

EXCEL and HIMELT crucibles

DESCRIPTION

EXCEL and HIMELT are high quality carbon-bonded silicon carbide crucibles manufactured using the latest roller-forming techniques and are designed to cater for a range of non-ferrous melting applications.

APPLICATIONS

EXCEL: Intended for aluminium melting in oil-fired furnaces, melting copper-based alloys in gas and oil-fired furnaces, melting precious metals and non-ferrous alloys in low to medium frequency induction furnaces.

HIMELT: Provides enhanced performance in those applications where more arduous service conditions exist.

TYPICAL METAL CASTING TEMPERATURE

EXCEL: 850—1250°C (1562—2280°F)
HIMELT: 1000—1400°C (1830—2550°F)

PERFORMANCE CHARACTERISTICS

- Fast melting speed through high consistent thermal conductivity
- Excellent thermal shock resistance
- High resistance to oxidation
- Good erosion resistance
- Good resistance to corrosive attack by chemical treatment agents

IDENTIFICATION

EXCEL crucibles are coloured dark red and utilise the code X. e.g. AX800. HIMELT crucibles are bright red and utilise the code HM e.g. AHM800.

PATTERN RANGE

EXCEL and HIMELT crucibles are available in a comprehensive range of shapes and sizes to suit most end user requirements. Custom sizes can be supplied by special request. Heavy wall (HW) versions can be supplied for increased life in arduous applications and a selection of fixed pouring spouts with optimised profiles is offered where required.

EXCEL and HIMELT crucibles can be supplied with Morganite's unique PD coating system, which can assist with metal cleanliness and prevention of dross adhesion.

QUALITY

EXCEL and HIMELT crucibles are manufactured from premium grade raw materials under an ISO 9001:2000 quality management system.



PREHEATING / FIRST USE

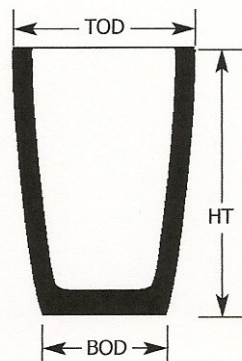
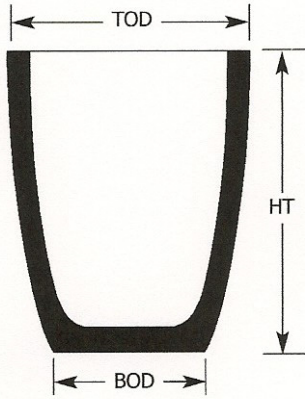
FUEL-FIRED FURNACES: Crucibles should be pre-heated empty until they reach a uniform bright red colour (circa 900°C) in order to pre-condition the glaze. The pre-heating time will depend on the size of the crucible.

In the case of large capacity crucibles and furnaces with high output burners the rate of temperature rise should be controlled in the initial stages to minimise thermal stress. The typical time taken from ambient to red heat is up to 1 hour. Avoid direct flame impingement on the crucible surface.

INDUCTION FURNACES: The heat-up procedure is dependant on furnace frequency, coil dimensions, and the resistivity of the metal being melted. It is recommended where possible to preheat the crucible empty. The power input rate should initially be limited until the crucible becomes bright red over its entire surface. The time taken to pre-heat will depend on the size of the crucible, but is usually in the range 20 – 40 minutes. Once one third of the crucible is full of molten metal the power can be increased to a higher level. Silicon carbide crucibles absorb proportionally high levels of power from the induction field. Care should be taken not to overheat the crucible. The actual maximum power setting should be assessed from experience and will be dependant on the capacity of the crucible. The appearance of the inside wall of the crucible should be monitored for signs of over-heating and the power reduced once the full charge is molten.

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.



Crucibles for Lift Out and Bale Out Furnaces

EXCEL/HIMELT A SHAPES (AX/AHM)	TOD (mm)	HT (mm)	BOD (mm)	Brass Capacity (kgs)	Brimful capacity (litres)
AX8	156	184	105	13	1.7
AX12	171	210	120	18	2.4
AX16	184	232	130	23	3.1
AX20	197	260	145	30	4
AX25	210	280	155	36	4.8
AX30	232	290	160	43	5.7
AX40	232	318	160	50	6.7
AX50	248	324	180	60	8
AX60	276	362	190	77	10
AX70	292	375	200	93	12
AX80	300	397	210	105	14
AX90	310	397	220	115	15
AX100	324	400	230	120	16
AX120	333	435	240	138	18
AX150	362	452	250	168	22
AX200	400	491	285	239	32
AX225	400	555	285	246	33
AX250	421	546	255	276	37
AX210	425	560	230	330	44
AX300	443	543	310	323	43
AX325	445	584	310	355	47
AX350	464	606	295	380	51
AX310	466	645	241	416	55
AX410	510	700	285	510	68
AX400	515	650	300	479	64
AX450	517	675	300	504	67
AX500	520	700	300	531	71
AX600	543	760	315	626	83
AX800	550	800	350	770	102
AX1000	616	822	420	1069	142

EXCEL/HIMELT C SHAPES (CX/CHM)	TOD (mm)	HT (mm)	BOD (mm)	Brass Capacity (kgs)	Brimful capacity (litres)
CX40	184	260	125	22	2.9
CX60	207	320	140	34	4.5
CX70	216	350	155	42	5.6
CX80	222	356	160	45	6
CX90	229	364	170	48	6.4
CX100	244	373	175	53	7.1
CX120	257	400	185	67	8.9
CX150	275	435	200	86	11
CX170	282	445	210	96	13
CX200	292	457	220	109	15
CX250	310	510	235	141	19
CX300	330	553	235	167	22
CX350	365	580	210	207	28
CX400	378	600	225	232	31
CX500	410	641	245	281	37
CX600	418	706	245	322	43

Cylindrical Crucibles for Induction Furnaces

EXCEL/HIMELT CYLINDERS (EX/EHM)

	TOD (mm)	HT (mm)	BOD (mm)		Brass Capacity (kgs)	Brimful capacity (litres)
EX323	165	318	165		25	4.3
EX1601	222	470	222		60	10
EX447	254	400	254		75	13
EX444	254	475	254		90	15
EX552	295	450	295		114	20
EX329	330	530	330		148	25
EX330	330	635	330		183	31
EX390	362	508	362		178	30
EX187	390	535	390		218	37
EX181	390	632	390		260	44
EX71	445	660	445		374	64
EX70	445	762	445		435	74
EX722	500	560	500		371	64
EX72	500	775	500		540	92
EX75	530	650	530		524	90
EX575	570	865	570		842	144
EX571	570	900	570		878	150
EX570	570	1000	570		980	168
EX650	645	1000	620		1072	183
EX652	650	1190	620		1327	227
EX800	800	1100	800		2199	376
EX905	905	1100	905		3115	533

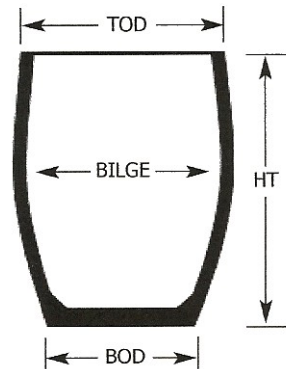
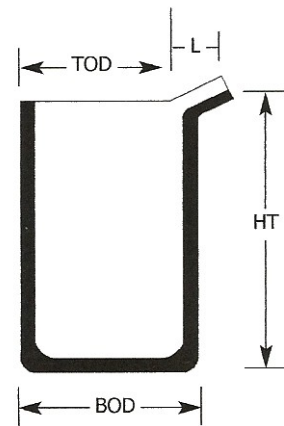
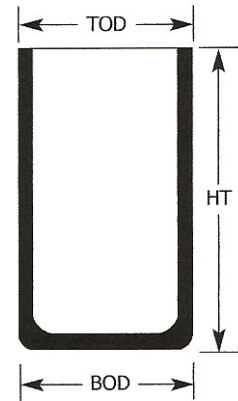
EXCEL/HIMELT SPOUTED CYLINDERS (TEX/TEHM)

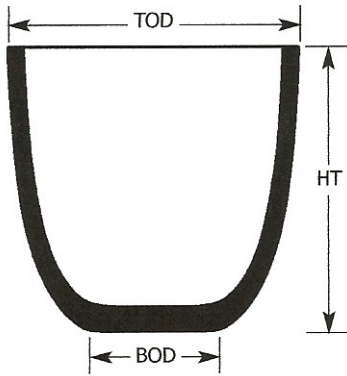
	TOD (mm)	HT (mm)	BOD (mm)	L (mm)	Brass capacity (litres)	Brimful capacity (litres)
TEX1601R	222	470	222	140	56	7.5
TEX1603R	222	470	222	276	56	7.5
TEX447R	254	400	254	164	74	9.8
TEX330R	330	635	330	200	182	24
TEX182R	390	632	390	190	258	34
TEX1821R	390	632	390	320	258	34
TEX70R	445	762	445	265	435	58
TEX577R	570	800	570	250	826	110

Bilge Crucibles for Lift-Out Furnaces

EXCEL/HIMELT F-SHAPES (FX/FHM)

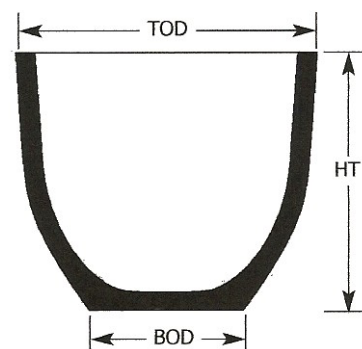
	TOD (mm)	HT (mm)	BOD (mm)	Bilge (mm)	Brass capacity (litres)	Brimful capacity (litres)
FX80	298	416	171	328	123	18
FX90	314	425	178	343	148	21
FX100	324	432	185	349	152	22.3
FX125	340	451	224	368	183	26
FX150	352	470	276	387	209	29.9
FX175	365	495	286	402	237	37.8
FX200	381	514	305	419	271	39.2
FX225	394	533	318	432	290	41.3
FX300	432	584	340	464	389	55.3





Crucibles for Bale Out Furnaces					
EXCEL/HIMELT BASINS (BX/BHM)					
	TOD (mm)	HT (mm)	BOD (mm)	Aluminium capacity (litres)	Brimful capacity (litres)
BX173	397	343	215	42	22
BX174	397	394	215	50	25
BX176	397	432	215	58	28
BX164	464	375	280	65	34
BX163	526	381	315	76	40
BX166	527	402	315	85	44
BX167	527	451	315	105	51
BX168	527	492	315	119	56
BX169	527	551	315	144	65
BX171	527	600	315	165	73
BX177	527	620	315	172	76
BX178	527	710	315	207	89
BX179	527	762	315	230	97
BX274	594	746	340	273	116
BX202	616	500	355	163	77
BX302	616	630	355	233	103
BX401	616	700	355	271	117
BX402	616	800	355	327	138
BX502	616	900	355	382	158
BX714	720	695	380	389	168
BX719	720	950	380	584	240
BX1261	762	490	460	216	106
BX1264	769	600	460	310	142
BX847	775	750	338	441	191
BX247	775	750	460	444	192
BX263	775	890	460	575	241
BX262	775	950	460	635	263
BX264	775	1000	460	700	287
BX850	850	750	450	595	254
BX851	850	950	450	815	336
BX2100	850	1140	300	964	391
BX852	850	1140	450	1130	453
BX853	850	1240	450	1252	498
BX8534	850	1720	450	1785	695

EXCEL/HIMELT BOWLS (BX/BHM)					
	TOD (mm)	HT (mm)	BOD (mm)	Aluminium capacity (litres)	Brimful capacity (litres)
BX300	570	475	305	136	65
BX400	700	450	305	161	83
BX500	715	525	305	216	104
BX600	725	585	305	262	122
BX700	726	630	305	298	136
BX800	726	690	305	347	154
BX890	850	603	350	328	156
BX900	850	650	350	386	178
BX1000	850	690	350	431	194
BX1100	850	750	350	500	220
BX1300	850	813	350	560	242
BX1500	850	850	350	611	261
BX1600	850	890	350	656	278
BX1800	850	980	350	757	315
BX2600	850	1244	350	1025	414
BXB900	885	650	350	409	188
BXB1000	885	690	350	455	205



Aluminium and brass capacity is calculated as follows:

A-Shapes - 90% of brimful

Basins and Bowls - With a freeboard of 75mm

Spouted Basins - With a freeboard of 75mm measured from the bottom of the spout

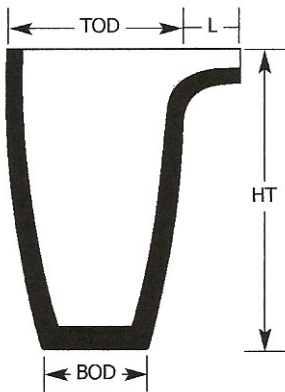
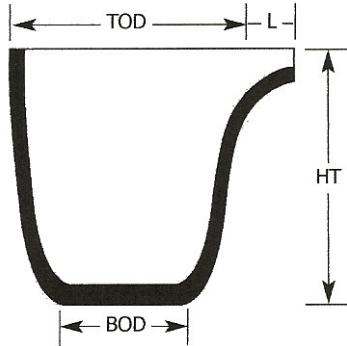
Cylinders - 70% of brimful

Base recess standard dimensions where fitted are 79mm dia. x depth 11mm.

All dimensions are subject to normal manufacturing tolerances. Pyrometer pocket and hole in wall configurations are available to facilitate measurement of metal temperature

Alternative sizes to those listed can be made available by request

Morganite also supplies a complete range of crucible stands to provide uniform heating and appropriate mechanical support of the crucible base



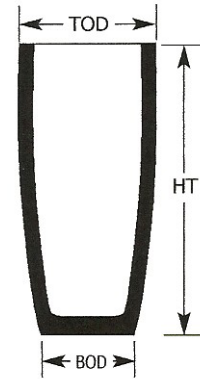
Spouted Basins for Tilting Furnaces

EXCEL/HIMELT A-SHAPES (TPX/TPHM)						
	TOD (mm)	HT (mm)	BOD (mm)	L (mm)	Brass capacity (litres)	Brimful capacity (litres)
TPX287	527	600	315	146	150	56
TPX178	527	710	315	146	192	71
TPX387	616	630	355	146	213	79
TBX401	616	700	355	290	253	94
TPX412	616	800	355	146	310	115
TPX512	616	900	355	146	361	134
TPX847	775	750	338	184	803	297
TPX587	775	890	460	184	530	196
TPX584	775	1000	380	184	655	243
TPX1600	850	890	350	184	600	222
TPX1800	850	980	350	184	700	259
TPX852	850	1140	450	184	1067	395

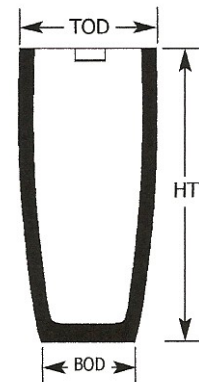
Spouted Crucibles for Tilting Furnaces

EXCEL/HIMELT SPOUTED (TPX/TPHM)						
	TOD (mm)	HT (mm)	BOD (mm)	L (mm)	Brass capacity (litres)	Brimful capacity (litres)
TPX176	310	510	235	203	115	14
TPX601	365	806	255	151	290	35
TPX400*	378	600	225	146	190	23
TPX475*	378	600	225	272	230	28
TPX843*	432	673	216	146	305	37
TPX982*	435	800	295	146	385	46
TPX12*	440	940	295	146	525	63
TPX740	443	543	310	146	265	32
TPX89*	543	760	315	146	555	66
TPX891*	543	760	315	250	555	66
TPX13*	550	975	350	146	885	106
TPX980*	680	1220	390	102/64	1690	289

EXCEL/HIMELT POUR OVER TOP (TPX/TPHM)						
	TOD (mm)	HT (mm)	BOD (mm)	L (mm)	Brass capacity (litres)	Brimful capacity (litres)
TPX901*	292	762	215		200	24
TPX904*	349	914	240		330	40
TPX14*	422	1025	255		560	67
TPX710*	432	720	295		388	46
TPX833*	541	1125	320		1100	132
TPX16*	550	975	350		940	113
TPX970*	680	1220	390		1830	219



EXCEL/HIMELT TUBE POUR (TPX/TPHM)						
	TOD (mm)	HT (mm)	BOD (mm)	L (mm)	Brass capacity (litres)	Brimful capacity (litres)
TPX10*	440	940	295	76/38	525	90
TPX830*	541	1190	320	76/38	1135	194
TPX15*	550	975	350	102/50	870	149
TPX980	680	1220	390	102/64	1690	289



INSTALLATION

The stand should be made from the same material as the crucible to ensure uniform heating of the crucible base and provide sufficient mechanical support. The diameter of the stand should be at least the same as the base of the crucible and the height should be such that the base of the crucible is level with the centre line of the burner in fuel-fired furnaces. The stand and crucible should be installed centrally in the furnace.

LIFT-OUT FURNACES A thin layer of coke dust or other carbonaceous material should be sprinkled on to the stand to prevent the crucible sticking to it.

BALE-OUT FURNACES The crucible should be installed with an 8mm gap between the upper wall of the crucible and the furnace lining to allow for expansion. Failure to leave a sufficient gap can lead to cracking.

A layer of ceramic fibre insulating material should be placed across the top of the furnace lining and the top surface of the crucible rim in order to seal the chamber and insulate the metal top plates. Ceramic fibre material must not be pushed down between the furnace lining and crucible wall as this would insulate the crucible, prevent the glaze from functioning, and lead to a rapid weakening by oxidation.

Where a flanged metal top ring is fitted to the furnace a 9mm gap should be present between the top ring and crucible wall to allow for expansion. Too small a gap can result in cracking of the crucible.

TILTING FURNACES Cement the stand on the floor of the furnace and ensure that it is central and level. Place the crucible centrally on the stand and use a thin layer of Morcem 900 cement to bond the crucible and stand together.

Use three equi-spaced grip bricks positioned 75mm below the rim of the crucible, leaving a 6-10mm gap between these and the crucible wall for expansion. Insert cardboard spacers in the gap.

Leave a clear 38mm space under the spout to prevent the crucible from "hanging up" on the spout.

After the crucible and accessories have been installed, initially fire the furnace slowly in order to release moisture and to set the cement.

INDUCTION FURNACES Cylindrical crucibles are installed in tilting furnaces with a protective layer of back-up material, which should be refractory in composition (e.g. magnesite) with no sintering additives. Back-up thickness is determined by crucible size. A slip plane of mica or glass fibre wool should first be installed against the furnace wall. A layer of back-up is placed in the base of the furnace to support the crucible and establish it at the correct height. The "star wires" are positioned to make contact with the crucible base in order to provide earth leakage protection. The crucible is lowered and centred in the furnace and back-up material is then added in layers approximately 50mm thick, de-aired and compacted using a forked tool, with each layer scored to provide a key for the next layer. The top of the crucible and back-up lining are sealed in position using plastic refractory. Ultramelt crucibles can be supplied with an integral spout, or alternatively a pouring spout can be fashioned using plastic refractory.

CLEANING OUT

Crucibles should be cleaned out carefully between melts or at least once per day in holding applications while hot in order to remove build-up of oxide dross. In tilting furnaces crucibles should be cleaned in the horizontal position where possible.

SAFETY

Proper safety clothing must be worn at all times. Ensure that no moisture is introduced into the melt. Provision should be made underneath the furnace to catch metal that may be discharged.

CRUCIBLE CARE



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.



Use locating bricks in tilting furnaces, to allow for expansion.



Tangential fire around crucible.



Do not drop charge—slowly lower in with tongs.



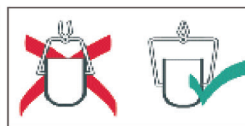
First charge with returns, then ingots on top.



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.



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For additional information on Morgan MMS' products & services or to find a location nearest to you, please visit: www.morganmms.com