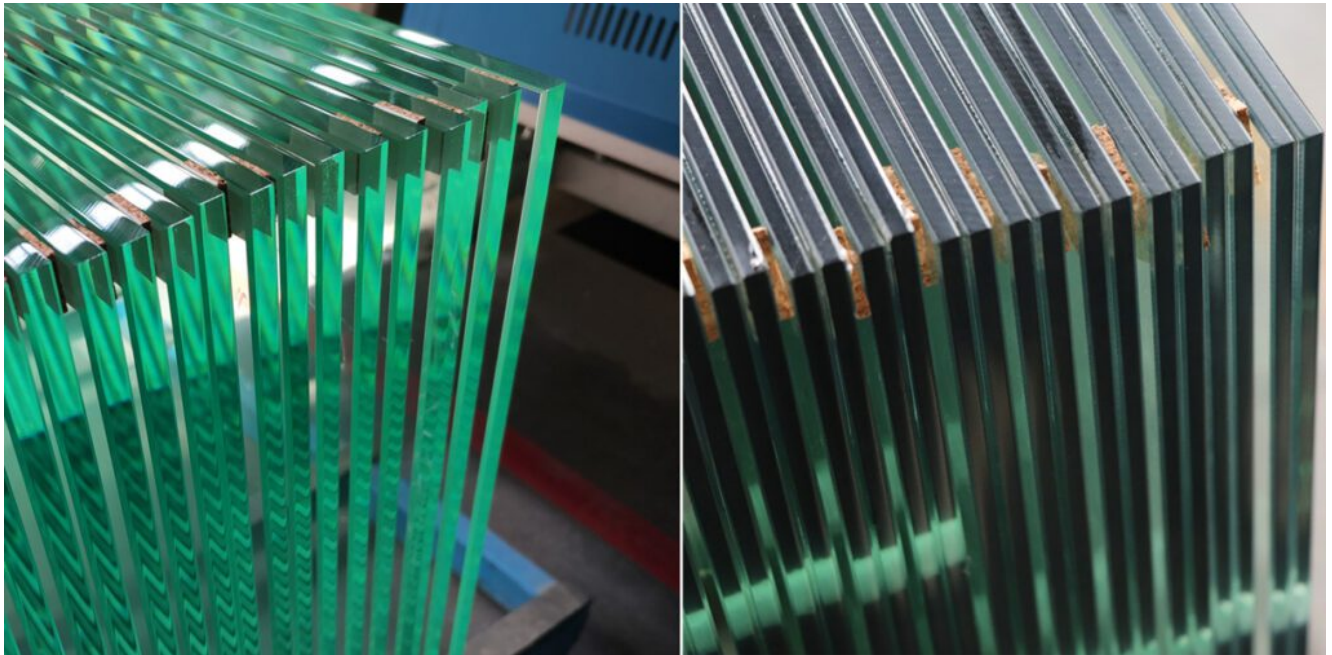
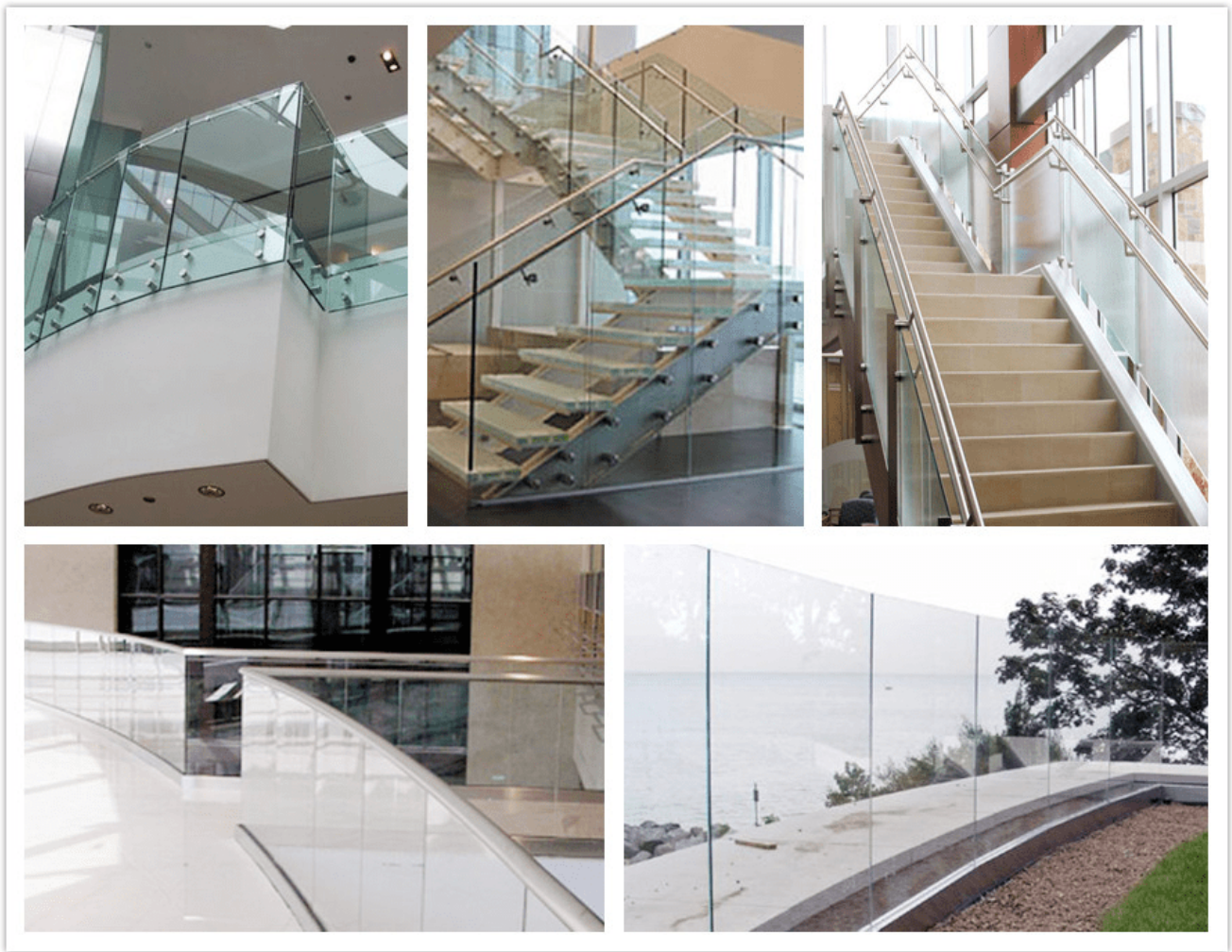


# How to choose two types of safety glazing – laminated glass (VSG) or toughened safety glass (ESG)



There has been an huge demand for “safety glazing” and other safety glass products in order to keep residential and commercial buildings safe. More and more glass suppliers continue to come up with better glass products to meet the needs of safer glazing products by homeowners and commercial building owners.

Today, we’re going to talk about the main difference of two types of safety glazing that are common around us.



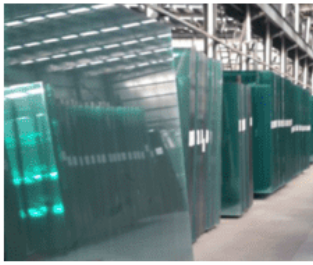
*safety glass railing system*

## How is safety glazing made?

### 1. The manufacturing process of tempered glass

Using annealed glass as raw material, the glass is heated to about 600 degrees Celsius in a tempering furnace, and then rapidly cooled with air, and the compressive stress reaches more than 95 MPa.

Raw Material



Bottero-cutting



Grinding



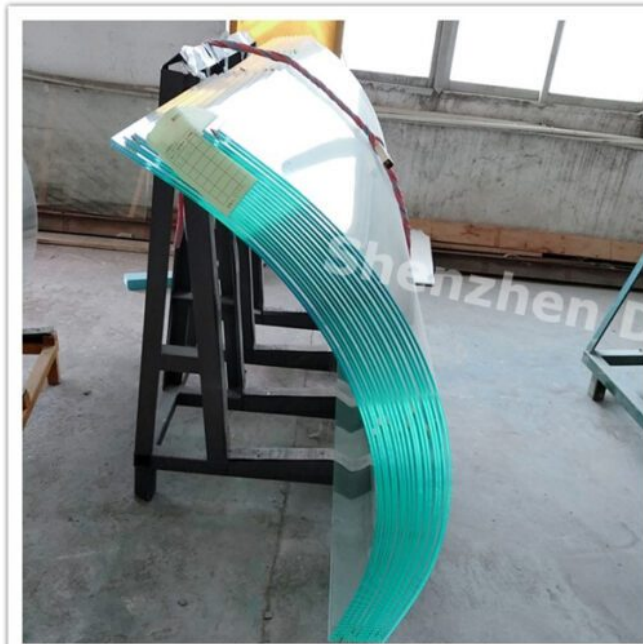
Tempering



Packing







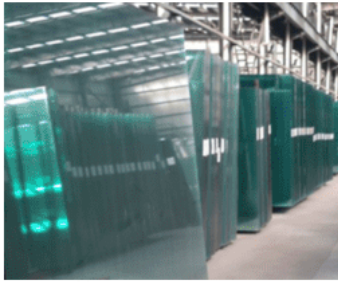
*various toughened safety glass*

## 2. The manufacturing process of laminated glass

It is produced by bonding two or more layers of annealed or toughened glass together under high temperature and pressure. The interlayers could be PVB interlayer, EVA interlayer, or SPG interlayer.



Raw Material



Bottero-cutting



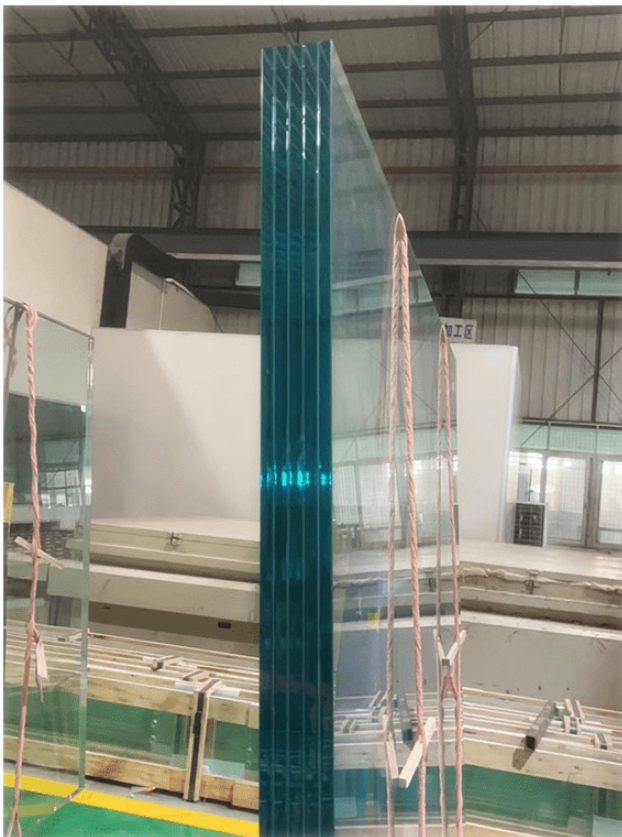
Grinding



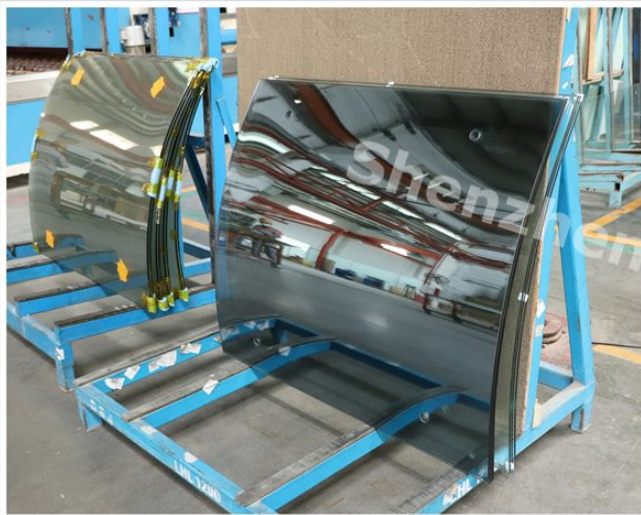
Laminating



Packing



*multi layer laminated glass (VSG)*



***curved laminated glass (VSG)***



# Safety glazing features



*broken tempered glass*





*broken tempered laminated glass*

### ***Advantages of tempered glass***

- **High strength:** It is at least 4 times stronger than annealed glass, higher impact resistance. It is not as fragile and don't worry about accidentally hitting the glass and causing glass breakage.
- **Safety:** It breaks into small and blunt pieces rather than long and big sharp pieces, helping to prevent the injury from the glass shatters. Tempered glass safety is much higher.
- **Higher clarity:** Ultra clear glass or extra clear glass, like Guardian ExtraClear Glass and Pilkington Optiwhite, with over 91% light transmittance. It is perfect for those applications where transparency and purity of color are needed.



- **Heat resistance:** It can withstand temperatures up to 470 degrees Fahrenheit (243 degrees Celsius).

### ***Disadvantages of tempered glass***

- **Spontaneous breakage of tempered glass:** It is most commonly caused by chipped or nicked edges during installation, and internal defects such as nickel sulfide. Using high quality glass and better glass edges processing, and also heat soak test will reduce and prevent tempered glass spontaneous breakage.
- **Unable for further processing:** Because the compressive stresses on the surface of tempered glass, any cutting or grinding must be done before tempering. Cutting, grinding, and sharp impacts after tempering will cause the glass to fracture.

### ***Advantages of laminated glass***

- **Security:** Even laminated glass is broken, the interlayer continues to safeguard the building. It is often used as hurricane resistant glass, bulletproof glass, glass floor glass, burglar proof windows and doors, etc.
- **Higher safety performance:** Its fragments keep binding on the interlayers. The laminated glass windows and doors panel are unlikely falling off the window or door frames.
- **Sound reduction:** PVB films can reduce sound to passing through glass, which block noise outside effectively, enhancing sound proof effect. There is also a soundproof PVB interlayer brand called **Saflex**, offering higher soundproofing effect.
- **UV protection:** It blocks 99% of UV light from coming in

your house to reducing fading some of the things, such as carpets, curtains, and furniture.

### ***Disadvantages of laminated glass***

- **High cost:** Laminated glass requires more manufacturing process and the materials so making laminated glass becomes more expensive than standard tempered glass.

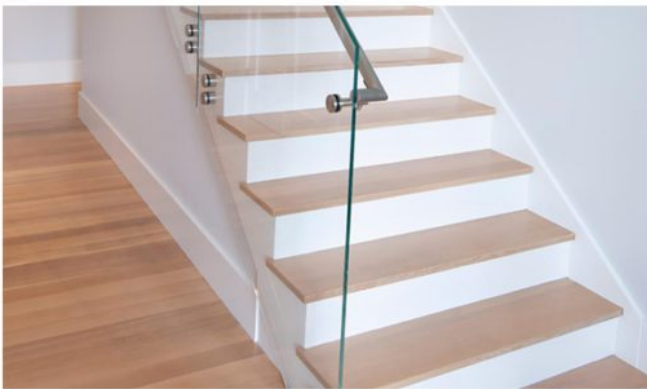
Do you want to know more differences among float glass, laminated glass & tempered glass? Click [here](#) to know more.

## **laminated glass vs tempered glass**

**For residential usages, and with limited budgets, toughened safety glass is a good choice.**

- skylight windows
- shower enclosures
- glass furniture
- glass railings
- glass partitions

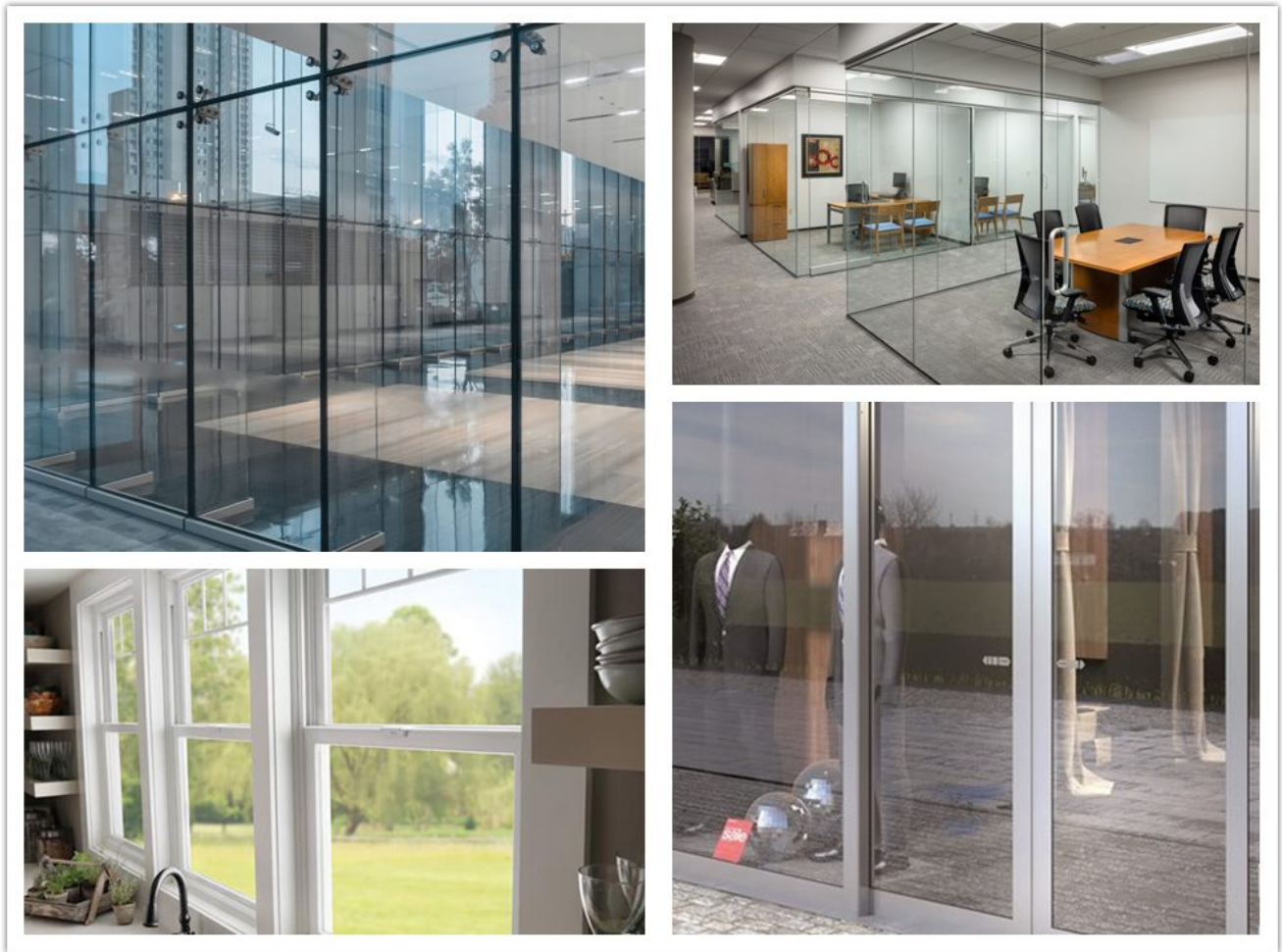




### ***applications of tempered glass***

**For safer & higher security, sound reduction, and commercial applications, laminated glass is better.**

- shop doors & windows
- severe weather conditions areas
- office and meeting rooms
- other commercial applications



### ***applications of laminated glass***

**[Shenzhen Dragon Glass](#)** is a leading glass supplier in China, if you are interested in our safety glazing products, please contact us for more details.