

# Creating complete solutions

Thermal edge bond solutions  
for insulating glass

## Hello, it's us, Technoform!

As a family company, we know that people empower every business. We firmly believe that the best ideas are always born together. We are Technoform – 1,500 and growing, dedicated innovators that work for our customers worldwide.

Understanding what drives customers and markets since 1969, we develop leading solutions collaboratively. Providing 100% reliability and quality on all levels, we offer the same level of high-quality services and solutions all around the world. 45 sites in over 40 countries ensure continuous supply wherever you are.

Performing 360° precision and 1,000+ skills, our highly trained team turns individual needs into tailored technological solutions. Delivering quantities from 1 to 1,000,000 our customers can rely on receiving the best available package of quality, quantity, time, and value.



**We invite you to browse through this brochure and find out how we can support your personal vision.**

## Warm edge – insulating glass performance at its best

When it comes to building sustainably, high energy efficiency, durability, and indoor comfort are key factors. To achieve this, durable thermally optimized edge bond solutions for insulating glass are what it takes. With our warm edge spacers between the glass panes, we improve the thermal performance of the edge bond and ensure gas tightness. This leads to optimized energy performance and a visible reduction in condensation at the edge of the window, thereby preventing the formation of mold. A warm edge significantly reduces the circulation of air near the window which makes life more comfortable inside your home.

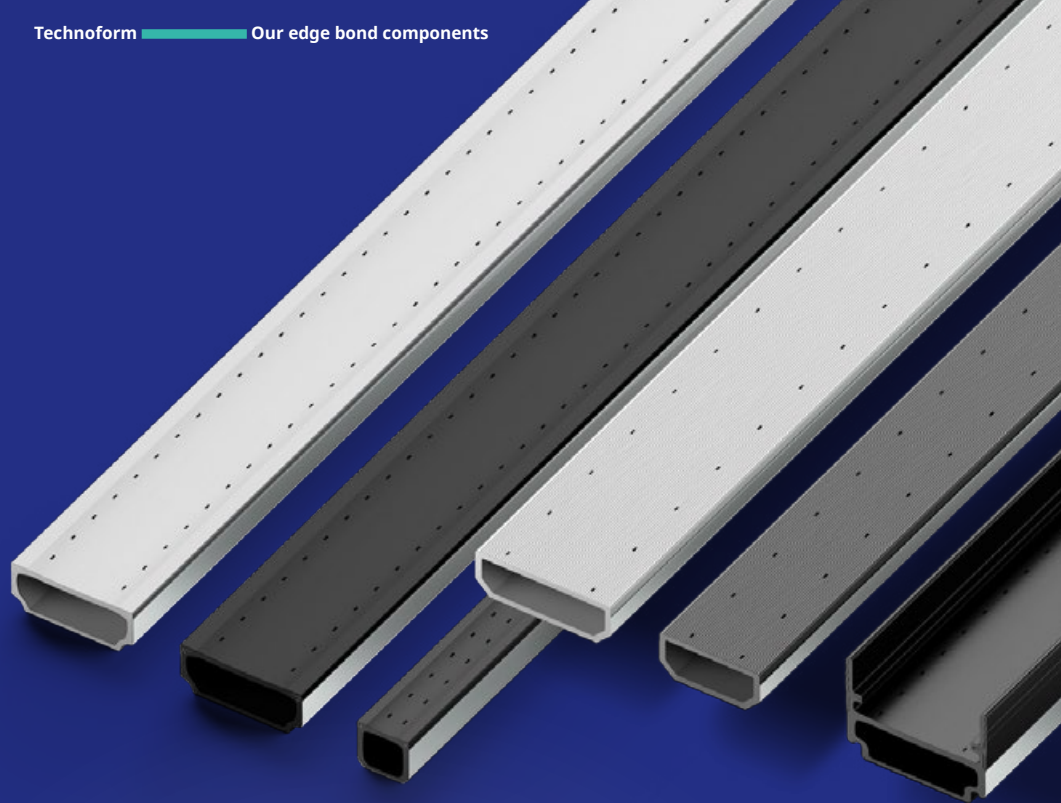
Our warm edge solutions set new standards in surface quality and match the highest requirements of architects and building designers.

Contact us if you want to increase the quality and durability of your window, door, and facade systems through an optimized glass edge bond.

### **Warm edge – why?**

To understand the importance of warm edge, take a standard window with triple glazing, aluminum frame and an average aluminum spacer. Using our high thermal performance spacer instead, results in a 13% improvement of the window U-value. Multiply this effect by 200,000 (the size of an average town) and you achieve an annual savings equivalent to almost 1.5 million liters of heating oil. This makes warm edge a smart and sustainable solution.



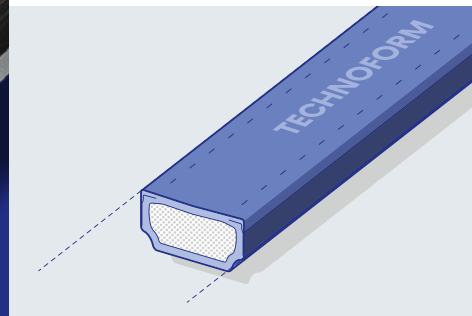


Thermal edge bond solutions for insulating glass

**Our solutions combine peak performance with appealing design – wherever you want to use them.**

## **Equipped for every challenge**

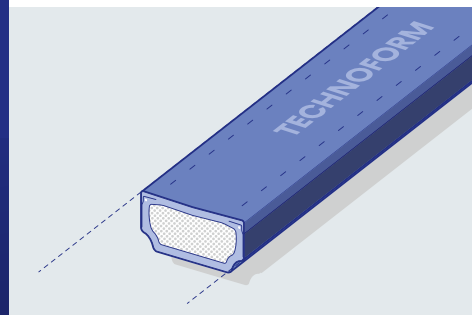
This warm edge spacer was designed to meet the numerous requirements which apply to the modern glass edge seal. It is available in a range of options, specially matched to the intended applications. While some of the details of the designs may differ from each other, they all provide low thermal conductivity values, high productivity, high process reliability and high-quality appearance. In addition, the solid metal back prevents moisture-vapor transmission. It complies with the requirements of EN 1279-2, 3 & 6, DTA and ASTM E2190. It is a certified Passive House Component Class pHB for Cool, Temperate Climate.



### **SP13**

**You can benefit from the following advantages:**

- High level of design flexibility in any form
- Enables the bending of the smallest radii
- Allows negative bending (e.g. for capillary tubes)
- Can be used in curved glass



### **SP14**

**You can benefit from the following advantages:**

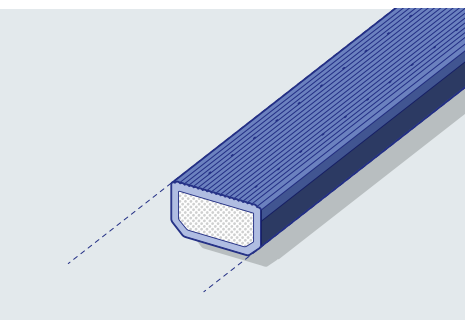
- High profile stability due to patented reinforcing steel wires
- Ideal for medium to large frames
- Reduces frame readjustment
- Rigid corners



## Designed for highest thermal performance

Our developments in thermal performance fit in perfectly with the trend towards zero-energy buildings. Due to our innovative production process, the optimum combination of materials in this spacer enables the lowest possible U-values to be achieved in the system as a whole. As a result, fluctuations in thermal values are minimized. This ensures a reliable basis for your calculations. The spacer is processable on automatic butyl extruders for small, medium, and large frames. It shows no memory effect, making straight butyl application possible while avoiding the need of a manual adjustments of the frame after assembling on the glass.

It complies with the requirements of EN 1279-2, 3, 4 and 6, CAN/CGSB-12.8, DTA, and the RAL quality and test regulations. It is certified by Cekal and CSTB.



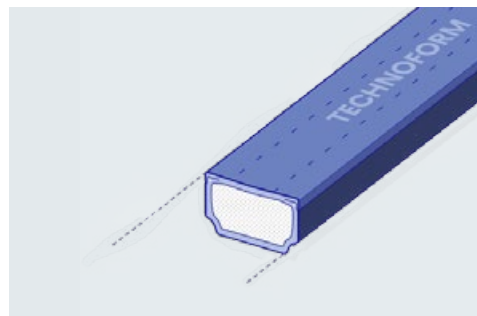
### SP16

**You can benefit from the following advantages:**

- High quality of the edge bond and consistent Lambda-equivalent values due to lowest possible product tolerances within the range of  $\pm 0,05$  mm (while  $\pm 0,1$  mm is usual on the market)
- Optimum process capability due to high fracture strength
- The plastic body does not crack during proper process handling or while inserting connectors.
- High-quality look: Smooth and bright surface. The slight rills on the surface protect the spacer from scratches and dust pollution.
- The multilayer barrier foil has a significant impact on the durability of the edge bond and the Lambda-equivalent of the spacer.
- Certified Passive House Component Class phA (Arctic Climate)
- Eudermic: The spacer does not cause any skin irritations thanks to the orientation of glass fibres in the profile.

## Optimized for improved processing

These warm edge spacers have increased rigidity, making it even easier to process and handle the spacer frame, especially for large sizes. Each of these spacers have specific features that increase insulating glazing manufacturing capacities while improving quality and maintaining thermal performance. In addition, the solid metal back prevents moisture-vapor transmission.

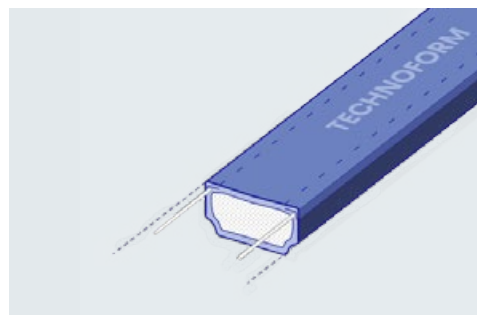


### SP17

**You can benefit from the following advantages:**

- Taller 8mm height improves handling and placement of spacer frames
- Drop-in replacement for 8mm tall aluminum or stainless-steel spacers
- Highest desiccant capacity and longest primary seal length for best in class durability

It complies with the requirements of ASTM E2190.



### SP18

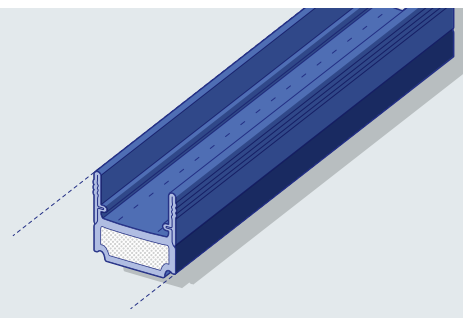
**You can benefit from the following advantages:**

- Larger wire diameter improves rigidity
- Increases the production efficiency and quality
- High reliability and durability of the glazing
- Optimum adaptation to automatic machines

It complies with the requirements of EN 1279-2, 3, 4 and 6, DTA, and the RAL quality and test regulations. It is certified by Cekal and CSTB.

## Designed for integral blinds

This solution for internal blinds is a spacer with integrated locating and guiding elements and is specially designed for use with internal blinds while keeping thermal conductivity values low within the whole system.

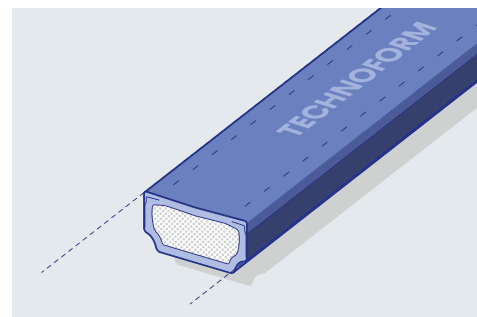


### SP15

You can benefit from the following advantages:

- No noise or damage to the surface of the glass
- Low thermal conductivity values
- High-quality appearance

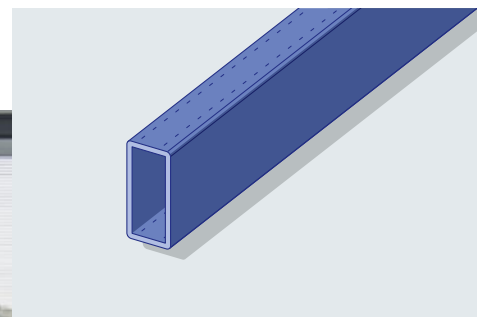
The movement of the blind, for manual or motorized systems, does not compromise the insulating properties of the insulating glass unit and is performed in a totally sealed environment. Our spacers for integral blinds help protect against dirt, dust or weather conditions, and therefore blinds do not require any maintenance.



### SP19

You can benefit from the following advantages:

- Mid-range conductivity of 0,50 W/mK
- High level of design flexibility in any form
- Designed for manufacturers who cut and connect the profile with corners keys



### MU10

You can benefit from the following advantages:

- Low heat conductivity of just 0.25 W/mK
- Very high profile stability and low coefficient of linear expansion due to integrated glass fibres
- Perfect processability together with our warm edge spacers

## Designed as a first step

Start your transition from aluminum with this beginner warm edge spacer. This spacer is perfect for making the transition to thermally optimized edge bonds. Using a more basic steel grade than our other spacers, allows ductility for shapes, offers mid-range thermal performance, and still prevents moisture-vapor transmission with the solid metal back. It complies with the requirements of EN 1279-2, 3, and 4.

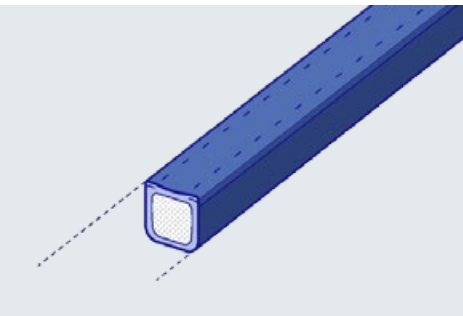
## Less contact, more performance

Our muntin bar system can be positioned within an insulating glass unit without any direct contact with the glass. It is aesthetically identical to our warm edge spacers, giving insulating glazing manufacturers a complete thermally optimized system that meets current thermal insulation requirements and will also meet the tighter requirements of tomorrow. Cross-shaped muntin bar connectors are used to connect profiles and are matched to the exact profile width in each case.

## Designed for small spaces

For thin insulating glass units this warm edge spacer fits seamlessly. This spacer is ideal for retrofits on historic buildings where a smaller thickness of insulating glass must be maintained. This spacer can be used for triple glazing, especially when high thermal performance is needed while still maintaining a similar thickness as double glazed insulating glass. In addition, the solid metal back prevents moisture-vapor transmission.

It complies with EN 1279-2, 3 & 6, DTA and ASTM E2190.



### SP12

**You can benefit from the following advantages:**

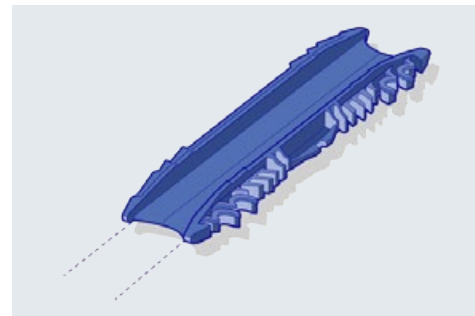
- Ability to maintain existing building aesthetics while increasing thermal performance
- High level of design flexibility in any form
- Ideal for thin frames where an air space of less than 10 millimeters is needed

Mason Square Apartments at Indian Motorcycle  
Springfield, Massachusetts, U.S.A.  
Photo courtesy Diamond Windows & Doors MFG Inc.



## The excellent connection

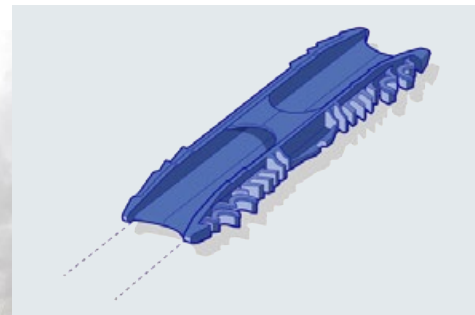
Within the glass edge bond, a functional secure frame has a significant impact on the performance of the entire glass edge bond system. Technoform connectors convince with an improvement in quality and durability of the insulating glass unit and offer dimensional stability at the connection points even with larger frames. The connectors are ideally suited for manual and automated processing and fit perfectly to our spacer geometry. Thus, we ensure the best composition of the components in the glass edge bond.



### CN53

**You can benefit from the following advantages:**





- Improved quality and durability of the insulating glass unit
- Process reliability
- Dimensional stability at the connection points, even for larger frames
- Prevention of gap formation and avoidance of desiccant leakage
- No deformation of the spacer geometry
- Reliable molecular sieving due to asymmetry and special inlet ramp
- Larger interior cross section for a reduced flow resistance
- Guaranteed barrier for gas and moisture diffusion
- Simple and easy handling



### CN54

\_\_\_\_\_

Width	SP12	SP13	SP14	SP18	SP19
Former product brand name*:	TGI-Spacer	TGI-Spacer M without wire	TGI-Spacer M with wire		
6,2 mm	■				
8 mm	■				
9 mm	■				
10 mm		■	■		■
12 mm		■	■	■	■
13 mm		■	■		
14 mm		■	■	■	■
15 mm		■	■	■	■
16 mm		■	■	■	■
17 mm			■		
18 mm		■	■	■	■
20 mm		■	■	■	■
22 mm		■	■		
24 mm		■	■		
26 mm		■	■		
28 mm			■		
30 mm		■	■		
32 mm			■		

 Similar to RAL 9016  
White\*
  Similar to RAL 7035  
Light grey
  Similar to RAL 7040  
Dark grey
  Similar to RAL 8003  
Light brown\*

\*We are Technoform, formerly known as TGI. We are transitioning all our existing products and their brand names to article IDs.



SP16	SP15	CN53	CN54	Width	Height	MU10
TGI-Spacer Precision	TGI-Spacer Pellini					
				9,5 mm	21,5 mm	■
				9,5 mm	25,5 mm	■
				9,5 mm	31,5 mm	■
■				11,5 mm	21,5 mm	■
■		■		11,5 mm	25,5 mm	■
				11,5 mm	31,5 mm	■
■		■	■	13,5 mm	21,5 mm	■
■		■	■	13,5 mm	31,5 mm	■
■	■	■	■			
■		■	■			
■	■	■	■			
■	■	■	■			
■		■	■			

Similar to RAL 8016 Dark brown\*      Similar to RAL 9005 Black

Customized options can be produced according to your specification.  
Please contact us.

# Thermal values

A comparison of thermal values (according to Bundesverband Flachglas e.V.):

$$U_w = \frac{U_f \cdot A_f + U_g \cdot A_g + \psi \cdot l_f}{A_w}$$
$$T_{oi} = T_{ia} + f_{Rsi} \cdot (T_{li} - T_{ia})$$

$U_w$  = Thermal transmission coefficient, window  
 $U_f$  = Thermal transmission coefficient, frame  
 $U_g$  = Thermal transmission coefficient, glass  
 $A_w$  = Window area  
 $A_f$  = Frame area  
 $A_g$  = Glass area

$l_f$  = Length of edge, frame-glass  
 $\psi$  = Linear thermal coefficient, composite edge  
 $T_{oi}$  = Inner surface temperature  
 $T_{li}$  = Indoor air temperature +20 °C  
 $T_{ia}$  = Outdoor air temperature -10 °C  
 $f_{Rsi}$  = Temperature factor at  $R_{si} = 0.20 \text{ m}^2 \text{ K/W}$

Frame	Wood			Plastic			Aluminum			Wood/Aluminum		
Double glazing	2 IG			2 IG			2 IG			2 IG		
Spacer	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16
ψ value	0.074 W/mK	0.040 W/mK	0.031 W/mK	0.068 W/mK	0.040 W/mK	0.032 W/mK	0.100 W/mK	0.049 W/mK	0.036 W/mK	0.084 W/mK	0.044 W/mK	0.032 W/mK
U <sub>w</sub> window	1.37 W/m²K	1.29 W/m²K	1.27 W/m²K	1.30 W/m²K	1.23 W/m²K	1.21 W/m²K	1.52 W/m²K	1.39 W/m²K	1.36 W/m²K	1.40 W/m²K	1.31 W/m²K	1.28 W/m²K
Temperature factor f <sub>Rsi</sub>	0.50	0.62	0.66	0.54	0.65	0.68	0.53	0.66	0.69	0.45	0.59	0.63
Surface temperature T <sub>oi</sub> at -10 °C, +20 °C	7.6	10.6	11.4	8.6	11.3	12.0	8.3	11.5	12.4	6.2	9.7	10.7

Frame	Wood			Plastic			Aluminum			Wood/Aluminum		
Triple glazing	3 IG			3 IG			3 IG			3 IG		
Spacer	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16	Aluminum	SP13/SP14	SP16
ψ value	0.078 W/mK	0.039 W/mK	0.029 W/mK	0.069 W/mK	0.038 W/mK	0.030 W/mK	0.100 W/mK	0.044 W/mK	0.031 W/mK	0.090 W/mK	0.042 W/mK	0.030 W/mK
U <sub>w</sub> window	1.08 W/m²K	0.98 W/m²K	0.95 W/m²K	1.00 W/m²K	0.92 W/m²K	0.90 W/m²K	1.26 W/m²K	1.12 W/m²K	1.09 W/m²K	1.15 W/m²K	1.03 W/m²K	1.00 W/m²K
Temperature factor f <sub>Rsi</sub>	0.57	0.70	0.74	0.59	0.70	0.73	0.60	0.73	0.76	0.53	0.59	0.71
Surface temperature T <sub>oi</sub> at -10 °C, +20 °C	9.3	12.5	13.4	9.8	12.9	13.3	10.1	13.3	14.1	8.2	11.9	12.8



# TECHNOFORM

Thermal edge bond solutions  
for insulating glass

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