S-LAL14

Code(d) **697555**
Code(e) **700553**

Refractive Index n_d	**1.696 80** 1.696 797	Abbe Number ν_d	**55.53**	Dispersion $n_F - n_C$	**0.012 548**
Refractive Index n_e	1.699 788	Abbe Number ν_e	55.31	Dispersion $n_{F'} - n_{C'}$	0.012 653

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.658 20
n_{1970}	1.970 09	1.665 78
n_{1530}	1.529 58	1.673 69
n_{1129}	1.128 64	1.680 39
n_t	1.013 98	1.682 52
n_s	0.852 11	1.686 15
$n_{A'}$	0.768 19	1.688 58
n_r	0.706 52	1.690 79
n_C	0.656 27	1.692 97
$n_{C'}$	0.643 85	1.693 58
$n_{He\text{-}Ne}$	0.632 8	1.694 15
n_D	0.589 29	1.696 69
n_d	0.587 56	1.696 80
n_e	0.546 07	1.699 79
n_F	0.486 13	1.705 52
$n_{F'}$	0.479 99	1.706 24
$n_{He\text{-}Cd}$	0.441 57	1.711 44
n_g	0.435 835	1.712 34
n_h	0.404 656	1.718 00
n_i	0.365 015	1.727 67

Constants of Dispersion Formula	
A_1	1.237 209 70E+00
A_2	5.897 226 23E-01
A_3	1.319 218 80E+00
B_1	1.535 513 20E-02
B_2	-3.078 962 50E-04
B_3	9.372 029 47E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	111.8	
Rigidity Modulus G (GPa)	43.5	
Poisson's Ratio σ	0.284	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	83	

Partial Dispersions	
$n_C - n_t$	0.010 452
$n_C - n_{A'}$	0.004 389
$n_d - n_C$	0.003 823
$n_e - n_C$	0.006 814
$n_g - n_d$	0.015 543
$n_g - n_F$	0.006 818
$n_h - n_g$	0.005 665
$n_i - n_g$	0.015 333
$n_{C'} - n_t$	0.011 061
$n_e - n_{C'}$	0.006 205
$n_{F'} - n_e$	0.006 448
$n_i - n_{F'}$	0.021 437

Relative Partial Dispersions	
$\theta_{C,t}$	0.833 0
$\theta_{C,A'}$	0.349 8
$\theta_{d,C}$	0.304 7
$\theta_{e,C}$	0.543 0
$\theta_{g,d}$	1.238 7
$\theta_{g,F}$	0.543 4
$\theta_{h,g}$	0.451 5
$\theta_{i,g}$	1.221 9
$\theta'_{C,t}$	0.874 2
$\theta'_{e,C'}$	0.490 4
$\theta'_{F,e}$	0.509 6
$\theta'_{i,F'}$	1.694 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.025 8
$\Delta\theta_{C,A'}$	0.006 6
$\Delta\theta_{g,d}$	-0.010 7
$\Delta\theta_{g,F}$	-0.008 2
$\Delta\theta_{i,g}$	-0.038 1

Coloring			
λ_{80}	365	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	349	$\lambda_{0.05}$	285

CCI		
B	G	R
0.00	0.32	0.29

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.07
300	0.15
310	0.27
320	0.41
330	0.56
340	0.70
350	0.81
360	0.88
370	0.931
380	0.959
390	0.974
400	0.982
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.991
1 600	0.992
1 800	0.982
2 000	0.954
2 200	0.86
2 400	0.59

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		643
Yield Point At (℃)		677
Softening Point SP (℃)		700
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	58
	(100 ℃ ~ 300 ℃)	70
Thermal Conductivity λ (W/(m·K))		0.908

Linear coefficient of thermal expansion	
Temperature range (℃)	α_l (10^{-7} K^{-1})
-100 ～ -90	44
-90 ～ -80	46
-80 ～ -70	47
-70 ～ -60	49
-60 ～ -50	50
-50 ～ -40	51
-40 ～ -30	52
-30 ～ -20	54
-20 ～ -10	55
-10 ～ 0	56
0 ～ 10	57
10 ～ 20	58
20 ～ 30	59
30 ～ 40	60
40 ～ 50	61
50 ～ 60	62
60 ～ 70	63
70 ～ 80	63
80 ～ 90	64
90 ～ 100	65
100 ～ 110	66
110 ～ 120	66
120 ～ 130	67
130 ～ 140	68
140 ～ 150	68
150 ～ 160	69
160 ～ 170	69
170 ～ 180	69
180 ～ 190	70
190 ～ 200	70
200 ～ 210	71
210 ～ 220	71
220 ～ 230	71
230 ～ 240	71
240 ～ 250	71
250 ～ 260	72
260 ～ 270	72
270 ～ 280	72
280 ～ 290	72
290 ～ 300	72

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.86
Specific Gravity *d*	3.70
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature (℃)	$\Delta n_{rel} / \Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	2.6	2.7	3.0	3.1	3.1	3.2	3.3	3.5	3.6	3.9	4.2	4.8
-60 ~ -40	2.5	2.7	2.9	3.0	3.0	3.1	3.2	3.5	3.6	3.8	4.1	4.7
-40 ~ -20	2.5	2.7	2.9	3.0	3.0	3.1	3.3	3.5	3.6	3.9	4.2	4.8
-20 ~ 0	2.5	2.7	3.0	3.1	3.1	3.3	3.4	3.7	3.7	4.0	4.3	5.0
0 ~ 20	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.8	3.8	4.2	4.5	5.2
20 ~ 40	2.7	2.9	3.3	3.3	3.4	3.5	3.7	4.0	4.0	4.3	4.7	5.3
40 ~ 60	2.9	3.1	3.4	3.5	3.5	3.6	3.8	4.1	4.1	4.5	4.9	5.7
60 ~ 80	3.0	3.1	3.6	3.7	3.6	3.9	4.0	4.3	4.4	4.8	5.2	5.9
80 ~ 100	3.1	3.3	3.6	3.7	3.7	3.9	4.1	4.4	4.5	5.0	5.4	6.1
100 ~ 120	3.2	3.4	3.7	3.9	3.9	4.1	4.2	4.6	4.6	5.1	5.6	6.3
120 ~ 140	3.3	3.5	3.8	4.0	4.0	4.2	4.4	4.7	4.8	5.3	5.7	6.5
140 ~ 160	3.3	3.5	4.0	4.1	4.2	4.3	4.5	4.9	5.0	5.4	5.9	6.7
160 ~ 180	3.4	3.6	4.0	4.2	4.2	4.4	4.6	5.0	5.0	5.5	6.0	6.8

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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.