

# S-NPH 3

Code(d) **959175**

Code(e) **972173**

Refractive Index $n_d$	<b>1.95906</b> 1.959060	Abbe Number $\nu_d$	<b>17.47</b>	Dispersion $n_F-n_C$	<b>0.054895</b>
Refractive Index $n_e$	1.971885	Abbe Number $\nu_e$	17.33	Dispersion $n_F-n_{C'}$	0.056091

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.87064
$n_{1970}$	1.97009	1.88002
$n_{1530}$	1.52958	1.89131
$n_{1129}$	1.12864	1.90412
$n_t$	1.01398	1.90937
$n_s$	0.85211	1.91984
$n_{A'}$	0.76819	1.92780
$n_r$	0.70652	1.93559
$n_C$	0.65627	1.94376
$n_{C'}$	0.64385	1.94612
$n_{\text{He-Ne}}$	0.6328	1.94834
$n_D$	0.58929	1.95860
$n_d$	0.58756	1.95906
$n_e$	0.54607	1.97188
$n_F$	0.48613	1.99866
$n_{F'}$	0.47999	2.00221
$n_{\text{He-Cd}}$	0.44157	2.02976
$n_g$	0.435835	2.03488
$n_h$	0.404656	2.06965
$n_i$	0.365015	

Constants of Dispersion Formula	
$A_1$	2.09834903E+00
$A_2$	4.89088388E-01
$A_3$	2.94009268E+00
$B_1$	1.79123869E-02
$B_2$	7.76653353E-02
$B_3$	1.60930428E+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	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	102.2
Rigidity Modulus G (GPa)	41.1
Poisson's Ratio $\sigma$	0.243
Knoop Hardness Hk(Class)	500   5
Abrasion Aa	215

Partial Dispersions	
$n_C-n_t$	0.034388
$n_C-n_{A'}$	0.015956
$n_d-n_C$	0.015300
$n_e-n_C$	0.028125
$n_g-n_d$	0.075817
$n_g-n_F$	0.036222
$n_h-n_g$	0.034773
$n_i-n_g$	
$n_C-n_t$	0.036744
$n_e-n_{C'}$	0.025769
$n_{F'}-n_e$	0.030322
$n_i-n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6264
$\theta_{C,A'}$	0.2907
$\theta_{d,C}$	0.2787
$\theta_{e,C}$	0.5123
$\theta_{g,d}$	1.3811
$\theta_{g,F}$	0.6598
$\theta_{h,g}$	0.6334
$\theta_{i,g}$	
$\theta'_{C,t}$	0.6551
$\theta'_{e,C'}$	0.4594
$\theta'_{F',e}$	0.5406
$\theta'_{i,F'}$	

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	-0.0022
$\Delta\theta_{C,A'}$	-0.0063
$\Delta\theta_{g,d}$	0.0527
$\Delta\theta_{g,F}$	0.0466
$\Delta\theta_{i,g}$	

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	671
Yield Point At (°C)	704
Softening Point SP (°C)	-
Expansion Coefficients (-30~+70°C)	59
$\alpha$ ( $10^{-7} \text{K}^{-1}$ ) (+100~+300°C)	65
Thermal Conductivity $\lambda$ W/(m·K)	1.01

Coloring			
$\lambda_{80}$		$\lambda_5$	395
$\lambda_{70}$	440		

Internal transmission			
$\lambda_{0.80}$	430	$\lambda_{0.05}$	398

CCI		
B	G	R
0.00	13.14	13.56

Internal Transmittance	
$\lambda(\text{nm})$	$\tau$ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	
390	
400	0.12
420	0.72
440	0.88
460	0.932
480	0.956
500	0.970
550	0.990
600	0.996
650	0.997
700	0.999
800	0.999
900	0.998
1000	0.998
1200	0.999
1400	0.998
1600	0.995
1800	0.989
2000	0.983
2200	0.968
2400	0.949

Temperature Coefficients of Refractive Index							
Range of Temperature (°C)	$\Delta n / \Delta T$ relative ( $10^{-6} \text{K}^{-1}$ )						
	t	C'	He-Ne	D	e	F'	g
-40~-20	0.6	2.1	2.2	2.8	3.7	6.2	9.6
-20~ 0	0.8	2.4	2.6	3.2	4.2	6.9	10.6
0~20	1.1	2.8	2.9	3.6	4.6	7.6	11.6
20~40	1.2	3.1	3.2	3.9	5.0	8.2	12.4
40~60	1.4	3.4	3.5	4.3	5.5	8.8	13.3
60~80	1.7	3.8	3.9	4.8	6.0	9.5	14.3

Other Properties	
Photoelastic Constant $\beta$ nm/(cm·10 <sup>5</sup> Pa)	3.35
Specific Gravity d	3.59
Remarks	

OHARA 24-01

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.