

ZIBO SHENG KAI NEW MATERIALS CO., LTD.

SK MATEC
ADVANCED CERAMIC SOLUTIONS

晟凯新材
SHENGKAI REFRACTORY

PROFESSIONAL SUPPLIER OF GRAPHITE CRUCIBLE



ZIBO SHENG KAI NEW MATERIALS CO., LTD.

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ZIBO SHENG KAI NEW MATERIALS CO., LTD.



ABOUT US

Zibo Sheng Kai New Materials Co., LTD. is in Zibo City Shandong Province of China. Zibo Sheng Kai specializes in the manufacture of crucibles for non-ferrous metal smelting, and refractory products for continuous casting, it has a registered capital of 1milion RMB, Zibo Shengkai has two brands, "Mars" and "SK", respectively for Chinese and overseas markets. Zibo Sheng Kai is one of the largest crucible manufacturers in China, and it uses isostatic pressing technology to produce silicon carbide graphite crucibles and clay graphite crucibles. With many years of research and field tests, the technical team of Zibo Sheng Kai has made significant efforts to solve various technical problems and developed silicon carbide graphite crucibles and clay graphite crucibles which have characteristics of high oxidation resistance, high thermal conductivity, long service life, and low energy consumption, increasing production efficiency and significantly reducing production costs for non-ferrous metal smelting companies.

Product Characteristics

Higher thermal conductior

Silicon carbide graphite crucibles use high thermal conductivity raw materials such as graphite, which shortens the melting time and saves energy; in addition, higher thermal conductivity materials are used, with dense structures, low apparent porosity, and higher thermal conductivity.

Excellent thermal shock resistance

Silicon carbide graphite crucibles have strong heat-resistant impact functions, and they are not easy to break under sharp heating and cooling. The heat shock strength is high, so any process can be carried out safely.

Anti-adhesion

Because graphite has the characteristics of not easily adhering to the molten metal, the penetration, and adhesion of the molten metal are less;

High strength

High-quality materials are selected, high-pressure isostatic pressing, fair combination, high strength, scientific product modeling and high pressure bearing capacity, and good crack resistance. So it maintains the original physical and chemical properties of natural graphite.

Higher temperature resistance

The using temperature range 400-1600°C.

Long life

Life is 3-5 times longer than the ordinary clay graphite crucible.

Corrosion resistance

Advanced materials and glaze recipes are effectively corrosion resistance.

Less metal pollution

Because of the choice of high-purity inorganic material, there are little or no harmful impurities in products in the metal melting process.

Less slag sticking

less slag hanging on the inner wall, greatly reducing the possibility of thermal resistance and expanding and cracking, and keeping the capacity maximized.

Antioxidant

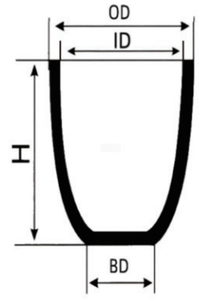
Unique anti-oxidation design, and uses high-purity raw materials to protect graphite; high oxidation resistance is 5-10 times higher than the ordinary graphite crucible.

ZIBO SHENG KAI NEW MATERIALS CO., LTD.

Graphite silicon carbide crucibles

NO	Model	ODMM	HMM	IDMM	BDMM	Brim.Cap(L)
1	A26	155	165	125	100	1.6
2	A65	260	310	212	180	6.1
3	A40	190	225	160	95	3.4
4	A81	330	420	263	225	17
5	A101	365	445	295	255	23
6	A130	395	500	324	220	30
7	200	430	500	366	238	33
8	300	430	570	366	238	43
9	320	430	650	366	238	53
10	340	460	600	391	245	52
11	350	530	530	457	260	53
12	355	460	660	395	245	65
13	360	460	700	396	245	69
14	370	530	560	460	260	73
15	A380	520	700	440	315	80
16	400	530	620	460	260	78
17	450	530	660	468	260	88
18	463	580	600	510	260	88
19	465	580	650	513	260	88
20	501	525	740	433	255	81
21	502	524	745	436	255	80
22	505	530	785	445	255	104
23	511	550	660	467	330	94
24	765	620	630	540	240	106
25	765/500	620	500	540	240	91
26	790	650	650	570	265	124
27	801	620	700	540	300	127
28	802	620	750	543	300	134
29	803	620	800	548	300	146
30	810	620	830	536	320	150
31	820	715	530	620	280	111
32	850	715	650	628	280	145
33	910	715	600	625	280	170
34	1000/650	715	650	630	280	150
35	1000	715	700	630	280	165
36	1100	720	720	633	280	168
37	1200/680	720	680	633	280	154
38	1200	720	740	633	280	177
39	1400	780	650	688	350	155
40	1500	735	900	647	440	229
41	1501	745	910	650	300	237

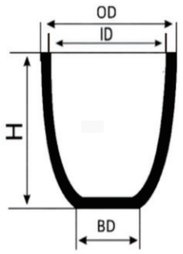




Graphite silicon carbide crucibles

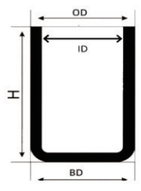
NO	Model	ODMM	HMM	IDMM	BDMM	Brim.Cap(L)
42	1510	750	900	645	310	223
43	1550/600	780	600	678	300	162
44	1550	780	750	690	400	200
45	1560	775	750	680	310	212
46	1650	780	800	685	305	229
47	1800	780	900	693	305	258
48	1801	770	900	680	300	251
49	1950	830	750	745	380	226
50	2100	870	860	785	360	306
51	2170/750	880	750	785	320	275
52	2170/680	880	680	780	330	241
53	2200	880	800	780	360	289
54	2250	880	880	780	360	320
55	2300	880	1000	785	360	382
56	2350	880	1050	785	360	401
57	2270	1035	830	925	520	427
58	2270/750	1035	750	920	520	386
59	2400	880	1100	785	400	387
60	2500	880	1140	785	400	415
61	2700	880	1170	785	400	436
62	5000/880	1050	880	929	510	475
63	5000/900	1050	900	929	510	483
64	5000/1000	1050	1000	929	510	542
65	5000/1050	1050	1050	935	510	569
66	5000/1200	1050	1200	935	520	650
67	5000	1050	1320	935	520	715





NO	Model	ODMM	HMM	IDMM	BDMM	Brim.Cap(L)
1	IND201	385	525	303	307	34
2	IND260	380	500	303	360	33
3	IND275	380	600	303	360	40
4	IND285	400	650	340	407	54
5	IND550	400	892	346	407	88
6	IND800	530	1110	440	535	168
7	IND1450	710	720	630	710	211
8	IND1500	710	800	630	710	243
9	IND4700	825	1675	703	840	644

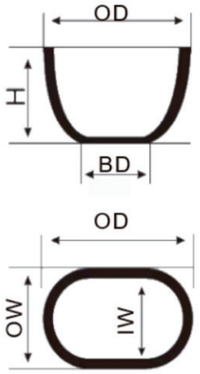




Graphite silicon carbide crucibles

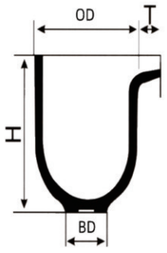
NO	Model	LMM	WMM	IWMM	HMM	Brim.Cap(L)
1	Y700	785	525	420	520	112
2	Y950	845	565	462	540	134
3	Y1160/520	960	620	520	520	167
4	Y1160/600	960	620	530	600	173
5	Y1200	1100	595	485	560	212
6	Y1240	842	552	461	670	163
7	Y1260	980	560	470	560	160
8	Y1560/500	1080	590	470	500	172
9	Y1560/550	1080	590	482	550	180
10	Y1560/600	1080	590	483	600	197
11	Y1560/700	1080	590	500	700	235
12	Y1820	975	735	642	640	239
13	Y1820/700	975	735	643	700	255
14	Y2000	1260	630	540	520	216
15	Y2110H550	1069	584	478	550	180
16	Y2110H630	1074	589	486	630	208
17	Y2110H650	1076	591	489	650	216
18	Y2110	1080	595	495	700	236
19	Y2340	1075	745	640	650	273
20	Y2340/700	1075	745	640	700	295
21	Y2640	1150	825	715	700	374
22	Y2690	1065	845	730	770	378
23	Y2760	1290	690	590	690	322
24	Y3140	1158	833	725	760	383
25	Y3160	1070	850	735	885	431
26	Y4750	1080	850	755	1255	665





NO	Model	ODMM	HMM	IDMM	BDMM	Brim.Cap(L)
1	Z803	620	800	533	295	144
2	Z1550	775	750	680	340	212
3	Z1800	780	900	680	300	257
4	Z2300	880	1000	785	350	364
5	Z2700	880	1175	785	360	428
6	Z5000/750	1036	750	917	541	379
7	Z5000/830	1036	830	917	541	475
8	Z5000/1200	1050	1200	935	520	650
9	Z5000	1050	1320	935	520	715

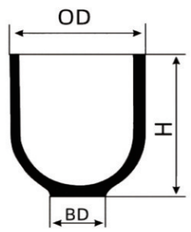




Graphite Clay Crucibles

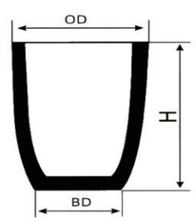
NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
CN210	570#	500	610	250	76.92
CN250	760#	630	615	250	102.56
CN300	802#	800	615	250	108.23
CN350	803#	900	615	250	108.37
CN400	950#	600	710	305	128.21
CN410	1250#	700	720	305	168.69
CN41 OH680	1200#	680	720	305	161.94
CN420H750	1400#	750	720	305	188.93
CN420H800	1450#	800	720	305	195.68
CN420	1460#	900	720	305	197.03
CN500	1550#	750	785	330	209.18
CN600	1800#	750	785	330	242.91
CN687H680	1900#	680	785	305	256.41
CN687H750	1950#	750	825	305	263.16
CN687	2100#	800	825	305	283.40
CN750	2500#	875	830	350	337.38
CNBOO	3000#	1000	880	350	404.86
CN900	3200#	1100	880	350	431.85
CN1100	3300#	1170	880	350	445.34





NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
CA300	300#	450	440	210	40.49
CA400	400#	600	500	300	53.98
CA500	500#	660	520	300	67.48
CA600	501#	700	520	300	67.61
CABOO	650#	800	560	320	87.72
CR351	351#	650	435	250	47.37

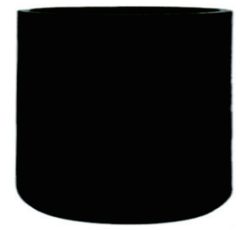


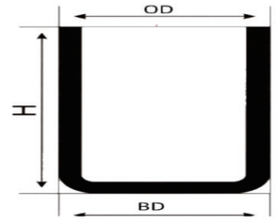


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Graphite Clay Crucibles

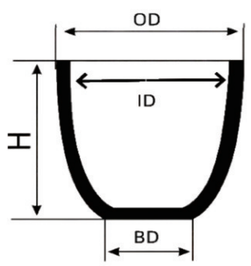
NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
CC1300X935	C800#	1;300	650	620	107.96
CC1200×650	C700#	1200	650	620	94.47
CC650X640	C380#	650	640	620	51.28
CC800X530	C290#	800	530	530	39.14
CC510X530	C180#	510	530	320	24.29





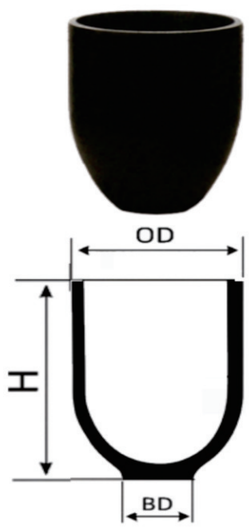
NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
CU210	570#	500	605	320	76.92
CU250	760#	630	610	320	102.56
CU300	802#	800	610	320	108.23
CU350	803#	900	610	320	108.37
cusoo	1600#	750	770	330	215.92
CU600	1800#	900	900	330	242.91





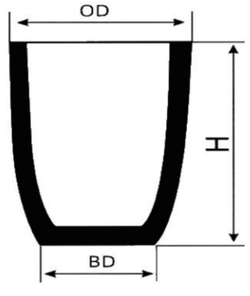
Graphite Clay Crucibles

NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
RN250	760#	630	615	250	102.56
RN500	1600#	750	785	330	215.92
RN430	1500#	900	725	320	202.43
RN420	1400#	800	725	320	188.93
RN410H740	1200#	740	720	320	161.94
RN410	1000#	700	715	320	134.95
RN400	910#	600	715	320	122.81



NO	Model	HMM	ODMM	BDMM	Brim.Cap(L)
RA100	100#	380	330	205	13.50
RA200H400	180#	400	400	230	24.29
RA200	200#	450	410	230	26.99
RA300	300#	450	450	230	40.49
RA350	349#	590	460	230	47.10
RA350H510	345#	510	460	230	46.56
RA400	400#	600	530	310	53.98
RA500	500#	660	530	310	67.48
RA600	501#	700	530	310	67.61
RA8OO	650#	800	570	330	87.72
RR351	351#	650	420	230	47.37

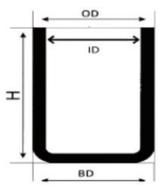




Special crucible for pre-carbonization of negative electrode materials

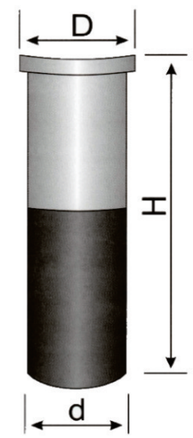
NO	MODEL	ODMM	HMM	IDMM	BDMM	Brim.Cap（L）
1	OD450	450	1200	400	450	150
2	OD500	500	1200	450	500	190
3	OD550	550	1200	500	550	235
4	OD600	600	1200	550	600	285



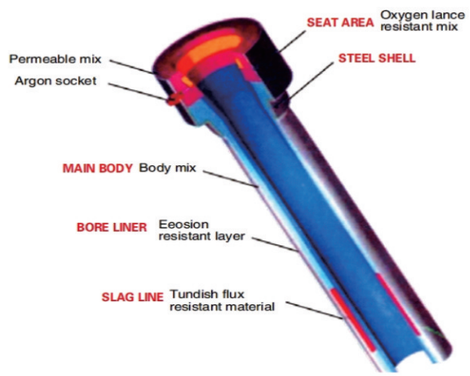


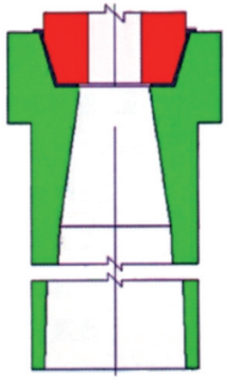
Radiant tube

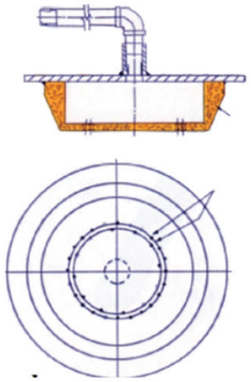
NO	OD	H	ID
H850	153	855	90
H850B	233	855	160
H850C	253	855	160
H850D	273	855	200
H950	263	955	180
H950D	273	955	200
H1000	273	1005	200
H1030	273	1035	200



Ladle Shroud

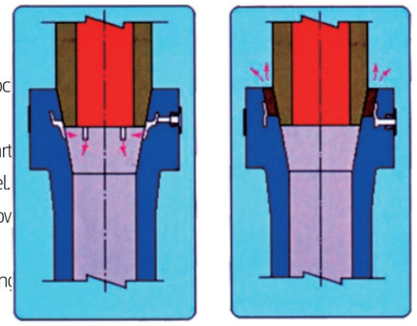






Performance Characteristics

- We accept customized for different argon blowing design
- Oxidation resistance layer can prevent Carbon bonded material be oxidated.
- BZ type AL-C material for body part is with good property which is thermal shoc resistance and erosion resistance.
- BZ type Zr-based material provides good erosion resistance properties for slag line part
- BZ type Mg material ensures excellent erosion resistance of slag line to Ca-treated steel.
- Inner layer with carbon free material guarantee the special requirements of ultra-lov carbon steel, silicon steel and clean steel
- Bell shroud plays an important role in ensuring the quality of molten steel during casting.



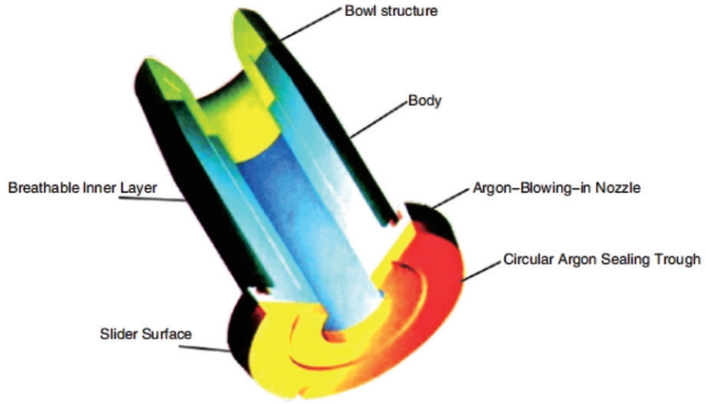
Function of Ladle Shroud

- Prevent oxidation of molten steel and the formation of non-metalllic inclusion
- To reduce molten steel temperature loss from ladle to tundish
- It is preventing molten steel splashing when pouring from ladle to tundish and can make sure the minimum turnover in tundish.

Component	AL_2O_3%	Fe_2O_3%	SiO%	TiO_2%	ZrO_2%	MgO%	LOI%	Density g/cm³	Porosity%	Fracture Strength Mpa	Type
Body	58.78	1.3	10.8	1.59	7		21.28	2.61	16.8	8.1	BZ Type
Slang line					76.2	1.71	15.01	3.65	15.61	5.87	Slag Line
Body	39.25		21.3		12		35.2	2.2	14.67	5.32	Reusable Type

Tundish Nozzle



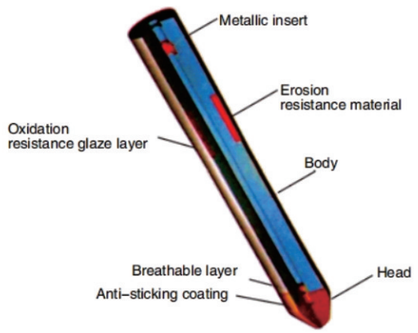


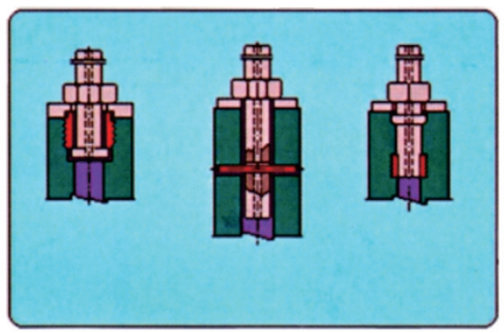
Function of Tundish Nozzle

- BZ type AL-C based material having good erosion resistance and good thermal resitance properties.
- BZ type AL-C based material for the bowl structure part having high corrosion resistance.
- BZ type anti-blocking material can prevent Al2O3 adhesion inside of the tundish nozzle which helps prevent nozzle be blocked.
- BZ type argon blowing design can help prevent Oxygen inhalation.
- High wearing resistance and actuate dimension used in the bottom materials ensure nozzle to achieve quick change.

Component	AL_2O_3%	Fe_2O_3%	SiO%	TiO_2%	ZrO_2%	CaO%	MgO%	LOI%	Density g/cm³	Porosity%	Fracture Strength Mpa	Type
Body	63.15	1.15	6.83	0.87	3.25			24.58	2.54	16.42	8.67	BZ Type
Bowel Structure	86.61	0.43	0.77	0.33				11.11	2.85	17.7	6.73	BZ Type
Bowel Stucture	71.43	0.91	10.65				12.1	10.85	2.78	16.3	14.5	JQ Type
Liner	64.1	0.81	12.5		4.94	0.12	0.32	16.52	2.63	22.48	10.28	Breathable Materials

Monoblock Stopper





Performance Characteristics

- Oxidation resistance glaze layer can help to prevent carbon bonded material to be oxidized.
- Stopper body is BZ type AL-C based material with good properties which is good thermal shock resistance and erosion resistance.
- Stopper head is BZ type AL-C material with good properties and good anti-erosion property.
- Stopper head is JQ type spinel material which can resistant to the most severe erosion.
- Stopper head is BZ type Mg-C material is good erosion resistance properties to Ca-treated steel.
- Slag line part is GBZ type Zircon material gives excellent erosion resistance properties.

Function of Stopper

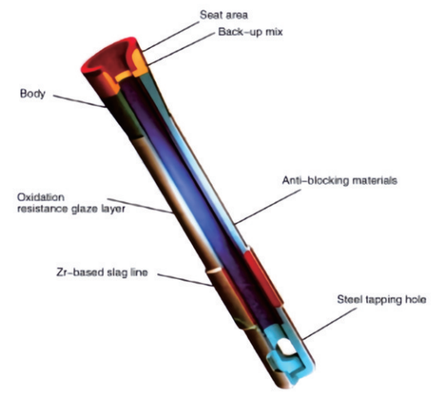
- To control the steel flow from tundish to mold.
- Work with slide gate as an shut off device and to prevent slag entrapment during casting end.
- Through stopper to blow Argon to steel channel to prevent block from inclusion deposition.

Preheating method for stopper andtundish before casting

- It takes 20minites from room tempreture to 900°C
- From 900°C to 1150°C it takes 20minites and holding at 1150°C for 2.5hours, then casting.

Component	AL_2O_3%	Fe_2O_3%	SiO%	TiO_2%	ZrO_2%	CaO%	MgO%	LOI%	Density g/cm³	Porosity%	Fracture Strength Mpa	Type
Body	55.42	0.91	16.58	1.41	3.25			26.81	2.53	16.81	9.6	BZ Type
Head	86.61	0.43	0.77	0.33				11.11	2.85	17.7	6.73	BZ Type
Head	71.43	0.91	10.65				12.1	10.95	2.78	16.3	14.5	JQ Type
Slang line					75.1	1.71		15.1	3.78	15.61	6.97	Slag Line
Head	15.1		8.95		0.29	1.56	56.8	17.3	2.59	16.7	7.8	Ca-treated Steel

Submerged Entry Nozzle





Performance Characteristics

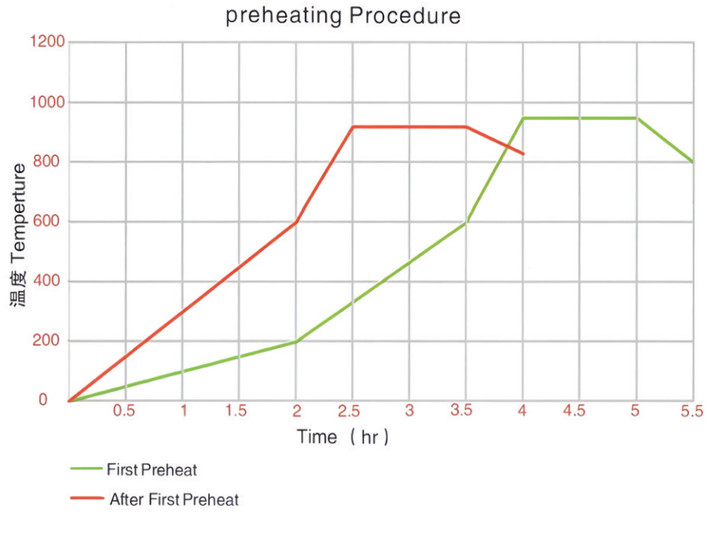
- BZ type AL-C based material having good erosion resistance and good thermal resitance properties.
- JQ type spinel material for bowl part ensures the parts which SEN worked with stoppers can resist the most severe erosion.
- BZ type argon blowing design help to prevent oxidation adhesion.
- GBZ type Zirconium material ensures excellent corrosion resistance of slag line, and is more 5.resistant to the corrosion of fluorine-containing protective slag.
- Inner layer with carbon free material guarantee the special requirements of ultra-low carbon steel, silicon steel and clean steel.

Function of Submerged Entry Nozzle

- Bowl part of SEN worked with stopper head can guarantees a perfect steel pouring control.
- Preventing molten steel from re-oxidation and affecting billet quality.
- Assuring molten steel be well distributed in molds to achieve optimal solidification.

Component	AL_2O_3%	Fe_2O_3%	SiO%	TiO_2%	ZrO_2%	CaO%	MgO%	LOI%	Density g/cm³	Porosity%	Fracture Strength Mpa	Type
Body	63.15	1.15	6.83	0.87	3.25			24.58	2.54	16.42	8.67	BZ Type
Bowel Structure	86.61	0.43	0.77	0.33				11.11	2.85	17.7	6.73	BZ Type
Bowel Structure	71.43	0.91	10.65				12.1	10.95	2.78	16.3	14.5	JQ Type
Slang line					79.1	1.71		12.01	3.81	13.61	6.97	Slag Line
Liner	56.2	0.81	4.06		15.2	0.12		22.5	2.4	16.7	7.2	Anti-blocking Materials
Liner	52.9		13.9				21	2.1	2.51	18.71	6	Non-carbon Materials

Preheating instructions for crucible



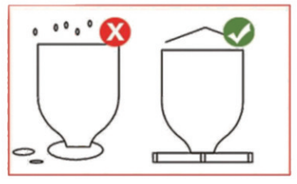
Preheating Procedure for Crucible First Use：

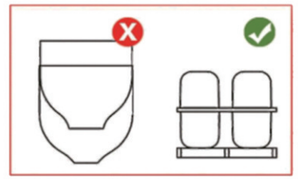
- After being loaded into the furnace, the crucible should be heated slowly to 200°C(≈390°F) for 2 hours to remove any moisture that may be present.
- Subsequently, the crucible was heated at low power to 600°C(≈1100°F) after 1.5 hours and then reached 950°C(≈1750°F) after half an hour at full heating power and held for about 1 hour, which ensures that the glaze layer and anti-oxidation coating on the surface of the crucible are fully sintered to prevent oxidation, which is essential to maximize the service life of the crucibles.
- Add ingot into the crucible.
- The preheating procedure is shown in the green line.

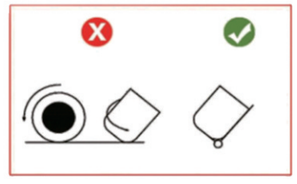
Preheating Procedure for Crucible After First Use：

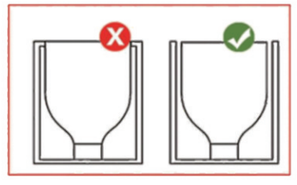
- First, the crucible should be slowly heated to 600°C (≈1100°F) after 2 hours to remove the moisture that may be present, which ensures that the glaze layer and anti-oxidation coating on the surface of the crucible are fully sintered to prevent oxidation, which is essential to maximize the service life of the crucibles.
- Subsequently, with full heating power, the temperature reached 950°C (≈1100°F) after half an hour and was maintained for about 1 hour.
- Add ingot into the crucible.
- The preheating procedure is shown in the red line.

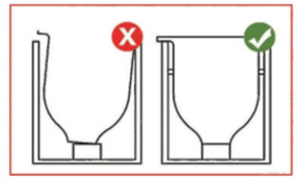
Crucible usage and maintenance methods

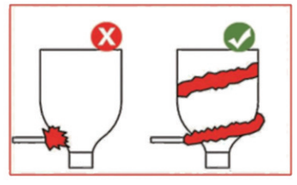

Store crucibles in a dry, warm place or on a wooden plate

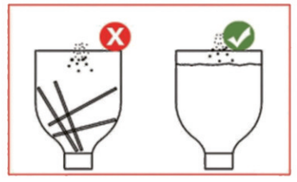

Do not stock inside another

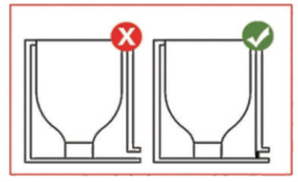

Do not roll crucibles

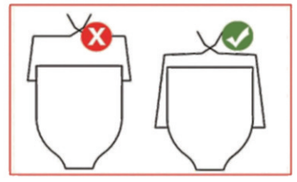

Seal with refractory felt, with expansion gaps on both sides of the crucible

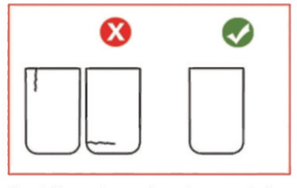

Use locating bricks in tilting furnaces, to interspace of expansion

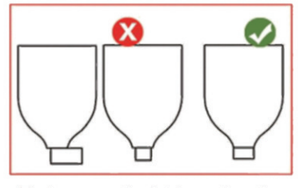

The tangential fire around the crucible

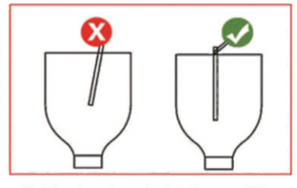

Add flux after the metal is molten

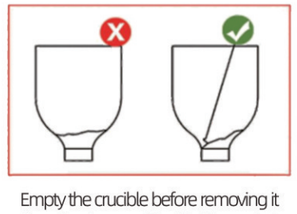

Avoid premature crucible failure by ensuring that the furnace drain hole is sealed

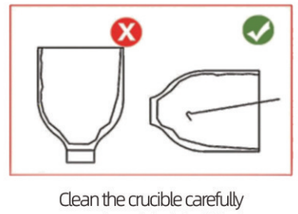

For lift-out, tongs must be placed on the lower third of the crucible. Fit tongs evenly on both


Check for cracks or other damage during transportation before use


The base must be flat, larger than the bottom of the crucible, and centered


Put the ingot gently into the crucible with tongs, avoiding throwing it directly


Empty the crucible before removing it from the furnace. Don't let the metal solidify in the crucible


Clean the crucible carefully every day while it is still hot


Put in return scrap first, then add ingots vertically

The Common Problem Analysis

Slow heat conduction

- There is no preheating according to standard procedures.
- Slag influences heat conduction.
- The crucible has reached its service life.



Crucible corrosion

- Add flux before the metal is molten or excessive use of flux.
- Some fluxes contain corrosive substances.
- Fuel contains corrosive substances.
- Abnormal high-temperature operation may cause the glaze layer to melt, similar to corrosion.

Excessive oxidation

- The flame in the furnace is directly against the bottom of the crucible.
- The temperature in the top area is too low.
- The working temperature is overheated.
- Improperly hoisting or moving damages glaze layer.
- The emergent drain hole is open.

Explosion

- The crucible will heat up quickly when it is damp during storage or transportation.
- The crucible heats up rapidly during the preheating procedure.
- The added materials are not completely dried.

Middle or bottom cracks

- The crucible is impacted during transportation or installation.
- The crucible should be placed in the middle of the furnace stack smoothly and stably.
- An improper graphite stand is used.
- There is a high temperature difference in the furnace.
- The metal ingot is placed horizontally or diagonally in the crucible. Metal materials overfill.
- Slag or molten metal remains in the crucible.

ZIBO SHENG KAI NEW MATERIALS CO., LTD.

Memo