

Henson Ceramics Limited

Castle Works, Stafford ST16 2ET

HCL24A

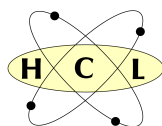
HCL2000 SERIES

(Ref: 1296)

HCL2087 LITHIUM ALUMINO-SILICATE

A high strength glass-ceramic suitable for sealing to 17% chrome-iron or Nilo 48

PROPERTY	UNIT	TEMPERATURE	HCL2087 LITHIUM ALUMINO-SILICATE
Density	kgm ⁻³		2400
Youngs Modulus	GPa	20°C	82.7
Modulus of Rupture	MPa	20°C	350
		300°C	312
		500°C	363
		700°C	271
Hardness	Rockwell 45N		75
Coefficient of Linear Expansion	10 ⁻⁷ °C ⁻¹	20° - 100°C	93
		20° - 800°C	117
Volume Resistivity	ohm.m	20°	3.2 x 10 ⁻¹⁶
		100°C	2.4 x 10 ⁻¹⁵
		500°C	6.2 x 10 ⁻⁹
		700°C	1.4 x 10 ⁻⁷
Dielectric Breakdown Strength	MVm ⁻¹		46
Permittivity		(10kHz)	6.1
		(10MHz)	5.5
		(9.6GHz)	5.1
Power Factor		(10kHz)	4.0 x 10 ⁻³
		(10GHz)	1.9 x 10 ⁻³
		(9.6GHz)	5.6 x 10 ⁻³



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HCL2088 ZINC ALUMINO-SILICATE

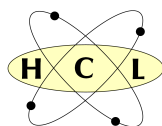
A low expansion glass-ceramic suitable for sealing to molybdenum.

PROPERTY	UNIT	TEMPERATURE	HCL2088 ZINC ALUMINO-SILICATE
Density	kgm ⁻³		3100
Youngs Modulus	GPa	20°C	84
Modulus of Rupture	MPa	20°C	170
Coefficient of Linear Expansion	10 ⁻⁷ °C ⁻¹	20° - 520°C	47
Volume Resistivity	ohm.m	20°	>10 ¹⁴
Dielectric Breakdown Strength	MVm ⁻¹		46

HCL 2089 CORDIERITE

Cordierite glass-ceramic has good thermal shock properties and is suitable for heat resistant components, which undergo rapid thermal cycling. (Ref: 1296)

PROPERTY	UNIT	TEMPERATURE	HCL 2089 CORDIERITE
Density	kgm ⁻³		1800
Porosity	% Water Absorption		15
Flexural Strength	MPa	20°C	60
Coefficient of Linear Expansion	10 ⁻⁷ °C ⁻¹	20° - 520°C	16
Thermal Conductivity	Wm ⁻¹ K ⁻¹	20° - 800°C	16
Max. Service Temperature (No Load Condition)	°C	20°C	2 1100



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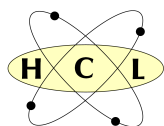
HCL2090 ZEMAT® ZERO EXPANSION GLASS-CERAMIC

'Zero Expansion' glass-ceramic is a transparent material now in production for applications requiring ultra-low thermal expansion. The primary crystal phase is $\alpha\beta$ -eucryptite ($\text{Li}_2\text{OAl}_2\text{O}_3\cdot 2\text{SiO}_2$) solid solution and the crystal size is limited to 50-100nm to permit high transparency in the visible and near infra-red. (Ref: 197)

PROPERTY	UNIT	TEMPERATURE	HCL 2090 ZEMAT® ZERO EXPANSION GLASS-CERAMIC
Density	kgm^{-3}		3100
Youngs Modulus	GPa	20°C	84
Poissons Ratio			0.24
Flexural Strength	MPa	300°C	98
Weibull Modulus		500°	6.8
Coefficient of Linear Expansion	$10^{-7} \text{ } ^\circ\text{C}^{-1}$	20° - 100°C	0.5
Heat Capacity	$\text{J.g}^{-1} \text{ } ^\circ\text{C}^{-1}$	50°C	0.79
Thermal Conductivity	$\text{Wm}^{-1} \text{ } ^\circ\text{C}^{-1}$	50°C	1.17
Vickers Hardness	Kg.mm^2		800
Refractive Index			1.540
Loss Tangent (9.3 GHz)			7.2×10^{-2}
Dielectric Constant (9.3 GHz)			6.62

ZEMAT is a registered trademark of Henson Ceramics Limited

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HCL2091 MEXIM C

Mexim C has been specially formulated to give an expansion closely matched to that of copper. It has high electrical insulation properties and good mechanical strength, and finds increasing application as a conformal insulating layer on copper substrates as well as conventional electrical lead-throughs.

PROPERTY	UNIT	TEMPERATURE	HCL2091 MEXIM C
Density	kgm ⁻³	20°C	3.142
Modulus of Rupture	MPa	20°C	250
Thermal Expansion Coefficient	10 ⁻⁷ °C ⁻¹	20° - 700°C	165 – 177
Softening Temperature	°C		720 – 725
Volume Resistivity	ohm.m	20° C	1.9 x 10 ¹⁷
		300°C	10 ¹²
Dielectric Breakdown Strength	Kv.mm ⁻¹		28
Permittivity (10kHz)		20°C	5.8
(100MHz)			5.8
(3GHz)			6.2
Power Factor (10kHz)		20°C	8.5 x 10 ⁻⁴
(100GHz)			2.0 x 10 ⁻⁴
(3GHz)			26.5 x 10 ⁻⁴

Please note that these figures are based on test sample results and should be taken as a guide only. Further information regarding the above materials is available on request

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