

The magic „V“ for perfect casting

What are the most important factors for successful and efficient casting production? A consistently high casting quality, making the costs for post-processing predictable and, above all, keeping them down. A reject rate that is as low as possible. And a high resilience of the casting component during post-processing. Of course achieving these objectives is not the responsibility of the foundry section alone. A lot depends on the technical layout, model making, production of wax models, and the production of casting moulds. The experience of the caster and the casting technology used nevertheless play a decisive role. This is why many foundry managers attach particular value to two things, or rather two „V“s, when it comes to casting machines:

Vibration casting and a perfectly aligned Vacuum pressure system.

A Vibration system, like the one Indutherm has developed and installed in many of its precision casting machines, improves mould filling, protects castings with a higher and more even density, substantially reduces porosity and provides a finer and more uniform metal structure within the casting component. This results in greater elasticity and therefore improved post-processing properties, e.g. during diamond-coated machining, widening of rings etc.

The most recent level of development, „Sweep Mode Vibration“, even takes into account the different natural resonances of different geometric bodies. Changing the frequencies accordingly makes sure that every part of a casting tree is agitated by the optimum vibration frequency.

The second decisive criterion for a casting machine is the Vacuum pressure system. Melting in a vacuum is indispensable for most alloys (except e.g. alloys containing zinc), to ensure that the melt can be ‚degassed‘ and, above all, to prevent a reaction with oxygen (oxide formation!). A vacuum function is actually standard for precision casting machines nowadays, but unfortunately not for continuous casting machines. Indutherm is alone in also offering vacuum continuous casting machines which can be used to make oxidation-free semi-finished products even from highly reactive alloys. Even with precision casting machines, however, vacuum does not equal vacuum – the fine details make the difference. We will explain this using Indutherm VC 650 V as an example:

Blue Power.

Thanks to a powerful vacuum pump and pneumatic melting chamber sealing, a vacuum of <10 mbar (10 hPa) is reached quickly and maintained consistently at the preset value. Additionally or alternatively, the melting chamber can be backfilled with protective gas. Like all Indutherm precision casting machines, the VC 650 V is constructed as a two-chamber differential pressure system. The separate vacuum and sealing systems for melting and flask chamber permit inserting the flask just immediately before pouring. As soon as the flask is also under vacuum, the crucible seal is opened and the vacuum in the melting chamber is simultaneously switched to positive pressure. The Indutherm Turbo Pressure Plus-System permits an extremely fast pressure change from vacuum to max 4 bar (abs.) overpressure. The pressure difference between crucible and flask virtually causes the metal to shoot into the mould to fill even the most filigree structures down to the finest detail. But even this procedure is carried out in a controlled manner with the VC 650 V: The „Turbulence Reduction Software“ ensures a uniform flow of metal and prevents interfering swirls or damage to the mould.

And the other „V“ described above comes into play as well. With the VC 650 V the casting can be allowed to freeze over a few minutes under vacuum and vibration („oxidation-reduced casting system“). The program control of the VC 650 V integrates this cooling down phase into the automated casting cycle. The user gets indicated by display and in addition by an acoustic signal when the cast flask can be removed and the new flask can be inserted for the next casting. In the meantime the next charge can be molten.

By this program controlled „Overlapping Casting“ up to 15 flasks per hour are easy to realise with the VC 650 V.

