LandVac® **100% Tempered Vacuum Insulated Glass** *Redefining Safety, Energy Efficiency, and Comfort*

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LandVac®
Tempered Vacuum Insulated Glass

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01 What is LandVac®

LandVac®, Fully Tempered Vacuum Insulated Glass.
LandVac®, Redefining the Standards for Safety, Energy Efficiency, and Comfort.

02 Certifications

Note:

ATI: Founded in 1970, ATI is a leading certification body for architectural engineering testing and inspection in North America.

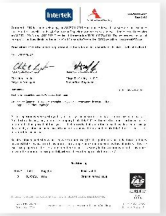
ift: ift is a world-renowned building materials testing institution in Germany.

ANSI: Established in 1918, ANSI is the center for U.S. national standards.

RoHS, officially known as the "Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment", is a mandatory standard established by European Union.

Thermal transmittance (U-value): as low as 0.4W/(m²·K); data source: ift test report.

Weighted Sound Reduction Index (Rw): exceeding 36dB; data source: ift test report.



Fully tempered: surface stress and ranularity meet empered glass standards, wind resistance up to ±7200 Pa. LandVac passed American ANSI Z97.1-2015& CPSC 16 CFR 1201 (1977) impact testing (data source: U.S. Intertek-ATI test report).

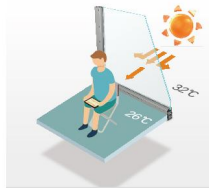
Environmental protection: the edge-sealing materials are in compliance with RoHS 2011/65/EU Directive requirements , environmental friendly, free of lead and pollution.

03 Performance Advantages

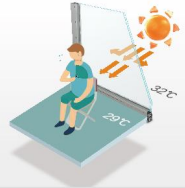
• Thermal Insulation

U-value as low as 0.4W/(m²·K). A 8.3 mm thick LandVac has better thermal insulation effect than the 1.5m thick brick wall.

Thanks to the high vacuum chamber of LandVac, which effectively blocks the thermal transmission, the thermal insulation performance of LandVac is 2-4 times better than insulated glass and 6-10 times better than single pane glass. The properties of this product meet all international thermal transmittance requirements on windows and doors for passive houses.



LandVac 0.6W/(m²·K)



Insulated glass 1.8W/(m²·K)

• Noise Reduction

With its weighted sound reduction index exceeding 36dB, LandVac makes rooms in downtown quiet like a library.

Thanks to the high vacuum chamber of LandVac , which effectively blocks the sound transmission, the sound insulation performance is far better than insulated glass. It has remarkable acoustic properties against high penetrative medium and low frequency noises such as traffic and construction noises.

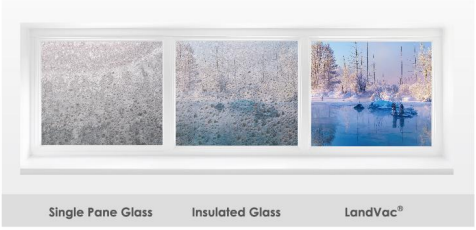
LandVac Rw＞36dB

Insulated glass Rw＞29dB

• Free of condensation

Free of condensation even when the temperature falls below -70℃. Ultra low dew point allows LandVac in buildings and freezers to maintain their exceptional transparency.

LandVac effectively eliminates the dew condensation between glass layers. Meanwhile, the high thermal resistance property significantly lowers the dew point of LandVac surface as well.



Test conditions: tested at temperature of 25℃ with relative humidity of 70%.

• Fully Tempered

Surface stress and granularity meet tempered glass standards and passed several key safety tests including wind resistance test and impact test. Each piece of 8.3 mm thick LandVac can withstand the pressure of a 1.7 m tall sand column, equivalent to 1 m^2 of LandVac having 40 adults with an average body weight of 70 Kg standing on the surface.

By adopting low temperature sealing technology, LandVac completely retains the high strength, impact resistance, and other safety attributes of tempered glass. In case the glass breaks, it shatters into small and less harmful honeycomb shaped particles.

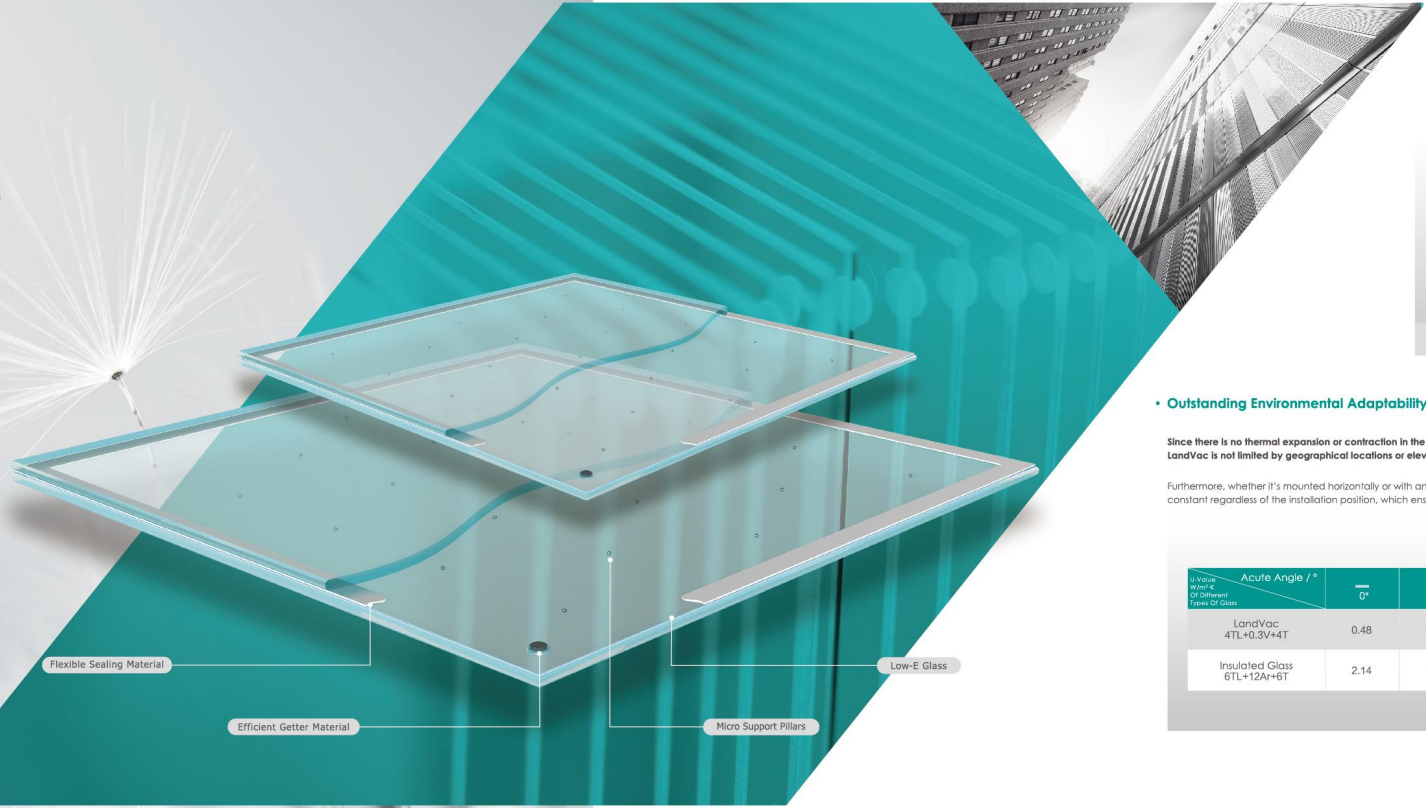
• Thin Structure

The 8.3 mm thick LandVac weights only 20Kg/m², considerably reducing the costs for components, storage and logistic operations.

In comparison with triple-pane insulated glass, LandVac has only a quarter of its thickness and weighs at least 12 Kg less per square meter while managing a better U-value.

Type	U- value (W/m²·K)	Visible Light Transmittance (%)	Thickness (mm)	Weight (Kg/m²)
LandVac 4TL*+0.3V+4T	0.48	71	8.3	20
Insulated glass 4TL*+12Ar+4TL*+12Ar+4T	0.75	50	36	32

Note: provided radiation rate of Low-E glass at 0.05.



Deflection of Insulated Glass

• Outstanding Environmental Adaptability

Since there is no thermal expansion or contraction in the high vacuum chamber of LandVac, the use of LandVac is not limited by geographical locations or elevation.

Furthermore, whether it's mounted horizontally or with an angle, the U-value of LandVac remains constant regardless of the installation position, which ensures excellent energy saving effect.

U-Value W/m²·K Of Different Types Of Glass \ Acute Angle / °	— 0°	∠ 30°	∠ 60°	L 90°
LandVac 4TL+0.3V+4T	0.48	0.48	0.48	0.48
Insulated Glass 6TL+12Ar+6T	2.14	1.98	1.66	1.45

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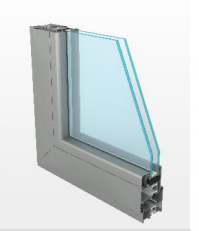
- **Super Long Life**

The service life expectancy of LandVac exceeds 25 years.

By using flexible edge sealing materials, LandVac overcomes the seal failure problem caused by fragile sealing materials especially in the environment with big temperature difference between the inner and outer glass surfaces. Moreover, with the assistance of built-in high efficiency getter material, it can sustain a high level of vacuum for a long time.

LandVac> 25 years



Insulated glass < 15 years

04 Product Type

LandVac Product parameters

Products				Low-E Glass Type	Visible Light		Solar Energy		Thermal Transmittance U-value W/m²·K	Total Solar Energy Transmittance (TET) g	Shading Coefficient Sc	Light-to-solar Gain LSG	The Weighted Sound Reduction Index dB
					Transmittance %	Reflectivity %	Transmittance %	Reflectivity %					
Home Appliances	Home Appliance	Vacuum Insulated Glass 4TL+0.3V+4T	High Transmittance Series	Off-line Double Silver	70	16	36	47	0.40	0.49	0.56	1.43	36
		Vacuum Insulated Glass 4TL+0.3V+4TL		Off-line Double Silver	62	11	27	37	0.35	0.36	0.41	1.72	36
Architecture	Regular Series (Including Special Shaped)	Vacuum Insulated Glass 5TL+0.3V+5T	High Transmittance Series	Off-line Double Silver	70	16	36	47	0.48	0.49	0.56	1.43	36
				Off-line Single Silver	80	15	57	35	0.53	0.62	0.71	1.29	36
				On-line	74	20	63	20	0.93	0.76	0.87	0.97	36
			Shading Series	Off-line Double Silver	63	24	28	47	0.42	0.29	0.34	2.17	36
				Off-line Single Silver	45	16	21	11	0.72	0.24	0.28	1.88	36
	Thermal Insulation Series	Vacuum Insulated Glass Plus Insulated 5TL+0.3V+5T+12A(Aluminum Spacer)+5T	High Transmittance Series	Off-line Double Silver	63	22	32	49	0.44	0.45	0.52	1.40	40
				Off-line Single Silver	72	23	51	39	0.48	0.57	0.65	1.26	40
				On-line	67	27	56	25	0.79	0.69	0.79	0.97	40
			Shading Series	Off-line Double Silver	57	28	26	48	0.41	0.27	0.31	2.11	40
				Off-line Single Silver	40	18	18	12	0.63	0.22	0.26	1.82	40
	Sound Insulation Series	Vacuum Insulated Glass Plus Laminated 5TL+0.3V+5T+1.14P+4T	High Transmittance Series	Off-line Double Silver	63	22	32	49	0.47	0.46	0.53	1.37	42
				Off-line Single Silver	72	23	51	39	0.51	0.57	0.66	1.26	42
				On-line	67	27	56	25	0.88	0.7	0.81	0.96	42
			Shading Series	Off-line Double Silver	57	28	26	48	0.40	0.27	0.31	2.11	42
				Off-line Single Silver	40	18	18	12	0.69	0.22	0.26	1.82	42
	Premium Series	Vacuum Insulated Glass Plus Insulated Plus laminated 5TL+0.3V+5T+12A (Warm Edge)+ 4T+1.14P+4T	High Transmittance Series	Off-line Double Silver	57	26	29	51	0.42	0.43	0.49	1.33	46
				Off-line Single Silver	65	29	46	43	0.45	0.53	0.61	1.23	46
				On-line	61	32	51	29	0.74	0.64	0.74	0.95	46
			Shading Series	Off-line Double Silver	52	32	23	50	0.36	0.25	0.28	2.08	46
				Off-line Single Silver	36	20	17	13	0.59	0.2	0.23	1.80	46
	Passive House Series	Passive House Product 5T(Ultra White)+0.3V+5TL+12A(Warm Edge)+ 5T (Ultra White)	High Transmittance Series	Off-line Single Silver	75	18	51	34	0.47	0.58	0.67	1.29	40

REMARKS

1. T--tempered clear glass ; TL-- tempered Low-E glass ; V--vacuum space ; P-- PVB interlayer ; A--air space.
2. Max. Size: 1500 × 2500 (mm) ; Min. Size : 300 × 300 (mm).
3. Low-E coating on 3rd surface for high transmittance series and on 2nd surface for shading series.
4. The performance data are calculated in accordance with U.S. ASHRAE Standards.
5. Above data are for reference only. Parameters for a specific product needs to be calculated separately. For parameters related to a specific product, please refer to the data provided by LandGlass.

05 Quality Assurance

Certified under ISO9001 quality management system and U.S. SGCC, LandGlass Fully Tempered Vacuum Insulated Glass Manufacturing Center guarantees the precise and effective control throughout the entire R&D process of LandVac as well as the stability of product quality.

• Core Technologies

Low temperature sealing technology:
Low temperature sealing technology: By adopting low-melting-point metal as the sealing material, successfully solved the world-class problem of tempered glass annealing during production.

High Vacuum Sealing Off technology:
Air removing and sealing are done in an Ultra High Vacuum environment, it guarantees the consistency of high vacuum in LandVac.

Flat sealing technology:
To make product safer and better looking and allow easier and more cost efficient packaging, storage, and transportation.

Flexible edge sealing technology:
Flexible-sealing materials can withstand more severe thermal shock and larger temperature difference between the surfaces, improving the durability of LandVac significantly.

Intelligent control technology:
The intelligent continuous production line optimizes the production management and control while guaranteeing the quality of LandVac.

• Advanced equipment

After eight years of endeavor, LandGlass developed the automatic fully tempered vacuum insulated glass production line. The production line consists of fully automatic spacer placement, high precision automatic combining of glass sheets, continuous removing air in high vacuum environment, and state-of-the-art Cyclone™ series JetConvection™ tempering furnace along with full lines of other top brands glass processing equipment. With carefully selected high quality glass sheets, application of self-developed five major technologies, and implementation of monitoring and inspection measures far exceeding industrial standards, LandGlass warrants the Superior quality of LandVac.

• Product inspection

LandGlass has established high standard quality control system for the raw material checking, process monitoring and final products inspection with the world's leading testing instruments and technologies, focusing on safety and thermal insulation performance of LandVac. We can ensure that every piece of LandVac is of superior quality.

06 Applications

• Architecture

LandVac is thin, lightweight, and safe. The remarkable performance in thermal and sound insulation makes it a perfect fit for green buildings and quality living environment.

Applications: Doors, windows, curtain walls, and skylights for upscale commercial and residential buildings, public facilities, and landmark structures, as well as for noiseless doors and windows. It can also be used to replace the single-pane window glass on historic buildings for energy-saving.

• Home Appliances

The advantages LandVac has in energy savings, weight, thickness, safety, and condensation-free will help home appliances to upgrade.

Applications: Ideal for freezers, wine cabinets, and display cases.

• Science & Research

The outstanding performance of Landvac allows scientific projects to be successfully carried out under harsh environmental conditions where high thermal insulation and condensation resistance are required.

Applications: Lab observation windows and test cabinets.

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• Vehicles

In addition to the excellent thermal insulation, soundproofing and condensation-free features of LandVac, its optical transparency performance makes LandVac the best choice for automobile windows.

Applications: Suitable as flat window materials for automobiles, high-speed rail, aircraft, and vessels.

• Agriculture

The distinguishing traits of LandVac in thermal insulation and optical transparency are just right for precision agriculture.

Applications: Modern greenhouse farming.

• BIPV

LandVac's performance in thermal insulation and sloped installation makes it a perfect candidate as the lining glass in solar power generation applications.

Applications: Solar photovoltaic buildings.

07 Company Profile

Luoyang LandGlass Technology Co., Ltd. (hereinafter "LandGlass") is a high tech enterprise specialized in the development, manufacturing and marketing of glass tempering furnaces, fully tempered vacuum insulated glass and its production line, offering smart integrated solutions for high-end energy saving glass to glass processing companies around the world. Since its formation, under the guidance of company values of integrity, quality, innovation, and service, LandGlass has established its innovation driven approach to the company's development and secured the world's leading position in the glass processing industry.

By embracing innovation and adopting state-of-the-art intelligent technologies in glass tempering industry, LandGlass is committed to providing its customers the finest innovative technology, world's leading glass tempering equipment, and intelligent customer support before, during, and after sales that allow companies to continuously challenge themselves and succeed! LandGlass'R&D team, consisting of nearly one hundred dedicated engineers and scientists, devoted eight years of unremitting efforts to the success of the fully tempered vacuum insulated glass and its intelligent production line, redefining the standards of safety, energy efficiency, and comfort, leading the trend of green and low-carbon life!

Set the trend. The future is now! Today, LandGlass is offering its customers tailored solutions through digital manufacturing and smart service support. We firmly believe that with joint efforts, we will lead the industry development in this new wave of intelligent manufacturing and enjoy a safer and better life!