NPPL

NAGPUR PYROLUSITE PVT. LTD

www.nagpurpyrolusite.com

INOCULANTS

STRONTIUM, BARIUM, ZIRCONIUM & CERIUM BASED INOCULANT

NPPL INOCULANTS FOR FERROUS FOUNDRIES

STANDARD GRADES	SI	CA	BA	SR	ZR	TRE	MN	AL	FE
Barium Inoculants	68-72%	1-2%	2-3%	Nil	Nil	Nil	Nil	1%	Balance
Barium(H) Inoculants	60-65%	1-2%	7-11%	Nil	Nil	Nil	Nil	1%	Balance
Strontium Inoculants	72-76%	0.10%	Nil	0.8-1.20%	Nil	Nil	Nil	0.50%	Balance
Strontium Zirconium Inoculants	72-76%	0.10%	Nil	0.8-1.10%	0.8-1.20%	Nil	Nil	0.50%	Balance
Zirconium Alumium Inoculants	60-65%	0.5-1.60%	Nil	Nil	3-5%	Nil	Nil	3-5%	Balance
Cerium Inoculants	60-65%	0.7-1.20%	Nil	Nil	Nil	5-7%	Nil	1%	Balance
Zircon Manganese Inoculants	60-65%	0.5-1.60%	Nil	Nil	3-5%	Nil	3-4%	0.5-1.50%	Balance

Standard Sizes: 0.2 To 0.70 Mm
1.0 To 3.00 Mm
2.0 To 6.00 Mm
3.0 To 12.00 Mm

Standard Packing: 25 Kg Paper Bags On Pallets.
250 Kg Steel Drums On Pallets.
1250 Kg Jumbo Bags On Pallets

Other Chemical Analysis ; Refined Quality & Sizes Available

85 Yeshwant Stadium, Dhantoli, Nagpur- 440012,
Maharashtra, (India)

aditya@nagpurpyrolusite.com
npplltd@yahoo.com

+91-712-2448844
+91-9823074264

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INOCULATION

The term "Inoculation" refers to the introduction of Nuclei into the melt to influence structural formation of the molten Cast Iron during solidification. As per the Oxide- Nucleation theory, certain elements like Ba,Sr,Ca,Zr, & Ce; Al which have high affinity towards oxygen, are introduced in combination with FeSi as 'Inoculants' into The melt – they combine with oxygen present in melt & produce numerous small Nuclei (tiny particles which are <4µm in size).

These Nuclei serve as Crystallization centers, where The graphite present in the melt can grow onto these nuclei. (Graphite precipitation) & form Nodules. Hence effective inoculation leads To uniform mechanical material properties in different wall thicknesses.

Eutectic Equilibrium CONDITION:

The molten cast iron which contains about 1.5 To 3% Si & 2-4% Carbon, during cooling after a certain time attains the Eutectic Composition (4.30% carbon) & then the eutectic solidification begins immediately – under Ideal Conditions, where The precipitating carbon is fully present as Graphite. Practically the Equilibrium conditions are never achieved, due To various reasons like variation in chemical compositions, wall thickness, pouring temperature, cooling speed which results in melt cooling below eutectic temperature before solidification of The eutectic begins. The purpose of inoculation now is to ensure that sufficient Nuclei are present for Crystallization of Graphite at the beginning of this Eutectic Solidification. This prevents formation of iron carbide (Fe3c) & enables formation Of evenly distributed A- Graphite (Lamellar Graphite) with formation of many small Graphite nodules in Mg treated Cast Iron.

INOCULANTS NPPL PRODUCES : FeSiBa ; FeSiCa ; FeSiSr ; FeSiRe

Pre- Conditioning:

This basically refers to reduction of oxygen content and improvement in nucleation distribution of the melt by addition of pre-conditioning agents like Zr-Mn & Ce along with Si, in the furnace itself during preparation of the melt or even during tapping, thereby preparing the melt for the next stage of treatment, ensuring presence of sufficient Nuclei & Nodules even before Mg treatmenr begins.

Fading Effect :

Pre - Conditioners NPPL Produces : FeSiZrSr ; FeSiZrMn ; FeSiSr ; FeSiZrAl

Re- oxidation & Dissolution of Nuclei leads to reduction in the number of Nodules. Inoculation treatment effect depends on Temperature & largely on Time, as the fading begins with addition of Inoculants & ends when the Eutectic Solidification temperature is reached.

The difference in solidification times (Crystallization) for a casting with thin wall of 5 to 50 mm and that of a thick section (60mm & above) is huge, & entails a greater fading effect. Thereby leading to Longer Crystallization time with reduced number of Nodules & Bigger Size Nodules in thicker section of the casting. This Phenomenon can be Overcome by late inoculation or with Stronger Inoculant. Note Stronger Inoculant can fade away equally strongly with time.

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