

# L-PHL 1

Code(d) **565608**

Code(e) **567605**

Refractive Index $n_d$	1.56455 1.564550	Abbe Number $v_d$	60.8 60.82	Dispersion $n_F-n_C$	0.00928 0.009283
Refractive Index $n_e$	1.566764	Abbe Number $v_e$	60.51	Dispersion $n_F-n_C'$	0.009366

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.53937
$n_{1970}$	1.97009	1.54382
$n_{1530}$	1.52958	1.54859
$n_{1129}$	1.12864	1.55285
$n_t$	1.01398	1.55428
$n_s$	0.85211	1.55680
$n_{A'}$	0.76819	1.55854
$n_r$	0.70652	1.56014
$n_C$	0.65627	1.56174
$n_{C'}$	0.64385	1.56218
$n_{\text{He-Ne}}$	0.6328	1.56260
$n_D$	0.58929	1.56447
$n_d$	0.58756	1.56455
$n_e$	0.54607	1.56676
$n_F$	0.48613	1.57102
$n_{F'}$	0.47999	1.57155
$n_{\text{He-Cd}}$	0.44157	1.57541
$n_g$	0.435835	1.57608
$n_h$	0.404656	1.58029
$n_i$	0.365015	1.58747

Partial Dispersions	
$n_C-n_t$	0.007455
$n_C-n_{A'}$	0.003193
$n_d-n_C$	0.002815
$n_e-n_C$	0.005029
$n_g-n_d$	0.011534
$n_g-n_F$	0.005066
$n_h-n_g$	0.004209
$n_i-n_g$	0.011388
$n_C-n_t$	0.007903
$n_e-n_{C'}$	0.004581
$n_{F'-n_e}$	0.004785
$n_i-n_{F'}$	0.015923

Relative Partial Dispersions	
$\theta_{C,t}$	0.8031
$\theta_{C,A'}$	0.3440
$\theta_{d,C}$	0.3032
$\theta_{e,C}$	0.5417
$\theta_{g,d}$	1.2425
$\theta_{g,F}$	0.5457
$\theta_{h,g}$	0.4534
$\theta_{i,g}$	1.2268
$\theta'_{C,t}$	0.8438
$\theta'_{e,C'}$	0.4891
$\theta'_{F',e}$	0.5109
$\theta'_{i,F}$	1.7001

Thermal Properties	
Strain Point StP (°C)	308
Annealing Point AP (°C)	331
Transformation Temperature Tg (°C)	347
Yield Point At (°C)	379
Softening Point SP (°C)	408
Expansion Coefficients (-30~+70°C)	105
$\alpha$ (10 <sup>-7</sup> /°C) (+100~+300°C)	140
Thermal Conductivity k (W/m·K)	0.627

Coloring			
$\lambda_{80}$	34	$\lambda_5$	31
$\lambda_{70}$			

Internal Transmittance	
$\lambda(\text{nm})$	$\tau_{10\text{mm}}$
280	
290	
300	
310	0.06
320	0.37
330	0.70
340	0.88
350	0.952
360	0.981
370	0.990
380	0.994
390	0.996
400	0.996
420	0.996
440	0.996
460	0.997
480	0.997
500	0.998
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.986
1800	0.955
2000	0.923
2200	0.86
2400	0.83

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	-0.0289
$\Delta\theta_{C,A'}$	-0.0056
$\Delta\theta_{g,d}$	0.0041
$\Delta\theta_{g,F}$	0.0026
$\Delta\theta_{i,g}$	0.0111

Mechanical Properties	
Young's Modulus E (10 <sup>8</sup> N/m <sup>2</sup> )	589
Rigidity Modulus G (10 <sup>8</sup> N/m <sup>2</sup> )	230
Poisson's Ratio $\sigma$	0.280
Knoop Hardness Hk[Class]	350   4
Abrasion Aa	547
Photoelastic Constant $\beta$ (nm/cm/10 <sup>5</sup> Pa)	3.29

Constants of Dispersion Formula	
A <sub>1</sub>	1.07570798E+00
A <sub>2</sub>	3.35020347E-01
A <sub>3</sub>	8.10997558E-01
B <sub>1</sub>	5.91654042E-03
B <sub>2</sub>	2.03432769E-02
B <sub>3</sub>	1.06182158E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	5
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	53.3
Phosphate Resistance PR	4.3

Other Properties	
Bubble Quality Group B	
Specific Gravity d	3.18
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	-0.7	-0.4	-0.3	-0.2	0.0	0.3	0.7
-20~0	-0.7	-0.4	-0.3	-0.2	0.0	0.3	0.7
0~20	-0.8	-0.4	-0.3	-0.2	0.0	0.3	0.7
20~40	-0.8	-0.4	-0.4	-0.2	-0.1	0.3	0.7
40~60	-0.9	-0.4	-0.4	-0.2	-0.1	0.3	0.7
60~80	-1.0	-0.5	-0.4	-0.3	-0.1	0.4	0.8