

## Resource-saving binder with biopolymer for the production of cast components for the automotive industry



# SUSTAINABILITY

## THE CHALLENGE

With growing concern about the negative impacts of environmental pollution from fossil fuels and from petrochemical products such as those based on phenol, much research has gone into exploring renewable alternatives that would pose less risk to the environment and represent an alternative to phenol which is a main component of most organic foundry binders. Biopolymers are one possible solution to the challenge and they can be obtained from renewable raw materials. The biopolymer lignin is readily available and considered to be a substitute for phenol in PF resins like ECOLOTEC\*.

### FOUNDRY:

FONDIUM Mettmann GmbH was founded in 1907. The foundry is the most important industrial company in the Mettmann region. With around 1,000 employees and a production capacity of 180,000 tons/year, the Mettmann site produces cast components for the automotive and commercial vehicle industry.

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## PARAMETER

**Alloy:** EN-GJS 500  
**Casting weight:** 23 kg  
**Pouring temp.:** 1420° C  
**Binder:** Biopolymer-ECOLOTEC  
EXP 5E 4126F  
**Binder level:** 2.3 %  
**Sand:** Silica sand

## FOSECO PRODUCTS

ECOLOTEC EXP 5E 4126F binder  
SEDEX\* filter  
VAPEX\* stopper  
VAPEX nozzles

## OUR SOLUTION

The ECOLOTEC process is the most environmentally-friendly gas cured organic binder process available and offers significant environmental benefits compared to other core manufacturing processes. ECOLOTEC is a phenolic resin. Phenol from petroleum fractionation is a base chemical for the manufacture of phenolic resins. There is great interest in the resin industry in replacing this petrochemically produced phenol with renewable raw materials, for example lignin. The biopolymer lignin is readily available as a by-product from the pulp and paper industry. It is considered to be a promising substitute for phenol in (PF) resin synthesis, given the increasing concerns of the shortage of fossil resources and the environmental impact from petroleum-based products. In our newly developed ECOLOTEC binder, the raw material phenol has now been partly replaced by the renewable biopolymer.

## KEY BENEFITS

- No isocyanates, peroxides or amines
- Low free phenol and low formaldehyde
- Phenol partly replaced by biopolymer
- Mild odour

> LET'S LEARN MORE



THINK BEYOND. SHAPE THE FUTURE.

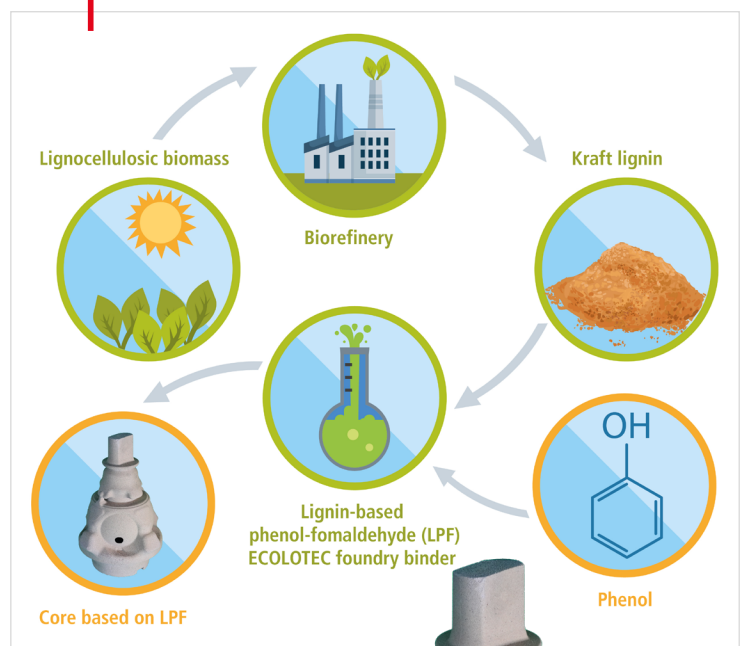


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## THE OUTCOME

A recently developed biopolymer-based binder for foundries based on the proven ECOLOTEC concept has been used successfully. The cores, for whose binder's phenol was partly replaced by biopolymer, were characterised by excellent strength, high dimensional accuracy and excellent surface finish. Cores containing biopolymer have a dark colour and a mild, aromatic odour. The castings made with these cores were sound and dimensionally accurate. They were characterised by a surface quality that was at least equivalent to that of conventionally manufactured components based on binders made from purely fossil raw materials.

From biomass to a foundry binder



Core for differential housing



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