L-BAL35

Code(d) **589612**
Code(e) **591609**

Refractive Index n_d	**1.589 13** 1.589 130	Abbe Number ν_d	**61.15**	Dispersion $n_F - n_C$	**0.009 634**
Refractive Index n_e	1.591 428	Abbe Number ν_e	60.93	Dispersion $n_{F'} - n_{C'}$	0.009 706

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.557 75
n_{1970}	1.970 09	1.564 07
n_{1530}	1.529 58	1.570 69
n_{1129}	1.128 64	1.576 22
n_t	1.013 98	1.577 95
n_s	0.852 11	1.580 85
$n_{A'}$	0.768 19	1.582 76
n_r	0.706 52	1.584 48
n_C	0.656 27	1.586 18
$n_{C'}$	0.643 85	1.586 65
$n_{He\text{-}Ne}$	0.632 8	1.587 09
n_D	0.589 29	1.589 04
n_d	0.587 56	1.589 13
n_e	0.546 07	1.591 43
n_F	0.486 13	1.595 81
$n_{F'}$	0.479 99	1.596 36
$n_{He\text{-}Cd}$	0.441 57	1.600 31
n_g	0.435 835	1.601 00
n_h	0.404 656	1.605 28
n_i	0.365 015	1.612 56

Constants of Dispersion Formula	
A_1	1.162 626 30E+00
A_2	3.256 610 51E-01
A_3	1.351 324 86E+00
B_1	1.259 574 37E-02
B_2	-3.269 110 50E-03
B_3	1.192 145 96E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.2

Mechanical Properties		
Young's Modulus E (GPa)	100.8	
Rigidity Modulus G (GPa)	40.3	
Poisson's Ratio σ	0.252	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	100	

Partial Dispersions	
$n_C - n_t$	0.008 230
$n_C - n_{A'}$	0.003 418
$n_d - n_C$	0.002 952
$n_e - n_C$	0.005 250
$n_g - n_d$	0.011 867
$n_g - n_F$	0.005 185
$n_h - n_g$	0.004 288
$n_i - n_g$	0.011 567
$n_{C'} - n_t$	0.008 702
$n_e - n_{C'}$	0.004 778
$n_{F'} - n_e$	0.004 928
$n_i - n_{F'}$	0.016 208

Relative Partial Dispersions	
$\theta_{C,t}$	0.854 3
$\theta_{C,A'}$	0.354 8
$\theta_{d,C}$	0.306 4
$\theta_{e,C}$	0.544 9
$\theta_{g,d}$	1.231 8
$\theta_{g,F}$	0.538 2
$\theta_{h,g}$	0.445 1
$\theta_{i,g}$	1.200 6
$\theta'_{C',t}$	0.896 6
$\theta'_{e,C'}$	0.492 3
$\theta'_{F',e}$	0.507 7
$\theta'_{i,F'}$	1.669 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.020 7
$\Delta\theta_{C,A'}$	0.004 8
$\Delta\theta_{g,d}$	-0.005 9
$\Delta\theta_{g,F}$	-0.004 3
$\Delta\theta_{i,g}$	-0.012 4

Coloring			
λ_{80}	345	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	300

CCI		
B	G	R
0.00	0.23	0.20

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.06
310	0.27
320	0.53
330	0.73
340	0.85
350	0.922
360	0.956
370	0.975
380	0.984
390	0.989
400	0.992
420	0.993
440	0.993
460	0.995
480	0.996
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.991
1 600	0.994
1 800	0.989
2 000	0.978
2 200	0.934
2 400	0.81

Thermal Properties		
Strain Point StP (°C)		489
Annealing Point AP (°C)		520
Transformation Temperature Tg (°C)		530
Yield Point At (°C)		573
Softening Point SP (°C)		619
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	66
	(100 °C ~ 300 °C)	85
Thermal Conductivity λ (W/(m·K))		1.13

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	49
-90 ~ -80	50
-80 ~ -70	52
-70 ~ -60	54
-60 ~ -50	55
-50 ~ -40	57
-40 ~ -30	58
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	66
20 ~ 30	67
30 ~ 40	68
40 ~ 50	69
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	75
100 ~ 110	77
110 ~ 120	78
120 ~ 130	79
130 ~ 140	80
140 ~ 150	81
150 ~ 160	82
160 ~ 170	82
170 ~ 180	83
180 ~ 190	84
190 ~ 200	85
200 ~ 210	86
210 ~ 220	87
220 ~ 230	87
230 ~ 240	88
240 ~ 250	89
250 ~ 260	89
260 ~ 270	90
270 ~ 280	90
280 ~ 290	91
290 ~ 300	92

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.29
Specific Gravity *d*	2.82
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	3.3	3.4	3.7	3.8	3.8	3.9	4.1	4.3	4.3	4.7	5.0	5.5
-60 ~ -40	3.2	3.3	3.5	3.7	3.7	3.9	4.0	4.2	4.3	4.5	4.8	5.4
-40 ~ -20	3.1	3.3	3.5	3.6	3.6	3.9	4.0	4.2	4.3	4.6	4.8	5.4
-20 ~ 0	3.2	3.4	3.6	3.7	3.7	3.8	4.1	4.3	4.4	4.6	4.9	5.5
0 ~ 20	3.2	3.5	3.7	3.8	3.8	4.0	4.1	4.4	4.4	4.7	5.0	5.6
20 ~ 40	3.4	3.6	3.8	3.9	3.9	4.1	4.2	4.5	4.5	4.8	5.1	5.7
40 ~ 60	3.5	3.6	3.9	4.0	4.0	4.1	4.3	4.5	4.6	4.9	5.3	5.8
60 ~ 80	3.6	3.7	4.0	4.1	4.1	4.3	4.4	4.7	4.7	5.0	5.3	5.9
80 ~ 100	3.6	3.7	4.1	4.2	4.2	4.3	4.5	4.8	4.8	5.1	5.4	6.0
100 ~ 120	3.6	3.9	4.2	4.3	4.3	4.4	4.6	4.8	4.9	5.2	5.5	6.1
120 ~ 140	3.7	3.9	4.2	4.3	4.3	4.4	4.6	4.9	4.9	5.2	5.5	6.1
140 ~ 160	3.7	3.9	4.2	4.3	4.3	4.4	4.6	4.9	4.9	5.2	5.5	6.2
160 ~ 180	3.7	3.8	4.1	4.3	4.3	4.5	4.5	4.9	5.0	5.3	5.6	6.2

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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.