



# Exterior

HI-MACS can give shape and form to virtually any of your design ideas. New dimensions are opening up now: Just take the countless advantages offered by HI-MACS j outside and use the material of possibilities to design facades as well.

Location: Inheung-ri, Toseong-myeon, Goseong-gun, Gangwon-do, South Korea / Design: Woo-jin, LIM AEV Architectures, [aev-architectures.com](http://aev-architectures.com) / Material: HI-MACS®, Arctic White



# Explore new ideas for endless possibility

Exterior



UV resistance



Fire Resistance



Design diversity



Air ventilated  
system

# Explore new ideas for endless possibility

Exterior



UV resistance



Fire Resistance



Design diversity



Air ventilated  
system



# Explore new ideas for endless possibility

Exterior



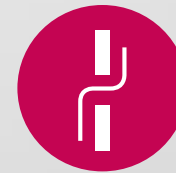
UV resistance



Fire Resistance



Design diversity



Air ventilated  
system



# 10 years warranty on colors' UV resistance

Exterior

The HI-MACS -FR-quality has been tailor-made for outdoor application and its resistance to UV radiation surpasses that of any other solid surface.

## Delta E5

### Solid



**S302**  
Opal



**S034**  
Diamond White



**S033**  
Nordic White



**S028/S728**  
Alpine White



**S029**  
Ivory White



**S002**  
Almond



**S009**  
Cream

### Granite



**G034**  
Arctic Granite



**G004**  
White Quartz



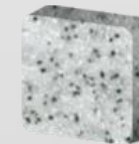
**G038**  
Sea Oat Quartz



**G048**  
Beach Sand



**G030**  
Ivory Quartz



**G002**  
Gray Sand



**G005**  
White Granite



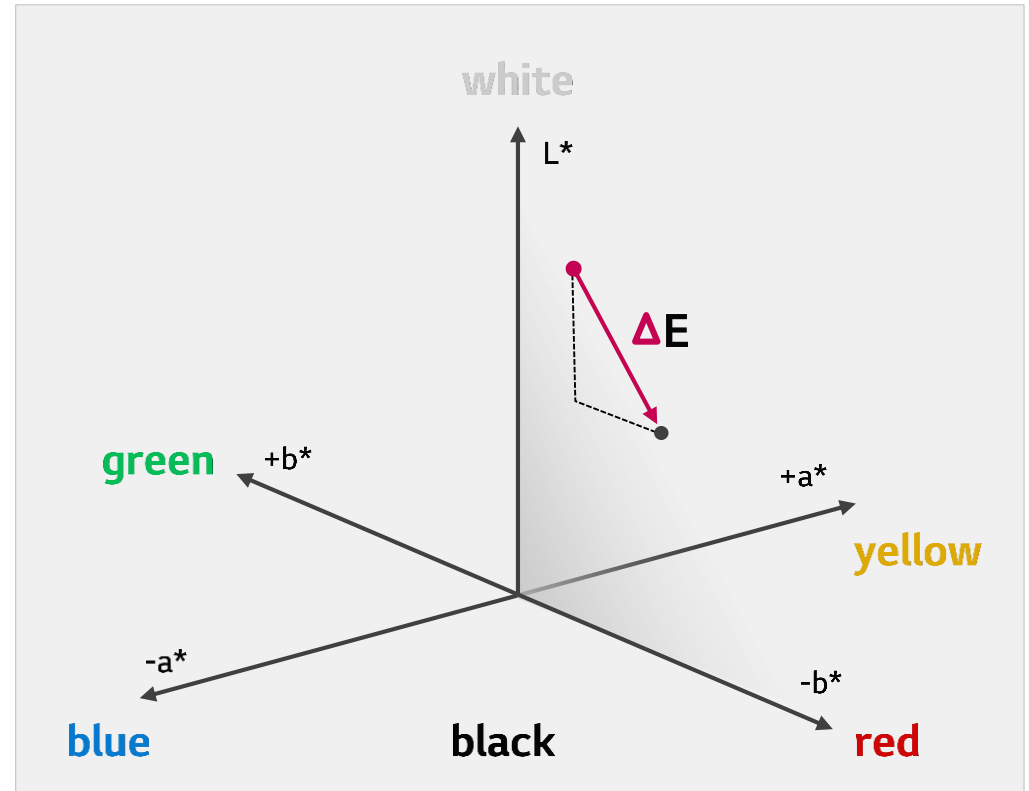
# UV resistance

Exterior

The HI-MACS -FR-quality has been tailor-made for outdoor application and its resistance to UV radiation surpasses that of any other solid surface.

## Delta E values - ID

$\Delta E$ value	meaning
0 - 1	a normally invisible difference
1 - 2	very small difference, only obvious to a trained eye
2 - 3.5	medium difference, also obvious to an untrained eye
3.5 - 6	an obvious difference
> 6	a very obvious difference





# Fire resistance

Exterior

The HI-MACS -FR-quality passed the fire rating test with far better Results than any of the other mineral materials : The achieved SBI test According to EN-13501-1 is the impressive proof of this.

**B** = classification level | **S1** = low smoke density | **d0** = non droplets

Product concerned	Test method	Results
HI-MACS FR-12mm	DIN EN 13501-1, tested with sub-construction and insulation	B-s1, d0
	NFP 92-501 1995, Class M1 certifies that HI-MACS FR benefits from advanced resistance to fire	M1
	DIN 4102-1 EN 13501-1	B1 B-s1,d0



## Class B-s1, d0

Equivalent to the class 0 from Warrington Fire certification.



## Class B1

Class B1 certifies that HI-MACS has a low flammability. B1 Class is the European fire resistance requirement.

# Technical Properties

Great Quality Material means great resistance to the outdoors.

## Technical Properties

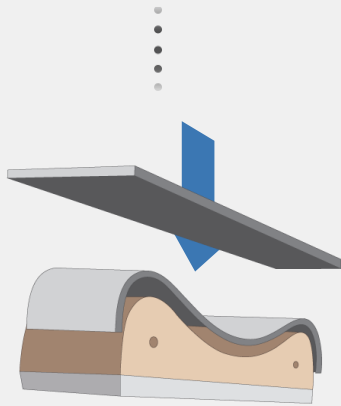
SPECIFICATION		RESULT	UNIT	TEST METHODS
Flexural E-modulus	E <sub>f</sub>	8900	MPa	DIN EN ISO 178
Flexural strength	σ <sub>fm</sub>	76,9	MPa	DIN EN ISO 178
Breaking elongation	ε <sub>fm</sub>	1,01	%	DIN EN ISO 178
Resistance		> 1 x 10 <sup>12</sup>	Ω	EN61340-5-1
				DIN IEC 61340-4-1
Diffusion resistance coefficient	μ	1807		DIN EN ISO 12572
Density		1,71	g/cm <sup>3</sup>	ISO 1183
Heat conductance	λ <sub>10tr</sub>	0,636	W/mK	DIN EN 12664
Resistance to thermal expansion	R	0,048	m <sup>2</sup> K/W	DIN EN 12664
Thermal expansion coefficient	α	0,048	mm/mK	prEN 14581
Linear expansion coefficient		max. 30 x 10 <sup>-6</sup>	m/°C	
Tensile resistance	σ <sub>fm</sub>	32,7	MPa	DIN EN 527
Water absorption		< 0,1	%	DIN EN 438 – part 12
SBI fire performance		B – d0 – s1		DIN 13501

\* Applicable to HI-MACS FR S728 Alpine White, tested with subconstruction and insulation



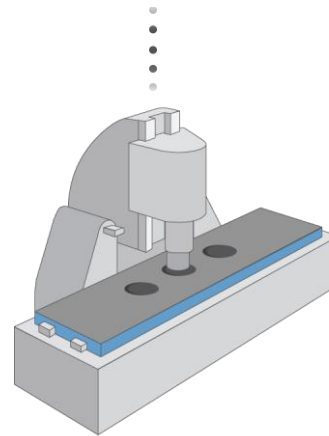
1

## Three-Dimensional Design Facade



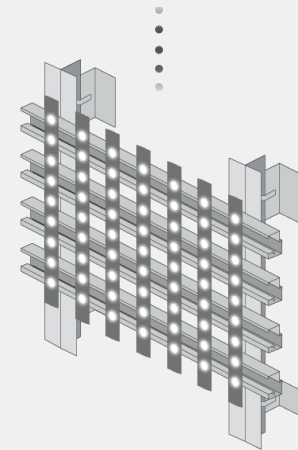
2

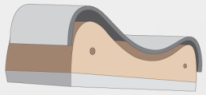
## Design Skin Facade



3

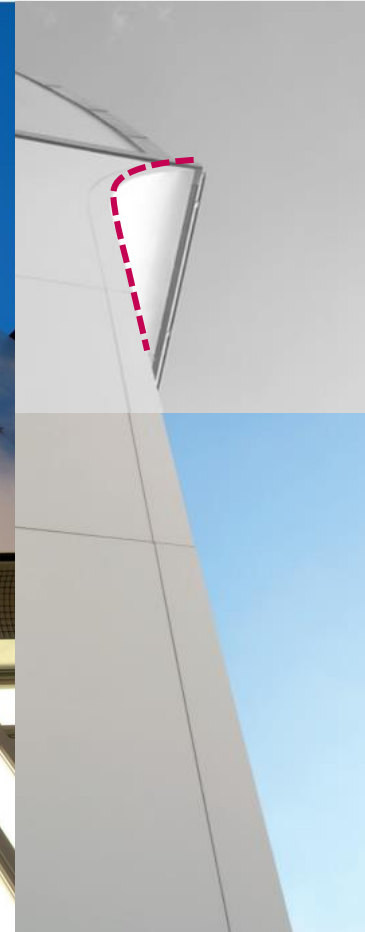
## Media Facade

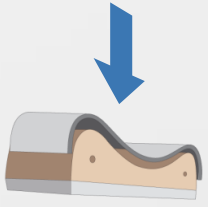




Three-Dimensional  
Design Facade

Design: Köhler Architekten, Hamburg  
Material: HI-MACS®, Alpine White, Opal  
Photograph: Nikolaus Herrmann



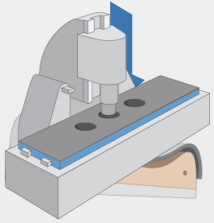


Three-Dimensional  
Design Facade

Location: Pan-gyo, Korea  
Design: Office 53427  
Fabrication: Daemyung ATM  
Material: HI-MACS®, Alpine White



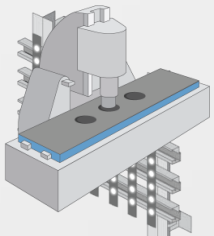




**Design Skin Facade**  
Design Facade



Location: Givran, France  
Designer: PAD Architectes for BERI21, France  
Fabrication: Fabrication: LCC A, France  
Material: HI-MACS®, Alpine White

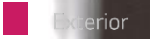
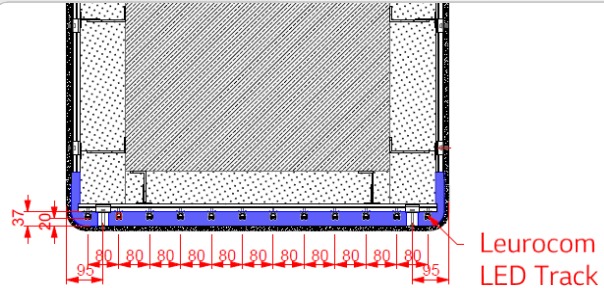


Design Skin Facade  
Media Facade



Location: Berlin, Germany  
Design: Neo Systems Architects, Berlin, Germany  
Engineering: 5D Engineering GmbH, Germany  
Material: HI-MACS®, Alpine White, Opal

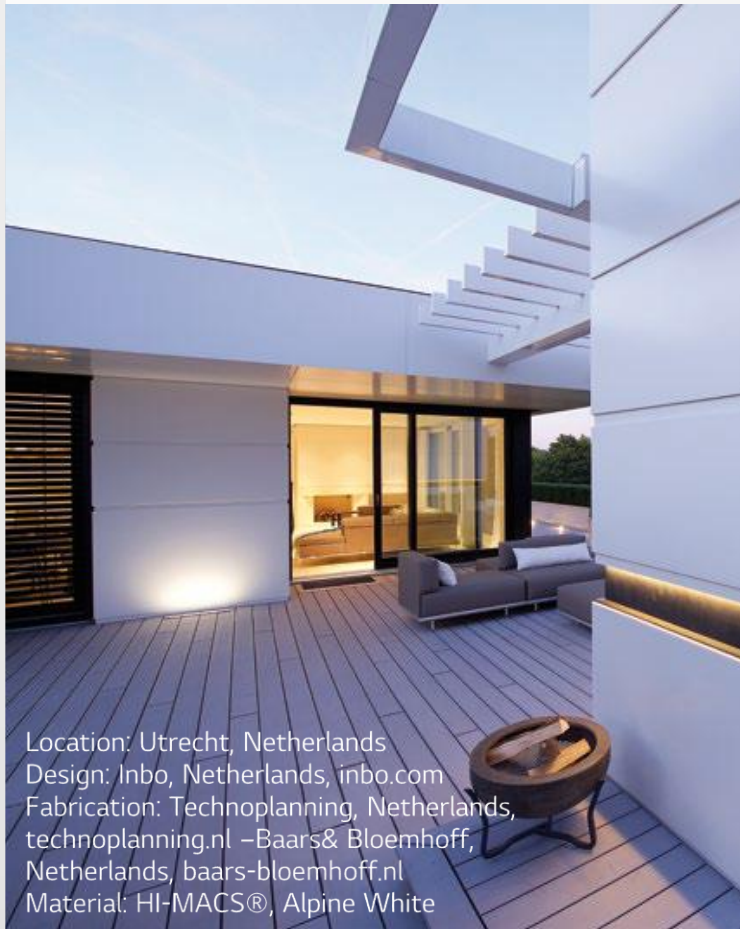








White  
stays white

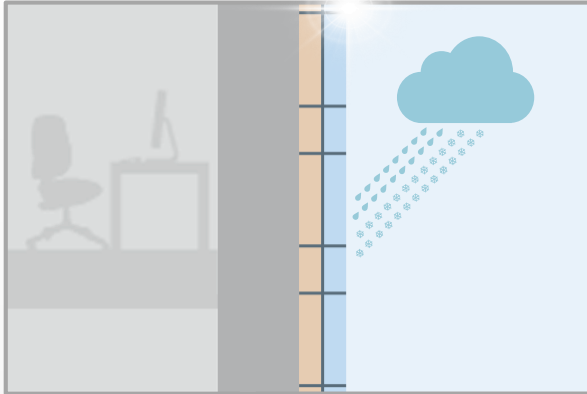


Location: Utrecht, Netherlands  
Design: Inbo, Netherlands, inbo.com  
Fabrication: Technoplaning, Netherlands,  
technoplaning.nl – Baars& Bloemhoff,  
Netherlands, baars-bloemhoff.nl  
Material: HI-MACS®, Alpine White



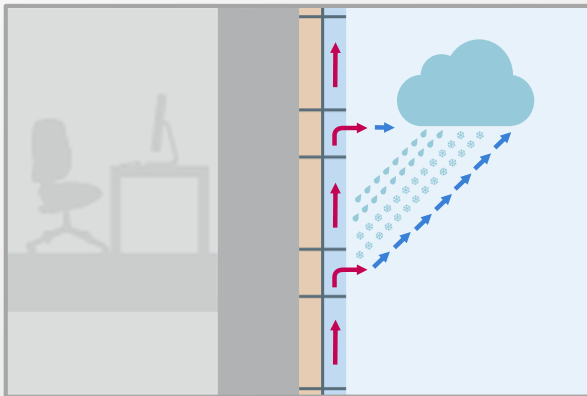
# HI-MACS as a Ventilated Rainscreen Facade.

Exterior



## Perfect moisture resistance

HI-MACS is highly resistant to moisture like rain, snow or condensation, thus providing excellent protection for the insulation layer behind the facade. Furthermore, any moisture is perfectly removed via a gap between the façade panel and the insulation material.



## Perfect air circulation

In connection with the ventilated rainscreen HI-MACS technology, ensures air circulation irrespective of low or high temperatures. This method removes condensation moisture and prevents damage to the insulation layer.

# How to apply HI-MACS Facades?

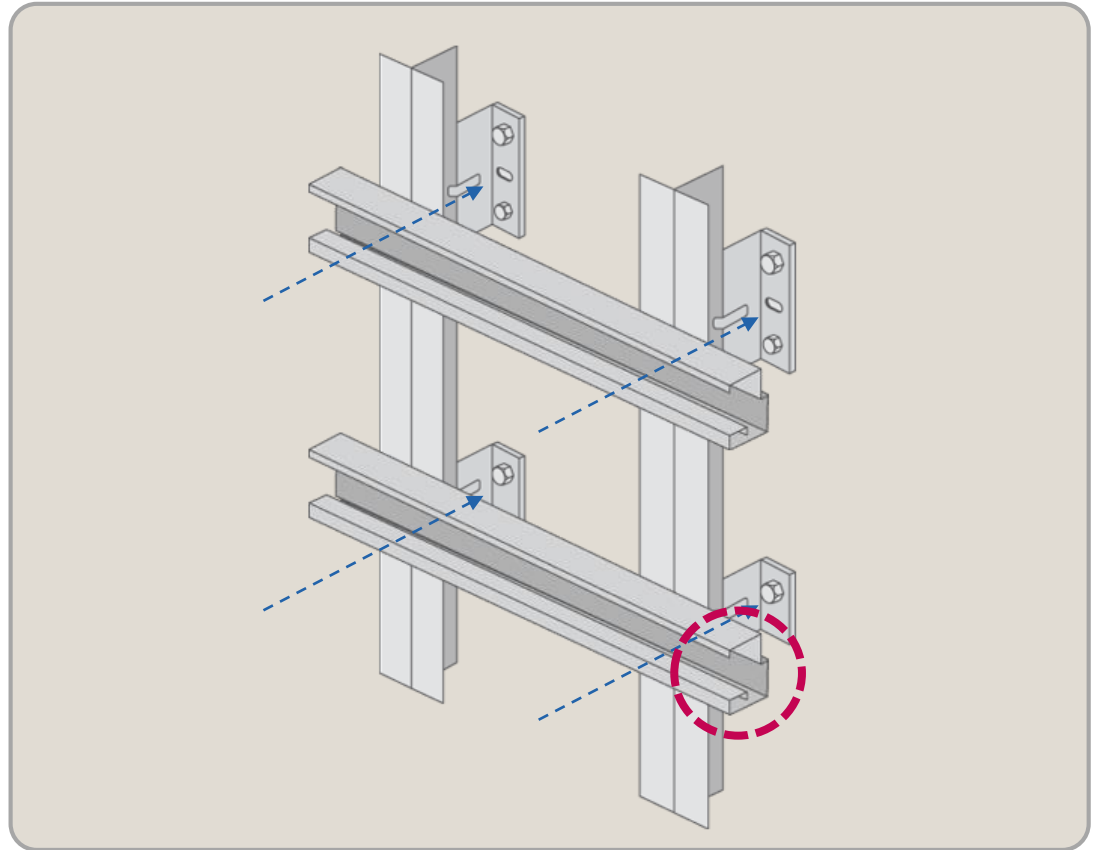
Exterior

To build the HI-MACS facades, LG Hausys suggests using a structure made from a ventilated facade system using open joint method.

Step 1

Step 2

Step 3





# How to apply HI-MACS Facades?

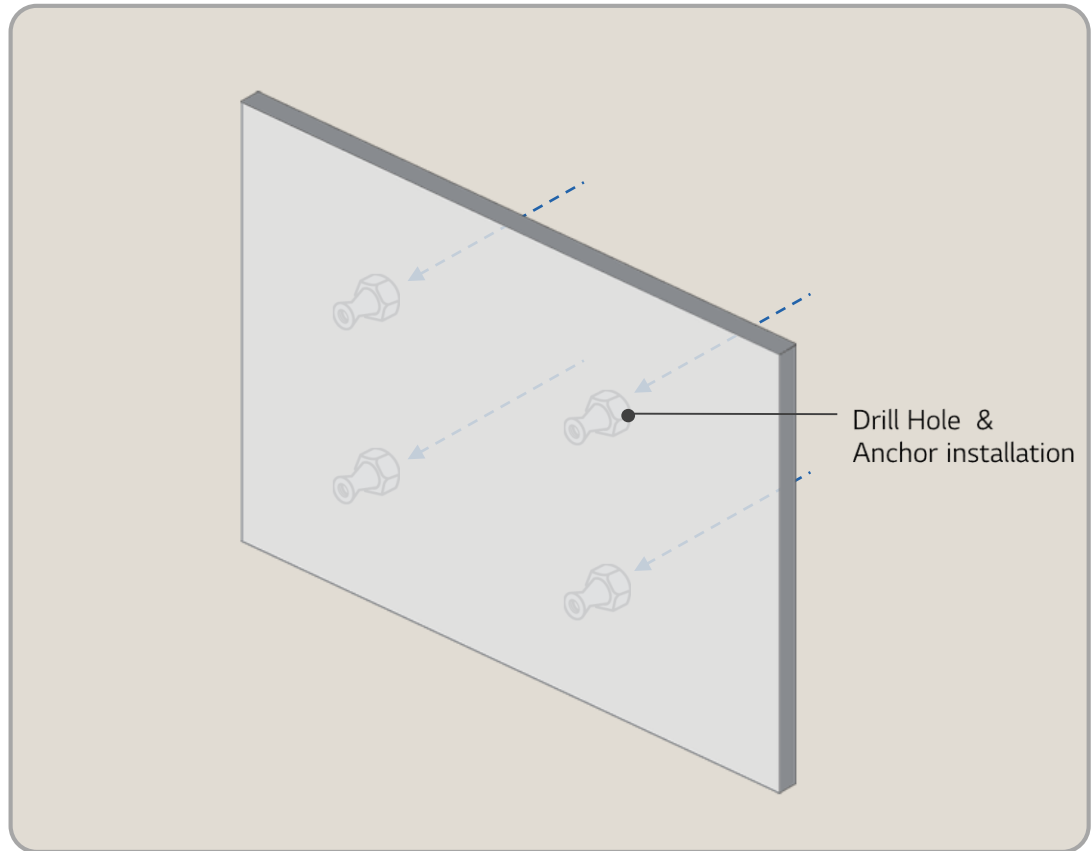
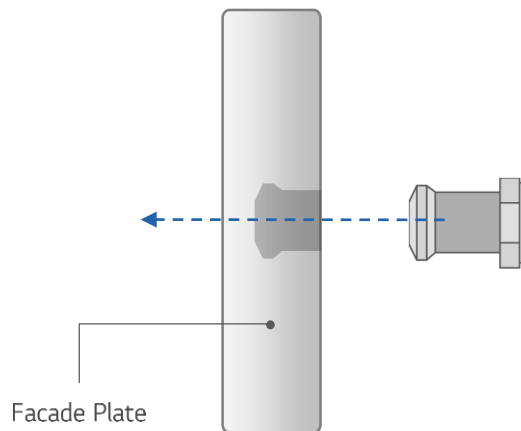
Exterior

To build the HI-MACS facades, LG Hausys suggests using a structure made from a ventilated facade system using open joint method.

Step 1

Step 2

Step 3



# How to apply HI-MACS Facades?

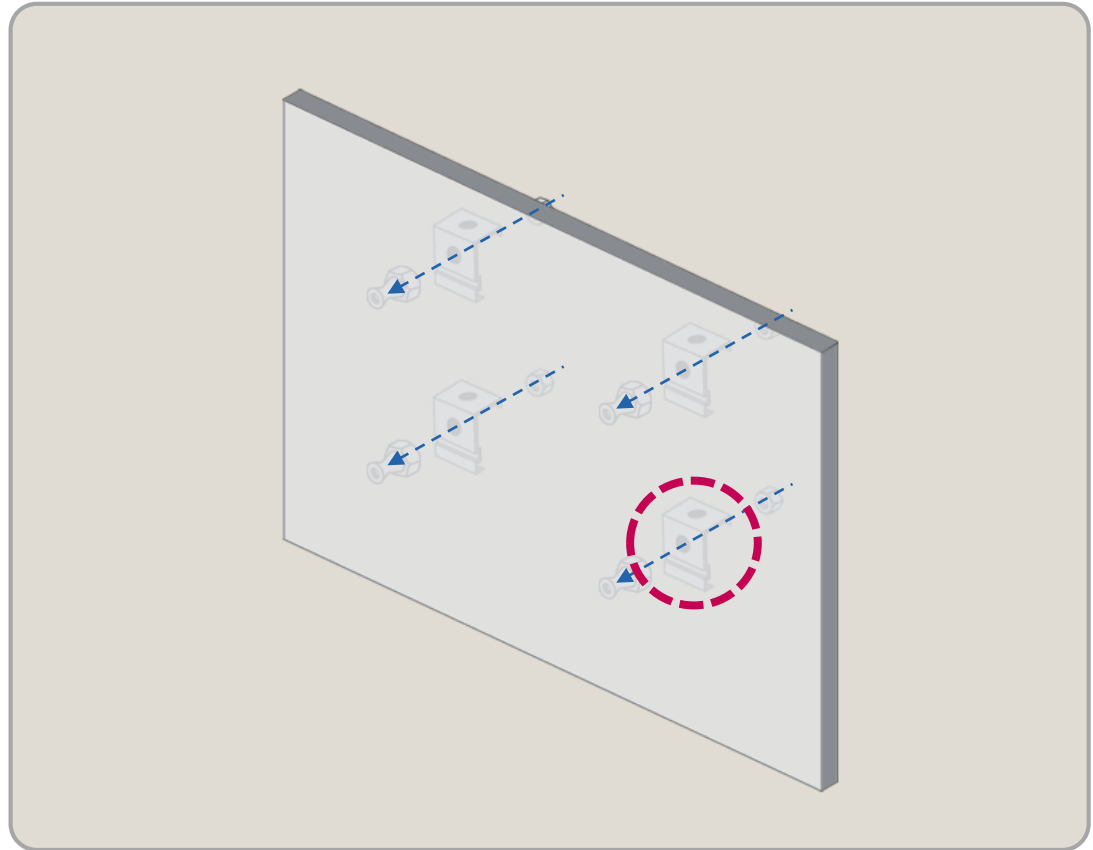
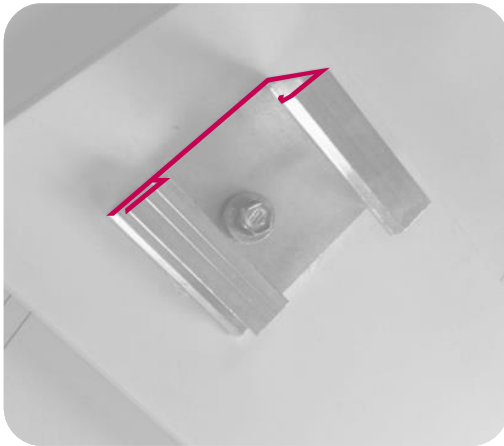
Exterior

To build the HI-MACS facades, LG Hausys suggests using a structure made from a ventilated facade system using open joint method.

Step 1

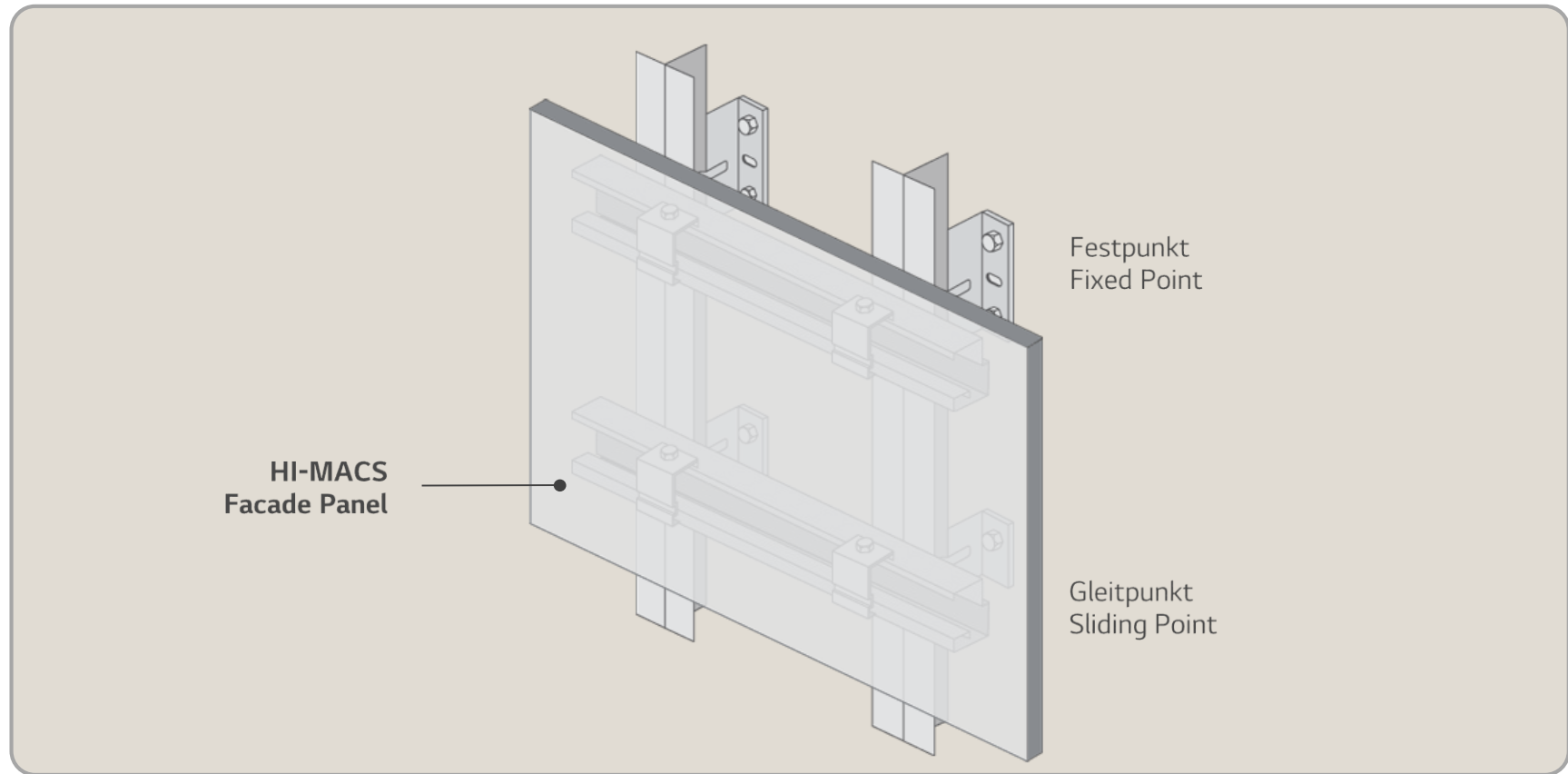
Step 2

Step 3



# Cladding System

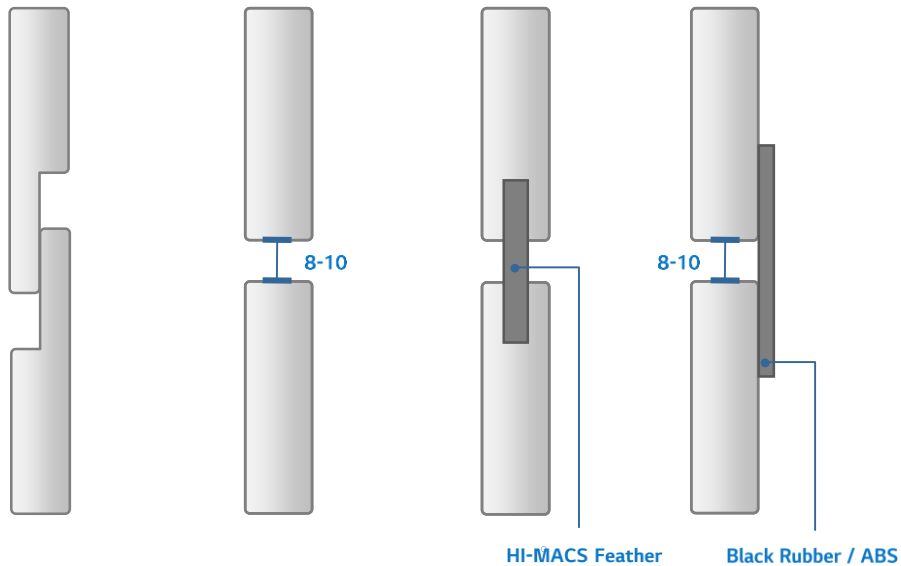
To build the HI-MACS facades, LG Hausys suggests using a structure made from a ventilated facade system using open joint method.





# Seams Design

HI-MACS has natural contraction and expansion properties related to temperature changes. We suggest leaving gaps of 8 to 10mm between each panel.



Open seam with/without backside protection



# Exterior Warranty

Exterior

## Product Warranty for exterior applications

1. The LG Hausys's Acrylic Solid Surface, HI-MACS<sup>®</sup>, has been widely chosen for various interior design, projects and architectural work because of its unique properties and advantages. With increasing interest and demand from architects for new applications for exterior use, LG Hausys has run tests to evaluate the possibility of using HI-MACS<sup>®</sup> on the façade of a building...

2. The test focused to check possible color change when using HI-MACS<sup>®</sup> in façade application. Although HI-MACS<sup>®</sup> has good resistance to UV rays in general, the level of color change could differ per patterns according to the type and quantity of pigment and other ingredients contained in different patterns... These 14 Colors change of less than or equal to 5 ΔE units in 10 years under normally predictable circumstances...

Code..	Colors..	Code..	Colors..	Code..	Colors..	Code..	Colors..
S002..	Almond..	G004..	White Quartz..	G034..	Arctic Granite..	S034..	Diamond White..
S009..	Cream..	G005..	White Granite..	G038..	Sea Oat Quartz..	G030..	Ivory Quartz..
S028/S728..	Alpine White..	S033..	Nordic White..	G048..	Beach Sand..		
G002..	Gray Sand..	S029..	Ivory White..	S302..	Opal..		

3. Gloss loss will not exceed 40% on matte finish and the color will not leach during the first 10 years after the initial installation. In addition, LG Hausys warrants that the HI-MACS<sup>®</sup> color offering will remain free from: peeling, swelling and delaminating during the first 20 years from the date when the application was completed and when the product has been stored, handled, applied and maintained in accordance with LG Hausys technical instructions and all applicable building codes...

4. During the period stated above, if any HI-MACS<sup>®</sup> façade panel shows signs of defects (subject to all the limitations stated herein), LG Hausys will at its option either provide free replacement of HI-MACS<sup>®</sup> façade panels or refund the original purchase price of the HI-MACS<sup>®</sup> façade panels determined by LG Hausys to have any of the above conditions. In order for LG Hausys to respond under this warranty, LG Hausys must be permitted to inspect the product and thereafter to follow its warranty services procedures. All decisions regarding the existence of any of the above conditions or manufacturing defects or in any case affecting this warranty shall be made by LG Hausys and shall be final and binding upon the parties...

5. This limited warranty applies only to defects appearing within ten (10) years from the date of permanent installation or twenty (20) years in the specific case of peeling, swelling and delaminating of the HI-MACS<sup>®</sup> façade panels. The limited warranty is only applicable if LG Hausys is notified in writing within sixty (60) days after such defects either appear or should have been discovered after the exercise of reasonable diligence...

Failure of the claiming party to notify LG Hausys within such period shall automatically relieve LG Hausys of any and all responsibility and/or liability under this Limited Warranty. LG Hausys makes no express or implied warranty (including, without limitation, the warranties of merchantability, fitness for a particular purpose even if that purpose is known to seller or from any course of dealing or trade usage) regarding the product. The purchaser assumes all risk and liability for results obtained by the use of products covered by this limited warranty, whether used singly or in combination with other materials. The warranty herein does not cover LG Hausys TM Joint Adhesive; it covers only HI-MACS<sup>®</sup> sheets products...

6. This warranty does not cover, and LG Hausys hereby disclaims, all liability for damage caused by physical or chemical abuse, acts of vandalism, damage from excessive heat or uneven exposure to weather conditions, fire, flood, earthquakes, accident, war, acts of God, improper design or installation of LG Hausys products, any particular application or selection of products for any particular project or design, any parts, components, sealants or other manufacturers used with LG Hausys products, or the lack of performance of LG Hausys products attributable to such items...

7. LG Hausys's obligation hereunder is limited solely to the refund of the purchase price of the HI-MACS<sup>®</sup> façade panels or replacement of the HI-MACS<sup>®</sup> façade panels for which the claim is made excluding any costs associated with fabrication, replacement or installation. In no event shall LG Hausys be liable for special, indirect, incidental, punitive, consequential or any similar damages (including, without limitation, damages for loss of business profits, business interruption or any other loss), whether or not caused by or resulting from the negligence of LG Hausys even if LG Hausys has been advised of the possibility of such damages...

8. This is the only limited warranty made in connection with the sale of HI-MACS<sup>®</sup> façade panels used in exterior cladding projects. No representative, dealer or any other person is authorized to make or makes any warranty, representation or promise with respect to such products. No terms or condition other than those stated herein, and no agreement or understanding, oral or written, in any way purporting to modify this limited warranty shall be binding upon LG Hausys unless made in writing and signed by an authorized LG Hausys employee...

9. Laws, building and safety codes governing the design, engineering and construction of installations vary widely. LG Hausys assumes no responsibility or obligations with respect to the selection of product for the installation or the design, engineering and construction of the installation...

10. This warranty is subject to the condition of the supply of the above mentioned product from a LG Hausys HI-MACS<sup>®</sup> authorized supplier.

\*This published document will lose its validity when a new one will become published.\*