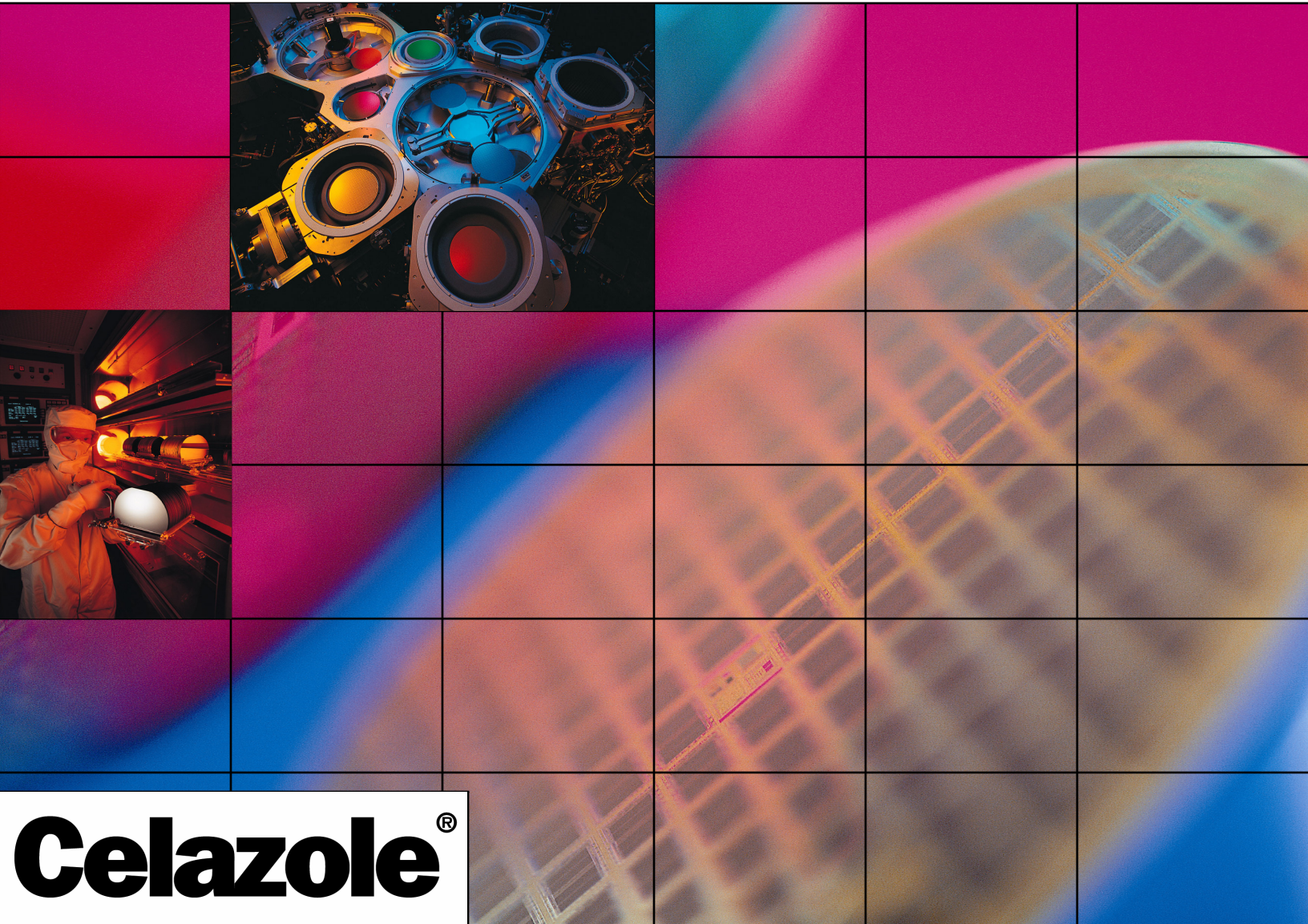


Celazole[®] PBI - Semiconductor



Celazole[®]

Celazole®

Celazole® PBI (Polybenzimidazole) is the world's highest performing thermoplastic – known for its superior high temperature and plasma resistance, high strength, dimensional stability and wear resistance.

Celazole U-60SD is a Semiconductor grade PBI thermoplastic recommended for use in Dry Etch Chambers and Sputtering Systems. The material is ideally suited for:

- Oxide Etch Chamber Seals
- Oxide Etch Lifting Pins
- Interior Chamber Screws and Components
- Focus Rings
- Wafer Clamps
- Sputtering Chamber Seals
- Sputtering Chamber Clamps and Components

Celazole U-60SD

Property Highlights:

- High Purity
- Plasma Resistance to CF_4 , F, O_2 and Ar plasmas
- Heat Resistance to 800F
- 57,000 psi Compressive Strength
- Low Outgassing
- CTE 2.3 E-5/C
- Superior Abrasion Resistance

Celazole® U-60SD PBI SEMICON

Application

Successes:

Oxide Etch Chamber Seals

Celazole U-60SD replaced Quartz oxide etch chamber seals, extending service life of the seal by a factor of three while lowering wafer contamination.

Etch Chamber Lifting Pins

Celazole U-60SD replaced Alumina lifting pins, extending the life cycle, while reducing wafer contamination, pin breakage and wafer scratching.

Oxide Etch Chamber Parts

Celazole U-60SD has replaced numerous polyimide pins, bushings, screws, insulators and other in chamber parts by offering a two-fold average increase in life cycle, lower ionic and polymeric contamination and higher strength parts.

Celazole[®] PBI U-60

Typical Properties

PROPERTIES	ASTM METHOD	ENGLISH VALUE	METRIC VALUE
MECHANICAL			
Tensile Strength	D-638	23 kpsi	160 MPa
Modulus		850 kpsi	5900 MPa
Elongation		3.0%	3.0%
Tensile Fatigue, % of stress to failure at 1,000,000 cycles, 1 Hz	D-638	35% (8.1 kpsi)	35% (56 MPa)
Flexural Strength	D-790	32 kpsi	220 MPa
Modulus		950 kpsi	6500 MPa
Compressive Strength (Yield)	D-695	57 kpsi	390 MPa
Compressive Strength (10% Strain)	D-695	50 kpsi	340 MPa
Compressive Modulus	D-695	850 kpsi	5900 MPa
Hardness – Rockwell M	D-785	>125	>125
– Rockwell E	D-785	104	104
– Shore D	D-2240	95	95
Izod Impact Strength (notched)	D-256	.53 ft-lb/in	30 J/m
(unnotched)		11 ft-lb/in	590J/m
THERMAL			
Heat Deflection Temp. (264 psi; 1.8 MPa)	D-648	815°F	435°C
Glass Transition	DMA	800°F	427°C
Coefficient of Linear Thermal Expansion			
75-300°F (25-150°C)	TMA	13 X 10 ⁻⁶ in/in°F	23 μm/m°C
390-570°F (200-300°C)	TMA	18 X 10 ⁻⁶ in/in°F	33 μm/m°C
Limiting Oxygen Index	D-2863	58%	58%
Thermal Conductivity 77°F (25°C)		2.8 Btu-in/hr-ft ² °F	0.41 W/m°C
ELECTRICAL			
Dielectric Strength	D-149	580 V/mil	23 KV/mm
Volume Resistivity	D-257	2 X 10 ¹⁵ ohm-cm	2 X 10 ¹⁵ ohm-cm
Dissipation Factor			
1 kHz	D-150	0.000	0.000
10 kHz	D-150	0.003	0.003
0.1 MHz	D-150	0.034	0.034
Dielectric Constant			
1 kHz	D-150	3.4	3.4
10 kHz	D-150	3.4	3.4
0.1 MHz	D-150	3.3	3.3
Arc Resistance	D-495	185 sec.	185 sec.

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