L-LAL13

Code(d) **694532**
Code(e) **697529**

Refractive Index n_d	**1.693 50** 1.693 500	Abbe Number ν_d	**53.18**	Dispersion $n_F - n_C$	**0.013 040**
Refractive Index n_e	1.696 607	Abbe Number ν_e	52.93	Dispersion $n_{F'} - n_{C'}$	0.013 160

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.657 37
n_{1970}	1.970 09	1.663 92
n_{1530}	1.529 58	1.670 89
n_{1129}	1.128 64	1.677 02
n_t	1.013 98	1.679 06
n_s	0.852 11	1.682 63
$n_{A'}$	0.768 19	1.685 07
n_r	0.706 52	1.687 31
n_C	0.656 27	1.689 55
$n_{C'}$	0.643 85	1.690 18
$n_{He\text{-}Ne}$	0.632 8	1.690 76
n_D	0.589 29	1.693 38
n_d	0.587 56	1.693 50
n_e	0.546 07	1.696 61
n_F	0.486 13	1.702 59
$n_{F'}$	0.479 99	1.703 34
$n_{He\text{-}Cd}$	0.441 57	1.708 79
n_g	0.435 835	1.709 74
n_h	0.404 656	1.715 70
n_i	0.365 015	1.725 92

Constants of Dispersion Formula	
A_1	1.177 761 46E+00
A_2	6.345 913 45E-01
A_3	1.204 356 49E+00
B_1	5.576 182 43E-03
B_2	2.068 214 69E-02
B_3	9.963 227 76E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	107.8	
Rigidity Modulus G (GPa)	41.9	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	108	

Partial Dispersions	
$n_C - n_t$	0.010 490
$n_C - n_{A'}$	0.004 481
$n_d - n_C$	0.003 949
$n_e - n_C$	0.007 056
$n_g - n_d$	0.016 239
$n_g - n_F$	0.007 148
$n_h - n_g$	0.005 962
$n_i - n_g$	0.016 179
$n_{C'} - n_t$	0.011 117
$n_e - n_{C'}$	0.006 429
$n_{F'} - n_e$	0.006 731
$n_i - n_{F'}$	0.022 580

Relative Partial Dispersions	
$\theta_{C,t}$	0.804 4
$\theta_{C,A'}$	0.343 6
$\theta_{d,C}$	0.302 8
$\theta_{e,C}$	0.541 1
$\theta_{g,d}$	1.245 3
$\theta_{g,F}$	0.548 2
$\theta_{h,g}$	0.457 2
$\theta_{i,g}$	1.240 7
$\theta'_{C',t}$	0.844 8
$\theta'_{e,C'}$	0.488 5
$\theta'_{F',e}$	0.511 5
$\theta'_{i,F'}$	1.715 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 2
$\Delta\theta_{C,A'}$	0.003 3
$\Delta\theta_{g,d}$	-0.009 0
$\Delta\theta_{g,F}$	-0.007 2
$\Delta\theta_{i,g}$	-0.039 0

Coloring			
λ_{80}	360	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	288

CCI		
B	G	R
0.00	0.35	0.32

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.01
290	0.06
300	0.15
310	0.28
320	0.45
330	0.61
340	0.74
350	0.84
360	0.913
370	0.949
380	0.969
390	0.979
400	0.984
420	0.989
440	0.991
460	0.993
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.995
1 800	0.988
2 000	0.969
2 200	0.918
2 400	0.72

Thermal Properties		
Strain Point StP (°C)		503
Annealing Point AP (°C)		522
Transformation Temperature Tg (°C)		538
Yield Point At (°C)		583
Softening Point SP (°C)		615
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	75
	(100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(m·K))		0.887

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	58
-90 ~ -80	60
-80 ~ -70	62
-70 ~ -60	63
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	71
-10 ~ 0	72
0 ~ 10	73
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	80
60 ~ 70	81
70 ~ 80	82
80 ~ 90	83
90 ~ 100	84
100 ~ 110	85
110 ~ 120	86
120 ~ 130	87
130 ~ 140	88
140 ~ 150	89
150 ~ 160	90
160 ~ 170	91
170 ~ 180	92
180 ~ 190	93
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	96
230 ~ 240	96
240 ~ 250	97
250 ~ 260	98
260 ~ 270	98
270 ~ 280	99
280 ~ 290	99
290 ~ 300	100

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	1.9	2.1	2.5	2.5	2.6	2.7	2.9	3.2	3.3	3.7	4.1	4.9
-60 ~ -40	1.8	1.9	2.2	2.3	2.4	2.5	2.7	3.1	3.2	3.5	3.9	4.8
-40 ~ -20	1.6	1.9	2.2	2.3	2.3	2.5	2.7	3.0	3.0	3.5	4.0	4.7
-20 ~ 0	1.7	1.8	2.1	2.3	2.4	2.5	2.7	3.1	3.1	3.5	3.9	4.8
0 ~ 20	1.7	1.9	2.3	2.4	2.4	2.6	2.7	3.1	3.2	3.6	4.1	4.9
20 ~ 40	1.8	1.9	2.4	2.5	2.5	2.7	2.9	3.2	3.3	3.7	4.1	5.1
40 ~ 60	1.9	2.1	2.4	2.5	2.6	2.8	2.9	3.3	3.4	3.8	4.3	5.2
60 ~ 80	2.0	2.1	2.5	2.7	2.6	2.8	3.1	3.5	3.6	4.0	4.5	5.3
80 ~ 100	2.1	2.3	2.6	2.7	2.8	3.0	3.2	3.6	3.6	4.2	4.6	5.5
100 ~ 120	2.2	2.4	2.7	2.9	2.9	3.1	3.3	3.7	3.7	4.2	4.8	5.7
120 ~ 140	2.2	2.4	2.8	2.9	3.0	3.2	3.4	3.8	3.8	4.4	4.9	5.8
140 ~ 160	2.3	2.5	3.0	3.1	3.1	3.3	3.6	4.0	4.0	4.5	5.0	6.0
160 ~ 180	2.4	2.6	3.0	3.2	3.2	3.4	3.6	4.0	4.1	4.6	5.1	6.0

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.91
Specific Gravity d	3.69
Remarks	

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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.