S-LAH99

Code(d) **001291**
Code(e) **009289**

Refractive Index n_d	**2.001 00** 2.001 000	Abbe Number ν_d	**29.14**	Dispersion $n_F - n_C$	**0.034 352**
Refractive Index n_e	2.009 118	Abbe Number ν_e	28.92	Dispersion $n_{F'} - n_{C'}$	0.034 895

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.938 63
n_{1970}	1.970 09	1.945 85
n_{1530}	1.529 58	1.954 40
n_{1129}	1.128 64	1.963 80
n_t	1.013 98	1.967 56
n_s	0.852 11	1.974 88
$n_{A'}$	0.768 19	1.980 35
n_r	0.706 52	1.985 61
n_C	0.656 27	1.991 05
$n_{C'}$	0.643 85	1.992 60
$n_{He\text{-}Ne}$	0.632 8	1.994 06
n_D	0.589 29	2.000 70
n_d	0.587 56	2.001 00
n_e	0.546 07	2.009 12
n_F	0.486 13	2.025 40
$n_{F'}$	0.479 99	2.027 49
$n_{He\text{-}Cd}$	0.441 57	2.043 19
n_g	0.435 835	2.046 00
n_h	0.404 656	2.064 24
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.391 406 62E+00
A_2	4.392 192 28E-01
A_3	2.383 584 67E+00
B_1	1.314 675 00E-02
B_2	5.532 260 42E-02
B_3	1.612 599 00E+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	2.0
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	131.3	
Rigidity Modulus G (GPa)	50.2	
Poisson's Ratio σ	0.307	
Knoop Hardness Hk[Class]	720	7
Abrasion Aa	55	

Partial Dispersions	
$n_C - n_t$	0.023 490
$n_C - n_{A'}$	0.010 695
$n_d - n_C$	0.009 952
$n_e - n_C$	0.018 070
$n_g - n_d$	0.045 001
$n_g - n_F$	0.020 601
$n_h - n_g$	0.018 235
$n_i - n_g$	
$n_{C'} - n_t$	0.025 041
$n_e - n_{C'}$	0.016 519
$n_{F'} - n_e$	0.018 376
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.683 8
$\theta_{C,A'}$	0.311 3
$\theta_{d,C}$	0.289 7
$\theta_{e,C}$	0.526 0
$\theta_{g,d}$	1.310 0
$\theta_{g,F}$	0.599 7
$\theta_{h,g}$	0.530 8
$\theta_{i,g}$	
$\theta'_{C',t}$	0.717 6
$\theta'_{e,C'}$	0.473 4
$\theta'_{F',e}$	0.526 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 4
$\Delta\theta_{C,A'}$	0.000 1
$\Delta\theta_{g,d}$	0.005 8
$\Delta\theta_{g,F}$	0.005 4
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	360
λ_{70}	425		

Internal transmission			
$\lambda_{0.80}$	407	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	5.00	5.23

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.25
380	0.49
390	0.66
400	0.76
420	0.87
440	0.924
460	0.951
480	0.968
500	0.980
550	0.995
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.995
2 000	0.983
2 200	0.964
2 400	0.88

Thermal Properties		
Strain Point StP (℃)		682
Annealing Point AP (℃)		718
Transformation Temperature Tg (℃)		727
Yield Point At (℃)		763
Softening Point SP (℃)		792
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	76
	(100 ℃ ~ 300 ℃)	90
Thermal Conductivity λ (W/(m·K))		0.944

Linear coefficient of thermal expansion	
Temperature range (℃)	α_l (10^{-7} K^{-1})
-100 ~ -90	62
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	70
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	84
120 ~ 130	85
130 ~ 140	86
140 ~ 150	87
150 ~ 160	87
160 ~ 170	88
170 ~ 180	89
180 ~ 190	89
190 ~ 200	90
200 ~ 210	91
210 ~ 220	91
220 ~ 230	92
230 ~ 240	92
240 ~ 250	93
250 ~ 260	93
260 ~ 270	94
270 ~ 280	94
280 ~ 290	94
290 ~ 300	95

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	0.76
Specific Gravity *d*	5.02
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	0.7	1.0	1.7	2.0	2.1	2.5	2.9	4.0	4.2	5.5	7.2	-
-60 ~ -40	0.6	0.9	1.7	2.0	2.0	2.5	2.9	4.1	4.2	5.7	7.5	-
-40 ~ -20	0.6	1.0	1.8	2.1	2.2	2.6	3.1	4.3	4.5	6.0	7.8	-
-20 ~ 0	0.7	1.2	2.0	2.3	2.4	2.8	3.3	4.6	4.8	6.3	8.2	-
0 ~ 20	0.9	1.3	2.2	2.5	2.6	3.1	3.6	4.8	5.0	6.7	8.7	-
20 ~ 40	1.1	1.5	2.4	2.7	2.8	3.3	4.0	5.2	5.4	7.1	9.1	-
40 ~ 60	1.3	1.7	2.6	2.9	3.0	3.6	4.2	5.6	5.8	7.5	9.6	-
60 ~ 80	1.4	1.8	2.8	3.2	3.2	3.9	4.5	5.9	6.1	7.9	10.1	-
80 ~ 100	1.6	2.1	3.1	3.4	3.5	4.1	4.7	6.1	6.3	8.4	10.6	-
100 ~ 120	1.7	2.2	3.3	3.6	3.7	4.4	5.0	6.4	6.7	8.6	11.0	-
120 ~ 140	1.8	2.4	3.4	3.8	3.9	4.6	5.2	6.7	6.9	9.0	11.4	-
140 ~ 160	1.9	2.4	3.5	3.9	4.1	4.7	5.4	7.0	7.2	9.3	11.8	-
160 ~ 180	2.0	2.5	3.6	4.0	4.1	4.8	5.5	7.1	7.4	9.6	12.2	-

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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.