

# Morgan Molten Metal Systems(Suzhou)Co.,Ltd



Only Morgan Crucibles, proven over 100 years.



# The Morgan Crucibles legend lives on in Asia

We are the worldwide leader in the supply of crucibles to non-ferrous metals industries.

We produce and supply crucibles and various foundry products. We specialize in providing total solutions to non-ferrous metal melting industry, covering applications including aluminum, master alloy, Zinc, Copper/brass/bronze, precious metals and other non-ferrous metals.

We provide you the following unique benefits:

- Over 100 years of experience
- Continued innovations to meet customer needs
- Leading R & D and technology development from Germany
- Complete product ranges to meet all applications
- Best Quality & reliability
- Global operations and sales services network
- Global link with international furnace & equipment suppliers
- Technical application services from global & local experts
- Best proven systems
- Best value, total supplier



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# Pre-Heating / First Use

Electric Resistance, Gas Fired and Fuel Fired Furnaces

## Clay Graphite Crucibles:

- Syncarb
- Syncarb Z2
- Syncarb Z2 e<sup>2</sup>
- Alustar e<sup>2</sup>
- VAluStar

## New crucibles and after long cool off phase

**ATTENTION:** Clay Graphite crucibles are highly susceptible to thermal stresses if not properly preheated. In larger capacity furnaces and/or furnaces with high output burners, these startup procedures must be followed and the heat source modulated to avoid thermally shocking the crucible.

1. Heat empty crucible slowly over two hours to 200°C (390°F) to eliminate any moisture.
2. Heat on low power to 600°C (1,100°F) over 1.5 hours
3. Heat the crucible on full power until it is completely bright red at approximately 950°C (1750°F).

**\*NOTE:** Syncarb and Iso-Alustar crucibles in aluminum holding applications must be held at 950°C (1750°F) for 30 to 40 minutes in order to fully develop the external glazing.

4. The crucible is now safe to be brought to the correct charge temperature and charged. Be sure to follow proper and safe charging procedures and wear proper protection equipment.

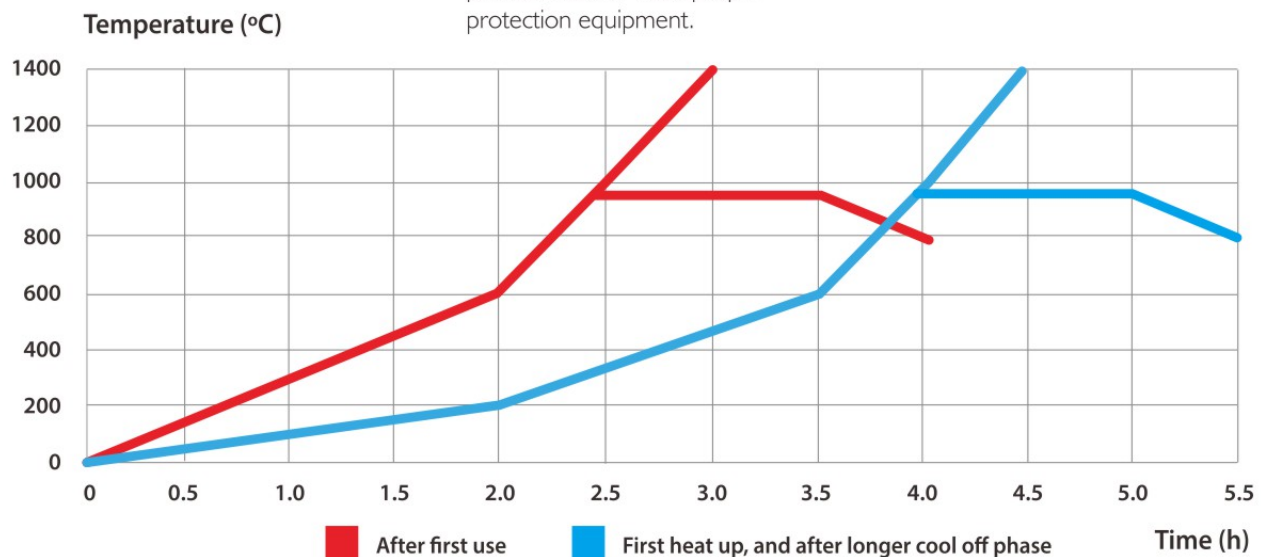
## After first use and normal use

1. Loosely charge the furnace.
2. Slowly heat on low power to 600°C (1,100°F).

### **CAUTION:**

**After long extended periods of time, the crucible should be slowly heated up over two hours to 200°C (390°F) and the previous procedure followed.**

3. Heat the crucible to the desired temperature on full power.



# Pre-Heating / First Use

## Induction Furnace

- Syncarb Z2
  - Ultramelt
  - E64
- When a crucible is installed, dry up the moisture from furnace lining and crucible under lower temperature (below 200°C)
  - When using metal ingot for melting, charge the crucible loosely with metal ingot, and increase power input step by step to 50% of Max. power, until the ingot is fully melted. Do not turn on too high power when the ingot is not fully melted, to avoid over heat of the crucible.
  - When using molten metal as raw material, preheat the crucible to similar temperature as the molten metal before charging, otherwise, if the temperature difference between crucible and molten metal is too large, thermal shock may happen and lead to crucible crack.
  - Ultramelt crucible has much lower electric resistivity, thus crucible body will heat up very quickly in the magnetic field. When using Ultramelt crucible, please follow our recommendation for power curve when heating up, and raise power input step by step.

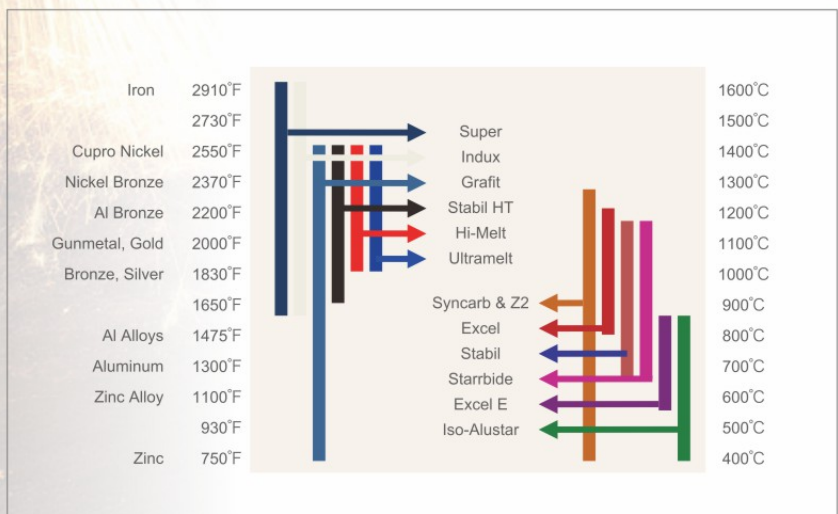
## Crucibles Safety Information



- Proper safety clothing and equipment must be worn at all times in the vicinity of molten metal.
- Any residual moisture must be removed slowly from the crucible and/or furnace refractories before use.
- Ensure that no moisture or volatile materials are introduced into the melt.
- Provision should be made underneath the furnace to safely catch any metal that may be discharged.
- Crucibles used as transfer vessels must be fully supported and be sufficiently pre-heated before being filled with molten metal.
- Hot crucibles should not be placed down on a cold surface.
- Ensure that manufacturers' recommendations for maintenance of furnaces are adhered to.
- Keep all flammable material away from the furnace and ensure there is access to firefighting equipment.
- The crucible should only be used for the purpose for which it is designed or recommended.

### Morgan Crucible Products & Application

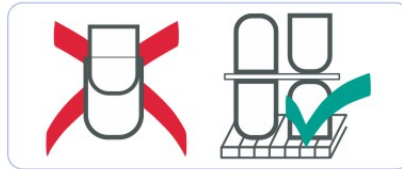
#### METAL & CASTING TEMPERATURE



# Crucible Care Information



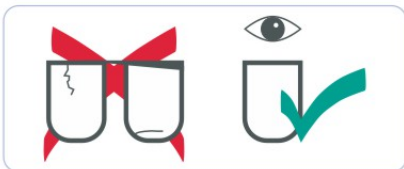
Store crucibles in a dry, warm area.



Do not stack inside another.



Do not roll crucibles.



Check for cracks or transport damage before use.



Base block must be flat, larger than crucible bottom and centered.



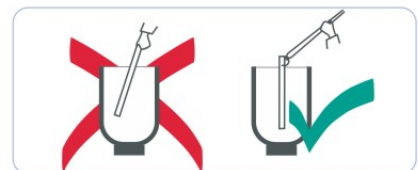
Use a ceramic fiber blanket to seal. Allow space between top and sides of furnace.



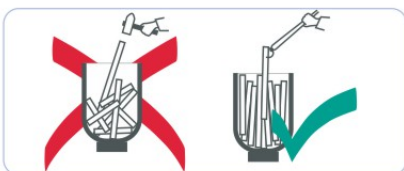
Ensure that there is clearance around the spout in tilting furnaces.



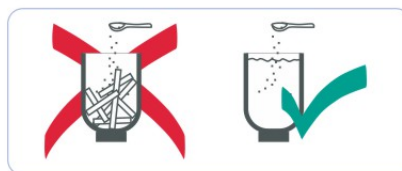
Tangential fire around crucible.



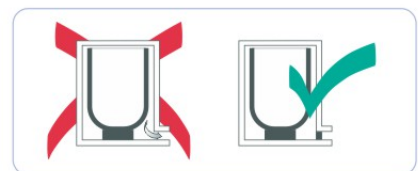
Do not drop charge — slowly lower in with tongs.



First charge with returns, then ingots on top.



Only add flux after metal is molten.



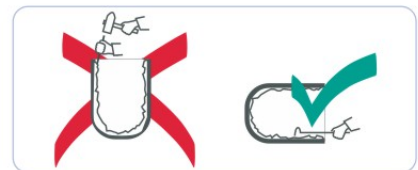
Avoid premature crucible failure by ensuring drain hole is sealed.



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



Empty crucible before removing from furnace. Do not let metal solidify in crucible.



Clean carefully every day while still hot.



# Crucible Troubleshooting Guide

	Vertical Cracks				Lateral Cracks			Holes		
	Cracks any where on crucible	Crack in chine and bottom	Crack from top edge	Crack in center wall	Near bottom	Half way up wall in lift out crucible		Large holes in wall	Pin Holes	Outside, in pits and craters
PROBABLE CAUSE										
Crucible thin and worn causing loss of strength	■				■				■	
Thermal shock due to too rapid heating	■	■	■		■					
Thermal shock due to rapid cooling					■					
Top ring too tight			■							
Dross build up on inside of crucible	■	■	■	■						
Badly fitting tongs crushing crucible	■		■	■						
A bridged or wedged charge can expand and crack the crucible				■						
Mechanical damage such as ingot dropped in a Mechanical damage – possible dropped ingot or scrap					■			■		
Mechanical damage during handling								■		
Crucible stuck to base and cracked when using tongs to free						■				
Spout touching furnace lining when initially installed							■			
Leaks from a crack									■	
Flux attack									■	■
Damage due to excessive cleaning										
Stand or base block too small										
Crucible not placed centrally on stand (base block)					■					
Standing hot crucible on uneven surface				■						
Badly adjusted burner										
Stand (base block) too small/ crucible set too low causing flame impingement										
Thermal blanket incorrectly installed at top of crucible							■			
Badly adjusted burner with too much air										
Furnace spill door open or not airtight					■					
Inadequate preheating during start-up to activate the glaze										
Moisture in crucible not dried out properly										
Thermal blanket used between stand (base block) and crucible					■					
Using a non-conductive refractory/brick stand (base block)		■			■					
Support blocks in tilting furnace too tight			■	■						



Star Cracks		Wear / Erosion			Oxidation				Miscellaneous			PROBABLE REMEDY
In base	In side wall	Inside at metal level	Inside all over	At the bottom and chin	Round top edge	All over crucible	Crucible base	Crucible chine	Bottom bulged up and cracked	Flaking of glaze	Spalling of crucible material	
■												Monitor crucible and replace when worn out.
										■	■	Follow recommended start up procedure
												Do not stand (base block) hot crucible on cold surface (Concrete)
												Replace top ring with correct size or adjust properly
												Clean crucible of dross after each use
												Replace tongs with correct size
	■											Ensure that the crucible charge is loaded correctly
												Place ingots carefully using tongs
						■		■				Follow crucible care recommendations for handling
												Use graphite powder on base
												Ensure that there is clearance around the spout
												Break up and look for crack then reassess
		■	■	■								Avoid premature and excessive flux additions
	■		■									Use correct cleaning tools/Clean when hot
									■			Ensure that the correct size stand (base block) is used
									■			Ensure that crucible is installed correctly
									■			Rest crucible in a sand bed
				■	■	■		■				Reset burner
				■								Raise crucible to stop burner flame impingement
					■							Blanket should be placed on top of crucible not down sides
					■	■		■				Reset burner to correct mixture
						■	■	■				Close and seal spill door
					■	■						Follow pre-heat recommendations
										■	■	Ensure that the crucible is stored in dry conditions
							■					Only use graphite/cardboard between stand (base block) and crucible
							■					Use the correct stand (base block) for the crucible material
												Ensure that the crucible is installed correctly

## VALuStar Crucible

### Introduction

VALuStar™ is the latest and most advanced family of crucibles developed by Molten Metal Systems. It is a high density, clay bonded, iso- statically pressed crucible, which has a high graphite and SiC content to give it a superior mechanical strength. VALuStar™ has excellent internal and external glazes, which prevent low temperature oxidation, and degradation of the crucible, that are common in aluminium and other low temperature alloys, when used over extended periods.

As a result, VALuStar™ has a significantly longer life than all other iso-statically pressed crucibles for lower temperature applications and retains its good thermal conductivity over the entire life. VALuStar™, when combined with Star coating, delivers significantly less dross adhesion and reduced impurities in holding applications.

### Applications

VALuStar™ crucibles are designed to perform exceptionally well to hold aluminium and aluminium alloys in electric resistance furnaces.

### Typical Metal Casting Temperature

- 700 – 1000 °C (1292 °F – 1832 °F).

### Performance Characteristics

- Significantly longer life due to higher oxidation resistance.
- Excellent thermal conductivity and good thermal shock resistance.
- High mechanical strength.
- Good erosion resistance.

### Identification

VALuStar™ crucibles are finished with a blue Low Temperature Protection (LTP) coating.

### Pattern Range

VALuStar™ crucibles are available in wide range of shapes and sizes, as per our current range of crucible models i.e. A, BU, BN, TP & TBN. The crucible can also be supplied with specialised & patented coatings developed by Morgan Molten Metal Systems to enhance specific properties required in the application.



# ALUSTAR e2 Crucibles

## Introduction

ALUSTAR e2 crucible is manufactured using high pressure cold iso-static pressing process and it shows high levels of oxidation resistance and mechanical durability.

This product range is designed to provide enhanced oxidation resistance which leads to lower energy consumption and longer crucible life.

## Applications

- Aluminum melting and holding
- Melting and holding of zinc and zinc alloys

## Typical Metal Casting Temperature

- Aluminum: 620 - 900°C (1148 - 1652°F)
- Zinc: 450 - 550°C (842 - 1022°F)

## Performance Characteristics

- Superior oxidation resistance
- High and constant thermal conductivity
- Excellent resistance to chemical attack
- High mechanical strength
- Highly consistent density

## Identification

ALUSTAR e2 crucibles are finished in green colour and utilize pattern coding with the suffix ALUS e2 e.g. BN 500 ALUS e2.





## Pattern Range

ALUSTAR e2 crucibles are available in a range of shapes and sizes to suit most end user requirements. Certain sizes can be made available with pyrometer pocket configuration to facilitate accurate measurement of metal temperature. A selection of fixed pouring spouts with optimised profiles is offered where required for tilting furnace applications.

## Charging

As soon as the crucible has been pre-heated as specified, charge and melt immediately. Charge light scrap and returns first in order to form a cushion for heavier material. Use tongs to charge ingots and place large pieces and ingots vertically allowing space for expansion. Only add flux once the metal is molten and use the minimum quantity required to obtain good metal quality.

## Preheating / First Use

**ELECTRIC RESISTANCE AND GAS FIRED FURNACES:**  
Crucibles should be pre-heated empty. A new crucible should initially be heated slowly to 200°C over a period of two hours to eliminate any moisture that may be present. Subsequently the crucible should be heated to 600°C on low power before the full heating rate is used to reach 950°C, or the desired working temperature if higher. Iso-Alustar e2 crucibles used for holding applications should be held at 950°C for one hour in order to fully develop the anti-oxidant glaze system. The time taken to reach temperature will depend on the size of the crucible but will typically be in the range two and a half to three hours. Avoid direct flame impingement on the crucible surface.

The same heat up procedure should be repeated prior to re-use after a cool-down period. The two hour drying period can be omitted except where the crucible has not been used for a long period in which case moisture that has been absorbed by slag will need to be slowly removed.

# Syncarb Z2 Crucibles

## Introduction



The Syncarb Z2 is a high pressure, isostatically pressed clay-graphite crucible that achieves optimal life when melting copper and copper alloys and in induction furnace applications. At the same time, several applications have demonstrated that the new Z2 Syncarb also performs exceptionally well in zinc distillation operations, where a common mode of crucible failure is corrosive attack from the Zn vapors.

## Applications

Syncarb Z2 is designed to perform exceptionally well to melt and hold copper and copper alloys in induction and fuel fired furnaces as well as in zinc distillation applications. Syncarb Z2 can also be used in some precious metal melting applications especially in Globar furnaces.

## Typical Metal Casting Temperature

- Metal casting temperature between 1000°C and 1400°C (1832°F and 2552°F)

## Materials Advantages

Syncarb Z2 crucibles use a proprietary processing technology that results in a product with a very homogenous and high density structure. The clay-bonded Syncarb Z2 crucible provides excellent chemical resistance against fluxes and excellent thermal conductivity. The inherent high mechanical strength allows the production of much larger crucibles. Other properties include outstanding oxidation resistance, high refractoriness and good thermal shock resistance.

## Identification

Syncarb Z2 crucibles are finished in a black color.

## Pattern Range

Syncarb Z2 crucibles are available in a range of shapes and sizes to suit most end user requirements. Certain sizes can be made available with pyrometer pocket to facilitate measurement of metal temperature.

A wide range of pouring lips are available.



# Syncarb Z2 e<sup>2</sup> Crucibles

## Introduction

Syncarb Z2 e<sup>2</sup> is a premium quality hybrid ceramic bonded clay graphite crucible with a high silicon carbide and graphite content that is manufactured through an advanced iso-static pressing process.



MorganMMS uses a proprietary processing technology that results in a product with a very homogenous and high density structure. This allows the crucible to obtain superior thermal conductivity over its entire operating temperature range, high mechanical strength and erosion resistance along with good shock resistance. These properties translate into a durable and robust crucible with excellent performance

characteristics in lower temperature environments.

In addition, Syncarb Z2 e<sup>2</sup> also features proprietary internal and external glazes to prevent low temperature oxidation and degradation that occur in aluminum and other low temperature alloys over extended periods of time.

## Applications

Syncarb Z2 e<sup>2</sup> is designed to perform exceptionally well to melt and hold aluminum and other low temperature alloys in gas and electric resistance furnaces

## Typical Metal Casting Temperature

- Metal casting temperature between 400°C and 1000°C (752°F and 1832°F)

## Performance Characteristics

- Extremely high oxidation resistance.
- Very good thermal conductivity.
- Very good resistance to chemical attack.
- High mechanical strength and good erosion resistance.
- Good thermal shock resistance.

## Identification

Syncarb Z2 e<sup>2</sup> crucibles are finished with a gray Low Temperature Protection (LTP) coating.

## Pattern Range

Syncarb Z2 e<sup>2</sup> crucibles are available in a range of shapes and sizes to suit most end user requirements. Certain sizes can be made available with pyrometer pocket to facilitate measurement of metal temperature.

A wide range of pouring lips are available.





# Ultramelt Crucibles

## Description

Morgan MMS is committed to the development of new products, and always to provide you the technical service solutions. We continue to improve our process and technology to help you get the highest cost performance.

## Applications

- Raw materials: imported resin bonded silicon carbide mixture; good physical properties and adhesion, thus ensuring the pressed crucible has sufficient strength and superior performance.
- Application: melting non-ferrous metal alloy.
- Temperature range: 1000-1400 °C
- Furnace: gas furnace; oil furnace; low to medium frequency induction furnace (50-1000Hz); high frequency induction furnace (higher than 2500Hz).



Ultramelt

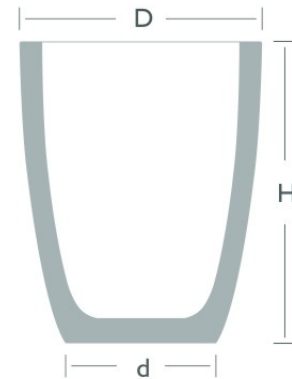
## Performance Characteristics

- Introduced advanced technology from Germany;
- Excellent corrosion resistance;
- Excellent high temperature performance;
- Good thermal shock resistance;
- High mechanical strength and thermal conductivity.

Can produce BN, BU, ZYL, A, P and other type.

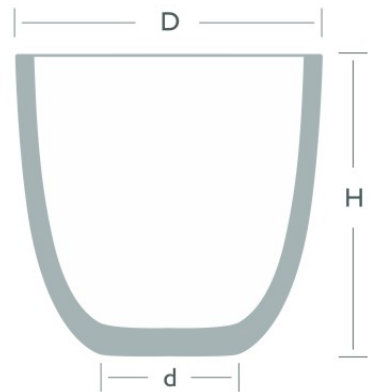
Size A_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
465	470	270	650	57.7
560	470	270	750	67.3
350	480	340	590	55.1
400	480	340	600	56.5
500	540	300	650	89.5
600	545	300	680	94.5
800	560	300	800	116.1
800R	560	300	800	115.3
825H970	560	300	970	147.5

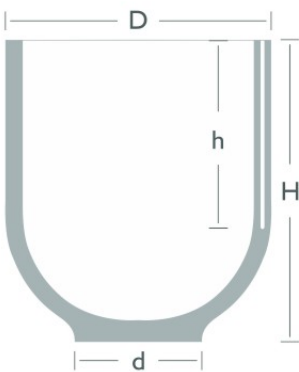
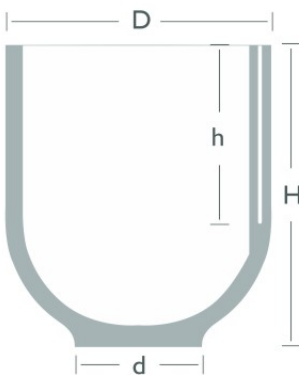
**Form A**



Size BU_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
100	515	305	400	465
125	520	305	450	53.2
150	520	305	490	58.4
175	527	305	550	68.2
200	527	305	600	75.5
210	615	320	500	77.3
250	615	320	630	101.2
300	615	320	700	111.2
350	615	320	800	128.2
360	615	320	900	175.2
370	615	320	1050	208.8
500	775	360	750	192.2
720H1150	720	380	1100	258.3
740H750	830	450	750	240.5
740H880	835	450	880	298.2
740H950	838	450	950	331.2
740H1280	848	450	1280	475.5
740H1360	850	450	1360	513.2
1500H1500	985	340	1500	780.7
1800H760	1030	540	760	362.1
1800H815	1035	540	815	417.2
1800H830	1035	540	830	429.8
1800H900	1035	540	900	473.5
1800H1100	1040	540	1100	620.1
1800H1200	1045	540	1200	691.5
1800H1300	1050	540	1300	764.1

**Form BU**



**Form BN****PL****PT**

Size BN_ALUS	D (mm)	d (mm)	H (mm)	PT h (mm)	PL h (mm)	Walter brimful capacity (L)
150	525	230	490	290		65.1
175	525	230	550	350		74.2
200	527	230	600	400		82.9
204	527	230	700	500		99.8
210	615	245	500	250		87.1
250	615	245	630	380		118.1
300	615	245	700	450		133.8
350	615	245	800	550		154.1
370	625	245	900			180
400	715	305	600		260	143.5
410	715	305	700		360	176.8
420	715	305	800		460	207.2
510	750	300	910			232.4
500	775	310	750	450		219.3
600	780	310	900	460		280.1
687	830	285	900			318.2
690	830	285	1000			362.2
750	875	350	880			330.1
800	880	350	1000		580	392.1
900	880	350	1100			440.7
1100	880	350	1170			475.2
1200	880	350	1250			514.1
1500	880	350	1500			643.2
1800	1030	350	1600			868.5

PT = Pyrometer-pocket

PL = Pyrometer-hole

Product shape BN are available with or without Pyrometer-pocket/Pyrometer-hole

Standard type pyrometer-pocket or pyrometer-hole opposite of the spout(180°)

Other dimensions on request



Size TBN_ALUS	D (mm)	d (mm)	H (mm)	PT h (mm)	PL h (mm)	Walter brimful capacity (L)
287	525	230	600	400		67.1
387	615	245	630			85.2
412	615	245	800			133.2
412H	615	245	900			149.5
410	715	305	700			145.1
587	780	310	900			229.4
587H	780	310	1000			258.8
687	830	285	900			269.8
690	830	285	1000	590		322.1
750	875	350	880			289.2
800	880	350	1000	580		338.8
900	880	350	1100			397.1
1100	880	350	1170	750		423.3
1200	880	350	1250			471.9

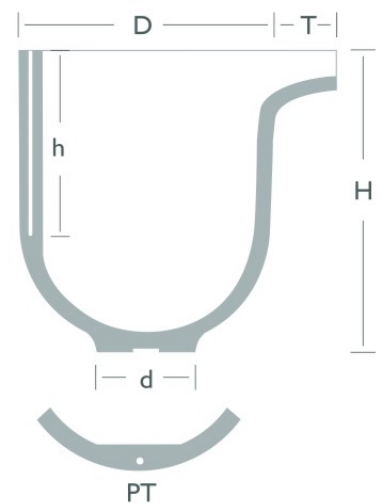
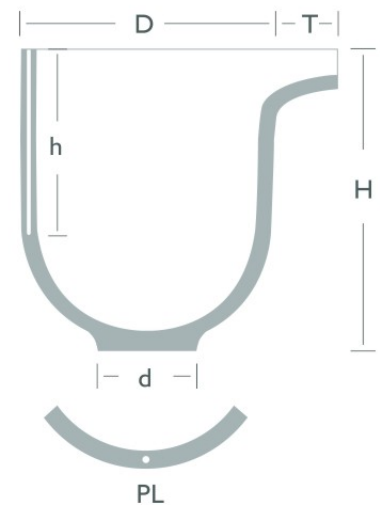
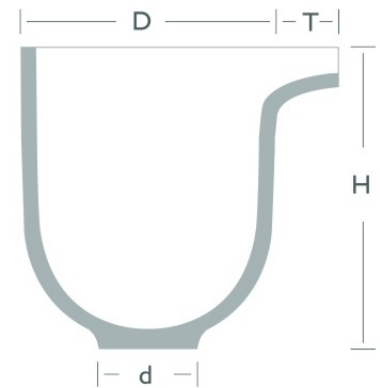
PT = Pyrometer-pocket  
PL = Pyrometer-hole

Product shape TBN are available with or without Pyrometer-pocket/Pyrometer-hole

Standard type pyrometer-pocket or pyrometer-hole opposite of the spout(180°)

Other dimensions on request

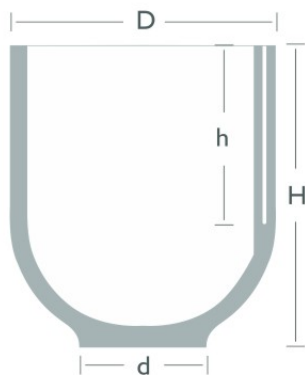
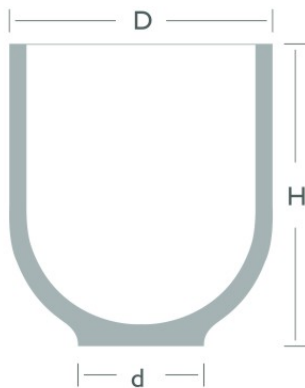
## Form TBN



BN-shape with spout

**Form F**

Size F_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
107	330	215	635	31.6

**Form NO**

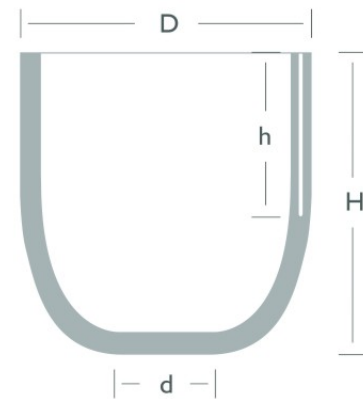
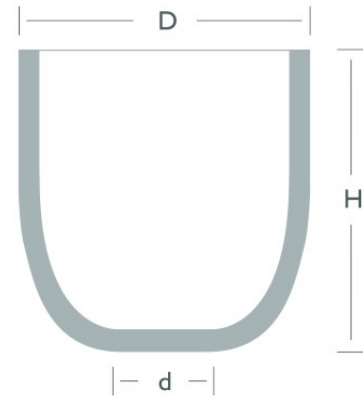
Size NO_ALUS	D (mm)	d (mm)	H (mm)	PT h (mm)	Walter brimful capacity (L)
30.430	700	305	430		89.1
30.450	700	305	450		93.1
30.525	700	305	525		114.9
30.585	700	305	585		137.6
30.597	700	305	597		142.5
30.630	700	305	630		152.8
30.720	705	305	660		162.1
30.765	705	305	685		170.5
30.810	705	305	735		186.8
30.785	710	305	785		202.8
30.900	710	305	800		208.1
31.000	715	305	875		232.1
31.100	715	305	940		253.4
41.100	865	350	750		262.3
41.200	865	350	815	395	291.8
41.300	875	350	865	445	326.2
41.400	880	350	915	495	351.2
41.500	880	350	965	545	375.2
41.600	880	350	1015	595	399.5
41.700	880	350	1065	645	424.1
41.900	880	350	1165	745	478.2
42.000	880	350	1215	795	496.3

PT = Pyrometer-pocket

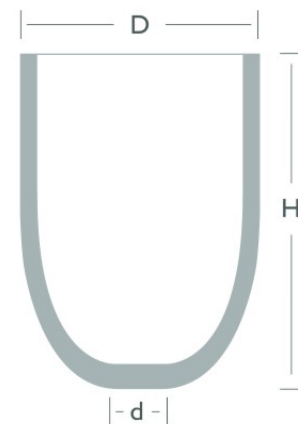
Size NO_ALUS	D (mm)	d (mm)	H (mm)	PL h (mm)	Walter brimful capacity (L)
52330	980	340	1500		780.7
60.615	1030	540	615		322.1
60.700	1030	540	700		341.5
60.915	1035	540	915		422.1
60.990	1035	540	990	570	532.4
61.320	1050	540	1320		779.2

PL = Pyrometer-hole

## Form NO



Size B_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
650HI080	650	280	1080	201.1
850HI170	850	350	1170	440.5
850HI430	850	350	1430	546.2





**Form P**

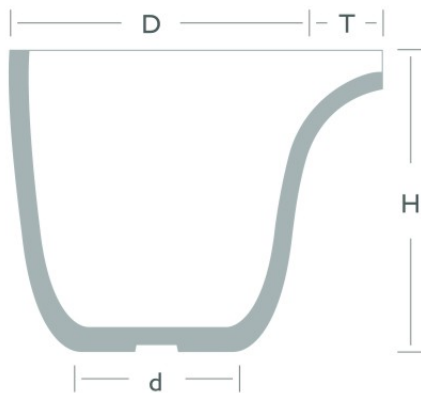
Size P_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
15	540	330	970	127.5
15H900	540	330	900	115.8
830	540	330	1190	158.5

Also available with cut-out for spout

Other dimensions on request

**Form TP**

Size TP_ALUS	D (mm)	d (mm)	H (mm)	T (mm)	Walter brimful capacity (L)
89	540	300	740		89.7
125	520	305	450		35.4
287	527	305	600		56.5
387	615	320	630		79.2
412	615	320	800		115.5
412H1050	615	320	1050		174.2
587	780	350	900		196.2
1800H1250	1045	540	1250		658.1
1800H1300	1050	540	1300		693.1
1800H1320	1050	540	1320		708.1



Size R_ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
500H700	470	340	700	68.1
500H715	475	340	715	69.8
500H775	480	340	775	76.8
500	480	340	840	85.6
600	480	340	940	96.1

Size ZYL ALUS	D (mm)	d (mm)	H (mm)	Walter brimful capacity (L)
700×330	330	328	700	41.2
700×345	345	345	700	40.3
800×390	390	380	800	53.6
1050×430	430	415	1050	84.5
760×465	465	460	760	83.5
1000×465	465	460	1000	112.3
1000×480	480	470	1000	112.3
815×510	510	510	815	107.5
1575×530	530	510	1575	225.2
1220×560	560	540	1220	196.3
1230×620	620	620	1230	248.3
1220×650	650	630	1220	280.7
1505×660	660	630	1505	349.3
1850×780	780	700	1850	575.8
750×810	810	800	750	263.5
1140×820	820	800	1140	424.5
1560×830	830	800	1560	592.8
1680×850	850	830	1680	672.0
1020×880	880	750	1020	474.2
1030×910	910	740	1030	497.1
1200×920	920	740	1200	551.2
1500×935	935	740	1500	750.5
1650×935	935	740	1650	791.5
1850×940	940	740	1850	891.7
2095×940	940	940	2095	1117.4
2025×950	950	740	2025	1009.5
880×970	970	735	880	469.2
960×970	970	735	960	502.2
1475×980	980	735	1473	820.1
1560×980	980	735	1560	816.5
1850×985	985	735	1850	1052.1
2025×988	988	735	2025	1060.2
2200×990	990	735	2200	1280.1

## Form R



## Cylindrical crucibles



# MORGANITE<sup>®</sup> ACE

## Degassing Rotor-Silicon Carbide

One of the major concerns in the modern aluminium casting industry is aluminium alloy cleanliness. With the ever increasing demands for improved casting properties, the requirements for molten metal cleanliness have become extremely stringent. The removal of dissolved hydrogen and unwanted particles from the melt using rotary degassing has become a widely used foundry practice.

Morgan Advanced Materials has developed a one piece silicon carbide rotor and shaft for use in this process. The Morgan rotary degassing rotor has a high resistance to wear in service and has excellent anti oxidation properties providing a cost effective consumable for use in foundries' degassing processes.



### Features

- One piece shaft and rotor
- Wear resistant silicon carbide material
- Excellent oxidation resistance
- Rotor designed for good gas dispersal
- Six vane rotor to reduce bubble size for better hydrogen removal

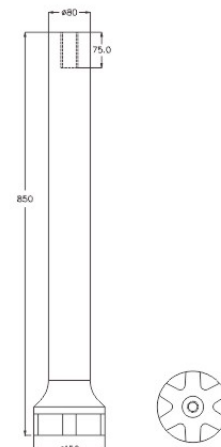
### Advantages

- Efficient removal of hydrogen and unwanted particles
- Quick change over of rotor
- One piece construction
- Long life
- Cost effective

### Dimensions

The Morgan standard degassing rotor is currently available with a rotor diameter of 150mm in lengths up to 1200 mm to suit customer requirements. Some of the standard patterns are listed as follows.

Pattern	Length (mm)	Rotor Diameter (mm)	Connection
DGR 0150H0850 M36	850	150	M36x4
DGR 0150H1000 M36	1000	150	M36x4
DGR 0165H0950 M36	950	165	M36x4
DGR 0180H0950 M36	950	180	M36x4
DGR 0200H0950 M36	950	200	M36x4



## Thread Adapter

The Morgan Thread Adapter will be delivered as a set which includes all mounting parts, tools for assembling and gaskets.

Our technical service team is able to provide detailed product support.

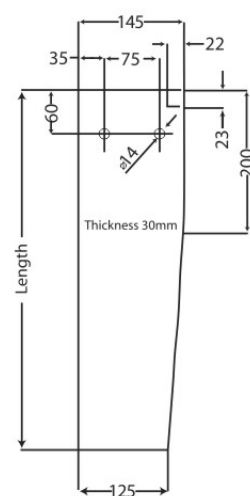
Please enquire with your sales representative.



## Anti Vortex Plate

To complement our degassing rotor, Morgan also produces a clay graphite anti vortex plate. This plate is manufactured in a proven wear and oxidation resistant material. It will help stop the reintroduction of hydrogen and aluminium oxide particles into the treated molten aluminium by reducing the circular metal flow caused by the rotation of the degassing rotor.

Reference Number	Length (mm)
I580388	420
I580395	450
I580400	500
I580510	650





# Blue Lightning Thermocouple Sheaths

## Introduction

The Morgan Blue Lightning Thermocouple Sheaths offer superior protection, excellent service life, quick response and ease of use for aluminum and other non-ferrous melting and holding applications.

Morgan Blue Lightning Thermocouple Sheaths are available with either a 1/2" BSP, 3/4" NPT pipe or without a pipe as a straight ceramic sheath for higher temperature copper applications. The pipe versions are also available as a complete pyrometer assembly to help speed-up installation and reduce labour costs.



Design Feature	Advantage
Robust Design	Long Service Life
Non-Wetting Chemistry	Ease of Cleaning
	Low Dross Build-Up
	No Metal Contamination
Highly Conductive	Rapid Response Times
	Reduced Fuel Usage
	Good Thermal Shock Resistance
Simple Design	Quick Change Out
Integral Coating	No Coating Required
Assembly Available	Minimal Labor and No Downtime

## Pyrometer Assembly

The pyrometer assembly comes ready for the tough foundry environment and is inspected and tested prior to shipment. They are specifically designed to provide a quick and technician free change out of the existing pyrometer with no additional effort other than plugging in the new pyrometer and screwing on the sheath.

## Assembled, Tested and Includes:

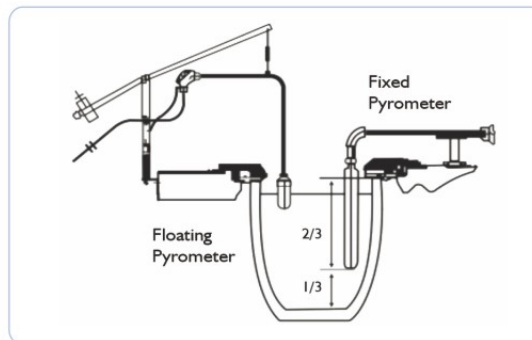
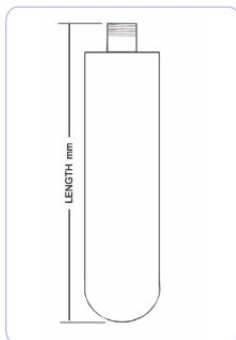
- Blue Lightning Thermocouple Sheath
- Thermocouple (Type K)
- Horizontal pipe and fittings
- Junction head and connectors
- Stainless sheathed lead (2m)
- Male connector
- Female connector (for connection to furnace)



## Choosing The Correct Length

**Fixed Pyrometer** – A pyrometer is normally recommended to be long enough to measure 2/3 from the top of the crucible.

**Floating Pyrometer** – ATS50329 Blue Lightning Thermocouples are often chosen to measure 100mm (4") from the top of the melt.



Floating and Fixed Thermocouple Sheath Mountings

## Options

Pyrometer Sheath Only	Complete Assembly	Outside Diameter (mm)	Length (mm)	Length (in)	1/2" BSP Pipe	3/4" NPT Pipe	No Pipe 25mm hole
ATS50329	ATS50329WA	50	328	13	✓		
ATS50486	ATS50486WA	50	486	19	✓		
ATS50639	ATS50639WA	50	639	25	✓		
ATS50791	ATS50791WA	50	791	31	✓		
ATS50943	ATS50943WA	50	943	37	✓		
ATS501096	ATS501096WA	50	1096	43	✓		

## Care And Use

Ensure that the Blue Lightning Thermocouple Sheaths are completely screwed into the fitting and that the thermocouple is long enough to make contact with the bottom of the pyrometer sheath.

**TIP:** Apply thread sealing compound to the threads to avoid oxidation and possible premature failure.

Gently preheat the sheath prior to immersion into the molten metal bath to minimize thermal shock and eliminate any trapped moisture.

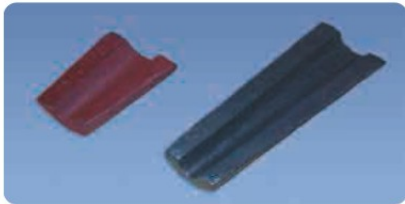
### Failure to preheat the thermocouple can cause premature failure and potential injury.

At the end of every shift, be sure to gently clean the sheath of any dross or other buildup to ensure accurate temperature readings and to increase the life of the sheath.

## Crucible Accessories



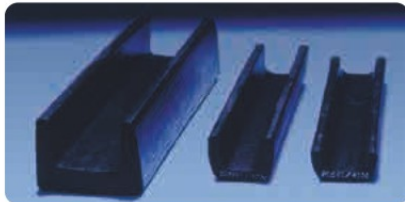
Crucible Stands



Spout Extensions



Muffle Rings



Launders



Crucible Covers



Hotrod Pyrometer Sheaths

### Description

Morgan Molten Metal Systems manufactures a full line of accessories to complement its extensive crucible range.

### Product Range

Crucible Accessories:

- Crucible Stands
  - Muffle Rings (rings increase the cold charge capacity of the crucible and can improve melt times)
  - Crucible Covers
  - Spouts and Spout Extensions
  - Crucible Lifters
- Foundry Products:
- Hot Rod Pyrometer Sheaths
  - Launder and Tubes
  - Ladle Bowls
  - Degassing Tubes
  - Plunger Mixers and Plunging Bells
  - Cements and Castables
  - Plates and Tiles
  - Needle Valves and Nozzles/Down Spouts

### Applications

EXCEL E stands and muffle rings are used in conjunction with EXCEL E and ISO-ALUSTAR crucibles for aluminium alloy and zinc applications in electric resistance and gas-fired furnaces.

EXCEL stands and muffle rings are used in conjunction with EXCEL, HI-MELT and ULTRAMELT crucibles intended for copper alloy and precious metal applications in gas and oil-fired furnaces.

SALAMANDER crucible accessories are available as spout extensions to increase pouring length and covers to exclude impurities from the melt. In addition a comprehensive range of graphitic Foundry products are offered in the form of both shaped and packaged refractories. We also supply crucible lifting devices.

### Typical Metal Casting Temperature

Excel E Accessories:	650 - 1000°C (1202 - 1832°F)
Excel Accessories:	900 - 1400°C (1652 - 2552°F)
Salamander Accessories:	1000 - 1600°C (1832 - 2912°F)

### Performance Characteristics

- Optimised glaze coatings tailored for specific temperature ranges
- Excellent thermal conductivity and shock resistance
- High resistance to oxidation
- Good wear resistance
- Good resistance to corrosive attack by chemical treatment agents
- Consistent performance
- High refractoriness
- Non-wetting properties

### Quality

Crucible accessories are manufactured from premium grade raw materials under an ISO 9001:2008 quality management system.

### Safety

Proper safety clothing must be worn at all times. Ensure that no moisture is introduced into the melt and that all refractories and tools are dry before coming into contact with molten metal. Provision should be made underneath the furnace to catch metal that may be discharged.

Morgan Molten Metal systems are committed to providing you with the best value products and technical service solutions to help you become the leader in your business

## Morgan MMS Global Capability



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