S-LAH93

Code(d) **905350**
Code(e) **911348**

Refractive Index n_d	**1.905 25** 1.905 250	Abbe Number ν_d	**35.04**	Dispersion $n_F - n_C$	**0.025 838**
Refractive Index n_e	1.911 372	Abbe Number ν_e	34.79	Dispersion $n_{F'} - n_{C'}$	0.026 200

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.854 01
n_{1970}	1.970 09	1.860 68
n_{1530}	1.529 58	1.868 34
n_{1129}	1.128 64	1.876 30
n_t	1.013 98	1.879 35
n_s	0.852 11	1.885 17
$n_{A'}$	0.768 19	1.889 44
n_r	0.706 52	1.893 50
n_C	0.656 27	1.897 68
$n_{C'}$	0.643 85	1.898 86
$n_{He\text{-}Ne}$	0.632 8	1.899 98
n_D	0.589 29	1.905 02
n_d	0.587 56	1.905 25
n_e	0.546 07	1.911 37
n_F	0.486 13	1.923 51
$n_{F'}$	0.479 99	1.925 06
$n_{He\text{-}Cd}$	0.441 57	1.936 58
n_g	0.435 835	1.938 62
n_h	0.404 656	1.951 76
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.178 843 78E+00
A_2	3.255 086 83E-01
A_3	1.706 086 46E+00
B_1	1.157 608 79E-02
B_2	4.959 825 03E-02
B_3	1.289 135 80E+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	4.0
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	124.7	
Rigidity Modulus G (GPa)	47.8	
Poisson's Ratio σ	0.304	
Knoop Hardness Hk[Class]	690	7
Abrasion Aa	60	

Partial Dispersions	
$n_C - n_t$	0.018 330
$n_C - n_{A'}$	0.008 240
$n_d - n_C$	0.007 573
$n_e - n_C$	0.013 695
$n_g - n_d$	0.033 374
$n_g - n_F$	0.015 109
$n_h - n_g$	0.013 137
$n_i - n_g$	
$n_{C'} - n_t$	0.019 516
$n_e - n_{C'}$	0.012 509
$n_{F'} - n_e$	0.013 691
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.709 4
$\theta_{C,A'}$	0.318 9
$\theta_{d,C}$	0.293 1
$\theta_{e,C}$	0.530 0
$\theta_{g,d}$	1.291 7
$\theta_{g,F}$	0.584 8
$\theta_{h,g}$	0.508 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.744 9
$\theta'_{e,C'}$	0.477 4
$\theta'_{F',e}$	0.522 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.001 7
$\Delta\theta_{C,A'}$	0.000 6
$\Delta\theta_{g,d}$	-0.000 2
$\Delta\theta_{g,F}$	0.000 0
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	355
λ_{70}	410		

Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	353

CCI		
B	G	R
0.00	3.75	3.96

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.22
370	0.48
380	0.65
390	0.75
400	0.82
420	0.901
440	0.938
460	0.959
480	0.974
500	0.984
550	0.996
600	0.998
650	0.999
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	0.993
2 000	0.979
2 200	0.952
2 400	0.84

Thermal Properties		
Strain Point StP (°C)		645
Annealing Point AP (°C)		672
Transformation Temperature Tg (°C)		688
Yield Point At (°C)		733
Softening Point SP (°C)		761
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	74
	(100 °C ~ 300 °C)	89
Thermal Conductivity λ (W/(m·K))		0.892

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	60
-90 ~ -80	61
-80 ~ -70	63
-70 ~ -60	64
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	72
10 ~ 20	73
20 ~ 30	74
30 ~ 40	76
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	85
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	88
180 ~ 190	88
190 ~ 200	89
200 ~ 210	89
210 ~ 220	90
220 ~ 230	91
230 ~ 240	91
240 ~ 250	92
250 ~ 260	92
260 ~ 270	93
270 ~ 280	93
280 ~ 290	93
290 ~ 300	94

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.10
Specific Gravity *d*	4.83
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	2.3	2.5	3.2	3.4	3.5	3.8	4.1	5.0	5.1	6.1	7.4	-
-60 ~ -40	2.3	2.6	3.2	3.5	3.5	3.9	4.3	5.1	5.2	6.3	7.5	-
-40 ~ -20	2.4	2.7	3.4	3.6	3.7	4.0	4.4	5.3	5.4	6.6	7.8	-
-20 ~ 0	2.5	2.8	3.6	3.8	3.8	4.2	4.6	5.5	5.6	6.8	8.1	-
0 ~ 20	2.7	3.1	3.8	4.0	4.1	4.5	4.9	5.8	5.9	7.2	8.5	-
20 ~ 40	2.9	3.2	3.9	4.3	4.3	4.8	5.2	6.1	6.2	7.5	8.8	-
40 ~ 60	3.0	3.4	4.1	4.5	4.6	5.0	5.4	6.4	6.5	7.8	9.2	-
60 ~ 80	3.2	3.6	4.4	4.6	4.7	5.2	5.6	6.6	6.7	8.0	9.6	-
80 ~ 100	3.3	3.7	4.5	4.7	4.9	5.4	5.8	6.9	7.0	8.4	9.9	-
100 ~ 120	3.4	3.8	4.6	4.9	5.0	5.4	6.0	7.1	7.2	8.6	10.2	-
120 ~ 140	3.4	3.9	4.7	5.0	5.1	5.5	6.0	7.2	7.4	8.8	10.4	-
140 ~ 160	3.5	3.9	4.7	5.0	5.1	5.6	6.2	7.3	7.5	8.9	10.6	-
160 ~ 180	3.5	3.9	4.8	5.1	5.2	5.7	6.2	7.4	7.5	9.0	10.7	-

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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.