Heat Lamps Cracking Absolute Black ◄ ► My Opinion

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Q: We supplied a buffet serving counter in Absolute Black. We've been called back to the project because of extensive cracking in the countertops. The cabinetry looks very stable, and we can't see any signs of error in the installation or support of the granite. Someone has suggested that the heat from the lamps over the food could cause this cracking. Is that possible? I thought granite was heat resistant.

A: Not only possible, it is nearly certain that the heat lamps are the cause of the cracking. This is a very common call that we field in this office.

Granite, and "granite-like" stones are very heat resistant, as long as the heat is uniformly applied. An extensive study was completed decades ago and a paper authored by Richter & Simmons on the Thermal Expansion Behavior of Igneous Rocks.

Their findings indicated that slow, uniform heating of igneous rocks up to 250°C (482°F) produced no cracking or permanent strain, and that the sample would return to its original dimension after cooling to its original temperature. But rapid heating would produce a thermal gradient (a change in temperature across a given distance) in the sample, and cracking would occur.

While the buffet top is nowhere near approaching the 480°F temperature, it likely has a significant thermal gradient due to its uneven heating. I've investigated a few of these failures, and the most extreme that I've ever encountered had a surface temperature of 267°F directly under the lamps, and 132°F at the edge of the counter, about 16 inches away. It was cracked in numerous places, as the hot portion needed to expand, but the cooler portion couldn't expand with it, and cracking was the only way for the stone to relieve the stress.

Based on the temperatures that I've recorded, it wouldn't take a lot higher temperature to start failing the resin of a resin treated slab, although I've never seen it due to heat lamps. At least in theory, black stones would be the most vulnerable due to their typically high moduli of elasticity (resistance to bending), although I've seen this occur in many stone types. And a thicker stone would have slightly better resistance due to its greater mass in which to dissipate the heat, but it would likely need to be much thicker to realize a significant advantage. I've also seen thermal gradient cracking in stones that were 6" thick, so if the gradient is strong enough, the stone is going to crack regardless of thickness.

My suggestion would be to check the surface temperature of the stone to confirm the existence of a strong gradient. This can be done quite easily with an infrared thermometer, the hardware store variety of which can be found under $100.

Q: Is there a documented standard numbering system for numbering the stones on a building façade? I want to specify a numbering system that the supplier would use on the shop drawings that would facilitate tracking of the material back to its in situ position in the quarry.

A: There are numerous references to the need to label stones on shop drawings with numeric or alphanumeric identifications for use in tracking shipments and verifying installation of the correct piece on the project.

However, no standard exists on how to set up the numbering system, and it would be difficult to create a standard since different projects have different needs. For instance, on a project with interchangeable pieces, a typical numbering system would be preferred so the installer has the least number of piece marks to manage. But if the project had been color matched or blended by the fabricator prior to shipment, then a consecutive numbering system would be required because each piece now has an exact position in which it must be installed.

The ability to track to the *in situ* position in the quarry would be very rare. There are producers that are capable of this, in which they could identify the sibling pieces cut from the same slab, and the sibling slabs cut from the same block, and the location of the block in the quarry, from which they could determine the identifications of pieces cut from adjacent blocks. While desirable from a quality control perspective because such a system could literally facilitate a "recall" of affected material if necessary, this level of tracking sophistication is extremely rare and seldom necessary.