

Knowing When to Pour

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Generally there are two options for knowing when to pour. The first (\$) is to buy a pyrometer. Obviously expensive, but if you are going to be doing this commercially it would be a good investment.

The second is to use the "superheat" method. This involves taking GOOD notes and some trial and error. The principle is to watch your crucible during the melt and record the time from when the last bit melts in the crucible till the time you remove it from the furnace and pour. This is called the superheat time.

As metal is melting in the crucible the temperature of the molten puddle (the "heel") remains almost constant. This is because as the metal melts it changes phases from a solid to a liquid, absorbing heat from the puddle in the process. However once the last bit melts, there is nothing to prevent the temperature from rising rapidly in the crucible. This is the superheat phase.

For each and every part you intend to make you need adjust the superheat time until you get just the right amount of heat into the metal to make for a good part. Too little superheat and you get partially filled molds (cold shuts). Too much heat and you can get surface defects and poor appearing parts. Take good notes with accurate times for each part and you will eventually come to the right point.

For this to work all other variables must remain the same. Use the same amount of raw feed stock (weigh it), use the same furnace settings, use the same size crucible, the same flask size, where possible the same room / sand temperature, etc. Also be aware that the superheat will possibly be only in the range of tens of seconds, to a few minutes. We are not talking a 10-minute time here...

Caution: Careful observation of the "heel" in the crucible means looking at the hot surface so wear eye protection from both splashing and from the infrared radiation.