S-LAL 9

Code(d) **691548**
Code(e) **694546**

Refractive Index n_d	**1.691 00** 1.691 002	Abbe Number ν_d	**54.82**	Dispersion $n_F - n_C$	**0.012 605**
Refractive Index n_e	1.694 007	Abbe Number ν_e	54.59	Dispersion $n_{F'} - n_{C'}$	0.012 714

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.653 43
n_{1970}	1.970 09	1.660 64
n_{1530}	1.529 58	1.668 22
n_{1129}	1.128 64	1.674 70
n_t	1.013 98	1.676 78
n_s	0.852 11	1.680 37
$n_{A'}$	0.768 19	1.682 79
n_r	0.706 52	1.684 99
n_C	0.656 27	1.687 17
$n_{C'}$	0.643 85	1.687 78
$n_{He\text{-}Ne}$	0.632 8	1.688 35
n_D	0.589 29	1.690 89
n_d	0.587 56	1.691 00
n_e	0.546 07	1.694 01
n_F	0.486 13	1.699 77
$n_{F'}$	0.479 99	1.700 49
$n_{He\text{-}Cd}$	0.441 57	1.705 73
n_g	0.435 835	1.706 64
n_h	0.404 656	1.712 36
n_i	0.365 015	1.722 12

Constants of Dispersion Formula	
A_1	1.161 956 87E+00
A_2	6.448 600 99E-01
A_3	1.250 622 21E+00
B_1	1.596 595 09E-02
B_2	5.055 024 67E-04
B_3	9.382 841 69E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	107.5	
Rigidity Modulus G (GPa)	41.8	
Poisson's Ratio σ	0.287	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	89	

Partial Dispersions	
$n_C - n_t$	0.010 384
$n_C - n_{A'}$	0.004 384
$n_d - n_C$	0.003 833
$n_e - n_C$	0.006 838
$n_g - n_d$	0.015 640
$n_g - n_F$	0.006 868
$n_h - n_g$	0.005 714
$n_i - n_g$	0.015 476
$n_{C'} - n_t$	0.010 994
$n_e - n_{C'}$	0.006 228
$n_{F'} - n_e$	0.006 486
$n_i - n_{F'}$	0.021 625

Relative Partial Dispersions	
$\theta_{C,t}$	0.823 8
$\theta_{C,A'}$	0.347 8
$\theta_{d,C}$	0.304 1
$\theta_{e,C}$	0.542 5
$\theta_{g,d}$	1.240 8
$\theta_{g,F}$	0.544 9
$\theta_{h,g}$	0.453 3
$\theta_{i,g}$	1.227 8
$\theta'_{C',t}$	0.864 7
$\theta'_{e,C'}$	0.489 9
$\theta'_{F',e}$	0.510 1
$\theta'_{i,F'}$	1.700 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.019 9
$\Delta\theta_{C,A'}$	0.005 5
$\Delta\theta_{g,d}$	-0.010 1
$\Delta\theta_{g,F}$	-0.007 9
$\Delta\theta_{i,g}$	-0.038 2

Coloring			
λ_{80}	375	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	301

CCI		
B	G	R
0.00	0.51	0.52

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.01
300	0.04
310	0.11
320	0.22
330	0.38
340	0.55
350	0.70
360	0.82
370	0.89
380	0.936
390	0.960
400	0.973
420	0.985
440	0.988
460	0.992
480	0.994
500	0.995
550	0.997
600	0.996
650	0.997
700	0.998
800	0.998
900	0.997
1 000	0.996
1 200	0.996
1 400	0.992
1 600	0.992
1 800	0.984
2 000	0.963
2 200	0.89
2 400	0.66

Thermal Properties		
Strain Point StP (°C)		606
Annealing Point AP (°C)		630
Transformation Temperature Tg (°C)		649
Yield Point At (°C)		681
Softening Point SP (°C)		707
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	61
	(100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(m·K))		0.895

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	50
-90 ~ -80	51
-80 ~ -70	52
-70 ~ -60	53
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	57
-10 ~ 0	58
0 ~ 10	59
10 ~ 20	60
20 ~ 30	61
30 ~ 40	62
40 ~ 50	62
50 ~ 60	63
60 ~ 70	64
70 ~ 80	65
80 ~ 90	66
90 ~ 100	66
100 ~ 110	67
110 ~ 120	68
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	71
170 ~ 180	72
180 ~ 190	73
190 ~ 200	73
200 ~ 210	74
210 ~ 220	75
220 ~ 230	75
230 ~ 240	76
240 ~ 250	76
250 ~ 260	77
260 ~ 270	78
270 ~ 280	78
280 ~ 290	79
290 ~ 300	79

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	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.7	3.8	4.2	4.4	5.0
-60 ~ -40	2.6	2.7	2.9	3.0	3.1	3.2	3.3	3.7	3.7	4.0	4.3	4.9
-40 ~ -20	2.4	2.7	3.0	3.0	3.1	3.2	3.3	3.6	3.7	4.0	4.4	5.0
-20 ~ 0	2.5	2.6	2.9	3.0	3.0	3.3	3.4	3.7	3.8	4.1	4.4	5.2
0 ~ 20	2.5	2.8	3.1	3.2	3.2	3.4	3.5	3.8	3.9	4.2	4.6	5.3
20 ~ 40	2.6	2.8	3.2	3.3	3.3	3.5	3.7	4.0	4.0	4.4	4.8	5.5
40 ~ 60	2.8	3.0	3.3	3.4	3.5	3.6	3.8	4.1	4.2	4.6	5.0	5.8
60 ~ 80	2.9	3.1	3.4	3.5	3.6	3.8	4.0	4.4	4.4	4.8	5.2	5.9
80 ~ 100	3.0	3.2	3.6	3.7	3.7	3.9	4.1	4.5	4.5	5.0	5.5	6.2
100 ~ 120	3.2	3.4	3.7	3.9	3.9	4.1	4.3	4.7	4.7	5.2	5.7	6.5
120 ~ 140	3.3	3.5	3.9	4.0	4.0	4.2	4.4	4.8	4.9	5.3	5.9	6.7
140 ~ 160	3.4	3.6	4.1	4.2	4.3	4.5	4.7	5.1	5.1	5.6	6.1	6.9
160 ~ 180	3.5	3.8	4.2	4.3	4.4	4.6	4.8	5.2	5.3	5.7	6.2	7.1

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.85
Specific Gravity *d*	3.63
Remarks	

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.