S-BAL35

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

Refractive Index n_d	**1.589 13** 1.589 130	Abbe Number ν_d	**61.14**	Dispersion $n_F - n_C$	**0.009 636**
Refractive Index n_e	1.591 429	Abbe Number ν_e	60.88	Dispersion $n_{F'} - n_{C'}$	0.009 714

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.559 59
n_{1970}	1.970 09	1.565 31
n_{1530}	1.529 58	1.571 34
n_{1129}	1.128 64	1.576 48
n_t	1.013 98	1.578 13
n_s	0.852 11	1.580 93
$n_{A'}$	0.768 19	1.582 80
n_r	0.706 52	1.584 50
n_C	0.656 27	1.586 19
$n_{C'}$	0.643 85	1.586 66
n_{He-Ne}	0.632 8	1.587 10
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 82
$n_{F'}$	0.479 99	1.596 37
n_{He-Cd}	0.441 57	1.600 34
n_g	0.435 835	1.601 03
n_h	0.404 656	1.605 35
n_i	0.365 015	1.612 68

Constants of Dispersion Formula	
A_1	9.413 572 73E-01
A_2	5.461 748 95E-01
A_3	1.161 689 17E+00
B_1	1.403 339 96E-02
B_2	9.066 356 83E-04
B_3	1.141 637 58E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2～3
Acid Resistance(Surface) Group SR	4.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	83.2	
Rigidity Modulus G (GPa)	33.3	
Poisson's Ratio σ	0.250	
Knoop Hardness Hk[Class]	590	6
Abrasion Aa	116	

Partial Dispersions	
$n_C - n_t$	0.008 061
$n_C - n_{A'}$	0.003 384
$n_d - n_C$	0.002 942
$n_e - n_C$	0.005 241
$n_g - n_d$	0.011 904
$n_g - n_F$	0.005 210
$n_h - n_g$	0.004 314
$n_i - n_g$	0.011 647
$n_{C'} - n_t$	0.008 530
$n_e - n_{C'}$	0.004 772
$n_{F'} - n_e$	0.004 942
$n_i - n_{F'}$	0.016 310

Relative Partial Dispersions	
$\theta_{C,t}$	0.836 6
$\theta_{C,A'}$	0.351 2
$\theta_{d,C}$	0.305 3
$\theta_{e,C}$	0.543 9
$\theta_{g,d}$	1.235 4
$\theta_{g,F}$	0.540 7
$\theta_{h,g}$	0.447 7
$\theta_{i,g}$	1.208 7
$\theta'_{C',t}$	0.878 1
$\theta'_{e,C'}$	0.491 2
$\theta'_{F',e}$	0.508 8
$\theta'_{i,F'}$	1.679 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 0
$\Delta\theta_{C,A'}$	0.001 2
$\Delta\theta_{g,d}$	-0.002 4
$\Delta\theta_{g,F}$	-0.001 8
$\Delta\theta_{i,g}$	-0.004 4

Coloring			
λ_{80}	345	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	339	$\lambda_{0.05}$	303

CCI		
B	G	R
0.00	0.17	0.15

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.01
310	0.16
320	0.43
330	0.67
340	0.82
350	0.904
360	0.949
370	0.972
380	0.983
390	0.989
400	0.993
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.999
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.984
1 600	0.994
1 800	0.987
2 000	0.972
2 200	0.89
2 400	0.80

Thermal Properties		
Strain Point StP (°C)		619
Annealing Point AP (°C)		646
Transformation Temperature Tg (°C)		668
Yield Point At (°C)		715
Softening Point SP (°C)		768
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	57
	(100 °C ~ 300 °C)	69
Thermal Conductivity λ (W/(m·K))		0.915

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ～ -90	47
-90 ～ -80	48
-80 ～ -70	49
-70 ～ -60	50
-60 ～ -50	51
-50 ～ -40	52
-40 ～ -30	53
-30 ～ -20	54
-20 ～ -10	55
-10 ～ 0	55
0 ～ 10	56
10 ～ 20	57
20 ～ 30	58
30 ～ 40	59
40 ～ 50	60
50 ～ 60	60
60 ～ 70	61
70 ～ 80	62
80 ～ 90	63
90 ～ 100	63
100 ～ 110	64
110 ～ 120	65
120 ～ 130	65
130 ～ 140	66
140 ～ 150	67
150 ～ 160	67
160 ～ 170	68
170 ～ 180	68
180 ～ 190	69
190 ～ 200	69
200 ～ 210	70
210 ～ 220	70
220 ～ 230	71
230 ～ 240	71
240 ～ 250	71
250 ～ 260	72
260 ～ 270	72
270 ～ 280	72
280 ～ 290	73
290 ～ 300	73

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.15
Specific Gravity d	3.31
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	2.2	2.3	2.6	2.6	2.7	2.8	2.8	3.0	3.1	3.4	3.6	4.0
-60 ~ -40	2.2	2.3	2.5	2.6	2.6	2.7	2.8	3.0	3.1	3.3	3.5	4.1
-40 ~ -20	2.2	2.3	2.5	2.6	2.6	2.8	2.9	3.1	3.1	3.4	3.6	4.1
-20 ~ 0	2.3	2.4	2.6	2.7	2.7	2.8	3.0	3.2	3.3	3.5	3.7	4.2
0 ~ 20	2.4	2.6	2.8	2.9	2.9	3.0	3.1	3.3	3.4	3.6	3.9	4.5
20 ~ 40	2.6	2.8	3.0	3.0	3.1	3.2	3.3	3.5	3.5	3.8	4.1	4.7
40 ~ 60	2.8	2.9	3.1	3.2	3.2	3.3	3.4	3.6	3.7	3.9	4.3	4.8
60 ~ 80	2.8	3.1	3.3	3.4	3.4	3.5	3.6	3.8	3.9	4.2	4.4	5.0
80 ~ 100	3.0	3.1	3.4	3.5	3.5	3.7	3.8	4.0	4.1	4.3	4.6	5.2
100 ~ 120	3.2	3.3	3.6	3.7	3.7	3.8	3.9	4.2	4.2	4.5	4.8	5.4
120 ~ 140	3.3	3.4	3.7	3.8	3.8	3.9	4.0	4.3	4.3	4.6	4.9	5.5
140 ~ 160	3.4	3.5	3.7	3.8	3.8	4.0	4.1	4.4	4.4	4.7	5.0	5.7
160 ~ 180	3.4	3.5	3.8	4.0	4.0	4.1	4.3	4.5	4.6	4.9	5.2	5.8

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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.