Building with conscience.

StoVentec® Rainscreen® Systems

StoVentro™ Sub-construction

Facades

The StoVentro™ sub-construction is an integral component of StoVentec® systems. Safe and long-lasting, StoVentro absorbs both the wind loads and dead loads present on the facade. The sophisticated modular system fulfills specific structural and energy efficiency requirements and provides the best possible solutions for your projects.

Because functionality and energy efficiency are part of the system

In addition to their numerous design options, rainscreen cladding facades provide maximum functionality and safety. The sophisticated StoVentro sub-construction is invisible yet indispensable, forming the basic supporting structure for aesthetically appealing rainscreen cladding facade solutions.

Thanks to their system build-up, rainscreen cladding facades possess a number of attractive qualities in terms of design, functionality, and safety. StoVentro forms the structural link between the facade and the substrate. It absorbs the wind loads and dead loads present on the facade and redirects these into the substrate itself. Alongside structural suitability, the design of StoVentro incorporates corrosion resistance and a reduction in thermal bridges while also being quick and easy to install. StoVentro sub-construction combines both Zn-Al-Mg galvanized (ZAM®) steel or aluminum and aluminium components to enable the creation of solutions which are both economical and optimised in terms of energy efficiency. This is what we mean by "Building with conscience".

Benefits at a glance:

- Complete facade system all from a single source – from StoVentro right through to the cladding
- Suitable for virtually all claddings
- Optimized for reducing thermal bridges through specific material selection and combination
- Simple and quick installation thanks to intelligent product design
- Project-specific advice and solution development

Cover photo:
Vlněna - Budova H
Design: Studio acht, spol. s r.o.
Execution:
FRONTECH s.r.o.
Sto expertise:
StoVentec Render
Photo: Guido Erbring, Köln

The components

1 Anchorage elements
- Frame anchors or screws to secure the wall bracket to the substrate
- Selection and design in accordance with structural requirements
- Steel framing anchors available from Sto. Fasteners for other substrates may require project-specific engineering.

2 StoVentro Bracket
- StoVentro Bracket: Adjustable support brackets for vertical T & L profiles
- In Zn-Al-Mg galvanized steel or aluminium
- Anchored into the substrate
- Adjustable - accommodates substrate irregularities for precise alignment of cladding elements
- Optional - Integrated retainer for easy installation of StoVentro T & L profiles

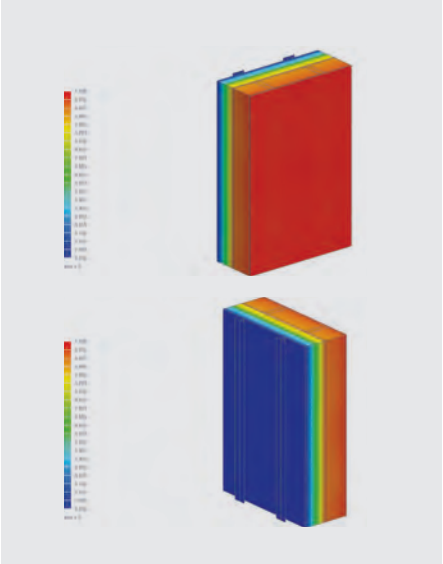
3 T & L / Agraffe Profiles
- StoVentro T & L profiles: supporting sub-construction for StoVentec Carrier Board or StoVentro Agraffe Profile
- StoVentro Agraffe Profile: Horizontal profile attached to the vertical StoVentro T-profile, which supports the StoVentec Glass Panel assembly
- Made of aluminium
- Fixed to the wall bracket to hold the cladding

4 Connecting and fixing elements
- StoVentro sub-construction screw: Self-tapping stainless steel fastener that provides wall bracket to vertical profile attachment and StoVentro Agraffe Profile to vertical profile attachment
- StoVentro Facade Screw: Stainless steel fastener that provides attachment of StoVentec Carrier Board to vertical StoVentro T-Profiles

Energy-efficient construction with intelligent product design

Sometimes, minimizing thermal bridges is crucial. In this case, we can use StoVentro Brackets made with ZAM® galvanized steel or stainless steel. These materials exhibit approximately up to 90% lower thermal conductivity than aluminium, enabling a reduction in insulant thickness and saving resources, all while achieving the required level of energy efficiency.

The International Energy Conservation Code and ASHRAE 90.1 are evolving with each code development cycle and trend towards improved exterior envelope thermal performance requirements with each release. Exterior insulation free from thermal bridging is critical to optimized energy efficiency and StoVentro Sub-construction optimizes effective R-Values and U-Factors while enabling a vast array of exterior cladding options. Sto Corp commissioned Morrison Hershfield to evaluate the thermal performance of StoVentro in each of its metal types. This way we can help projects find the right balance between thermal efficiency to meet or exceed code and costs, which can help projects stay in budget while still executing a design vision.

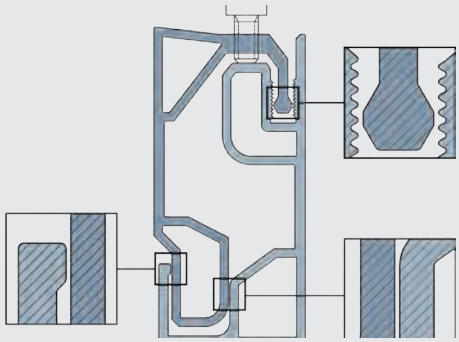


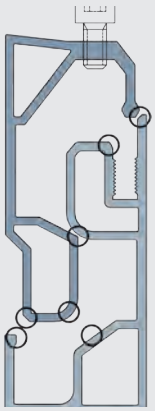
Courtesy of Morrison Hershfield: Thermal efficiency profile wall sections for ZAM galvanized steel StoVentro on exterior insulated steel-frame wall assemblies.

Thermal Performance of Exterior Insulated Steel-Frame Wall Assemblies with Studs at 24 inches (610 mm) o.c. and Galvanized Steel GP Brackets at 24 inch (610 mm) Horizontal Bracket Spacing. Full thermal performance reports are available under the documentation center on www.stocorp.com.

Vertical Bracket Spacing inch (mm)	Exterior Insulation Thickness inch (mm)	StoVenTec Bracket Size	Nominal Exterior Insulation R-value ft² hr °F/Btu (m²K/W)	Overall U-factor Btu/h f1² °F (W/m² °K)	Effective R-value ft² hr °F/Btu (m2 °K/W)
24 (610)	2 (51)	80	R-8.4 (1.48 RSI)	0.091 (0.51)[1]	R-11.0 (1.94 RSI)[1]
	3 (76)	100	R-12.6 (2.22 RSI)	0.070 (0.40)[1]	R-14.3 (2.53 RSI)[1]
	4 (102)	120	R-16.8 (2.96 RSI)	0.057 (0.32)[1]	R-17.5 (3.08 RSI)[1]
	5 (127)	160	R-21.0 (3.70 RSI)	0.048 (0.28)[1]	R-20.6 13.63 RS)[1]
	6 (152)	180	R-25.2 (4.44 RSI)	0.043 (0.24)[1]	R-23.4 (4.12 RSI)[1]
	7 (178)	200	R-29.4 (5.18 RSI)	0.038 (0.22)[1]	R-26.0 (4.59 RSI)[1]
	8 (203)	220	P-33.6 (5.92 RSI)	0.035 (0.20)[1]	R-28.6 15.04 RSI)[1]

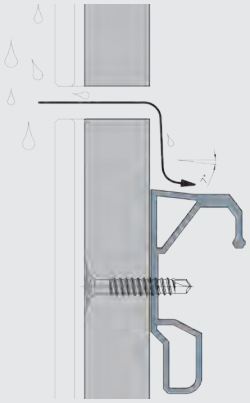
Innovative product design takes the various sub-construction requirements into account.

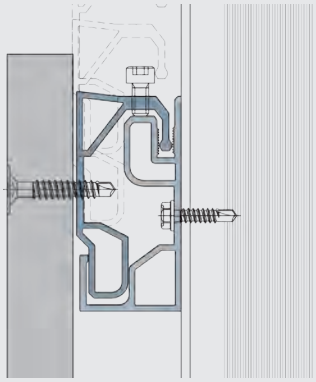




The patented system for the StoVentec Glass panels use mating Agraffe Profiles:

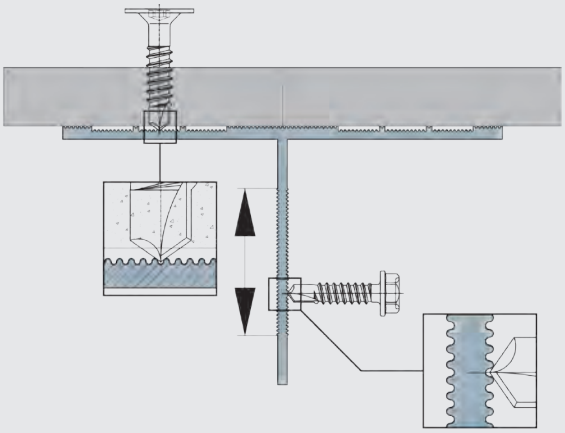
- Clearly shaped contact points for the transmission of force between the mating Agraffe Profiles
- Specific chamfers, curves, and bevels for almost straight-lined mounting of the facade panels in StoVentro





Further benefits of the system:

- Precipitation and moisture are systematically conducted away from the rear side of the panel due to sloped plane of glass panel mounted Agraffe Profiles
- Simple and effortless mounting process through optimized StoVentro Profile geometry
- High resistance to torsional stress
- Reliable adjustment due to the reinforcement of the material in the area of the StoVentro Adjustment screw



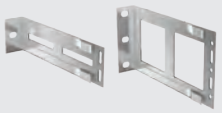
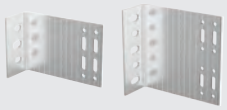
Innovative T-profile design:

- Precise screw guidance thanks to corrugated screw fixing areas
- No need for thermal isolating strip due to reduced facade panel contact surface on the flange

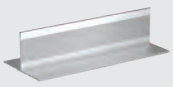
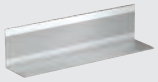
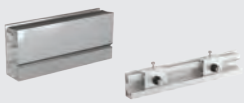
The supporting facade elements

StoVentro sub-construction at a glance

StoVentro Bracket

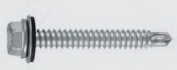
	Product description	Application	Properties
	Zn-Al-Mg galvanized steel StoVentro Brackets	• For the formation of fixed and sliding points to absorb the dead loads and wind loads from the facade system • Anchored into the substrate • For holding and fixing StoVentro T & L profiles	• Made of HSLAS Grade 80 with ZAM, S550 GD _ ZM or 304 Stainless Steel • 60–360 mm StoVentro Bracket sizes for use in various wall cavity depths • With or without retainer for simplified StoVentro T & L profile installation • Material thickness: 2.0 (sliding point/fixed point)
	Passive house StoVentro Brackets		• Specially designed for sub-construction free from thermal bridges • Made of 304 or 316L stainless steel • 200–360 mm StoVentro Bracket sizes for use in various wall cavity depths (sizes > 360mm availible upon request) • With retainer for simplified StoVentro T & L profile installation • Material thickness: 1.5 mm • Passive House certification: free from thermal bridges in combination with thermal blocking and thermal sliding element
	Aluminium StoVentro Brackets		• Made of aluminium 6063 grade or structurally approved equivalent • 40–320 mm StoVentro Bracket sizes for use in various wall cavity depths • Material thickness: 3.2/4.2 mm
	StoVentro Lintel Brackets/corner brackets		• Specially designed for the StoVentro Lintel Bracket/corner area of the facade sub-construction • Made of 304 or 316L stainless steel • Available in a variety of lengths • Project-specific solutions available on request

Sub-frame profile

	Product description	Application	Properties
	T-profile	• Horizontal or vertical installation orientation	• Made of aluminium 6063 grade or structurally approved equivalent • Available rail lengths: 3m or 6m
	L-profile		• Made of aluminium 6063 grade or structurally approved equivalent • Availible rail lengths: 3m or 6m
	Agraffe profile	• Horizontal installation orientation • Fasten to vertical T or L profiles	• Made of aluminium 6063 grade or structurally approved equivalent • Adjustment screws included to level glass panels • Protection against lateral movement thanks to locking pin or screw on board carrier profile • Availible rail lengths: 3m or 6m

Further profiles and project-specific solutions available on request

Anchorage elements

	Product description	Application	Properties	Substrates
	StoVentro Bracket to Steel Stud Fastener with washer	· For anchoring the StoVentro Brackets in the substrate	· A self-drilling hexagonal head stainless steel screw (Bi-Metal) with a hardened drill point	· For attachment of StoVentro Brackets to metal stud walls

Connecting and fixing elements

	Product description	Application	Properties
	Connecting StoVentro screws	· For connecting T & L profiles to the StoVentro Brackets · With over-tightening protection	· Made of stainless steel · With hexagon head · Two StoVentro screws per StoVentro Bracket and T-profile connection point
	Render Facade screws	· For fixing StoVentec Carrier Board to the StoVentro sub-construction · Versions for timber or metal sub-construction available	· Made of stainless steel · With Torx bit TX25

Thermal separating elements

	Product description	Application	Properties
	Thermal stop elements	· For thermally separating aluminium StoVentro Brackets from the substrate	· Made of rigid PVC/white · With pre-punched holes · Material thickness: 6 mm · Versions for sliding and fixed point StoVentro Brackets available
	Thermal blocking elements	· For thermally separating Passive House StoVentro Brackets from the substrate	· Made of sintered polystyrene/white · With pre-punched holes · Material thickness: 10 mm · Versions for sliding and fixed point StoVentro Brackets available
	Thermal sliding elements	· For thermally separating wall brackets from T & L profiles for sub-constructions certified as free from thermal bridges	· Made of black plastic · Material thickness: 1 mm · Versions for sliding and fixed point StoVentro Brackets available

StoVentro sub-construction supports a variety of facade claddings

Render

StoVentec Render
Render offers a range of fascinating options for facade design. It can be used in individual designs and applied manually using a wide variety of tools and application techniques. Surfaces ranging from smooth to very coarse can be created using different types of render with various grain sizes. You can also choose from a whole rainbow of color shades, and a variety of specialty finishes to achieve your own unique look.

Glass

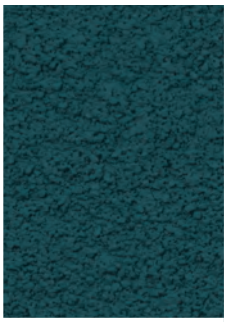
StoVentec Glass
Glass is a reflective surface that shows a mirror image of its environment, but that's not the only effect that can be achieved with this material. Alongside a whole host of possible color shades, glass can be screen printed, treated in various ways, or provided with special coatings, giving you considerable scope to design customized facades. Our tempered safety glass is available in various shapes and sizes and can be used in a wide range of applications.

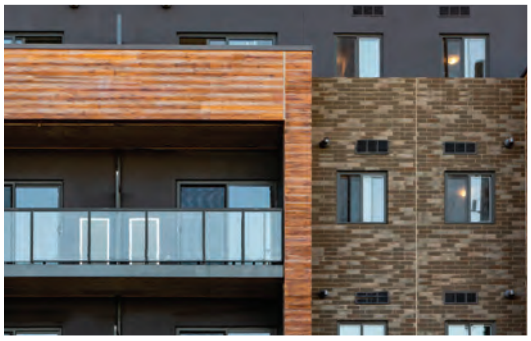
Masonry Veneer

StoVentec for Masonry Veneer Facades
We have a wide range of natural stone for you, some of which comes from our very own quarry. You can find stones such as Kirchheim shell limestone, sandstone, and dolomite in our product range. Stones can be polished, finely honed, or sand-blasted to create a matte or gloss appearance.

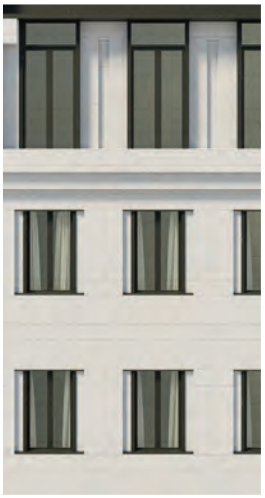
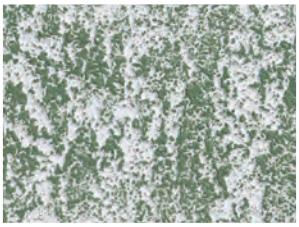
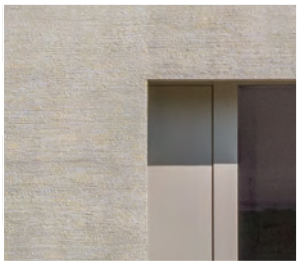
With a wide selection of materials and combinations, StoVentec systems provide considerable freedom to design customized rainscreen cladding facades. Whether you opt for render, masonry veneer or glasss – at Sto, the system concept remains at the heart of our facade solutions.










Catering to your every need

Solution expertise at every stage

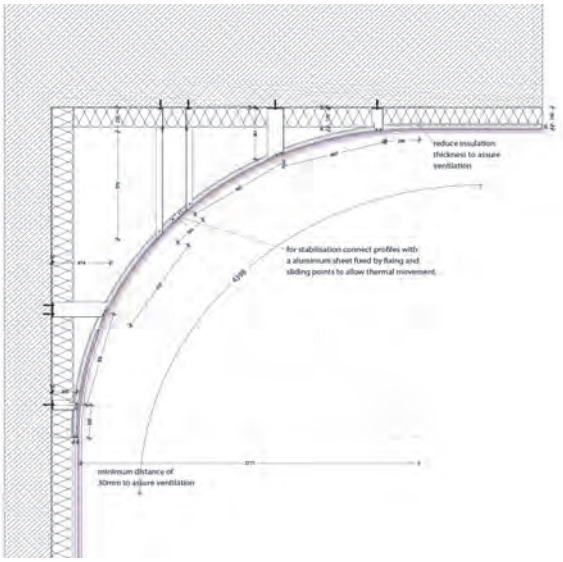
Designing and constructing a new building always presents the project team with new questions and challenges. As the face of a building, the facade requires particular attention – from the initial concept and the implementation possibilities with a range of claddings right through to the appropriate sub-construction. At Sto, our technical support staff will provide you with support at every stage of the project and are available to answer any facade-related questions you might have.

Take advantage of our range of services when it comes to designing and implementing your sub-construction:

- System definition based on the structural and energy efficiency requirements
- Project-specific determination of wind loads for all facade areas
- Preliminary dimensioning of rods and anchors
- Dimension and cost calculations
- Detailed planning and facade structuring
- Layout drawings

Project-specific solutions:
Depending on the building and the concept, project-specific sub-construction solutions may be required. We can provide you with detailed support every step of the way.

Sto on site:
Our technical consultants are available to provide you with on-site support of the overall configuration of the project in accordance with their structural calculations and shop drawings. Additionally, our technical consultants and other Sto partners will provide guidance for the installation sub-contractor in accordance with StoVentec details. Sto will only provide guidance on required and recommended StoVentec configurations.



Sto provides project-specific solutions and construction details for all your specific sub-construction requirements.

Image on right:
The "Infanta Doña Elena" concert and congress hall in Águilas, Spain
Design: Estudio Barozzi Veiga, Barcelona, ES
Building owner: Ayuntamiento de Águilas, Águilas, Murcia, ES
Sto expertise:
StoVentec R with Stolit® K 3.0, concave sub-construction, StoTherm Classic®, StoMiral®, StoColor Jumbosil
Photo: Julien Lanoo, Boeschepe, FR/Mariela Apollonio, Valencia, ES

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