L-LAL15

Code(d) **693529**
Code(e) **696527**

Refractive Index n_d	**1.693 04** 1.693 040	Abbe Number ν_d	**52.93**	Dispersion $n_F - n_C$	**0.013 093**
Refractive Index n_e	1.696 160	Abbe Number ν_e	52.70	Dispersion $n_{F'} - n_{C'}$	0.013 210

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.654 55
n_{1970}	1.970 09	1.661 89
n_{1530}	1.529 58	1.669 60
n_{1129}	1.128 64	1.676 21
n_t	1.013 98	1.678 35
n_s	0.852 11	1.682 03
$n_{A'}$	0.768 19	1.684 53
n_r	0.706 52	1.686 80
n_C	0.656 27	1.689 06
$n_{C'}$	0.643 85	1.689 70
$n_{He\text{-}Ne}$	0.632 8	1.690 29
n_D	0.589 29	1.692 92
n_d	0.587 56	1.693 04
n_e	0.546 07	1.696 16
n_F	0.486 13	1.702 16
$n_{F'}$	0.479 99	1.702 91
$n_{He\text{-}Cd}$	0.441 57	1.708 37
n_g	0.435 835	1.709 32
n_h	0.404 656	1.715 28
n_i	0.365 015	1.725 50

Constants of Dispersion Formula	
A_1	1.079 596 34E+00
A_2	7.318 721 34E-01
A_3	1.171 111 07E+00
B_1	4.700 475 43E-03
B_2	1.986 157 58E-02
B_3	8.703 599 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	53.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	110.3	
Rigidity Modulus G (GPa)	42.7	
Poisson's Ratio σ	0.291	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	82	

Partial Dispersions	
$n_C - n_t$	0.010 719
$n_C - n_{A'}$	0.004 537
$n_d - n_C$	0.003 975
$n_e - n_C$	0.007 095
$n_g - n_d$	0.016 276
$n_g - n_F$	0.007 158
$n_h - n_g$	0.005 966
$n_i - n_g$	0.016 189
$n_{C'} - n_t$	0.011 351
$n_e - n_{C'}$	0.006 463
$n_{F'} - n_e$	0.006 747
$n_i - n_{F'}$	0.022 598

Relative Partial Dispersions	
$\theta_{C,t}$	0.818 7
$\theta_{C,A'}$	0.346 5
$\theta_{d,C}$	0.303 6
$\theta_{e,C}$	0.541 9
$\theta_{g,d}$	1.243 1
$\theta_{g,F}$	0.546 7
$\theta_{h,g}$	0.455 7
$\theta_{i,g}$	1.236 5
$\theta'_{C',t}$	0.859 3
$\theta'_{e,C'}$	0.489 3
$\theta'_{F',e}$	0.510 7
$\theta'_{i,F'}$	1.710 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.023 7
$\Delta\theta_{C,A'}$	0.006 5
$\Delta\theta_{g,d}$	-0.011 7
$\Delta\theta_{g,F}$	-0.009 1
$\Delta\theta_{i,g}$	-0.045 3

Coloring			
λ_{80}	345	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	320	$\lambda_{0.05}$	

CCI		
B	G	R
0.00	0.14	0.14

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.39
290	0.53
300	0.64
310	0.73
320	0.80
330	0.87
340	0.916
350	0.948
360	0.968
370	0.980
380	0.987
390	0.991
400	0.993
420	0.995
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.990
1 600	0.991
1 800	0.979
2 000	0.949
2 200	0.85
2 400	0.59

Thermal Properties		
Strain Point StP (℃)		494
Annealing Point AP (℃)		515
Transformation Temperature Tg (℃)		537
Yield Point At (℃)		570
Softening Point SP (℃)		596
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	57
	(100 ℃ ~ 300 ℃)	74
Thermal Conductivity λ (W/(m·K))		0.923

Linear coefficient of thermal expansion	
Temperature range (℃)	α_l (10^{-7} K^{-1})
-100 ~ -90	42
-90 ~ -80	43
-80 ~ -70	44
-70 ~ -60	46
-60 ~ -50	47
-50 ~ -40	49
-40 ~ -30	50
-30 ~ -20	51
-20 ~ -10	52
-10 ~ 0	54
0 ~ 10	55
10 ~ 20	56
20 ~ 30	57
30 ~ 40	58
40 ~ 50	60
50 ~ 60	61
60 ~ 70	62
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	72
170 ~ 180	73
180 ~ 190	73
190 ~ 200	74
200 ~ 210	75
210 ~ 220	76
220 ~ 230	77
230 ~ 240	77
240 ~ 250	78
250 ~ 260	79
260 ~ 270	79
270 ~ 280	80
280 ~ 290	81
290 ~ 300	81

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.44
Specific Gravity *d*	3.66
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	5.6	5.8	6.2	6.3	6.3	6.5	6.6	7.0	7.1	7.5	7.8	8.6
-60 ~ -40	5.5	5.7	6.0	6.2	6.2	6.4	6.5	7.0	7.0	7.4	7.8	8.6
-40 ~ -20	5.4	5.7	6.1	6.2	6.2	6.4	6.6	6.9	7.0	7.5	7.9	8.7
-20 ~ 0	5.5	5.7	6.2	6.3	6.3	6.5	6.7	7.1	7.1	7.6	8.0	8.9
0 ~ 20	5.5	5.8	6.2	6.3	6.4	6.6	6.8	7.2	7.2	7.7	8.1	9.1
20 ~ 40	5.6	5.8	6.3	6.5	6.5	6.7	6.9	7.4	7.4	7.9	8.4	9.4
40 ~ 60	5.8	6.0	6.4	6.6	6.6	6.8	7.1	7.5	7.6	8.1	8.6	9.6
60 ~ 80	5.8	6.1	6.5	6.7	6.7	7.0	7.3	7.7	7.8	8.3	8.9	9.9
80 ~ 100	5.9	6.2	6.6	6.8	6.8	7.1	7.3	7.8	7.9	8.5	9.1	10.1
100 ~ 120	6.0	6.3	6.8	6.9	7.0	7.2	7.5	8.0	8.0	8.6	9.3	10.4
120 ~ 140	6.1	6.3	6.9	7.0	7.1	7.3	7.6	8.1	8.2	8.9	9.5	10.6
140 ~ 160	6.1	6.4	7.0	7.2	7.2	7.5	7.8	8.3	8.4	9.0	9.6	10.8
160 ~ 180	6.2	6.5	7.0	7.2	7.3	7.5	7.8	8.4	8.5	9.1	9.8	11.0

OHARA Copyright© OHARA INC. All Rights Reserved.

※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.