

# **Development Trends of Eco-friendly Binder for Foundry Molding**

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Abstract: Reducing emissions and promoting carbon neutrality are inevitable choices for sustainable development in all countries around the world. HA focuses and owns the cutting-edge technology and ecofriendly products for this. Compared to traditional molding binders, the Alkaline Phenolic No-bake reduces VOCs emissions by 30% in the hand molding field, while the Furan system uses a new generation of low sulfur hardener(Without sulfuric acid), reducing emissions of SO<sub>2</sub> and NOx by nearly 70%; In the field of automatic molding lines, HA's the fourth generation eco-friendly Cold-Box resin introduces inorganic components in the production process of base resins, reducing the emissions more than 50%; And the ultimate product for emission reduction, 100% pure inorganic binder, has not only been widely used in non-ferrous castings, but also achieved breakthroughs in the application of iron castings.

At the end of the article, shares successful cases for well-known domestic foundries how to achieve emission reduction, for reference.

Keywords: sustainable development; emission reduction; molding binders; resin

#### **1** Introduction

With the official implementation of the Emission Standards for Air Pollutants in the Foundry Industry, foundry workers have to face the problem of how to implement the standards. However, due to a lack of experience, many Foundries have invested a large amount of funds with little effect. 100 years old international enterprise, HA Group, with the most cutting-edge products and mature solutions. This article introduces the latest development and application of furan, alkaline phenolic, cold box resin, and pure inorganic binders of zero emission, in order to help Foundries avoid detours and promote the Eco-friendly development.

#### Furan no bake system

Traditional furan system contains nitrogen and sulfur, which is not only increases emissions and also strong odor. HA developed a new material to replace sulfuric acid and sulfonic acid, which can reduce more than 50% S content of recycled sand. At the same time, the N content is controlled  $\leq 1\%$ , reducing NOx emissions by nearly 70%



#### Alkaline phenolic no bake system

Alkaline phenolic no bake has a good high-temperature stability and is commonly used in steel castings, but it is difficult to reclaim. HA has improved the regeneration performance, by using mechanical regeneration method, a minimum of 15% new sand addition can maintain the balance of recycled sand strength, and make 30% reduction in emissions.



## Cold box resin

HA's the fourth generation eco-friendly Cold-Box resin introduces inorganic components in the production process of base resins, reducing the emissions 50% and C content 23%.





## Pure inorganic binder

During core making and filling, there are no unpleasant smelling gases, liquids and no condensation by using inorganic systems, Emission=0. Now it is not only applied to Al casting, and also iron parts



Cylinder heads, crankcases M 270/ 274, M 133 Fig. 3 Figure caption

## Study case

The way to help H customer successfully reduce NMHC from 120 to below 60, meeting GB39726-2020 standard (requirement<100).



## **2** Conclusion

HA product Compared to traditional:

- [1] The Alkaline phenolic no bake process reduces emissions by 30% and improved the regeneration performance.
- [2] Furan resin system without sulfuric acid, reducing help of SO2 and NOx by nearly 70%;
- [3] The 4th eco-friendly Cold-Box introduces inorganic components, reducing the emissions more than 50%.
- [4] 100% pure inorganic binder, emission=0, has not only non-ferrous, but also iron castings.
- [5] Can reduce emissions, help foundry meet standard.