L-LAM69

Code(d) **731405**
Code(e) **735403**

Refractive Index n_d	**1.730 77** 1.730 770	Abbe Number ν_d	**40.51**	Dispersion $n_F - n_C$	**0.018 040**
Refractive Index n_e	1.735 051	Abbe Number ν_e	40.25	Dispersion $n_{F'} - n_{C'}$	0.018 262

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.688 05
n_{1970}	1.970 09	1.694 88
n_{1530}	1.529 58	1.702 37
n_{1129}	1.128 64	1.709 39
n_t	1.013 98	1.711 85
n_s	0.852 11	1.716 32
$n_{A'}$	0.768 19	1.719 48
n_r	0.706 52	1.722 43
n_C	0.656 27	1.725 42
$n_{C'}$	0.643 85	1.726 26
$n_{He\text{-}Ne}$	0.632 8	1.727 05
n_D	0.589 29	1.730 61
n_d	0.587 56	1.730 77
n_e	0.546 07	1.735 05
n_F	0.486 13	1.743 46
$n_{F'}$	0.479 99	1.744 52
$n_{He\text{-}Cd}$	0.441 57	1.752 40
n_g	0.435 835	1.753 79
n_h	0.404 656	1.762 67
n_i	0.365 015	1.778 58

Constants of Dispersion Formula	
A_1	1.740 389 60E+00
A_2	1.769 969 17E-01
A_3	1.767 754 13E+00
B_1	1.033 988 70E-02
B_2	4.848 227 65E-02
B_3	1.366 719 96E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.1

Mechanical Properties		
Young's Modulus E (GPa)	113.3	
Rigidity Modulus G (GPa)	44.5	
Poisson's Ratio σ	0.273	
Knoop Hardness Hk[Class]	630	6
Abrasion Aa	121	

Partial Dispersions	
$n_C - n_t$	0.013 567
$n_C - n_{A'}$	0.005 939
$n_d - n_C$	0.005 354
$n_e - n_C$	0.009 635
$n_g - n_d$	0.023 019
$n_g - n_F$	0.010 333
$n_h - n_g$	0.008 885
$n_i - n_g$	0.024 789
$n_{C'} - n_t$	0.014 410
$n_e - n_{C'}$	0.008 792
$n_{F'} - n_e$	0.009 470
$n_i - n_{F'}$	0.034 057

Relative Partial Dispersions	
$\theta_{C,t}$	0.752 1
$\theta_{C,A'}$	0.329 2
$\theta_{d,C}$	0.296 8
$\theta_{e,C}$	0.534 1
$\theta_{g,d}$	1.276 0
$\theta_{g,F}$	0.572 8
$\theta_{h,g}$	0.492 5
$\theta_{i,g}$	1.374 1
$\theta'_{C',t}$	0.789 1
$\theta'_{e,C'}$	0.481 4
$\theta'_{F',e}$	0.518 6
$\theta'_{i,F'}$	1.864 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.015 4
$\Delta\theta_{C,A'}$	0.004 2
$\Delta\theta_{g,d}$	-0.004 6
$\Delta\theta_{g,F}$	-0.003 1
$\Delta\theta_{i,g}$	-0.011 7

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.88	1.91

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.04
350	0.26
360	0.53
370	0.71
380	0.81
390	0.87
400	0.910
420	0.947
440	0.963
460	0.974
480	0.983
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.997
1 600	0.995
1 800	0.987
2 000	0.971
2 200	0.925
2 400	0.76

Thermal Properties		
Strain Point StP (°C)		461
Annealing Point AP (°C)		489
Transformation Temperature Tg (°C)		500
Yield Point At (°C)		539
Softening Point SP (°C)		574
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	87
	(100 °C ~ 300 °C)	109
Thermal Conductivity λ (W/(m·K))		1.11

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	70
-70 ~ -60	72
-60 ~ -50	73
-50 ~ -40	75
-40 ~ -30	77
-30 ~ -20	79
-20 ~ -10	81
-10 ~ 0	82
0 ~ 10	84
10 ~ 20	86
20 ~ 30	87
30 ~ 40	89
40 ~ 50	90
50 ~ 60	92
60 ~ 70	93
70 ~ 80	95
80 ~ 90	96
90 ~ 100	97
100 ~ 110	99
110 ~ 120	100
120 ~ 130	101
130 ~ 140	103
140 ~ 150	104
150 ~ 160	105
160 ~ 170	106
170 ~ 180	107
180 ~ 190	108
190 ~ 200	109
200 ~ 210	110
210 ~ 220	111
220 ~ 230	112
230 ~ 240	113
240 ~ 250	114
250 ~ 260	115
260 ~ 270	116
270 ~ 280	116
280 ~ 290	117
290 ~ 300	118

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.03
Specific Gravity *d*	3.24
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature (°C)	$\Delta n_{rel}/\Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	1.5	1.7	2.1	2.3	2.4	2.6	2.8	3.3	3.4	4.1	4.8	6.2
-60 ~ -40	1.3	1.5	2.0	2.1	2.2	2.4	2.7	3.2	3.2	4.0	4.7	6.1
-40 ~ -20	1.2	1.4	1.8	2.0	2.0	2.4	2.6	3.2	3.3	3.9	4.7	6.3
-20 ~ 0	1.1	1.4	1.9	2.0	2.1	2.3	2.6	3.2	3.3	4.1	4.9	6.5
0 ~ 20	1.1	1.4	1.9	2.1	2.1	2.4	2.7	3.4	3.4	4.2	5.0	6.7
20 ~ 40	1.2	1.4	2.0	2.1	2.2	2.5	2.8	3.4	3.5	4.4	5.2	7.0
40 ~ 60	1.2	1.5	2.0	2.2	2.3	2.6	2.9	3.6	3.7	4.6	5.4	7.3
60 ~ 80	1.2	1.6	2.2	2.4	2.4	2.7	3.1	3.7	3.8	4.7	5.6	7.5
80 ~ 100	1.3	1.6	2.2	2.4	2.6	2.8	3.2	3.9	4.0	4.9	5.9	7.9
100 ~ 120	1.4	1.7	2.3	2.5	2.6	2.9	3.4	4.1	4.2	5.1	6.1	8.2
120 ~ 140	1.4	1.7	2.5	2.6	2.7	3.1	3.4	4.2	4.3	5.3	6.3	8.5
140 ~ 160	1.6	1.9	2.5	2.8	2.8	3.2	3.6	4.4	4.5	5.5	6.5	8.7
160 ~ 180	1.6	1.9	2.6	2.8	2.9	3.3	3.6	4.5	4.6	5.6	6.7	9.0

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.