

## Flow Control Refractory Materials

We supply a complete line of functional refractory materials of slide gate plates, shrouds, nozzles, and stopper rods for flow control of furnaces of ferrous and non-ferrous metal smelting and casting. Typical material grades are categorized as:

Graphitized Alumina  
Graphitized Alumina Zirconia  
MgO Alumina-Carbon  
Fused Silica



### Slide Gate Plates & Nozzles

Part No. Specs.	SGTG -80 (Plate)	SGTG-75 (Plate)	SGTG-70	SGTG-70-Z (ZrO Plate)	HGG-65 (Nozzle)	NZT-85 (Nozzle)	NZT-70 (Nozzle)	NZT-75 (Nozzle)
Bulk Density g/cm <sup>3</sup> ≥	3.17	3.13	3.05	4.9	2.9	3.05	2.70	2.70
Apparent Porosity % ≤	6	6	5	16	8	8	8	10
Cold Crushing Strength Mpa ≥	140	130	120	200	100	80	70	88
Refractoriness Under Load °C ≥	1700	1700	1700		1650	1700		
Al <sub>2</sub> O <sub>3</sub> % ≥	80	75	70	CaO 3 ~ 4	65	80	70	75
C % ≥	6	7	7	Fe <sub>2</sub> O <sub>3</sub> ≤ 0.1	7	3	3	3
ZrO <sub>2</sub> % ≥	4	7	6	94	4			
Service Position	Ladles	Ladles & Tundish	Ladle & Tundish		Ladle	Ladle	Ladle	Tundish
Use Times	Normal 3 ~ 5 Max. 7	For Ladle: Normally 2 ~ 4 Max. 5  For Tundish: Normally 8 Max. 14	For Ladles: Normally ≥ 2  For Tundish: Normally ≥ 6		1 ~ 2	Normally ≥19 Max. 28	Same as for Sliding Plate	Same as for Sliding Plate of Tundish

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### Ladle Shrouds

Shroud Types Specs.	Main Body		Slag Line		
	GALS	GALH	ZCLS	MCLS	GALSN
Material Codes					
Performance Conditions	Preheating	Non-preheating	Acid	Basic	Neutral
Al <sub>2</sub> O <sub>3</sub> % ≥	40	45			55
ZrO <sub>2</sub> % ≥			55		
MgO % ≥				55	
C+SiC % ≥	30	20	18	15	15
Bulk Density g/cm <sup>3</sup> ≥	2.15	2.18	3.20	2.5	2.44
Apparent Porosity % ≤	19	19	22	18	19
Cold Crushing Strength MPa ≥	18	19	20	18	Ladle
Modulus of Rupture MPa ≥	6	5.5	5.0	4.0	5.0

### Stopper Rods

Rod Types Specs.	Main Body	Head	
	GASR	MGSR	AG
Material Codes			
Al <sub>2</sub> O <sub>3</sub> % ≥	40		60
MgO % ≥		58	
C+ SiC % ≥	20	15	10
Bulk Density g/cm <sup>3</sup> ≥	2.28	2.45	2.60
Apparent Porosity % ≤	19	18	18
Cold Crushing Strength MPa ≥	19	20	23
Modulus of Rupture MPa ≥	5.5	4.5	5.0

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### Tundish & Ladle Nozzles

Product Name Specs.	Upper Nozzle	Lower Nozzle	Tundish Nozzle	
			Main Body	Bowl
Material Codes	HANZ	GANZ	GAZMZ	The materials are equivalent to stopper rods
Al <sub>2</sub> O <sub>3</sub> % ≥	90	55.0	45.0	
ZrO <sub>2</sub> % ≥	-	-	5.0	
C+SiC % ≥	-	8.0	20.0	
Bulk Density g/cm <sup>3</sup> ≥	3.10	2.8	2.28	
Apparent Porosity % ≤	8.0	11.5	19.0	
Cold Crushing Strength MPa ≥	45.0	35.0	19.0	
Modulus of Rupture MPa ≥	10.0	10.0	5.5	

### Fused Silica Stopper Rods & Nozzles

Chemical Analysis	Physical Properties		
SiO <sub>2</sub> % ≥	Bulk Density g/cm <sup>3</sup> ≥	Apparent Porosity % ≤	Cold Crushing Strength MPa ≥
99	15	15	40

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