

## **Why use laminated glass?** **Explore these "Top 10" benefits:**

In home construction or in other building projects, the benefits of using laminated glass include:

- Safety
- Security
- Sound Reduction
- Solar Energy Control
- UV Control
- Weather/Natural Disasters
- Durability
- Design Versatility
- Installation Ease
- Low Visible Distortion

### **Safety**

Ordinary window glass is brittle, breaking into long sharp pieces which can cause serious and sometimes fatal injuries. The principal feature of laminated safety glass is its performance under impact. DuPont interlayers absorb the energy of the impact, resisting penetration. Although the glass may break, the glass fragments remain firmly bonded to the interlayer, minimizing the risk of injuries. Little wonder that laminated glass is mandatory for automotive windshields in almost every industrialized country in the world and increasingly specified or required in architectural glazing.

In glass skylights, sunspaces, sloped glazing installations and curtainwalls, there is always the possibility of glass breakage. Without laminated glass, that could mean a big safety problem caused by falling glass. Unlike all types of monolithic glass, laminated glass remains intact when broken, protecting people from injury. This is why many building codes worldwide require laminated glass for overhead glazing.

### **Security**

Burglars often break windows to get to door and window handles, and laminated glass can resist their intrusion. Even if it is accidentally broken, the interlayer continues to safeguard the building until the glass is replaced. Reglazing can be done when convenient, rather than during expensive after-hours.

Laminated glass can be designed to withstand bullets and bomb blasts by using multiple or thick layers of glass and interlayer. In prisons, laminated security glass can replace traditional bars to create a more humane environment.

The rise in urban crime and terrorism has created a need for glazing materials that enable people to carry on normally and be protected from harm. Laminated glass made up of several glass sheets and interlayers can provide protection in medium to high security applications. For extra security, including uparmoring of vehicles, DuPont offers SentryGlas® Plus interlayers with 100 times the stiffness and 5 times the toughness of traditional interlayers.

### **Sound reduction**

Noise, just like a burglar, gains easiest entry to homes and buildings through windows. Laminated glass has proven to be an excellent barrier to noise, having a higher sound reduction index than monolithic glass of equal thickness between the frequencies of 125Hz and 4,000Hz. This sound dampening is due to the "viscoelastic" properties of the interlayer material. The coincidence effect experienced with monolithic glass at certain frequencies is also considerably reduced with laminated glass, and the noise reduction performance of IG units can be greatly improved by incorporating at least one layer of laminated glass.

Tailored for noise control applications, DuPont™ SentryGlas® Acoustic™ sound reduction interlayers are available.

### **Solar energy control**

While natural light plays an important role in architectural design, too much sunlight can also mean too much heat. Tinted laminated glass can reduce heat gain from sunlight to lower air conditioning costs, and it can also control glare.

Laminated glass also can be used to combine reflective coated glass or low-E glass with heat-absorbing glass tints. In warm climates, these combine the penetration resistance and sound reducing qualities of laminated glass with good shading and energy management. In laminated glass containing coated glass, the metallic coating faces toward the inside of the laminate, where it is protected from harmful dirt or contact.

### **UV control**

The major cause of deterioration and fading of furnishings and pictures is the chemical reaction caused by short-wavelength UV radiation. UV-absorbing additives in the interlayer in laminated glass can screen out almost all these damaging rays.

### **Protection from weather and natural disasters**

If broken, laminated glass remains in its frame, preventing interior damage, while reduced flying glass protects people both indoors and outdoors.

In developed areas subject to heavy winds and rains such as hurricanes or cyclones, buildings often need extra protection. Flying debris carried by these winds can shatter the glass of windows and doors, injuring people and opening buildings to often devastating further damage. Laminated glass constructions can be properly designed to remain intact under impact and keep the envelope of the home or building sealed.

Glass fallout in earthquakes exposes people to dangerous broken shards. Again, laminated glass has been shown to keep the glass intact and in its frame.

### **Durability**

Laminated glass is durable, maintaining its color and strength, and is as easily cleaned as ordinary glass.

### **Design versatility**

Laminated glazings can be manufactured flat or curved, and include annealed, toughened, heat-strengthened, spandrel, wired, patterned, tinted and reflective glasses. DuPont glass laminating interlayers can be used to add color tints or increase the opacity of the glazing, for further design aesthetics or privacy needs.

For even more design freedom, DuPont™ SentryGlas® Expressions™ offers decorative interlayers in a range of transparencies. High-resolution digital printing adds custom color effects, words, patterns or images - anything you imagine - to the interlayer prior to lamination. Located inside the glass, your design is beyond the reach of stains, fingerprints, abrasions or harsh cleaning chemicals. The result is a durable, easy-to-maintain, "signature" or branded environment with the full safety performance of conventional laminated glass.

### **Installation ease**

Laminated glass is simple to install. Standard-sized, two-ply glass panels can be cut to size on-site, and can also be drilled or notched.

### **Low visual distortion**

Laminated building glass is usually glazed in an annealed form, avoiding the distortion caused by "roller waves" in tempered and heat-strengthened glass. Sharp reflected images are possible with curtainwalls constructed of laminated annealed glass.