

# S-NPH53

Code(d) **847239**

Code(e) **855237**

Refractive Index $n_d$	<b>1.84666</b> 1.846660	Abbe Number $v_d$	<b>23.9</b> 23.88	Dispersion $n_F-n_C$	<b>0.03545</b> 0.035449
Refractive Index $n_e$	1.855001	Abbe Number $v_e$	23.69	Dispersion $n_F-n_C$	0.036088

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.78347
$n_{1970}$	1.97009	1.79094
$n_{1530}$	1.52958	1.79971
$n_{1129}$	1.12864	1.80921
$n_t$	1.01398	1.81297
$n_s$	0.85211	1.82029
$n_{A'}$	0.76819	1.82577
$n_r$	0.70652	1.83105
$n_C$	0.65627	1.83654
$n_{C'}$	0.64385	1.83811
$n_{\text{He-Ne}}$	0.6328	1.83959
$n_D$	0.58929	1.84636
$n_d$	0.58756	1.84666
$n_e$	0.54607	1.85500
$n_F$	0.48613	1.87199
$n_{F'}$	0.47999	1.87420
$n_{\text{He-Cd}}$	0.44157	1.89098
$n_g$	0.435835	1.89403
$n_h$	0.404656	1.91412
$n_i$	0.365015	

Partial Dispersions	
$n_C-n_t$	0.023568
$n_C-n_{A'}$	0.010771
$n_d-n_C$	0.010123
$n_e-n_C$	0.018464
$n_g-n_d$	0.047367
$n_g-n_F$	0.022041
$n_h-n_g$	0.020094
$n_i-n_g$	
$n_C-n_t$	0.025139
$n_e-n_{C'}$	0.016893
$n_{F'}-n_e$	0.019195
$n_i-n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6648
$\theta_{C,A'}$	0.3038
$\theta_{d,C}$	0.2856
$\theta_{e,C}$	0.5209
$\theta_{g,d}$	1.3362
$\theta_{g,F}$	0.6218
$\theta_{h,g}$	0.5668
$\theta_{i,g}$	
$\theta'_{C,t}$	0.6966
$\theta'_{e,C'}$	0.4681
$\theta'_{F',e}$	0.5319
$\theta'_{i,F}$	

Thermal Properties	
Strain Point StP (°C)	569
Annealing Point AP (°C)	590
Transformation Temperature Tg (°C)	621
Yield Point At (°C)	663
Softening Point SP (°C)	715
Expansion Coefficients (-30~+70°C)	74
$\alpha$ (10 <sup>-7</sup> /°C) (+100~+300°C)	90
Thermal Conductivity k (W/m-K)	0.83

Coloring			
$\lambda_{80}$		$\lambda_5$	36
$\lambda_{70}$	40		

Internal Transmittance	
$\lambda(\text{nm})$	$\tau_{10\text{mm}}$
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.34
380	0.63
390	0.77
400	0.85
420	0.914
440	0.94
460	0.953
480	0.962
500	0.971
550	0.988
600	0.994
650	0.996
700	0.997
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.995
1800	0.986
2000	0.976
2200	0.952
2400	0.927

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0010
$\Delta\theta_{g,d}$	0.0211
$\Delta\theta_{g,F}$	0.0190
$\Delta\theta_{i,g}$	

Mechanical Properties	
Young's Modulus E (10 <sup>8</sup> N/m <sup>2</sup> )	886
Rigidity Modulus G (10 <sup>8</sup> N/m <sup>2</sup> )	352
Poisson's Ratio $\sigma$	0.258
Knoop Hardness Hk[Class]	420   4
Abrasion Aa	286
Photoelastic Constant $\beta$ (nm/cm/10 <sup>5</sup> Pa)	3.18

Constants of Dispersion Formula	
A <sub>1</sub>	1.85484904E+00
A <sub>2</sub>	3.96194484E-01
A <sub>3</sub>	2.43512461E+00
B <sub>1</sub>	1.34621486E-02
B <sub>2</sub>	6.31945361E-02
B <sub>3</sub>	1.70864886E-02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	2.3
Phosphate Resistance PR	1.0

Other Properties	
Bubble Quality Group B	
Specific Gravity d	3.78
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	-0.9	0.1	0.2	0.5	1.1	2.4	4.0
-20~ 0	-0.8	0.2	0.3	0.7	1.2	2.6	4.4
0~20	-0.8	0.3	0.4	0.8	1.4	2.9	4.8
20~40	-0.8	0.4	0.5	1.0	1.6	3.2	5.2
40~60	-0.7	0.6	0.7	1.1	1.8	3.5	5.6
60~80	-0.7	0.7	0.8	1.3	2.0	3.7	6.0