up to 3
Dipropylene Glycol, Dibenzoate	27138-31-4	Up to 60

5. Physical data

Boiling point (°C)	176.6°C ~ 232.2°C
Vapour pressure (mm Hg) at 25°C	5 mm at 22.2°C
Vapour density	Heavier than air
Evaporation rate	Slower than ether
Water volume	0%

6. Fire and explosion hazard data

Flammability	None
Explosion hazard	May be not present
Unusual fire & explosion	None
Special fire fighting procedure	None

Wear stand-alone breathing apparatus and protective clothing to prevent contact with skin and eyes.

Adhesive (continued)

7. Health hazard data

Exposure limits: TLV = 5 mg/m³.

Effects of overexposure: headache, nausea, nose, throat distress.

Emergency and first aid procedures

Eyes : flush with water for 15 minutes, get medical attention.

Skin: wash with soap and water, remove contaminated clothing.

Inhalation: Transport person to a well-ventilated area.

Provide with respiratory assistance if necessary.

Ingestion: no known antidote but give milk or water.

Try to avoid vomiting if swallowed. Get medical attention.

Primary entry route : skin, eyes, inhalation.

8. Reactivity data

Stability	Unstable	
	Stable	0

Incompatibility: oxidising materials can cause a reaction.

Hazardous decomposition products: none.

Condition to avoid: source of ignition.

Hazardous	May occur	
polymerisation	Will not occur	0

9. Spill or leak procedures

Steps to be taken in case material is released or spilled: prevent skin and eye contact. Small spills may be collected with absorbent materials. For large spills, rinse with acetone.

10. Special protection information

Handling and storing: keep storage container closed, avoid source of heat and flammable materials.

11. Safe handling and use

Respiratory protection: not normally required.

Ventilation: use in well ventilated areas.

Protective gloves: neoprene gloves recommended.

Eye protection: not normally needed.

Hygiene measures: clean skin with soap and water.

Other protective equipment: none.

HI-MACS[®] Sheets

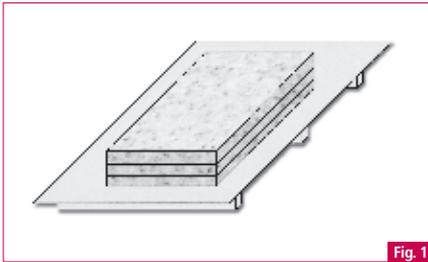


Fig. 1

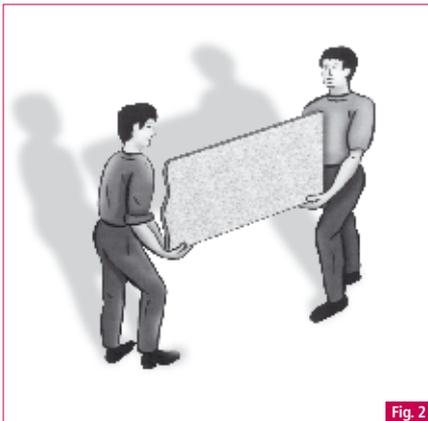


Fig. 2

Storage, Handling & Transportation

- 5.1 HI-MACS[®] should always be stored flat on sturdy pallets with a cover board placed on the pallet before stacking the sheets (Fig. 1).
- 5.2 Keep the sheets in a dry, well ventilated area.
- 5.3 Using a shelving, HI-MACS[®] sheets must always be stored with sufficient support so that the sheets do not warp.
- 5.4 Never attempt to carry sheets of HI-MACS[®] on your own. The sheet should be lifted by two people, one at either end. Always lift in a vertical position (Fig. 2).
- 5.5 Never drag sheets of HI-MACS[®] along the floor as this will lead to chipped or broken edges.
- 5.6 Always support panels which have cut-outs and/or joins during transportation.
- 5.7 Store sinks and bowls in the same way as the sheets.
- 5.8 Pack fabricated elements made out of HI-MACS[®] using blister pack for protection.
- 5.9 Large fabricated elements are best supported on their edge.
- 5.10 Avoid transporting fabricated items of HI-MACS[®] in open top vehicles as this can cause extreme thermal movement and a change of air conditions.
- 5.11 Prevent panels and elements from moving during transportation.
- 5.12 HI-MACS[®] adhesive is best stored in cool conditions $\approx 8-15^{\circ}\text{C}$, and away from direct sunlight. This will increase the shelf life of the adhesive by up to 12 months.
- 5.13 Always check the expiry date of adhesives prior to use.

HI-MACS[®] Adhesive



Further information:
Technical Bulletin 9

Sheet Inspection

Quality Control

LG Hausys is continuously improving its manufacturing processes and controls to offer the highest quality of sheets.

- 6.1** Before using or fabricating HI-MACS[®] sheets, we strongly recommend that you visually inspect them for defects and colour match
- 6.2** Each sheet has a printed number on the side. Please state this number in case of complaint. This allows LG Hausys to trace back manufacturing process to continually improve our product.

Example :

sheet N° : **LG HI-MACS[®] Arctic White 1 3 D E 009**

LG = manufacturer's name

HI-MACS[®] = product name

Arctic White = colour of the sheet

1 = production line no. 1 (2, 3, 4)

3 = year of production: 2003

D = month : April (A = January, B = February, C = March, D = April, .., L = December)

E = day : 15th (1 = 1st; 2 = 2nd; 3 = 3rd; 4 = 4th;...;

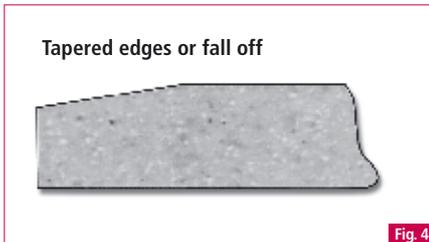
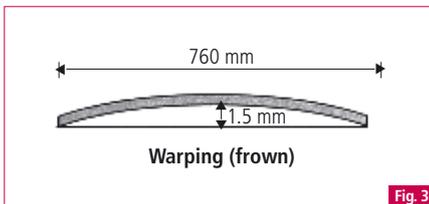
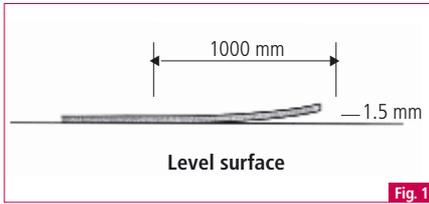
10 = 10th;

A = 11th; B = 12th; C = 13th; D = 14th;...;

U = 31st)

From day 11th to day 31st, each day corresponds to a letter (A to U)

009 = running no (001, 002, 003,...)



6.3 Prior to cutting full sheets please check for visible defects. Make sure that there is no : Length warp. If the warp is greater than 1.5 mm per metre (Fig.1) contact your HI-MACS[®] supplier for inspection and product replacement if necessary.

- "Smile" warp. If the sheet is deflected along its edge in the shape of a smile (Fig. 2) and if the warp is greater than 1.5 mm per metre (Fig. 2), contact your HI-MACS[®] supplier for inspection and product replacement if necessary.
- "Frown" warp. If the sheet deflects on the edges to the shape of a frown (Fig. 3) and if the warp is greater than 1.5 mm per metre (Fig. 3), contact your HI-MACS[®] supplier for inspection and product replacement if necessary.

Specification for flatness		
Solids and Pearls Colours	≤	1.5 mm* over 760 mm
Small Chip Colours Sands	≤	1.5 mm* over 760 mm
Large Chip Colours Quartz and Granite	≤	1.5 mm* over 760 mm

* Warp of the sheet should not exceed 1.5 mm

6.4 Make sure that the sheets are:

- Free from chipped or broken edges
- Free from tapered edges (Fig. 4);
- Free from pinholes (max. 10 par Ø 50 mm).

6.5 Make sure that the sheets are:

- Do not show any colour inconsistency
- Have an even distribution of particles
- Are protected on the face side with a poly coating film.

6.6 HI-MACS[®] shapes should also be checked for:

- Colour consistency of the proposed sheet (see technical details for correct installation)
- Black spots and flakes
- Pinholes
- Cracks, chips or breakage
- Quality of top edge for bonding

6.7 Should you have any concerns about the quality of HI-MACS[®] products please call your local representative.

Shape Inspection

Tools & Accessories



Fig. 1

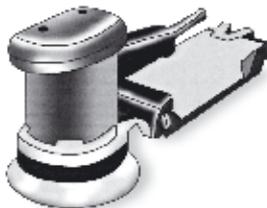


Fig. 2

- 7.1** LG Hausys recommends specific tool manufacturer(s) or specific supplier(s) to help to reduce fabrication and installation costs or allow fabricators to run fabrication processes in an efficient way.
- 7.2** Ideally, a table circular saw or panel saw should be used for sizing full sheets.
- 7.3** Spindle moulders, V-grooving machines and CNC's can be used according to application needs.
- 7.4** Long and/or wide belt sanders may be helpful for specific HI-MACS[®] projects or other woodworking industrial materials.
- 7.5** Heavy-duty manual routers suitable for 12 mm shank cutters, with a minimum wattage of 1600 are recommended. (Fig. 1).
- 7.6** A range of sanders (electronic or pneumatic) including: Orbital, Random Orbital, Palm and Belt. Always select machines which use quick fix discs and pads up to Ø150 mm. (Fig. 2).
- 7.7** You should have a wide selection of Tungsten Carbide tipped router bits for straight cuts, profile finishing and bowl installation. You should also have profiling cutters with bear rings (should be specified with nylon).
- 7.8** A range of sanding discs from 80 – 320 and/or larger will be required for the Random Orbital sander.
- 7.9** Polishing pastes and waxes will improve the gloss level to a previously sanded element but are only recommended for art and special purpose.
- 7.10** **The recommended finish level is semi-gloss** (320 sandpaper & Superpad S/G 1200).

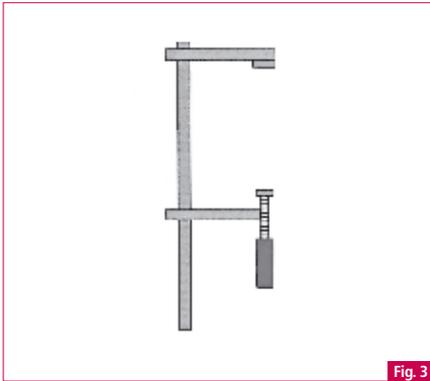


Fig. 3

- 7.11** High-gloss is not covered under the 15 years limited installed warranty of HI-MACS®.
- 7.12** Routers and templates should be used wherever possible.
- 7.13**
- A range of clamps for the bonding of drop edges and upstands, including 'A' style spring clamps.
 - Screw clamps of various lengths i.e. 250 mm, 400 mm and 1200 mm.
 - A few longer sash clamps. (Fig. 3)
- 7.14** Hot melt glue gun with cartridges or pellets.
- 7.15** Heavy duty paper towel dispenser.
- 7.16** Either a fixed point or portable extraction system.
- 7.17** Finally, in addition to the above, a selection of hand tools should also be available. See list below :

Tools List

Tools/machines/equipment	Quantity needed
Safety code	x
Safety equipment (Safety glasses, ear plugs, safety shoes, work clothes, etc.)	x
Router (~ 1.8 kW) a. submount technique b. profiling	x
Router (~ 900 w) profile bit radius 2-3 mm	x
Random orbital sander (air or electric)	x
Orbital sander (electric) (adhesive mixer)	x
Hand belt sander	x
Stick saw	x
Quality saw blade	x
Drilling machine (electric accu)	x
Adhesives	x
Adhesive bulk gun	x
Mixer tips	x
Hot melt glue gun	x
Glue	x
Silicone pistol	x
Silicone cartridges	x
Planer	x
Cutter to change	x

Tools List *(continued)*

Tools/machines/equipment (continued)	Quantity needed
Set of chisels	X
Set of screw drivers	X
Set of spanners	X
Varnish	X
Measuring tape	X
Tube wringer	X
Hammer (500 gr)	X
Rubber hammer	X
Pencil	X
Pencil sharpener	X
Ruler (assorted)	X
Square edged angle (assorted)	X
Router bits (assorted)	X
Assembly table	X
Benches (height adjustment)	X
Benches with drawer	X
Clamp car (movable)	X
Clamps (assorted)	X
Sanding station (movable)	X
Vacuum	
Vacuum pipe	
Sand paper (micron assorted, Scotch Brite, Superpad S/G (Jöst))	
Tapes (assorted)	X
Cleaning paper	X
Denatured alcohol (or alternatives)	X
Spray bottle	X
Templates (assorted)	X
Thin skids (assorted)	X
Glue blocks	X
centralised electric switchbox	
centralised dust collection (swivel-mounted pipes)	
centralised air connection	

List of Equipment for Joinery Workshop (Basic*)

Based on solid surface starters*

No.:	Machine/Equipment	Joinery Workshop Suggestion for Manufacturer	Quantity
	Dust collection system	Nedermann	
		Höcker - Polytechnik	
		xxx	
	Air compressor	Fini	
		xxx	
	Table circular saw	Altendorf	
		with sliding table L = > 2.80 m	
		xxx	
	Panel saw	Striebig	
		Holzher	
		xxx	
	Spindle motor	Martin	
		xxx	
	PLong belt sander	Klingspor	
		xxx	
	Long belt sander	Bütfering	
		Viet	
		Weber	
		xxx	
	Work benches	Ulmia	1 / employee
		alternatives/self-made	
		xxx	
	Work bench horses	wooden	
		self-made	
	Clamps	Cross-Stabile	
		Klemsia	
		xxx	
	Hand router	Dewalt	2 / employee
		Festo	2 / employee
		xxx	
	Random orbital sander	Festo	1 / employee
		Dynerbrade	
		xxx	
	Hand belt sander	Festo	
		Dewalt	
		Bosch	
		Holzher	
		Makita	
		xxx	

Job Planning

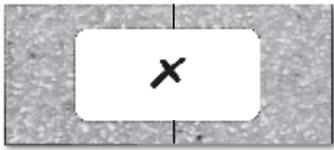


Fig. 1



Fig. 2

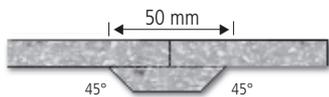


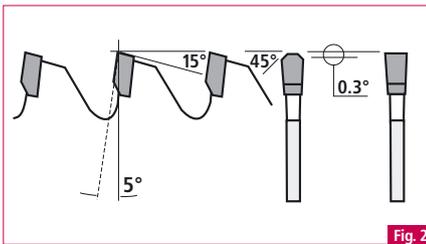
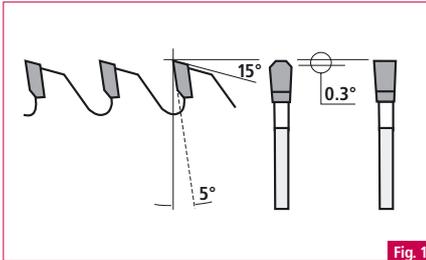
Fig. 3



Fig. 4

- 8.1 Successful installation relies on accurate job planning, especially around kitchen appliances.
- 8.2 Never position joints near cut-outs. (Fig. 1).
- 8.3 Never position a joint over dishwashers or heat producing appliances.
- 8.4 Keep joints away from internal corners, minimum distance of 50 mm (Fig. 2).
- 8.5 Wherever possible reinforce all joints (Fig. 3) with a strip of 12 mm HI-MACS[®] at least 50 mm wide and angled to 45° along both long edges. Ensure that the strip covers the whole joint and spread adhesive over the complete surface of the strip. Clean joint smooth from underneath.
- 8.6 Inspect the site and check for anything that could interfere with fabricated elements.
- 8.7 Check for unevenness in the wall (Fig. 4).

Cutting HI-MACS[®]



- 9.1** Cutting full size sheets of HI-MACS[®] should initially be carried out using a panel saw, beam saw or table circular saw. Always remember to completely support the entire sheet during this operation.
- 9.2** Circular sawblades with triple chip teeth will provide the best possible result (Fig. 1). A standard \varnothing 300 mm saw blade should have 96 teeth and is best with a negative hook angle. (Fig. 2).
- 9.3** It is important to avoid stress fractures when sawing a HI-MACS[®] sheet; this can lead to crack formation later. In the event of small chips and cracks appearing when cutting, ensure the edges are always dressed using a router or spindle moulder.
- 9.4** Never use hand held rip saws or portable jigsaws to cut sheets of HI-MACS[®]. During on-site fabrication portable circular power saws can be used providing the edge is subsequently finished with a router. But the best and most efficient way is to use a router only with straight edge and/or template.

Machining

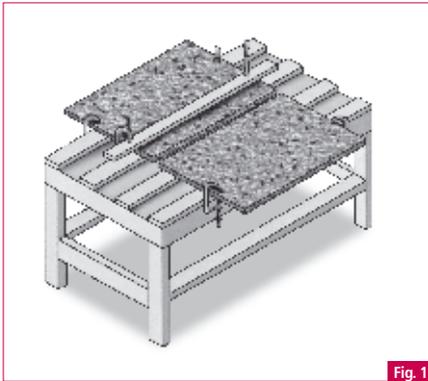


Fig. 1

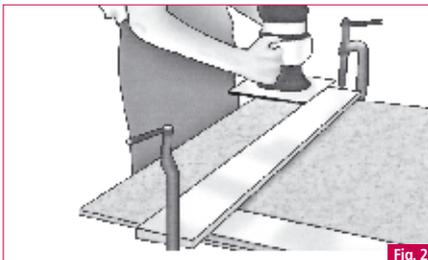


Fig. 2

Seam Preparation

- 10.1** The machining of two pieces of HI-MACS[®] to create a seam joint can be carried out in different ways. What is important however, is the quality of the machined edge.
- 10.2** The most reliable method is the "mirror cut" technique with a hand-held router, which works by cutting both adjoining edges in one cut. Place the two pieces onto a seaming table (Fig. 1), leaving a gap of 9 mm between them and secure with either G clamps or screw clamps. Clamp a metal or compact straight edge to one of the pieces and to a strong and stable table. With a 12 mm double flute tungsten router bit fixed into your hand router, move the machine steadily in one direction away from your body and cut both sections at once. Maintain a slow steady pace without stopping. After cutting check that the joint matches perfectly and mark the mating position with a pencil line.
- 10.3** Another possibility is to machine each edge independently using a standard workbench and straight edge (Fig. 2). First clamp the work piece to the bench and attach the straight edge to the sheet, so that the router will remove 1.5mm in total. Push the router at a slow steady pace without stopping. Repeat this exercise for the second piece and then check the accuracy of the joint. If the edges do not match then one or both of these edges will require re-machining. (Using a wavy profile router bit can avoid gauge difference between both work pieces).
- 10.4** After machining, both cut edges will require sanding with 150/180 grit abrasive sandpaper and to be cleaned using denatured alcohol (or Acetone) with a white clean cloth or white industrial paper, in preparation for bonding.
- 10.5** The use of CNC cutting and nesting programs is becoming more and more popular. Equipment, such as this, is becoming more and more efficient, especially for small serial production or individual requirements.

Bonding Seams

Seaming table tray covered with transparent paper

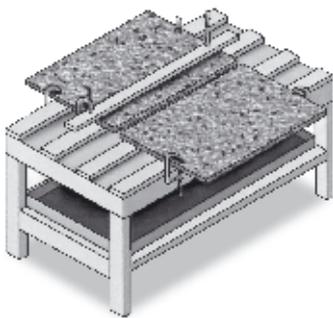


Fig. 1

Blocks attached to the sheet



Fig. 2

Reinforced seams



Fig. 3

- 10.6** When edges have been machined, sanded and cleaned, they are ready for bonding.
- 10.7** Before bonding, cover the tray beneath the seaming table with a transparent tape in order to catch any overspill of adhesive (Fig. 1).
- 10.8** The sheets are to be clamped together using for example screw clamps. It will be necessary to fix small blocks to the sheet using hot melt adhesive (Fig. 2). Additional working steps are needed till the work piece is finished.
- 10.9** Alternatively, sash clamps can be used, provided they are not over tightened.
- 10.10** Prepare the HI-MACS[®] adhesive system (see Section 016).
- 10.11** Apply tape at either end of the assembly prior to the application of adhesive.
- 10.12** Apply a continuous bead of adhesive along the entire part to be joined. (Fig. 3). Reinforce the length of the joint and push the sheets together so that an even bead of adhesive is forced out from the joint.
- 10.13** Clamp the assembly but do not over tighten it, as this will cause weak joints through starvation of adhesive.
- 10.14** Remove the clamps once the adhesive is fully cured and hard to the touch.
- 10.15** Remove excess cured adhesive with either a portable hand held router, set on skis or a small block plane with a sharp blade. Whenever possible avoid the use of chisels.
- 10.16** Standard butt seams will remain a weak part of the assembly, therefore to strengthen the joint, reinforce the underside with an offcut of HI-MACS[®] (Fig. 3). In cases where the joint could be affected by heat, it is strongly recommended to bevel (45°) the edges of the reinforced strip along the full length of the joint and to make a full adhesive film on the backside of the strip and to remove and finish off squeezed out adhesive till it is smooth.
- 10.17** Finish the joint by sanding it with 180/240 grit followed by 320 grit and Scotch Brite (grey) or Superpad S/G 1200. Do not simply concentrate on joint alone as this will cause shallow depressions around the joint.
- 10.18** For detailed sanding instructions see Technical Bulletin "Sanding HI-MACS[®]".

Joint - Adhesives (1/4)



Further information:
Technical Bulletin 11

Adhesive

- 11.1** HI-MACS[®] special formulated adhesive system is available in 250 ml cartridges, in many different colours.
- 11.2** Each adhesive tube has a maximum shelf life as described below. Check its suitability prior to use, see the date of manufacture on the label attached on the product itself and on the packaging boxes from LG Hausys.

Shelf life for all colours:
2-years after date of manufacturing
- 11.3** Storage of adhesive should be in cool (approx. +8°C to maximum +15°C) and dry conditions. Keep the unopened HI-MACS[®] adhesive tubes package and HI-MACS[®] adhesive cartridges in a dark room, avoid sunlight and do not place them adjacent to any heating equipment.
- 11.4** Keep HI-MACS[®] adhesives away from children.
- 11.5** For more Health and Safety information read the MSDS sheet in section 004.
- 11.6** For more information about HI-MACS[®] - assembly glue please refer to page 47.

Joint - Adhesives (1/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
G-01	DESERT SAND	H04	PEANUT
G-02	GREY SAND	H03	GREY
G-04	WHITE QUARTZ	H36	SILVER
G-05	WHITE GRANITE	H03	GREY
G-06	ROSE QUARTZ	H06	PINK
G-07	PLATINUM GRANITE	H03	GREY
G-08	ALMOND PEARL	H04	PEANUT
G-09	BLACK SAND	H42	MERAPHI
G-10	BLACK PEARL	H07	BLACK
G-15	MIDNIGHT PEARL	H10	BLUE
G-17	GREY GRANITE	H03	GREY
G-23	NATURAL GRANITE	H03	GREY
G-30	IVORY QUARTZ	H04	PEANUT
G-31	BLACK GRANITE	H07	BLACK
G-34	ARCTIC GRANITE	H36	SILVER
G-38	SEA OAT QUARTZ	H04	PEANUT
G-40	CELEBRATION GRANITE	H07	BLACK
G-41	CONFETTI QUARTZ	H01	SATIN WHITE
G-42	VENETIAN SAND	H26	SAND BROWN
G-48	BEACH SAND	H04	PEANUT
G-50	TAPIOCA PEARL	H36	SILVER
G-58	MOONSCAPE QUARTZ	H04	PEANUT
G-60	GREYSTONE GRANITE	H03	GREY
G-62	OREGANO SAND	H13	OLIVE YELLOW
G-63	ALLSPICE QUARTZ	H14	SEPHIA
G-74	MOCHA GRANITE	H37	MOCCA
G-100	PEANUT BUTTER	H04	PEANUT
G-101	CRYSTAL BEIGE	H01	SATIN WHITE
G-102	GREY CRYSTAL	H03	GREY
G-105	BROWN PEARL	H35	DARK
G-106	RIVIERA SAND	H04	PEANUT
G-107	PEBBLE PEARL	H03	GREY
G-108	LUNAR SAND	H36	SILVER

Joint - Adhesives (2/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
G-501R	COCOA	H47	STELLER
G-510R	SUGAR MAPLE	H52	BABYLON BEIGE
G-511R	POPLAR	H01	SATIN WHITE
G-514R	BIRCH BARK	H36	SILVER
G-515R	PECAN	H04	PEANUT
G-516R	HICKORY	H03	GREY
G-517R	MOUNTAIN ASH	H26	SAND BROWN
G-518R	RIPE COTTON	H36	SILVER
M-103	BOLOGNA	H34	IVORY CRYSTAL
M-104	ROMA	H22	PERNA GREY
M-105	VERONA	H61	VERONA
P-100	KEY LIME	H110	KEY LIME
P-101	KREEMY GREY	H112	KREEMY GREY
P-102	KOLD SILVER	H111	KOLD SILVER
P-103	KANDY PINK	T14	KANDY PINK
P-104	KANADA VIOLET	H10	BLUE
S-01	SATIN WHITE	H01	SATIN WHITE
S-02	ALMOND	H04	PEANUT
S-05	GREY	H03	GREY
S-06	ARCTIC WHITE	H02	ARCTIC WHITE
S-09	CREAM	H20	CREAM
S-22	BLACK	H07	BLACK
S-25	FIERY RED	H18	RED
S-26	BANANA	H17	BANANA
S-27	ORANGE	H19	ORANGE
S-28	ALPINE WHITE	H16	ALPINE WHITE
S-29	IVORY WHITE	H32	IVORY
S-33	NORDIC WHITE	H16	ALPINE WHITE
S-34	DIAMOND WHITE	H113	DIAMOND WHITE
S-100	COFFEE BROWN	H37	MOCCA
S-101	JASMIN GREEN	H51	JASMIN GREEN
S-102	BABYLON BEIGE	H52	BABYLON BEIGE
S-103	CONCRETE GREY	H53	CONCRETE GREY
S-104	TOFFEE BROWN	H54	TOFFEE BROWN
S-105	FLORIDA ORANGE	H108	FLORIDA ORANGE
S-106	LEMON SQUASH	H104	LEMON SQUASH
S-107	MAZARIN BLUE	H102	MAZARIN BLUE
S-108	MARTA GREY	H107	MARTA GREY
S-109	STEEL GREY	H101	STEEL GREY
S-110	CARMENERE	T11	CARMENERE
S-111	DARK NIGHT	T09	DARK NIGHT

Joint - Adhesives (3/3)

HI-MACS®		Adhesive	
Code	Colours	Code	Colours
S-112	GREENISH GRAY	T13	GREENISH GRAY
S-113	CHIFFON	T10	CHIFFON
S-114	MILL OLIVE	T12	MILL OLIVE
S-115	DEEP INDIGO	T08	DEEP INDIGO
S-116	FESTIVAL PINK	H106	FESTIVAL PINK
S-117	MIDNIGHT GREY	H35	DARK
S-201	NOUGAT CREAM	H04	PEANUT
S-203	SKY BLUE	H30	DAWN MISTY
S-212	LIGHT GREEN	H56	LIGHT GREEN
S-302	OPAL	T02	OPAL
S-303	SAPPHIRE	T03	SAPPHIRE
S-304	RUBY	T04	RUBY
S-305	EMERALD	T05	EMERALD
T-02	URANUS	H60	URANUS
T-10	NEBULA	H02	ARCTIC WHITE
T-11	VENUS	H01	SATIN WHITE
T-16	MARS	H34	IVORY CRYSTAL
T-17	ANDROMEDA	H16	ALPINE WHITE
T-18	CARINA	H02	ARCTIC WHITE
T-19	NEW MOON	H01	SATIN WHITE
T-20	HERCULES	H22	PERNA GREY
VA01	SANTA ANA	H03	GREY
VB02	CIMA	H45	V/BLACK
VE01	TAMBORA	H20	CREAM
VW01	GEMINI	H36	SILVER
VA22	FROSTY	H03	GREY
VB21	TAOS	H48	TAOS
VG21	MAUI	H49	MAUI
VE23	MAYON	H06	PINK

Cut-outs in HI-MACS®

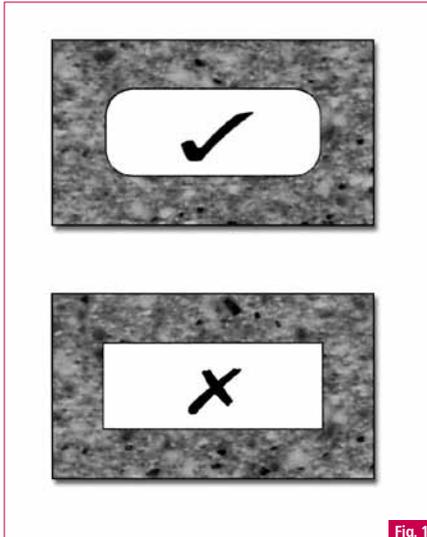


Fig. 1

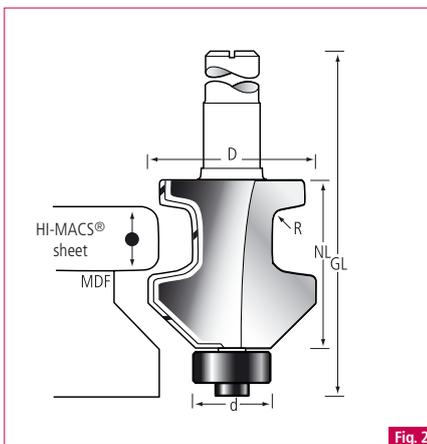


Fig. 2

- 12.1** Internal corner cut-outs for sinks, hobs and other accessories will always be subject to higher stress and as such will require to be handled very accurately in accordance with the latest instructions given in these Fabrication Guidelines or additional Technical Bulletins.
- 12.2** Machine the cut-out using a CNC router or hand router and a template.
- 12.3** Always machine a radius around these corners and make the radius as large as practical, ($R \geq 8$ mm). (Fig. 1).
- 12.4** Always ensure that there is a radius of R 3mm on both sides of the edge of the cut-out (or using a profile router bit.: Titman no XC 341*12). (Fig. 2).
- 12.5** Do not position a joint or any glueline across any kind of hob.
- 12.6** For hob cut-outs the internal edge should be covered with self adhesive Neoprene tape or Koawool tape and covered with self adhesive aluminium reflective tape (3M, tape no.: 425). This will prevent excessive heat build up and the potential risk of stress cracking.
- 12.7** Always leave a minimum of at least 3 mm space between the underneath of the appliance and the edge of the HI-MACS® if possible (depending on the type of hob you may have to include a filling piece)

Réf.	D (Largest diameter of router bit)	d (Diameter of bearing)	NL (Maximal use of router bit)	GL (Total length)	R (Radius)	HI-MACS®
XC341*12	35 mm	16 mm	36 mm	107 mm	3 mm	12 mm ±

Drop Edges & Downturns

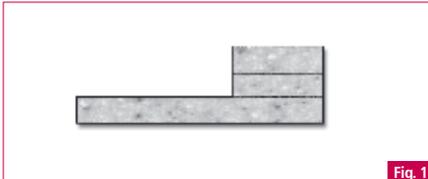


Fig. 1

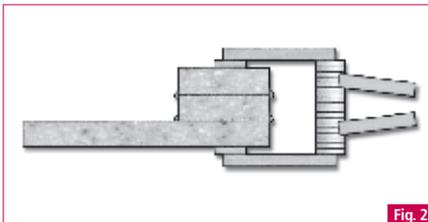


Fig. 2

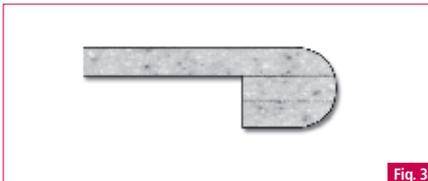


Fig. 3

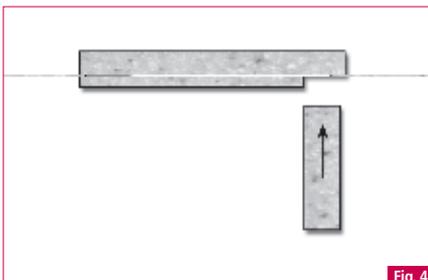
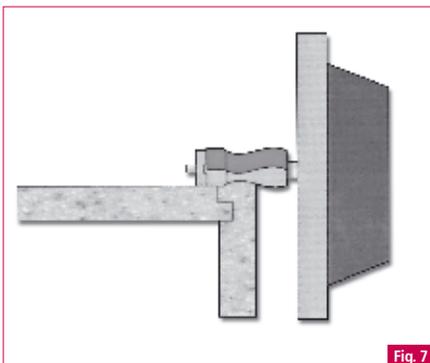
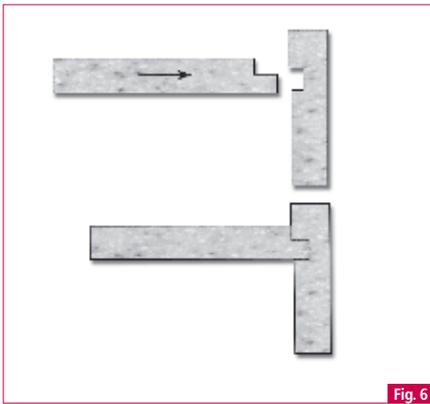
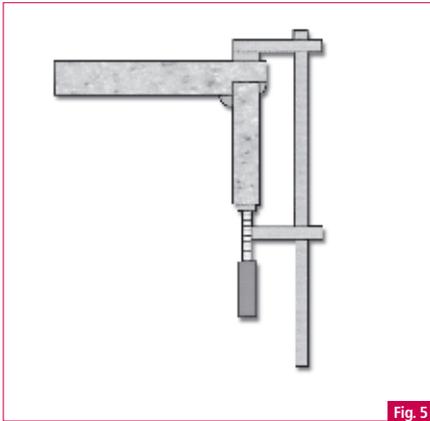


Fig. 4

- 13.1** Drop edges applied to sheets of HI-MACS[®] can create a multitude of design possibilities.
- 13.2** One of the easiest ways to produce a drop edge is to simply stack layers of HI-MACS[®] on the underside of the sheet. (Fig. 1).
- 13.3** Start by cutting strips which are slightly oversized and sand the underside with 120 grit paper. Clean with denatured alcohol and white cloth.
- 13.4** Apply a sufficient amount of HI-MACS[®] joint adhesive to each of the strips and smooth out using a wooden or plastic spatula.
- 13.5** Attach 'A' style spring clamps every 70 mm to 80 mm and allow to cure (approx. 45 min/+20°C). Ensure that, once the clamps have been applied, a reasonable amount of adhesive is forced out from the joint (Fig. 2).
- 13.6** When the adhesive is completely dry, smooth down the surface using a circular table saw, then machine the required profile using a portable hand-held router or a table planer (Fig. 3).
- 13.7** Drop edges can sometimes be applied on edge, primarily for deeper downturns. The best way to achieve this detail is to first rebate the underside of the sheet to a depth of approx. 1-2 mm (Fig. 4).
- 13.8** The rebate serves two functions, firstly it increases the bond strength and secondly it minimizes the effect of uneven particle distribution.
- 13.9** As you would normally do, sand both the internal edges of the rebate and the corresponding edges of the downturn with 150/180 grit paper, cleaned with denatured alcohol with a white cloth (Fig. 4).

i Further information:
Technical Bulletin 6



- 13.10** Apply a sufficient amount of adhesive and clamp edge in position with screw clamps set 70 mm - 80 mm apart (Fig. 5).
- 13.11** Ensure that beads of adhesive are formed at both the internal and external edge of the joint (Fig. 5). Once fully cured trim the overhang using a portable hand router, use a straight cutter with Nylon bearing attachment.
- 13.12** It is possible to create curved downturns to shaped counters, simply by thermoforming the edges prior to bonding. Please refer to **Section 020** for thermoforming techniques (but more time-intensive and limited in terms of profile)
- 13.13** For internal/external corners, thermoforming will provide one solution, alternatively simply stack up and bond sheets of HI-MACS[®] at these corners and machine using a portable hand router.
- 13.14** When it comes to a 'waterfall' edge, the top sheet will need to be rebated while the edge will need grooving (Fig. 6).
- 13.15** Ensure that the connection between the rebate and the groove is neither too tight nor too slack (Fig. 7).
- 13.16** Clamp the section together using sash clamps and allow the adhesive to fully cure.
- 13.17** Machine the two edges using a purpose made router tool with a Nylon bearing, working from the top edge (Fig. 7).

Backsplashes

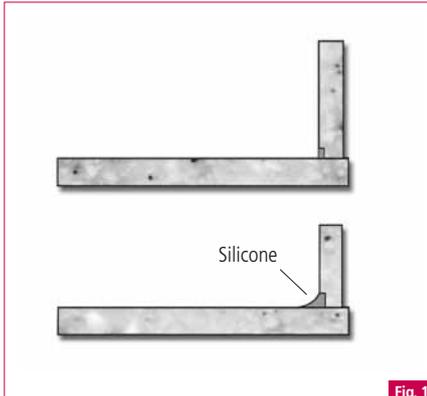


Fig. 1



Fig. 2

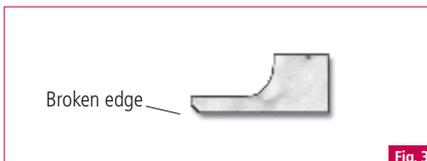


Fig. 3

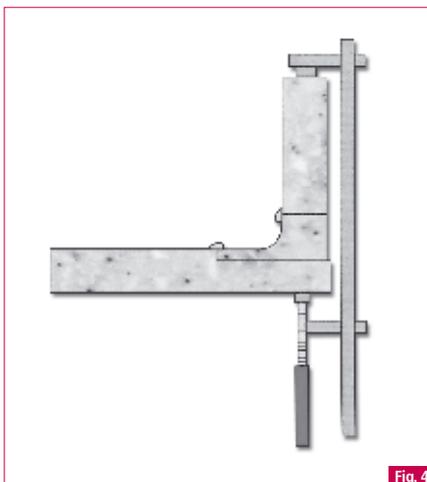


Fig. 4

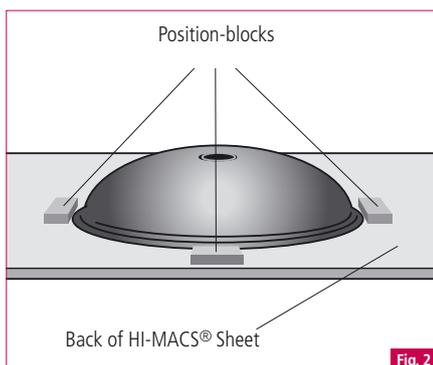
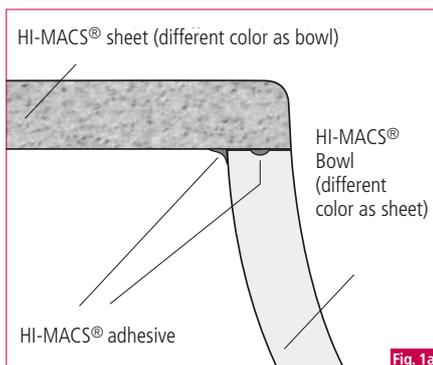
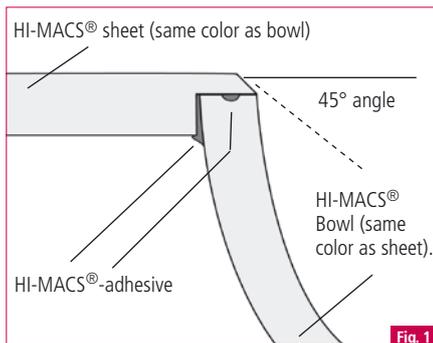
- 14.1** Upstands or curved backsplashes can be created with either a square or a coved detail at the internal joint (Fig. 1).
- 14.2** One method is to attach a square cut upstand to the top edge of a counter with either HI-MACS[®] adhesive or a suitable colour matched silicone sealant.
- 14.3** A common alternative method is to form a coved upstand with an internal radius.
- 14.4** Start by rebating the face side of the sheet which will form the counter, to a depth of 2 mm x 25 mm wide (Fig. 2).
- 14.5** Cut a section of HI-MACS[®] 25 mm wide, this will form the internal cove. The machine you must use is a 10/12 mm radius using an overhead router or spindle moulder (Fig. 3).
- 14.6** Cut a square section of HI-MACS[®] to the required height for the final upstand.
- 14.7** Rub down all edges to be bonded with 150/180 grit paper and clean with denatured alcohol and a white cloth.
- 14.8** Apply a sufficient amount of adhesive to all edges and secure with screw clamps. Allow adhesive to fully cure before sanding (Fig. 4).



For more information on installation at customer's place: Technical Bulletin 2+3

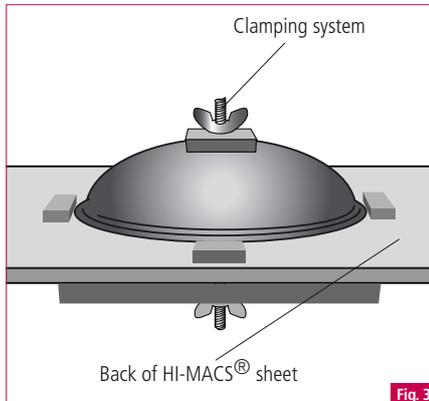
For detailed information on backsplash: Technical Bulletin 7

Shape Installation



i For more information on installation at customer's place: Technical Bulletin 2+3
For detailed information on shape installation: Technical Bulletin 5

- 15.1** Thermoformed Sinks and Bowls can be fitted in two ways: undermount with a rebate if using the same colour of sheet and moulding (Fig. 1) or without a rebate if using different colours of sheet and moulding (Fig. 1a).
- 15.2** A rebate (45°) must be made when working with sheets & moulding of the same colour in order to minimise potential colour differences between the thermo-formed bowl and the sheet and to be covered by limited installation warranty.
- 15.3** Position cut-out template correctly from the back of the HI-MACS® and fix it with clamps.
- 15.4** Route cut-out (clockwise). Use a sharp 10 mm single flute carbide router bit with a 30 mm sleeve guide.
- 15.5** Remove cut-out template and position rebate template. Use a sharp 20 mm double flute carbide. Router (side and ground cutter) with a 30 mm sleeve guide. Install depth of router to leave a gap of 4 mm.
- 15.6** Remove rebate template and proceed with normal cleaning procedure (denatured alcohol/white cloth).
- 15.7** Prepare HI-MACS® adhesive and glue bowl into work top.
- 15.8** Clamp bowl. Do not over-tighten pressure and let adhesive cure (ca. 45 min/+18°C).
- 15.9** Take off clamp system and turn over sheet.
- 15.10** Trim cut-out with a tungsten carbide profile router bit with Nylon bearing. Always use a profile of 45°. Do not use any radius as it may cause a potential colour difference between the sheet and moulding.
- 15.11** Sand and finish off to a standard semi-gloss finish as recommended.
- 15.12** To butt under-mount sinks and bowls, simply attach the sink to the underside of the sheet using HI-MACS® adhesive after sanding the back of the sheet with 180 grit sandpaper.
- 15.13** Position the moulding and fix position plugs (Fig. 2).



- 15.14** With a separate template made out of wood, make a smaller cut-out.
- 15.15** Sand both bonding surfaces with 150/180 grit sandpaper and clean with denatured alcohol and a white cloth prior to bonding.
- 15.16** Prepare HI-MACS[®] adhesive and bond both parts with a clamp (Fig. 3).
- 15.17** Once the adhesive is fully cured, plunge a 12 mm tungsten carbide tipped router cutter through the sheet to create access for a straight roller bearing cutter. Change the cutter in the router and remove the unwanted sheet above the bowl or sink.
- 15.18** Sand down the joint in the normal way with various grades of abrasive paper.
- 15.19** Safety checklist :
- Check all electrical tools prior to use.
 - Only use sharp cutters.
 - Always wear safety glasses or goggles or a visor.
 - Do not wear loose clothing.
 - Work in a well-lit and well ventilated area.

Sanding Process

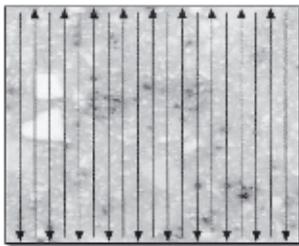
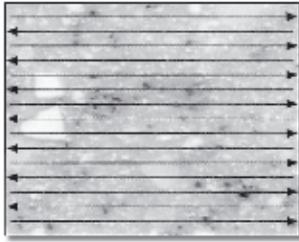


Fig. 1

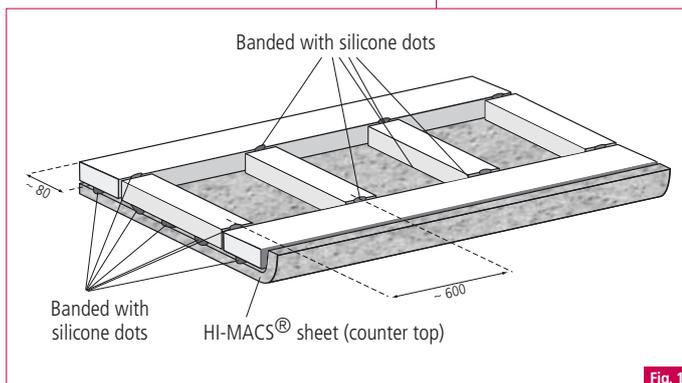


Further information:
Technical Bulletin 4

- 16.1** The final process in the fabrication of all HI-MACS[®] elements is to sand (and/or to polish for special applications).
- 16.2** Under normal circumstances, begin by sanding the entire element with 120 grit paper. In instances where there has been no prior fabrication of the sheet, it is possible to start with 280 or 320 grit.
- 16.3** Always use dust extraction systems at all times when sanding, this will help pick up loose particles of grit and prevent unwanted scratches.
- 16.4** Build up to finer and finer levels of grit size, taking care to clean down between each change with a damp cloth. Finish with a 320 grit paper, followed by Superpad S/G 1200 from Jöst to reach a recommended semi-gloss level.
- 16.5** To improve the gloss level of the surface use 1200/1500/1800 wet or dry Scotch Brite pads, or polishing pastes available from 3M or other manufacturers. High-gloss finish level is very high-maintenance and not recommended for normal use, but is ideal for art subjects. High-gloss finish Level is NOT covered under the 15-year limited installed warranty program.
- 16.6** Keep the sander moving slowly in circles at all times, first in an East – West direction then North – South (Fig. 1). Ensure that you use proper equipment, like a random orbital sander with a flat pad. For straight surfaces always use a hard pad. Soft or super-soft pads are recommended for curved surfaces.
- 16.7** Never concentrate on one specific area, particularly near joints, as this can lead to dipping.
- 16.8** After each sanding step, wipe off dust, then start with the next step.
- 16.9** Be aware that some dark colours need more careful sanding than some other lighter colours.

Substructure

- 17.1** HI-MACS[®] Natural Acrylic Stone™ mainly needs to be supported to avoid any kind of dip.
- 17.2** Depending on the application, the following support materials are recommended:
- Steel/stainless steel profiles
 - Aluminum/aluminum profiles
 - Moisture-resistant MDF, plywood or particle board
 - Plasterboard or other alternative constructional boards
- 17.3** When used as a kitchen work surface, a frame substructure is strongly recommended. A full sub-structure can, but need not, be used (Fig. 1).
- 17.4** Adjust all substructures with elastic silicone or with an permanent elastic PU adhesive to the back of the HI-MACS[®] sheet, preferably in dots at a maximum spacing of approximately 100 mm.
- 17.5** Wooden strips should have a width of approx. 80 mm.
- 17.6** Rebate for reinforcement strips should be provided.



For more information
on installation at customer's place:
Technical Bulletin 2+3

Repairs



Fig. 1



Fig. 2

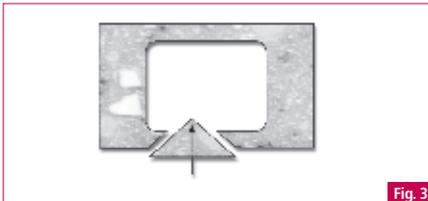


Fig. 3



Fig. 4

- 18.1** One of the main advantages of HI-MACS®, is that the surfaces can be repaired in the event of an accident. Depending on the type of damage, a number of solutions can be used.
- 18.2** For scratches, it may well be possible to sand them out with Scotch Brite pads, abrasive creams or even abrasive papers.
- 18.3** With small indentation marks it is possible to drill out the affected area and fill the hole with HI-MACS® colour matched adhesive. Be sure to over fill the hole and try to eliminate any air pockets prior to curing. Once cured the adhesive can be sanded down in the normal way, however, the repaired area will need to be blended in with the existing work surface.
- 18.4** For larger areas of damage, particularly with the Granites and Sands, a plug repair is a possible alternative solution. Router cutters are available from Titman or Trend (Fig. 1).
- 18.5** For major damage, such as cracks or burn marks, a 9 or 12 mm triangular piece of HI-MACS® (same thickness as installed) will need to be fitted. Make a template as shown in Fig. 2, and clamp it to the surface around the damaged area. Machine out the section using a portable hand router. Using the same template cut another section from an off-cut of colour matched HI-MACS® sheet or, even better from the same sheet, to minimize any colour difference.
- 18.6** Bond the triangular spare piece with HI-MACS® adhesive and reinforce the underside (Fig. 3).
- 18.7** To repair a broken joint, first machine a 'V' groove down the entire length of the crack.
- 18.8** Cut a square section of matching HI-MACS® so that when turned through 90°, it fits the groove (Fig. 4).
- 18.9** Apply HI-MACS®- adhesive into groove and push the square section home until sufficient adhesive is forced upwards.
- 18.10** Once fully cured sand down the new section as normal. Ensure that the seam has a reinforcement beneath prior to completion.
- 18.11** Always leave sink or bowl cutout in your drawer for repair.

Thermoforming

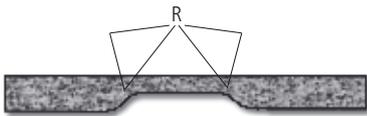


Fig. 1

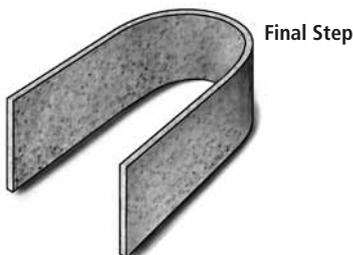
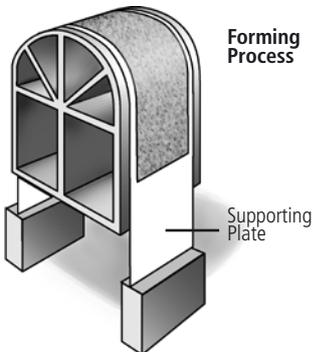
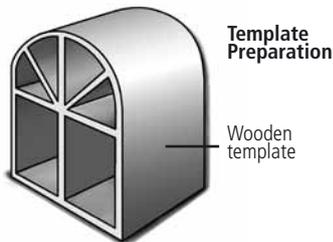


Fig. 2



Further information:
Technical Bulletin 8

- 19.1** HI-MACS[®] can be moulded to a tight radius by means of heating. The oven must heat the entire sheet for the thermoforming to be successful.
- 19.2** The sheets need to be heated to a temperature of 160 – 180°C, but should never exceed 200°C.
- 19.3** Remove the protective film prior to heating.
- 19.4** The minimum moulding radius for 12 mm HI-MACS[®] is approx. 45 mm for Solids, Pearls and Sands and a minimum moulding radius for 12 mm HI-MACS[®] Quartz and Granite approx. 100 mm to 120 mm. Be aware that the darker the colour and the smaller the radius, the more whitening there may be.
- 19.5** The sheets should normally be heated for 15 to 30 minutes, depending on batch (manufacture date), heating temperature and pre-heated oven. Rebating the reverse side in the area to be moulded can result in shorter heating times and smaller radius. **Fig. 1.**
- 19.6** Once heated to the required temperature remove workpiece with heat-resistant gloves from the oven and place directly into a mould. **Fig. 2.** Male and female moulds are required. Allow heated material to shrink in the mould.
- 19.7** Leave the sheet in the mould until the sheet has cooled down, to approx. 60° C at least, (typically 20 – 40 minutes, depending on the material of the mould). Always wear heat-protection gloves for this operation.
- 19.8** Never attempt any shock cooling as this can cause stress to the material.
- 19.9** Attempting to bend HI-MACS[®] at lower temperatures or shortening the heating cycles will often result in "whitening" or cracking of the edge.
- 19.10** Normal sanding and finishing of the moulded edge can be carried out once the sheet is fully rigid.

Use & Care

If you have searched long and hard for a superior quality, durable and tough material, we would like to congratulate you for choosing HI-MACS[®] Natural Acrylic Stone[™]. The material is hard-wearing, extremely repellent to stains and is therefore very easy to look after. We would like to provide you with a few simple tips and hints for caring for your product so that you can enjoy its exceptional quality for many years to come.

General day-to-day stains

HI-MACS[®] is a completely homogenous material. As it does not have any pores, you can simply and easily clean it with a damp cloth or sponge and a mild detergent. You can also use a domestic scouring agent on all matt finishes. It is also useful to wipe your surface occasionally with a scouring agent or wet sponge to retain the even finish of your product.

Tougher stains

Tougher stains, caused by food colouring, tea or fruit juice can easily be removed using a bleaching agent (do not leave in contact with the work surface for more than five minutes). Clean the surface with a domestic all-purpose cleaner and rinse with clean water. You can also use a scouring agent on matt finishes. Nail varnish can easily be removed with nail varnish remover (acetone-free) or a scouring agent.

Acidic cleaning agents

A number of cleaning agents contain acids, such as methyl chloride or acetone. You should avoid using these on a HI-MACS[®] surface. Should one of these products accidentally come into contact with the material, as a precautionary measure you should rinse the surface with soapy water to prevent any discolouring taking place.

HI-MACS[®] is an ecological material. Its mineral and acrylic composition, environmentally-friendly and virtually "waste-free" manufacturing process give it top marks in terms of "eco-friendliness."

There can be no dirt build up where there are no joints.
HI-MACS[®] can be simply and easily joined seamlessly.

Renowned hotels and restaurants rely on HI-MACS[®] because of its ease of care.

Hot objects

Hot saucepans or pots straight out of the oven or from the hob should not be laid directly on the HI-MACS[®] surface. Place a mat or board underneath to prevent any damage to your product.

If you pour boiling liquids into HI-MACS[®] sinks or basins, you should also pour in cold water at the same time.

Burn marks

Small burn marks or marks caused by nicotine can simply be removed using a scouring agent or an abrasive sponge. Should this give the high-gloss finish a matt appearance, rubbing the surface with a scouring pad will quickly return it to its high-gloss state.

Sharp objects

HI-MACS[®] copes effortlessly with the wear and tear of everyday life, however pointed or sharp-edged objects can leave cuts or scratches on the HI-MACS[®] surface. You can repair smaller cuts and scratches without too much trouble but we recommend the services of a professional for especially deep cuts.

Quality and environmental awareness

All HI-MACS[®] products are manufactured in accordance with the ISO-9001 Quality Process for Systems and Processes and the ISO 14001 Environmental Management Standard.



Warranty

HI-MACS[®] 15 YEARS LIMITED INSTALLED WARRANTY TERMS



This limited warranty covers all HI-MACS[®] products manufactured and/or marketed by LG Hausys Europe. The warranty covers also finished products when fabricated and installed by a member of the HI-MACS[®] Quality Club. LG Hausys Europe expressly warrants to the owner of a HI-MACS[®] installation made following the application, fabrication and installation guidelines published by LG Hausys Europe for HI-MACS[®], that it will, repair or replace HI-MACS[®], if the product fails due to any product manufacturing defect during the first 15 years after installation. LG Hausys Europe will cover in that case the costs related to installation, transportation and fabrication on top of the material.

The warranty of the original purchaser can be transferred to the next owner. The warranty registration card and number or/and a purchase receipt or other proof of date of original purchase from one of our HI-MACS[®] Quality Club member will be required before warranty service is rendered. In case none of the above mentioned documents are available, the warranty will not be applicable.

This warranty will not apply to damage caused in the following cases:

1. Improper fabrication and installation of your HI-MACS[®] :

- fabrication and installation not done by a HI-MACS[®] Quality Club member;
- failure to follow procedures recommended in the application, fabrication and installation guidelines (sheets 6 mm for vertical application, 9 mm for horizontal application without heat source and 12 mm sheet for horizontal application with heat source or more structural support);
- faulty or improper installation, including seams (need to use HI-MACS[®] adhesive only);
- a non authorized modification of the installation.

2. Failure to apply the HI-MACS[®] Use & Care guidelines including:

- improper or inadequate general maintenance;
- hard chemicals or physical aggression of the installation;
- exposure to excessive heat due to direct heat (e.g. hot pots and pans put without protection on the surface without trivet with rubber legs or protective pad) or due to a bad thermal isolation (e.g. for cooking plates, bains-marie, etc.);
- pouring boiling liquids into HI-MACS[®] shapes without running the cold tap as well;
- force majeure.

3. HI-MACS[®] Colours and gloss finish of HI-MACS[®]

- the basic HI-MACS[®] material is identical for every colour but it is important to note that darker and more heavily pigmented colours will show dust, scratches, haziness, marks left by hard water and other ordinary wear and tear more noticeably than lighter textured colours.
- therefore colours marked with a * are less suitable for applications that are exposed to extensive surface contact such as worktops located in heavy traffic area as an example. Disclaimer colours (mentioned with a * on the brochure and on www.himacs.eu) are not covered by the present warranty.
- due to specific characteristics and properties of the Marmo colours, which have a veined effect, special consideration has to be taken into account with jointing and the use of covered up-stands. Veining may vary from sheet to sheet.
- applications using inappropriate gloss finish for the intended end use (as mentioned in the colours brochure or in any other HI-MACS[®] documentation) will not be covered under this warranty.

4. DecoBowl[™] and DecoTray[™] are no longer covered under the 15 years limited installed warranty, as off 01.01.2008 and DecoSink as off 01.06.2006.

All cast shapes sold by LG Hausys Europe are covered by the present warranty.

5. HI-MACS[®] repairs or replacements under this warranty must be executed by a member of the HI-MACS[®] Quality Club..

6. This warranty is applicable until superseded, only on installations:

- executed after 01.09.2003 in Europe; For any other location, please consult LG Hausys Europe.
- executed by a member of the HI-MACS[®] Quality Club;
- installations which have not been moved from their original location;
- installations that are properly maintained and used applying the Use & Care guidelines.

7. LG Hausys Europe's obligation together with the HI-MACS[®] Quality Club members is limited solely to the repair or replacement of the products purchased, including reasonable and necessary labour charges when the claim is acceptable within the warranty terms. In case HI-MACS[®] is not in a position to repair or replace, depending on the case, a defective product, LG Hausys Europe commits to reimburse, within a reasonable time frame after the filing of the claim, the purchase price of the HI-MACS[®] material, as long as the customer returns to LG Hausys Europe or the assigned HI-MACS[®] Quality Club member the defective material.

8. No other expressed or implied warranties of merchantability or fitness for a particular purpose are made by this warranty except for those expressly provided herein. Under no circumstances shall LG Hausys Europe be liable for any loss or damage arising from the purchase, use or inability to use this product, or for any special, indirect, incidental or consequential damages.

9. This warranty entitles the purchaser to specific legal rights. Other rights may also be available, which may vary from country to country.

10. To obtain service under this warranty, please contact directly the source from which you purchased your HI-MACS® Natural Acrylic Stone™. Our HI-MACS® Quality Club member will evaluate your claim and when accepted will develop a practical and satisfactory solution. For any additional question with regard to the present warranty, you can contact LG Hausys Europe by writing to the following address:

LG Hausys Europe GmbH
Frankfurt am Main, Lancy Branch
HI-MACS® – Warranty Department
Avenue des Morgines 12
1213 Petit-Lancy, Geneva
Switzerland

Please include your name, address, phone/fax number and e-mail in all correspondence as well as your warranty number. We will respond to all inquiries within 30 working days.

11. The present 15-year limited installed warranty for HI-MACS® from LG Hausys Europe is ruled under the Swiss law. Any argumentation in relation to this 15-year limited installed warranty, its interpretation or its execution will fall under the exclusive competence of the courts of the canton of Geneva Switzerland.
12. HI-MACS® colours are particularly suitable for outdoor applications because of their good UV-resistance. Their colour-fastnesses are guaranteed 5 years for a tolerance of $\Delta E3$ to $\Delta E4$ according to the colour:
- For $\Delta E3$: S02 Almond, S09 Cream, S28 Alpine White, G34 Arctic White, G38 Sea Oat Quartz, G48 Beach Sand
 - For $\Delta E4$: G02 Grey Sand, G04 White Quartz, G05 White Granite, G30 Ivory Quartz, G41 Confetti Quartz, S302 Opal, S33 Nordic White, S34 Diamond White, S29 Ivory White

Quality and environmental responsibility

All HI-MACS® products are manufactured to ISO 9001 quality procedures for systems and processes, as well as ISO 14001 environmental protection standards



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