Value-Added Glass Concrete Products

Concrete products made with waste glass as aggregate can be categorized as either “commodity” products or “value-added” products. The primary objective of commodity products is the disposal of waste. One way to avoid ASR-related problems is to grind the glass to such fineness that it is virtually impossible to see whether the end product contains glass or not. In value-added products, the esthetic potential of the glass particles is utilized.

This calls for larger particle sizes and, in turn, measures to suppress ASR. The maximum glass particle size is to some degree dictated by the thickness of the beverage containers, which comprise the bulk of waste glass. Larger particles in unpolished surfaces may display the curvature of the original glass containers, which can produce its own interesting effects.

Our technology makes it possible not only to engineer the mechanical properties of the material, but also to achieve surface textures and appearances not possible with other materials. The key is careful coordination of selected glass and matrix colors, glass particle grading, production technology, and surface treatment.

With the inherent formability of concrete, we have a truly new material, with a range of applications limited only by one’s imagination. To name just a few:

- building facade elements;
- paving stones;
- floor tiles;
- wall tiles;
- wall panels;
- elevator paneling; etc.
- table top counters;
- partitions;
- park benches;
- planters;
- ashtrays;
For applications that call for tensile or flexural strength or fracture toughness, the products may be reinforced either with randomly distributed fibers (e.g. nylon or polypropylene) or with continuous fiber mesh.

The surface treatment requires special attention. There are several ways of achieving the desired surface finish and texture:

- Casting the products in special molds, which will create the desired surface texture;
- Grinding and polishing the product surfaces;
- Treating the form with special retarding agents and, after demolding, washing off the unhydrated cement paste to expose the aggregate particles

Polishing operations are generally difficult, because of the different hardnesses of glass and cement matrix. The concrete mix can be designed such that the exposed surfaces will exhibit no porosity and therefore assure good durability properties.

**Research Sponsors**

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