

S-NPH 3

Code(d) **959175**

Code(e) **972173**

Refractive Index n_d	1.95906 1.959060	Abbe Number ν_d	17.47	Dispersion n_F-n_C	0.054895
Refractive Index n_e	1.971885	Abbe Number ν_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 (10^9N/m^2)	1022
Rigidity Modulus G (10^9N/m^2)	411
Poisson's Ratio σ	0.243
Knoop Hardness Hk[Class]	450 5
Abrasion Aa	215
Photoelastic Constant β nm/(cm· 10^5Pa)	3.35

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
α ($10^{-7}/^\circ\text{C}$) (+100~+300°C)	65
Thermal Conductivity λ W/(m·K)	1.01

Coloring			
λ_{80}		λ_5	395
λ_{70}	440		

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

CCI		
B	G	R
0.00	13.14	13.56

Internal Transmittance	
$\lambda(\text{nm})$	τ 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 ($10^{-6}/^\circ\text{C}$)						
	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	
Bubble Quality Group B	
Specific Gravity d	3.59
Remarks	

OHARA 17-04

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※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.