

Kurtz Foundry Machines – more energy, more power, less CO₂

New low-pressure casting engine technology



Ever-increasing performance with ever lower consumption and less CO₂ emissions – how does that work? Engine development has made rapid progress yet is still a long way from the finishing line. A snapshot of the current state of technology ...

The design and demands on crankcases have changed immeasurably: „open deck“ has given way to „closed deck“, as the latter offers a lot more stability, enabling the crankcase to operate with higher loads. While open-deck crankcases could still be envisaged using die casting, this is no longer possible with a closed deck design. In addition to the water jacket core, many more sand cores are currently used for the production of crankcases, to enable the inner contours (cooling channels) of the crankcase to be cast.

The best possible casting quality is essential

The cylinder liners used until now – mostly made of grey cast iron, which is either cast in or subsequently inserted – are employed less and less, as running surfaces are directly cast and then coated. A running surface that is subsequently coated requires the best possible casting quality, so that no pores appear during the coating process. Higher injection pressures require the casting to have increasingly higher mechanical properties – both in the area of the crosspieces and the crankcase. These are just a few details that the casting has to fulfil. Low-pressure casting offers the optimum process for satisfying all of these requirements. Turbulence-free or low-turbulence die filling is of key importance here. Turbulence and oxide formation are avoided.

Multiple cavity dies

i.e. two crankcases per casting, is now possible and more or less accepted as standard. Multiple cavities do not necessarily increase the cycle time – on the contrary, cycle times are reduced, irrespective of the die design and layout.

Production availability

There is also a focus on production availability. In order to achieve this Kurtz uses the proven furnace exchange system, type FSC, with furnace shuttle both for chassis components as well as crankcases.

Well cooled, perfect cycle times

Sufficient cooling is the most important prerequisite to achieve the mechanical properties and to reduce the cycle time. While sand packages can only be cooled by using chill castings, the versatile gravity die casting is recognised for its ability to be selectively used for targeted, separate and/or controlled cooling. Chill castings used in sand casting do "cool", but this type of cooling is incomparably difficult to the point of being unmanageable. With many castings we no longer use a sand package with a chill casting, but

instead use a chill casting with sand. Chill castings must be prepared again after use, but with "cooling in the die", however, they are not cleaned, or only during tool maintenance.

Individually tailored customer solutions

Low-pressure casting machines for crankcases are provided with a lot of equipment so that casting can be carried out profitably. Despite the high demands on the crankcase, Kurtz low-pressure casting machines make production very profitable.

The low-pressure furnaces used here differ from low-pressure furnaces for chassis only in their geometry, not in terms of their volume. Furnaces between 2,400 and 3,300 kg are used, with one or two riser tubes. Kurtz is not just a supplier of casting machines, but on request can also provide the associated peripheral equipment, such as smelting furnaces, impellers and tool change systems. Successful, commercial designs are rarely found off the shelf – we find that we far more frequently tailor these to customers' requirements. Including yours – take our word for it! ■



An example of the equipment for a typical crankcase casting line:

- Smelting furnace
- Impeller unit
- Holding and cleaning station for low-pressure furnaces ... between two to three stations ... plus pre-heating ovens for riser tubes
- Furnace shuttle, type FSC, for a faster furnace change
- Six casting machines per line
- Automation
- Tool change system
- Cooling system – die heating

Main components of a casting machine:

- Low-pressure furnace with approx. 2,800 kg capacity
- Quick change system for dies
- Automatic coupling for cooling circuit
- 60–80 cooling circuits
- Water
- Air
- Mixed cooling
- Design dependent on die design