EDITION 2

National Company. Local Service.

DGS GROUP PLC.

WARMFLOW EASY FILL

Warmflow® Easyfill

A NEW AND INNOVATIVE WARM EDGE BAR

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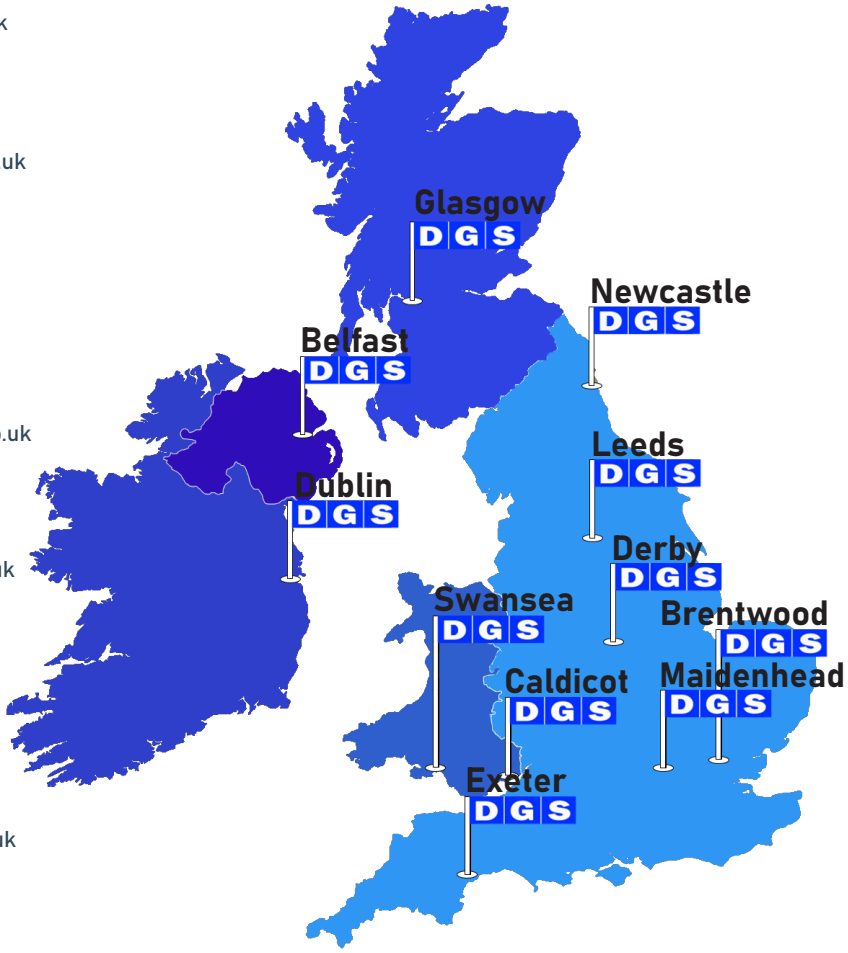


All content in this catalogue is for reference and guidance only. We have taken all reasonable due care to ensure the content within our brochures and website is accurate and current but we do not accept any liability for any inaccuracy or omission.

About
DGS Group Plc.

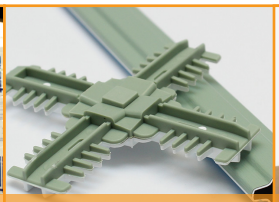
DGS Group Plc – Trusted for over 46 Years

DGS Group Plc is an independent quality manufacturer and distributor to the fenestration industry, the only company supplying ALL sectors of the window and door market.

Window Hardware **Door Hardware** **Sealed Unit** **Fitting Materials**

Since 1977 we have continued to innovate and invest.

Glasmol Desiccant


Geo Bar

Hot Melt

2 Part


Cloth Tape


Multitech


Chromatech


Ferrotech


2000+ Exclusive products including the complete ELITE range of hardware and furniture.


Over 100,000,000 pairs! ELITE friction stays and catches manufactured in the UK and in use today.

bsi Building Hardware used in Windows and Doors KITEMARK™ KM 719295 BS 6375 Parts 1, 2 & 3

ELITE

Secured by Design SBD Police Preferred Specification

Enhanced Security Performance PAS 24

Contents

WarmFlow® Easyfill

- ☑ No Splitting
- ☑ Sealant Saving
- ☑ Easy to Pin for Decorative Grilles
- ☑ Optimum Desiccant Capacity
- ☑ Longer Unit Life
- ☑ Saves money

DGS

DGS Group Plc.

National Company. **Local** Service.

Warmflow® easyfill

Hi, I'm Professor W. Wolfram,

WarmFlow is the latest advance in Warm Edge Spacer Bar in terms of Design, Performance and Cost Saving. Still not convinced...

Check out these Benefits:

- Less labour costs.
- Faster production.
- Improved product quality.
- IG units last up to 39% longer.
- Delivered Nationwide by our own Fleet of vehicles.
- Peace of mind.

Find out more at www.dgsgroup.co.uk or contact one of our team by phone on 01332 811611 or email at customerservices@dgsgroup.co.uk.

What are you waiting for...?

WarmFlow IG
Warm Edge Bar

1) IG units with WarmFlow spacer last up to 39% longer.

2) Fundamental principles in design ensures features enhance product performance, IG units longevity and cost optimization.

3) The standard 7mm high system produced in a premium grade engineering polymer is durable, easy to cut and holds up to 39% more desiccant per unit length than other premium brands, increasing quality and peace of mind.

Warmflow Features

- ☑ More desiccant per unit length increases unit life.
- ☑ Filling 2 long sides is now acceptable for unit performance - reduced labour costs, increased efficiency.
- ☑ Larger cross-sectional area makes desiccant filling cleaner and faster - we call it Easyfill.
- ☑ Easy to cut and virtually burr free.
- ☑ Robust in production - good lateral stability makes fabrication easier and faster.
- ☑ Easy to work with - less brittle than other premium brands.
- ☑ Twin perforations give a faster airflow generating less seal stress.
- ☑ Aluminium moisture and gas barrier - great adhesion to all sealant types.
- ☑ Longer spacer shoulder allows for an increased depth +10% of PIB and longer unit life.
- ☑ The supersized spacer shoulder makes for easier drilling when automatically desiccant filling.
- ☑ Premium engineering polymer generates less static for cleaner faster production.
- ☑ Greater thermal performance certified in 2023 by IFT Rosenheim.
- ☑ λ eq 2B = 0.160 W/MK for optimum performance
- ☑ Fully certified to EN1279 PT2, PT3 and PT6.
- ☑ Easy to substitute under BFRC Scheme.
- ☑ Available ex stock from Nationwide Depots.

Warmflow® Easyfill

Printing Service Available
Your company details can be printed directly onto the bar. Please contact your local branch or sales representative for further details.

Warmflow
Ordering Information

Ordering Information

Size	Code	Box Qty 5m Length	Bundles Per Box
8mm	WF08BK	264 lengths (1320m)	12 Bundles Per Box
10mm	WF10BK	242 lengths (1210m)	11 Bundles Per Box
12mm	WF12BK	198 lengths (990m)	9 Bundles Per Box
14mm	WF14BK	176 lengths (880m)	8 Bundles Per Box
16mm	WF16BK	154 lengths (770m)	7 Bundles Per Box
18mm	WF18BK	132 lengths (660m)	6 Bundles Per Box
20mm	WF20BK	110 lengths (550m)	5 Bundles Per Box

BK = Black RAL 9004

Corner Key 90°

Size	Code	Box
8mm	WFCK/08BK	10,000
10mm	WFCK/10BK	10,000
12mm	WFCK/12BK	5000
14mm	WFCK/14BK	5000
16mm	WFCK/16BK	5000
18mm	WFCK/18BK	4000
20mm	WFCK/20BK	4000

BK = Black RAL 9004

Flexi Corner Key

Size	Code	Box
10mm	WEFK10BK	2700
12mm	WEFK12BK	2000
14mm	WEFK14BK	1500
16mm	WEFK16BK	2800
18mm	WEFK18BK	2500
20mm	WEFK20*BK	2000

BK = Black RAL 9004

Warmflow
Ordering Information

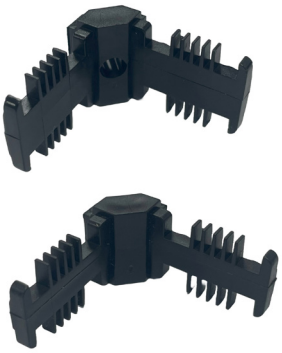
Sleeves and Plugs

Size (Drill Hole)	Code	Type	Box
6.5mm	GKS/6.8BK	Sleeve	1000
6.5mm	GKP5.1BK	Plug	1000

RAL 9004

Gas Keys

Size	Code	Box
16mm	WEGK16BK	2300
18mm	WEGK18BK	2000
20mm	WEGK20BK	1800
Plug	WEGKPBK	1000



RAL 9004

Add **W** ie. WEGK**W**16BK for With Hole

Frequently Asked Questions

1) **Q** - Do units with more desiccant last longer?

A - Yes. All sealants are permeable, some more so than others. Once the desiccant becomes saturated, condensation will form on the inside of the glass. IG units with more desiccant in them will of course take longer to saturate and fail.

2) **Q** - Do Aluminium spacers have a greater desiccant capacity than Warm Edge spacers?

A - Yes. The profile cross sectional area is much smaller typically with Warm Edge spacers due to a thicker profile wall and an external height of 6.5mm.

3) **Q** - How many sides of Warm Edge spacer do I need to fill with desiccant?

A - To date most Warm Edge spacers recommend filling 3 to 4 sides as a minimum.

4) **Q** - Why then do you only need to fill 2 sides with WarmFlow Easyfill?

A - WarmFlow Easyfill system is 7mm high externally, this increases the volume of desiccant per unit length by up to 39% effectively increasing the IG units life by 39%.

5) **Q** - Are you saying by using WarmFlow Easyfill and filling 2 long sides with desiccant the units will last up to 39% longer prior to failure?

A - Yes. The other branded Warm Edge products hold less desiccant per unit length therefore if you are filling 2, 3 or 4 sides at the moment, by switching to WarmFlow Easyfill and doing exactly the same units will last upto 39% longer.

p.s) Maintaining the existing units sightline will effectively save up to 9% in less sealant usage without affecting unit integrity.

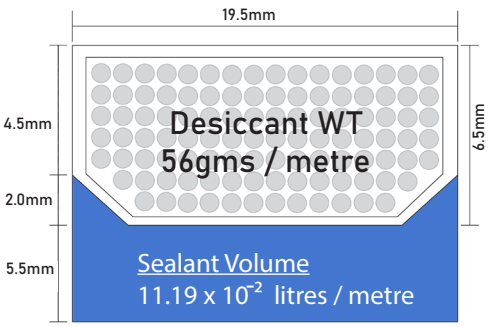
Technical Sheets

IG Units Last up to 39% Longer

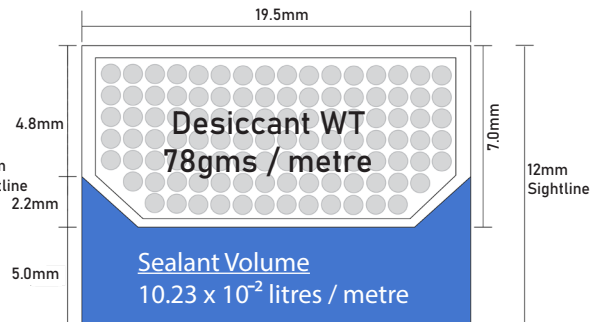
The Facts.

All rigid Warm Edge bars are NOT the same!

Look at the schematic below illustrating desiccant capacity and sealant volumes.



6.5mm High Typical Warm Edge Spacer



7.0mm High WarmFlow Easyfill Spacer

The Knowledge.

The many offerings available in the market today have adopted a spacer height typically 6.5mm that replicates traditional aluminium spacer bars for simpler integration.

However, aluminium spacers have a much thinner wall thickness than rigid Warm Edge spacers thereby holding more desiccant per metre. In order to compensate for this limitation suppliers of 6.5mm high “Warm Edge” spacers recommend filling 3/4 sides with desiccant rather than the traditional 2 long sides.

The Kicker.

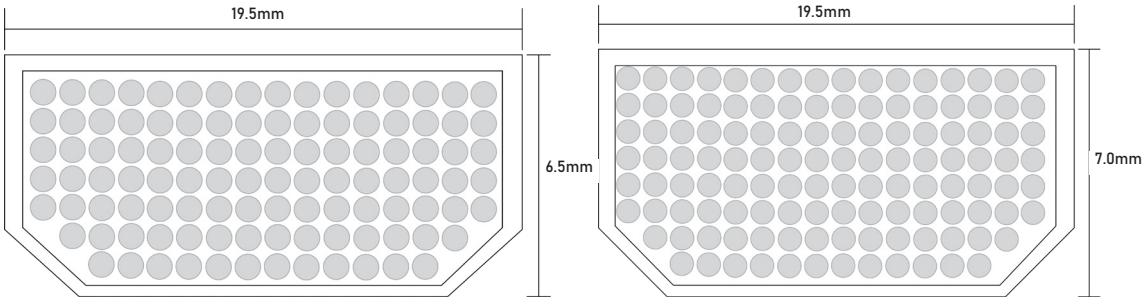
WarmFlow Easyfill 7mm high spacers require only 2 long sides filling with desiccant as they hold up to 39% more desiccant than some 6.5mm high aternatives.

The Benefits.

Less labour costs, faster production, improved product quality - Peace of Mind.

On a like for like basis WarmFlow Easyfill IG units will last up to 39% longer and require less sealant than other Warm Edge spacers.

Desiccant Capacity Analysis



6.5mm High Warm Edge **7mm High WarmFlow Easyfill**

Objective.

To evaluate the different desiccant capacities between aluminium and commercially available Warm Edge spacer bars. A typical unit size of 0.5M² with an aspect ratio 2:1 giving spacer bar lengths of 1000mm long and 500mm short sides.

Procedures.

Spacer bars of the **same** length were filled with 3A standard bead 1 - 1.5mm desiccant from the same carton and desiccant contents weighed and tabulated below.

The ability to mirror the aluminium spacer IG unit life cycle with warm edge systems is deemed to be a fundamental requirement for all manufacturers.

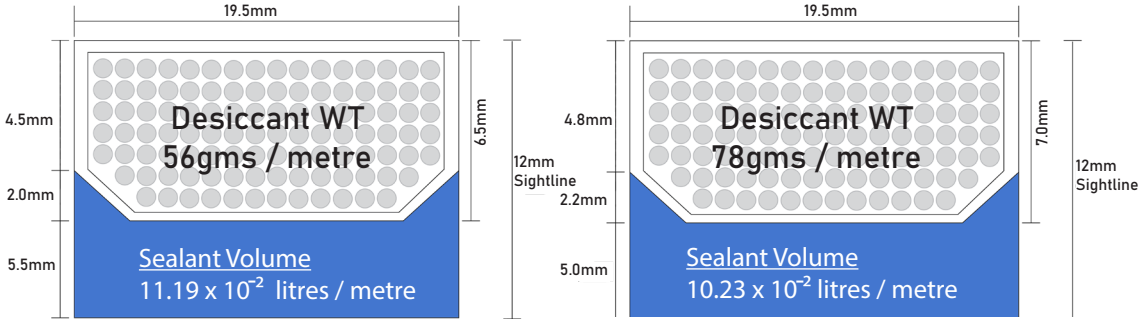
Results.

Size mm	Product	Length (mm)	Perforation Pattern	WT Desiccant Per M	WT Desiccant 1 long/ 1 short filled	WT Desiccant 2 long filled	WT Desiccant 2 long/ 1 short
19.5	Aluminium	1000	Twin	94.00gms	141.00gms	188.00gms	N/A
19.5	WarmFlow	1000	Twin	78.00gms	117.00gms	156.00gms	195.00gms
19.5	Multitech	1000	Twin	68.00gms	102.00gms	136.00gms	170.00gms
19.5	Swiss Ultimate	1000	Single	63.00gms	94.50gms	126.00gms	157.50gms
19.5	Thermobar	1000	Single	56.00gms	84.00gms	112.00gms	140.00gms

Warmflow Spacer Bar Saves Sealant

The Facts.

All rigid Warm Edge bars are NOT the same. Look at the schematic below illustrating sealant volumes.



6.5mm High Typical Warm Edge Spacer **7.0mm High WarmFlow Easyfill Spacer**

- Both systems ⇢ Total sightline @ 12mm
- Only 1 system Warmflow uses <u>less</u> sealant.

Look at the numbers

6.5mm high system	11.19×10^{-2} Litres per metre
7.00mm high system	10.23×10^{-2} Litres per metre
Warmflow saving	0.96×10^{-2} Litres per metre

The benefit - A typical 6.5mm high spacer system uses up to **9% more sealant than Warmflow easy fill.**

WARMFLOW SAVES YOU MONEY

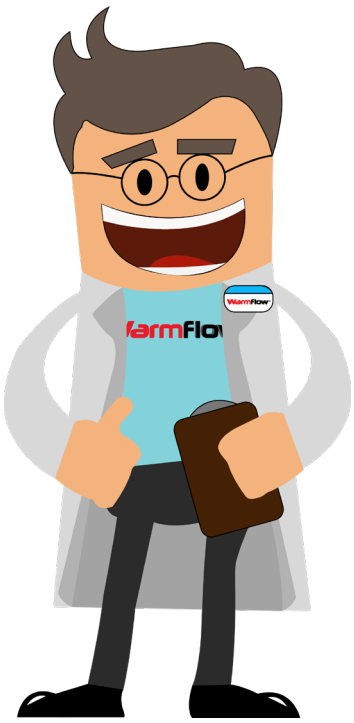
Warmflow Saves you Money

Conclusion.

WarmFlow holds up to 39% more desiccant per M than the lowest capacity spacer thereby giving an extended IG unit life. Filling 2 long sides of WarmFlow gives improved product performance against all products tested apart from aluminium.

Other 6.5mm high spacers require 3/4 sides filled in order to give the same level of longevity as WarmFlow. This is both labour intensive and costly in order to get an acceptable product performance result that is commensurate with the manufacturers guidelines.

The Warmflow spacer system uses less sealant than other typical 6.5mm high spacer systems yet still maintains the same effective seal depths as other systems. Sealant saving is typically >9% saving money without compromising quality.



The Spacer Lab.
Results Verified.
Dr. W. Wolfram

Perforation Analysis

The popularity of hot melt single and dual sealed units enables spacer bar manufacturers to optimise product features that are not detrimental to overall product performance to **all** other systems but can be particularly suited to specific construction methods.

Twin lines of perforations are preferable for hot melt IG unit construction as they ensure expanding air within the spacer during hot melt application can easily pass freely into the cavity airspace and back again as the unit cools.

The desiccant has the opportunity to work straight away unlike spacer tubes with a single row of perforations that can take many weeks to absorb moisture trapped in the air space during manufacture.

Typically single breather hole systems ensure the hot air inside the spacer as it expands is forced out through a corner joint creating a leak path for moisture and gas as the breather holes are too small or few in number to be effective.

Warmflow® Easyfill

Twin Rows of Perforations

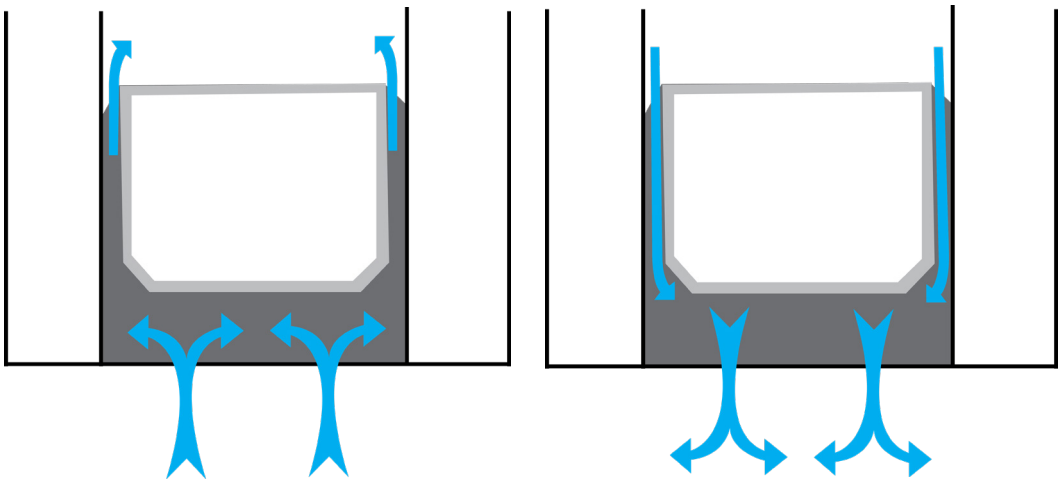
Typical Warm Edge Spacer

Single Row of Perforations

Enhances the technical brief perfectly. Less IG stress, faster equalization, longer unit life.

Permeation Geometry

Spacer Geometry of that part of the edge seal of the insulating glass unit through which the vapour and gas transmission takes place.



a) Moisture Penetration

b) Gas Loss

Example of permeation geometry

Sealant Performance Facts

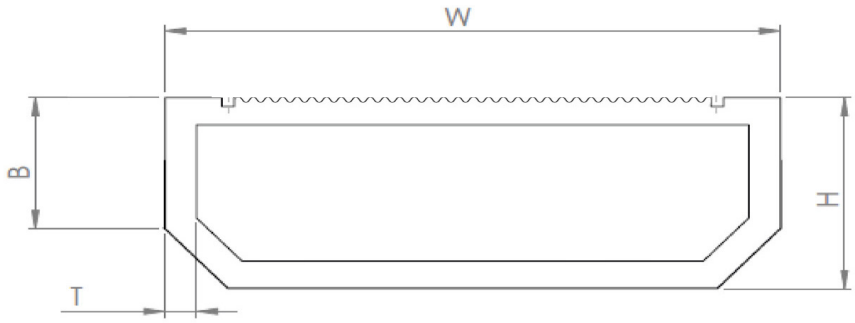
Product	MVTR	Gas Permeation
Fenzi A+	0.08 gms/m² 24hrs 2 mm	1.99×10^{-3} gms/m² hrs
Thiover	8.7 gms/m² 24hrs 2 mm	4.96×10^{-3} gms/m² hrs
Poliver	2.1 gms/m² 24hrs 2 mm	28.40×10^{-3} gms/m² hrs
Butylver	0.04 gms/m² 24hrs 2 mm	1.06×10^{-3} gms/m² hrs

	MVTR	Gas Permeation
Best	Butylver	Butylver
	Fenzi A+	Fenzi A+
	Poliver	Thiover
Worst	Thiover	Poliver

Clearly Thiover and Poliver can only pass EN1279 PT2 and PT3 as part of a Dual Seal System.These products rely on the integrity of the PIB Primary Sealant to keep moisture out and gas in.

Warmflow Spacer Bar Technical Information

Warmflow is a high performance, low heat conductive rigid warm edge spacer bar, extruded in high technology engineering plastic material and coated with a thermally improved gas and moisture diffusion barrier.



Dimensions V Tolerances

Nominal Size (mm)	W + 0.2mm - 0.1mm	H + 0.2 - 0.1mm	B ± 0.05mm	T = 0.9mm ± 0.1mm
8	7.50	7.00	4.80	0.9
10	9.50	7.00	4.80	0.9
12	11.50	7.00	4.80	0.9
14	13.50	7.00	4.80	0.9
16	15.50	7.00	4.80	0.9
18	17.50	7.00	4.80	0.9
20	19.50	7.00	4.80	0.9

Basic Specifications

- ☑ High rigidity and stability.
- ☑ UV and chemical resistancy.
- ☑ The applied thermally improved high tech aluminium gas and moisture barrier stops water vapour getting in and gas getting out of the sealed unit and guarantees the durability of the insulating glass unit.
- ☑ Lowest Psi value.
- ☑ Reduced thermal extension.
- ☑ Bendable by welding or heating.
- ☑ Improved perforation for better ventilation.
- ☑ Compatible with all types of sealant.
- ☑ Maximum cavity volume for desiccant filling.

Warmflow Spacer Bar Technical Information

Description	Specification	Test Method
Height	7.00 + 0.2 - 0.1mm	Slide gauge and inspection drift
Width	+0.2 - 0.1mm	Slide gauge and inspection drift
Colour	Black	Visual
Length	5M +/- 10mm	Steel ruler, visual
Thickness	0.9mm +/- 0.1mm	Micrometer
Volatile Contents	≤ 0.01%	Volatile test, weight loss. Mv measured
Perforation	Calibrated perforation holes drilled and measured for maximum performance.	Air Flowmeter
Surface	The surface is clean and no need for any treatment with chemicals.	Visual test and adhesion test
Thermal Properties	Equivalent Thermal Conductivity $\lambda Eq, 2B = 0.16$ W/mK	Documented by IFT Rosenheim
Coefficient of Thermal Expansion	1.69×10^{-5} °K for plastic 1.76×10^{-5} °K for foil	IFT VE-17 Guidelines
Straightness Deviation	15 mm/m at room temperature	Steel ruler, visual
Strength under Tensile Load	0.23 MPA	IFT VE-17 Guidelines
Strength under Shear Load	0.24 MPA	IFT VE-17 Guidelines
Grease Waste	No lubrication or grease	Weight loss and adhesion test

Storage and Use

Make sure the spacer should be conditioned at room temperature before use. Preferred conditions will be a room temperature 15 - 25°C and humidity RH of minimum 45%. Avoid having an environment with a high concentration of dust. General handling according to safety data sheet for the spacer. Use gloves when handling the spacer/frames and recommend air extraction when cutting the spacer.

Adhesion Check

When preparing samples for adhesion test according to EN1279-6 F3.2.2 make sure the spacer adhesion area is covered and in full contact with the sealant (there should be no air bubbles).

When pulling the samples, make sure to support the spacer fully inside to avoid deformation. If the spacer deforms the adhesion test will be affected. Written procedure can be delivered upon request. Curing time according to instruction from sealant manufacturer.

Cleaning the Spacer Surface

If the spacer surface gets dirty by dust from outside or from other materials, it can be cleaned again with a lightly wet cloth pad or air. Dust can easily be removed with antistatic loaded compressed air or a moist cloth.

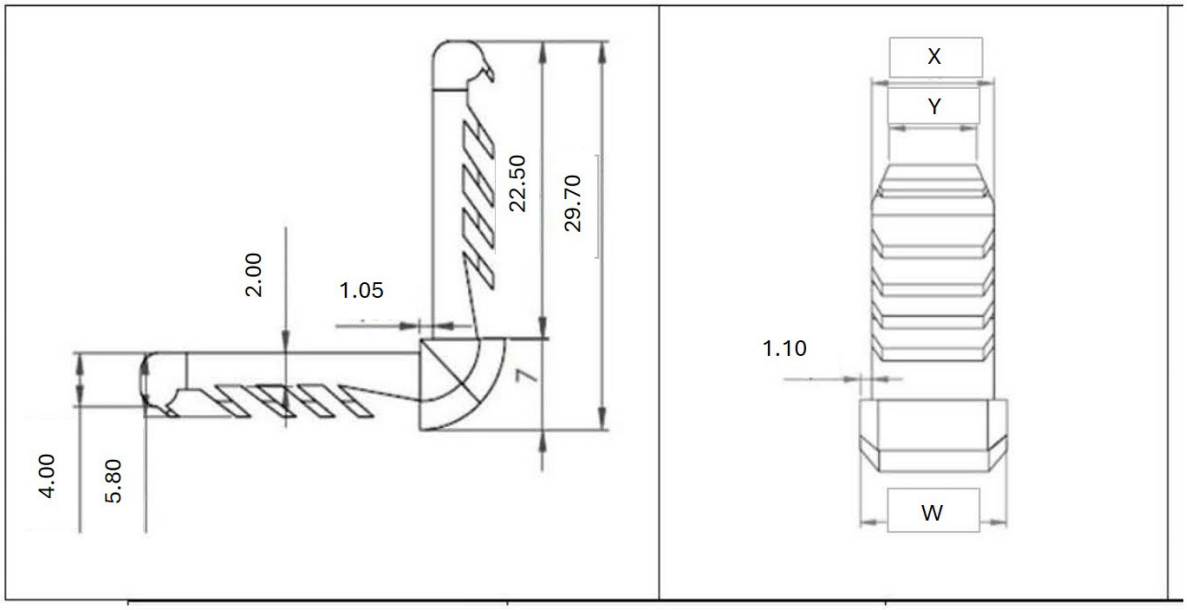
UV Stability

The body is a plastic material with effective UV stabilizer in order to minimize the ageing effect caused by sunlight. The material is tested for 3.000 hours according to EN ISO 4892-1 & EN 4892-2 method A, cycle 1. Evaluation is done according to grey scale index.

Fogging EN1279 PT4 – 2018
No Fogging at 60°C and 80°C.

Corner Keys for Warmflow

Corner Key Sizes For Warm Edge Spacers

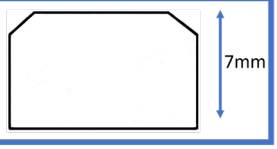


Nominal Spacer Sizes (mm)	W (mm) +/- 0.20mm	X (mm) +/- 0.20mm	Y (mm) +/- 0.20mm
7.5	7.00	5.10	4.60
9.5	9.00	7.10	6.60
11.5	11.00	9.10	8.60
13.5	13.00	11.10	10.60
15.5	15.00	13.10	12.60
17.5	17.00	15.10	14.60
19.5	19.00	17.10	16.60

PSI Values for Windows

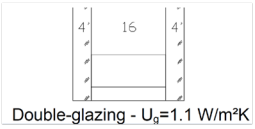
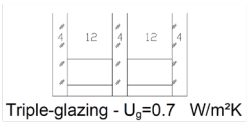
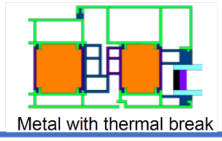
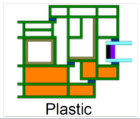
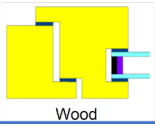
Determination of the equivalent thermal conductivity of spacers by measurement

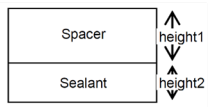
March 2023 Doc Ref: 22-001322-PR03

For	Spacer name	Technical Drawing
DGS Group Sycamore Road Trent Lane Industrial Estate Castle Donington Derby	Warmflow Spacer (For use with hotmelt/polysulphide/polyurethane sealant)	

Dimensions (mm)	Description	Thickness (mm)
7.00 high x 15.5 wide	Polypropylene Glass Filled Spacer with a Metalized PET Foil	0.9 2.3×10^{-2}

Representative PSI Value

	 Double-glazing - U_g=1.1 W/m²K	 Triple-glazing - U_g=0.7 W/m²K
 Metal with thermal break	0.039W/mK	0.034W/mK
 Plastic	0.033W/mK	0.032W/mK
 Wood	0.033W/mK	0.031W/mK
 Wood and Metal	0.035W/mK	0.033W/mK

Space between panes (mm)	λeq.2 in W/mK	
	Spacer – height1 = 7.0mm	Sealant-height2 = 3.0mm
Valid for all spacer widths 	0.16	0.40

This report follows the principles of IFT guidline WA-17/1 "Thermally improved spacers - Determination of the equivalent thermal conductivity by measurement" and IFT guideline WA-08/3 "Thermally improved spacers - part 1: Determination of the representative PSI value for window frame profiles"
The tabulated results are a summary of tests undertaken by IFT Rosenheim completed 07/03/2023

Warmflow

1.1 Product identifier
Product name: Warmflow

1.2 Relevant identified uses of the substance or mixture and uses advised
Application of the substance: Warmedge spacer for insulated glass unit

1.3 Details of the supplier of the SDS
Manufacturer/Supplier: DGS Group PLC
Address: Sycamore Road, Trent Lane Industrial Estate Castle Donington, Derby. DE74 2NW
Telephone: 01332 811611
Fax: 01332 812650
E-Mail: sales@dgsgroup.co.uk

2.1 Classification of the substance - Classification (REGULATION (EC) No 1272/2008)
Physical hazards: No application
Harm to human health: No application
Environmental hazard: No application

2.2 Label elements labelling (REGULATION (EC) No 1272/2008)
Signal word: No application
Hazard statements: No application
Precautionary statements: No application

2.3 Other hazards: None known

3.1 Substance: Not applicable

3.2 Mixture: Warm Edge Spacer made of a PP compound with additives like glass fibre and UV stabilizers, coated with a multilayer foil. PP is inert and non-toxic at high temperatures such as a wood fire, since the contains no halogens. Its combustion does not typically produce any persistent organic pollutants.

4.1 After inhalation: No application
4.2 In case of skin contact: No application
4.3 After eye contact: No application
4.4 After swallowing: No application
4.5 Advice to doctor: No application

5.1 Extinguishing media: A suitable extinguishing media: Carbon dioxide or water.
Inappropriate extinguishing media: No application

5.2 Special hazards arising from the substance or mixture: Toxic gases do not form if burned

5.3 Advice for firefighters: Use breathing apparatus. Fight against fire in accordance with official regulations.

6.1 Personal precautions, protective equipment and emergency procedures: Wear protective gloves/protective clothing

6.2 Environmental precautions: None

6.3 Methods and materials for containment and cleaning up: By sweeping the spill area; avoid raising dust. Provide ventilation.

6.4 Reference to other sections: For further information and details, see sec. 8 and 13.

7.1 Precautions for safe handling: Procede in accordance with general principles of safety and health at work with chemicals. Keep out of reach of children. Avoid release to the environment. Do not eat, drink or smoke when using this product. Use appropriate clothing and gloves in the work area

7.2 Conditions for safe storage, including any incompatibilities: No specific measures required

7.3 Specific end use(s): Warmedge spacer for insulated glass unit

8.1 Control parameters: The relevant exposure limit values: For the components of a mixture does not specify a limit value of exposure.

8.2 Exposure controls: individual protection measures: Taking into account the Personal Protective Equipment Regulation and taking into account the appropriate CEN standards. During operation caution to avoid getting the product on the floor, the skin. Can be used while maintaining normal conditions and adequate ventilation. Use in premises with smoothly functioning ventilation. Wash your hands during the break and after work. Avoid close or prolonged contact with the skin.

8.3 Individual protection measures, such as personal protective equipment
Breathing equipment: It is not necessary
Protection of hands: Use protective gloves
Penetration time of the material of the glove: It is not necessary
Eye protection or face: It is not necessary
Skin protection: Wear protective clothing

9.1 Information on basic physical and chemical properties
Appearance: Solid
Colour: Black, white, grey
Odor: Odourless
pH: Not applicable
Melting/freezing: Not applicable
Initial boiling point/range: Not applicable
Flash point: Not applicable
Evaporation: Not applicable
Flammability: >400C

Vapour Density: Not applicable
Vapour pressure: Not applicable
Solubility in water: Not mixed
Log Pow: Not applicable
The decomposition temperature: Not applicable
Explosive properties: product is not explosive
Fluidity: Not applicable
Density (20C): 1,2-1,3 g/cm3

9.2 Other data: Not applicable

10.1 Reactivity: stable under recommended storage and handling conditions
10.2 Chemical stability: Stable under normal conditions of use
10.3 Possibility of hazardous reactions: No known hazardous reactions
10.4 Conditions to avoid: No information available
10.5 Incompatible materials: No information available
10.6 Hazardous decomposition products: No information available

11.1 Information on toxocological effects
Acute toxicity oral: No data available
Inhalation: No data available
Acute dermal toxicity: No data available
Skin irritation: Not irritating
Eye irritation: Not irritating
Sensitisation: This information is not available
Germ cell mutagenicity: This information is not available
Carcinogenicity: This information is not available
Reproductive toxicity: This information is not available

12.1 Toxicity: No information available
12.2 Persistence and degradability: The product is not readily biodegradable
12.3 Bioaccumulative potential: No information available
12.4 Mobility in soil: No information available
12.5 Results of PBT and vPvB assessment: No information available
12.6 Other adverse effects: No information available

Land transport (ADR/RID): Not classified as dangerous in the meaning of transport regulations
Inland waterways transport: Not classified as dangerous in the meaning of transport regulations
Marine transport: Not classified as dangerous in the meaning of transport regulations
Air transport: Not classified as dangerous in the meaning of transport regulations

The product has been classified and labelled in accordance with EC Directives/ Chemicals (Hazard, information and Packaging for Supply) (CHIP) Regulations. (According to Regulation (EU) No. 1907/2006 (REACH)
Information concerning the adjustment of the safety data sheet of the chemical

The safety data sheet of the chemical has been verified in accordance with annex II of the Regulation 453/2010/EC (sec. 1-16)
The classifications of the components and the mixture have been amended in accordance with Regulation (EC) 1272/2008/EC (CLP), as amended.

Update: This product has been updated and prepared according to Regulation (EU) No. 1907/2006 (REACH)

Abbreviations and acronyms
CLP
CAS - Chemical Abstracts Service (division of the American Chemical Society)
EINECS - European Inventory of Existing Commerical Chemical Substances
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
ADR - Accord Européen sur le transport des marchandises dangereuses par Route
(European Agreement concerning the International Carriage of Dangerous Goods by Road)
GHS - Globally Harmonised System of Classification and Labelling of Chemicals

H statements: No application

The information in this SDS is provided all the relevant data fully and truly. However, the information is provided without any warranty on their absolute extensiveness and accuracy. This SDS was prepared to provide safety preventative measures for the user who has got professional training. The personal user who obtained this SDS should make independent judgement for the applicability of this SDS under special conditions. In these special cases, we do not assume responsibility for the damage. According to REACH Article 31(S) the SDS shall be supplied in an official language of the Member State(s) where the substance or mixture is placed on the market, unless the recipient Member State(s) concerned provide otherwise. It should be noted that this SDS is applicable to the countries with English as an official language.

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