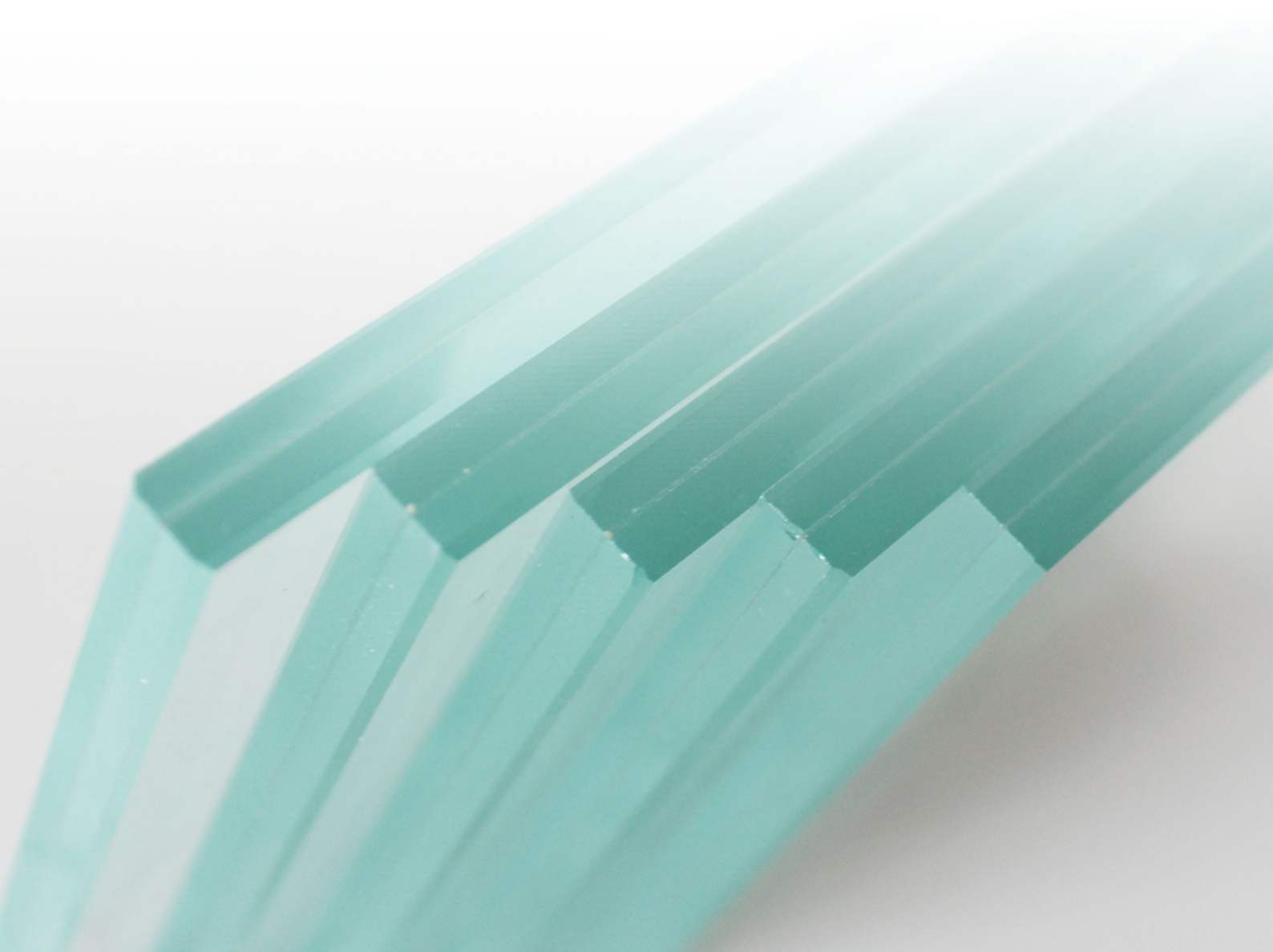


# NOVAL GLASS

## LAMINATED GLASS



[WWW.NOVALGLASS.COM](http://WWW.NOVALGLASS.COM)

## ABOUT LAMINATED GLASS

### GENERAL INTRODUCTION

LAMINATED GLASS is made up of two or more sheets of glass bonded together with a clear or colored polyvinyl Butyral (PVB) interlayer. Various transparent or translucent shades and color can be achieved by using different colored PVB. After the plastic has been placed between the glass sheets, the whole assembly is subjected to heat and pressure. This results in the complete adhesion of the vinyl and the glass. In the event of breakage, the glass fragments remain bonded to the PVB. If the glass breaks, the fragments of glass are held in place by the PVB interlayer(s). In fully framed installations the broken glass retains residual strength while awaiting replacement.

- Color:** Clear, Ultra Clear, Milk white, Green, Blue, Bronze, Grey etc...
- Thickness:** 2+0.38(0.76)+2, 3+0.38(0.76)+3, 4+0.38(0.76)+4, 5+0.38(0.76)+5, 6+0.76(0.38)+6, 8+0.76(0.38)+8 etc...  
Thickness combination can be customized.
- Size:** 2440mm\*1830mm, 3300mm\*2140/2250/2440mm , 3660mm\*2140/2250/2440mm etc..  
Size can be customized.

### TEMPERED LAMINATED GLASS

Tempered Laminated Glass is made of two or more layers of glass, which is tempered in advance, with more layers of PVB film than normal laminated glass. It combines the double advantages of tempered glass and laminated glass. By adding more PVB and different thickness of glass, it will achieve the function of bullet proof, for which it is widely used in bank, jewelry shop, and vehicle etc...

- Color:** Clear, Ultra Clear, Milk white, Green, Blue, Bronze, Grey etc...
- Thickness:** Glass Thickness 3mm to 19mm. PVB Layer Thickness 0.38mm.  
Glass and PVB layer combination is customized.
- Size:** No Standard size. All sizes are customized.

### SGP LAMINATED GLASS

SGP Laminated Glass is made of DuPont™ SentryGlas® interlayer instead of PVB. SGP Laminated Glass is stronger and more rigid than conventional laminated glass. 5 times tougher and up to 100 times stiffer provides protection against bigger storms, larger impacts and more powerful blasts. After laminating, the SGP interlayer becomes an engineered component within the glass, holding more weight, so the glass can serve as a more active structural element in the building envelope, increasing framing system design freedom. SGP Laminated Glass performance helps architects and glazed building system manufacturers meet society's need for greater security, energy efficiency, noise reduction, healthful living, safety and maintenance ease. It helps builders do more with less, creating innovative new spaces, while providing greater protection for occupants.

- Color:** Clear, Ultra Clear, Green, Blue, Bronze, Grey.
- Thickness:** Glass Thickness 3mm to 19mm. SGP Layer Thickness 0.89mm, 1.52mm.  
Glass and SGP layer combination is customized.
- Size:** No Standard size. All sizes are customized.



## GLASS OPTION

Various glass type can be applied for Laminated Glass.

**Float Glass:** Clear Float Glass, Ultra Clear Float Glass, Body Tinted Float Glass.

**Coated Glass:** Low-E Glass, Reflective Glass.

**Decoration Glass:** Patterned Glass, Acid Etched Glass, Painted Glass, Screen Printed Glass, Mirror etc...



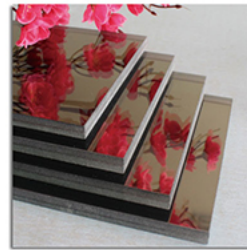
Patterned Glass



Clear Mirror



White Painted Glass



Bronze Mirror



Acid Etched Glass

## COLOR OPTION

Laminated Glass color can be from glass color as well as PVB interlayer color.



F Green



Dark Green



Dark Blue



Light Grey



Euro Grey



Euro Bronze



Milky White



Opal White



Opal Red Orange



Opal Ocean Blue



Opal Green



Opal Black

## PERFORMANCE & APPLICATION

### PROTECTION AGAINST INJURY

If the glass breaks, the fragments of glass remain bonded to the interlayer. Meanwhile, the object is prevented from passing through the glass. This safety feature, which is often mandatory (for example, in public buildings, schools, crèches, etc), is also ideal for residential buildings, where it protects the occupants.



Handrail & Floor



Canopy

### PROTECTION AGAINST VANDALISM AND BURGLARY

Tempered Laminated Glass is made of two or more layers of glass, which is tempered in advance, with more layers of PVB film than normal laminated glass. It combines the double advantages of tempered glass and laminated glass. By adding more PVB and different thickness of glass, it will achieve the function of bullet proof, for which it is widely used in bank, jewelry shop, and vehicle etc...



Bank Front



Show Case

### PROTECTION AGAINST NOISE

Silence laminated acoustic and safety glass can be used in applications where high acoustic insulation is essential (e.g. interpreting booths, residential areas in close proximity to airport, towns or city centers, railway lines or motorways, etc), without compromising the safety performance.



Phone Booth



Airport

### PROTECTION AGAINST FIREARMS AND EXPLOSIONS

Bullet Proof Laminated Security Glass provides protection against armed attack (e.g. financial institutions, banks, guardrooms, official or military units, etc).

Please find the details on catalogue *NOVAL GLASS BULLET PROOF GLASS*

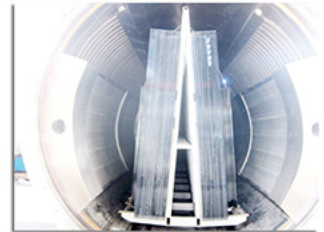
### PROTECTION AGAINST UV LIGHT

The PVB interlayer in Laminated Glass range filters most UV rays. It can be used to reduce the discoloration of items inside a building that are exposed to direct sunlight (e.g. shop window displays, curtains, carpets, conservatories etc).



## PRODUCTION, PROCESSING & INSTALLATION

### PRODUCTION PROCESS



### PROCESSING COMBINATION

#### 1. Edge Worked

Matt, Grinded and Polished appearance as well as Flat, Round and Beveled shape all available, providing that edgework after assembly does not comprise any toughened or heat-strengthened components.

#### 2. Heat-Strengthened, Tempered or Heat Soaked

The components must be heat-treated before laminating.

#### 3. Drilled and Notched

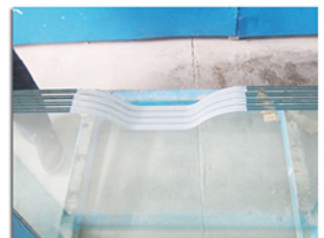
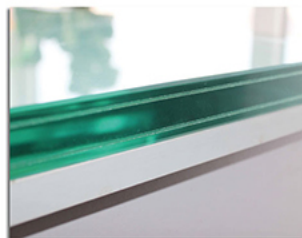
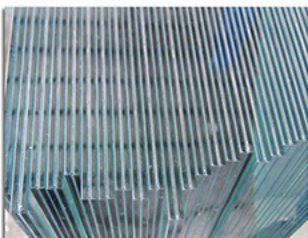
For tempered and ultra thick laminated glass, the individual components should be processed prior to laminating. In other situation, processing both before and after laminating are OK

#### 4. Screen Printed

Various color & shape, customized design. Printing can be on both outer face and inner face.

#### 5. Other Processing

Assembled into Double Glazing Unit. Coated a Solar Control Coating, or a Low-E Coating. Sandblasted or Acid Etched.



### INSTALLATION GUIDELINES

1. All the products described above must be installed in accordance with current national standards and regulations and our own installation instructions. Unless gasket glazed into a drained and ventilated system, particular care must be taken to protect the PVB interlayer against water ingress. Prolonged contact with water can cause the interlayer to swell and ultimately lead to delamination.
2. The interlayer should be protected from contact with unsuitable mastics and sealants containing mineral or vegetable oils and unsuitable glazing compounds such as acid curing silicones. Only use products classified as suitable for PVB laminated by the manufacture. In case of doubt always check compatibility.

3. For all installations, a thermal safety risk analysis is necessary to ensure that the Noval Laminated glass is not susceptible to break as a result of thermal stress. In order to minimise this risk, locating heat generating devices close to the glazing should be avoided (e.g. spotlights, radiators and convectors which could cause a localised rise in temperature). Similarly, no screens or films should be applied to the glass (posters, signage, adhesive lettering etc).
4. Noval Laminated Glass should not be exposed to temperatures of more than 60 celsius before and post glazing .
5. When incorporated into double-glazing, the laminated glass can be positioned on the inner or outer pane of the unit, depending on the specific safety/security requirements of the application.
6. To provide enhanced protection against vandalism, burglary, firearms and explosions, Noval Laminated glass must be used with the appropriate framing systems. Reference from the standards must be made, depending on the level of protection required, to ensure that the performance of the frame used is fully compliant.

## PACKING & LOADING

### PACKING



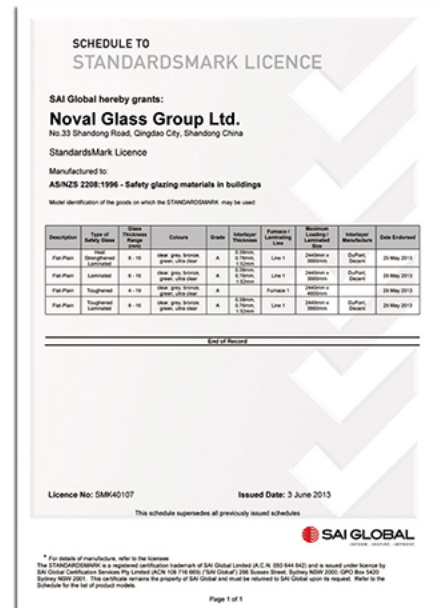
### LOADING





# DATA SHEET, TEST REPORT & CERTIFICATION

## NOVAL CERTIFICATION



## PVB LAYER TEST REPORT



## LAMINATED GLASS EN12600 PENDULUM TEST

Project: EN12600 Product: Laminated Glass	Project: EN12600 Product: Laminated Glass	Project: EN12600 Product: Laminated Glass	Project: EN12600 Product: Laminated Glass
<b>EN 12600</b> Pendulum test - Impact test method and classification for flat glass For details, see test report	<b>EN 12600</b> Pendulum test - Impact test method and classification for flat glass For details, see test report	<b>EN 12600</b> Pendulum test - Impact test method and classification for flat glass For details, see test report	<b>EN 12600</b> Pendulum test - Impact test method and classification for flat glass For details, see test report
Product: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Product: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Product: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Product: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China
Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China
Product: Laminated Safety Glass (5.1)	Product: Laminated Safety Glass (5.1)	Product: Laminated Safety Glass (5.1)	Product: Laminated Safety Glass (5.1)
Test Result: <b>2/0B2</b>	Test Result: <b>3/0B1</b>	Test Result: <b>2/0B2</b>	Test Result: <b>3/0B2</b>
The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.
Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader

## TEMPERED LAMINATED GLASS EN12600 PENDULUM TEST

Project: EN12600 Product: Tempered Laminated Safety Glass	END Quality Service BV	2 Experimental	3 Signature
<b>EN 12600</b> Pendulum test - Impact test method and classification for flat glass For details, see test report	<b>END Quality Service BV</b> Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China Tempered Laminated safety glass (5.1.2)	<b>2 Experimental</b> 2.1 Reference samples and materials The following samples were allowed for the Pendulum test - Impact test method and classification for flat glass EN 12600: Product: Noval Glass Group LTD Production date: 01-06-2017 Commercial product name: EN 12600 (5.1.2) Type and nominal thickness: 10mm Dimensions of the test glass in accordance with EN 12600: 1000x1000mm Reference of the test glass in accordance with EN 12600: 1000x1000mm Applied force (N): 1000	<b>3 Signature</b> Endorsement: October 2017 Author: <i>[Signature]</i> A. Van der Veen - In Charge Project leader
Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)
Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China
Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)	Product: Tempered Laminated Safety Glass (5.1.2)
Test Result: <b>3/0B1</b>	Test Result: <b>3/0B1</b>	Test Result: <b>3/0B1</b>	Test Result: <b>3/0B1</b>
The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.	The tested samples are complying with the requirements of EN12600.
Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader

## LAMINATED GLASS EN-ISO12543 DURABILITY TEST

Project: EN-ISO12543 Product: Laminated Glass	3 Results	3.1 Results	3.2 Results
<b>EN ISO 12543-4</b> Laminated glass and laminated safety glass For details, see test report	<b>3 Results</b> 3.1 General All samples have been tested by the China Safety Glass Certification Center (CSGCC) which is an approved test body and approved by Certification and Registration of the P.R.China (CMAA) and approved by China National Accreditation Board for Certification (CNAS).	<b>3.1 Results</b> Type of specimen: Tempered glass 10mm thick (10mm thick) + Tempered glass Reference test specimen: 1000x1000mm Production date: Laminating working date	<b>3.2 Results</b> Type of specimen: Tempered glass 10mm thick (10mm thick) + Tempered glass Reference test specimen: 1000x1000mm Production date: Laminating working date
Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)
Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China	Under responsibility of: Noval Glass Group LTD No.11 Wansheng Road, Qinghai P.R.China
Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)	Product: Laminated Glass (5.1.2)
Test Result: <b>PASS</b>	Test Result: <b>PASS</b>	Test Result: <b>PASS</b>	Test Result: <b>PASS</b>
The tested samples are complying with the requirements of EN ISO 12543-4.	The tested samples are complying with the requirements of EN ISO 12543-4.	The tested samples are complying with the requirements of EN ISO 12543-4.	The tested samples are complying with the requirements of EN ISO 12543-4.
Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader	Signatures: <i>[Signature]</i> A. Van der Veen - In Charge Project leader