Glass Performance Days 2025

10 – 12 JUNE 2025 | NOKIA ARENA - TAMPERE, FINLAND

GLASS PERFORMANCE DAYS 2025

THERMO PLASTIC SPACER - LONGEVITY

Process requirements
for optimal application

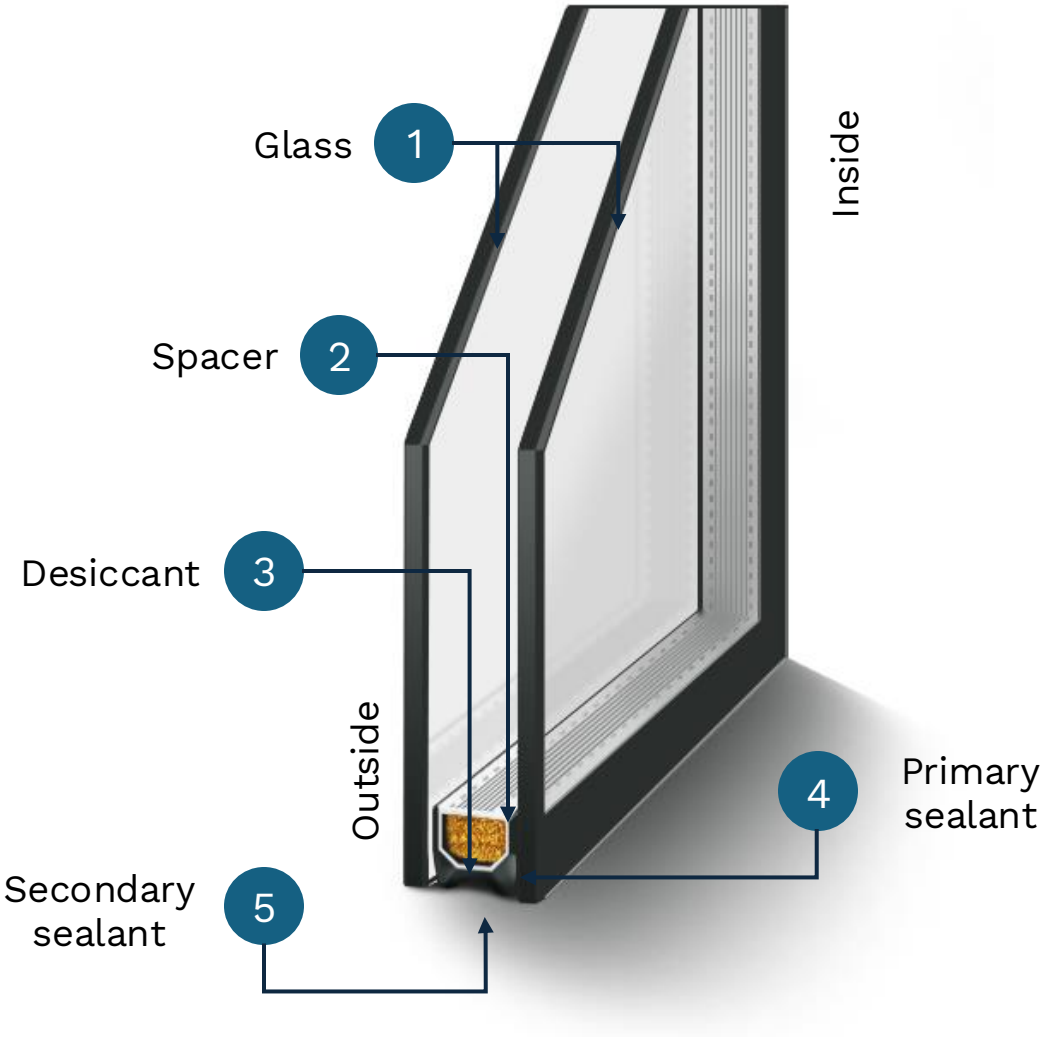
UWE RISLE / GLASTON GERMANY

Agenda

- Introduction - Insulating glass unit
- Application Process
- A reactive miracle
- Outlook & Summary

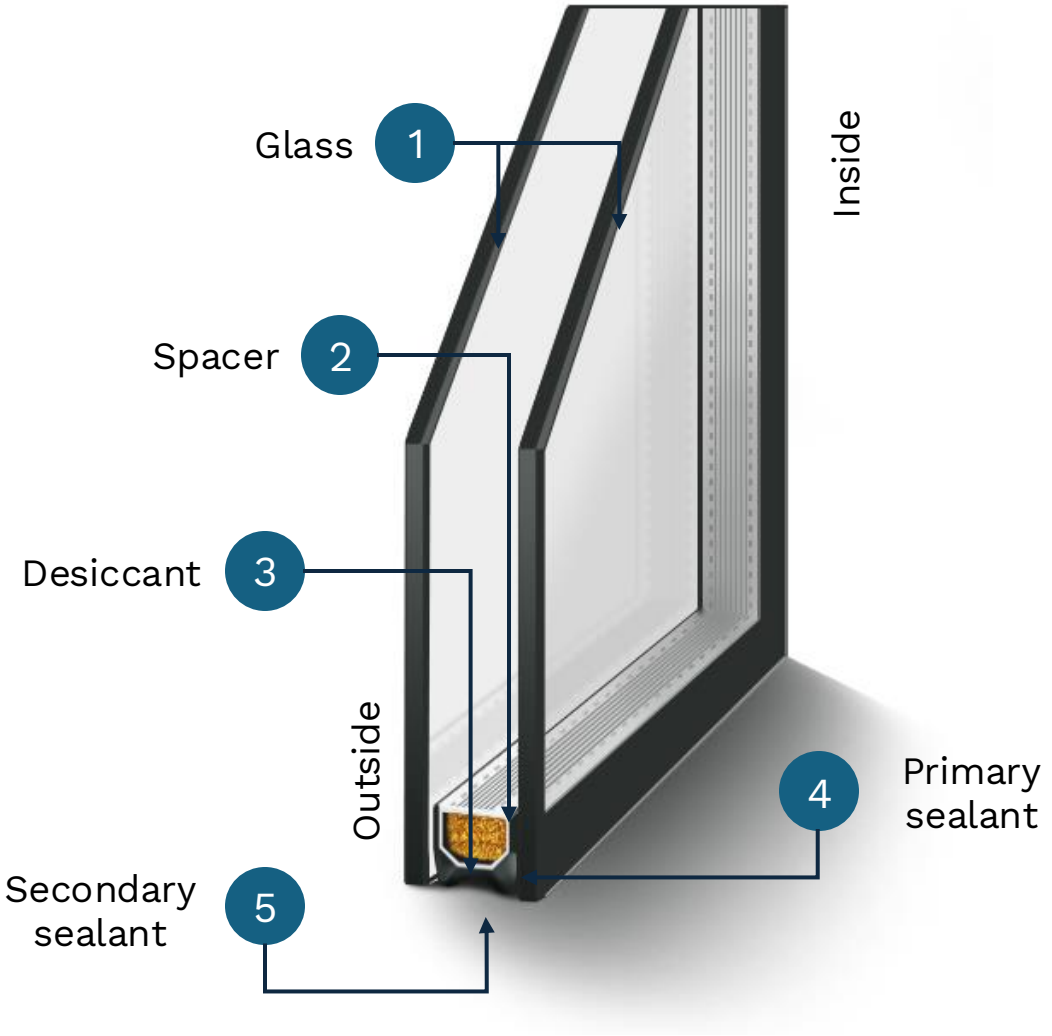
Insulating Glass Unit (IGU) – Components

1. Glass
2. Spacer
3. Desiccant
4. Primary sealant
5. Secondary sealant



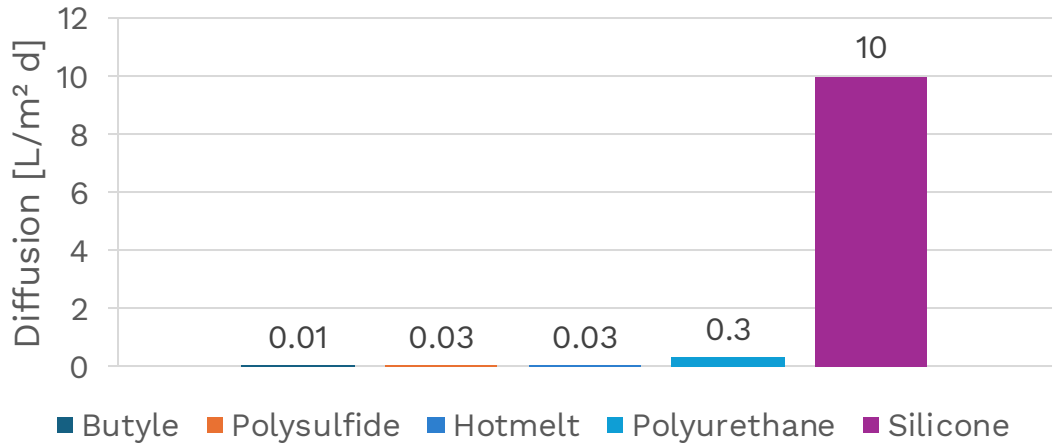
Insulating Glass Unit (IGU) – Gas Types

- Common air
  - Low insulating capability
  - Rare utilization
- Argon
  - Low price
  - Good insulating capability
  - Common utilized gas
- Krypton and Xenon
  - High price
  - High insulating capability

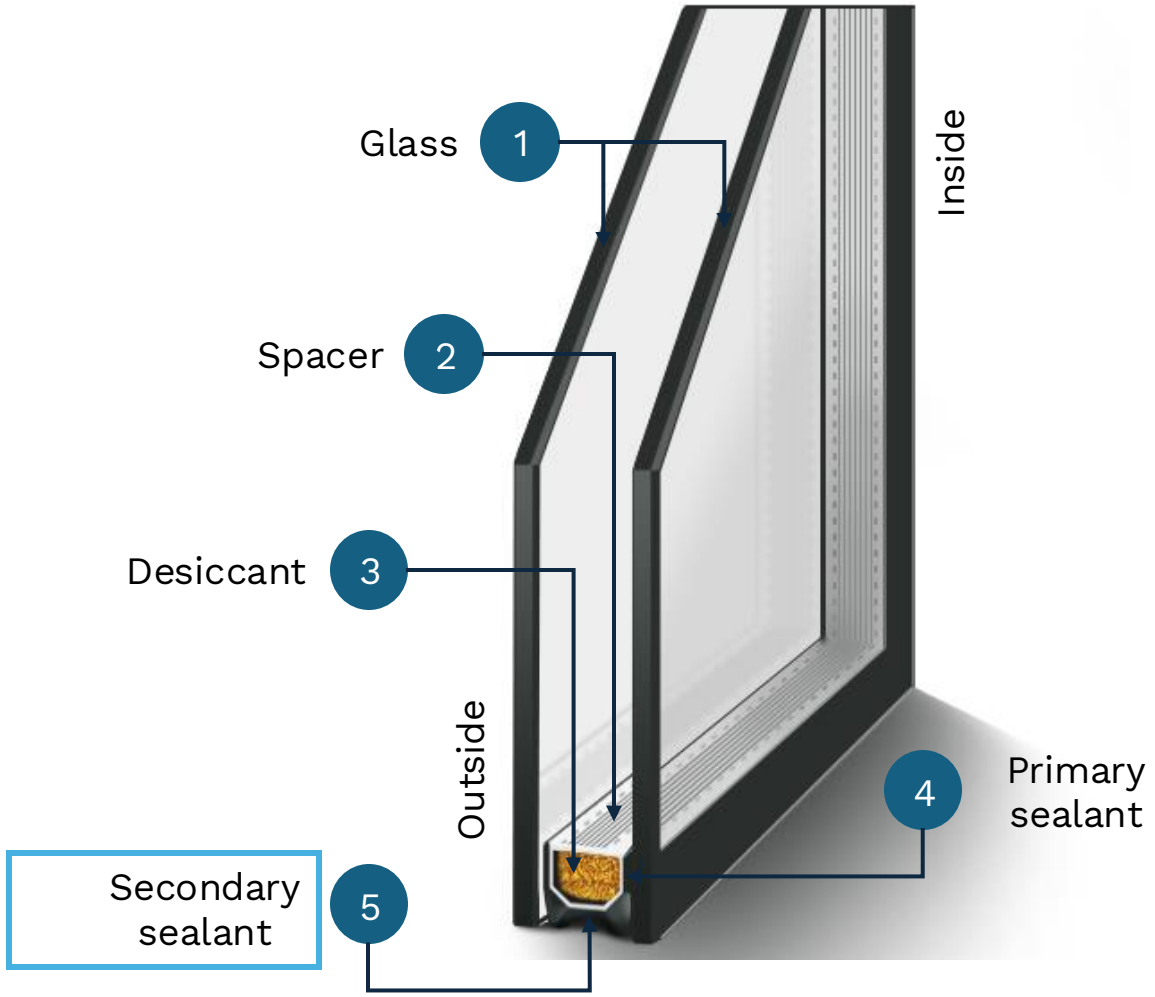


Insulating Glass Unit (IGU) – Sealant Types

Argon diffusion at different sealant types

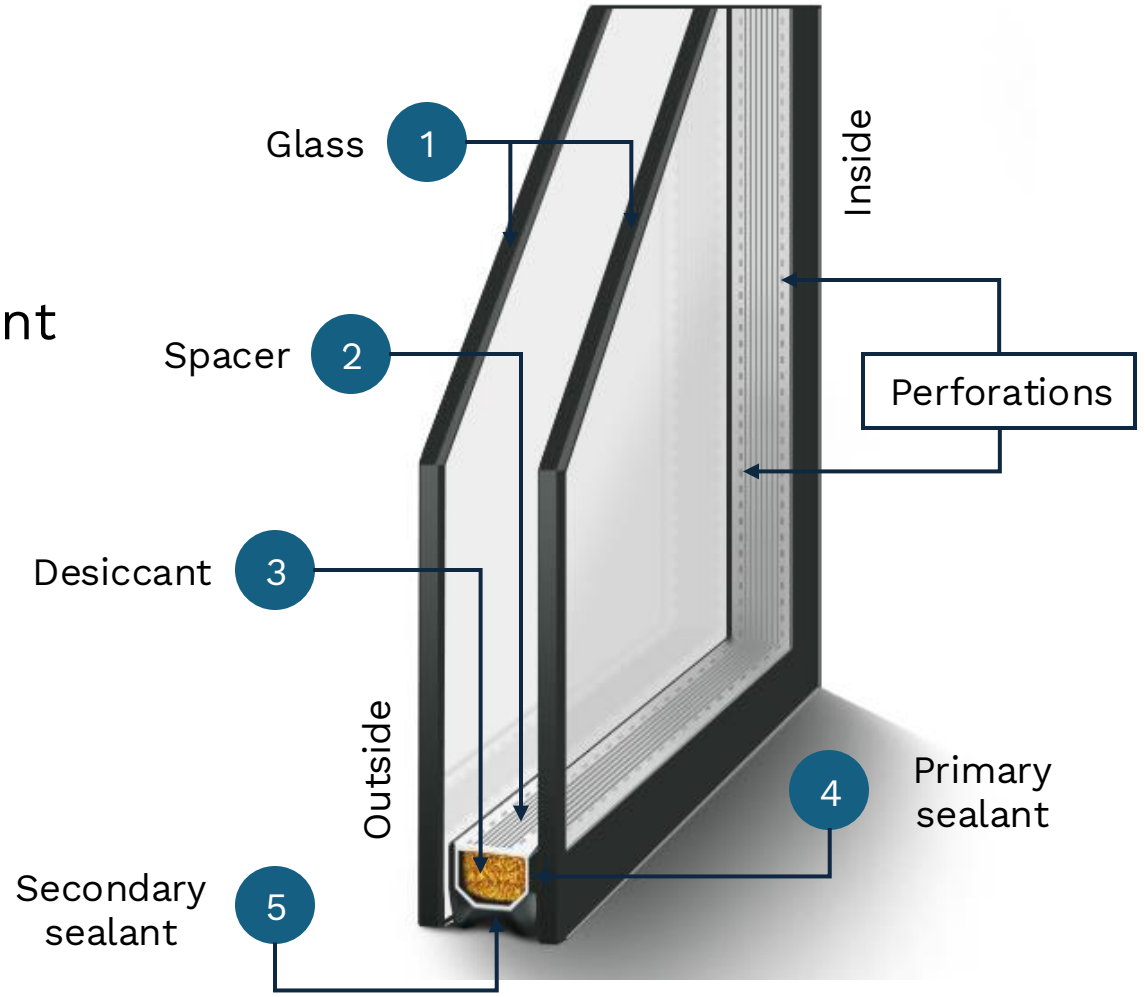


Sealant	Butyl	Polysulfide	Hotmelt	Polyurethane	Silicone
Factor	1	3	3	30	1000



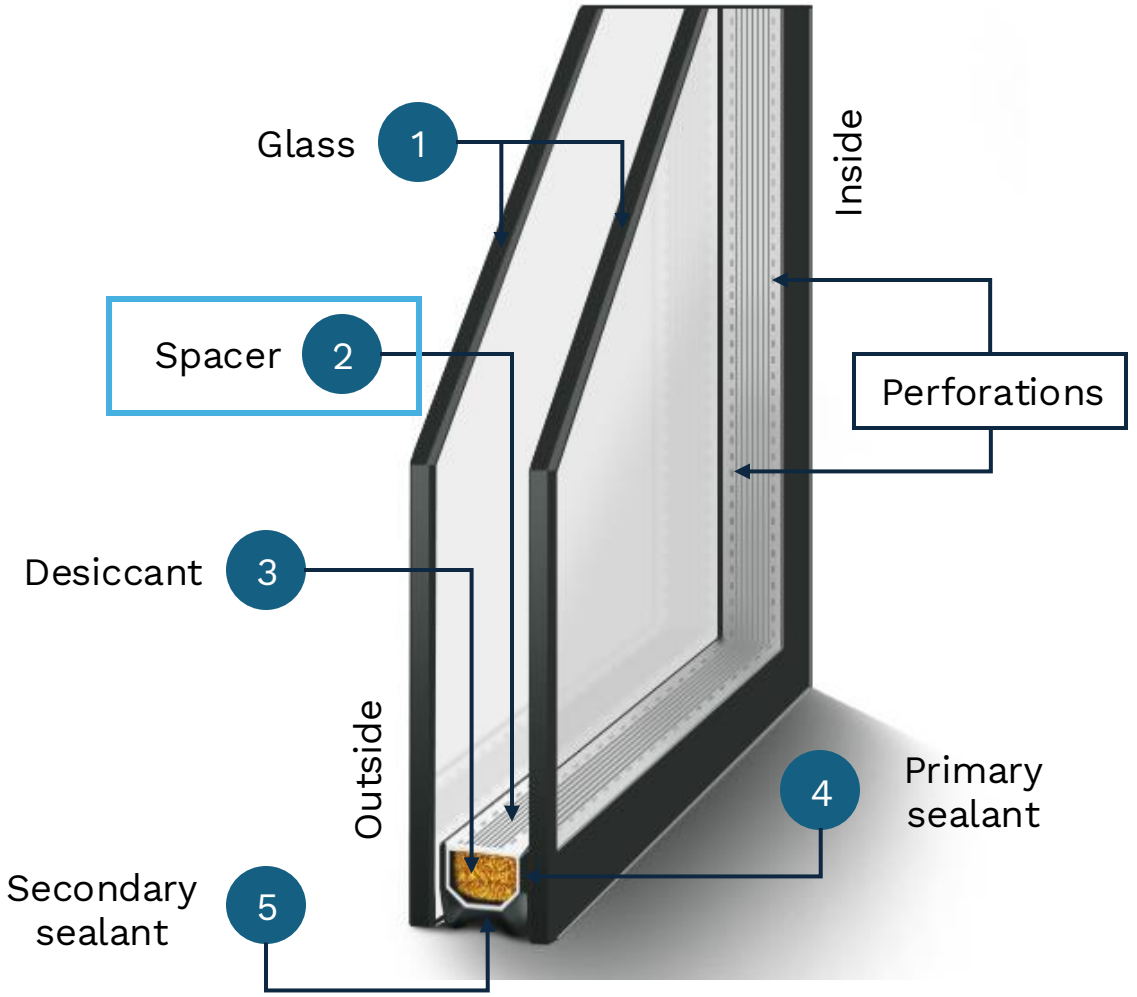
Spacer Functions

- Keeps distance between the glass plates
- Enables the absorption of humidity from the residual air percentage by the desiccant via applied perforations
- Be flexible in order to absorb the stress caused by thermal expansion and contraction

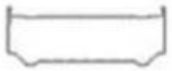
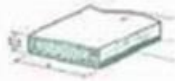


Insulating Glass Unit (IGU) – Spacer Types

Spacer types



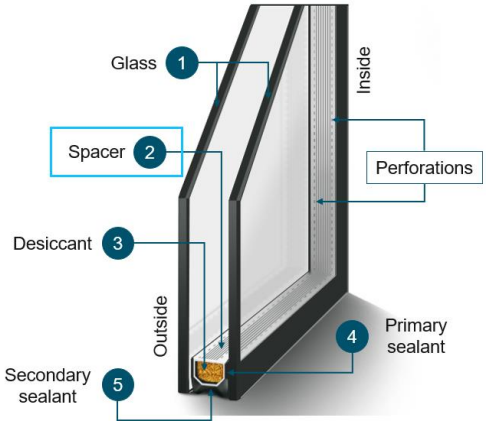
Insulating Glass Unit (IGU) – Spacer Types

Spacer	CHROMATECH plus	CHROMATECH	CHROMATECH ultra	Swissspacer	TGI	Thermix TXN	SS Triseal	TPS
								
Supplier	Rolltech	Rolltech	Rolltech	Saint Gobain	Technoform	Ensinger	Edgetech	Various Sealant Supplier
Spacer bar system	Homogeneous Stainless steel	Homogeneous Stainless steel	Stainless steel with PC bridge	Composit - plastic	Composit - plastic	Composit - plastic	Silicone foam	Thermoplastic
Insulating Material	SST 0,15 mm	SST 0,18 mm	Polycarbonate	Polycarbonate / fibreglass	Polypropylene	Polypropylene / fibreglass armed	Silicone with desiccant implemented	Isobutylen / desiccant
Damp barrier	SST 0,15 mm	SST 0,18 mm	SST 0,10 mm	SST 0.01mm / Alum Foil	SST 0,10 mm	SST 0,10 mm	Multilayer plastic spray	Isobutylen
Production technology	Roll forming	Roll forming	roll forming & connect with polycarbonat bridge	Extruded & separate foil application	SST/PP Co-extrusion	SST/PP-fibreglass co-extrusion	Extruded; separate Foil & Acrylic glue application	Lenhardt Robot application from drums
PSI value W/mK PVC frame	0,051	0,051	0,041	0,034 - 0,045	0,044	0,041	0,035	0,039
Remarks	Corrugated austenitic SST profile	Traditional austenitic SST standard profile	Austenitic SST shell & PC Top	Variations with different damp barrier foils & diff. Psi values	Ferritic steel & PP	PP Fiberglas & Glued Moisture barrier	Triseal with Butyl barrier - diff. Moisture barrier	Thermoplastic spacer

Box Spacer

Flexible Spacer

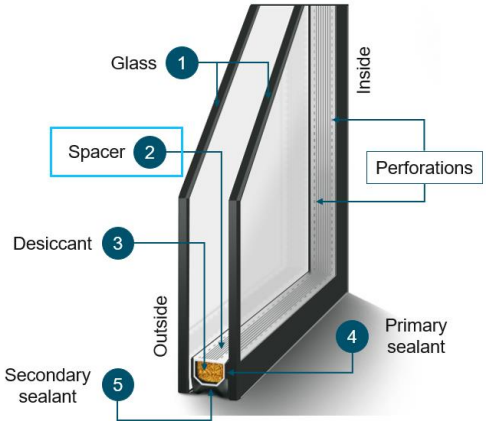
Applied Space



Insulating Glass Unit (IGU) – Spacer Types

TPS

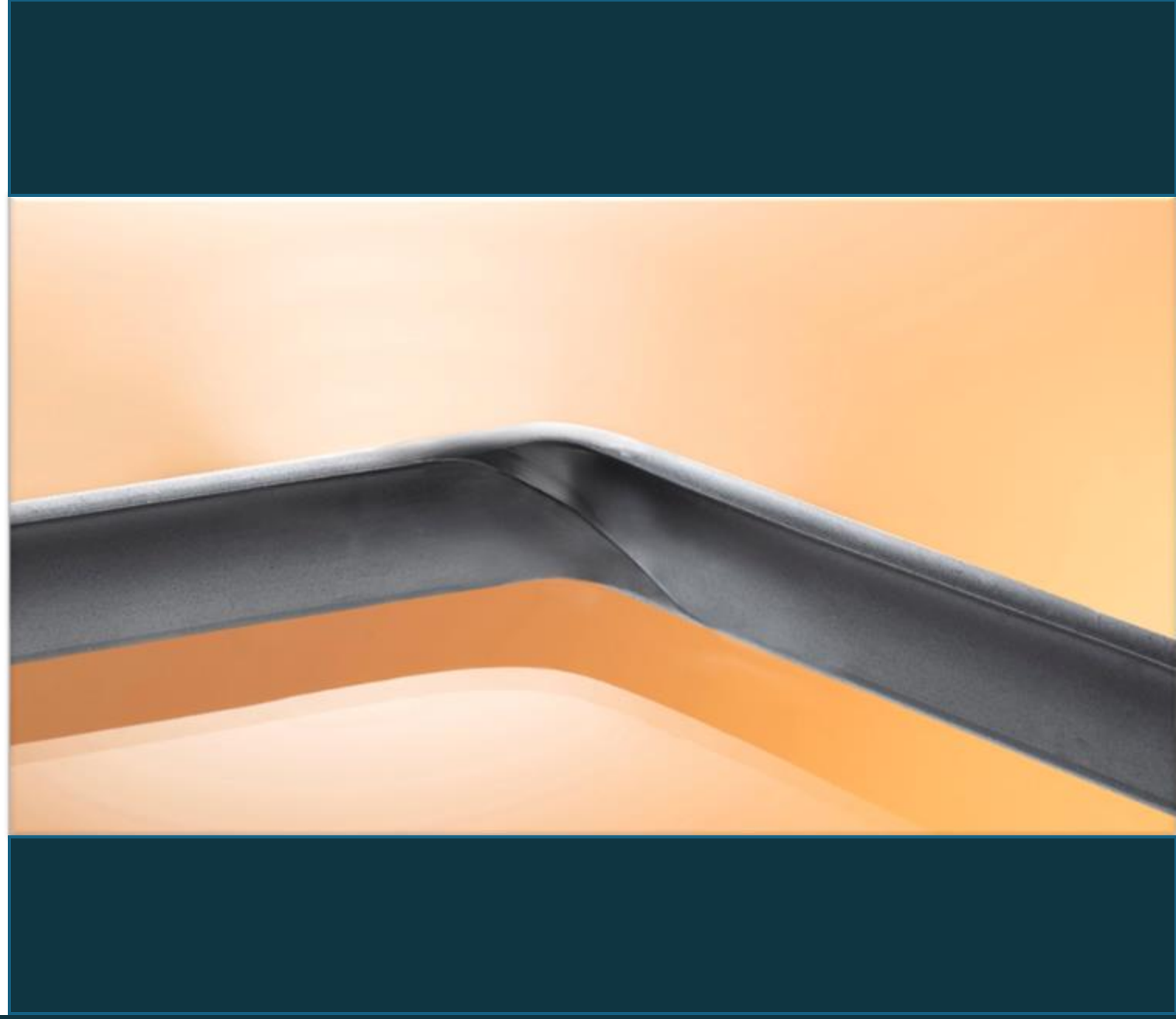
Various Sealant Supplier
Thermoplastic
Isobutylen / desiccant
Isobutylen
Lenhardt Robot application from drums
0,039
Thermoplastic spacer



Application Process

TPS® - Automatic Application Process

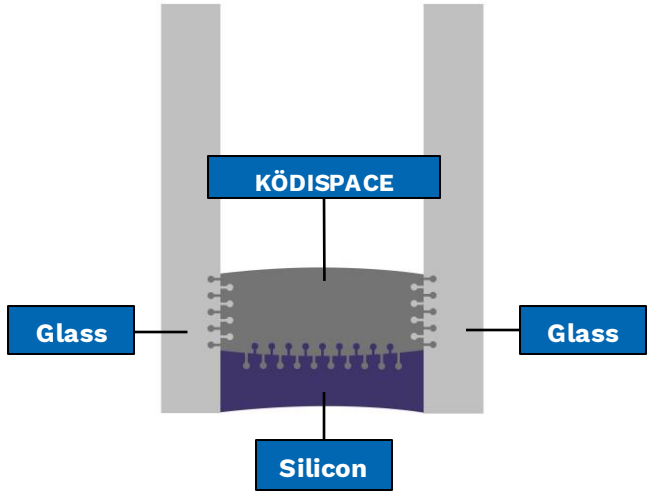
A reactive miracle

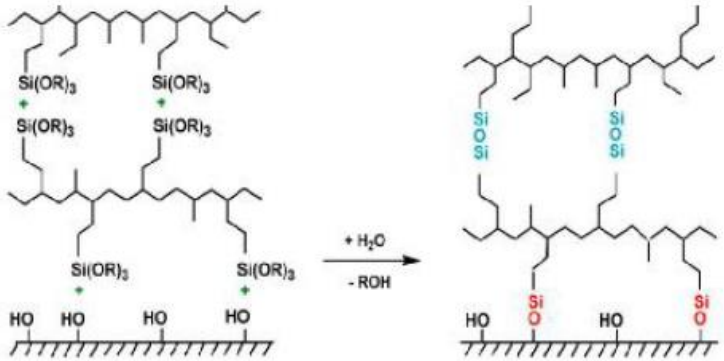


Thermo Plastic Spacer – A reactive miracle

Market leading warm edge technology

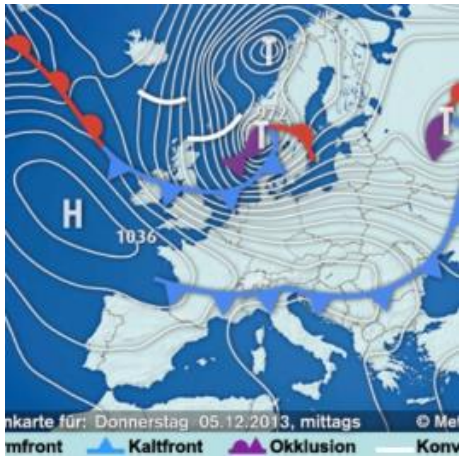
- One integrated system based on polyisobutylene
- Replaces conventional spacer, butyl primary sealant & desiccant
- Reactive (bonds chemically with glass and silicone secondary sealant)
- Dislocation of spacer is impossible
- Service temperature up to +90 °C
- Resistance to incompatible glazing materials

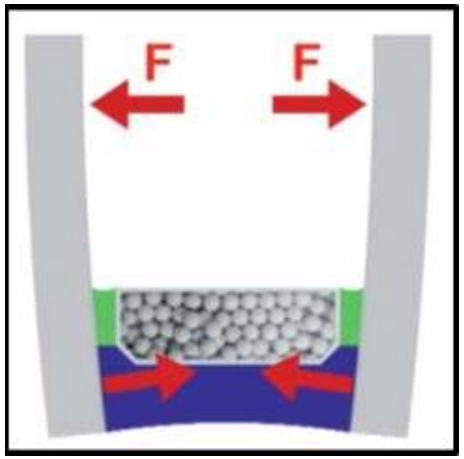




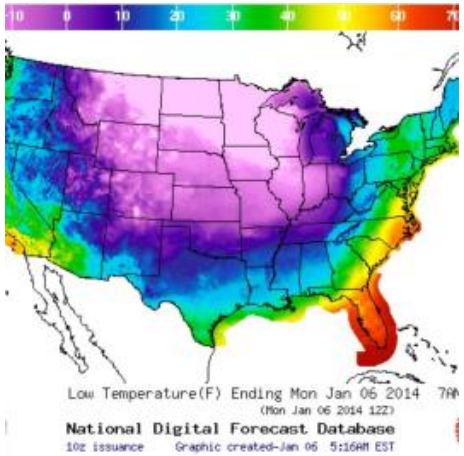
The Life of an IG Unit

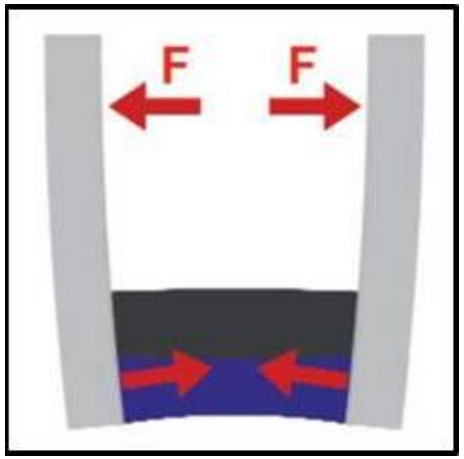
- Insulating glass façades endure multiple stressors
  - Temperature changes
  - Humidity extremes
  - Wind loads
  - Pressure differentials





- Leads to change within the IG unit
  - Edge seal strain and tension at temperature
  - Airspace volume change and glass deflection
  - Moisture vapor ingress
  - Differential thermal expansion of lites

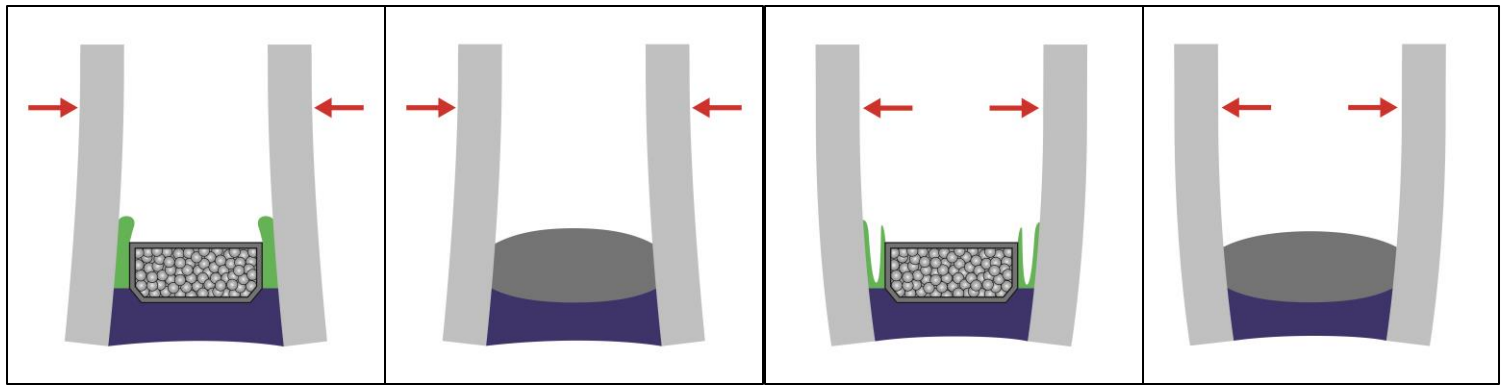




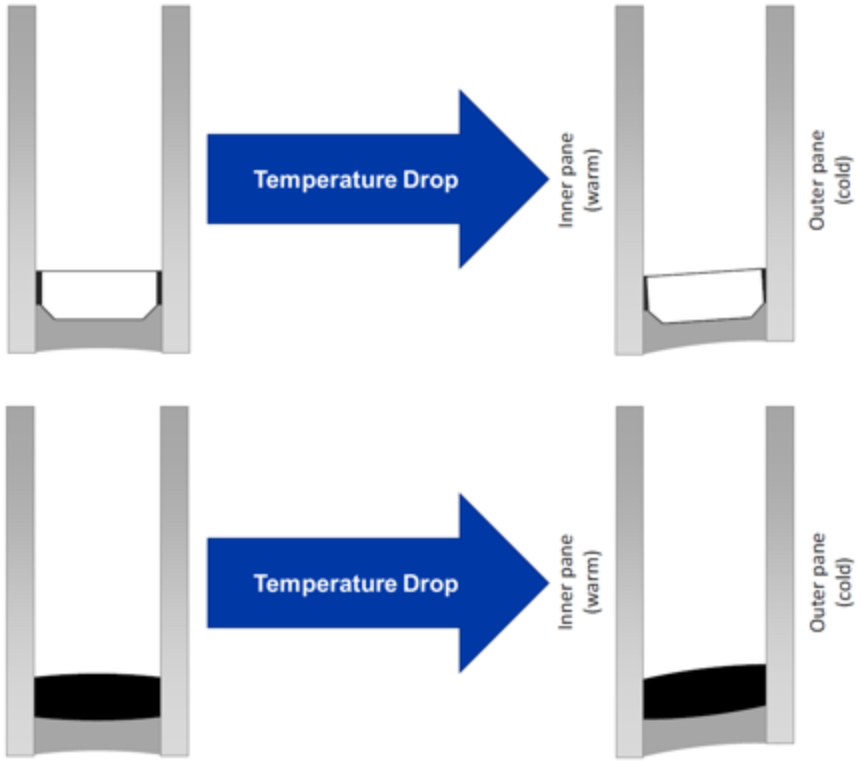
The Importance of Elasticity and Reactivity

- Stress results in strain in an IG unit
- Rigid spacer systems compensate through glass deflection and primary seal deformation
- Thermo Plastic Spacer can elastically deform and minimize glass movement
- Reactivity reduces vulnerabilities

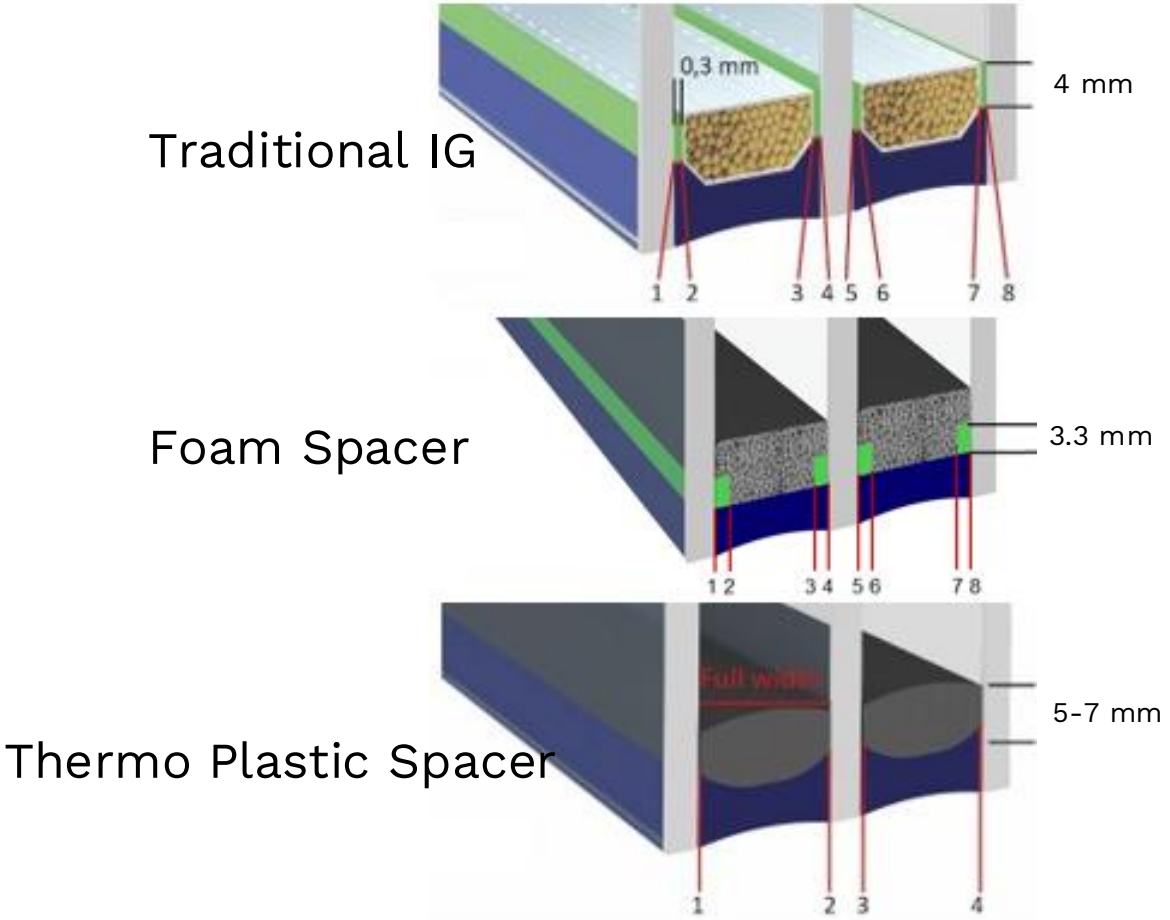
Improved stress and strain distribution = minimized chance of failure = longer service life



Better Moisture and Gas Barrier

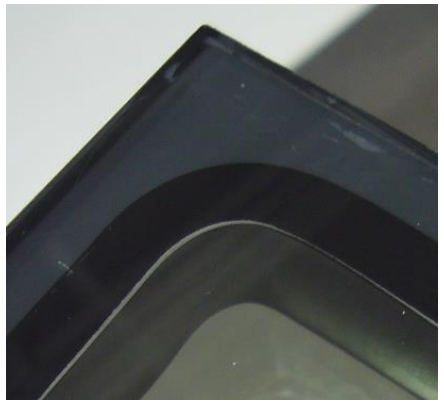


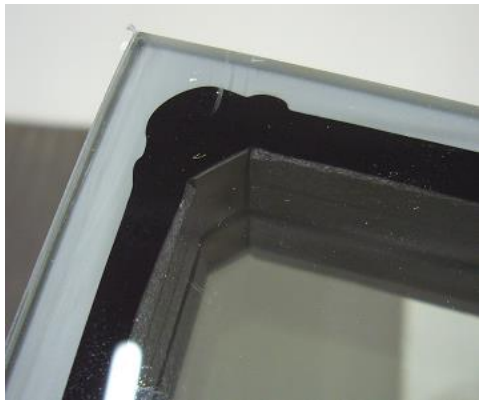
Able to compensate for thermal contraction

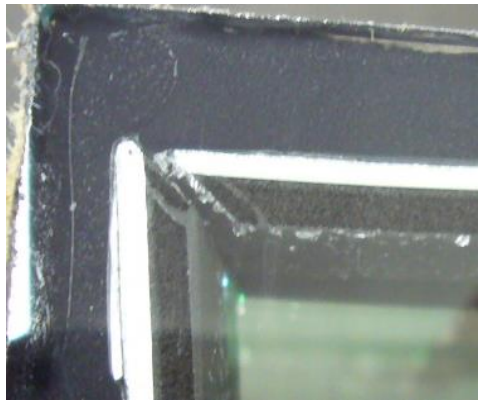


Fewer and longer paths for moisture and gas

Truly Sealed IGU







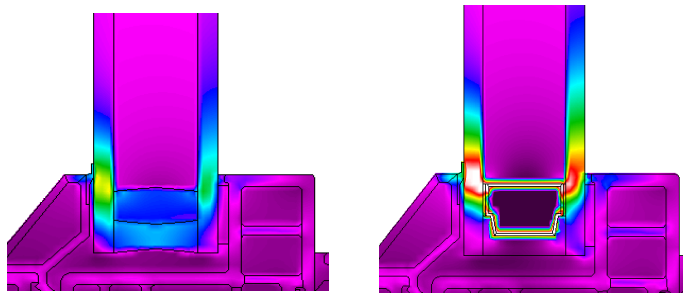
The TPS® joint overlaps and chemically bonds to itself, forming a continuous primary seal

The Hierarchy of IGU Thermal Performance

Gas Filling

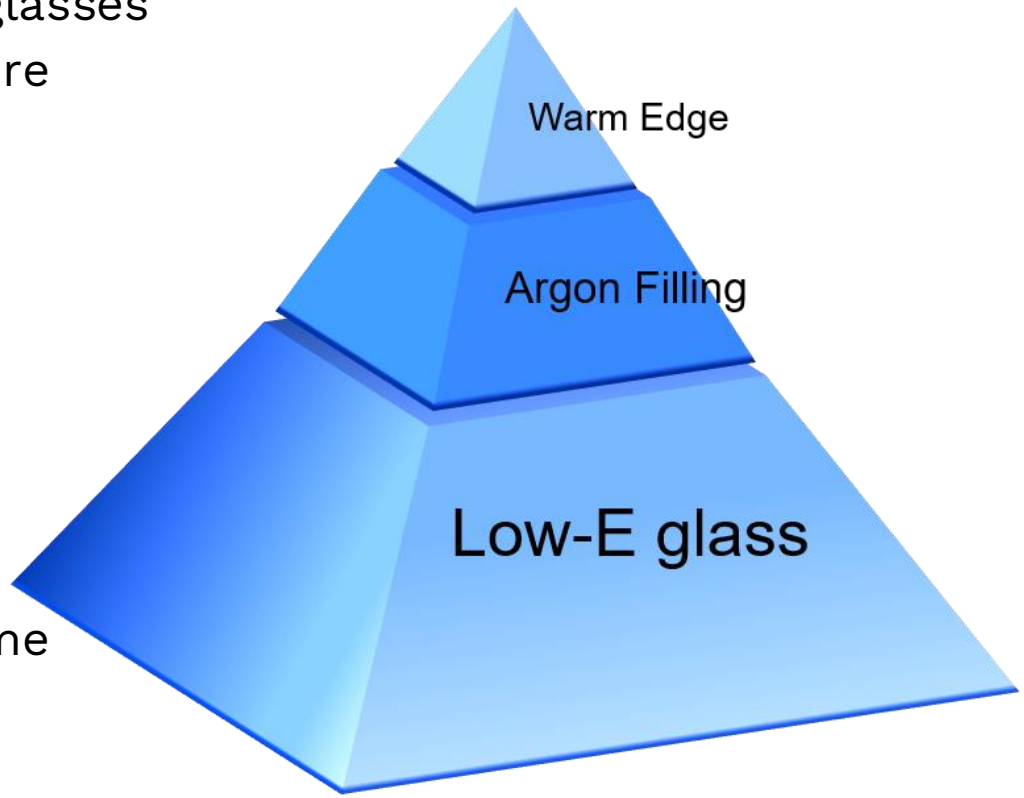
- Maximises the low emmissivity performance of coated glasses
- Protects against degredation of the coating from moisture
- Increases the thermal insulation value

Warm Edge



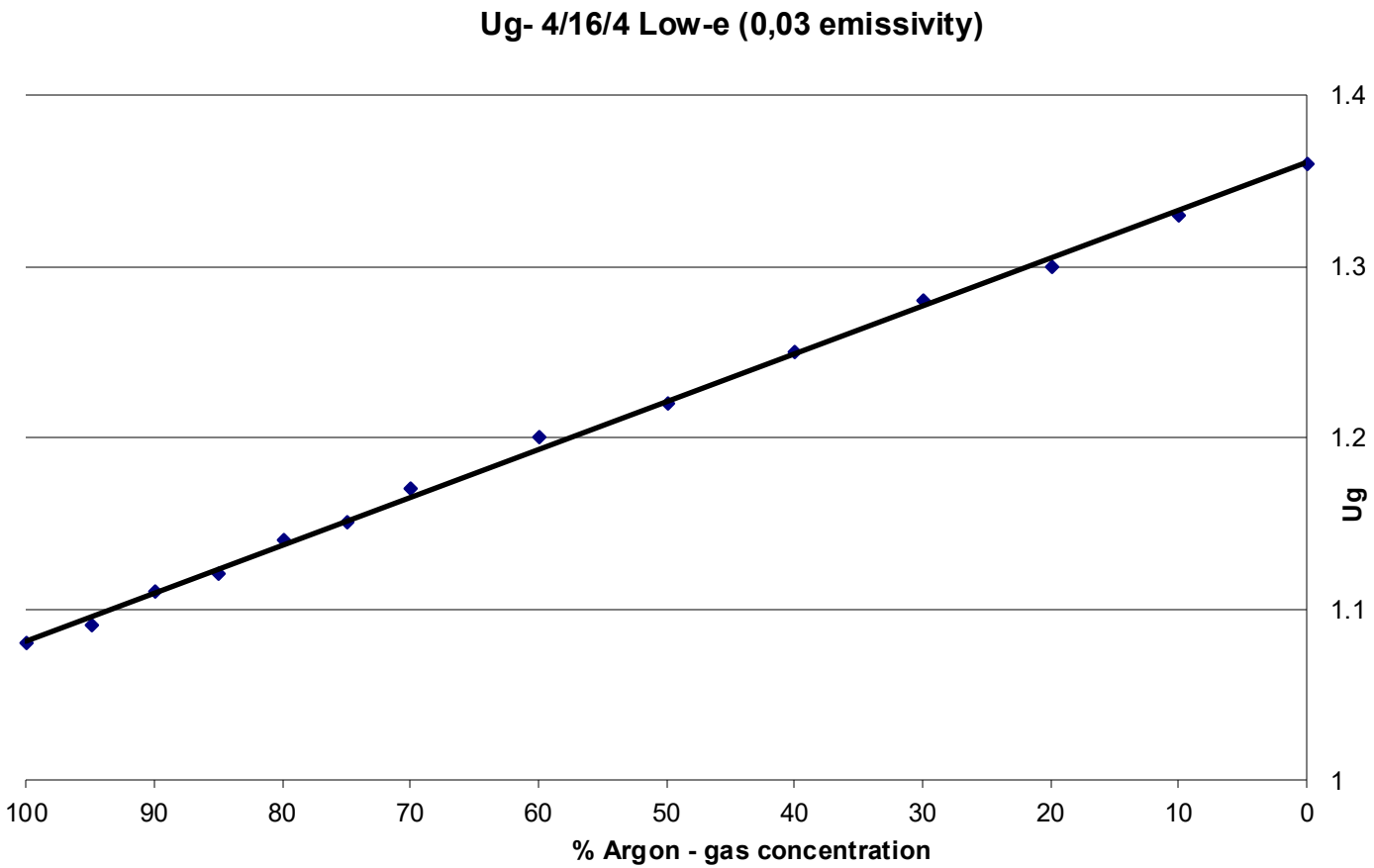
- Increases the insulation (Psi) value of the frame system
- Reduces negative thermal transmission through the frame
- Reduces condensation and mold spores

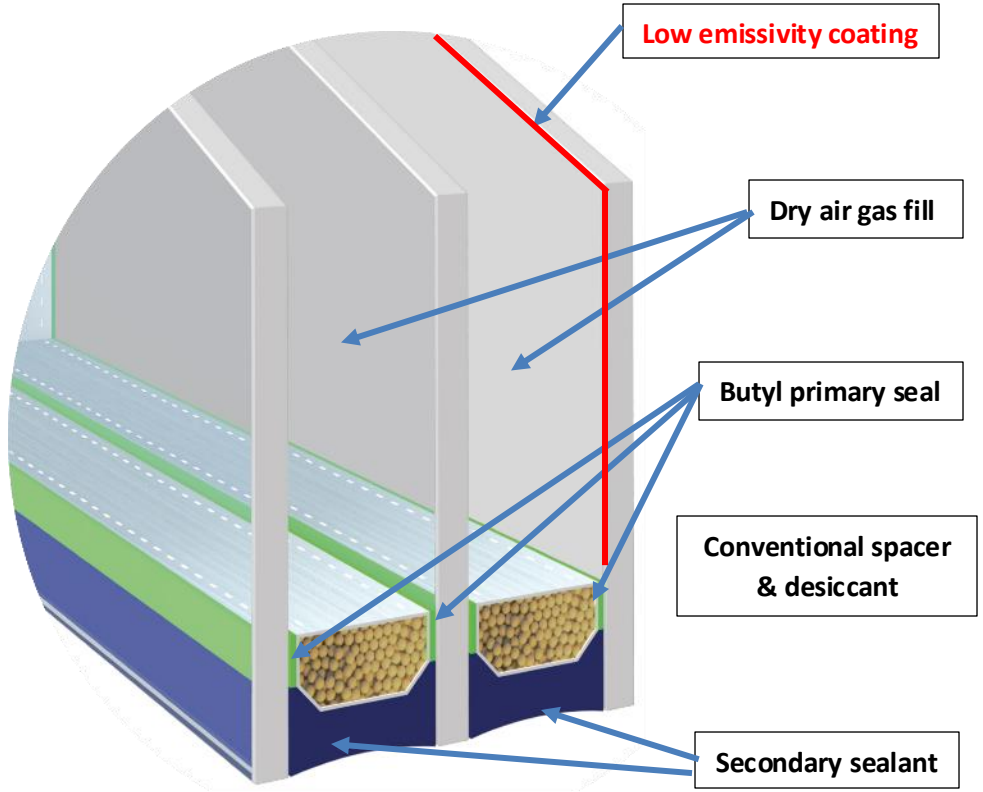
Relative Contribution to U-Value



Long term gas tightness is the key for long term energy efficiency

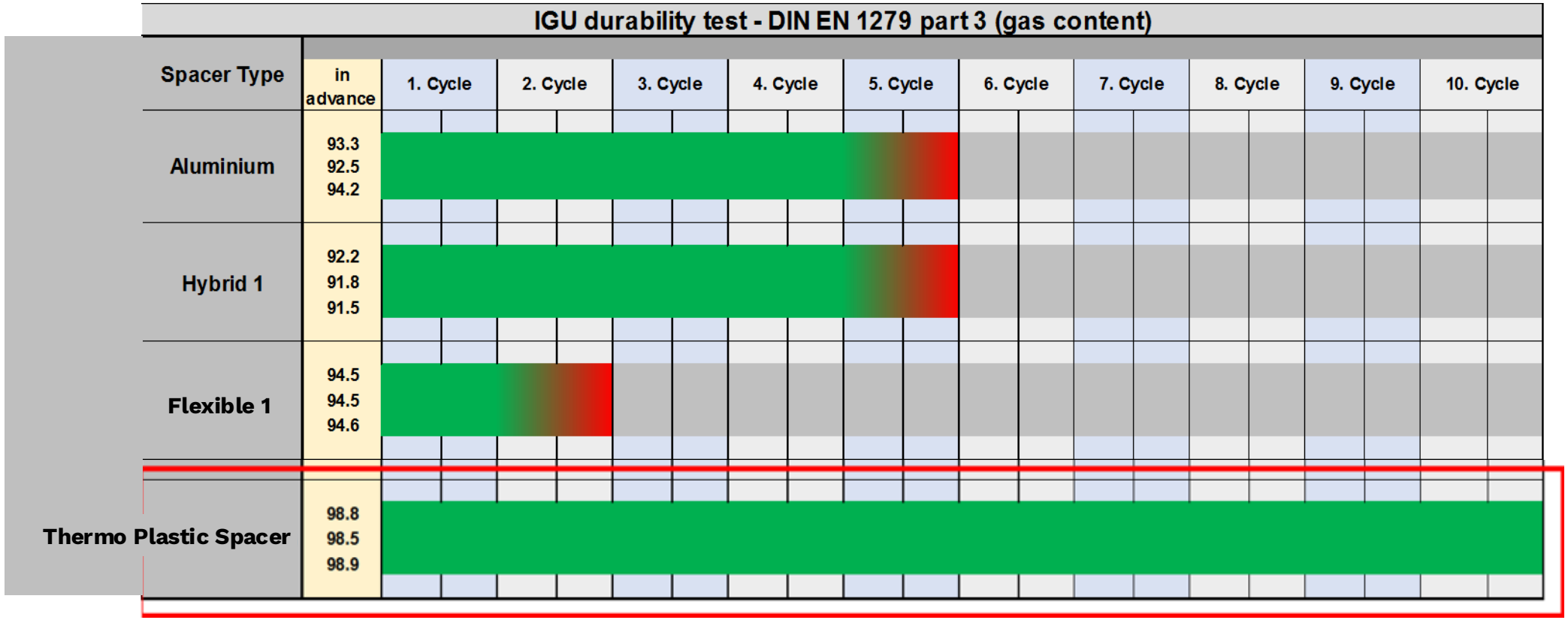
The Insulation Consequence of MVTR and Gas Loss





Correlation of Ug values against argon gas concentration*

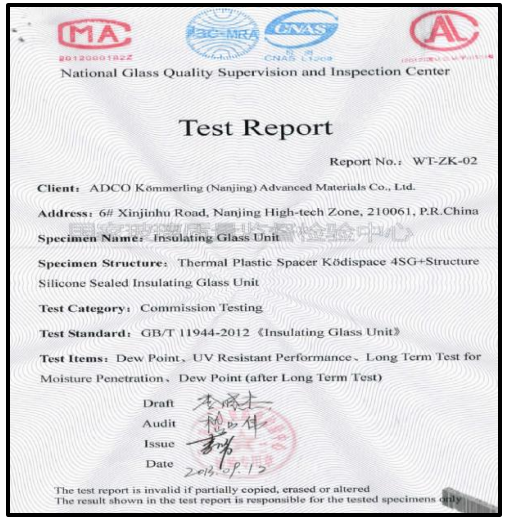
Thermo Plastic Spacer – Longevity Cavity Tightness



External Testing and Validation – EN1279

- Thermo Plastic Spacer EN1279-2 & EN 1279-3
  - Test results after five EN1279 p2 cycles
  - Simulates decades of IG performance

	Initial	Run 1	Run 2	Run 3	Run 4	Run 5
Dew Point [°C]	< -40	< -40	< -40	< -40	< -40	< -40
Moisture Penetration Index [%]	-	2.86	4.63	5.30	10.18	12.12
Argon Concentration [%, V/V]	**93.4**	**92.5**	**91.6**	**90.8**	**90.1**	**89.3**



National Glass Quality Supervision and Inspection Center

Test Report

Report No.: WT-ZK-02

Client: ADCO Kömmerling (Nanjing) Advanced Materials Co., Ltd.

Address: 6# Xinjinhu Road, Nanjing High-tech Zone, 210061, P.R.China

Specimen Name: Insulating Glass Unit

Specimen Structure: Thermal Plastic Spacer Ködispace 4SG+Structure Silicone Sealed Insulating Glass Unit

Test Category: Commission Testing

Test Standard: GB/T 11944-2012《Insulating Glass Unit》

Test Items: Dew Point、UV Resistant Performance、Long Term Test for Moisture Penetration、Dew Point (after Long Term Test)

Draft

Audit

Issue

Date

The test report is invalid if partially copied, erased or altered

The result shown in the test report is responsible for the tested specimens

Each run is 28 days of cycling -18ºC to +53ºC/95% RH
followed by 7 weeks at +58ºC/95% RH

Thermo Plastic Spacer – Tested in the Field

- Testing carried out across different locations of the 2017 building

	Argon Content %		
No.	2020	2021	2022
1	93.7	95.4	98.4
2	97.1	98	99.9
3	93	94.6	95
4	95.5	95.4	95
5	94.9	96	95.6
6	95.8	97.8	98
7	93.2	95.4	95.5
8	95.4	95.5	94.9
Average	94.8	96	96.5
	95.8		

Equipment

SparklikeHandheld™ Handheld gas analyzer

Main test site

Hall and emergency center of the Langyi Hospital, China

Thermo Plastic Spacer

The energy efficient system

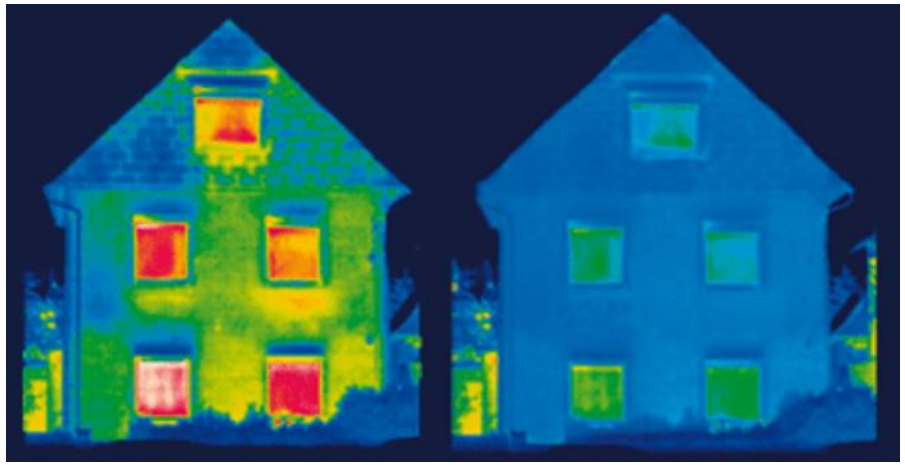
Best U-Values minimizing energy loss by:

- Low conductivity
- Highest gas tightness
- Warm edge spacer system like TPS®

No coating

Argon gas

Aluminum spacer



Low E coating

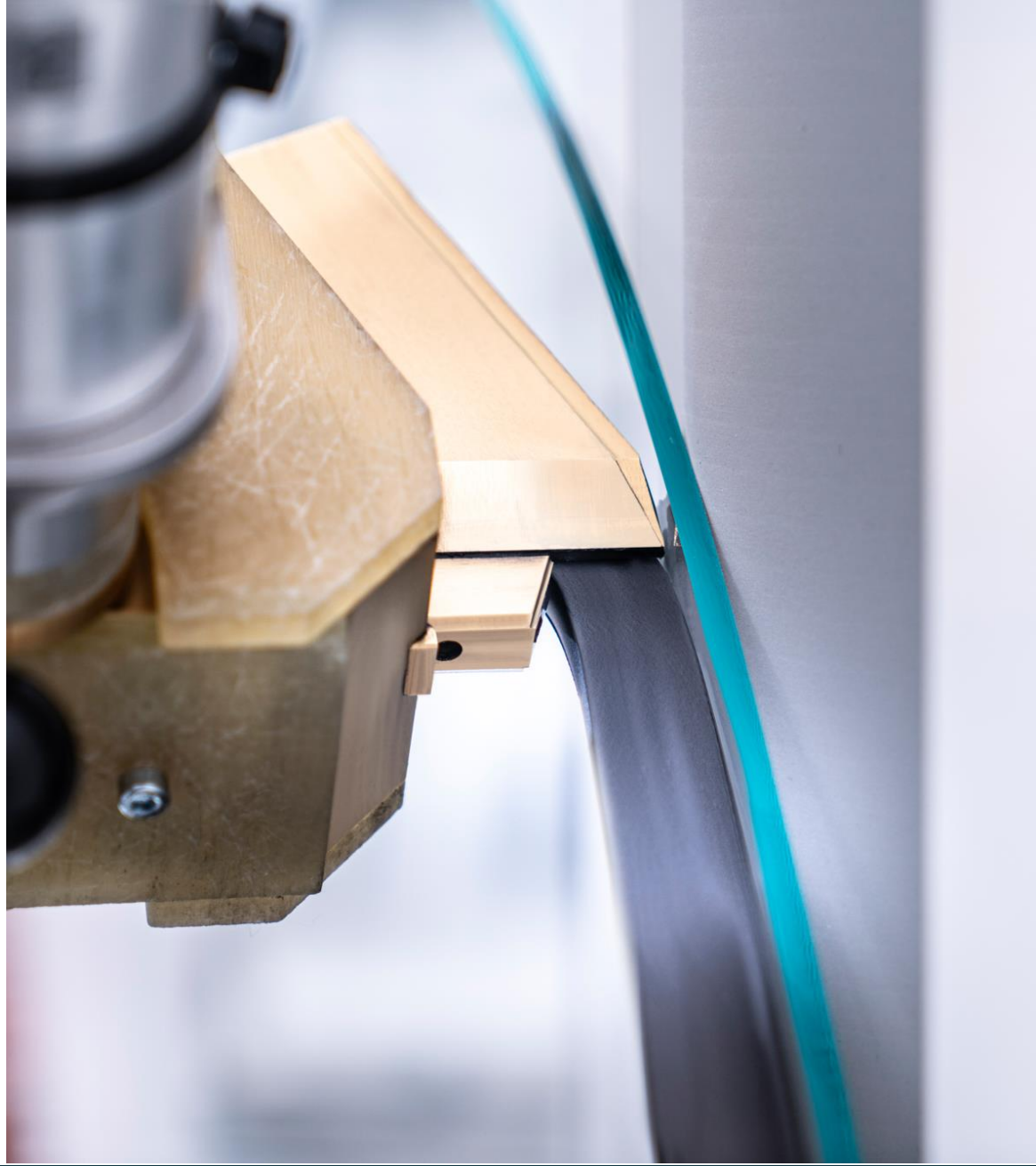
Argon gas

Warm edge spacer

Source: energie-bau (2010)

Summary
Thermo Plastic Spacer – Longevity

- Solution to meet the requirements for the future in manufacturing of insulating glass due to lean production
- Increasing requirements in energy efficiency worldwide
- High insulation effect, maximum energy efficiency
- Due to the excellent properties of the material, 4SG TPS® also was established in the solar industry



> www.glaston.net

Thank You!

glaston
seeing it through®