S-BAL12

Code(d) **540595**
Code(e) **542592**

Refractive Index n_d	**1.539 96** 1.539 956	Abbe Number ν_d	**59.46**	Dispersion $n_F - n_C$	**0.009 081**
Refractive Index n_e	1.542 121	Abbe Number ν_e	59.20	Dispersion $n_{F'} - n_{C'}$	0.009 158

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.513 58
n_{1970}	1.970 09	1.518 48
n_{1530}	1.529 58	1.523 70
n_{1129}	1.128 64	1.528 25
n_t	1.013 98	1.529 74
n_s	0.852 11	1.532 30
$n_{A'}$	0.768 19	1.534 04
n_r	0.706 52	1.535 62
n_C	0.656 27	1.537 19
$n_{C'}$	0.643 85	1.537 63
$n_{He\text{-}Ne}$	0.632 8	1.538 04
n_D	0.589 29	1.539 88
n_d	0.587 56	1.539 96
n_e	0.546 07	1.542 12
n_F	0.486 13	1.546 27
$n_{F'}$	0.479 99	1.546 79
$n_{He\text{-}Cd}$	0.441 57	1.550 56
n_g	0.435 835	1.551 22
n_h	0.404 656	1.555 32
n_i	0.365 015	1.562 32

Constants of Dispersion Formula	
A_1	7.146 052 58E-01
A_2	6.219 932 89E-01
A_3	1.225 376 81E+00
B_1	3.017 639 13E-03
B_2	1.665 054 50E-02
B_3	1.435 063 14E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	71.0	
Rigidity Modulus G (GPa)	30.6	
Poisson's Ratio σ	0.161	
Knoop Hardness Hk[Class]	530	5
Abrasion Aa	112	

Partial Dispersions	
$n_C - n_t$	0.007 456
$n_C - n_{A'}$	0.003 156
$n_d - n_C$	0.002 762
$n_e - n_C$	0.004 927
$n_g - n_d$	0.011 260
$n_g - n_F$	0.004 941
$n_h - n_g$	0.004 105
$n_i - n_g$	0.011 107
$n_{C'} - n_t$	0.007 896
$n_e - n_{C'}$	0.004 487
$n_{F'} - n_e$	0.004 671
$n_i - n_{F'}$	0.015 531

Relative Partial Dispersions	
$\theta_{C,t}$	0.821 1
$\theta_{C,A'}$	0.347 5
$\theta_{d,C}$	0.304 2
$\theta_{e,C}$	0.542 6
$\theta_{g,d}$	1.240 0
$\theta_{g,F}$	0.544 1
$\theta_{h,g}$	0.452 0
$\theta_{i,g}$	1.223 1
$\theta'_{C,t}$	0.862 2
$\theta'_{e,C'}$	0.490 0
$\theta'_{F,e}$	0.510 0
$\theta'_{i,F'}$	1.695 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.004 6
$\Delta\theta_{C,A'}$	-0.000 5
$\Delta\theta_{g,d}$	-0.001 2
$\Delta\theta_{g,F}$	-0.001 2
$\Delta\theta_{i,g}$	-0.004 0

Coloring			
λ_{80}	330	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	330	$\lambda_{0.05}$	301

CCI		
B	G	R
0.00	0.09	0.06

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.02
310	0.23
320	0.57
330	0.80
340	0.914
350	0.959
360	0.979
370	0.989
380	0.992
390	0.995
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.993
1 600	0.995
1 800	0.983
2 000	0.966
2 200	0.920
2 400	0.89

Thermal Properties		
Strain Point StP (°C)		432
Annealing Point AP (°C)		468
Transformation Temperature Tg (°C)		483
Yield Point At (°C)		543
Softening Point SP (°C)		624
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	84
	(100 °C ~ 300 °C)	105
Thermal Conductivity λ (W/(m·K))		0.982

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	68
-90 ~ -80	70
-80 ~ -70	71
-70 ~ -60	73
-60 ~ -50	74
-50 ~ -40	75
-40 ~ -30	77
-30 ~ -20	78
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	82
10 ~ 20	84
20 ~ 30	85
30 ~ 40	86
40 ~ 50	87
50 ~ 60	89
60 ~ 70	90
70 ~ 80	91
80 ~ 90	92
90 ~ 100	94
100 ~ 110	95
110 ~ 120	96
120 ~ 130	97
130 ~ 140	98
140 ~ 150	99
150 ~ 160	101
160 ~ 170	102
170 ~ 180	103
180 ~ 190	104
190 ~ 200	105
200 ~ 210	106
210 ~ 220	107
220 ~ 230	108
230 ~ 240	109
240 ~ 250	110
250 ~ 260	111
260 ~ 270	112
270 ~ 280	113
280 ~ 290	114
290 ~ 300	115

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	0.7	0.8	1.1	1.2	1.2	1.3	1.4	1.6	1.6	2.0	2.2	2.7
-60 ~ -40	0.6	0.7	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.8	2.2	2.7
-40 ~ -20	0.6	0.8	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.8	2.2	2.8
-20 ~ 0	0.6	0.8	1.0	1.1	1.1	1.2	1.4	1.6	1.6	1.9	2.2	2.9
0 ~ 20	0.7	0.8	1.0	1.1	1.1	1.3	1.4	1.7	1.8	2.1	2.4	3.0
20 ~ 40	0.7	0.9	1.1	1.2	1.2	1.3	1.6	1.8	1.9	2.2	2.5	3.1
40 ~ 60	0.9	1.0	1.2	1.3	1.4	1.5	1.6	1.9	1.9	2.3	2.6	3.2
60 ~ 80	0.9	1.0	1.3	1.3	1.4	1.5	1.8	2.0	2.1	2.4	2.8	3.4
80 ~ 100	0.9	1.1	1.3	1.4	1.4	1.6	1.7	2.0	2.2	2.5	2.9	3.6
100 ~ 120	0.9	1.1	1.4	1.5	1.5	1.7	1.8	2.2	2.3	2.6	3.0	3.7
120 ~ 140	0.9	1.1	1.5	1.6	1.6	1.8	1.9	2.2	2.3	2.7	3.0	3.8
140 ~ 160	1.0	1.2	1.5	1.6	1.6	1.7	1.9	2.2	2.3	2.7	3.1	3.8
160 ~ 180	0.9	1.1	1.4	1.5	1.5	1.7	1.9	2.2	2.3	2.7	3.1	3.8

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.60
Specific Gravity d	2.75
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.