

# CYROLITE®

## CYROLITE® acrylic-based multi-polymer compounds

### High Performance

CYROLITE® compounds offer the very best balance of properties for Medical Device Applications.

- All grades of CYROLITE® compounds are engineered for applications where gamma or e-beam sterilization is required, with no loss in properties.
- CYROLITE® compounds are easy to process and can be used for very intricate to very large medical device parts.
- All grades are all tough, transparent, bondable and chemically resistant.
- All grade are BPA, DEHP and BPS free
- Meet the requirements of FDA food contact, USP Class VI and ISO 10993 in 001 and 3128 clear tints

CYROLITE® Features By Grade - Chart #1

CYROLITE® Features by Grade	CYROLITE® G-20	CYROLITE® G-20 HiFLO	CYROLITE® GS-90	CYROLITE® CG-97	CYROLITE® Med 2	CYROLITE® Protect	CYROLITE® Protect 2
Good Transparency	XX	XX	XX	XX	XX	X	X
EtO/Gama E-beam Stable	X	X	X	X	X	X	X
Excellent Bonding With PVC Tubing	X	X	X	X	X	X	X
High Flow For Multicavity Tools/Thin Walls		X	X			X	
Industry Best Gamma / E-beam Stability			X	X		X	X
Excellent Lipid Resistance				X	X		X
Excellent Alcohol Resistance				X	X		X
Microbial Resistance						X	X

CYROLITE® Protect- CYROLITE® grades with antimicrobial properties for use with FDA- regulated Class 1 and Class II medical devices covered by 510(k) PM N submission.

X- Transparent  
XX - Highly Transparent

**Effect of Isopropanol Exposure On CYROLITE® compounds Vs. Competitive Materials – Chart #2**  
**IPA Exposure Testing At 0.9% Strain At 230 C for 5 Hours Per ASTM D543**

Visual Observation	Crazing	Fracturing
CYROLITE® G-20	Crazed < 7 minutes	No Effect* <sup>4</sup>
CYROLITE® G-20 HiFLO®	Crazed < 3 minutes	Fractured < 2 Minutes
CYROLITE® GS-90	Crazed < 7 minutes	No Effect* <sup>4</sup>
CYROLITE® CG-97	No Effect* <sup>4</sup>	No Effect* <sup>4</sup>
CYROLITE® Med 2	No Effect* <sup>4</sup>	No Effect* <sup>4</sup>
Higher Flow Medical Co-polyester	Crazed < 10 minutes	No Effect* <sup>4</sup>
Medical Co-polyester	Crazed < 30 minutes	No Effect* <sup>4</sup>
Higher Flow Polycarbonate	No Effect* <sup>4</sup>	No Effect* <sup>4</sup>
Higher Flow TABS	Crazed < 3 minutes	Fractured < 6 Minutes

\* after 5 hours exposure



**Lipid Exposure Testing At 1.2% Strain At 230 C for 24 Hours Per ASTM D543 – Chart #3**

Visual Observation	Crazing	Fracturing
CYROLITE® CG-97	No Effect* <sup>3</sup>	No Effect* <sup>3</sup>
CYROLITE® Med 2	No Effect* <sup>3</sup>	No Effect* <sup>3</sup>
Higher Flow Medical Co-polyester	Crazed < 2 hours	No Effect* <sup>3</sup>
Medical Co-polyester	Crazed < 4 hours	No Effect* <sup>3</sup>
Higher Flow Polycarbonate	Crazed < 2 hours	Fractured < 24 hours

\* after 24 hours exposure



CYROLITE® Protect and CYROLITE® Protect 2 compounds provide antimicrobial activity against a variety of microorganisms commonly found in healthcare facilities:

**Antimicrobial Activity – Test Method JIS Z 2801**  
**(Log Rate of >4 means a kill rate of 99.99%) – Chart #4**

Duration	<i>Staphylococcus aureus</i>	<i>Klebsiella pneumoniae</i>	<i>Pseudomonas aeruginosa</i>	<i>Staphylococcus epidermidis</i>
24 hours	>4	>4	>4	>4
96 hours	>4	>4	>4	>4



\*CYROLITE® Protect – CYROLITE® grades with antimicrobial properties intended for use with FDA – regulated Class I and Class II medical devices covered by 510(k) PMN submission.

**Physical Properties of CYROLITE® acrylic based multi-polymer compounds**

Property	Parameter	Unit	ASTM Standard	CYROLITE®	CYROLITE®	CYROLITE®	CYROLITE®	CYROLITE®	CYROLITE®	CYROLITE®
				G20-100	G20-HIFLO	GS-90	CG-97	Med 2	Protect	Protect 2
				Typical Value						
<b>Optical</b>										
Light Transmission	@3mm	%	D 1003	89	89	89	87	85	40	11 @1.5mm
Haze	@3mm	%	D 1003	5.0	6.0	3.0	5.0	7.0	48	32 @1.5 mm
Yellowness Index	@3mm	-	E313	-0.3	-0.3	-0.3	-0.3	-1.0	-	-
<b>Rheological</b>										
Melt Flow Rate	@230°C & 5kg	g/10min	D 1238	2.6	10.0	6.5	1.8	2.1	10	2.5
<b>Mechanical Properties</b>										
Tensile Strength	-	psi [MPa]	D 638	6800 [46.9]	7000 [48.3]	6300 [43.4]	5270 [36.3]	5320 [36.7]	6,850 (47.2)	5,840 [40.3]
Tensile Modulus	-	x106 psi [GPa]	D 638	0.32 [2.2]	0.37 [2.6]	0.43 [3.0]	0.27 [1.9]	0.25 [1.7]	0.33 (2.1)	0.26 [1.8]
Tensile Elongation @ Yield	-	%	D 638	4.0	3.6	3.6	3.8	3.9	3.0	4.0
Tensile Elongation @ Break	-	%	D 638	9.5	9.5	6.7	13.9	22.0	8.0	17.0
Flexural Strength	-	psi [MPa]	D 790	10500 [72.4]	9400 [64.8]	10800 [74.5]	9800 [67.6]	8590 [59.2]	10,200 (70.2)	8,840 [61]
Flexural Modulus	-	x106psi [GPa]	D 790	0.34 [2.3]	0.31 [2.1]	0.33 [2.3]	0.27 [1.8]	0.24 [1.6]	0.325 (2.2)	0.28 [1.9]
Notched Izod	¼" bar @23°C	ft-lb/in [J/m]	D 256	1.9 [101]	1.9 [101]	2.0 [107]	2.3 [122]	2.2 [117]	1.3 (64.0)	1.7 [91]
Notched Izod	¼" bar @0°C	ft-lb/in [J/m]	D 256	1.1 [59]	1.1 [59]	0.8 [43]	-	-	-	-
Rockwell Hardness	M Scale		D 785	M39	M27	M30	L47	M33	M40	M33
<b>Physical Properties</b>										
Deflection Temperature, Annealed	1.8MPa, 0.250"	°F [°C]	D 648	186 [86]	186 [86]	163 [73]	158 [70]	163 [73]	167 (75)	149 [65]
Vicat Softening Point	-	°F [°C]	D 1525	214 [101]	214 [101]	210 [99]	194 [90]	201 [94]	212 (100)	201 [94]
Specific Gravity	-	-	D 792	1.11	1.11	1.11	1.08	1.08	1.11	1.08
Water Absorption	%, max	-	D 570	0.30	0.30	0.30	0.40	0.38	0.30	0.30
Mold Shrinkage	in/in	-	D 855	0.004-0.007	0.004-0.007	0.004-0.006	0.005-0.007	0.005-0.007	0.004-0.007	0.005-0.007
Coefficient Of Linear Expansion	in/in/°F (mm/mm°C)	32 - 212 °F (0 - 100 °C)	D 696	0.0000514	0.0000514	0.00004	0.000053	0.000048	0.0000514	0.000048
UL Flammability Class	-	-	-	UL 94HB	UL 94HB	UL 94HB	UL 94HB	UL 94HB	UL 94HB	UL 94HB
<b>Recommended processing conditions</b>										
Predrying Temperature	-	°F [°C]	-	175 [80]	175 [80]	160 [71]	160 [71]	160 [71]	175 (79)	160 [71]
Predrying Time	-	hour	-	3 - 4	3 - 4	3 - 4	3 - 4	3 - 4	3 to 4	3 to 4
Melt Temperature	-	°F [°C]	-	400 - 475 [204 - 246]	380 - 460 [193 - 238]	410 - 450 [210 - 232]	420 - 480 [215 - 249]	420 - 480 [215 - 249]	450 - 480 (232-249)	460 - 490 [238 - 254]
Cylinder Temperature	-	°F [°C]	-	380 - 475 [193 - 246]	360 - 460 [182 - 238]	375 - 450 [190 - 232]	410 - 480 [210 - 249]	410 - 480 [210 - 249]	450 - 480 [232 - 249]	460 - 490 [238 - 254]
Mold Temperature	-	°F [°C]	-	120 - 180 [49 - 82]	120 - 180 [49 - 82]	120 - 180 [49 - 82]	120 - 180 [49 - 82]	120 - 180 [49 - 82]	120 - 180 (50-82)	120 - 170 [60 - 77]

Information on CYROLITE® PMMA MD grades available on sell sheet #3570A

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