

# Application of Glass in Building Materials Industry

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**Abstract:** Glass in human society has a very long history of development, the earliest can be traced back to 5000 years ago in ancient Egypt. Up to now, glass has been widely used in the building materials industry, and has achieved very good application results, and has been well received by people. With the continuous development of society, the functionality and decoration of glass itself are also constantly improving. In the building materials industry, the types of glass are very rich, and there are obvious differences in its performance. In the specific construction process, it is necessary to select the appropriate glass type according to the inherent characteristics and specific needs of the construction project. This paper mainly expounds the application value of glass in the building materials industry, analyzes the specific application of glass in the building materials industry, and further improves the application value of glass in the building materials industry.

**Keywords:** Glass; Building materials; Application

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## Fund Project:

Research on the Construction Path of Modern Industrial College for the Construction of Shanxi Province's Characteristic Professional Towns (Shanxi Province Higher Education Teaching Reform and Innovation Project)

Study on the integration strategy of additive manufacturing industry and education (Jinzhong University teaching reform and innovation project)

Reform and innovation of teaching content of welding structure course for industry demand (Jinzhong University teaching reform and innovation project)

Shanxi Province Collaborative Innovation Center for Light Materials Modification and Application

Due to the different production processes, the glass in the building materials industry can be mainly divided into flat glass and deep-processed glass. Their applications in windows, door leaves and screens can not only play a good decorative role, but also effectively control light Noise, reduce the weight of the building structure, adjust heat, etc. It can be seen that it is very necessary to actively explore the application of glass in the building materials industry.

## 1. Application Value of Glass in Building Materials Industry

### 1.1 The Aesthetic Value of Glass

Compared with other building materials, glass has certain particularity, its smooth surface, pure transparency, good texture and changeable shape, all make glass unique in the building materials industry. In construction engineering, glass can create a sense of atmosphere in which there is reality in the virtual and reality in the virtual, and form a more significant contrast effect between the virtual and the real. The application of various artistic techniques in glass modeling design can make the point, line and surface achieve a high degree of unity, and present a variety of forms, making the whole construction project show a good texture beauty<sup>[1]</sup>. In addition, the application of glass in the building materials industry can convey a pure, clear and bright feeling to people, thereby effectively alleviating people's repressed interest.

### 1.2 Practical value of glass

When light is refracted or reflected on the glass, it can present a wonderful light and shadow change, and make the whole space environment visually larger, further strengthening the sense of space of the construction project. In the specific construction process,

the glass material due to its unique nature, so it is easy to be effectively distinguished by the construction personnel, so as to effectively avoid the problems of mixing and misuse. At the same time, the glass can be effectively combined with the main body of the building, providing a strong guarantee for the stability of the material application. In addition, the construction process of glass in construction is not complicated, so it is easy to complete the installation and disassembly work, and the overall practicability is relatively good.

## **2. Specific application of glass in building materials industry**

### **2.1 Flat glass**

In the current process of social development, flat glass can be divided into flat flat glass, flat glass and float glass. Flat glass, also known as clean glass and white glass, has the inherent characteristics of wear resistance, heat preservation, light transmission, heat preservation, etc., and the transmittance can reach more than 85%. For different thicknesses of flat glass, there is a big gap in their use. Among them, 3-4mm flat glass is mainly used for the surface of picture frames, 5-6mm flat glass is mainly used for small-area light-transmitting modeling such as door leaves and exterior wall windows, 7-9mm flat glass is mainly used for frame-protected and large-area light-transmitting modeling such as indoor screens, 9-10mm flat glass is mainly used for projects such as railings and large-area partitions, and 11-12mm flat glass is mainly used for floor spring glass doors<sup>[3]</sup>. In building materials, the application of flat glass above 15mm is relatively small.

### **2.2 Deep processing glass**

#### **2.2.1 Tempered glass**

Tempered glass is a prestressed glass formed by reprocessing on the basis of flat glass. Compared with flat glass, the tensile strength and impact resistance of tempered glass have been significantly increased. Relevant data show that the tensile strength of tempered glass can reach more than 3 times that of flat glass, and the impact resistance can reach more than 5 times that of flat glass. In addition, tempered glass is difficult to break. Even if it is broken, it is broken in the form of no acute angle, which can reduce the harm to people in a large case.

#### **2.2.2 Frosted Glass**

Frosted glass is a glass formed by re-grinding on the basis of flat glass. Under normal circumstances, the thickness of ground glass is mostly below 9mm. The surface of the frosted glass has a strong roughness, which can make the light on the glass diffuse reflection, so as to achieve the effect of light transmission and non-perspective. At present, frosted glass has more applications in the bathroom and office.

#### **2.2.3 Sandblasted glass**

There are many similarities in the performance of sandblasting glass and frosted glass. The difference between the two is mainly reflected in the frosted glass using frosted technology, and the sandblasting glass mainly uses sandblasting technology. The application of sandblasted glass in building materials can make life more emotional, mainly used in screens, indoor partitions and so on.

#### **2.2.4 Laminated Glass**

The wire-clamped glass is a kind of flat glass formed by embedding metal mesh or metal wire in the glass plate by means of calendaring. This kind of glass has a very strong impact resistance. When impacted by external force, the glass will form radial cracks, so it will not cause harm to the human body due to falling. At present, the application of wire glass in high-rise buildings and high-rise buildings with strong concussion is more extensive.

#### **2.2.5 Hollow glass**

Insulating glass is mainly through the way of gluing, so that a certain distance between the two pieces of glass, and then use the appropriate material to complete the seal<sup>[4]</sup>. At present, the material in the insulating glass interval is mainly dry air, which has a very obvious sound insulation effect, so it is mainly used in construction projects with sound insulation effect.

#### **2.2.6 Bulletproof glass**

Bulletproof glass is mainly composed of high-strength tempered glass, with a large number of interlayers, and the overall safety is relatively high. At present, bulletproof glass is mainly used in luxury houses, banks and other construction projects with high safety requirements.

#### **2.2.7 Glass brick**

Glass brick has inherent characteristics such as weathering resistance and corrosion resistance, and its overall physical properties are relatively stable, which can greatly reduce the adverse effects of the external environment on the skin of construction projects. Glass brick and flat glass in the production process is almost identical, the difference between the two is mainly manifested in the molding method. At present, the middle of the glass brick contains a lot of dry air, which is mainly used in construction projects with thermal insulation requirements and decoration requirements.

### 3. Decorative glass

In recent years, the development of the construction industry is very rapid. In this era, the production technology of glass in building materials is also continuously improving. Up to the current position, the function of glass is no longer limited to lighting, but is constantly developing in the direction of decoration and other multi-functions, which is a very important decoration material. Decorative glass can be divided into two main types, namely, energy-saving decorative glass and artistic decorative glass, in which artistic decoration includes embossed glass, iced glass, engraved glass, embossed glass, glazed glass, mirror glass and colored flat glass, etc. [5]. Take transparent colored flat glass as an example, it is mainly used for doors and windows, interior and exterior walls and other parts with high lighting requirements.

### 4. New type of glass

#### 4.1 Titanium glass

Titanium glass is a layer of titanium foil film on the glass substrate, through the effective combination of the two to form a whole. Titanium glass has obvious advantages in heat protection, UV protection and shattering resistance, and different glass substrates can be freely combined with different titanium foil films to form glass of different specifications, different properties and different colors. Among them, the application of brown, colorless transparent, copper reflective, brown reflective and other colors is the most common.

#### 4.2 Microcrystalline glass

Glass-ceramics is a mixture of glass and microcrystals formed by sintering and crystallizing glass particles. In the process of producing microcrystalline glass, almost no pollution is produced, and the microcrystalline glass itself has a strong environmental protection coefficient, which belongs to the category of green building materials. Compared with other glasses, microcrystalline glass has the dual properties of ceramic and glass. From the point of view of brightness, the brightness of glass ceramics is higher than that of ceramics; from the point of view of toughness, the toughness of glass ceramics is stronger than that of ceramics. When using microcrystalline glass to decorate construction projects, it hardly reacts with other substances in the external environment, so after a long time of use, it can still maintain a new state, and it is not easy to hide dirt.

### Conclusion:

Glass occupies a very critical position in the building materials industry and has a profound impact on the development of the building materials industry. In view of this situation, we must make clear the application advantages of glass in the building materials industry, and constantly strengthen the research and application of glass, so as to give full play to the maximum efficiency of glass in the building materials industry, and pour new vitality and vitality into the sustainable development of the building materials industry.

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