



# SIFGA<sup>®</sup>

## The Unique Refractory Solution

Presented by:



### **Wahl Refractories**

# SIFCA®

## GENERAL FEATURES

**SIFCA®** is an acronym that stands for Slurry Infiltrated Fiber CAstable. **SIFCA®** is a precast refractory composite composed of low cement refractory slurry and stainless steel fiber. It is a combination of up to 16 volume percent stainless steel fibers and any one of six (6) slurry types. Under appropriate conditions, **SIFCA®** shapes can have an intermittent service temperature range up to 3000°F (1649°C). The unique characteristics of this product are; thermal shock resistance, impact resistance, compressive strength and refractoriness when compared to steel or cast iron shapes. At elevated operating temperatures, **SIFCA®** replaces cast iron and steel parts that are oxidizing. **SIFCA®** is also a direct replacement for conventional precast refractory shapes in structural or support applications. **SIFCA®** shapes, unlike standard precast shapes, can be bolted to the same structure as the steel or cast iron it is replacing.

## RECOMMENDED APPLICATIONS

TYPICAL IRON AND STEEL APPLICATIONS:	TYPICAL NON FERROUS APPLICATIONS:
<ul style="list-style-type: none"> <li>• Steel Ladle Retainer Rings</li> <li>• Reheat Furnace Door Jambs</li> <li>• Reheat Furnace Door Perimeters</li> <li>• Iron Ladle Pour Spouts</li> <li>• Slag Out Sections</li> <li>• Torpedo Ladle Throats</li> <li>• Composite Tundish Covers</li> <li>• Blast Furnace Trough and Runner Covers</li> <li>• Replace Water Cooled Metal Sections</li> </ul>	<ul style="list-style-type: none"> <li>• Furnace Door Jambs, Sills and Lintels</li> <li>• Rotary Kiln Nose Rings</li> <li>• Cruse Bottoms</li> <li>• Trough and Launder Sections</li> <li>• Metal Stirring Tools</li> <li>• Siphon Tips</li> <li>• Furnace Door Perimeters</li> <li>• Thermocouple Protection Tubes</li> <li>• Skim Blades</li> </ul>

**NOTE:** **SIFCA®** is a unique refractory composite and **IS SUPPLIED AS A PRECAST SHAPE ONLY**. The application of this product requires close cooperation with the end user. New applications are continuing to be developed. Your Wahl Representative or Licensee can furnish additional application information and suggestions.

## PRODUCT TYPES

<b>SLURRY CHARACTERISTICS:</b>	Low Cement Castable Technology
<b>SLURRY TYPES:</b>	<ul style="list-style-type: none"> <li>• <b>SIFCA®</b> High Alumina</li> <li>• <b>SIFCA®-AL</b> High Alumina; Nonferrous Metal Resistant</li> <li>• <b>SIFCA®-PLUS</b> High Alumina</li> <li>• <b>SIFCA®-PLUS-AL</b> High Alumina; Nonferrous Metal Resistant</li> <li>• <b>SIFCA®-PLUS-SC</b> Silicon Carbide</li> <li>• <b>SIFCA®-PLUS-SC-AL</b> Silicon Carbide; Nonferrous Metal Resistant</li> </ul>
<b>SERVICE TEMPERATURE:</b>	Up to 3000°F ( <i>Intermittent</i> ) 1649°C ( <i>Intermittent</i> )
<b>WEIGHT REQUIRED FOR CONSTRUCTION (with fiber)</b>	175 lbs/ft <sup>3</sup> 2803 Kg/M <sup>3</sup>

## KEY PROPERTIES OF SIFCA® / SIFCA® Plus

TEMPERATURE	PERMANENT LINEAR CHANGE (%)	MODULUS OR RUPTURE	
		(psi)	(Mpa)
230°F 110°C (24Hr)	0.00	8000 – 9500	55 – 65
1500°F 816°C (24 Hr)	-0.01 to -0.02	5500 – 6500	38 – 45
2000°F 1093°C (24 Hr)	+0.30 to +0.50	5500 – 6000	38 – 41
2000°F 1093°C (100 Hr)	+0.50 to +1.00	5500 – 6500	38 – 45
(AFTER 24 to 100 HOURS AT INDICATED TEMPERATURE)			

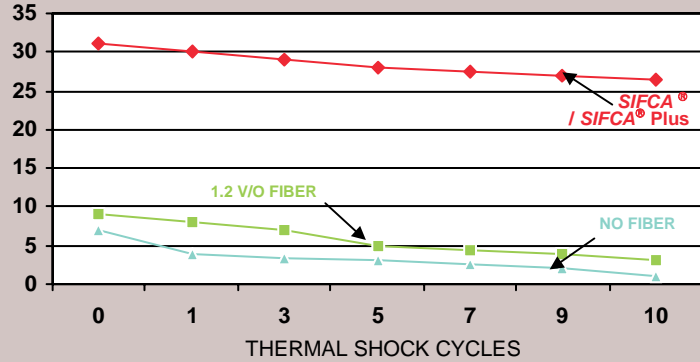
### Thermal Conductivity (ASTM C417)

Hot Face Temperature	SIFCA® 15-26/SIFCA® Plus		SIFCA® AL/ SIFCA® Plus AL		SIFCA® Plus TA		SIFCA® Plus SC	
	Btu in/hr ft2 °F	W/m °K	Btu in/hr ft2 °F	W/m °K	Btu in/hr ft2 °F	W/m °K	Btu in/hr ft2 °F	W/m °K
1000°F 538°C	7.69	1.11	9.25	1.33	16.62	2.40	18.4	2.65
1500°F 816°C	7.98	1.15	10.07	1.45	16.47	2.37	18.25	2.63
2000°F 1093°C	8.88	1.28	10.77	1.55	16.55	2.39	17.85	2.57
2500°F 1371°C	9.54	1.38	11.44	1.65	16.64	2.40	18.02	2.60

### THERMAL SHOCK RESISTANCE

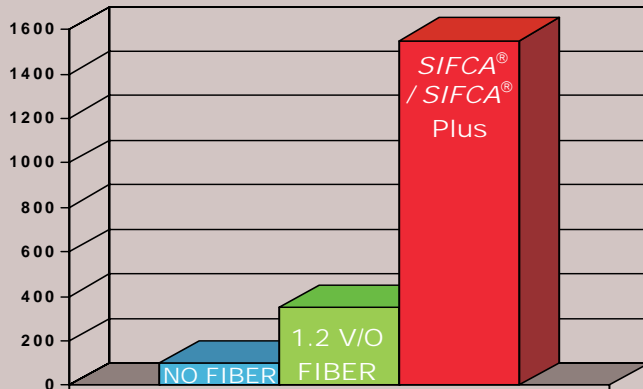
The superior thermal shock resistance of **SIFCA® / SIFCA® Plus** compared to castable with no fiber and castable with 1.2% by volume steel fiber is obvious. One (1) cycle is heating a 50 x 50 x 180 mm bar to 955°C, immersing in room temperature water for 3 minutes and placing in front of a fan for an additional 7 minutes. Flexural testing was done at 1 cycle, 5 cycles and 10 cycles. *NOTE: Total time at temperature is 100 hours.*

MOR after indicated cycles, MPa



### IMPACT RESISTANCE

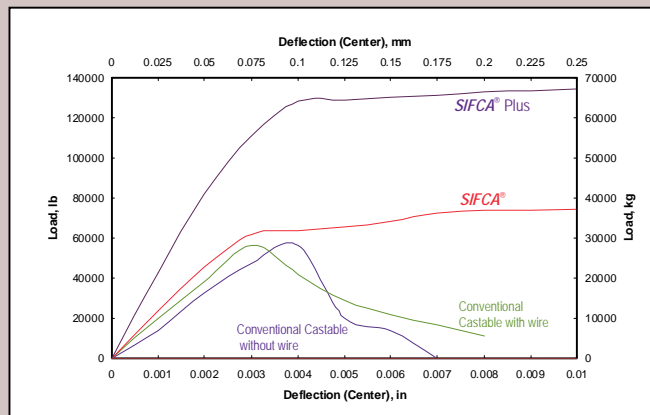
IMPACT RESISTANCE, BLOWS TO FIRST CRACK



Superior impact resistance of **SIFCA® / SIFCA® Plus** versus plain castable and castable with 1.2% by volume steel fiber is clearly demonstrated. The procedure, recommended by ACI Committee 544, involves dropping a 10 lb. (4.5 Kg) soil compaction hammer 18 inches (457.2 mm) onto a hardened steel ball placed in the center of a castable piece 6" (152.4 mm) in diameter and 2.5 inches (63.5 mm) thick. Plain castable cracked and separated after 140 blows, castable with 1.2 volume % after 400 blows and **SIFCA® / SIFCA® Plus** had no cracks after 1500 blows. (Pieces were fired to 2000°F or 1093°C)

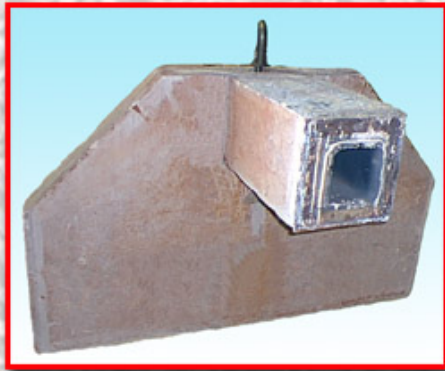
### COMPRESSIVE STRENGTH

**SIFCA® / SIFCA® Plus** continues to carry a significant percentage of ultimate compressive load at deflections well beyond the point at which plain castable and castable with 1.2 volume % steel fibers fall off dramatically. Measurements were made on 7.5 cm x 15 cm cylinders.



**SIFCA**®

**Aluminum & Nonferrous  
Industry Applications**



**BOOM BLADE**



**IMPELLER**



**THERMOCOUPLE PROTECTION TUBE**



**TROUGH**



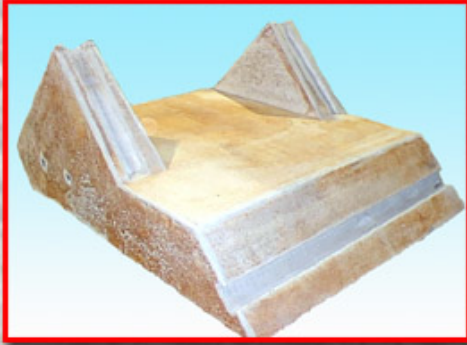
**ROUND MELTER TOP RING SECTIONS**



**CHARGING TOOL**

**SIFCA**®

**Aluminum & Nonferrous  
Industry Applications**



**BLISTER WELL**



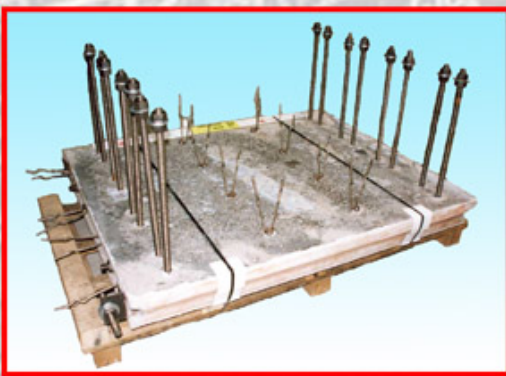
**LINTEL ASSEMBLY**



**DUCK NEST TROUGH**



**JAMBS**



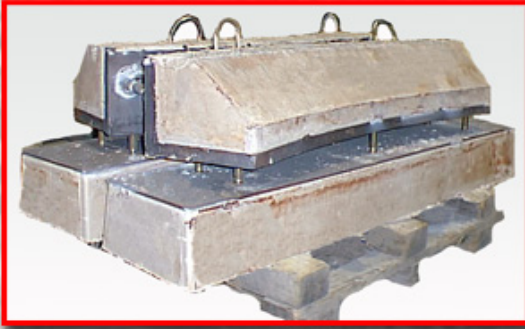
**PAD SKIM SHELF**



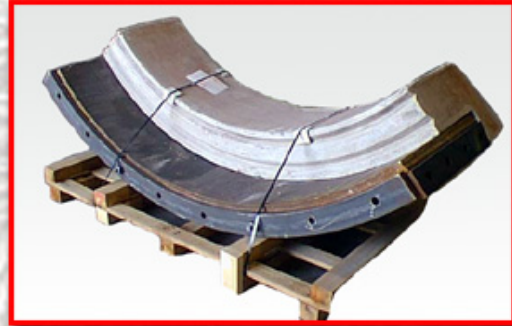
**BAFFLE**

**SIFCA**®

**IRON / STEEL & OTHER  
Industry Applications**



**LADLE LIP RING**



**POUR OFF SECTION**



**SPOUT BACKUP**



**SPLASH SHIELD**



**HOT CAR THROAT**



**LMF HOOD ASSEMBLE**

**SIFCA**®

**IRON / STEEL & OTHER  
Industry Applications**



**FUNNEL ALLOY**



**CEMENT NOSE RING**



**LADLE SPOUT**



**CEMENT KILN LIFTER**



**WIRE FEED BLOCK**



**ALLOY ADD CHUTE**

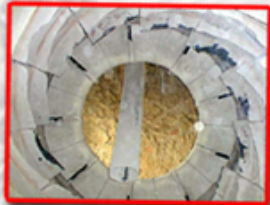
# SIFCA®



## **Applications in the following industries:**



Aluminum  
Copper  
Foundries (Ferrous & Nonferrous)  
Hydrocarbon Processing  
Incineration  
Iron and Steel  
Mineral Processing



New applications are continually being developed by ourselves and our customers!



## **Wahl Refractories**

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