

2025

HAANGLAS

VACUUM INSULATING GLASS



ABOUT



Since 2019, HaanGlass is international pioneer in vacuum glazing industry.

We research, develop vacuum insulated glass technology, supply and promote VIG worldwide with the deep cooperation with ZhongTeng(Basic) and Leadus (Pro).

With SGCC / IGCC / CE certified long durable vacuum insulating glass, HaanGlas Strive to contribute to Net Zero world.

Our mission is to make vacuum insulating glass more stable, more reliable, more affordable and more popular.



VIG introduction

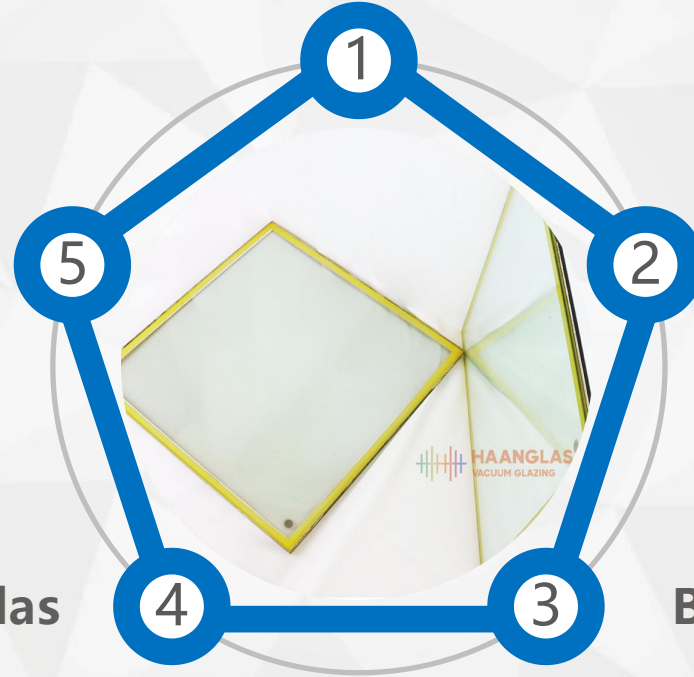
**NET ZERO
POLICIES**

Feature

Benefits

**HaanGlas
VIG**

CONTENT





01

VIG INTRODUCTION

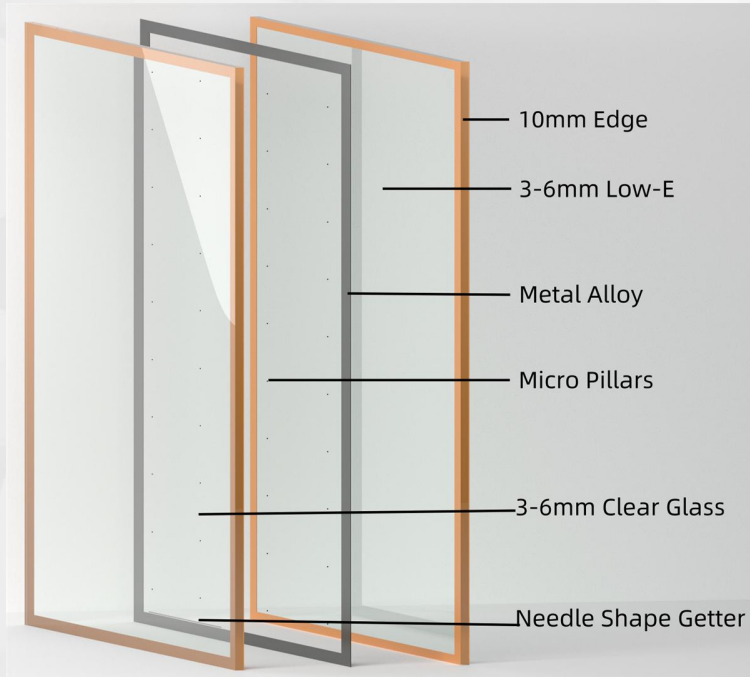
HAANGL
AS
VIG

What is VIG ?

VIG has similar structure as insulating glass, it's a sealed unit composed of 2 pieces of glass.

Different from insulating glass that has air or argon, VIG is sealed and contains 0.15mm vacuum space.

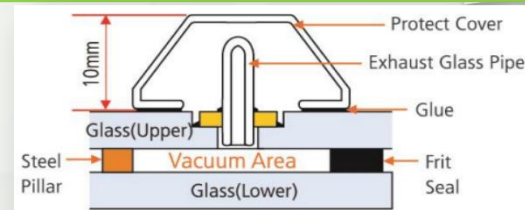
The existence of vacuum space requires special edge sealing materials, and micro support pillars to resist air pressure, and keep overall structure.



1995

- High Temperature Glass Solder
- Annealed VIG
- Two Steps Production
- With exhaustion holes / End Caps

1ST Generation

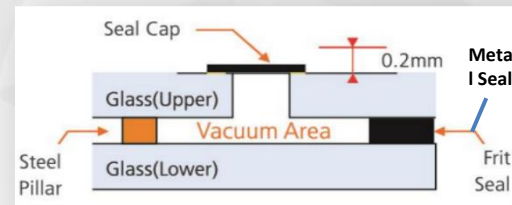


(Images from EAGON Windows & Doors)

2010

- High Temperature Glass Solder
- Tempered /Heat Strengthened VIG
- Two Steps Production
- With exhaustion holes / End Caps

2nd Generation

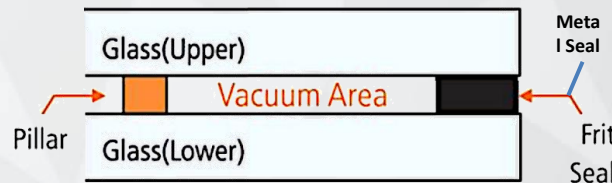


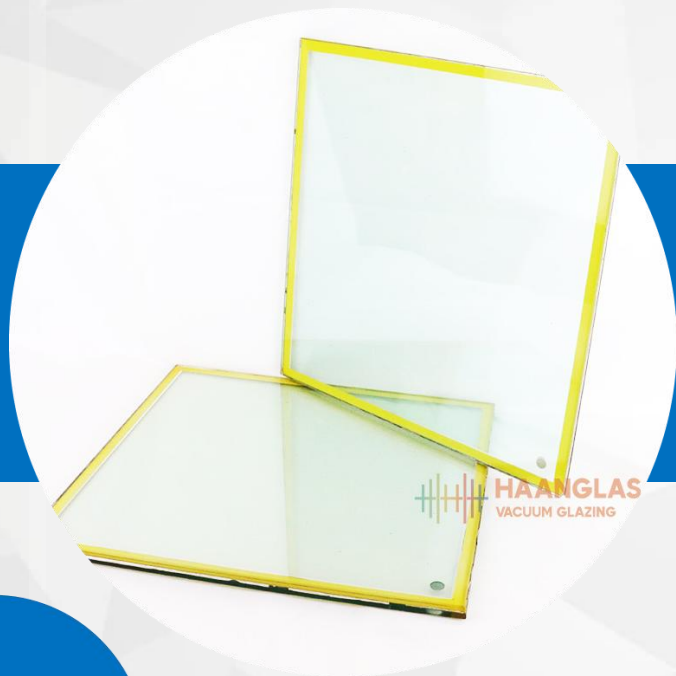
(Images from EAGON Windows & Doors)

2019

- Low Temperature Glass Solder | Metal Alloy
- Tempered VIG
- One Step Production
- No exhaustion holes /End caps

3rd Generation





02

VIG FEATURES

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Thin & Light

Thickness 6-12mm to fit historical windows frame && commercial retrofits.



Noise Control

36dBS noise refuction
Same performance as laminated glass.

Thermal Performance

0.47W/M2.K U value effectively
block heat transfer the glass.



Stable Performance

VIG performance not affected
by installation angle & altitude

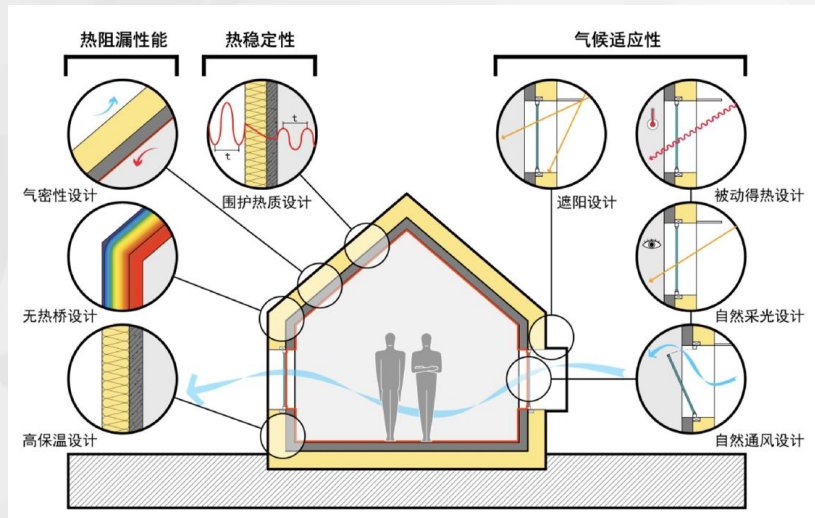
Condensation Free

VIG keeps high interior temperature
ensures no condensation.



Long lifetime

Lifetime > 25 Years
Warranty 15 Years.



3 Types of Heat Transfer

Radiation

High Performance low-E coating reflect most solar radiation while keeping high light transmittance

Convection

High Vacuum Space (10⁻⁴pa) eliminate the air convection inside the units

Conduction

High Vacuum Space eliminate the heat conduction through air. ONLY conduction is through support pillars, and glass edge

	Wall	Roof	Ground	Door	Windows
U Value W/(m²·K)	1.4	0.80	0.52	4.70	4.70

Typical Glass U value

Glass Type	Glass Combination	Low-E Type	Thickness	Weight	U value
Monolithic	Clear	N/A	6MM	15KGS/SQM	5.8W/M2.K
Monolithic	6 LOW-E	Hard Coated	6MM	15KGS/SQM	3.8W/M2.K
IGU	6-12-6	Single Silver	24MM	30KGS/SQM	1.8W/M2.K
IGU	6-12-6-12-6	Dual Silver	42MM	45KGS/SQM	0.95W/M2.K
VIG	4-0.15V-4	Dual Silver	8MM	20KGS/SQM	0.47W/M2.K

Windows U value Compare

Frame Type	Frame Width	Frame U value	Uw -Double Glazing(1.62)	Uw-Triple Glazing(0.74)	Uw -VIG (0.45)
Alu+PVC	72	1.5-1.8	1.7-1.8	1.1-1.2	0.9-1.0
FRP	65	1.2	1.7	1.0	0.85
Alu+Wood	68	1.3-1.4	1.7	1.1	0.9
PVC	88	1.0	1.6	0.9	0.8
Alu	70	1.0	1.80	1.35	1.0



- Minimum 6mm thick, 15ks/sqm
- Max 12mm thick, 30kgs/sqm
- Fit for historical windows frames that don't allow thick IGU
- Can be added to existing glass
- Further Processing-HVIG/Lami VIG etc

Thickness

6mm -12mm

Weight

15-30 kgs /Sqm

Typical Glass U Noise Control

Glass Type	Glass Combination	Noise Reduction
Monolithic	6 Clear	30 (-1;-2)
IGU	6-12-6	34 (-1;-4)
IGU	6-12-6-12-6	37 (-2;-5)
Lami	6-1.52-6	36 (-1;-2)
VIG	4-0.15V-4	36 (-1;-3)

- VIG -vacuum space eliminate sound, sound reduction through air,realize same noise control performance as laminated glass.
- VIG -Has excellent noise reduction is low&middle frequency noise,such as traffic noise,engine noise,A/C noise etc.



What caused Condensation?

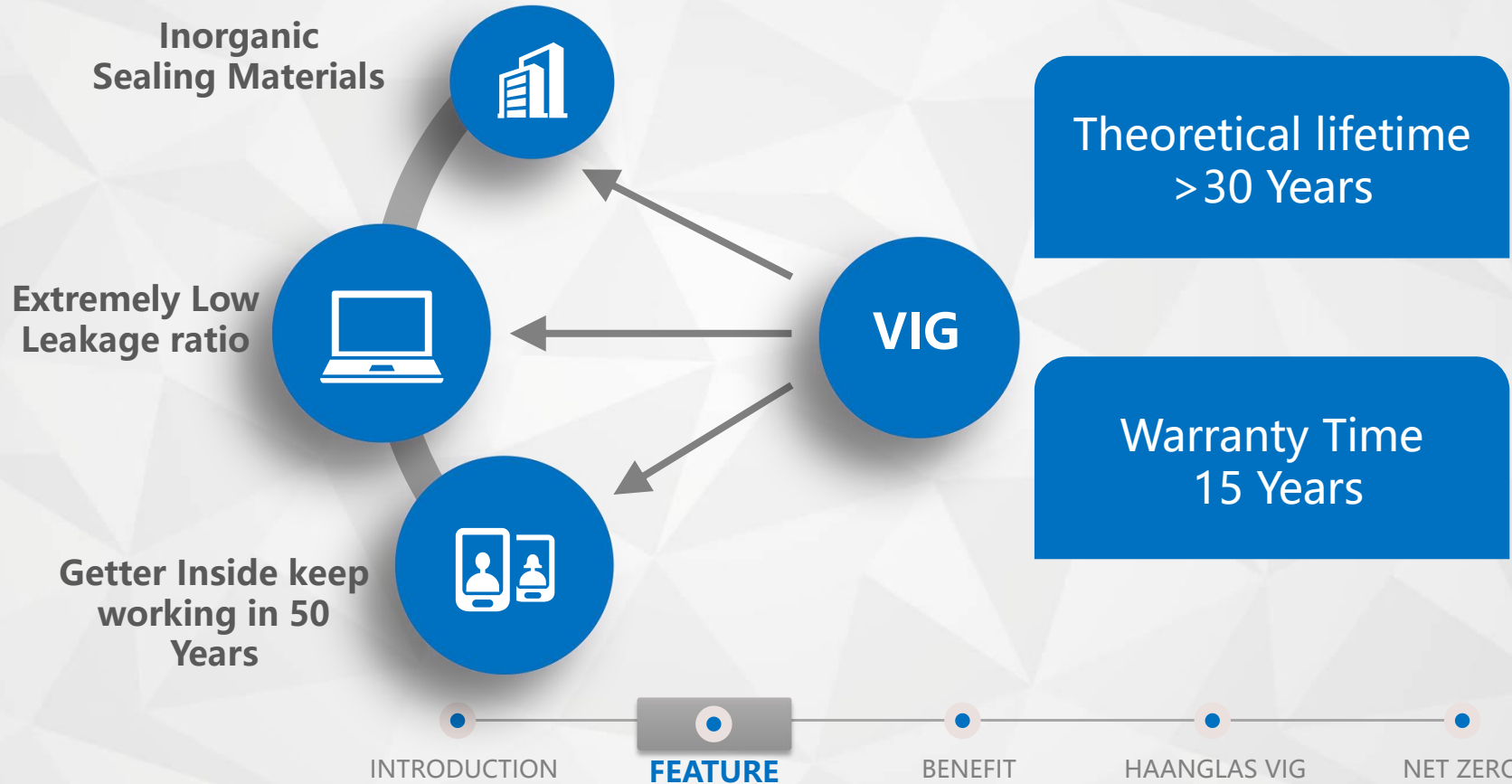
Condensation on the interior of windows and doors occurs when warm, humid air comes into contact with cool glass. This is especially common in the winter when outside air is cold.

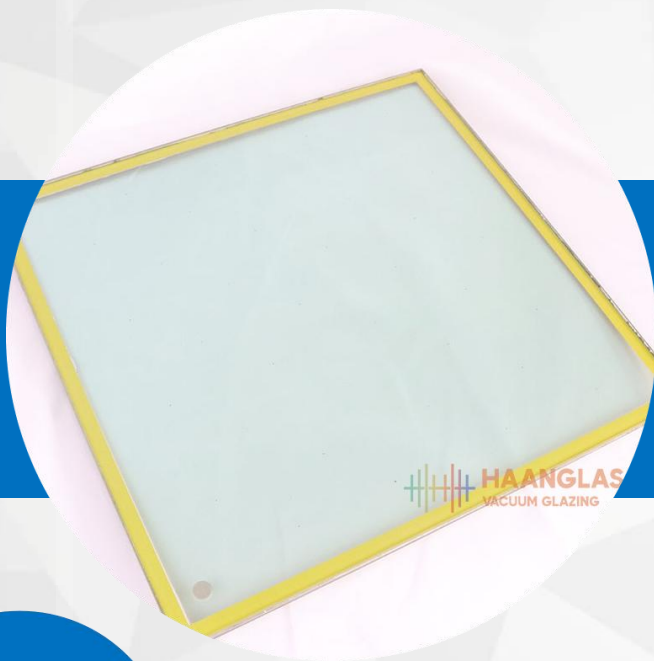
VIG low thermal conductivity keep interior surface temperature high and avoid condensation.

IGU performance is affected by Installation Angel

Glass Type	Installation Angle	U Value W/M2.K
IGU 6LE -12A-6	90°	1.65
	60°	1.87
	30°	2.25
	0°	2.46
VIG 4-0.15V-4	4-0.15V-4	0.47W/M2.K

- The Smaller installation Angle, the greater air convection inside IGU, result in higher U value.
- VIG is not affected by installation angle as no air inside.
- IGU must be with capillary tube to keep air pressure balance when altitude are different.
- VIG don't contain air, no need to consider air pressure.





03

VIG BENEFITS

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VIG

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VACUUM GLAZING





Independently assessed.

Original Window:
 U_w - 2.076 W/m²K g -value 0.50

Same frame, with a **PassivGlas™** ReGlaze 
 U_w - 1.033 W/m²K g -value 0.35

UK Windows Retrofitting Projects

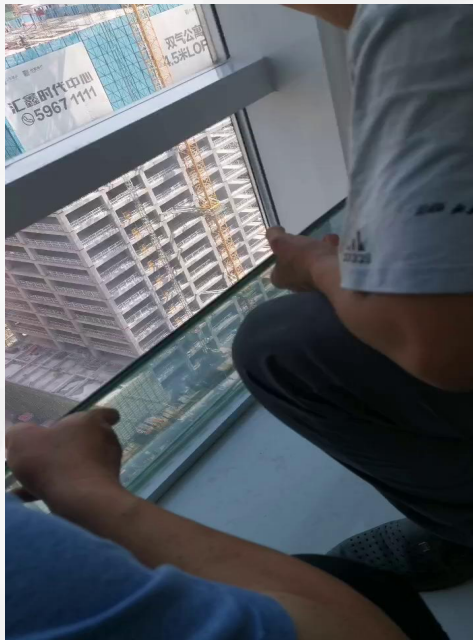
Energy performance	+100%
Acoustic	+20%
Retrofitting time	-200%
Overall Costs	-150%

Fit any existing window

Free from Disturbing life

Improve building energy rating

No condensation



China Facade Retrofitting Projects

Facade retrofitting

All works finished from inside.

Avoid tenant losing

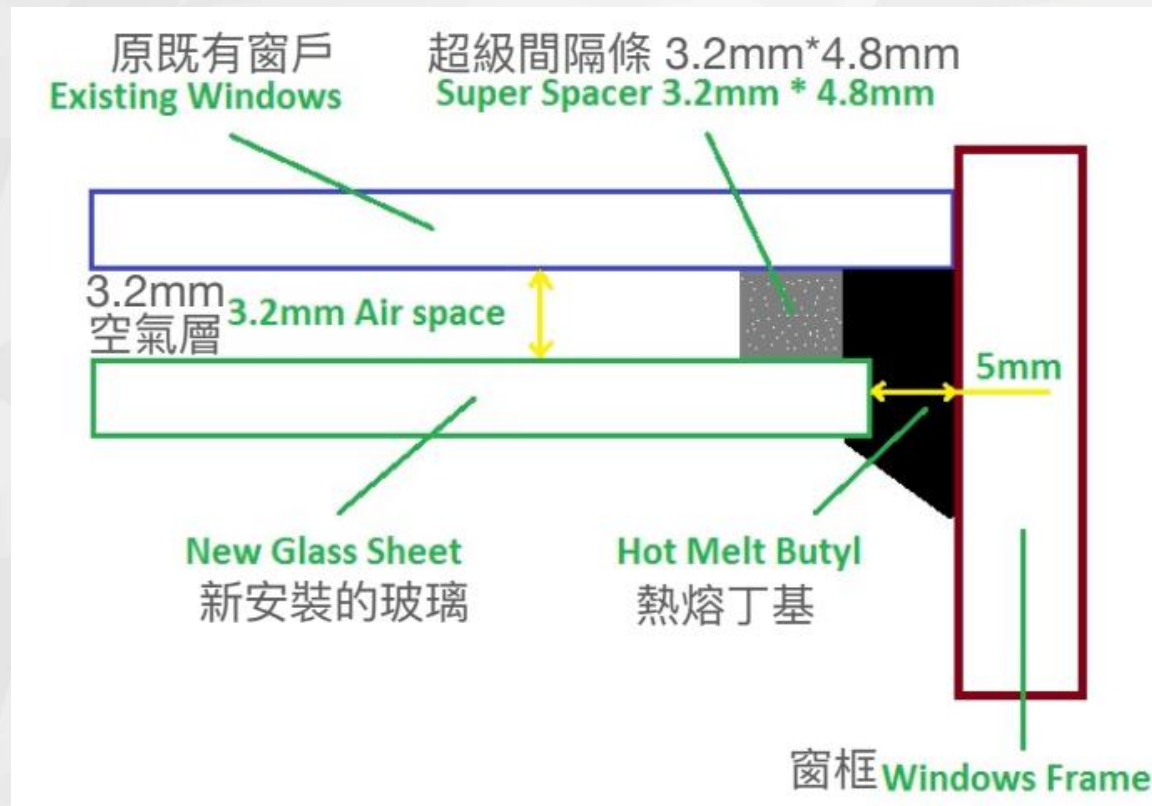
Retrofitting in silence

Fast&Clean&safe Improvement

Higher rent

Meet government rules

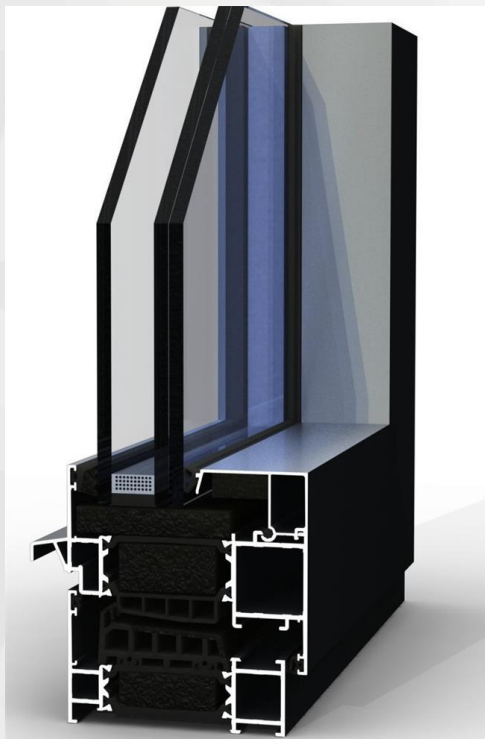
Tax credit&subsidy



Acoustic Performnace +5-10dBs
Energy Impovement



New Constructions

NFRC actual tested U value $0.13 \text{ BTU} = 0.74 \text{ W/M}^2 \cdot \text{K}$ 

TEST SAMPLE DESCRIPTION

FRAME

MATERIAL	AT (1.83"): Aluminum w/ Polyamide Thermal Breaks		
SIZE	47-1/4" x 59" (Model Size)		
DAYLIGHT OPENING	42-7/8" x 54-3/4"	GLAZING METHOD	Interior
EXTERIOR COLOR	Gray	EXTERIOR FINISH	Paint
INTERIOR COLOR	Gray	INTERIOR FINISH	Paint
CORNER JOINERY	Mitered / Keys / Sealed		

GLAZING INFORMATION

LAYER 1	1/4"	Shandong Jinjing Optisolar D80 (e=0.072*, #2)	
GAP 1	0.66"	TS-D: Technoform TGI Spacer	90% Argon*
LAYER 2	0.47"	1/4" Shandong Jinjing Optisolar D80 (e=0.072, #4) / 0.006" Vac. / 1/4" Clear) VIG	
GAS FILL METHOD	Single-Probe Method*		

RESULTS

1. Thermal Transmittance of Test Specimen (Us) $0.13 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{F}$
2. Standardized Thermal Transmittance of Test Specimen (Ust) $0.13 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{F}$



04

HAANGLAS VIG

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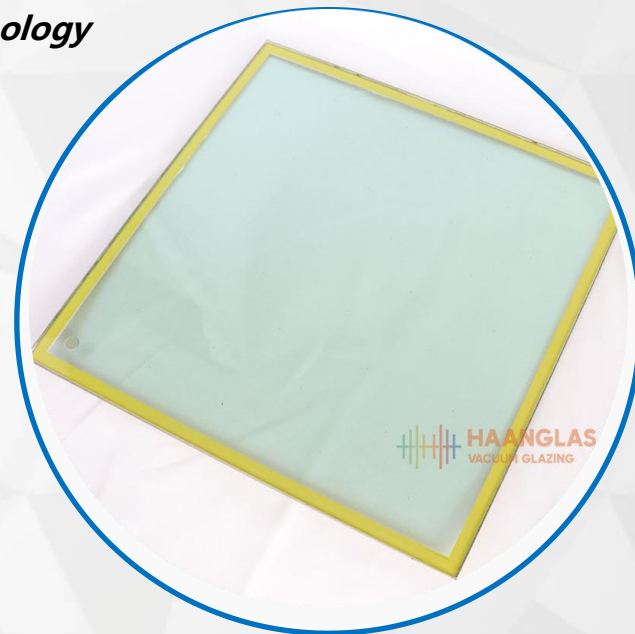
1 **ADVANCED** *Low Temperature Metal Edge Sealing Technology*

2 **UNIFORM** *One Step Production Technology*

3 **RELIABLE** *No Evacuation Hole Design*

4 **SAFETY** *Fully Tempered Vacuum Insulating Glass*

5 **SUSTAINABLE** *Lead Free Materials*



Glass Cutting



Glass Polishing



IGU Line



Heat Soaking Test



Glaston Tempering Furnace



Lami Line

**01**

Min Size
300 × 300mm

02

Max Size
1600*3000mm

03

Thickness
3、4、5、6mm

04

Coating Options
Single/Double/TRIPLE

05

Optional VIG
VIG / HVIG / Lami VIG

06

Annual Out
~ 100,000 m²/Y

1 **ADVANCED** *Temperature Glass Solder Sealing Technology*

2 **UNIFORM** *One Step Production Technology*

3 **RELIABLE** *No Evacuation Hole Design*

4 **SAFETY** *Fully Tempered Vacuum Insulating Glass*

5 **AFFORD** *Up to 300,000SQM/Year Supply Capability*





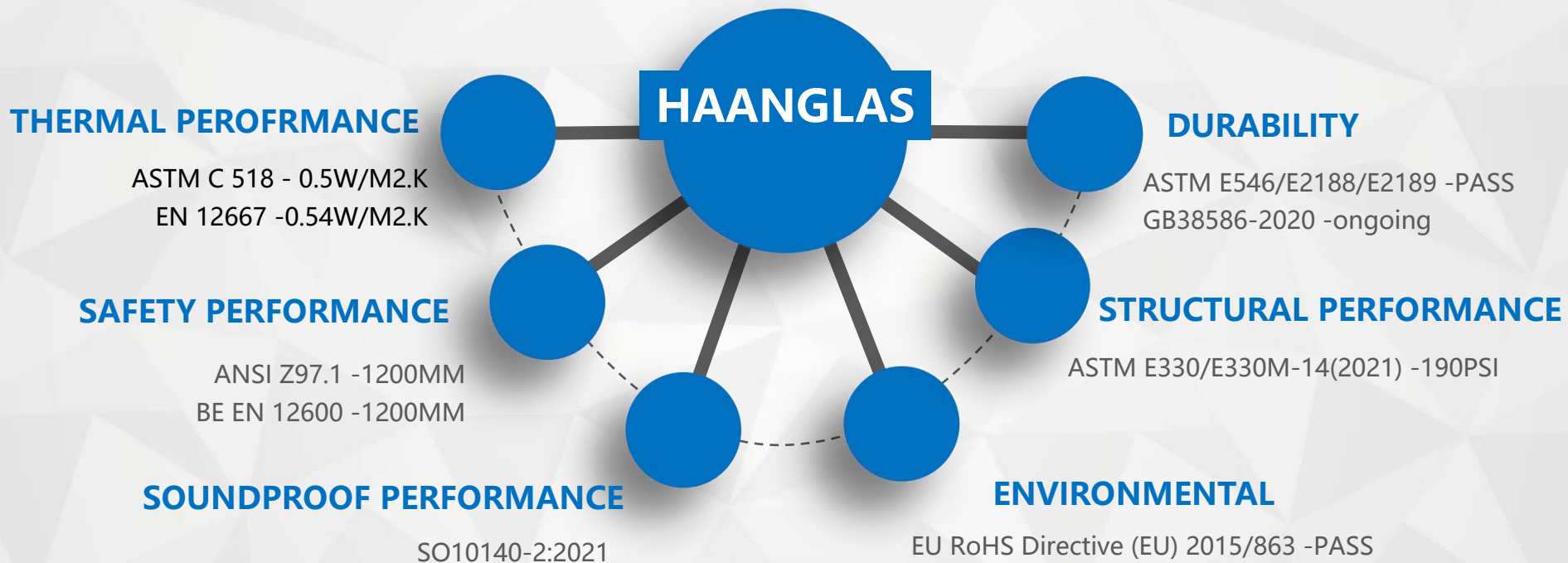
VIG Continuous Line

- 12 Plates / Hour
- Continuous Line
- New Ring Pillars
- 12mm Sealing Edge
- 15mm Edge Deleting

Up to
300,000SQM
Annual Output

Starting from
Oct,2023

Criteria	BASIC	PRO
Edge Seal	Glass solder -350°C	Metal -250°C
Edge Color	Black	Yellow
Edge width	8-12mm	10mm
Desiccant	Stripe along glass bottom	12mm Round Needle Shape
Best U value	0.47W/M2.K	0.47W/M2.K
Lead	Yes	No
Strength	6.15 8.15mm -Heat Strengthened 10.15 12.15mm -Fully Tempered	6.15-12.15mm All Fully Tempered
Low-E coating	Single/Double Silver low-E	Single/Double Silver low-E
Supply capability	300,000SQM / Year	100,000SQM / Year





intertek
Test Buyty Report

SHANDONG HAANGLAS CO., LTD HEAT FLOW METER TEST REPORT

SCOPE OF WORK
VIG SPECIMEN - 351.16±0.3Vx3 - ASTM C518

REPORT NUMBER
P0492.01-116-25 R1

TEST DATE
10/06/2022 to 10/12/2022

ISSUE DATE **REVISED DATE**
10/21/22 11/2/2022

PAGES
12

DOCUMENT CONTROL NUMBER
RT-A-AMER-Test-7906 (01/11/22)
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SGS

Test Report No.: SHAE22002802051 Date: Oct 29, 2022 Page 1 of 5
Client Name: Shandong HaanGlas Co., LTD

Client Address: No 2 Dongyue Ave. Taishan District Tai'an, Shandong 271000

Sample Name: Vacuum Insulating Glass Metal Sealing Materials
The above sample(s) and information were provided by the client.

SGS Job No.: SP22-025148
Sample Receiving Date: Oct 26, 2022
Testing Period: Oct 26, 2022 - Oct 29, 2022
Test Requested: Select test(s) as requested by the client.
Test Method(s): Please refer to next page(s).
Test Result(s): Please refer to next page(s).

Test Requirement	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU - Lead, Mercury, Cadmium and Hexavalent chromium	Pass

Signed for and on behalf of
SGS-CTC Standards Technical Services (Shanghai) Co., Ltd.

Dora Hu

Dora Hu
Approved Signatory



SGS is a leading provider of inspection, verification, testing and certification services. We are committed to providing our clients with the highest quality of service and the most accurate and reliable results. Our services are recognized by the international community and are a key factor in the success of many of our clients. For more information, please visit our website at www.sgs.com.

- SGCC -2023-2026
- IGCC -2023-2026
- CE -2023-2028
- ROHS -2022
- MORE TO COME



Vacuum Glazed Aluminium windows

Alum Windows Code	MAX SIZE	AAMA RATING	Best U value
VWP91 Picture Window	1500*2500	CW PG60	0.74W/M2.K
VWP91 Tilt&Turn Window	1200*1800	CW PG50	0.91W/M2.K
VWP91 Casement Window	1200*1000	CW PG50	1.19W/M2.K
VWP91 Awning Window	900*1500	CW PG50	1.19W/M2.K
VWP91 Side Hinged Door	1000*2500	CW PG40	1.02W/M2.K
VWS70 Picture Window	1500*2500	CW PG60	0.79W/M2.K
VWS70 Tilt&Turn Window	1200*1800	CW PG50	1.02W/M2.K
VWS70 Casement Window	1200*1000	CW PG50	1.47W/M2.K
VWS70 Awning Window	900*1500	CW PG50	1.47W/M2.K
VWS70 Side Hinged Door	1000*2500	CW PG40	1.25W/M2.K

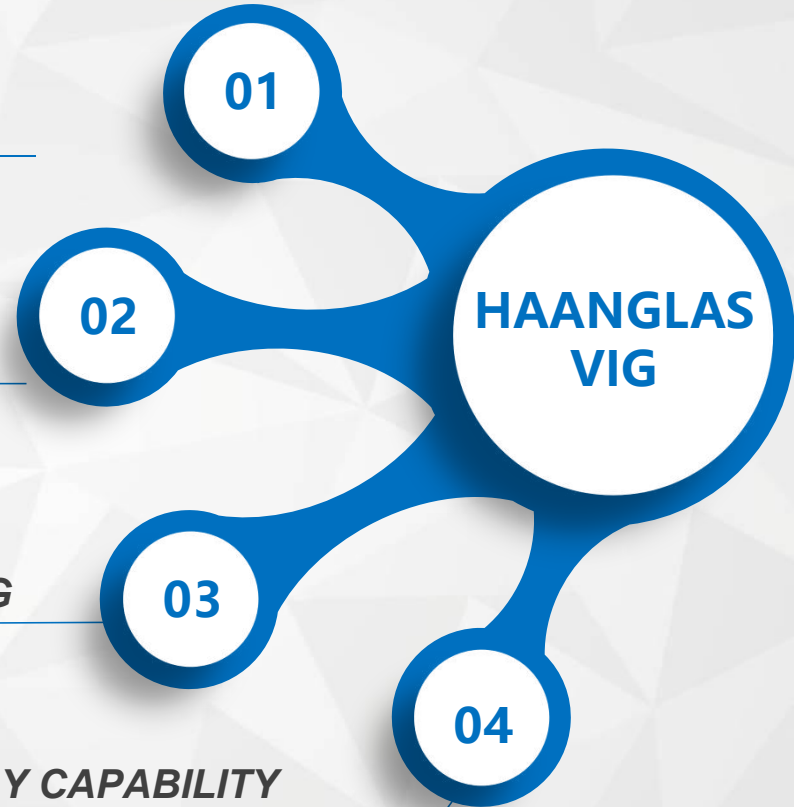


FULLY TEMPERED SAFETY GLASS

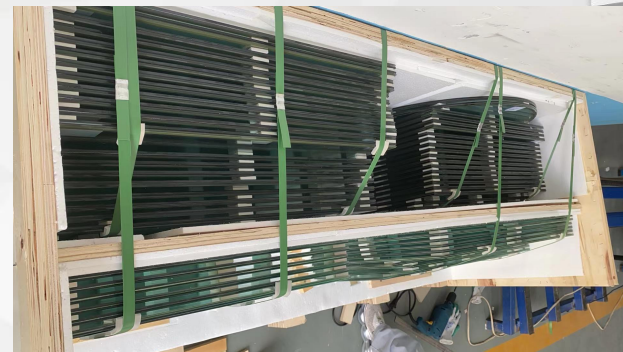
NO EVACUATION HOLES

UNIQUE 3+3 TEMPERED VIG

HUGE SUPPLY CAPABILITY



Project	Glass Combintion	Qty	Status
Qingdao Shanfu Hotel	5S1.16+0.15V+5C	5,800sqm	Finished
Huawei Auto Plant	6 PLE10B+0.15V+6C	6,000sqm	Finished
USA Grant Deneau Tower	5S1.16/D80 +0.15V+5Euro Grey	4,700sqm	Finished
USA Hawthorne School Glass	5S1.16+0.15V+5C	1,200sqm	ongoing
Germany Ehemalige	5S1.16 +0.15V+5C	700sqm	Finished
Mexico Heinkin Beer Refrigerator	4S1.16+0.15V+4C	2,000sqm	Finished
UK Social Houseing Retrofitting	5S1.16+0.15V+5C	280,000sqm	ongoing



INTRODUCTION

FEATURE

BENEFIT

HAANGLAS VIG

NET ZERO



INTRODUCTION

FEATURE

BENEFIT

HAANGLAS VIG

NET ZERO



INTRODUCTION

FEATURE

BENEFIT

HAANGLAS VIG

NET ZERO

**NORTH AMERICA****BENELUX****UK****UAE****MORE**

HAANGLAS strive to develop agents worldwide to promote VIG on

Building renovation, New constructions, Refrigerators, Greenhouse, BIPV

INTRODUCTION

FEATURE

BENEFIT

HAANGLAS VIG

NET ZERO



05

NET ZERO POLICIES

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PARIS AGREEMENT

The Paris Agreement entered into force on 4 November 2016. Today, 194 Parties (193 States plus the European Union) have joined the Paris Agreement.

In next decades, VIG will be applied in worldwide building renovation projects that account for 30% of total building carbon emission.



Substantially reduce global greenhouse gas emissions



Review countries' commitments every five years



Provide financing to developing countries to mitigate climate change

USA

1

The Inflation
Reduction Act



European Union

2

FIT FOR 55



CHINA

3

Carbon Peak-2030
Carbon Neutrality-2060



USA

1

Architects estimate that 75 percent of existing U.S. buildings require renovation to meet the emission reduction targets

European Union

2

Around 75% of EU buildings are still energy inefficient, there is an urgent need to scale up investments in energy renovations.

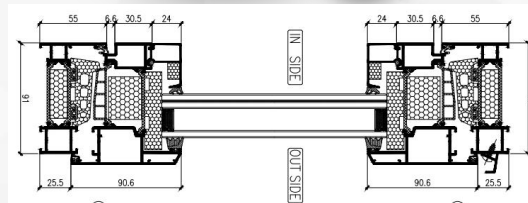
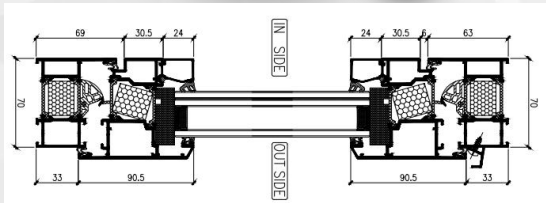
- Energy Efficiency Directive
- Nearly -Zero Energy Buildings
- Renovation Wave
- Energy Star
- The Inflation Reduction Act
- Building Energy Code Program

VWS70

1

VWP91

2



Aluminium System windows

70mm Thick
 $U_w = 1.0W/M2.K$

Aluminium Passive windows

91mm Thick
 $U_w = 0.8W/M2.K$

Product Series

- Aluminium Fixed
- Aluminium Dual Action
- Aluminium Awning
- Aluminium Sliding
- Aluminium Casement
- Aluminium Doors
- Aluminium hung



The background is a light gray field composed of numerous overlapping triangles of varying shades, creating a low-poly, crystalline effect. Scattered across this field are several circles of different sizes. Some are solid blue, while others are white with a subtle drop shadow, giving them a three-dimensional appearance as if they are floating or attached to the surface. The word "THANKS" is centered within one of the larger white circles.

THANKS

HAANGLAS

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