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Thermal Cracking in Cultured Marble

Cracking around the drain hole has been a major problem in the cultured marble industry. Radial cracking generally occures when sinks are exposed to alternating hot and cold water temperatures.

The Cultured Marble Institute now requires that sinks withstand 500 cycles of alternating hot and cold water utilizing a prescribed testing procedure. Developments in polyester resin technology have improved the resistance to the thermal cracking problem. But the most dramatic improvements occur when HGS is added to the formulation.

Testing has been done to show the advantage of HGS microspheres as a crack inhibiting additive. Replacing calcium carbonate with HGS on an equal volume basis at various levels provided good safety margins in passing the 500 cycle test.

Several factors may influence the way in which HGS improves the resistance to cracking. The sphericle nature of the HGS should be superior to the irregularly shaped calcium carbonate particles as far as avoiding stress concentrations. The insulating value of HGS may allow the heat from the resin exotherm to be held longer in the sink and act to some extent as a substitute for the expensive post curing which is sometimes used. This insulating effect may orevent the expansion or contraction on impact of hot and cold water.

Results of HGS-21 on Thermal Shock Resistance in Cultured Marble Sinks

Test #	% Wt. Polyester Resin (a)	% Wt. HGS-21	% Wt. Calcium Carbonate	Gel Coat Cycles to Failure	Matrix Cycles to Failure
1	25	0	75	na	210
2	25	0	75	na	600
3	25	0	75	na	334
4	32.7	2.1	65.1	360	1500
5	32.7	2.1	65.1	1190	1500
6	35.7	2.9	61.3	1200	1500
7	35.7	2.9	61.3	1500	1500
8	40.7	4.2	55.0	1400	1500
9	40.7	4.2	55.0	1500	1500

A low viscosity, general purpose polyester resin was used.