stc Material Solutions

Providing **highly engineered advanced material solutions** for over 120 years.



Superior engineering. Trusted solutions. Customized materials.

Superior Materials that Meet Semiconductor Processing Requirements

STC is equipped to handle the ever-growing demand of the semiconductor processing industry. We support 100mm through 300mm wafer systems, with larger-size components available. Our specialized technical ceramics experience, combined with dedication to quality and on-time delivery, have enabled semiconductor manufacturers to improve production methods and boost yields – ultimately reducing the cost of operations. We work with manufacturers and fabricators to create specialized components that can withstand the unique and challenging environments, including:

- High Heat
- Corrosive/Plasma Environments
- Thermal Management Challenges
- High Mechanical Wear Environments
- Electrical Insulation Requirements
- High-Temperature/High-Pressure Conditions

STC has a strong track record of supporting furnace manufacturers, supplying them with coil spacers and insulators, feedthroughs and other components. We maintain close relationships with our OEM customers – supporting assembly integrators, collaborating on design specifications, and supplying their components following lean and JIT manufacturing concepts.

STC also supplies metalized components and assemblies for a variety of instrumentation and control applications.

STC can supply ceramic components for all levels of semiconductor processing with our wide array of technical ceramics.

STC Manufactures the following components to support your business:

General Components	Deposition	Etching	Ion Implant
• E-Chuck Insulator Plates • Heater Components • End Effectors Insulators	• Chamber liners • Heater Components • Domes • Insulators	• Focus Rings • Plates & Shields • Domes • Shower Heads	• Ion Source Insulators • Plasma Gun Components • Rings • Chamber Liners

Contact STC Material Solutions:

STC Material Solutions
600 Industrial Park Road.
St. Albans, VT 05478

Phone: **(802) 527-7726**
Fax: **(802) 527-1181**
Email: **sales@ceramics.net**

ITAR REGISTERED

AS9100 & ISO 9001

REACH COMPLIANT

RoHS COMPLIANT

Materials Property Chart

	Property	ASTM Method	Units	Alumina		High Purity Alumina	
				AL96 96%	AL98 98%	AL995 99.5%	AL9980 99.8%
General	Crystal Size (Average)	Thin Section	Microns	8	7	6	6
	Color	--	--	White or Purple	White	Ivory - White	Ivory
	Gas Permeability	--	atms-cc/sec	gas tight <10-10	gas tight <10-10	gas tight <10-10	gas tight <10-10
	Water Absorption	C 20-97	%	0	0	0	0
Mechanical	Density	C 20-97	g/cc	3.71	3.78	3.88	3.91
	Hardness	Vickers 500 gm	GPa (kg/mm2)	12.7 (1300)	12.7 (1300)	14.3 (1459)	15 (1530)
	Hardness	--	R45N	81	81	82	86
	Fracture Toughness	Notched Beam	MPam1/2	4 - 5	4 - 5	4 - 5	3 - 4
	Flextrual Strength (MOR) (3 point) @ RT	F417-87	MPa (psi x 103)	358 (52)	393 (57)	338 (49)	379 (55)
	Tensile Strength @ RT	--	MPa (psi x 103)	200 (29)	221 (32)	172 (25)	200 (29)
	Compressive Strength @ RT	--	MPa (psi x 103)	2068 (300)	2241 (325)	2137 (310)	2240 (325)
	Elastic Modulus	C848	GPa (psi x 103)	310 (45)	345 (50)	379 (55)	379 (55)
	Poisson's Ratio	C848	--	0.22	0.23	0.23	0.23
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10-6/C	6.0	6.2	6.3	6.5
	C.T.E. 25 - 300° C	C 372-96	x 10-6/C	6.8	6.8	6.9	7.9
	C.T.E. 25 - 600° C	C 372-96	x 10-6/C	7.5	7.6	7.6	8.1
	Thermal Conductivity @ RT	C 408	W/m K	23	29	30	30
	Max Use Temp	--	Farenheit (°F)	3100	3100	3047	3047
		--	Celcius (°C)	1700	1700	1675	1675
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	250	260	270	290
	Dielectric Constant @ 1 MHz	D 150-98	--	9.1	9.5	9.8	9.8
	Dielectric Constant	D 2520-95	--	9.1	9.4	9.7	10
	@ Gigahertz			10.9	9.8	9.8	9.6
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0004	0.0006	0.0002	< .0001
	Dielectric Loss	D 2520-95	--	0.0007	0.0005	< .0001	< .0001
	@ Gigahertz			10.9	9.8	9.8	9.6
	Volume Resistivity, 25° C	D 257	ohms-cm	> 1 x 1014	> 1 x 1014	> 1 x 1014	> 1 x 1014
	Volume Resistivity, 300° C	D 1829	ohms-cm	3 x 1012	8 x 1011	1 x 1012	3 x 1012
	Volume Resistivity, 500° C	D 1829	ohms-cm	7 x 109	2 x 109	5 x 1010	6 x 1010
	Volume Resistivity, 700° C	D 1829	ohms-cm	4 x 108	2 x 108	2 x 109	6 x 109
	Volume Resistivity, 1000° C	D 1829	ohms-cm	--	--	--	--

Note: The information in this data sheet is for design guidance only. STC does not warrant this data as absolute values. Forming methods and specific geometry could affect properties. Slight adjustments can be made to some of the properties to accommodate specific customer requirements. Most of the dense materials in the table are resistant to mechanical erosion and chemical attack. STC has performed ASTM testing qualification for certain compositions, in accordance with ASTM D2442. Please consult our technical staff for appropriate material and specific test results.