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AMTIR-1 Supplemental Datasheet Notes for use with Zemax Optic Studio Software and Synopsis Code V Optical Design Software

The following information is provided for optical design engineers using **AMTIR-1** glass The coefficients provided are based on the use 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*.) (**Temperature: 22.0 °C**)

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

Zemax Optic Studio Sellmeier-1 Coefficients		Statistics of Fit	
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K_1	4.802133223	S1	0.00000
L_1	0.054171865	S2	725.6244
K_2	0.503764838	S3	725.6244
L_2	0.250305730	R2	1.00000
K_3	1.027925180	V2	0.00001
L_3	1488.910475		
K_0	1.000000000		

AMTIR-1 RT 22 °C Measured Index Data vs Sellmeier-1 Calculated Data

Wavelength (microns)	Measured Refractive Index 22.0 °C	Calculated Refractive Index 22.0 °C	Difference
1.0000	2.59776	2.59778	0.000016
1.1000	2.58104	2.58099	-0.000048
1.3000	2.55953	2.55956	0.000029
1.5000	2.54668	2.54674	0.000057
2.0000	2.53043	2.53035	-0.000077
2.5000	2.52283	2.52281	-0.000020
3.0000	2.51854	2.51856	0.000019
4.0000	2.51379	2.51377	-0.000018
5.0000	2.51071	2.51075	0.000040
6.0000	2.50820	2.50822	0.000025
7.0000	2.50574	2.50576	0.000017
8.0000	2.50319	2.50315	-0.000037
9.0000	2.50032	2.50031	-0.000013
10.0000	2.49714	2.49715	0.000009
11.0000	2.49362	2.49363	0.000005
12.0000	2.48971	2.48968	-0.000027
13.0000	2.48524	2.48527	0.000031
14.0000	2.48034	2.48033	-0.000009

AMTIR-1 Thermal Optical Coefficient Data

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

Zemax Optic Studio Sellmeier-1 Thermal Coefficients		Statistics of Fit	
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D_0	7.060505E-05	S1	0.000000E+00
D_1	5.777725E-10	S2	3.835059E-04
D_2	1.693255E-10	S3	3.835059E-04
E_0	5.380665E-05	R2	1.000000E+00
E_1	8.644378E-12	V2	0.000000E+00
S_{KT}	-1.000000E+00		
λ_{KT}	2.853359E-01		

Δn/ΔT Comparison of Measured Data 6th 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	2.59744	80	60	0.008032	1.34E-04	1.10E-04	0.000024
2	20	2.53018	80	60	0.005408	9.01E-05	8.15E-05	0.000009
3	20	2.51841	80	60	0.004911	8.19E-05	7.38E-05	0.000008
4	20	2.51362	80	60	0.004735	7.89E-05	7.35E-05	0.000005
5	20	2.51060	80	60	0.004651	7.75E-05	7.43E-05	0.000003
6	20	2.50808	80	60	0.004603	7.67E-05	7.41E-05	0.000003
7	20	2.50561	80	60	0.004572	7.62E-05	7.29E-05	0.000003
8	20	2.50301	80	60	0.004549	7.58E-05	7.17E-05	0.000004
9	20	2.50016	80	60	0.004531	7.55E-05	7.11E-05	0.000004
10	20	2.49701	80	60	0.004515	7.53E-05	7.13E-05	0.000004
11	20	2.49348	80	60	0.004500	7.50E-05	7.16E-05	0.000003
12	20	2.48954	80	60	0.004486	7.48E-05	7.12E-05	0.000004
13	20	2.48513	80	60	0.004472	7.45E-05	7.03E-05	0.000004
14	20	2.48019	80	60	0.004457	7.43E-05	7.12E-05	0.000003

Graphical Presentation of AMTIR-1 Thermal Coefficient Δn/ΔT Data