

PERFORMANT PROTECTION

# THERMOVIT®

Electrically heated glass solutions for  
marine applications

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**vetrotech**  
SAINT-GOBAIN



# ABOUT US

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Vetrotech Saint-Gobain is specialised in the development, manufacture and distribution of fire resistant and high security safety glasses. Vetrotech produces solutions to the highest resistance classifications to protect life and property on land, and at sea.

As part of the Saint-Gobain group, Vetrotech has access to a large range of skills and knowledge in the area of glass and other innovative materials. Collectively, the group provides tailor-made solutions with an array of advanced functionalities.

The Vetrotech Marine team is dedicated to helping customers find the most suitable solution, whatever the marine project requirements are. We offer multifunctional solutions of high quality to tackle any marine or offshore specification. The range includes glass solutions which offer:

- + Fire resistance
- + Bullet resistance
- + Weight & energy saving
- + Acoustic insulation
- + Impact resistance
- + Blast resistance
- + Solar control
- + Privacy

or, virtually any combination of these options.

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Discover THERMOVIT, our proven electrically heated glass product range which offers the best optical experience on board. Learn more about this product range in this brochure.

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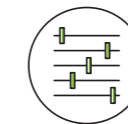
# STAY ON THE SAFE SIDE

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## Choice

We offer a full range of glazing solutions, providing resistance to various environmental and physical threats - fire, wave pressure, icing and condensation, piracy attack, and more.



## Customisation

Vetrotech safety solutions are able to meet multiple comfort or design requirements. Our protection range can be customised to meet your aesthetic, acoustic or thermal requirements.



## Collaboration

Whatever the project and its challenges, our technical and sales teams will ensure you are offered the solution best suited to your needs. We will work with you to provide the best solution for your project.



## Expertise

The bespoke nature of protection solutions requires our teams to constantly check and certify our product performances. Our products are thoroughly tested and conform to the rigorous standards and requirements imposed by classification authorities.



## Reliability

Vetrotech is a subsidiary of the Saint-Gobain group, an expert in glazed solutions for over 350 years.



# THERMOVIT®



## WHY THERMOVIT GLASS?

- + Ideally suited for marine window applications (wheelhouses, restaurants, cabins...) supplied as single-laminated or double-glazed units
- + Provides clarity of vision, whatever the climatic conditions (heating capacities between 3 - 30 W/dm<sup>2</sup>)
- + Individual glass panes are thermally toughened in accordance with ISO614
- + Large sizes up to 2600 x 5500 mm are possible (bigger sizes on request)
- + Available with a power supply varying from 12 V - 440 DC and 12 V - 110 AC
- + Can be easily combined with other products to incorporate extra safety, sustainability and/or comfort features
- + Available as a weight-saving solution for projects in which balance and stability is key
- + Complies with ISO 3434 (standard for heated glass), ISO 21005 and ISO 614 (impact safety & pressure resistance) standards
- + Helps to improve the ambient comfort by reducing the cold surface effect of the glass
- + Avoids the need for blowers, which means no condensation and subsequent damage of the interior, delivering full-decondensation

## PRODUCT RANGE

There are few environments more demanding than the high seas. During cold and high-humidity weather conditions, clear and undistorted vision, as well as thermal comfort, are essential at all times.

Vetrotech Saint-Gobain has developed THERMOVIT, a range of electrically heated glazing solutions designed specifically for marine applications. These products are designed to keep windows within the marine environment free from frost, snow, vapour and condensation.





# THERMOVIT PRODUCT RANGE

3 solutions to provide a clear view at all times

## THERMOVIT CLASSIC

Your best solution for large-sized windows and extreme temperatures



**THERMOVIT Classic** is a special laminated glass which is electrically heated using almost invisible conductive wires. It comprises two or more sheets of glass assembled with one or more interlayers of polyvinyl butyral (PVB).

Depending on the power supply, the thin electrically heated wires, varying between 15 and 29 µmm, are inlaid into one of the PVB films at a distance ranging from a few tenths of a millimetre up to several millimetres to remain as discrete as possible.

This solution is a perfect fit for the large sized-windows and extreme temperatures of public areas, such as restaurants, where it will enhance the passenger experience by providing clearer views to the Arctic horizon.

For naval architects, THERMOVIT Classic offers greater scope to experiment with different types of shapes and extra large windows within the vessel. It can also be installed in ship wheelhouses.

THERMOVIT Classic may be installed next to other un-coated glasses, like basic tempered glass or laminated glass, without visible colour difference.

The product has been on the market since 1974 and has proven its durability and technical reliability. It is also available in a double-glazed unit to provide improved thermal comfort and may be combined with many other glass-functionalities.



## THERMOVIT CLEARVIEW

Providing you with complete transparency and visibility



**THERMOVIT Clearview** is a specially laminated glass which is electrically heated by a metal-oxide coating which is neutral in appearance, offering complete transparency, undistorted and unobstructed visibility.

This wire-free product is ideally suited for areas in the vessel where an optimum view of the outside and thermal comfort are required. For instance, THERMOVIT Clearview provides extra comfort for passengers within restaurants and entertainment rooms by reducing the cold surface effect (convection) caused by the cold outside temperature and thereby ensuring a clearview through the windows, even for those sitting close to the glass.

The glass also limits condensation in high humidity areas such as swimming pools or when used in high humidity climates.

One of the primary advantages of THERMOVIT Clearview is achieved when the product is applied in the ship wheelhouse, where the ship's navigation can benefit from a clear and unobstructed view - showing no wires - when looking through binoculars.

THERMOVIT Clearview is also available in double-glazing units to provide improved thermal comfort. When compared with other coated Low-E glass solutions there is no noticeable colour difference.



## THERMOVIT Pro A0

A clearer view with the benefits of fire-resistance performance



THERMOVIT Pro A0 is a patented glazing solution which combines the benefits of THERMOVIT Clearview with A0 fire-resistance performance.

During normal use, the captain and crew will benefit from the unobstructed view due to the innovative heating solution.

In the event of fire THERMOVIT Pro A0 will protect the crew and equipment from dangerous heat transmission and flames while remaining transparent and keeping a clear vision to the outside.

The product has been developed to conform with 2014 IGC Code, which requires a minimal A0 (60 minutes) fire resistance integrity in the wheelhouse of liquefied natural gas (LNG) carriers.



“ 3.2.5 Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in 3.2.4, except wheelhouse windows, shall be constructed to “A-60” class. **Wheelhouse windows shall be constructed to not less than “A-0” class (for external fire load).** Sidescuttles in the shell below the uppermost continuous deck and in the first tier of the superstructure or deckhouse shall be of fixed (non-opening) type. ”

-2014 IGC Code

# THERMOVIT SOLUTIONS FEATURES

	THERMOVIT Classic	THERMOVIT Clearview	THERMOVIT Pro A0
Max dimensions (mm)	2600 x 5500 Other dimensions upon request	1500 x 2200 Other dimensions upon request	1500 x 2200 Other dimensions upon request
Min outside temp (°C)	-52	-40	-40
Max heating power (W/dm <sup>2</sup> )	30	21	21
Heating system	wires	coating	coating
Discoloration	light (traffic light may discolor)	none	none
Fire protection	optional	optional	A0
Solar factor Ug value	0,75	0,58	0,58
Electrical connection possibilities	all	all	low flame spread cable + Thermomatik-N
Light reflection	possible due to wires	none	none



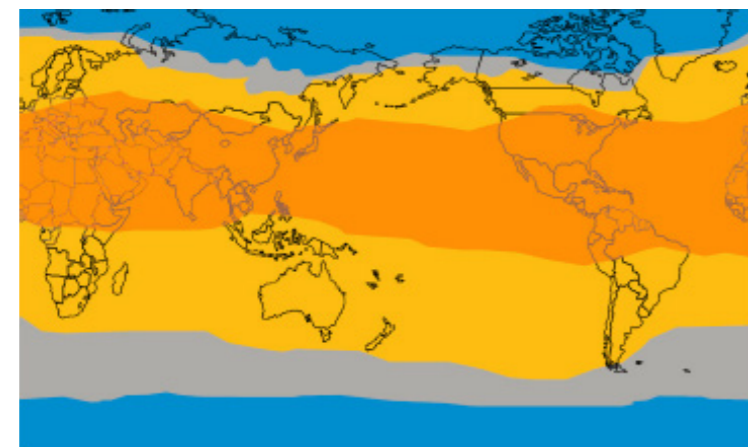
# POWER SUPPLY LOCATIONS

The amount of heating power (W/dm<sup>2</sup>) required depends on the area in which the ship or rig will operate and could influence your choice for the most suitable THERMOVIT glazing solution.

In areas where the temperature can drop to -12 °C and below, heated glass is mandatory according to the ISO 3434 standard. For areas where temperatures stay above -12°C, heated glass can be specified to avoid condensation on the glass due to the high humidity levels.

Meet the ISO 3434 standard for heated glass with THERMOVIT solutions

Temperature	Heating power	THERMOVIT Classic	THERMOVIT Clearview	THERMOVIT Pro A0
-12°C or warmer	7-9 W/dm <sup>2</sup>	X	X	X
-12°C through -28°C	12-15 W/dm <sup>2</sup>	X	X	X
-29°C through -40°C	17-21 W/dm <sup>2</sup>	X	upon request	upon request
-41°C or colder	upon request	upon request		



This map indicates the average annual sea surface temperature and provides an indication of the general weather conditions. In relation to this, the power supply is indicated. Please note this is an indication only. For exact specifications, please contact your Vetrotech representative.

- 21+ W/dm<sup>2</sup>
- 12 - 15 W/dm<sup>2</sup>
- 17 - 21 W/dm<sup>2</sup>
- 7 - 9 W/dm<sup>2</sup>

# CONNECTION POSSIBILITIES

There are three connection possibilities.

## Thermomatik-B system:

a system which turns off when maximum temperature has been reached. An on/off switch measures the glass surface area directly (only available for THERMOVIT Classic and THERMOVIT Clearview)

## Thermomatik-N system:

a manual (thermostat) control system which is in contact with a PTC sensor embedded in the glass. The thermostat control box is connected with the glass through a cable (only available for THERMOVIT Classic and THERMOVIT Clearview)

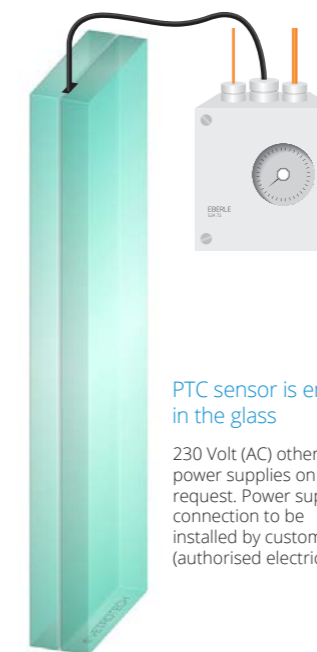
## Cable connection:

the customer provides their own temperature controller. A normal or low flame spread cable is installed in the case of THERMOVIT Pro A0.



On/off switch measures the glass directly

12 Volt (DC) up to 440 Volt (AC) Power supply connection to be installed by customer (authorised electrician)



PTC sensor is embedded in the glass

230 Volt (AC) other power supplies on request. Power supply connection to be installed by customer (authorised electrician)

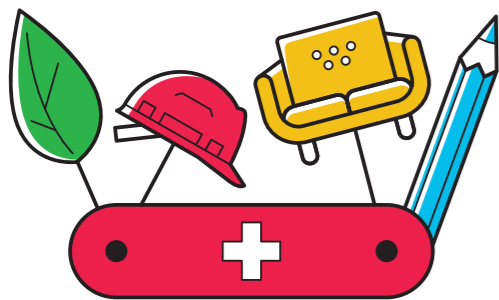


A single cable connection

PTC sensor is embedded in the glass

Control box to be installed by customer. Power supply connection to be installed by customer (authorised electrician)

All heating panels are equipped with a UV-resistant edge sealing material in order to create a durable and water-tight end-product.



# MULTIFUNCTIONALITY IS OUR SPECIALTY

Find the perfect fit for all of your requirements

All products within the THERMOVIT range are perfectly suited for multifunctional purposes, and many combinations are possible:



- + **Fire-resistance** for accommodation spaces or embarkation areas: PYROSWISS, VETROFLAM, CONTRAFLAM LITE, CONTRAFLAM
- + **Bullet-resistance** to resist piracy: VETROGARD



- + **Sound reduction** to reduce noise pollution for the vessels' occupants: DGU, TGU or laminated
- + **Thermal insulation** to improve the ambient comfort by reducing the cold surface effect of the glass via convection: CLIMAPLUS, CLIMATOP
- + **Solar control** to reduce glare and solar heat gain to create comfortable marine living and working environments: KM ULTIMATE coating range



- + **Weight saving** to contribute to more stable and faster vessels which consume less energy and have a lower impact on CO2 emissions: STADIP LITE

# WEIGHT-SAVING OPTION



THERMOVIT Classic can be combined with our specially developed weight-saving glass, STADIP LITE, allowing savings in weight up to 41.7%.

Weight saving is important for the stability of the ship; particularly in the wheelhouse or upper structure due to its position high above the water-line. Weight savings at these positions also contribute to a more sustainable vessel.

Our sales engineers are here to support you and have long-term experience in design, regulations, functionality and applications.

In addition, selecting THERMOVIT Classic Lite, which is the combination of STADIP Lite and THERMOVIT Classic, guarantees a better optical visibility when compared to conventional glass compositions.



All glass products manufactured by Vetrotech Marine are marked with a product stamp which indicates that the products comply with all comfort and safety standards. Additional customer stamps can also be applied on request.

Product experience and proven reliability since 1974.





## GLASS AT SEA

# TESO FERRY

Vetrotech is proud to have worked with the Royal TESO N.V, a private ferry company operating the only public boat service to and from the Dutch Wadden island of Texel, to upgrade a number of its vessels.

TESO has sailed in this area since 1907 and has a total of 14 company vessels that are used for the crossing between the island and the mainland. In recent years, TESO has modernised and expanded the size of its impressive fleet of ferries in response to an increased demand for ferry crossings.

Vetrotech has helped to modernise the Texelstroom – a ship built at a cost of almost 56 million euros – which sails between Den Helder and Texel Island in the Netherlands. Texelstroom will be the 15th TESO ship to join the TESO fleet.

The ship, which has the capacity to hold 1750 passengers, 350 passenger cars per crossing and has replaced TESO's flagship ferry service, "Dokter Wagemaker", has been built with a number of energy efficient measures in mind.

In addition to a sophisticated energy management system, which includes 700m<sup>2</sup> of solar panels and a motor that run on CNG (compressed natural gas) instead of diesel, Vetrotech was selected to provide innovative glass solutions throughout the vessel.

Vetrotech produced double glazed units of glass with a low-E coating, called Planitherm XN II, most of them with their own unique form due to the diamond shaped design specified by the architect for the upper deck. In certain areas, Vetrotech added screenprint to the glass in order to protect the glueing joint from UV-rays and to hide the frame for a better aesthetics.

Vetrotech also provided heated glasses (THERMOVIT) for the wheelhouse applications to prevent the glass from icing and misting, and additionally provided Contraflam A0 and A60 fire-resistant glass to secure the escape routes in case of fire.

*In total, Vetrotech installed over 1400m<sup>2</sup> of glass.*





Vetrotech Marine is part of the Saint-Gobain Group, the world leader in construction materials and solutions for living spaces.

**Picture credits:**

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