Elkem

ZORVEX
·DESULFURIZER·

... AN ENVIRONMENTALLY EFFECTIVE DESULFURIZER FOR DUCTILE IRON

Ca

"Zorvex" desulfurizer combines calcium carbide with selected ingredients that desulfurize foundry iron while yielding minimal amounts of unreacted calcium carbide in the discharged slag. It can benefit foundries facing environmental constraints on waste disposal.

ENVIRONMENTALLY FRIENDLY

"Zorvex" desulfurizer removes sulfur from cupola-melted iron as effectively as regular calcium carbide, providing a low-sulfur base iron for magnesium treatments. With an efficient desulfurization practice, unreacted calcium-carbide levels of less than 0.5% can be achieved.

FITS ALL DESULFURIZATION NEEDS

"Zorvex" desulfurizer is effective in any of the popular desulfurization processes, including batch and continuous desulfurization. Porous plugs provide adequate mixing of the specialty desulfurizer and the base iron, optimizing desulfurization results. Mechanical mixing may also be used in batch processes. An example of the continuous desulfurization of cupola-melted iron, agitated by three porous plugs, is shown below:

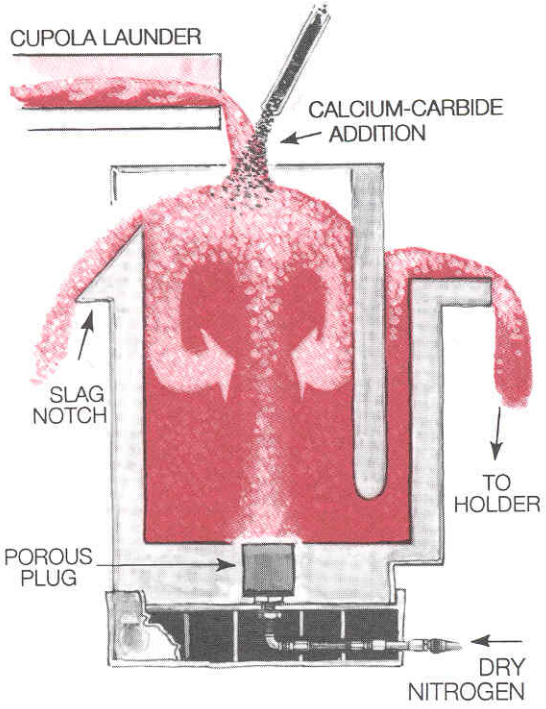
Desulfurization Treatment	Commercial Calcium Carbide	"Zorvex" Desulfurizer
Melt Rate, Tons per Hour	28	28
Addition	0.5%	0.5%
Initial Sulfur in Iron Final Sulfur in Iron	0.075% 0.011%	0.075% 0.011%
Residual Calcium Carbide in Slag	4.5%	0.32%

OPTIMUM DESULFURIZATION

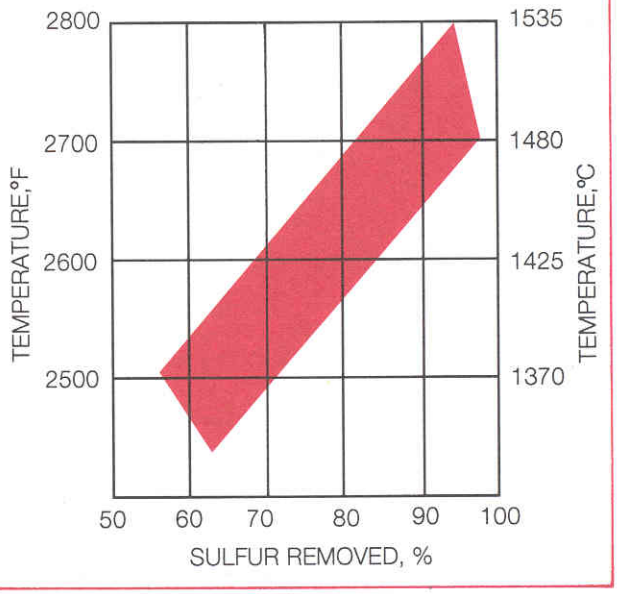
In optimizing desulfurization with "Zorvex" desulfurizer, foundries should consider iron temperature, agitation, vessel design, and addition rate, as follows:

IRON TEMPERATURE: The temperature of the iron affects the dynamics of the desulfurization reaction, so that fluctuations can cause variable results. Efficient desulfurization takes place above 2750°F., as shown in the graph at the right.

POROUS-PLUG MIXING WITH CONTINUOUS DESULFURIZATION



HOW TEMPERATURE AFFECTS SULFUR REMOVAL



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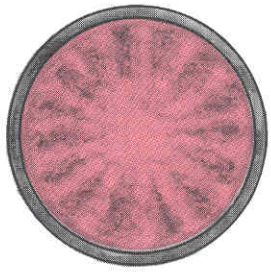
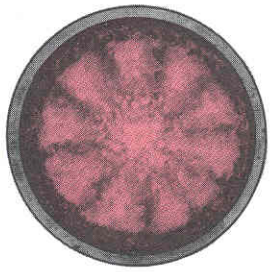
AGITATION: Since the desulfurization reaction relies on bringing the molten iron into contact with the desulfurizer, vigorous agitation is critical. Incomplete mixing will dramatically reduce desulfurization effectiveness and lead to high levels of unreacted calcium carbide in the slag. Examples of effective and incomplete mixing from porous-plug bubbling are shown below.

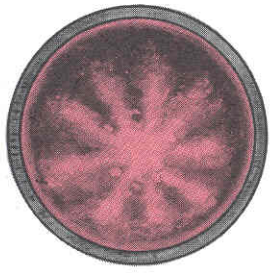
BUBBLING ACTION ON METAL SURFACE



A. SUFFICIENT BUBBLING, GOOD MIXING



B. INSUFFICIENT BUBBLING, POOR MIXING



C. TILTED LADLE, POOR MIXING

VESSEL DESIGN: The desulfurization vessel must be properly designed for each application, particularly for continuous desulfurization. Large variations in the volume of the iron being treated can lead to poor performance. Design criteria should include adequate freeboard for vigorous mixing, volume for sufficient dwell time, and easy slag removal.

ADDITION RATE: The amount of desulfurizer used should be monitored closely and adjusted to the minimum needed for adequate sulfur removal. This can be accomplished by employing a calibrated metering device which allows small adjustments in the addition rate. Excessive additions can reduce the efficiency of the process and lead to high levels of unreacted calcium carbide in the slag.

SPECIFICATIONS, TYPICAL SIZE, AND PROPERTIES

Calcium Carbide (CaC_2)	65.0 to 75.0%
Calcium Oxide (CaO)	18.0 to 25.0%
Silicon Dioxide (SiO_2)	5.0 to 15.0%
Typical Size	10 mesh x 40 mesh
Specific Gravity	Approximately 2.2
Approximate Melting Range	1300 to 2300°C (2375 to 4175°F)
Containers	As Requested by Customer

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