BRAND-NEW INNOVATION FOR THE NON FERROUS SECTOR: THE EXOTHERMIC FEEDER FEEDEX NF1

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In aluminium foundries, the use of insulating sleeves in a wide variety of materials has been common practice for many years. FOSECO is now launching an exothermic sleeve material for aluminium casting applications for the first time. The new recipe FEEDEX NF1 was specially developed for the aluminium sector and adapted to the existing requirements there. It ignites quickly, the exothermic reaction takes place slowly and steadily and ensures a considerable improvement in the feeding effect. This results in only low emissions. FEEDEX NF1 feeders are available in numerous different versions and eliminate the need for manual addition of exothermic powders.

INTRODUCTION

The use of insulating feeders is common practice in aluminium foundries. In this segment, many different products are available. In most cases, the products are made of fibres or spheres. In both cases, organic or inorganic binders are being used.

THE CHALLENGE

If the insulating property is not sufficient or if the size of the sleeve is limited, very often so called exothermic powders are applied. These powders start an exothermic reaction when in touch with liquid aluminium and provide their energy to the melt in the feeder to slow down the solidification. Also this technology is common practice.
However, this process contains a number of disadvantages:
First of all, the application of the powder has to be done manually, therefore the amount is often unstable. At big castings with a number of feeders, it is difficult for the operator to apply the powder to all feeders in an acceptable time frame. The exothermic reaction of the powder creates smoke, which (although it is not harmful) should be extracted. As the surface of the feeder must be open to apply the powder, users face limitation during the moulding process.

THE SOLUTION

With the new product line FEEDEX NF1, FOSECO now provides for the first time exothermic feeders for aluminium applications. These products are made of a new developed exothermic recipe and make the application of exothermic powders obsolete. When in contact with liquid aluminium, ignition starts within 30 seconds.
This exothermic reaction goes on slowly and steadily and provides a significantly delayed solidification of the metal in the sleeve and therefore a long lasting feeding performance.
The module extension factor which is between 1.3 and 1.5 for insulating sleeves is between 1.55 and 1.65 for FEDEX NF1.
These facts lead to a number of benefits: First of all, the manual application of exothermic powder becomes obsolete. In addition it is now possible to mould the feeders completely, which leads to reduced emissions. But also at open FEEDEX NF1 sleeves, reduced emissions can be observed. Due to the better feeding performance, sleeve dimensions can be reduced which leads to reduced re-melting costs. Figure 1 shows a typical cooling curve of a FEEDEX NF1 sleeve. The exothermic reaction is clearly visible. The released energy leads to a strongly delayed solidification. FEEDEX NF1 sleeves are available in all common dimensions. In all cases, the combination with a breaker core is possible. The use of breaker cores provides an easy knock-off of the sleeves from the casting and therefore reduces the costs.

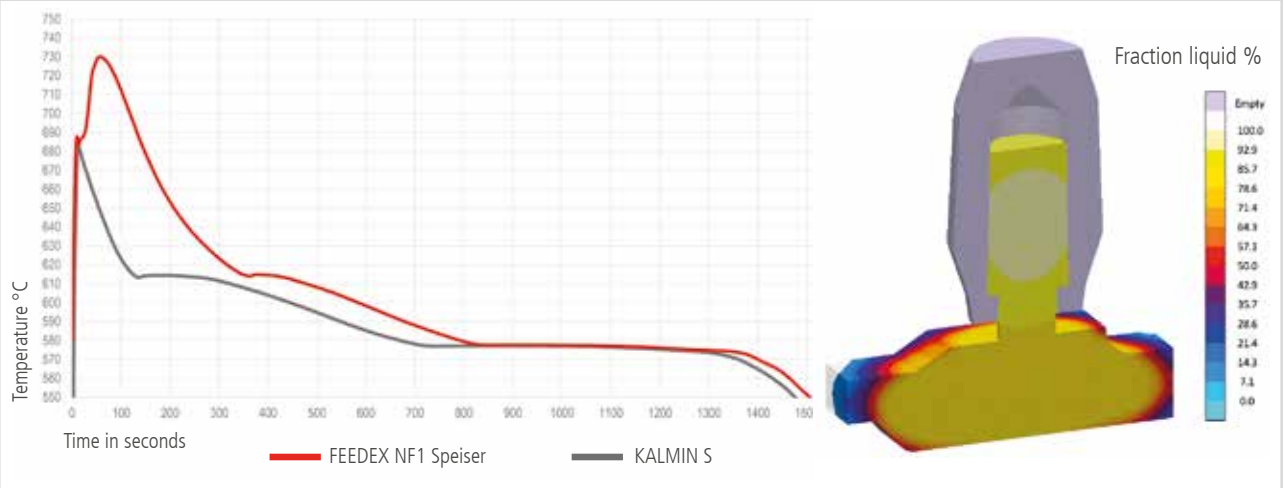

Figure 1: Comparison between cooling curve of an exothermic feeder sleeve FEEDEX NF1 and insulating feeder sleeve KALMIN* S

MAGMA simulation - Fraction liquid in %

Figure 2 shows the risers in the core box. Due to the high strength of the FEEDEX NF1 recipe it is possible to use the feeders on automated moulding lines without any problems. On the opposite, feeders with lower strength can break or deform during the moulding process.
Figure 3 shows the FEEDEX NF1 risers during casting. The exothermic reaction is clearly visible in contrast to the insulating risers. The reaction starts only a few seconds after filling with the melt and continues slowly and evenly. This makes the addition of exothermic powders such as FEEDOL* obsolete.

Figure 3: Clearly visible exothermic reaction of the FEEDEX NF1 riser

Figure 4. Constant burn-off of the FEEDEX NF1 feeder

CONCLUSION

FEEDEX NF1 is a new recipe for the non- errous sector. The fast, steady and lasting reaction makes it an excellent alternative to conventional insulating feeders. The high strength of the risers makes them suitable for use on automated moulding lines. The improved feeding effect can lead to a reduction of the feeder size and thus to a saving of recycled material. The manual addition of blowhole powders is no longer necessary, which increases process stability.

Figure. 2: Exothermic and insulating risers positioned in the moulding box

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