Helima GmbH | Am Deckershäuschen 62 | 42111 Wuppertal

Usability vs. Ψ value – which warm edge spacer is the right one?

Dear Sir or Madam,

More and more of our customers have been saying recently that only the Ψ value matters to window manufacturers and architects when it comes to choosing the right spacer system. People even talk about the "Ψ Value Olympics" and the "apparent accuracy of Ψ value calculations".

This often means that our customers have to stock lots of different spacer systems, production processes are not efficient enough, and window manufacturers are inadequately advised about the right spacers for their actual applications. Spacers are chosen almost exclusively on the basis of their Ψ values, and qualitative differentiations are no longer made. The usability of spacer systems gets completely ignored. This has prompted us today to discuss what we consider to be the key factors when evaluating spacer systems properly.

As you know, we firmly believe that stainless steel spacers, proven over decades, are the best warm edge products on the market because they combine usability with very good Uw values.

To show you and your customers just how little impact the Ψ value has in practice, we compared common warm edge spacer types in terms of kWh consumption for a detached house with a window area of 30 m^2. As you can see from the attached spreadsheet, whichever spacer system you use, the differences in heat loss are remarkably small in actual USD and cents. In this practical example, there is an **energy cost difference of just $0.65 per month and per house** between the best Ψ value (0.031) and the worst (0.051). Even compared with a conventional aluminum spacer, the saving is just $1.48 per month – and remember, that's for the whole house, not just one window.

In our view, however, there are considerable differences in how easy the various spacer system categories are to use. This we have also made clear in the table. For years, various committees and working groups of the Bundesverband Flachglas e.V. (German Flat Glass Association), of which we are also a member, have been trying in collaboration with the ift Rosenheim (Institute for testing and certification of building products, safety technology and protective equipment), and Ingrid Meyer-Quel (warm edge and glass consultancy) to define usability values in new guidelines that consider factors such as UV resistance, thermal linear expansion, storage, diffusion resistance, and so on. But all the while, limits are being extended so as to maintain the marketability of plastic spacers, and probably also so that establishments do not lose their positions as advisory institutions to the insulating glass industry.

Right back in April 2017, Ingrid Meyer-Quel wrote in an article in industry magazine *Glaswelt*:

"...A low-performance warm edge improves the Uw value over aluminum spacers by just 0.08 W/(m²·K); mid-performance systems improve it by 0.1 W/(m²·K); high-performance spacers achieve another 2/100, i.e. 0.12 W/(m²·K). To some this is 'hardly any difference', while for certain marketing and sales departments, these figures differ wildly...
...Note once again that although thermal superiority is the argument most frequently deployed in the daily battle for market shares, it is but one of many performance criteria which a serviceable spacer system must fulfill over the entire service life of an insulating glass unit.

... The market would be well advised to assess facts prudently and objectively when selecting profiles for use, and not to be lured into dangerous risks by promises and grandiose marketing statements..." Source: Ingrid Meyer-Quel, Glaswelt 04.2017, pages 96–98, excerpt.

In our view, there has not been enough discussion about just how limited the financial impact of Ψ values is on end consumers. Or about just how much time and expense the Ψ value hysteria of recent years has cost you as an insulating glass manufacturer. And throughout all this, stainless steel spacers have been available for decades as an ideal warm edge product which fulfills every essential requirement excellently and protects you long term against warranty claims and refund demands.

Our industry should be concerned about the long-term stability and functionality of insulating glass panes, beyond just the usual warranty period. In view of climate change, performance parameters – especially UV resistance and thermal linear expansion under the influence of heat – should be properly defined rather than generously interpreted.

We look forward to our discussions with you.

Kind regards,

Helima GmbH
Management

Ralf Schöpker

Bastian Breitenfellner

Enclosed: comparative overview of spacer systems for insulating glass production.

PROFILE YOUR PERFORMANCE

Comparative overview of spacer systems for insulating glass production.

	Helima AluTec	Helima NiroTec 017	Chromatech	Chromatech Plus	GTS	Chromatech Ultra F	Chromatech Ultra S	TGI Spacer M	Thermix TX Pro	Swisspacer Ultimate	Swisspacer Advance	Super Spacer TruPlas	Thermobar	Multitech	Tecatherm LowPsi	TGI Spacer Precision
Spacer edge sealant	**Aluminum**	**Stainless steel**				**Stainless steel / plastic**				**(Glass fiber reinforced) plastic with film**						
Ψ value double glazing*	0,077	0,049	0,051	0,049	0,047	0,039	0,040	0,040	0,040	0,032	0,039	0,033	0,032	0,031	0,032	0,032
U_w value W/m^{2}K**	1,321	1,253	1,258	1,253	1,248	1,229	1,231	1,231	1,231	1,212	1,229	1,214	1,212	1,209	1,212	1,212
Heat loss kWh/house p.a.***	1.605,02	1.522,40	1.528,47	1.522,40	1.516,32	1.493,24	1.495,67	1.495,67	1.495,67	1.472,58	1.493,24	1.475,01	1.472,58	1.468,94	1.472,58	1.472,58
Cost kWh gas €	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068	0,068
Cost heat loss p.a. €	109,14	103,52	103,94	103,52	103,11	101,54	101,71	101,71	101,71	100,14	101,54	100,30	100,14	99,89	100,14	100,14
ø cost heat loss / month €	9,10	8,63	8,66	8,63	8,59	8,46	8,48	8,48	8,48	8,34	8,46	8,36	8,34	8,32	8,34	8,34
Usability****																
Thermal linear expansion	√√√	√√√				√√√				√√						
Pressure stability	√√	√√				√√				√√√						
UV stability	√√√	√√√				√√				√√						
High-humidity storage	√√√	√√√				√√				√						
Aging / climate change	√√√	√√√				√√				√√						
Flexure properties	√√√	√√√				√√√				√						
Molecular sieve fill quantity	√√√	√√√				√√				√√						
Perforation openings	√√√	√√√				√√				√√						
Finishes / colors / low volume production	√√√	√√√				√				√√						
Static charging / dust formation	√√√	√√√				√				√√						
Diffusion resistance	√√√	√√√				√√√				√√						
Machinery required	√√√	√√√				√√√				√√						

* Source for warm edge spacers: Window Psi value data sheets www.bundesverband-flachglas.de, representative plastic frame profile

** $U_w = \frac{A_g \times U_g + A_f \times U_f + l_g \times \Psi_g}{A_w}$ $U_w = \frac{1.211 \times 1.0 + 0.610 \times 1.4 + 4.424 \times \Psi g}{1,82}$

*** Detached house, 30 m^2 window area, heating period 180 days, 15 h/day, 15°C temperature difference

**** Selected properties for gaging the usability of spacer systems

Helima GmbH, Am Deckershäuschen 62, 42111 Wuppertal, info@helima.de, tel. +49 (0)202 70 94 0

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