S-BAL 3

Code(d) **571530**
Code(e) **574527**

Refractive Index n_d	**1.571 35** 1.571 351	Abbe Number ν_d	**52.95**	Dispersion $n_F - n_C$	**0.010 790**
Refractive Index n_e	1.573 920	Abbe Number ν_e	52.65	Dispersion $n_{F'} - n_{C'}$	0.010 900

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.543 61
n_{1970}	1.970 09	1.548 31
n_{1530}	1.529 58	1.553 41
n_{1129}	1.128 64	1.558 06
n_t	1.013 98	1.559 65
n_s	0.852 11	1.562 48
$n_{A'}$	0.768 19	1.564 45
n_r	0.706 52	1.566 27
n_C	0.656 27	1.568 10
$n_{C'}$	0.643 85	1.568 62
$n_{He\text{-}Ne}$	0.632 8	1.569 10
n_D	0.589 29	1.571 26
n_d	0.587 56	1.571 35
n_e	0.546 07	1.573 92
n_F	0.486 13	1.578 89
$n_{F'}$	0.479 99	1.579 52
$n_{He\text{-}Cd}$	0.441 57	1.584 09
n_g	0.435 835	1.584 89
n_h	0.404 656	1.589 93
n_i	0.365 015	1.598 67

Constants of Dispersion Formula	
A_1	1.293 668 90E+00
A_2	1.324 402 52E-01
A_3	1.101 972 93E+00
B_1	8.003 679 62E-03
B_2	3.547 111 96E-02
B_3	1.345 174 31E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	1.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	71.9	
Rigidity Modulus G (GPa)	28.8	
Poisson's Ratio σ	0.249	
Knoop Hardness Hk[Class]	510	5
Abrasion Aa	172	

Partial Dispersions	
$n_C - n_t$	0.008 456
$n_C - n_{A'}$	0.003 653
$n_d - n_C$	0.003 246
$n_e - n_C$	0.005 815
$n_g - n_d$	0.013 536
$n_g - n_F$	0.005 992
$n_h - n_g$	0.005 041
$n_i - n_g$	0.013 784
$n_{C'} - n_t$	0.008 970
$n_e - n_{C'}$	0.005 301
$n_{F'} - n_e$	0.005 599
$n_i - n_{F'}$	0.019 152

Relative Partial Dispersions	
$\theta_{C,t}$	0.783 7
$\theta_{C,A'}$	0.338 6
$\theta_{d,C}$	0.300 8
$\theta_{e,C}$	0.538 9
$\theta_{g,d}$	1.254 5
$\theta_{g,F}$	0.555 3
$\theta_{h,g}$	0.467 2
$\theta_{i,g}$	1.277 5
$\theta'_{C',t}$	0.822 9
$\theta'_{e,C'}$	0.486 3
$\theta'_{F',e}$	0.513 7
$\theta'_{i,F'}$	1.757 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.011 4
$\Delta\theta_{C,A'}$	-0.001 5
$\Delta\theta_{g,d}$	-0.000 3
$\Delta\theta_{g,F}$	-0.000 5
$\Delta\theta_{i,g}$	-0.004 1

Coloring			
λ_{80}	360	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	332

CCI		
B	G	R
0.00	0.24	0.25

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.01
340	0.26
350	0.63
360	0.84
370	0.928
380	0.963
390	0.979
400	0.988
420	0.994
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.996
1 400	0.991
1 600	0.990
1 800	0.972
2 000	0.945
2 200	0.88
2 400	0.83

Thermal Properties		
Strain Point StP (°C)		483
Annealing Point AP (°C)		516
Transformation Temperature Tg (°C)		532
Yield Point At (°C)		587
Softening Point SP (°C)		652
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	97
	(100 °C ~ 300 °C)	116
Thermal Conductivity λ (W/(m·K))		0.864

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	82
-90 ~ -80	84
-80 ~ -70	85
-70 ~ -60	86
-60 ~ -50	87
-50 ~ -40	89
-40 ~ -30	90
-30 ~ -20	91
-20 ~ -10	92
-10 ~ 0	94
0 ~ 10	95
10 ~ 20	96
20 ~ 30	97
30 ~ 40	98
40 ~ 50	100
50 ~ 60	101
60 ~ 70	102
70 ~ 80	103
80 ~ 90	104
90 ~ 100	105
100 ~ 110	106
110 ~ 120	107
120 ~ 130	109
130 ~ 140	110
140 ~ 150	111
150 ~ 160	112
160 ~ 170	113
170 ~ 180	114
180 ~ 190	115
190 ~ 200	116
200 ~ 210	117
210 ~ 220	118
220 ~ 230	119
230 ~ 240	120
240 ~ 250	121
250 ~ 260	122
260 ~ 270	123
270 ~ 280	124
280 ~ 290	125
290 ~ 300	126

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.18
Specific Gravity *d*	2.98
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	-1.5	-1.4	-1.2	-1.2	-1.0	-0.9	-0.8	-0.5	-0.5	-0.2	0.3	1.0
-60 ~ -40	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-0.9	-0.6	-0.5	-0.2	0.2	0.9
-40 ~ -20	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-0.9	-0.6	-0.5	-0.2	0.2	1.0
-20 ~ 0	-1.6	-1.5	-1.3	-1.2	-1.2	-1.0	-0.9	-0.5	-0.5	-0.1	0.3	1.1
0 ~ 20	-1.5	-1.4	-1.1	-1.0	-1.0	-0.9	-0.7	-0.4	-0.4	0.0	0.4	1.2
20 ~ 40	-1.5	-1.4	-1.0	-1.0	-0.9	-0.8	-0.7	-0.4	-0.3	0.1	0.5	1.3
40 ~ 60	-1.3	-1.2	-1.0	-0.9	-0.9	-0.7	-0.6	-0.3	-0.3	0.1	0.6	1.5
60 ~ 80	-1.4	-1.2	-0.9	-0.8	-0.8	-0.6	-0.5	-0.2	-0.1	0.3	0.7	1.6
80 ~ 100	-1.3	-1.2	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.4	0.8	1.7
100 ~ 120	-1.3	-1.2	-0.9	-0.7	-0.7	-0.5	-0.4	0.0	0.0	0.4	0.9	1.8
120 ~ 140	-1.2	-1.1	-0.8	-0.7	-0.7	-0.5	-0.4	0.0	0.0	0.4	0.9	1.8
140 ~ 160	-1.3	-1.1	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.4	0.9	1.8
160 ~ 180	-1.4	-1.2	-0.9	-0.8	-0.8	-0.7	-0.5	-0.1	0.0	0.4	0.9	1.9

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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.