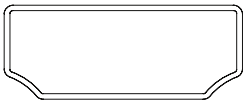
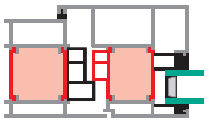
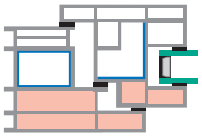
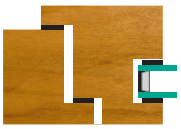
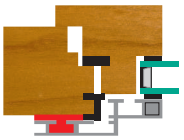
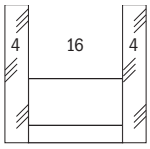
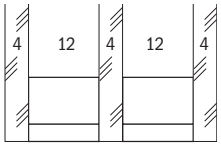
Data sheet Psi values for windows

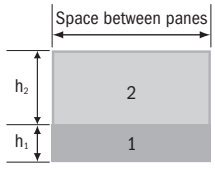
based on determination of the equivalent thermal conductivity of spacers by measurement

ROLLTECH A/S - an Alu-Pro Group Company

Rolltech A/S
W. Brüels Vej 20
DK - 9800 Hjørring

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Chromatech*** 	6.5	Stainless steel	0.18

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.068	0.051	0.053	0.059
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.066	0.050	0.054	0.060

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.81

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

Hochschule **Rosenheim** University of Applied Sciences

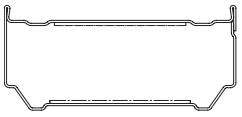
ift ROSENHEIM

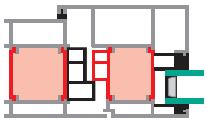
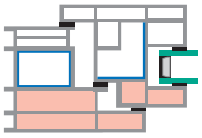
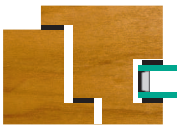
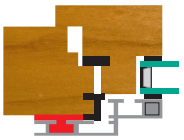
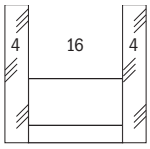
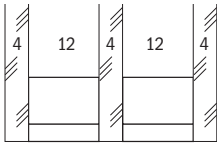
Data sheet Psi values for windows

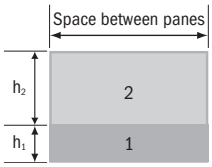
based on determination of the equivalent thermal conductivity of spacers by measurement

ROLLTECH A/S - an Alu-Pro Group Company

Rolltech A/S
W. Brüels Vej 20
DK - 9800 Hjørring

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Chromatech Plus*** 	7.0	Stainless steel	0.15

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.064	0.049	0.051	0.056
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.060	0.048	0.051	0.056

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 7 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.61

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

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University of Applied Sciences

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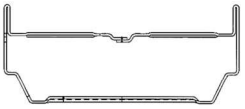
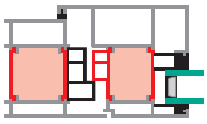
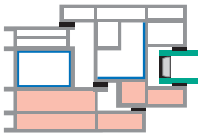
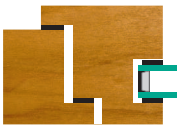
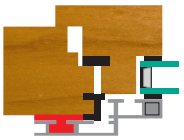
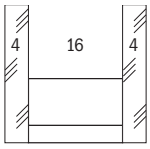
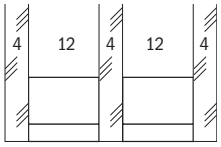
Data sheet Psi values for windows

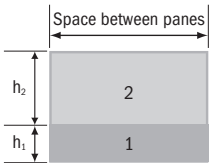
based on determination of the equivalent thermal conductivity of spacers by measurement

ALLMETAL GmbH®

Allmetal GmbH
Junkerstr. 8
D - 04509 Wiedemar

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	**GTS** 	6.5	Stainless steel	0.15

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.061	0.047	0.049	0.053
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.057	0.046	0.049	0.053

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.59

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

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April 2013 – No.4 – Revision index 2

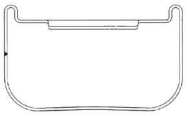
Data sheet Psi values for windows

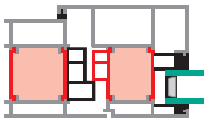
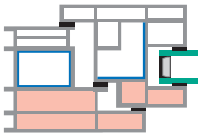
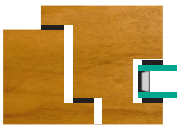
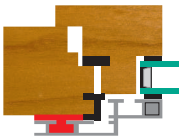
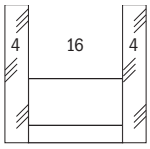
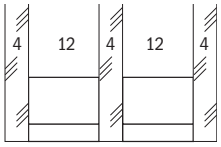
based on determination of the equivalent thermal conductivity of spacers by measurement

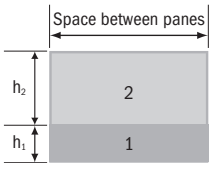
Lingemann-Gruppe HELIMA Profilierte Lösungen

Helmut Lingemann GmbH & Co. KG
Am Deckershäuschen 2
D - 42010 Wuppertal

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Nirotec 017*** 	7.0	Stainless steel	0.17

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.065	0.049	0.052	0.056
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.061	0.048	0.052	0.057

Two Box model Characteristic values		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 7.0 mm
		Can be used for all spacer widths	0.40	0.64

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:
Hochschule Rosenheim University of Applied Sciences
ift ROSENHEIM

October 2008 – No.6 – Revision index 1

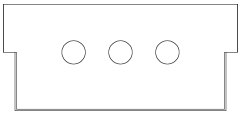
'WARM EDGE' WORKING PARTY

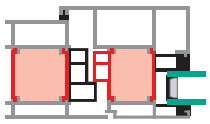
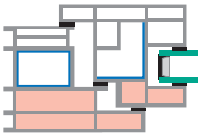
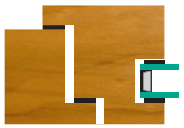
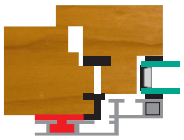
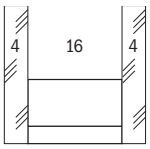
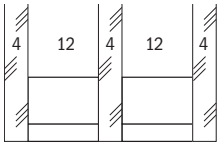
Data sheet
Psi values for windows

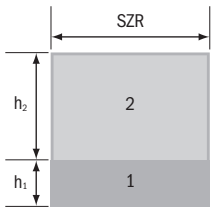
Edgetech

Edgetech Europe GmbH
Erftstraße 22-24
D - 41460 Neuss

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thermal conductivity λ in W/mK	Thickness d in mm
Cross-section	**Super Spacer TriSeal** 	7.3	Mylar foil Silicone foam	1.1 0.16	0.10 7.2

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.041	0.035	0.034	0.037
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.036	0.033	0.032	0.035

Two Box model Characteristic values	Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
		Box 1 · h_1 = 3 mm	Box 2 · h_2 = 7.3 mm
	16	0.40	0.18
	12	0.40	0.18

Explanations

The representative linear heat transfer coefficients (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficients U_w of windows. They have been determined using the boundary conditions (frame profile, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/1 "Thermally improved spacers - Part 1: Determination of the representative psi values for window frame profiles". This directive also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given to 0.001 W/mK. The method used for the arithmetic determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant.

Characteristic values determined by:

Hochschule Rosenheim
University of Applied Sciences

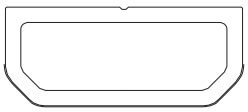
ift ROSENHEIM

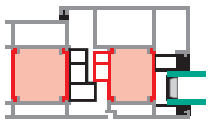
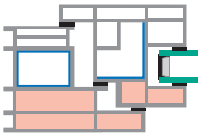
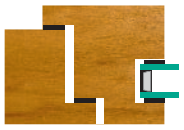
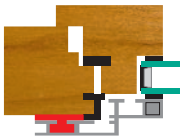
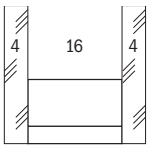
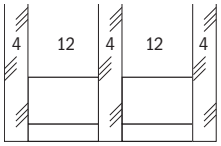
Data sheet
Psi values for windows

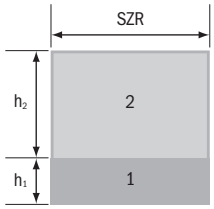
SWISSPACER
SAINT-GOBAIN

SWISSPACER®
Vetrotech Saint-Gobain (International) AG
Zweigniederlassung Kreuzlingen
Sonnenwiesenstrasse 15, CH-8280 Kreuzlingen

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thermal conductivity λ in W/mK	Thickness d in mm
Cross-section	**Swisspacer** 	6.5	Aluminium Plastic	160 0.16	0.03 1.0

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.060	0.045	0.047	0.052
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.056	0.042	0.046	0.051

Two Box model Characteristic values		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
		16	0.40	0.62
		12	0.40	0.56

Explanations

The representative linear heat transfer coefficients (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficients U_w of windows. They have been determined using the boundary conditions (frame profile, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/1 "Thermally improved spacers - Part 1: Determination of the representative psi values for window frame profiles". This directive also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given to 0.001 W/mK. The method used for the arithmetic determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant.

Characteristic values determined by:

Hochschule Rosenheim
University of Applied Sciences

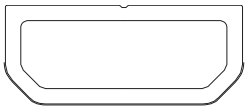
ift ROSENHEIM

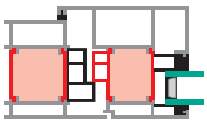
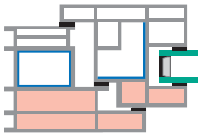
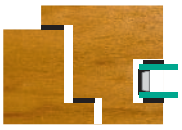
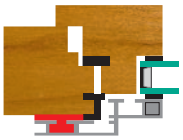
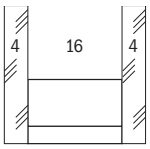
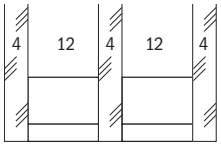
Data sheet
Psi values for windows

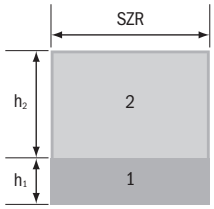
SWISSPACER
SAINT-GOBAIN

SWISSPACER®
Vetrotech Saint-Gobain (International) AG
Zweigniederlassung Kreuzlingen
Sonnenwiesenstrasse 15, CH-8280 Kreuzlingen

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thermal conductivity λ in W/mK	Thickness d in mm
Cross-section	**Swisspacer V** 	6.5	Stainless steel Plastic	15 0.16	0.01 1.0

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.039	0.034	0.032	0.035
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.034	0.032	0.031	0.033

Two Box model Characteristic values		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
		16	0.40	0.18
		12	0.40	0.18

Explanations

The representative linear heat transfer coefficients (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficients U_w of windows. They have been determined using the boundary conditions (frame profile, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/1 "Thermally improved spacers - Part 1: Determination of the representative psi values for window frame profiles". This directive also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given to 0.001 W/mK. The method used for the arithmetic determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant.

Characteristic values determined by:

Hochschule **Rosenheim**
University of Applied Sciences

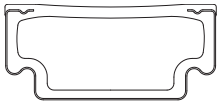
ift ROSENHEIM

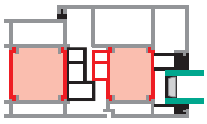
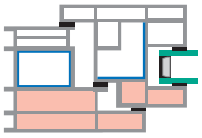
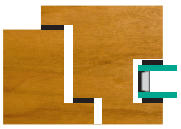
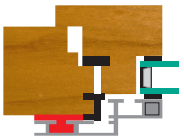
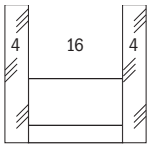
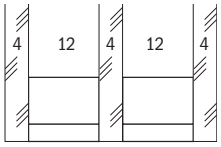
Data sheet Psi values for windows

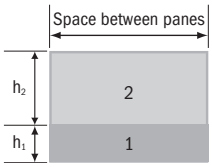
based on determination of the equivalent thermal conductivity of spacers by measurement

TECHNOFORM GLASSINSULATION

Technoform Glass Insulation GmbH
Matthäus-Merian-Str. 6
D - 34253 Lohfelden

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	**TGI-Spacer** 	6.9	Stainless steel Plastic	0.10 0.6/0.8

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.049	0.040	0.040	0.044
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.044	0.038	0.039	0.042

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.9 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.30

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:
Hochschule Rosenheim
University of Applied Sciences
ift ROSENHEIM

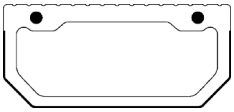
Data sheet Psi values for windows

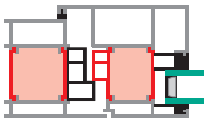
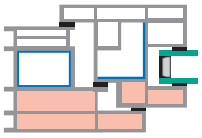
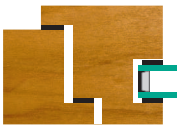
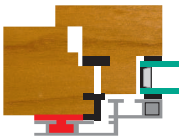
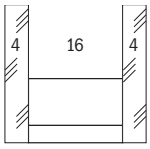
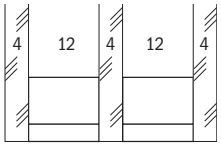
based on determination of the equivalent thermal conductivity of spacers by measurement

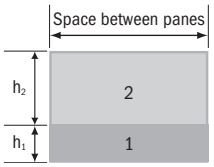
Ensinger

ENSINGER GmbH, Niederlassung Ravensburg
Mooswiesen 13
D - 88214 Ravensburg

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Thermix TX.N plus*** 	7.0	Stainless steel Plastic	0.10 0.75/1.20

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.050	0.041	0.041	0.045
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.045	0.039	0.040	0.043

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 7 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.32

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

Hochschule Rosenheim
University of Applied Sciences

ift ROSENHEIM

Data sheet Psi values for windows

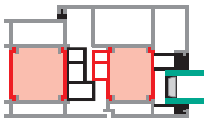
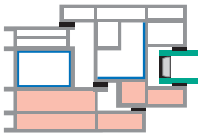
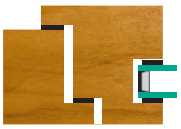
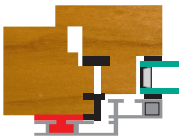
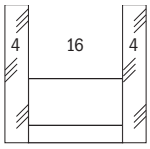
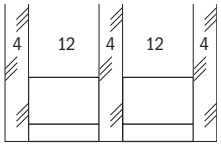
based on determination of the equivalent thermal conductivity of spacers by measurement

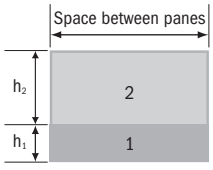
KÖMMERLING
KÖMMERLING CHEMISCHE FABRIK GMBH

KÖMMERLING CHEMISCHE FABRIK GMBH
Zweibrücker Straße 200
D - 66954 Pirmasens

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Ködispace*** 	5.0	Polyisobutylene	5.0

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.043	0.036	0.036	0.038
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.038	0.034	0.034	0.036

Two Box model Characteristic values	Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
		Box 1 · h_1 = 3 mm	Box 2 · h_2 = 5 mm
	Can be used for all spacer widths	0.40	0.31

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

Hochschule Rosenheim
University of Applied Sciences

ift ROSENHEIM

Data sheet Psi values for windows

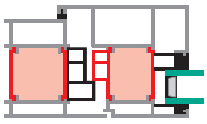
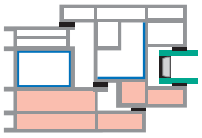
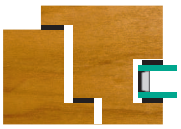
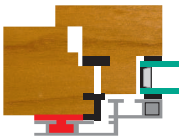
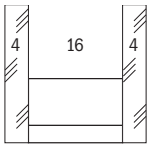
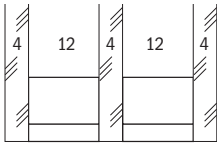
based on determination of the equivalent thermal conductivity of spacers by measurement

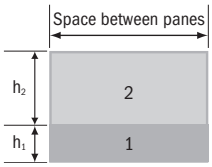
GLASWERKE ARNOLD Merkendorf

Glaswerke Arnold GmbH & Co. KG
Neuseser Straße 1
D - 91732 Merkendorf

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	**WEP classic** 	6.5	Stainless steel	0.20

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.068	0.051	0.053	0.059
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.066	0.050	0.054	0.060

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.81

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

Hochschule Rosenheim
University of Applied Sciences

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Data sheet Psi values for windows

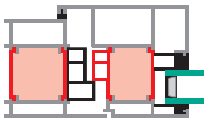
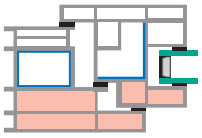
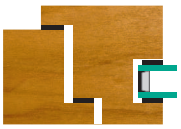
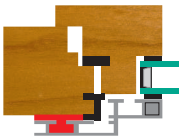
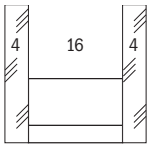
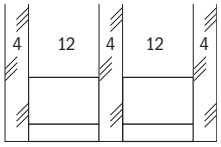
based on determination of the equivalent thermal conductivity of spacers by measurement

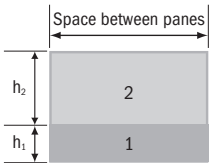
Lingemann-Gruppe HELIMA Profilierte Lösungen

Helmut Lingemann GmbH & Co. KG
Am Deckershäuschen 62
D - 42010 Wuppertal

RAL GÜTEZEICHEN MEHRSCHEIBEN ISOLIERGLAS

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***NIROTEC EVO*** 	6.6	Stainless steel Biopolymer	0.06 0.4

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.047	0.038	0.038	0.042
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.042	0.037	0.037	0.040

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.6 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.28

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

Hochschule Rosenheim
University of Applied Sciences

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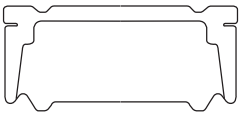
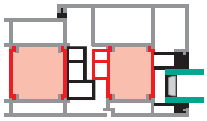
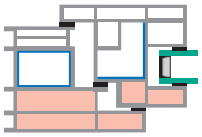
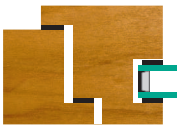
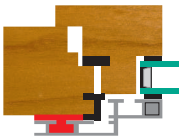
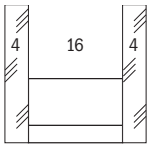
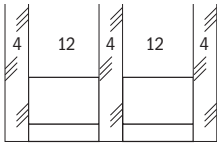
Data sheet Psi values for windows

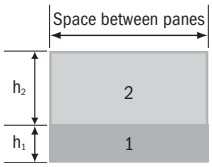
based on determination of the equivalent thermal conductivity of spacers by measurement

ROLLTECH A/S - an Alu-Pro Group Company

Rolltech A/S
W. Brüels Vej 20
DK - 9800 Hjørring

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	***Chromatech Ultra F*** 	6.9	Stainless steel Plastic	0.1 0.9

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.048	0.039	0.039	0.043
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.043	0.037	0.038	0.041

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.9 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.28

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

Ermittlung der Kennwerte durch:

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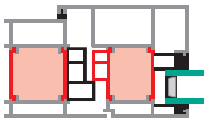
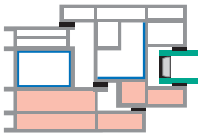
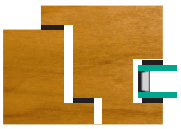
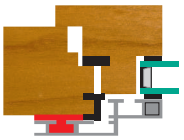
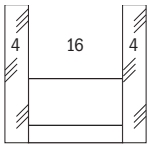
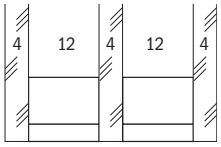
Data sheet Psi values for windows

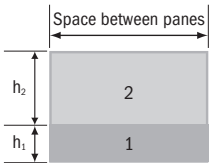
based on determination of the equivalent thermal conductivity of spacers by measurement

SWISSPACER®

Vetrotech Saint-Gobain (International) AG
Zweigniederlassung Kreuzlingen
Sonnenwiesenstrasse 15
CH-8280 Kreuzlingen

	Product name	Spacer height in mm	Material	Thickness d in mm
Cross-section	Ultimate SWISSPACER	6.5	Plastic / Multilayer – polyester coated film "High Tech Gas Barrier Foil"	1.0 0.097

		Metal with thermal break	Plastic	Wood	Wood / Metal
Representative frame profile					
Representative psi value double-sheet thermally insulating glass W/mK	 Double-sheet insulating glass U_g=1.1 W/m²K	0.036	0.032	0.031	0.032
Representative psi value triple-sheet thermally insulating glass W/mK	 Triple-sheet insulating glass U_g=0.7 W/m²K	0.031	0.030	0.029	0.030

		Space between panes in mm	$\lambda_{eq,2B}$ in W/mK	
			Box 1 · h_1 = 3 mm	Box 2 · h_2 = 6.5 mm
Two Box model Characteristic values		Can be used for all spacer widths	0.40	0.14

Explanations

The equivalent thermal conductivity has been determined in accordance with the ift guideline WA-17/1 "Thermally improved spacers – Determination of the equivalent thermal conductivity by measurement". The representative linear heat transfer coefficients calculated in this way (representative psi values) apply to typical frame profiles and glazing for the determination of the heat transfer coefficient UW of windows. They have been determined under the boundary conditions (frame profiles, glazing, glass mounting depth, back covering, primary and secondary sealant) defined in the ift guideline WA-08/2 "Thermally improved spacers – Part 1: Determination of the representative Psi value for window frame profiles". This guideline also governs the area of validity and application of the representative psi values. In order to avoid rounding errors, the psi values in the data sheet have been given at 0.001 W/mK. The method for the arithmetical determination of the psi values has an accuracy of ± 0.003 W/mK. Differences of less than 0.005 W/mK are not significant. For further information, refer to the Bulletin 004/2008 "Compass 'Warm Edge' for Windows" of Bundesverband Flachglas.

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