

Ceramic Pourable - How Low is “Low Exotherm”?

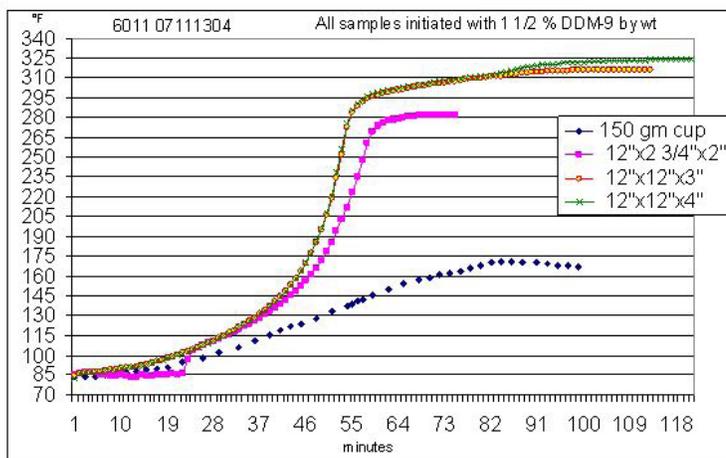
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Arjay’s Ceramic Pourable Compound (CPC) is a very special product that can be used in a variety of “mass casting” applications. The most common is as a core in power boat transoms. Recent trends toward larger, more powerful boats are requiring thicker, wider cores. This in turn leads to pouring larger masses of CPC, which raises the question of exactly how the exotherm temperature is affected.

It is a well established fact that exotherm temperature is strongly related to mass. For purposes of quality control, Arjay uses a standard mass of 150 grams which produces an exotherm temperature of around 170 F. This is a comparatively low temperature, but the typical application involves quantities of material over 500 times greater and obviously is accompanied by a higher exotherm. Just how high?

Studies conducted by Arjay indicate that, when poured in large masses, the exotherm temperature will approach or slightly exceed 300 F depending on the specifics of the case. Such an exotherm temperature, while it may seem high, is normal and does not result in any cracking. Most conventional polyester resin products used in similar masses would greatly exceed 300 F and most certainly would crack and possibly even self-ignite.

Figure 1
6011 Ceramic Pourable Compound Mass Exotherm Examples



Our studies have show that, as the mass increases, the exotherm temperature plateaus in the low 300’s F. For example, as indicated in Figure 1, at a core thickness of 3”, the peak exo reached 315 F, while a 4” core sample peaked at 325 F. This means that a 33% increase in mass resulted in an exotherm temperature increase of only 3%. The practical implication of this is that the larger pours should not result in appreciably higher temperatures than smaller pours. The results of this study can be used to answer a number of frequently asked questions.

We are often asked – particularly in regards to repairing transoms with CPC – if transom strength is affected by making two separate pours. We

strongly recommend organizing the work to pour all at once. Secondary bonds are never as strong as primary bonds. Also, the above described results indicate that dividing up the mass into two pours with the intent to reduce the exotherm temperature is not going to change it that much.

Another question concerns pouring the transom in the first part made in a new mold. Obviously, special efforts are warranted to keep the exotherm temperature as low as possible. Such steps might include:

- Placing the material to be used in a cool room for at least 24 hours.
- Pouring in the morning when ambient temperatures are cooler.
- Reducing the amount of catalyst to ¾ to 1 %, but NEVER below ¾ %.

Tens of thousands of boat transoms have been made and repaired with Arjay’s CPC over the last 18 years. Hopefully, these tips will allow you or your personnel to ensure that the product is successfully used in your operation.