



## SICAL-78

### Silicon Nitride-bonded Silicon Carbide Brick

#### Description

SICAL-78 is a high quality silicon nitride-bonded silicon carbide brick available in several shapes and sizes. SICAL-78 has a maximum service temperature of 1580°C (2876°F) and is characterized by:

- Excellent oxidation resistance and resistance to corrosion.
- Superior resistance to metal penetration and cryolite attack.
- Low gas permeability.
- High thermal conductivity.
- Low thermal expansion.
- Outstanding abrasion and erosion resistance.
- Low porosity.
- High modulus of rupture.
- Extremely high crushing strength.

#### Standard sizes:

SICAL-78 is available in the following standard sizes. Other sizes and shapes may be made on request.

Standard sizes	
Metric	
Length x width:	Thickness:
230 x 114 mm	64 mm
500 x 300 mm	100 mm
510 x 300 mm	50 mm
US/British	
Length x width:	Thickness:
9.1 x 4.5"	2.5"
19.7 x 11.8"	3.9"
20.1 x 11.8"	2.0"

#### Dimensional tolerances:

Length and width ..... ± 2.0 mm (± 0.08")  
 Thickness ..... ± 1.0 mm (± 0.04")

#### Application

SICAL-78 silicon carbide bricks are highly effective for lining of the upper sidewalls of aluminium reduction cells. SICAL-78 has an excellent oxidation resistance and a high resistance to corrosion and erosion by circulating electrolytic bath and molten aluminium. This combined with more ledge due to high thermal conductivity counteracts sidewall failures, with resulting increase of cell life.

The possible problem of too thick ledge formation as a result of using silicon carbide bricks for sidelinings may be solved by using a thin layer of SKAMOL VIP-12 vermiculite slabs as back-up insulation, thus securing the heat balance.

#### Standard packing

SICAL-78 bricks are packed on seaworthy, strong wooden pallets, palletised horizontally with foam between each layer, 4 mm cardboard protection on all 8 corners, PVC straps and polyethylene wrapping with an A3 label placed on inside. Special packing is available on request.

# SICAL-78

Silicon nitride-bonded silicon carbide brick for sidewall lining of aluminium reduction cells

Grade		SICAL-78
<b>Maximum service temperature</b>		
	°C	1580
	°F	2876
<b>Bulk density (EN 993-1 1995)</b>		
	kg/m <sup>3</sup>	2650
	lbs/cu.ft.	165
<b>Apparent porosity (EN 993-1 1995)</b>		
	%	17
<b>Cold crushing strength (EN 993-5 1998)</b>		
	MPa	160
	lbs/sq.in.	23200
<b>Modulus of rupture (EN 993-6 1995)</b>		
	MPa	44
	lbs/sq.in.	6380
<b>Permeability to gas (EN 993-4 1995)*</b>		
	nPm	<0.05
<b>Linear thermal expansion (ASTM C-372)</b>		
@ 20°C-1000°C (68°F-1832°F)	K <sup>-1</sup>	4.3x10 <sup>-6</sup>
	°F <sup>-1</sup>	2.4x10 <sup>-6</sup>
<b>Thermal conductivity (Sintef Microflash Method)</b>		
mean temp. @ 200°C	W/(mK)	38
@ 500°C		28
@ 700°C		21
@ 392°F	BTU/(sq.ft.h°F/in)	264
@ 932°F		194
@ 1292°F		146
<b>Corrosion resistance (SINTEF)</b>		
		3
<b>Mineralogical composition (XRD/XRF/LECO)</b>		
	%	
Silicon carbide	SiC	78
Silicon nitride	Si <sub>3</sub> N <sub>4</sub>	18
Silicon	Si	0.5
Silica + Silicon oxynitride	SiO <sub>2</sub> + Si <sub>2</sub> ON <sub>2</sub>	0.5
Other oxides	Al <sub>2</sub> O <sub>3</sub> + Fe <sub>2</sub> O <sub>3</sub> + CaO	0.5
<b>Standard sizes</b>		
Other sizes made on request.	mm	inches (")
	510 x 300 x 50	20.1 x 11.8 x 2.0
	500 x 300 x 100	19.7 x 11.8 x 3.9
	230 x 114 x 64	9.1 x 4.5 x 2.5
<b>Dimensional tolerances</b>		
	mm	inches (")
Length/width/thickness	±2.0/±2.0/±1.0	±0.08/±0.08/±0.04
<b>Colour</b>		Grey

\* b.d.: Below detection limit: 0.05 nPm

Data are average results of tests conducted under standard procedures and are subject to variation. All data are supplied in good faith and are subject to change without notice. No warranty or guarantee is implied. Misprint and errors excepted.

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