

Exploration on the Practical Application of the Flame Retardant Aluminum-Plastic Composite Plates used among Decorative Materials of the Curtain Wall of High-rise Buildings

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Abstract. At present, as a part of the interior curtain wall decorative materials of the first-sort high-rise buildings, the flame retardant aluminum-plastic composite plates have been used widely. For this reason, this paper explains the progress history of the flame retardant aluminum-plastic composite plates, and highlights the fireproof characteristics. The paper explains its utilization as the interior curtain wall decorative material of the first-sort high-rise buildings in details. The aim is to promote the long-term progress of domestic flame retardant aluminum-plastic composite plates.

Introduction

The superior continuity of the flame retardant aluminum-plastic composite plates make them be able to be produced by automation. This kind of plate has high stability, superior quality, and is convenient to use. It is popular among the interior curtain wall decorative materials of the first-sort high-rise buildings now. The application of the plate itself is simple and the theory is not complicated. However, the manufacture efficiency of this kind of plate is not high. Nowadays it has not carried out the mechanical manufacture extensively, so the quality of the product cannot be guaranteed. There are only some small enterprises producing the plates. Because the use of the flame retardant aluminum-plastic composite plates among the curtain wall decorative materials of the first-sort high-rise buildings is gradually increasing, the exploration on the practical application of it becomes significant.

The Characteristics of the Flame Retardant Aluminum-plastic Composite Plates

The flame retardant aluminum-plastic composite plate itself has the characteristics of resisting corrosion, preventing noise, isolating heat, small mass, strong flexure degree, flame retardance and anti-pollution. In the fire, the plate can carry out the corresponding control to the extension of the fire. Moreover, the processing characteristic of the plate is better, and the appearance of it is exquisite. It makes the construction much simpler. The flame retardance is exactly what the curtain wall decorative materials of the first-sort high-rise buildings cares the most. It also the key content in this paper. The corresponding characteristics of flame retardant aluminum-plastic composite plate are shown in the following aspects:

The plate can be operated like punching, drilling, cutting and segmentation. During the application period, the composite plate can be connected by means of adhesive bonding or riveting. To sum up, it is convenient to handle.

This kind of composite plate is extremely easy to be processed and formed. It can be constructed in all kinds of shapes in different ways, which makes it of great ornamental value. It is a key element for its mass utilization. Since the plate is easy to be shaped, the high-rise buildings can enhance its ornamental value and also can maximally shorten the construction time, which will reduce the corresponding input of the buildings.

The upgrade of the composite plates is fast and the adaptation is good. From the research and development of this kind of composite plates to the mass utilization, every upgrade of the technology has made this kind of composite plates be innovated and progress. The strength and hardness of the plates have been gradually increased, which guarantee them not to drop during operation.

Introduction of the Flame Retardant Aluminum-plastic Composite Plates

Fusing various flame retardant reagents with the corresponding copolymer of ethylene-vinyl acetate and ethylene to plasticize them into the flame retardant raw material. Then fusing this raw material with aluminum alloy plates of good quality by a unique technology into a sort of newly emerging and less polluted composite material, which is the flame retardant aluminum-plastic composite plates. Nowadays, the flame retardant aluminum-plastic composite plates are of mass use among the curtain wall decorative materials of the first-sort high-rise buildings. The corresponding construction of this kind of plate is very convenient. It is of better decoration feature, great strength and lighter mass, thus, many building workers love it. Nowadays, there are two main production technologies of the flame retardant aluminum-plastic composite plates: hot plying-up and cold plying-up. The hot plying-up has good continuity. It uses the polymer film raw materials and colloid as the basic to make the plates by processing and pushing. Colloid reagent is treated as adhesive in the process of cold plying-up. It bonds the aluminum plates with plastic plates by the method of pressurization. Comparing the two technologies, the hot plying-up is wider used.

The Application of the Flame Retardant Aluminum-plastic Composite Plates Used among the Interior Curtain Wall Decorative Materials of the First-sort High-rise Buildings

The application area of flame retardant aluminum-plastic composite plates is relatively large, such as compartments, columns, decorations and so on. In addition, there are many areas that are not photic in the base curtain wall of the first-sort high-rise buildings. The flame retardant aluminum-plastic composite plates can be embedded into these parts to lower the glass curtain wall, which will decrease all kinds of light pollution in the city. For the interior part, the flame retardant aluminum-plastic composite plates can be applied to the decoration of ceilings. The plate has the advantages of noise isolation, fire prevention, heat insulation and waterproofing, which makes it a kind of high-type raw material. This kind of plate is of mass use in decorating the curtain wall of the first-sort high-rise buildings. It becomes the new decorating way at the present stage.

The Relevant Disputes of the Flame Retardant Aluminum-plastic Composite Plates for the Interior Utilization of First-sort High-rise Buildings. One of the ideas points out that the flame retardant aluminum-plastic composite plates should not be used too much in the curtain wall decoration. Moreover, it should be used precisely. This kind of plates makes the curtain wall a "killer" in the high-rise buildings. Here are the reasons:

The core material of the plate is a toxic substance. Its aging resistance is weak. It will spread toxic gas when it is in the state of burning or under high temperature or in direct sunlight, which make it a threat to public health.

The strength of the plate is not high, so it is easy to make the curved surface fracture or make the core material swell and deform, which will weaken the ornamental and security of the curtain wall itself.

The plate is the poor conductor of the electric power. It is easy to be hit by the high-voltage lightning.

The raw material of the panel has low strength, which makes the characteristic of wind pressure resistance bad. However, the curtain wall of first-sort high-rise buildings is usually greatly influenced by wind force .

Some people think it is good to utilize the plates in the curtain wall decoration. The concept points out that the corresponding characteristics of flame retardant aluminum-plastic composite plates are: small quality; eligible flexibility and hardness, effective noise cancellation. At the same time, the plate is anti-seismic and of great ornamental value. After the workers do the operation like corrosion

resistance, daub and print, which can make the aluminum plate more durable, affordable, the plates can be utilized comprehensively in the curtain wall decoration.

The Approaches of the Utilization of the Flame Retardant Aluminum-plastic Composite Plates as the Interior Curtain Wall Decoration of First-sort High-rise Buildings. The Technological Process. The flame retardant aluminum-plastic composite plates are assembled together with steel structure. Then core of the stainless steel is connected with the aluminum plates and transoms by screws. The load force successfully transforms to the core. The core and the reinforced concrete bear the structural load to ensure the stability of the curtain wall itself. The corresponding assembly process is as follows: construction preparation - paying off - construction of the framework - assembly of lightning protection equipment - stabilization of the plates and assembly - closing frame disposal - cleaning and maintenance.

Construction preparation: Study the related engineering drawings for the curtain wall assembly and make a detailed construction plan.

Paying off: This is to make sure the assembly area, position and orientation of the curtain wall be the same as the design drawing. Before the installation of the curtain wall framework inside the flame retardant aluminum-plastic composite plates, it is important to clarify the position line of the core.

Construction of the framework: During the construction of the framework, the buried line should be determined according to the horizontal line, and then doing drilling and screwing in the corresponding bolts. After that, welding the pre-embedded bolts and steel brackets; At last, stabilizing the framework structure.

Assembly of lightning protection equipment: The corresponding curtain wall of the plates has its own lightning protection equipment, which should be separated from the main structure of the lightning protection system, so that it can be well protected against lightning strikes.

Stabilization of the plates and assembly: After the operation above, the assembly and processing of the aluminum-plastic plates can be performed. [1] By the help of screws, the plates can be stabilized in the framework structure with aluminum brackets of 20 mm x 20 mm x 2 mm. The 16 mm gap should also be maintained. Then assembling the foam rods and injecting the sealant to end the assembly.

Closing frame disposal: The closing frame disposal is the key work of perfecting the decoration of the corresponding curtain wall by the flame retardant aluminum-plastic composite plates, which can prevent the curtain wall from leaking, and seal the core to make the curtain wall more nice-looking.

Cleaning and maintenance: After the assembly, the maintenance film should be removed and the curtain wall should be cleaned with water to ensure the cleanliness of the surface so that the service life of the curtain wall can be increased.

Quality Control. The thickness of the plate is usually 5 mm. its surface must be smooth. The color must be the same. No wrinkles, blisters and scratches.

The keel structure of this kind of curtain wall should be consistent with the quality regulation and the design specification.

In the connection parts of the components such as stainless steel, the noise-control tapes must be set, so as to avoid the friction caused by the heat expansion and condensation.

Most welding of steel structure is manual. The thickness should be less than 6 mm. The corresponding columns and the welding line of the embedded bolts of the curtain wall should be less than 10 mm to ensure its surface smooth, clean, and without welding defects.

After the curtain wall assembly is finished, the weld shall be planished and painted.

The Prospect. At present, the sequence of the first-sort system of domestic economy has been gradually improved, which has made great progress in architecture. As a new decorative material in the field of architectural decoration, the flame retardant aluminum-plastic composite plates also have more opportunities for advancement. The utilization area of the plates increases gradually, which makes the demand of the plates correspondingly increase. As a result, its quality stipulation also gradually improves. [2] Therefore, the enterprises related to the flame retardant aluminum-plastic plates should focus on the investigation of the characteristics of the product itself, strengthen the

measurement and improvement of its characteristics in order to improve its adaptability in various construction conditions.

The Relevant Progressing History

The flame retardant aluminum-plastic composite plate set the fire retardant material which is burned and plastified from the integration of low density polyethylene and corresponding copolymer resin of ethylene-vinyl acetate with kinds of flame retardant reagents as the core material. Then the aluminum alloy plate with superior quality is used as the surface plate. Through the unique technology, the new composite plate with less-pollution has been made. With its wider use, its experiment exploration becomes significant.

Since the flame retardant aluminum-plastic composite plate has light mass, high strength, and it is with good decoration characteristic and be convenient during construction, it becomes popular in architecture industry. Since the end of last century, the flame retardant aluminum-plastic composite plate has been used in China. Through the progress of recent years, the corresponding production scale has been gradually formed. The hot plying-up uses the polymer film raw materials and colloid as the basic to make the plates by processing and pushing. It has good continuity and can do automatic production. The production itself has good quality and stabilization, which make it be widely used.[3] Colloid reagent is treated as adhesive in the process of cold plying-up. It bonds the aluminum plates with plastic plates by the method of pressurization. The production theory of the technology is very simple. The operation is very easy to handle. However, its production efficiency is not high. It can't implement the mechanical production on a large scale. What's worse, the quality of the product cannot be guaranteed. It only can be applied to small enterprises. There is high fire threat by using aluminum-plastic composite plates without flaming retarding. Therefore, it is necessary to implement fire protection for aluminum plastic composite plates.

By the year before last, there were more than 300 domestic companies doing production related to aluminum-plastic composite plates. There were more than 900 production lines of hot plying-up. However, the production of the flame retardant aluminum-plastic composite plates occupied only a little. Nowadays, the stipulation toward the fire protection characteristics of the interior curtain wall decoration materials is gradually strengthened globally. Domestic institutions have paid great attention to the application of flame retardant aluminum-plastic composite plates in public places and have compiled a large number of fire protection mechanisms[4]. For public occasions such as railway stations and wharves, the level of fire prevention of decorative materials should be higher than B1. The level of the decorative materials used in key positions should be higher than Grade A of non-flammable type. The Grade A flame retardant aluminum-plastic composite plate has better fire prevention characteristics, namely, the fire protection standard is the highest. Its service year is also longer. What's more, the progress of raw material science makes the corresponding manufacturing technology of flame retardant aluminum-plastic composite plate more and more perfect, and its performance becomes better.

Conclusion

All in all, the flame retardant aluminum-plastic composite plates have been used more and more as the interior curtain wall decoration raw material of first- sort high-rise buildings. Its advantages of light quality, waterproofing, anti-wear, anti-fire make it more and more popular. It will get more permanent progress in the future.

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