

S-NPH 1

Code(d) **808228**

Code(e) **816226**

Refractive Index n_d	1.80809 1.808095	Abbe Number ν_d	22.76	Dispersion n_F-n_C	0.035504
Refractive Index n_e	1.816434	Abbe Number ν_e	22.57	Dispersion n_F-n_C'	0.036174

Refractive Indices		
$\lambda(\mu\text{m})$		
n_{2325}	2.32542	1.74455
n_{1970}	1.97009	1.75226
n_{1530}	1.52958	1.76125
n_{1129}	1.12864	1.77084
n_t	1.01398	1.77459
n_s	0.85211	1.78187
$n_{A'}$	0.76819	1.78731
n_r	0.70652	1.79256
n_C	0.65627	1.79801
$n_{C'}$	0.64385	1.79957
$n_{\text{He-Ne}}$	0.6328	1.80105
n_D	0.58929	1.80779
n_d	0.58756	1.80809
n_e	0.54607	1.81643
n_F	0.48613	1.83351
$n_{F'}$	0.47999	1.83575
$n_{\text{He-Cd}}$	0.44157	1.85279
n_g	0.435835	1.85590
n_h	0.404656	1.87658
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.75156623E+00
A_2	3.64006304E-01
A_3	2.47874141E+00
B_1	1.35004681E-02
B_2	6.68245147E-02
B_3	1.70756006E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (10^9N/m^2)	893
Rigidity Modulus G (10^9N/m^2)	357
Poisson's Ratio σ	0.250
Knoop Hardness Hk[Class]	460 5
Abrasion Aa	320
Photoelastic Constant β nm/(cm· 10^5Pa)	3.23

Partial Dispersions	
n_C-n_t	0.023420
$n_C-n_{A'}$	0.010701
n_d-n_C	0.010086
n_e-n_C	0.018425
n_g-n_d	0.047809
n_g-n_F	0.022391
n_h-n_g	0.020676
n_i-n_g	
n_C-n_t	0.024983
$n_e-n_{C'}$	0.016862
n_F-n_e	0.019312
$n_i-n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6596
$\theta_{C,A'}$	0.3014
$\theta_{d,C}$	0.2841
$\theta_{e,C}$	0.5190
$\theta_{g,d}$	1.3466
$\theta_{g,F}$	0.6307
$\theta_{h,g}$	0.5824
$\theta_{i,g}$	
$\theta'_{C,t}$	0.6906
$\theta'_{e,C'}$	0.4661
$\theta'_{F,e}$	0.5339
$\theta'_{i,F'}$	

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0020
$\Delta\theta_{g,d}$	0.0292
$\Delta\theta_{g,F}$	0.0261
$\Delta\theta_{i,g}$	

Thermal Properties	
Strain Point StP (°C)	516
Annealing Point AP (°C)	547
Transformation Temperature Tg (°C)	552
Yield Point At (°C)	589
Softening Point SP (°C)	645
Expansion Coefficients (-30~+70°C)	83
α ($10^{-7}/^\circ\text{C}$) (+100~+300°C)	104
Thermal Conductivity λ W/(m·K)	0.882

Coloring			
λ_{80}	445	λ_5	375
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	404	$\lambda_{0.05}$	378

CCI		
B	G	R
0.00	4.24	4.43

Internal Transmittance	
$\lambda(\text{nm})$	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	0.14
390	0.53
400	0.77
420	0.917
440	0.952
460	0.967
480	0.975
500	0.982
550	0.992
600	0.994
650	0.995
700	0.996
800	0.997
900	0.997
1000	0.996
1200	0.997
1400	0.994
1600	0.992
1800	0.984
2000	0.973
2200	0.934
2400	0.88

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	-1.9	-1.2	-1.1	-0.7	-0.2	1.2	3.0
-20~ 0	-1.9	-1.1	-1.0	-0.6	0.0	1.5	3.4
0~20	-1.8	-0.9	-0.8	-0.4	0.2	1.8	3.8
20~40	-1.8	-0.8	-0.7	-0.3	0.4	2.1	4.3
40~60	-1.8	-0.7	-0.6	-0.1	0.6	2.4	4.7
60~80	-1.7	-0.5	-0.4	0.1	0.8	2.7	5.1

Other Properties	
Bubble Quality Group B	
Specific Gravity d	3.29
Remarks	

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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.