



**RHEOTEC XL – HIGH PERFORMANCE WATER-BASED CORE COATINGS**

FOR THE HIGHEST QUALITY DEMANDS OF THE MODERN FOUNDRY



**RHEOTEC XL high performance water-based core coatings**

The RHEOTEC XL range of water-based coatings has been designed specifically by Foseco to address the needs of the foundry producing grey and ductile iron components to the highest specifications. The increasing complexity and more exacting quality standards (see figure 1), combined with the drive to reduce overall costs in the manufacture of critical iron castings, requires optimised coating technology to reduce surface defects (see figure 2).

- ▶ Sand expansion (Veining)
- ▶ Scabbing
- ▶ Burn-on
- ▶ Metal penetration
- ▶ Retained particulate

RHEOTEC XL coatings have been engineered to combine superior rheological characteristics with specific refractory technology, to provide a cost effective solution (see figure 3).

- ▶ Excellent dipping characteristics
- ▶ Uniform layer deposition
- ▶ Controlled penetration of the refractory components into the core
- ▶ High insulation
- ▶ High temperature stability

**Superior protection against sand expansion defects**

Castings produced using cores made from silica sand have a higher tendency to exhibit sand expansion defects related to the  $\alpha$ - $\beta$  phase transition of quartz at 573 °C, commonly referred to as veining defects. The unique combination of refractory fillers within RHEOTEC XL coatings form a highly insulating layer between the molten metal and the core substrate, which delays and reduces the effect of this phase transition (see graph), significantly reducing or eliminating sand expansion related defects (see figure 4).

**RHEOTEC XL+ highly permeable coatings to prevent scabbing defects**

Typically a core coating will act as an impermeable barrier between the core substrate and the mould cavity, ensuring that gases formed through the thermal degradation of the core binder exit the core through predefined vents. Where adequate venting is not available or possible, there is a risk that gas pressure build-up within the core will rupture the coated core surface, resulting in scab defects, such as:

- ▶ A Non-metallic inclusion consisting of coating and core sand
- ▶ Scab defects where metal has replaced the ejected coating and core sand
- ▶ Metal penetration and burn-on in the area of the core no longer protected by a coating layer
- ▶ Gas blow-holes related to the binder decomposition gases which exit the core and become entrapped within the solidifying metal

The RHEOTEC XL+ range of coatings provide all of the benefits of RHEOTEC XL coatings, and in addition have very high permeability to reduce gas pressure build-up within the core, helping to eliminate the risk of scab defects where adequate venting is not possible (see figure 5).

**Cost effective solutions**

The applied layer of RHEOTEC XL acts as a highly protective barrier between the liquid metal and the sand substrate, helping to prevent common casting defects and resulting in:

- ▶ Reduced fettling and grinding costs
- ▶ Reduced shot-blasting costs
- ▶ Increased productivity - faster casting throughput
- ▶ Reduced core dressing operations
- ▶ Simplified core room practice: veining sand additives can be eliminated



Figure 1  
Complex internal passages of a cylinder head



Figure 2  
Veining defects in turbo housing (left) eliminated by the use of RHEOTEC XL (right)



Figure 3  
S.E.M. image of RHEOTEC XL layer

Figure 5  
Scabbing of a standard coating with low permeability (top) compared with RHEOTEC XL+ (bottom)

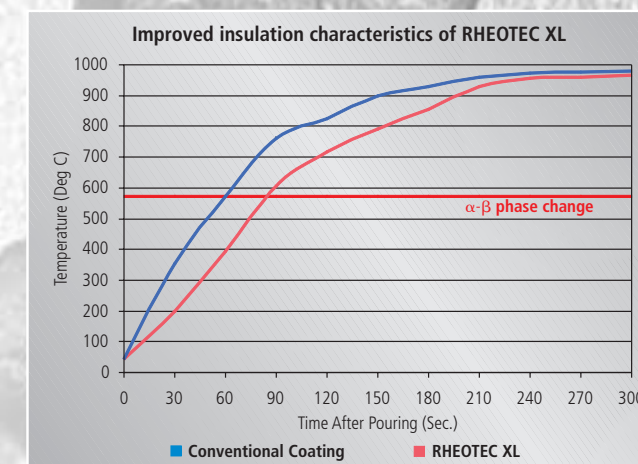


Figure 4  
Delayed  $\alpha$ - $\beta$  phase transition at core surface when using RHEOTEC XL