

Casting quality improvement by reducing pouring temperature by 70°C



SUSTAINABILITY

THE CHALLENGE

This type of massive casting is sensitive to severe segregation in its central part where solidification takes about 15 hours. Ultrasound cannot pass through interdimeric porosity and where porosity was detected, the part were required to be excavated by carousel machining and welded followed by additional annealing heat treatment. The most advanced technology was essential to achieve a sound casting as cast with no welding rework after inspection.

FOUNDRY:  **UNEX®**

UNEX foundry is located in the Czech Republic, specialising in the production of high quality castings for various industries, including mining, heavy construction and transportation. With a focus on innovation and customer satisfaction, UNEX is leading supplier of high quality castings in Europe and globally.

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PARAMETER

Alloy:	GS70
Casting weight:	3,700 kg
Pouring temp.:	1,480°C
Poured weight:	6,400 kg
Yield:	57,81 %
Pour time:	44s
Moulding Process:	Furan mold

FOSECO PRODUCTS

VISO Rotor

VISO Stopper

VAPEX Nozzle

SULFAMIN 70

HOLLOTEX Shroud & Diverter

KALMINEX Exothermic-insulating Feeder Sleeves

RotoCal Solid Calcium wire



OUR SOLUTION

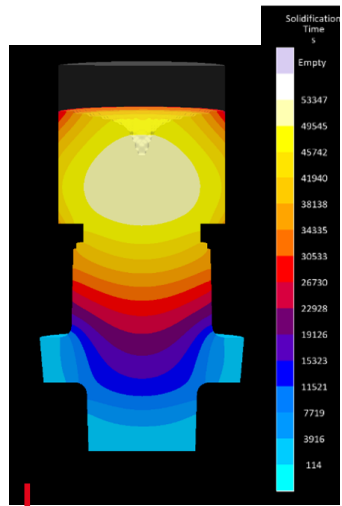
Molten metal treatment by the ROTOCLENE process in the pouring ladle and casting through the HOLLLOTEX Shroud to ensure metal remains free of inclusions, air entrapment and bifilms. Ultralow pouring temperature equal to the liquidus reduces segregation.

THE OUTCOME

Rotary treatment of molten steel in the ladle ensures dendrites cannot grow and conglomerate in the stirred metal and ensures it stays highly fluid even when approaching the liquidus temperature. The HOLLLOTEX Shroud protects the metal stream from reoxidation and air entrainment, so casting is possible even when the temperature of the metal passing through the gating system is already below the liquidus. The new method resulted in process stabilisation and a 70°C reduction in pouring temperature compared to the conventional method. The ultrasonic test performed on the cast parts using EN 12881 level 2 standard was acceptable with no need for repairs.



Complete casting picture after shot blasting



Solidification time according to MAGMA simulation is about 15 hours



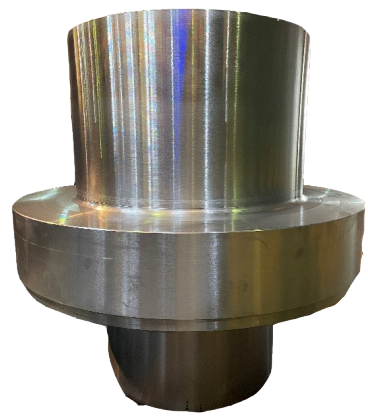
Porosity and segregation identified under the riser by ultrasonic inspection



Machining out of both defects under the riser and at the hub in drag until they disappeared before welding followed by additional annealing heat treatment

KEY BENEFITS

- Pouring temperature decreased to liquidus
- Reduced segregation and finer microstructure
- Ultrasonic requirement achieved with no repair
- Faster delivery to final customer
- Improved mechanical properties



ROTOCLENE treated casting cast from ultralow pouring temperature through the HOLLLOTEX Shroud passed ultrasonic inspection successfully with no repair

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