

S-FSL 5Y

Code(d) 487703

Code(e) 489702

Refractive Index n_d	1.487 49 1.487 490	Abbe Number v_d	70.36	Dispersion $n_F - n_C$	0.006 929
Refractive Index n_e	1.489 145	Abbe Number v_e	70.17	Dispersion $n_{F'} - n_{C'}$	0.006 971

Refractive Indices		
$\lambda(\mu\text{m})$		
n_{2325}	2.325 42	1.462 18
n_{1970}	1.970 09	1.467 61
n_{1530}	1.529 58	1.473 23
n_{1129}	1.128 64	1.477 78
n_t	1.013 98	1.479 15
n_s	0.852 11	1.481 38
$n_{A'}$	0.768 19	1.482 82
n_r	0.706 52	1.484 10
n_C	0.656 27	1.485 35
$n_{C'}$	0.643 85	1.485 69
$n_{\text{He-Ne}}$	0.632 80	1.486 01
n_D	0.589 29	1.487 43
n_d	0.587 56	1.487 49
n_e	0.546 07	1.489 15
n_F	0.486 13	1.492 28
$n_{F'}$	0.479 99	1.492 66
$n_{\text{He-Cd}}$	0.441 57	1.495 46
n_g	0.435 84	1.495 94
n_h	0.404 66	1.498 96
n_i	0.365 02	1.504 04
n_{334}	0.334 15	1.509 46
n_{326}	0.326 11	1.511 16

Constants of Dispersion Formula ※1	
A_1	9.774 099 44E-01
A_2	2.109 508 34E-01
A_3	1.371 428 48E+00
B_1	5.576 493 64E-03
B_2	1.770 003 13E-02
B_3	1.492 114 43E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	3
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group WS	2
Acid Resistance(Surface) Group SR	3.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	62.2
Rigidity Modulus G (GPa)	25.3
Poisson's Ratio σ	0.229
Knoop Hardness Hk(Class)	500 5
Abrasion Aa	114

※1 Refractive Indices of the wavelength nm can be calculated from 326 to 1129 nm by this constant.

Use the appended list of the constants to calculate 1129-2325nm.

Partial Dispersions	
$n_C - n_t$	0.006 201
$n_C - n_{A'}$	0.002 523
$n_d - n_C$	0.002 144
$n_e - n_C$	0.003 799
$n_g - n_d$	0.008 455
$n_g - n_F$	0.003 670
$n_h - n_g$	0.003 015
$n_i - n_g$	0.008 099
$n_{C'} - n_t$	0.006 546
$n_e - n_{C'}$	0.003 454
$n_{F'} - n_e$	0.003 517
$n_i - n_{F'}$	0.011 382

Relative Partial Dispersions	
$\theta_{C,t}$	0.894 9
$\theta_{C,A'}$	0.364 1
$\theta_{d,C}$	0.309 4
$\theta_{e,C}$	0.548 3
$\theta_{g,d}$	1.220 2
$\theta_{g,F}$	0.529 7
$\theta_{h,g}$	0.435 1
$\theta_{i,g}$	1.168 9
$\theta'_{C,t}$	0.939 0
$\theta'_{e,C'}$	0.495 5
$\theta'_{F',e}$	0.504 5
$\theta'_{i,F'}$	1.632 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.018 1
$\Delta\theta_{C,A'}$	0.002 9
$\Delta\theta_{g,d}$	0.001 6
$\Delta\theta_{g,F}$	0.002 1
$\Delta\theta_{i,g}$	0.033 1

Coloring			
λ_{80}	295	λ_5	270
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	298	$\lambda_{0.05}$	277

CCI		
B	G	R
0.00	0.00	0.00

Internal Transmittance		
λ (nm)	τ_i (10 mm)	τ_i (25 mm)
240		
250		
260		
270		
280	0.19	0.01
290	0.61	0.29
300	0.86	0.68
310	0.954	0.89
320	0.984	0.961
330	0.993	0.983
340	0.997	0.993
350	0.998	0.995
360	0.998	0.996
365	0.999	0.997
370	0.999	0.998
380	0.999	0.998
390	0.999	0.998
400	0.999	0.999
420	0.999	0.999
440	0.999	0.999
460	0.999	0.999
480	0.999	0.999
500	0.999	0.999
550	0.999	0.999
600	0.999	0.999
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.997
1 000	0.998	0.994
1 200	0.997	0.992
1 400	0.981	0.952
1 600	0.991	0.977
1 800	0.983	0.958
2 000	0.968	0.921
2 200	0.86	0.70
2 400	0.85	0.67

Thermal Properties	
Strain Point StP (°C)	465
Annealing Point AP (°C)	502
Transformation Temperature Tg (°C)	495
Yield Point At (°C)	590
Softening Point SP (°C)	676
Expansion Coefficients (-30 °C ~ 70 °C)	90
α_t (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(m·K))	1.00

Linear coefficient of thermal expansion	
Temperature range (°C)	α_t (10 ⁻⁷ K ⁻¹)
-100 ~ -90	81
-90 ~ -80	82
-80 ~ -70	83
-70 ~ -60	84
-60 ~ -50	84
-50 ~ -40	85
-40 ~ -30	86
-30 ~ -20	87
-20 ~ -10	88
-10 ~ 0	88
0 ~ 10	89
10 ~ 20	90
20 ~ 30	91
30 ~ 40	91
40 ~ 50	92
50 ~ 60	92
60 ~ 70	93
70 ~ 80	94
80 ~ 90	94
90 ~ 100	95
100 ~ 110	95
110 ~ 120	96
120 ~ 130	96
130 ~ 140	96
140 ~ 150	97
150 ~ 160	97
160 ~ 170	98
170 ~ 180	98
180 ~ 190	98
190 ~ 200	99
200 ~ 210	99
210 ~ 220	99
220 ~ 230	99
230 ~ 240	100
240 ~ 250	100
250 ~ 260	100
260 ~ 270	100
270 ~ 280	100
280 ~ 290	100
290 ~ 300	100

Other Properties	
Photoelastic Constant β (nm/(cm·10 ⁵ Pa))	2.87
Specific Gravity d	2.46
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature (°C)	$\Delta n_{\text{rel}} / \Delta T$ (10 ⁻⁶ K ⁻¹)											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-1.8	-1.8	-1.6	-1.6	-1.6	-1.5	-1.5	-1.4	-1.4	-1.3	-1.1	-0.9
-60 ~ -40	-1.9	-1.8	-1.7	-1.7	-1.7	-1.6	-1.6	-1.5	-1.4	-1.3	-1.1	-0.9
-40 ~ -20	-1.9	-1.8	-1.7	-1.7	-1.7	-1.6	-1.6	-1.4	-1.4	-1.2	-1.1	-0.8
-20 ~ 0	-1.8	-1.8	-1.6	-1.6	-1.6	-1.5	-1.5	-1.3	-1.3	-1.1	-0.9	-0.7
0 ~ 20	-1.7	-1.6	-1.5	-1.4	-1.4	-1.4	-1.3	-1.2	-1.1	-1.0	-0.8	-0.6
20 ~ 40	-1.5	-1.5	-1.3	-1.3	-1.3	-1.2	-1.1	-1.0	-1.0	-0.8	-0.7	-0.3
40 ~ 60	-1.4	-1.4	-1.2	-1.2	-1.2	-1.0	-1.0	-0.8	-0.7	-0.6	-0.4	-0.1
60 ~ 80	-1.3	-1.2	-1.0	-1.0	-1.0	-0.9	-0.8	-0.6	-0.6	-0.4	-0.2	0.2
80 ~ 100	-1.1	-1.0	-0.8	-0.8	-0.8	-0.7	-0.6	-0.4	-0.4	-0.2	0.0	0.3
100 ~ 120	-0.9	-0.9	-0.7	-0.6	-0.6	-0.5	-0.4	-0.2	-0.2	0.0	0.2	0.5
120 ~ 140	-0.8	-0.7	-0.5	-0.5	-0.4	-0.3	-0.3	-0.1	0.0	0.2	0.4	0.8
140 ~ 160	-0.7	-0.5	-0.3	-0.2	-0.2	-0.1	0.0	0.2	0.2	0.4	0.6	1.0
160 ~ 180	-0.5	-0.4	-0.2	-0.1	-0.1	0.0	0.1	0.3	0.4	0.6	0.8	1.2

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