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AMTIR-8 Supplemental Datasheet Notes for use with Zemax Optic Studio Software

The following information is provided for optical design engineers using AMTIR-8 glass and Zemax Optical Design software. The coefficients provided are based on the use of the Optic Studio variation of the Sellmeier-1 equation for Room Temperature at time of index measurement, whereby, the value "1" found in the (n_{λ}^2-1) term is actually the original Sellmeier Type-1 variable " K_0 " term. (i.e., K_0 is forced to be equal to 1 to accommodate OS software requirements.)

$$(n_{\lambda}^2-1) = K_1 * (\lambda^2 / (\lambda^2 - L_1)) + K_2 * (\lambda^2 / (\lambda^2 - L_2)) + K_3 * (\lambda^2 / (\lambda^2 - L_3))$$

Zemax Optic Studio Sellmeier-1 Coefficients		Statistics of Fit	
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K_1	0.0064087808	S1	0.00000
L_1	0.7273082400	S2	706.9570
K_2	5.8208358791	S3	706.9570
L_2	0.0862685410	R2	1.00000
K_3	0.7642669093	V2	0.00001
L_3	1518.88680630		
K_0	1.0000000000		

AMTIR-8 RT 20 °C Measured Index Data vs Sellmeier-1 Calculated Data

Wavelength (λ , μm)	Index Measured	Index Using Coefficients	Index Difference
1.0000	2.71908	2.71908	0.00000
1.5000	2.65730	2.65730	0.00000
2.0000	2.63725	2.63723	-0.00002
3.0000	2.62288	2.62290	0.00002
4.0000	2.61739	2.61744	0.00005
5.0000	2.61432	2.61435	-0.00003
6.0000	2.61208	2.61205	-0.00003
7.0000	2.61005	2.61001	-0.00004
8.0000	2.60800	2.60798	-0.00002
9.0000	2.60586	2.60585	-0.00001
10.0000	2.60354	2.60355	0.00001
11.0000	2.60099	2.60102	0.00003
12.0000	2.59819	2.59821	0.00002
13.0000	2.59510	2.59510	0.00000
14.0000	2.59166	2.59164	-0.00002

TIR-8 Thermal Optical Coefficient Data

$$\Delta n_{\lambda} = ((n_{\lambda}^2 - 1) / (2n_{\lambda})) \times [D_0 \Delta T + D_1(\Delta T)^2 + D_2(\Delta T)^3 + ((E_0 \Delta T + E_1(\Delta T)^2) / (\lambda^2 - S_{TK}(\lambda_{TK})^2))]$$

Zemax Optic Studio Sellmeier-1 Thermal Coefficients		Statistics of Fit	
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D₀	6.16498792E-06	S1	0.0000E+00
D₁	-4.02147364E-11	S2	4.0165E-06
D₂	-1.29939784E-12	S3	4.0165E-06
E₀	4.79884604E-05	R2	1.0000E+00
E₁	-3.89990649E-10	V2	0.0000E+00
S_{KT}	-1.000000E+00		
λ_{KT}	2.12073130E+00		

Δn/ΔT Comparison of Measured Data 3rd Order Polynomial Fit to Zemax Optic Studio Equation Fit using Thermal Coefficients

λ (um)	Temp (°C, ref.)	Index (n, ref.)	Temp (°C, Final)	ΔT (°C)	Δn Calculated	Δn/ΔT Optic Studio	Δn/ΔT Meas. Data Fit	Δn/ΔT Difference
1	20	2.71908	80	60	0.001050	1.75E-05	1.49E-05	0.000003
2	20	2.63725	80	60	0.000800	1.33E-05	1.26E-05	0.000001
3	20	2.62288	80	60	0.000653	1.09E-05	1.09E-05	0.000000
4	20	2.61739	80	60	0.000570	9.50E-06	9.59E-06	0.000000
5	20	2.61432	80	60	0.000521	8.69E-06	8.69E-06	0.000000
6	20	2.61208	80	60	0.000491	8.18E-06	8.11E-06	0.000000
7	20	2.61005	80	60	0.000471	7.85E-06	7.77E-06	0.000000
8	20	2.60800	80	60	0.000458	7.63E-06	7.61E-06	0.000000
9	20	2.60586	80	60	0.000448	7.47E-06	7.55E-06	0.000000
10	20	2.60354	80	60	0.000441	7.34E-06	7.51E-06	0.000000
11	20	2.60099	80	60	0.000435	7.25E-06	7.44E-06	0.000000
12	20	2.59819	80	60	0.000430	7.17E-06	7.26E-06	0.000000
13	20	2.59510	80	60	0.000427	7.11E-06	6.90E-06	0.000000
14	20	2.59166	80	60	0.000423	7.06E-06	6.28E-06	0.000001

Graphical Presentation of AMTIR-8 Thermal Coefficient $\Delta n/\Delta T$ Data

