

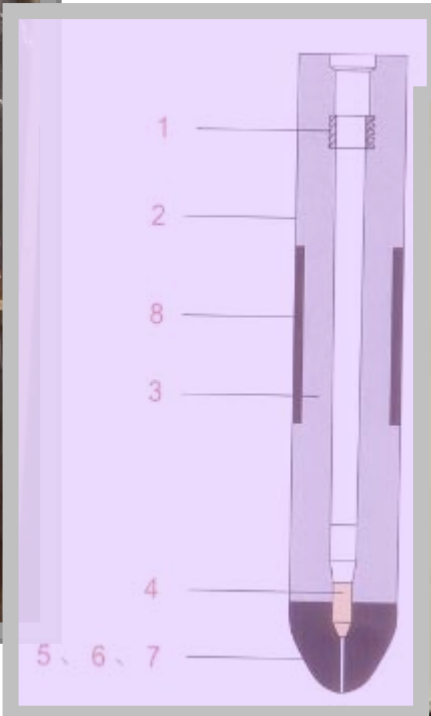


Ladle shroud is used to protect the steel stream from splashing and oxidation when it flows from ladle to tundish. The service life of this product can be over 10 hours. It has the advantages that it can be reused and furthermore that no preheating requirement.

Graphic illustration:

1. Argon injection structure can be designed according to customer's requirement.
2. Ceramic glaze layer can protect oxidation of material effectively.
3. Ceramic fiber blanket can decrease heat lost during casting.
4. Al₂O₃-C quality has high corrosion resistance and thermal shock resistance.
5. High quality ZrO₂ based composite to provide high corrosion resistance at the slag line.
6. No-graphite in the inner layer and therefore can meet requirement of low carbon steel, silicon steel and high purity steel.

	Al ₂ O ₃ ,%	Fe ₂ O ₃ ,%	SiO ₂ ,%	TiO ₂ ,%	ZrO ₂ ,%	CaO,%	MgO,%	LOI,%	Density,g/cm ³	Porosity,%	MOR,MPa	Application
Body	61.02	1.30	12.80	1.59	--	--	--	23.28	2.57	15.67	6.9	general
Slag line	--	--	--	--	75.10	1.71	--	15.01	3.78	415.61	6.97	High slag corrosion
Body	38.22	--	22.47	--	1.2	--	--	34.52	2.20	14.67	5.32	reusable



Graphic illustration of stopper:

1. Steel nut for convenient installation and avoid falling of head
2. Ceramic glaze layer to prevent oxidation of material effectively
3. High quality Al₂O₃-C material have good corrosion resistance and thermal shock resistance
4. Porous plug can prevent the steel stream from entering the stopper.
5. Al₂O₃-C material for the head has good slag corrosion resistance
6. Spinel material for the head has the best property of slag corrosion resistance
7. MgO-C material for the head mainly is used for processing steel with Ca
8. ZrO₂ is used slag line part for good corrosion resistance

	Al ₂ O ₃ ,%	Fe ₂ O ₃ ,%	SiO ₂ ,%	TiO ₂ ,%	ZrO ₂ ,%	CaO,%	MgO,%	LOI,%	Density,g/cm ³	Porosity,%	MOR,MPa	Application
Body	53.28	0.91	14.48	1.41	--	--	--	30.59	2.42	14.3	8.4	general
Head	86.61	0.43	0.77	0.33	--	--	--	11.11	2.85	17.7	6.73	general
Head	71.43	0.91	10.65	--	--	--	5.71	10.95	2.78	16.3	14.5	Serious slag corrosion place
Head	15.1	--	8.95	--	0.29	1.56	56.8	17.3	2.59	16.7	7.8	Steel processing with Ca
Slag line	--	--	--	--	75.10	1.71	--	15.01	3.78	415.61	6.97	High slag corrosion



Sliding nozzle is very important part for the steel making, which is controlling device for casting of caster. It can precisely control the steel flow from ladle to tundish to balance the flow of steel which is flowing from the tundish to the moulds. While sliding plate is the most important component of sliding nozzle, it is subject to chemical and physical erosion and thermal impacting. Therefore the sliding plate must have good performance concerning temperature resistance, high strength, good erosion resistance and thermal shock resistance, small creep. Our slide plate is especially designed considering these features.

Material properties:

Item	Al ₂ O ₃ -C			Al ₂ O ₃ -ZrO ₂ -C			MgO-C	MgO-Spinel-C
	Abax-65	Abax-70	Abax-75	Abaxz-65	Abaxz-70	Abaxz-75	Abaxm-80	Abaxms-70
Al ₂ O ₃ ,% ≥	65	70	75	65	70	75	--	--
C,% ≥	7	7	7	7	7	7	6	6
ZrO ₂ ,% ≥	--	--	--	5	6	6	--	--
MgO,% ≥	--	--	--	--	--	--	80	70
CCS,Mpa ≥	70	80	110	115	120	120	100	100
BD, g/cm3	2.80	2.85	2.95	3.05	3.10	3.15	3.05	3.00

Purging plug which injects Argon/Nitrogen through the bottom of ladle is mainly used for secondary refining with the main purpose is to adjust composition and temperature of liquid steel, and furthermore to equalize the conditions of the melt.

Main advantages:

- Good abrasion resistance
- Good thermal shock resistance
- Good permeation resistance
- Good erosion resistance



Item	Chrome-corundum purging plug	Chrome-corundum-spinel purging plug	Corundum-spinel purging plug
Al ₂ O ₃ %	88 ~ 92	≥ 94 (+ MgO, Cr ₂ O ₃)	≥ 94 (+ MgO)
Cr ₂ O ₃ %	4.0 ~ 7.0	—	—
Bulk density, g/cm ³ (1600°C×3hrs) ≥	3.0	3.0	3.0
CCS, (1600°C×3hrs) MPa ≥	90	90	90
MOR, (1600°C×3hrs) MPa ≥	12	14	14
Refractoriness under load, °C ≥ (0.2MPa,0.6%)	1700	1700	1700
Flow rate, NI/min (0.2~1.0 MPa)	200 ~ 650	200 ~ 650	200 ~ 650
Thermal shock resistance, cycle (Water quenching at 1200°C) >	12	12	12
Application	Used for bottom argon blowing refining ladles		

Monolithic products for EAF

Item	Corundum castable for roof	Refractory pre-cast shapes for roof	Tap hole fillers	Dry ramming mix for bottom	Gunning mix
Max. service temperature, °C ≥	1750	—	—	—	—
Al ₂ O ₃ % ≥	82	82	—	—	—
MgO % ≥	—	—	50	80	>86
CaO % ≤	2.0	2.0	—	4~10	—
SiO ₂ % ≤	—	—	35~40	2.0	—
Fe ₂ O ₃ %	—	—	—	4~10	—
Cr ₂ O ₃ %	—	2~5	—	—	—
Bulk density g/cm ³ , ≥	110°C×24hrs	2.9	—	2.3 packing density	2.2
	1600°C×3hrs	2.9	—		—
CCS, MPa, ≥	110°C×24hrs	30	—	—	60
	1600°C×3hrs	40	—	80	—
MPa, MOR ≥	110°C×24hrs	6.0	—	—	—
	1600°C×3hrs	8.0	—	—	4.0 (1500°C×3h)
Refractoriness °C	—	—	1710~1750	—	—
Grain size distribution, %	—	—	>6mm, ≤10	—	< 3mm, ≥90 > 1mm, ≥35 < 0.074mm, ≥20
Linear change after heating, %	0.2~0.6 (1600°C×5hrs)	—	—	—	0.0~0.4 (1500°C×3hrs)
Application	Used for in situ casting or pre-casting for tri-angle area of UFP EAF roof		Used to fill the tap hole of EBT	Used for dry ramming of UHP EAF bottom	Used for slag zone gunning of EAF



Monolithic products for Ladle and tundish

Item	Castables for ladle			Coating mix for tundish		Castable for tundish permanent lining	Castable for LF roof	
				MgO based	MgO-CaO based			
Max. service temperature, °C	—			1700	1700	—	—	
Al ₂ O ₃ % ≥	85	90	95	—	—	50~75	80	
MgO % ≥	—	—	—	80	60	—	—	
CaO % ≥	—	—	—	—	8.0	—	≤2.0	
Bulk density G/cm ³ ≥	110°C×24hrs	2.9	3.0	3.0	1.6~24	1.6~24	2.3	2.75
	1600°C×3hrs	2.9	3.0	2.9	—	—	—	2.80
CCS Mpa ≥	110°C×24hrs	40	25	25	40	2.0 (1100°C×24hrs)	30	30
	1500°C×3hrs	60	60 (1600°C×3hrs)	60 (1600°C×3hrs)	7.0	6.0	50 (1400°C×3hrs)	50 (1600°C×3hrs)
Mpa ≥	110°C×24hrs	6	5	4	1.5	1.5	6.0	6.0
MOR	1500°C×3hrs	8	10 (1600°C×3hrs)	10 (1600°C×3hrs)	2.0	3.0	10	10 (1600°C×3hrs)
Refractoriness under load (0.2 MPa, 0.6%), °C ≥	1400	1550	1580	—	—	—	1600	
Linear change after heating, 1500°C×3hrs %	0~±1.5	—	—	-0.5~2.5	-1~-4.5	±0.8 (1400°C×3hrs)	—	
Thermal shock resistance, ≥ (1200°C water cooling)	—	—	—	—	—	10	—	
Application	Used for in situ casting of ladle lining			Used for tundish working lining		Used for casting of tundish permanent lining	Used for casting of LF roof	



UHP - TUNDISH NOZZLES

INTRODUCTION

Tundish nozzles are one of the key elements for successful high-speed casting. Stable material properties are essential for a compact and uniform casting stream which is an important precondition for avoiding break-outs and for good billet quality.

MAIN ADVANTAGES

- Long casting sequences of up to ... hours
- Stable casting speed
- Low increase of inner diameter
- Consistent results
- Low cost

DESCRIPTION

Nozzles of ultra high performance type in composite design with zirconia-insert and alumina outer body.

A latest state of the art manufacturing facility ensures precise process control and consistent properties of our nozzles.

Nozzles are manufactured as fixed and quick-change type (all models available).

MATERIAL PROPERTIES

		HP		UHP	
		core	body	core	body
ZrO ₂ + HfO ₂	%	93	-	96	-
Al ₂ O ₃	%	-	75	-	80
bulk density	c/cm ³	4,30	2,2	4,70	2,4
apparent porosity	%	> 22	>22	> 22	>22
service-life	h	9		14	