L-LAH90

Code(d) **832401**
Code(e) **837398**

Refractive Index n_d	**1.832 20** 1.832 200	Abbe Number ν_d	**40.10**	Dispersion $n_F - n_C$	**0.020 755**
Refractive Index n_e	1.837 128	Abbe Number ν_e	39.84	Dispersion $n_{F'} - n_{C'}$	0.021 011

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.786 02
n_{1970}	1.970 09	1.792 93
n_{1530}	1.529 58	1.800 58
n_{1129}	1.128 64	1.808 00
n_t	1.013 98	1.810 69
n_s	0.852 11	1.815 68
$n_{A'}$	0.768 19	1.819 26
n_r	0.706 52	1.822 62
n_C	0.656 27	1.826 05
$n_{C'}$	0.643 85	1.827 01
$n_{He\text{-}Ne}$	0.632 8	1.827 92
n_D	0.589 29	1.832 02
n_d	0.587 56	1.832 20
n_e	0.546 07	1.837 13
n_F	0.486 13	1.846 80
$n_{F'}$	0.479 99	1.848 03
$n_{He\text{-}Cd}$	0.441 57	1.857 07
n_g	0.435 835	1.858 66
n_h	0.404 656	1.868 81
n_i	0.365 015	1.886 83

Constants of Dispersion Formula	
A_1	1.975 953 01E+00
A_2	2.839 249 85E-01
A_3	1.351 763 68E+00
B_1	1.042 763 95E-02
B_2	4.277 082 22E-02
B_3	1.014 537 10E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	1.2

Mechanical Properties		
Young's Modulus E (GPa)	114.8	
Rigidity Modulus G (GPa)	44.0	
Poisson's Ratio σ	0.304	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	80	

Partial Dispersions	
$n_C - n_t$	0.015 354
$n_C - n_{A'}$	0.006 789
$n_d - n_C$	0.006 153
$n_e - n_C$	0.011 081
$n_g - n_d$	0.026 462
$n_g - n_F$	0.011 860
$n_h - n_g$	0.010 152
$n_i - n_g$	0.028 165
$n_{C'} - n_t$	0.016 322
$n_e - n_{C'}$	0.010 113
$n_{F'} - n_e$	0.010 898
$n_i - n_{F'}$	0.038 801

Relative Partial Dispersions	
$\theta_{C,t}$	0.739 8
$\theta_{C,A'}$	0.327 1
$\theta_{d,C}$	0.296 5
$\theta_{e,C}$	0.533 9
$\theta_{g,d}$	1.275 0
$\theta_{g,F}$	0.571 4
$\theta_{h,g}$	0.489 1
$\theta_{i,g}$	1.357 0
$\theta'_{C',t}$	0.776 8
$\theta'_{e,C'}$	0.481 3
$\theta'_{F',e}$	0.518 7
$\theta'_{i,F'}$	1.846 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.005 0
$\Delta\theta_{C,A'}$	0.002 6
$\Delta\theta_{g,d}$	-0.006 4
$\Delta\theta_{g,F}$	-0.005 2
$\Delta\theta_{i,g}$	-0.032 2

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	376	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.32	1.36

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.05
350	0.26
360	0.55
370	0.73
380	0.84
390	0.903
400	0.936
420	0.966
440	0.978
460	0.985
480	0.990
500	0.994
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.996
1 600	0.994
1 800	0.988
2 000	0.969
2 200	0.925
2 400	0.75

Thermal Properties		
Strain Point StP (°C)		578
Annealing Point AP (°C)		597
Transformation Temperature Tg (°C)		615
Yield Point At (°C)		654
Softening Point SP (°C)		677
Expansion Coefficients	(-30 ℃ ~ 70 ℃)	62
α_l (10^{-7} K^{-1})	(100 °C ~ 300 °C)	76
Thermal Conductivity λ (W/(m·K))		0.839

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	49
-90 ~ -80	50
-80 ~ -70	52
-70 ~ -60	53
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	58
-10 ~ 0	59
0 ~ 10	60
10 ~ 20	61
20 ~ 30	62
30 ~ 40	63
40 ~ 50	64
50 ~ 60	65
60 ~ 70	66
70 ~ 80	67
80 ~ 90	68
90 ~ 100	69
100 ~ 110	69
110 ~ 120	70
120 ~ 130	71
130 ~ 140	72
140 ~ 150	73
150 ~ 160	73
160 ~ 170	74
170 ~ 180	75
180 ~ 190	75
190 ~ 200	76
200 ~ 210	76
210 ~ 220	77
220 ~ 230	78
230 ~ 240	78
240 ~ 250	79
250 ~ 260	79
260 ~ 270	80
270 ~ 280	80
280 ~ 290	81
290 ~ 300	81

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.93
Specific Gravity *d*	4.65
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	4.0	4.2	4.7	4.9	4.9	5.3	5.6	6.2	6.3	7.1	7.9	9.6
-60 ~ -40	3.9	4.2	4.7	4.9	4.9	5.3	5.6	6.2	6.3	7.1	8.0	9.7
-40 ~ -20	4.0	4.2	4.9	5.1	5.1	5.4	5.7	6.4	6.4	7.3	8.2	9.9
-20 ~ 0	4.1	4.4	5.0	5.2	5.2	5.5	5.9	6.6	6.7	7.5	8.4	10.3
0 ~ 20	4.2	4.5	5.1	5.3	5.4	5.7	6.0	6.8	6.9	7.8	8.7	10.5
20 ~ 40	4.3	4.7	5.3	5.5	5.6	5.9	6.3	7.0	7.1	8.0	9.0	10.9
40 ~ 60	4.5	4.9	5.5	5.7	5.8	6.1	6.4	7.2	7.3	8.2	9.2	11.2
60 ~ 80	4.6	5.0	5.6	5.8	5.9	6.4	6.7	7.5	7.6	8.5	9.5	11.5
80 ~ 100	4.8	5.1	5.8	6.0	6.0	6.4	6.8	7.6	7.7	8.7	9.7	11.8
100 ~ 120	4.8	5.2	5.9	6.1	6.2	6.5	6.9	7.7	7.8	8.8	9.8	12.0
120 ~ 140	4.9	5.2	5.9	6.2	6.2	6.6	7.0	7.8	7.9	8.9	10.0	12.2
140 ~ 160	4.9	5.2	6.0	6.2	6.3	6.7	7.0	7.9	8.0	9.0	10.2	12.4
160 ~ 180	4.8	5.2	5.9	6.3	6.3	6.7	7.2	8.0	8.1	9.2	10.3	12.5

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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.