Innovative Bonding with Plastics Interface Technology

Plastics Interface Technology (PIT) - is a patented technology for the bonding of various decorative materials with a polymer substrate. Developed by the PP Compounding group of LyondellBasell, this new technology enables the cost-effective manufacturing of structures with excellent surface qualities for a range of applications in appliances, electronics and automotive.

The production of a plastic substrate including a metal foil can be achieved by various methods. Existing methods; such as, gluing, electroplating or spray painting can sometimes require additional extensive manufacturing steps to finish the final component. A new patented technology combines a plastic substrate with metal or foils of other materials in a simple one-step operation. The PIT makes use of decorative foil that is pre-coated with a binder material and that is placed directly into the injection mold or pressed or welded with the substrate to form a permanent bond. The PIT process offers a wide potential for many applications as many materials can be processed. Paper, foil, cork, veneer, leather, linoleum, glass; as well as, stainless steel and aluminum could be used as possible decorative materials. The potential list of applications for the appliances, electronics and automotive segments are diverse as the many different materials that can be processed along with the decorative elements. In addition, self-supporting compounds can be produced that combine high strength with weight saving.

Compounds produced with PIT not only offer very good optical properties and functional surfaces, but also demonstrate mechanical and thermal properties that exceed those of the substrate material alone. In trials carried out in cooperation with customers, PIT composites have confirmed their toughness and long-term resistance to mechanical and chemical attack, even in demanding applications involving exposure to the hot detergent solutions found in washing machines and dishwashers. This technology has the potential not only to revolutionize the production process but to also saves valuable resources. All compounds can be separated by temperature between 200 and 300 °C and are fully recyclable.
"Silver-touch" for Polypropylene

Especially interesting is the use of aluminum foils on polypropylene substrates.

One obvious area of application for the new composite material is in the replacement of electroplated engineering plastic. Initial trials with an aluminum-polypropylene compound show the potential for significant cost savings by eliminating the process of electroplating to achieve a surface quality that is comparable or superior. In addition the reject rates are lower as the aluminum foil is less prone to surface errors.

Another area of application for a metal foil on a polymer substrate includes the provision of electromagnetic interference (EMI) shielding in electrical appliances or electro mobility. The high thermal resistance of the PIT composite can offer excellent flame-retardancy with a full compliance of the requirements of flammability classes B1 and B2 or UL94 V-0. IT compounds also offer weight saving opportunities in comparison to steel in the building and construction, elevators and automotive industry.

First time applications are already in production or are close to being commercialized. Potential new areas of application are currently being identified and evaluated. For example, lightweight polypropylene tiles with a decorative surface cover could be used to open up new possibilities for the home and furniture industry. Additionally, foamed PP compounds could be combined to enhance these decorative surfaces adding new dimensions with additional weight saving possibilities. Another application is thermal resistance by adding aluminum foils. It makes this technology attractive for lamps or even toaster housings. In automotive applications, PIT compounds can be used in interior (soft touch door covers, center console with veneer surface), exterior (chrome trims) or under-the-hood (engine covers) applications. PIT can also help reduce metal thickness - and therefore, weight - when foamed PP compounds are used. Caravans have the opportunity to replace wood components.

PIT composites have the potential to offer unprecedented levels of cost-performance in a wide area of application. Using this technology, the requirements of an economic production of lightweight components with high surface quality can be easily met with virtually unlimited possibilities.

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