

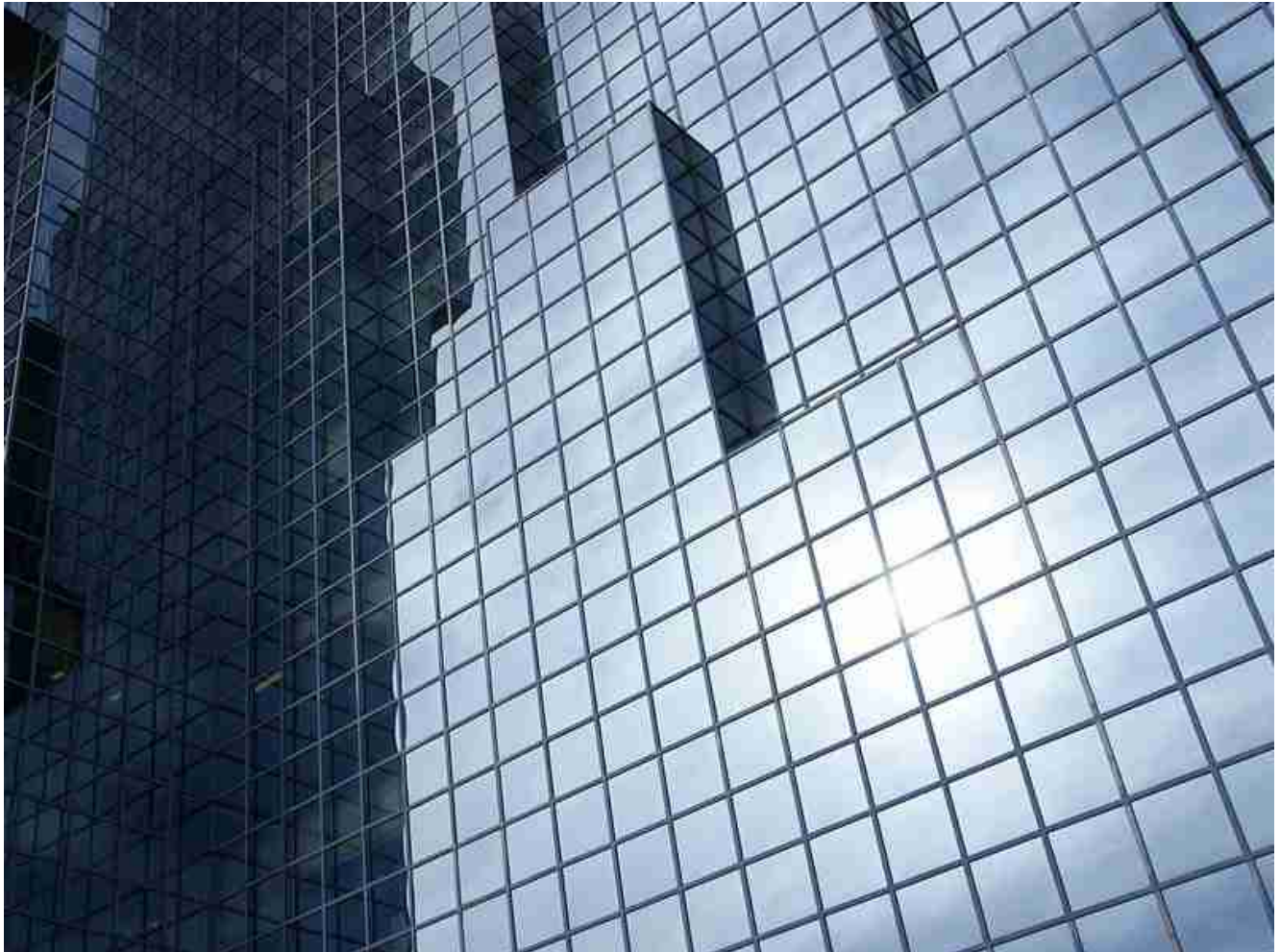
3 reasons for the image scattering of coated insulated glass on the curtain wall



Coated insulated glass composed of a piece of coated glass and a piece of other glass. To protect the metallic film layer from atmospheric erosion and increase the lifespan, the coated surface should face inward.

Coated insulated glass is generally used for glass curtain walls of buildings. As an architectural decoration, it brings a beautiful, generous, and bright image to the building and enhances the beauty of the building. However, we often find

that some buildings that use coated insulating glass have the phenomenon of image scattering. This makes the beauty of the building disappear. We analyze and summarize three main reasons as below.



Why the image for the insulated glass panels distorts?

The basic principle of the image scattering of the coated insulated glass is that the glass cannot form a whole flat plane on the curtain wall but form an arc-shaped, which causes image scattering, or even a distortion mirror shape.

1. Influence of design and installation:

With the increase of high-rise buildings, people's requirements for the aesthetic appearance of buildings have also increased, the glass panels' designs have become larger and larger. The wind load on the glass also increases as a result. There are two types of wind load pressure on glass: internal wind pressure and external wind load pressure. When the external wind pressure on the insulated glass is greater than the internal wind pressure, the glass surface bends inwards, and the glass surface becomes a concave curved surface; when the internal wind pressure is greater than the external wind pressure, the glass surface bends outwards, forming a convex surface; Only when the compressive loads are equal or close to each other can the glass form a flat plane. Therefore, in the design and installation, the wind pressure load of the glass should be fully considered. This wind load is not only the external wind pressure load that the glass itself bears, but also includes the integration of the internal and external wind pressure loads of the insulated glass.

Insulated glass internal and external loading changes by different ambient temperature changes and the installation area. The air pressure varies greatly between regions, especially between the plain and plateau regions. When the products produced in the plain area are used in the plateau area, the inside of the hollow glass becomes positive pressure, and the glass bulges outward. On the contrary, it becomes negative pressure and the glass is concave inward. Therefore, when designing the installation and use of insulating glass in different regions, the structure and specifications of insulating glass products should be designed according to the different regions and the size of the maximum wind pressure. The influence of environmental temperature

change on the load change of insulating glass mainly shows that with the temperature change, the volume of dry air sealed inside the insulating glass changes accordingly, which causes the change of internal load and makes the glass surface bend inward and outward. After repeated experiments, we have observed that for a rectangular coated insulating glass of 550mmx1100mm(5+9A+5)mm, when the ambient temperature changes by 1°C, the displacement of the center of the single-sided glass surface changes by about 0.03mm. Obviously that the change of temperature has a considerable influence on the flatness of insulating glass.

Insulated glass has unique technical conditions for installation and construction. During the construction of the glass curtain wall, when the glass is sealed in the installation and construction specifications, the thickness of the surrounding sealant's uniformity & strength and the metal frame have deflection or uneven connection, so the glass cannot be on the same plane. Even being in the same plane, with local variations, can also cause image scattering.



Coated insulated glass panels

2. Influence of insulated glass processing and production methods

As we all know, at present some of the insulating glass produced in China is vertical combining and horizontal sealing. During the combining process, the glass itself is not subject to force and does not deform. However during the sealing process, the upper glass will bend down due to its gravity, and the lower glass will bend upward, which will force the air in the internal space to overflowing. Although it is only a small amount, after sealing, a slight negative pressure will be generated inside the insulated glass. Two pieces of glass will bend inward. it is more obvious especially when the two pieces of glass are thin and the

product specifications are large. When the ambient temperature decreases and the external air pressure increases, the curvature of the glass will increase until the two pieces of glass are bonded together, losing the energy-saving effect of the insulated glass panels.

3. Other inevitable reasons

When installing glass, to ensure the airtightness of the window, generally we use the sealant to seal the glass with the metal frame. But as the temperature changes, the coefficient of expansion between the glass and the frame is different. Tensile or compressive stress will be generated around the glass. Although there is a sealant as a buffer, this stress cannot be eliminated. If the ambient temperature change increases, this stress also increases, the result of the stress is to increase the deformation of the glass edge and even make the glass burst.

During the production process, the choice of the raw glass variety has a great influence on the bending resistance of the glass. Generally for tempered glass, heat-reinforced glass, and ordinary glass, in terms of wind pressure resistance, [tempered glass](#) is the toughest, followed by [heat-reinforced glass](#). The deformation of these two glasses under external stress is better than ordinary glass. Therefore, we recommend that in the production of coated insulating glass, try to use a tempered coating glass or heat-enhanced coated glass; argon gas should be adopted for insulating glass as much as possible, and it is better for reducing the glass specifications to reduce the glass deformation.

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