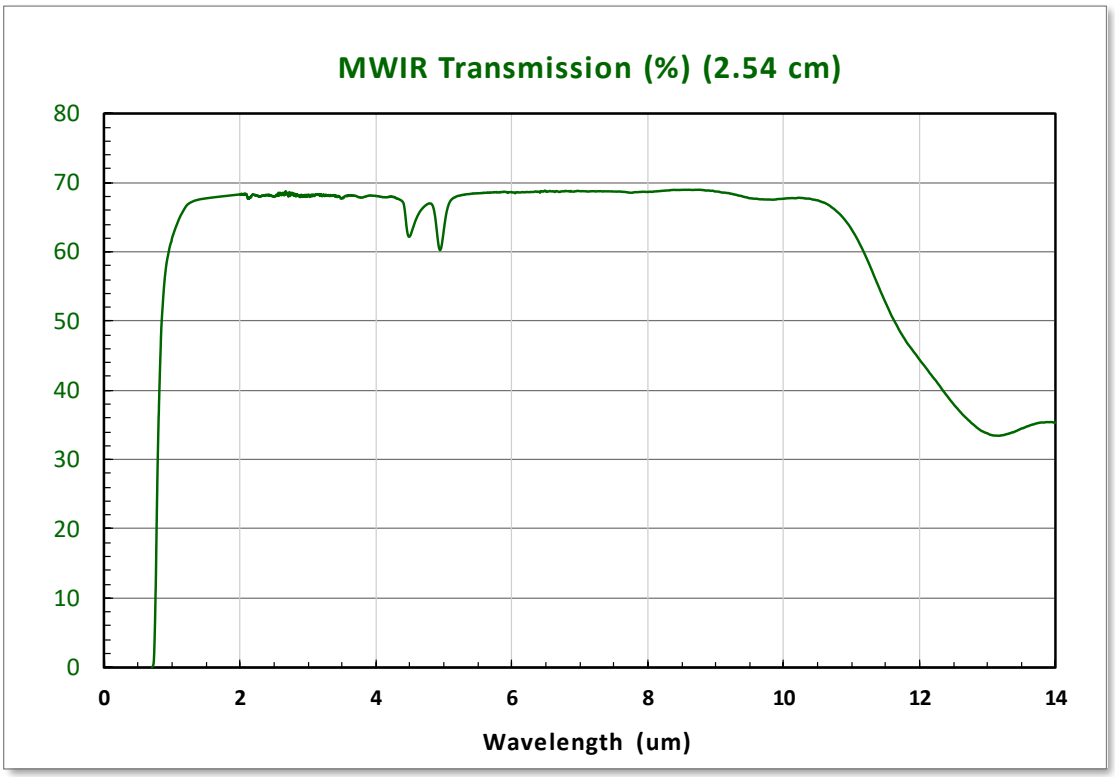
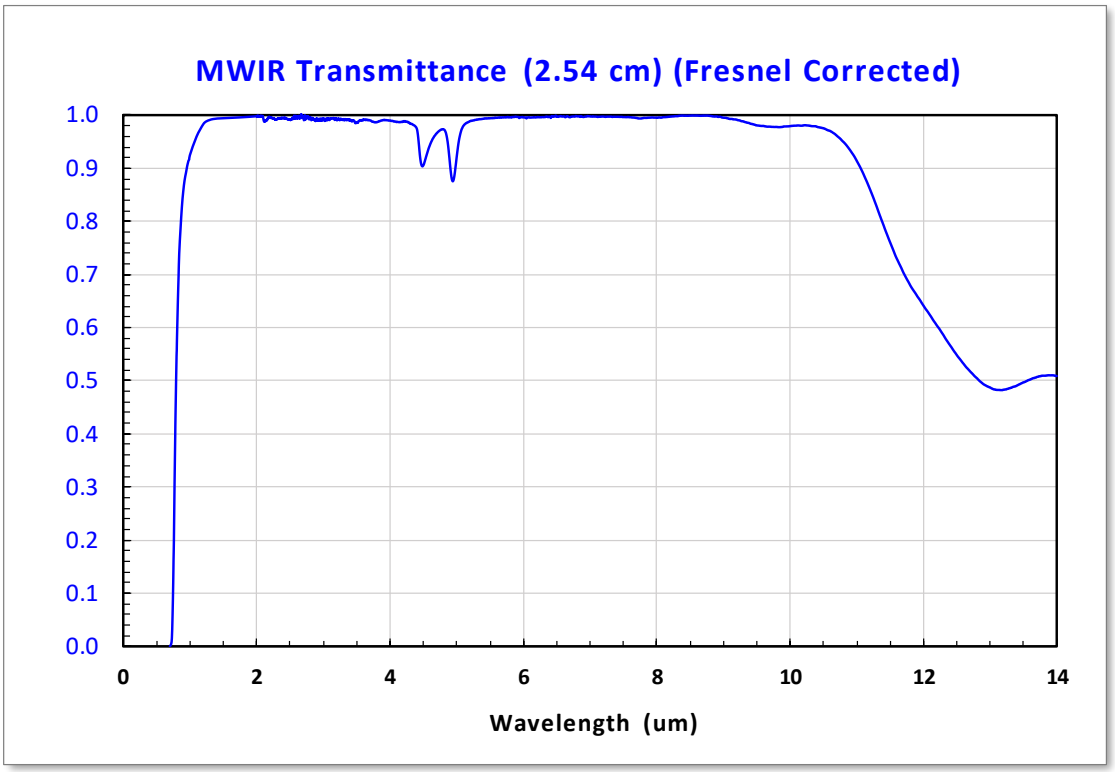
AMTIR-1 Material Properties

Property	METRIC UNITS	ENGLISH UNITS
Composition	GeAsSe	
Glass Transition Temperature (Tg)	353 °C	667 °F
Annealing Temperature	368 °C	694 °F
Dilatometric Softening Point	376 °C	709 °F
Thermal Expansion Coefficient	12.6 ppm / °C	7.0 ppm / °F
Thermal Conductivity	6.0 x 10^{-4} cal /sec-cm-°K	1.45 x 10^{-1} BTU/ Hr-ft-°F
Knoop Hardness	170	
Young's Modulus (E)	21.2 GPa	3.07 x 10^6 lbs /in²
Shear Modulus (G)	8.7 GPa	1.26 x 10^6 lbs/ in²
Poisson's Ratio	0.215	
Tensile Strength	7.6 MPa	1100 lbs / in²
Compressive Strength	145 MPa	21,000 lbs / in²
Rupture Modulus (ASTM-C158)	19.7 MPa	2850 lbs / in²
Density	4.43 gm/cm³	276.6 lbs/ft³
Dielectric Constant	7.9	
Resistivity (@100Hz)	>2x 10^{12} ohm-cm	>8 x 10^{11} ohm-in
Refractive Index @ 3.0 um (22 °C)	2.51856	
Refractive Index @ 8.0 um (22 °C)	2.50316	
Refractive Index @ 12.0 um (22 °C)	2.48968	
$\delta n/\Delta T$ @ 3.0 um	0.000075	
$\delta n/\Delta T$ @ 8.0 um	0.000072	
$\delta n/\Delta T$ @ 12.0 um	0.000071	
Chemical Durability (weight loss in milligrams in a 4 Hour Period)		
Solution	**Temperature (°C)**	**Milligrams**
H_2O	90 °C	0
2% HH_4OH	60 °C	10
2% KOH	60 °C	32
HCl, H_2SO_4, HNO_3 & EtOH (all conc)	60 °C	0

NOTE: All data provided on these datasheets are typical values and believed to be accurate and representative of standard AMI melt practice, at the time of publication.





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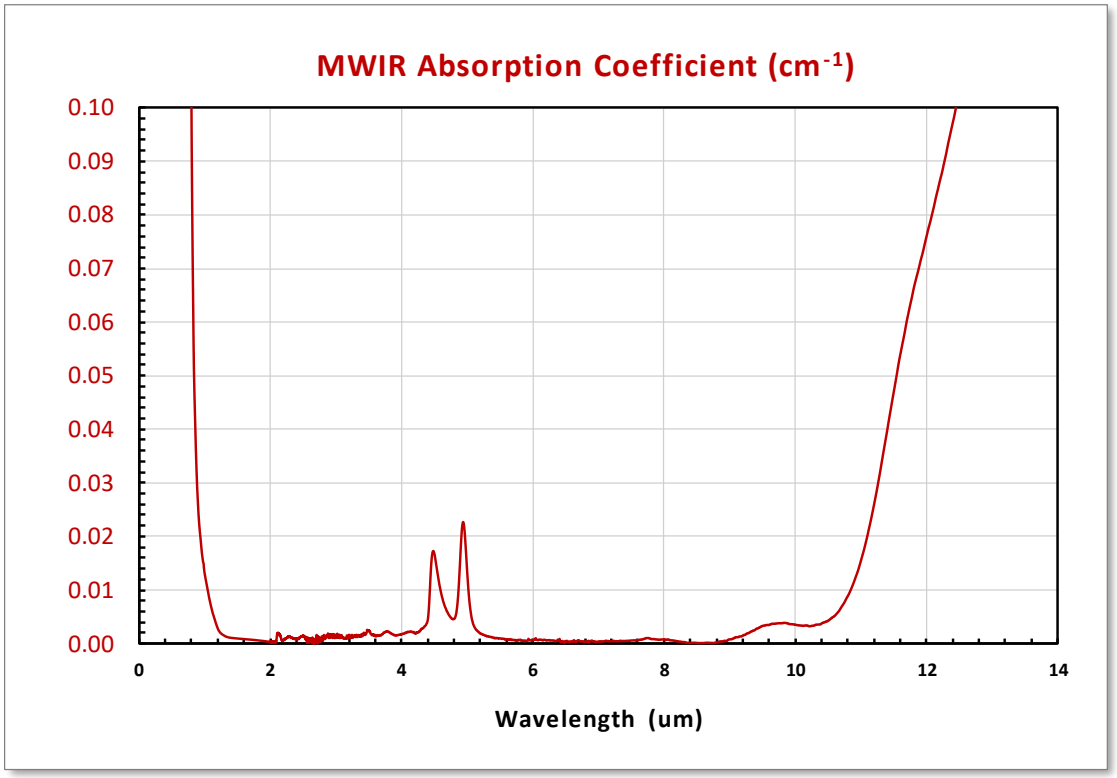

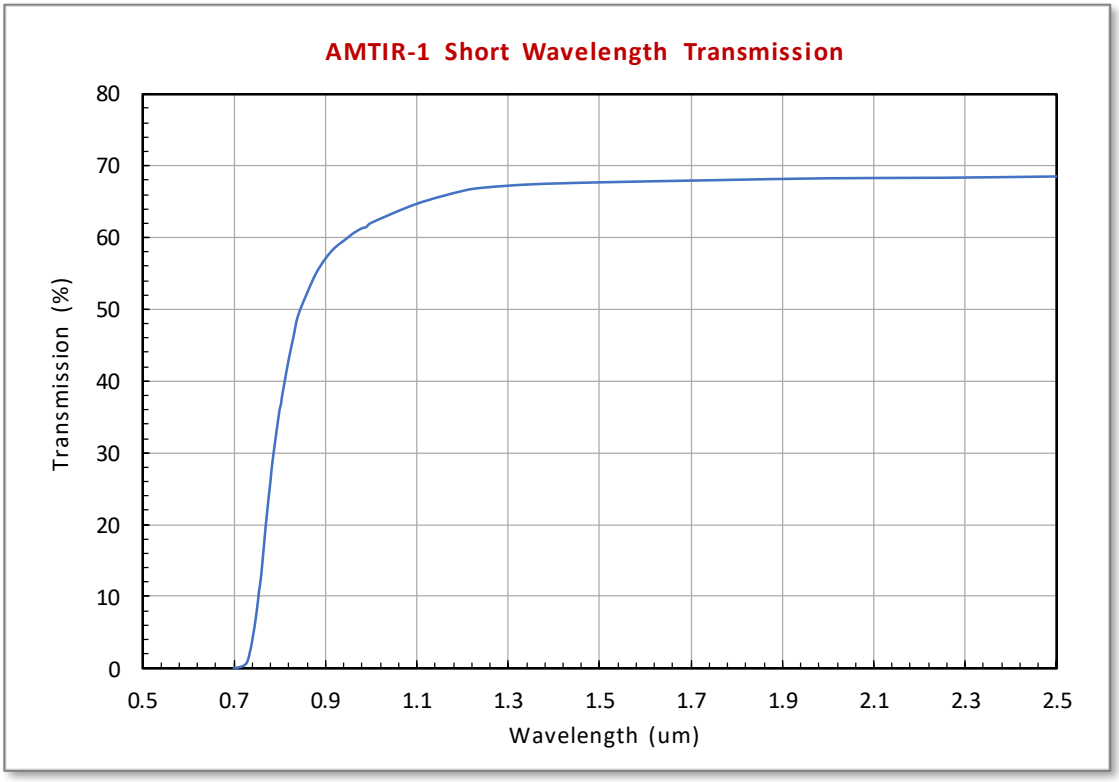

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Wavelength (um)	Fresnel Coefficient	Transmission (%) (2.54 cm)	Transmittance (2.54 cm) (corrected)	Absorption Coefficient (cm^{-1})
1.000	0.671	62.00	0.925	0.0133
2.000	0.684	68.22	0.998	0.0003
3.000	0.686	68.17	0.994	0.0010
4.000	0.687	67.97	0.990	0.0017
4.500	0.687	62.22	0.905	0.0171
4.960	0.687	60.64	0.882	0.0215
5.000	0.688	63.25	0.920	0.0143
6.000	0.688	68.51	0.996	0.0007
7.000	0.689	68.69	0.998	0.0003
8.000	0.689	68.57	0.995	0.0009
9.000	0.690	68.64	0.995	0.0009
10.000	0.690	67.60	0.979	0.0036
11.000	0.691	63.15	0.914	0.0154
12.000	0.692	44.38	0.642	0.0758
13.000	0.693	33.76	0.487	0.1230
14.000	0.694	35.31	0.509	0.1155

NOTE: Amorphous Materials, Inc. calculates the values for Absorption Coefficients, using the standard formulas and approach recommended by the Optical Society of America (OSA) and used routinely by most Optical Engineers.

Calculate the ABSORBANCE (*Abs*), at a given wavelength, corrected for multiple-internal reflections (i.e., Fresnel losses) and divide this value by the light path (i.e., sample thickness in centimeters).

FRESNEL REFLECTION COEFFICIENT (R_λ) = $2n_\lambda/(n_\lambda^2 + 1)$; where n_λ =the Refractive Index @ λ
INTERNAL TRANSMITTANCE (T_i) $_\lambda$ = OVERALL TRANSMISSION (T_o) $_\lambda$ / R_λ
ABSORBANCE at the wavelength (Abs_λ) = $-\text{Log}_{10}$ (T_i) $_\lambda$ or $Abs_\lambda = \text{Log}_{10}$ (1/ T_i) $_\lambda$
ABSORPTION COEFFICIENT (A_λ) = Abs_λ / thickness(cm)

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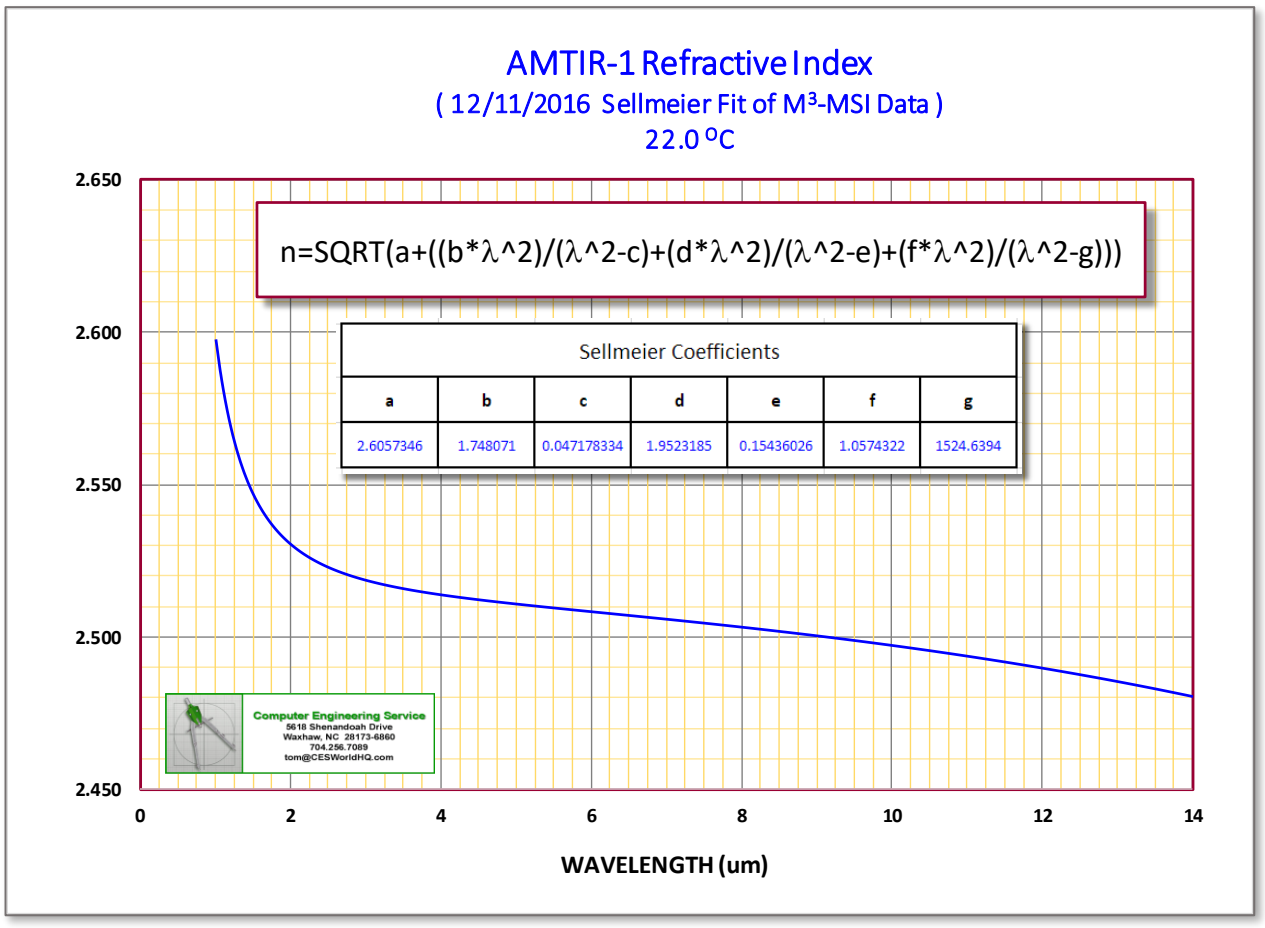

δn/ΔT	Wavelength (microns)	Refractive Index (20 °C)
0.000100	1.5000	**2.54672**
0.000080	2.0000	**2.53033**
0.000075	3.0000	**2.51856**
0.000074	4.0000	**2.51378**
0.000074	5.0000	**2.51076**
0.000073	6.0000	**2.50824**
0.000073	7.0000	**2.50577**
0.000072	8.0000	**2.50316**
0.000072	9.0000	**2.50031**
0.000071	10.0000	**2.49715**
0.000071	11.0000	**2.49362**
0.000071	12.0000	**2.48968**
0.000071	13.0000	**2.48527**
0.000071	14.0000	**2.48034**