

# L-LAL13

Code(d) **694532**

Code(e) **697529**

Refractive Index $n_d$	1.69350 1.693500	Abbe Number $v_d$	53.2 53.18	Dispersion $n_F-n_C$	0.01304 0.013040
Refractive Index $n_e$	1.696607	Abbe Number $v_e$	52.93	Dispersion $n_F-n_C'$	0.013160

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.65737
$n_{1970}$	1.97009	1.66392
$n_{1530}$	1.52958	1.67089
$n_{1129}$	1.12864	1.67702
$n_t$	1.01398	1.67906
$n_s$	0.85211	1.68263
$n_{A'}$	0.76819	1.68507
$n_r$	0.70652	1.68731
$n_C$	0.65627	1.68955
$n_{C'}$	0.64385	1.69018
$n_{\text{He-Ne}}$	0.6328	1.69076
$n_D$	0.58929	1.69338
$n_d$	0.58756	1.69350
$n_e$	0.54607	1.69661
$n_F$	0.48613	1.70259
$n_{F'}$	0.47999	1.70334
$n_{\text{He-Cd}}$	0.44157	1.70879
$n_g$	0.435835	1.70974
$n_h$	0.404656	1.71570
$n_i$	0.365015	1.72592

Partial Dispersions	
$n_C-n_t$	0.010490
$n_C-n_{A'}$	0.004481
$n_d-n_C$	0.003949
$n_e-n_C$	0.007056
$n_g-n_d$	0.016239
$n_g-n_F$	0.007148
$n_h-n_g$	0.005962
$n_i-n_g$	0.016179
$n_C-n_t$	0.011117
$n_e-n_{C'}$	0.006429
$n_{F'-n_e}$	0.006731
$n_i-n_{F'}$	0.022580

Relative Partial Dispersions	
$\theta_{C,t}$	0.8044
$\theta_{C,A'}$	0.3436
$\theta_{d,C}$	0.3028
$\theta_{e,C}$	0.5411
$\theta_{g,d}$	1.2453
$\theta_{g,F}$	0.5482
$\theta_{h,g}$	0.4572
$\theta_{i,g}$	1.2407
$\theta'_{C,t}$	0.8448
$\theta'_{e,C'}$	0.4885
$\theta'_{F',e}$	0.5115
$\theta'_{i,F}$	1.7158

Thermal Properties	
Strain Point StP (°C)	503
Annealing Point AP (°C)	522
Transformation Temperature Tg (°C)	534
Yield Point At (°C)	575
Softening Point SP (°C)	615
Expansion Coefficients (-30~+70°C)	76
$\alpha$ (10 <sup>-7</sup> /°C) (+100~+300°C)	92
Thermal Conductivity k (W/m·K)	0.887

Coloring			
$\lambda_{80}$	36	$\lambda_5$	29
$\lambda_{70}$			

Internal Transmittance	
$\lambda(\text{nm})$	$\tau_{10\text{mm}}$
280	0.01
290	0.06
300	0.15
310	0.28
320	0.45
330	0.61
340	0.74
350	0.84
360	0.913
370	0.949
380	0.969
390	0.979
400	0.984
420	0.989
440	0.991
460	0.993
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.995
1800	0.988
2000	0.969
2200	0.918
2400	0.72

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	0.0082
$\Delta\theta_{C,A'}$	0.0033
$\Delta\theta_{g,d}$	-0.0090
$\Delta\theta_{g,F}$	-0.0072
$\Delta\theta_{i,g}$	-0.0390

Mechanical Properties	
Young's Modulus E (10 <sup>8</sup> N/m <sup>2</sup> )	1078
Rigidity Modulus G (10 <sup>8</sup> N/m <sup>2</sup> )	419
Poisson's Ratio $\sigma$	0.285
Knoop Hardness Hk[Class]	620   6
Abrasion Aa	115
Photoelastic Constant $\beta$ (nm/cm/10 <sup>5</sup> Pa)	

Constants of Dispersion Formula	
A <sub>1</sub>	1.17776146E+00
A <sub>2</sub>	6.34591345E-01
A <sub>3</sub>	1.20435649E+00
B <sub>1</sub>	5.57618243E-03
B <sub>2</sub>	2.06821469E-02
B <sub>3</sub>	9.96322776E+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	53.2
Phosphate Resistance PR	4.0

Other Properties	
Bubble Quality Group B	
Specific Gravity d	3.69
Remarks	

Temperature Coefficients of Refractive Index							
Range of Temperature (°C)	$dn/dt$ relative (10 <sup>-6</sup> /°C)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	2.5	3.0	3.0	3.1	3.3	3.8	4.2
-20~ 0	2.5	3.0	3.0	3.2	3.4	3.8	4.3
0~20	2.5	3.0	3.1	3.2	3.4	3.9	4.3
20~40	2.5	3.1	3.1	3.3	3.5	4.0	4.4
40~60	2.5	3.1	3.1	3.3	3.5	4.0	4.5
60~80	2.5	3.1	3.2	3.3	3.6	4.1	4.6