

CALCAST® is a high performance technical ceramic manufactured from calcium silicate. All products are asbestos and quartz free. The densities are ranging from 53 to 69 lb/ft³ (850 to 1100 kg/m³) and can be machined to very close tolerances. The non-wetting properties of **CALCAST®** make these products ideally suited for non-ferrous metal casting applications. **CALCAST®** products are also used in a wide range of thermal process applications, and are rated for continuous use to 1832 °F (1000°C).

As a refractory material, **CALCAST®** is used in metal flow control applications in the aluminium industry, and as "hot face" linings in holding furnaces, die casting units and heat treatment equipment.

CALCAST® has high dimensional stability, and incorporates a unique particle reinforcement to increase fracture toughness and thermal shock resistance. These improvements extend the service life of the refractory components, and reduce operating costs.

CALCAST® CC 100, CC 350, CC 355 and CC 450 are widely used in billet and ingot casters as spouts, floats, trough dams, skim dams etc. **CC 150** as low shrinking material is very suitable for billet casting applications. The various grades have specially tailored properties designed for use in specific applications in the metal casting industry.

General Properties

Excellent thermal shock resistance, low thermal conductivity, good thermal insulation, low thermal capacity and thermal expansion.

Dimensionally stable and wear resistant.

High compressive and flexural strength, can be machined to sharp edges.

Non wetted by liquid non-ferrous metals, stable in basic and neutral media, non reactive to lubricants such as boron nitride and graphite.

Asbestosfree.

Machineable by lathe, router, drill, sanders, saws and other equipment.

CALSITHERM®

Silikatbaustoffe GmbH

Administration:

An der Eiche 15
D-33175 Bad Lippspringe
Tel.: +49 (0) 5252 9651 0
Fax: +49 (0) 5252 9651 28
www.calsitherm.de

Sales / Production:

Hermann-Löns-Strasse 170
D-33104 Paderborn-Sennelager
Tel.: +49 (0) 5254 9909 222
Fax: +49 (0) 5254 9909 217
sales@calsitherm.de



30/05/2005WH_BC

		CC 100	CC 150	CC 350	CC 450
MECHANICAL PROPERTIES					
Bulk density (EN 1094-4)					
(± 10%)		kg/m³	860	1040	1050
		lbs/cu.ft.	54	65	66
Open porosity (in acc. to EN 1094-4)					
		%	68	60	58
Compressive strength (EN 1094-5)					
		MPa	14	20	28
		lbs/sq.in.	2030	2900	4060
Flexural strength (EN 12089)					
		MPa	7	10	13
		lbs/sq.in.	1015	1450	1885
Hardness (DIN 53505)					
		Shore D	55	66	70
THERMAL PROPERTIES					
Service temperature					
		°C	1000	1000	1000
		°F	1832	1832	1832
Shrinkage after 12 h (EN 1094-6)					
Length-width / thickness	@ 750°C (1382°F)	%	0,2/0,6	0,05/0,2	0,25/0,8
	@ 1000°C (1832°F)	%	0,3/1,1	0,12/0,7	0,3/1,5
Thermal conductivity (EN 993-14)					
mean temp.	@ 400°C	W/(mK)	0,24	0,25	0,25
	@ 600°C	W/(mK)	0,25	0,27	0,27
	@ 800°C	W/(mK)	0,28	0,29	0,29
	@ 752°F	BTU/(sq.ft.h°F/in)	1,66	1,73	1,73
	@ 1112°F	BTU/(sq.ft.h°F/in)	1,73	1,87	1,87
	@ 1472°F	BTU/(sq.ft.h°F/in)	1,94	2,01	2,01
Specific heat capacity					
		kJ/(kgK)	0,8-1,2	0,8-1,2	0,8-1,2
		BTU/(lb°F)	0,19-0,29	0,19-0,29	0,19-0,29
Coefficient of thermal expansion					
	@ 900°C	K ⁻¹	5,7x10 ⁻⁶	5,0x10 ⁻⁶	5,9x10 ⁻⁶
	@ 1652°F	°F ⁻¹	3,2x10 ⁻⁶	2,8x10 ⁻⁶	3,3x10 ⁻⁶
CHEMICAL PROPERTIES					
Chemical composition					
	Calciumsilicate	%			95-97
	CaO-; MgO-; Al ₂ O ₃ -silicates	%	97,5-98	97,5-98	97,5-98
	R _x O _x (R=Fe, Ti, K, Na)	%	1	1	1
	Loss on ignition (LOI)	%	2-2,5	1-1,5	2-2,5
DIMENSIONS					
Standard sizes		mm		inches	
both sides sanded, untrimmed					
Length		1500, 3000		59.1, 118.1	
Width		1250		49,2	
Thickness		12.7, 19.1, 25.4, 31.8, 38.1, 50.8 76.2, 101.6		½; ¾, 1¼, 1½, 2, 3, 4	
Dimensional tolerances		mm		inches	
Length		0/+15		0/+0.59	
Width		0/+8		0/+0.31	
Thickness		0/+0,8		0/+0.03	

These values are tested in accordance with standards. They represent typical average values, but are subject to variations of raw materials and production variances. We are not liable for damages, connected with the use of our products. Misprints and errors excepted.

General remarks

Large sections should be supported by using adequate support systems. CALCAST® can be mechanically fixed using glue and/or screws. CALCAST® must be stored in dry environment. For additional information please contact CALSITHERM Silikatbaustoffe GmbH.

FURNACE AND LAUNDER APPLICATIONS

CALCAST® is a standard material for hot face lining in direct contact with the molten aluminum in dosing/holding furnaces (known as Swedish or Holimesy furnaces) as well as launders/troughs for OEM's and aftermarket rebuilds. The non wetting behaviour, high strength and excellent insulation properties secures an energy efficient construction and long lifetime.

SILCAL 1100 or MICROCAL, light weight Calcium Silicates with high insulation values are used as a backup insulation to further reduce the heat loss, shell temperature and weight.

The hot face lining generally is built using two layers of 1 ½ inch CALCAST®. Joints are offset to prevent metal penetration. Fiber paper or moldable can be added between the boards or in joints prior to screwing the boards together. This gives additional sealing in the corners and edges if needed.

Drilling and Sawing

In general the boards can be machined without any problems. Because the material is abrasive, slow speeds have to be used to reduce wear of the drills and saw blades and to

prevent glazing. If possible use variable speed tools to determine the optimum tip speed for cutting. All boards have a very uniform structure, there are no hard or soft spots. Before using screws the screw holes have to be predrilled to a smaller diameter using standard woodworking guides. The screw holding force of the boards is excellent.



MATERIAL	CC 100	CC 355	CC 350
SCREW PULL OUT FORCE ½" penetration	455 N	978 N	1138 N
SCREW PULL OUT FORCE 0.8" penetration	1187 N	2836 N	3072 N
SCREW PULL THROUGH FORCE Screw head	1092 N	2445 N	2731 N

Grades and Sizes

CALSITHERM is able to offer different grades, depending upon the user's philosophy. The differences are:

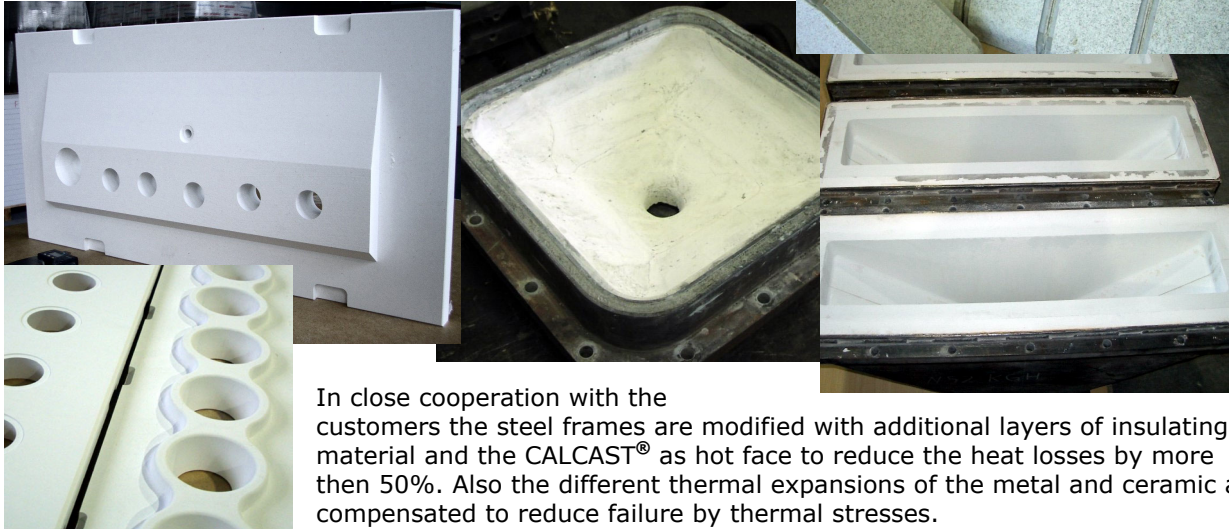
CC 350 and CC 100 are non shrinking boards, they are uniformly pre-heat-treated up to 1290°F / 700°C. CC 100 has a lower density than CC 350.

CC 355 is pre-heat-treated up to a temperature of 660°F, so still allowing the board a little shrink during the heat-up cycle before taking the furnace into operation.

Maximum board sizes are 10 x 4 ft, ideal for large furnace constructions and extended launders.

FOUNDRY

CALCAST® is used in many foundry applications to improve significantly the thermal balance during the casting operation. Applications in die-casting units, such as sprue boxes and distributor-plates are non-wetting and help keep the metal at a uniform temperature, significantly reducing the overall reject rate and prolonging the lifetime of the components. Calcast is also precisely machined for sprue bushings, charging troughs and transition tubes.



In close cooperation with the customers the steel frames are modified with additional layers of insulating material and the CALCAST® as hot face to reduce the heat losses by more than 50%. Also the different thermal expansions of the metal and ceramic are compensated to reduce failure by thermal stresses.

BILLET AND INGOT APPLICATIONS

CALCAST® grades are used in billet and ingot casters in direct contact with the molten metal. The materials can be machined in close tolerances, they do not wet and are mechanically stable. They insulate and control the flow of the liquid metal. Typical parts are spouts, floats, trough dams, skim dams, pigger paddles, etc.



CALCAST® is also successfully applied in many types and various designs of hot-top rings and transition plates for horizontal and vertical casting machines.

CALCAST® has very low oil absorption, which can be further reduced by applying a thin coating of either graphite- or boron nitride slurry. Due

to the low shrinkage of the material, the fastening torques during assembling have to be reduced to avoid critic preloading the plates and creating mechanical stresses. Please contact CALSITHERM Silikatbaustoffe GmbH for further advice.

CALSITHERM Silikatbaustoffe GmbH provides special solutions to the market, either by specific material modifications or by engineering solutions.

CALSITHERM®

Silikatbaustoffe GmbH

Administration:

An der Eiche 15
D-33175 Bad Lippspringe
Tel.: +49 (0) 5252 9651 0
Fax: +49 (0) 5252 9651 28
www.calsitherm.de

Sales / Production:

Hermann-Löns-Strasse 170
D-33104 Paderborn-Sennelager
Tel.: +49 (0) 5254 9909 222
Fax: +49 (0) 5254 9909 217
sales@calsitherm.de



30/05/2005WH_BC