



System Solutions for the Glass Industry



H.B. Fuller



KÖMMERLING



THE AMAZING WORLD OF GLASS

Green building is now the norm, and we are committed to improving lives and protecting our planet. Through a wide selection of trusted solutions, we are helping manufacturers create long-lasting, energy-efficient and outstanding glass solutions for any design or application. Whether we're creating new sealant formulations, manufacturing products, or providing responsive customer support, we always offer premium solutions and innovations.

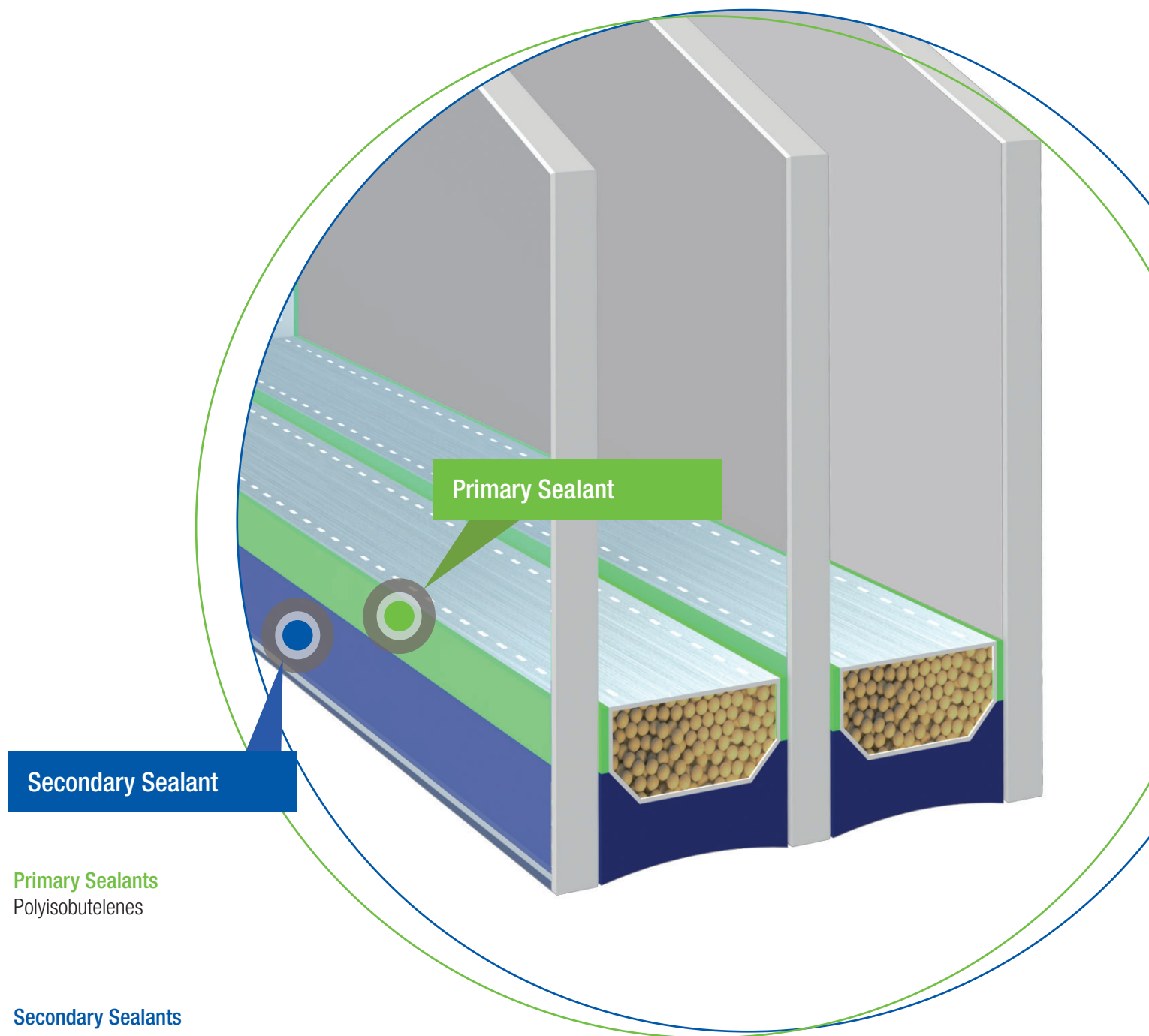
We understand the durability and reliability of a window relies heavily on the quality of insulating sealants and spacer systems used in the manufacturing process. Our customers require materials that can be used in a wide range of applications without sacrificing performance. Therefore we only provide premium, market-leading insulating glass sealants, reactive thermoplastic spacers, window assembly adhesives, and glazing adhesives.

Join us on the journey and become part of our amazing world of glass.

INSULATING GLASS SEALANTS

H.B. Fuller | KÖMMERLING offers the worlds most comprehensive product range for the glass industry and all from a single source.

Our primary sealants, reactive and non-reactive secondary sealants fulfill the highest requirements of international certification standards. They are laboratory and field-tested in a variety of extreme and accelerated aging conditions, ensuring reliability and application flexibility. We offer a solution for nearly every Insulating Glass (IG) configuration.



Primary Sealants

Polyisobutelenes

Secondary Sealants

2-component Polysulfides

2-component Polyurethanes

Hot Melts and Reactive Hot Melts

2-component Insulating Glass Silicones

1-component Insulating Glass Silicones

PRIMARY SEAL

POLYISOBUTYLENES

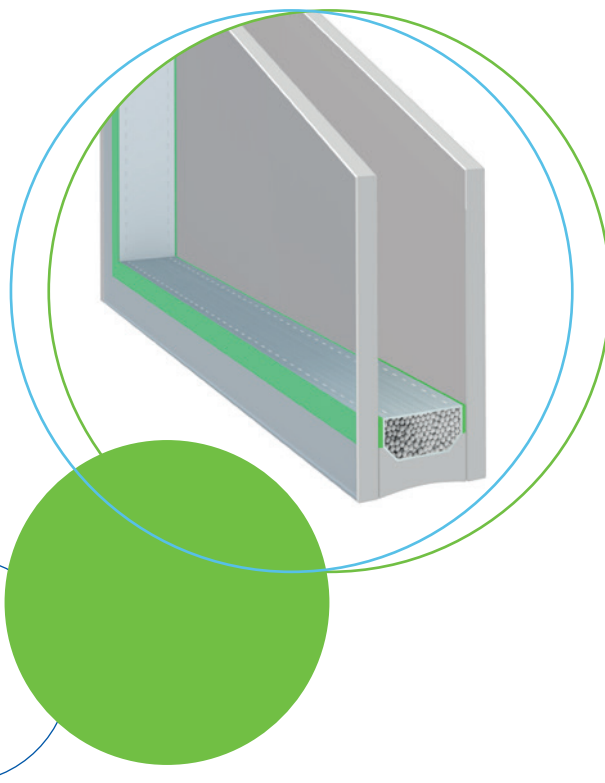
The primary sealant is the key to maintaining a moisture vapor and gas tight seal for long term unit performance. The polyisobutylene seals the spacer width to the glass and prevents moisture from entering the insulating glass unit and keeps the gas sealed inside and unable to escape.

Our polyisobutylene sealants are characterized by an extremely low moisture vapor transmission rate and excellent gas retention while providing superior adhesive properties on glass and spacer bars.

All of our PIBs fulfill the requirements of EN 1279, ASTM E2190 and CGSB 12.8.

Specific Properties

- ✚ Extremely low moisture vapor transmission rate
- ✚ Very good gas retention



SECONDARY SEAL

The secondary seal acts as a second layer of sealing but is more importantly, the structural component of the insulating glass edge. It is responsible for maintaining the structural integrity of the unit during expansion and contraction caused by environmental forces such as fluctuations in temperature, barometric pressure and wind speed.

All of our standard secondary sealants are fully compliant with EN 1279, ASTM E2190 and CGSB 12.8 and are approved for use with our Direct Glazing Systems.

POLYSULFIDES

Our 2-component polysulfide sealants are characterized by a low moisture vapor transmission rate, excellent gas retention and a wide range of adhesion properties. Tolerant of mix ratio deviations of up to $\pm 20\%$.

Specific Properties

- ✚ Approved by CEKAL
- ✚ Certified according to GMI

POLYURETHANES

In addition to a low moisture vapor transmission rate and good gas retention, our 2-component polyurethane sealants are characterized by fast adhesion build-up as well as very good adhesive properties to the surfaces of many frame materials.

Specific Properties

- ✚ For use in serial production
- ✚ Approved by CEKAL
- ✚ Certified according to GMI

SILICONES

If high UV stability of the edge sealant is needed, silicones are preferred as secondary sealants. Our silicone sealants not only have excellent UV resistance, but also particularly good weathering and temperature resistance.

Specific Properties

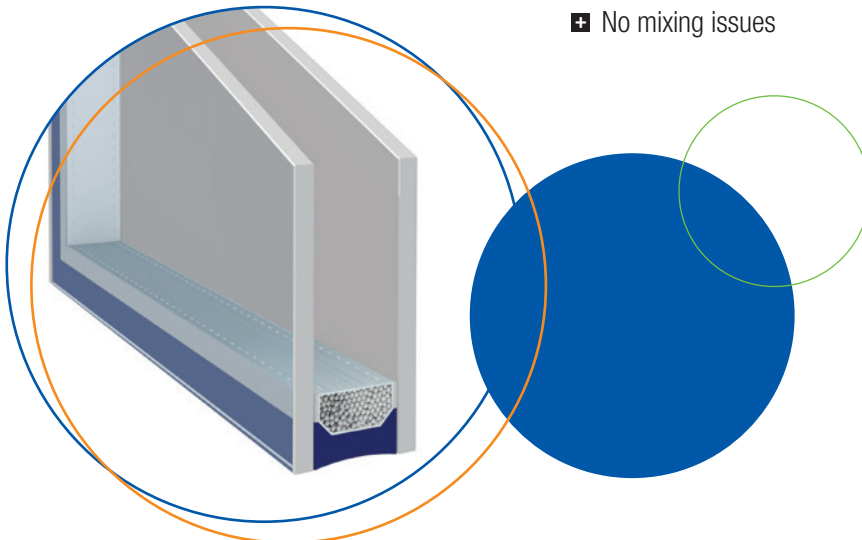
- ✚ Approved by CEKAL
- ✚ Certified according to GMI

HOT MELTS AND REACTIVE HOT MELTS

Our hot melt sealants are characterized by an extremely low moisture vapor transmission rate and superior gas retention. As they easily melt in tank and drum melting equipment and are easy to process, they are perfectly suited for both automated production and manual equipment.

Specific Properties

- ✚ Processing temperature $+170\text{ }^{\circ}\text{F}$ to $+350\text{ }^{\circ}\text{F}$
- ✚ No loss of material, no waste disposal issues
- ✚ No purging or flushing necessary
- ✚ No mixing issues



HIGH PERFORMANCE WARM EDGE SYSTEMS

KÖDISPACE AND KÖDISPACE 4SG

The polyisobutylene based thermoplastic spacer Ködispace is robotically applied and completely replaces conventional spacer bars, desiccants and primary seals. The system is characterized by incredibly low moisture vapor transmission rates, excellent gas retention, and high mechanical flexibility, all resulting in an extended long service life.

Ködispace 4SG has the additional ability to form a chemical bond with glass and silicone secondary sealant, and is therefore, particularly suited for use in façades.

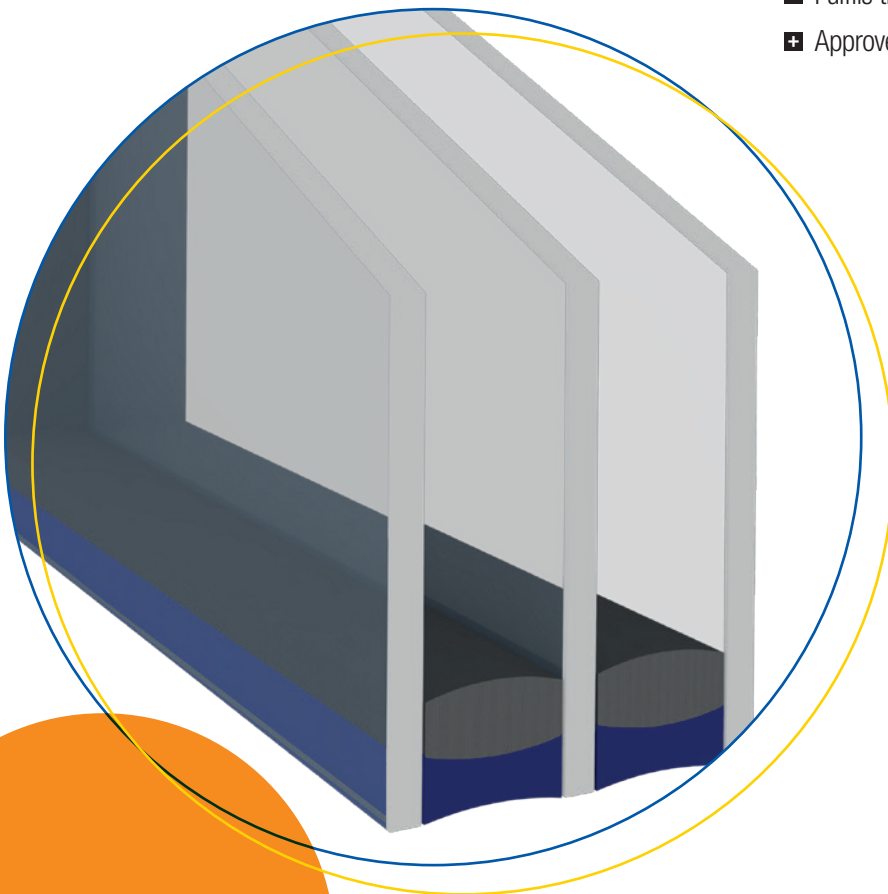
Ködispace

- ✚ Excellent thermal performance
- ✚ Individual shape design
- ✚ Spacer widths from 1 mm to 20 mm possible
- ✚ Approved by CEKAL

Ködispace 4SG

In addition to the properties of Ködispace, Ködispace 4SG also offers the following benefits:

- ✚ Best Psi and Ug values also for façade glass panes
- ✚ High temperature resistance
- ✚ For structural glazing applications in all climate zones
- ✚ Additional chemical bonding to glass and silicone secondary sealants, thus extremely tight and durable gas-filled façade glass panes
- ✚ Fulfills the requirements of ASTM E2190 and CGSB 12.8
- ✚ Approved by CEKAL



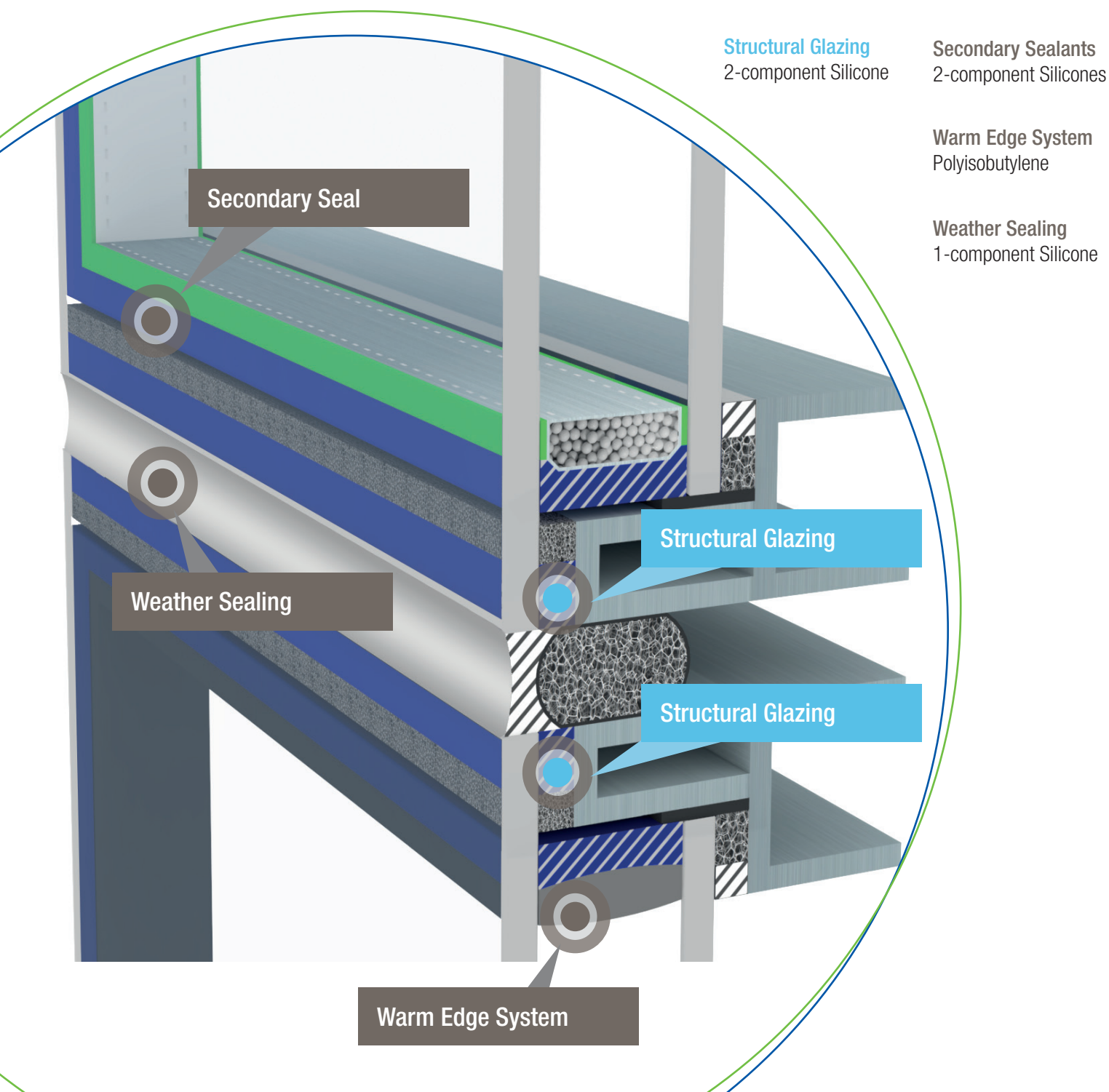


SYSTEM SOLUTIONS FOR THE GLASS INDUSTRY

SYSTEM SOLUTIONS FOR STRUCTURAL GLAZING

Glass is a material that provides high quality natural daylight, timeless elegance and transparency. This is why glass façades have had a significant impact on modern architecture and will define our cityscapes for decades. Façades must satisfy the most demanding aesthetic expectations whilst performing as technically smart systems and fulfilling a multitude of construction compliant functions. These requirements are safely and perfectly reconciled in glass façades built with our structural glazing solutions.

Our high-performance, silicone-based structural glazing products guarantee that façades and their fascinating unique designs will be long-lasting even under the most extreme climate conditions. With Ködispace 4SG, our unique Warm Edge System developed especially for use in structural glazing, extremely tight and durable gas-filled glass façades can be realized.

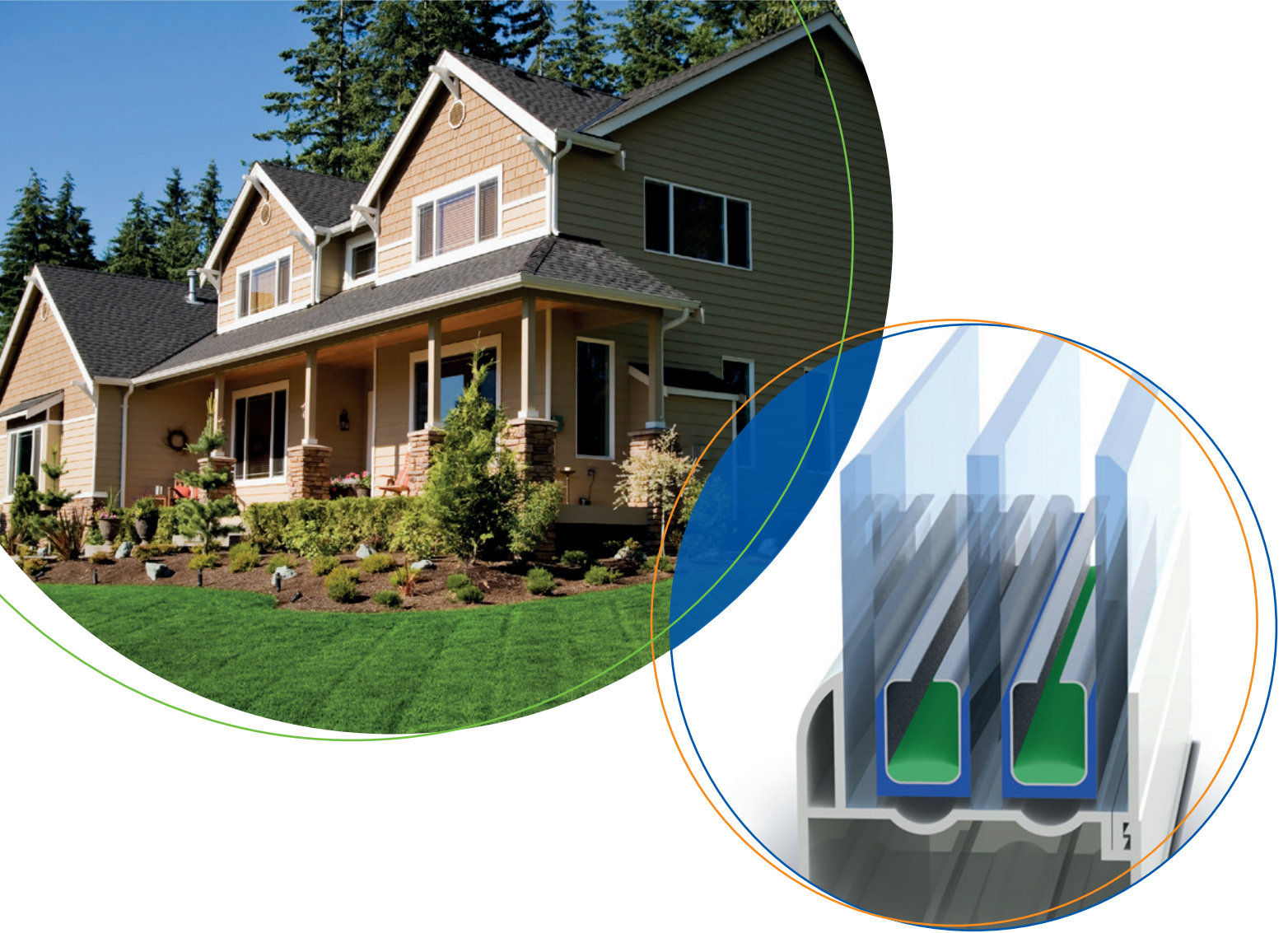




Structural Glazing projects are becoming more sophisticated architecturally and are also technically more complex.

Our customers can count on individual and diverse consulting and support services during the entire duration of a project.





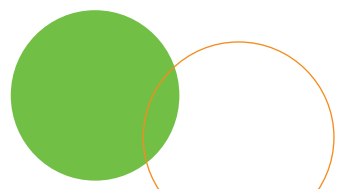
INNOVATIVE SOLUTIONS FOR INTERCEPT® SYSTEMS

H.B. Fuller's Intercept® solutions are certified, modern window sealants designed to help you simplify your materials acquisition process and enable you to create the ideal combination of price point and quality requirements for your end product.

Our Intercept® solutions combine desiccated matrix with a hot melt butyl or curable one-component sealant, ready for quick, seamless integration with the Intercept® spacer system and GED production lines. Our products have been exhaustively field tested, optimized for maximum productivity with Intercept® assembly lines and proven effective. No matter which combination you opt for, you'll make the right decision with H.B. Fuller's Intercept® solutions.

Specific Properties

- + One-component sealants with excellent adhesion to both glass and spacer
- + Quick and seamless integration with the Intercept® spacer system and GED production lines
- + Optimized for maximum productivity with Intercept® assembly lines



DIRECT GLAZING - THE FUTURE OF WINDOW DESIGN

FOR MORE RELIABLE WINDOWS AND HIGHER SAFETY LEVELS

The demands placed on modern windows are high! They need to be energy-efficient, visually appealing, flexible in shape and size, as well as burglar resistant. Direct Glazing is the key to a new world of window bonding: insulating glass is bonded into the window sash, which leads to significant improvements in the window's static properties. Load transfer no longer occurs selectively over setting blocks, but rather over the entire bonding area. This allows for thinner frames, lower weight, larger pane sizes, unusual window shapes and a higher safety level.

Direct Glazing can be realized with all types of window frame material, from wood via plastic to aluminium. Depending on the profile system, different bonding positions are possible: overlap, rebate and glass edge.

With Ködiglaze, H.B. Fuller | KÖMMERLING has developed a special product range for this innovative technology. Our Ködiglaze adhesives are polyurethane or silicone based and characterized by very good weathering performance, temperature resistance and an optimal relationship between stability and flow behavior. They also offer excellent creep resistance and are, of course, compatible with our insulating glass sealants.

Specific Properties

- ✚ Formulation and properties adapted to insulating glass secondary sealants
- ✚ Can be processed either as 1- or 2-component system

Learn more about
Direct Glazing



ANTI BURGLAR GLAZING

BE ON THE SAFE SIDE WITH H.B. FULLER | KÖMMERLING

In addition to energy efficiency, security is a critical issue when it comes to windows and doors. A break-in symbolizes a traumatic intrusion into our safe space which not only disrupts our need to be secure but overshadows our sense of freedom.

Direct Glazing greatly increases protection against break-ins for windows and doors. The glass and frame merge into a single cohesive unit. With our Ködiglaze range the circumferential glass connection, required by DIN EN 1627, for burglar-resistant glazing is achieved (resistance class RC-2 or RC-3).

Specific Properties

- ✚ Test certificates available
- ✚ Excellent adhesion to glass and all frame materials
- ✚ Formulation and properties specially adapted to insulating glass secondary sealants





The H.B. Fuller | KÖMMERLING LOCA range for liquid lamination adhesives are perfectly designed for the stress-free production of versatile, high quality, value added laminated glass constructions using passive manufacturing processes with green credentials.



SOLUTIONS FOR HIGH PERFORMANCE LAMINATED GLASS

LOCA - THE NEW REVOLUTION IN GLASS LAMINATION

Smart glass is the future! Laminated glass combines transparency and outstanding design with special functional properties for use in a wide variety of applications.

With our unique range of LOCA (Liquid Optical Clear Adhesives) and cooperation with our application partner TTEC GmbH, we have developed groundbreaking manufacturing processes for the lamination of glass. This includes lamination with alternative substrates and the embedment of smart components such as LEDs, display components and dynamic functional films. The safe and innovative production processes enable a wide range of additional functions to be encapsulated between glass. Once combined with the versatility of wet chemistry this opens up almost limitless potential for innovative laminated glass design. Enhancing performances in safety, security, structural and well being functions throughout architectural, automotive and home appliance applications.

Specific Properties

- ✚ 3D cross-linked polymer technology
- ✚ Outstanding durability and stability
- ✚ Crystal clear optics
- ✚ Passive processing
- ✚ Media-functionality
- ✚ Extensive range of applications





ENVIRONMENTAL CONSIDERATIONS

H.B. Fuller actively manages the environmental impact of our operations, people, and products. We monitor our environmental footprint and continually innovate for improved sustainability in our products and manufacturing practices. We also collaborate with customers to create adhesive and sealant solutions that allow them to meet their sustainability goals. Our products help customers save energy, reduce waste, and enable recycling and re-use.

Sustainable business practices are not only good for our environment, they also help our company grow responsibly, positioning H.B. Fuller for long-term success and making a difference for our customers, employees, and the planet.

- H.B. Fuller is fully committed to the Sustainable Development Goals of the United Nations
- Optimized internal processes with a clear focus on our environmental responsibilities
- Accreditation to ISO 9001, ISO 14001, ISO 45001 and ISO 50001

WE ARE YOUR RELIABLE PARTNER

The demands placed on the mechanical performance and life cycle properties of our products require a dedicated team delivering a diverse and comprehensive technical service to our partners across all of our application ranges.

At H.B. Fuller | KÖMMERLING our passion for customer partnerships is best demonstrated by our commitment to technical support for both product understanding and application process assistance utilizing our extensive, long term understanding of material behavior and properties added to first class facilities at our research and development centers. Our support does not stop there, we are renowned for the part we play in improving and perfecting process and application technology on-site with our partners.

From analyzing and improving the performance of existing materials, developing materials for new applications or delivering world class training H.B. Fuller | KÖMMERLING is recognized as a global market leader.



Competence & Service

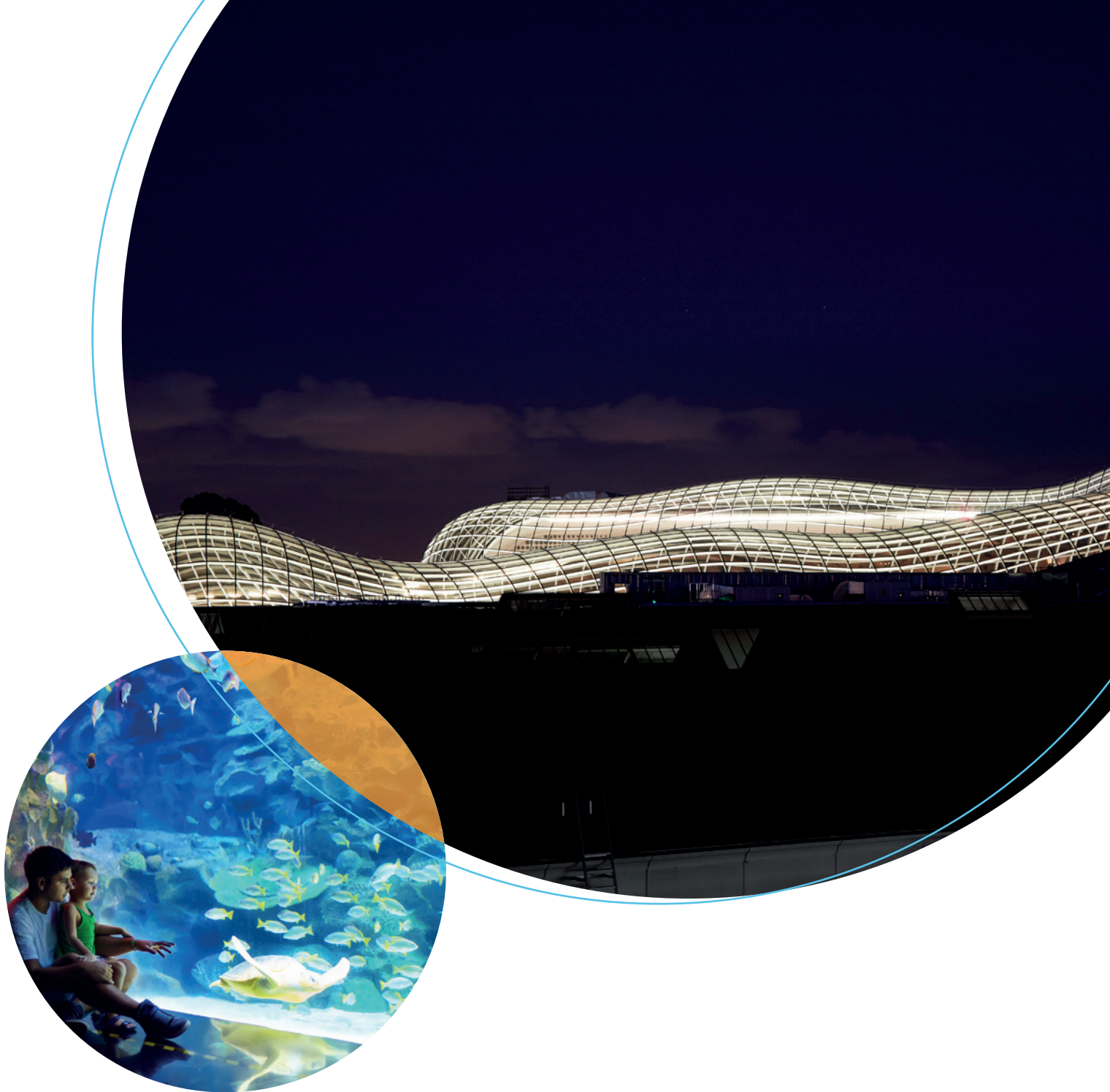
Our Service Portfolio



- ✚ Adhesion tests
- ✚ Material stress tests
- ✚ Compatibility tests
- ✚ Life cycle testing
- ✚ Modulus and Finite Element Analysis
- ✚ Market leading laboratory facilities
- ✚ On-site process assistance
- ✚ In house training
- ✚ Quality assurance programs

TECHNICAL CENTER OF EXCELLENCE

Our Technical Center of Excellence shows H.B. Fuller's commitment to the window and insulating glass industry. Here our customers can generate IG units for testing, try new processing conditions and simulate different systems for comparison – all without taking up valuable time on their own manufacturing lines. It also can be used as a training center to help customers better understand the capabilities of a line and how to use our products. We created this collaborative space to enable our technical and commercial teams to work alongside our customers testing new ideas and evaluating new products while demonstrating our world class capabilities.





 **H.B. Fuller** |  **KÖMMERLING** For more information about our company, visit www.hbfuller.com or www.koe-chemie.com

 Join the Conversation | www.hbfuller.com/connect

IMPORTANT: It is the user's responsibility to test and determine the suitability of a product for the user's intended use. Any product samples provided for testing are provided in accordance with standard limited warranties as stated on our technical data sheets.

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