INTRODUCTIONS
to
LANDGLASS & LandVac
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I. Introduction to LandGlass:

1. About us:

LandGlass Technology Co., Ltd. is a high-tech enterprise specializing in R&D, manufacture and sales of tempering furnaces and tempered vacuum insulated glass (VIG units).

There are more than 500 employees in LandGlass. Apart from the company headquarter which is located in the downtown of Luoyang, LandGlass has a Tempering Furnace Manufacturing Base in Luolong District with over 68,000 square meters, a Tempered Vacuum Insulated Glass Manufacturing Base in Yibin District with over 200,000 square meters and a New Products R&D Base in suburb with over 25,000 square meters.

Now, LandGlass has got more than 530 authorized patents for VIG, in which there are around 170 foreign patents in Europe, USA, Australia, Canada, Russia, Japan, Korea, etc.
2. Company's Honors

2004 Provincial Enterprise Technology Center

2008 High-tech Enterprises in Henan

2012 Postdoctoral Research and Development Base in Henan

2012-2013 Top Award in the industry and the Gold Medal of Chinese Patent in two consecutive years

2015 Intellectual Property Advantage Enterprise, the only enterprise selected in Luoyang

2017 Awarded as the "Leading Innovation Enterprise of Henan Province in 2017", the only enterprise in Luoyang which successfully passed the evaluation of Henan Provincial Department of Science and Technology.

2018 Selected in the list of "Technical Innovation Capability Top 1000 of China in 2018"
II. About LandVac Units

Fully Tempered Vacuum Insulated Glass of LandGlass (LandVac)

1. Structure of LandVac

![Diagram of LandVac structure]

2. Specifications of LandVac Units

<table>
<thead>
<tr>
<th>Items</th>
<th>Configurations</th>
<th>Main Parameters</th>
<th>Descriptions</th>
</tr>
</thead>
</table>
| Standard    | 5TL+0.3V+5T    | 1. U Value < 0.5W/m²K.  
2. Visible Light Transmittance is 75%. | Thickness optional 4mm/5mm/6mm        |
| VIG+IG      | 5T+9A+5TL+0.3V+5T | 1. Max size : 1450*2480mm 
2. Min size : 300*300mm  
Remarks: LandVac unit is a customized glass product. Its properties of U value, visit light transmittance and shading coefficient can be adjusted as per customers’ requirements. | 6mm/9mm/12mm/16mm                    |
| VIG+LG      | 5T+0.3V+5TL+0.76P+5T | 0.76mm or 1.52mm                                                               |                                       |

Remarks: 5T for 5mm clear glass, 0.3V for 0.3mm vacuum chamber, 5TL for 5mm Low-E glass, A for air space, P for PVB laminated layer
3. Advantages of LandVac Units

(1). Fully Tempered Glass

The stress at any points on the surface of LandVac exceeds 90 MPa, LandVac becomes small particles with obtuse angles after being broken. LandVac meets the national standard of toughened glass GB15763.2-2005, has passed the American Safety Glass Standard ANSI Z97.1 and obtained the Certification of American SGCC (Safety Glass Certification Association). The strength of wind resistance of LandVac reached up to +7200Pa (ATI Laboratory Test Report of the United States) and reached the top standard of wind pressure resistance grade 9 in China (Grade 9 is more than 5000Pa).
(2). Excellent Thermal Insulation Property:

The thermal insulation performance of vacuum insulated glass is based on the theory of vacuum flask, the heat insulation effect of LandVac is more than 1.5 meters thick brick wall, it is 6 times than that of the normal insulating glass. U value is as low as 0.4W/m2k ( European IFT Laboratory Test Report ).

(3). Outstanding Sound Insulation & Noise Reduction Properties

The sound insulation and noise reduction performance of vacuum insulated glass is based on the fact that sound does not propagate in vacuum chamber. The Weighted Sound Reduction Index at full frequency band can reach up to 39dB ( CTC National Inspection Group Report ), while the weighted sound reduction index of regular insulated glass is 28 dB.
(4). Free of Dew Condensation

Thank to the vacuum chamber of LandVac unit, so there is no inner condensation, even the temperature is lower than -40°. What’s more, its lead-free sealing material has passed the RoHS Certification. Therefore, LandVac can be used in global high-end home appliance industry.

(5). Super Service / Application Lifespan:
All kinds of materials consisting of LandVac units are inorganic. Even facing the high temperature, high moisture, high radiation and so on, LandVac units are not easy to get aged. Meanwhile, high vacuum chamber can protect the Low-E glass coatings from getting aged. In a word, the lifespan of LandVac can reach up to over 25 years.

(6) Stable and Reliable Quality

The fully automated vacuum insulated glass production line at LandGlass has the annually capacity of 200,000 square meters. This production-line has passed ISO 9001:2015 Quality System Certification and the strict System Audit and Process Audit of BSH Household Appliances as well. All these will ensure every single piece of LandVac units has the reliable quality, which is insured by PICC Quality Assurance Insurance.
3. Comparisons with Insulated Glass

<table>
<thead>
<tr>
<th>Items</th>
<th>Configurations</th>
<th>U Value (W/m²K)</th>
<th>RW (dB)</th>
<th>Thickness (mm)</th>
<th>Weight (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LandVac</td>
<td>5T+0.3V+5TL</td>
<td>0.45</td>
<td>39</td>
<td>10.3</td>
<td>25</td>
</tr>
<tr>
<td>Low-E IG</td>
<td>5T+12A+5TL</td>
<td>1.6</td>
<td>28</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Triple Glazing with Low-E IG</td>
<td>5T+12A+5TL+12A+5T</td>
<td>1.2</td>
<td>32</td>
<td>39</td>
<td>37.5</td>
</tr>
</tbody>
</table>
III. Some Application Cases

**Project 1 : Renovation Project for Beijing Institute of Architectural R&D**

LandApplication Amount : 1500m²
Configuration : 6T+16Ar+5T+0.3V+5TL
Application : Window, Curtain wall
Profile : 105 Broken Bridge Aluminum
Notes: U value of whole windows unites < 0.9 W/m²K

**Project 2 : Government Office Building Project of Luoyang**

LandVac Application Amount : 2000m²
Configuration : 5TL+0.3V+5T
Steel frame concealed frame curtain wall
Application : Window, Curtain wall
Notes: U value of whole windows unites < 0.9 W/m²K
Project 3: Border Post

LandVac Application Amount: 100m²
Configuration: 5TL+0.3V+5T
86 Aluminum-clad wood
Application: Windows & Doors glass
Notes: 40° difference of Internal and external without condensation

Project 4: Erlitou Musem Project in Luoyang

LandVac Application Amount: 100m²
Configuration: 4TL+0.3V+4T+1.52P+5T
Steel exposed frame
Application: Sunroof glass
Notes: High visible light transmittance & Low heat transfer

Project 5: Villa Project of Country Garden in Guangdong

LandVac Application Amount: 3000m²
Configuration: 5T+0.3V+5TL+14A
( warm edge ) +5T
75 Broken Bridge Aluminum
Application: Windows & Doors glass
Notes: U value of whole window unit < 1.0 W/m²K
Project 6: Villa Project in Weifang, Shangdong

LandVac Application Amount: 5000m²
Configuration: 5TL+0.3V+5T+9A+5T
88 Broken Bridge Aluminum
Application: Windows & Doors glass
Notes: U value of whole window unit < 1.0 W/m²K

Project 7: Passive House Project in Xinjiang

LandVac Application Amount: 1000m²
Configuration: 5T+0.3V+5TL
80 High class Plastic steel
Application: Windows & Doors glass
Notes: U value of whole window unit < 1.0 W/m²K

Project 8: Skylight System Project in Hebei

Usage amount LandVac: 1000m²
Configuration:
4T+9Ar+5T+0.3V+5TL+0.76P+4T
Aluminum-wood composite
Application: Skylight Glass
Notes: U value of whole windows unit < 0.9 W/m²K
IV. Development Trend of the Future

In recent years, green building materials are being used in lots of public construction projects at the backdrop of the global advocacy of green building, especially in the low energy consumption and passive buildings, which has very strict requests for door and window glass. Vacuum insulated glass with its irreplaceable energy saving property wins the favor of passive and low energy consumption buildings. Undoubtedly, there will be a broad market prospect for VIG units. Meanwhile, vacuum insulated glass has a very broad developing prospect in green appliances, transportation, military development and other application fields.