S-PHM52Q

Code(d) **618633**
Code(e) **620630**

Refractive Index n_d	**1.618 00** 1.618 000	Abbe Number ν_d	**63.32**	Dispersion $n_F - n_C$	**0.009 760**
Refractive Index n_e	1.620 327	Abbe Number ν_e	63.02	Dispersion $n_{F'} - n_{C'}$	0.009 843

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.589 96
n_{1970}	1.970 09	1.595 14
n_{1530}	1.529 58	1.600 64
n_{1129}	1.128 64	1.605 45
n_t	1.013 98	1.607 03
n_s	0.852 11	1.609 77
$n_{A'}$	0.768 19	1.611 64
n_r	0.706 52	1.613 34
n_C	0.656 27	1.615 03
$n_{C'}$	0.643 85	1.615 50
$n_{He\text{-}Ne}$	0.632 8	1.615 94
n_D	0.589 29	1.617 91
n_d	0.587 56	1.618 00
n_e	0.546 07	1.620 33
n_F	0.486 13	1.624 79
$n_{F'}$	0.479 99	1.625 34
$n_{He\text{-}Cd}$	0.441 57	1.629 38
n_g	0.435 835	1.630 08
n_h	0.404 656	1.634 48
n_i	0.365 015	1.641 95

Constants of Dispersion Formula	
A_1	1.269 687 50E+00
A_2	3.084 181 36E-01
A_3	1.040 789 76E+00
B_1	6.216 229 49E-03
B_2	2.077 852 65E-02
B_3	1.120 512 50E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	84.0	
Rigidity Modulus G (GPa)	32.7	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	450	5
Abrasion Aa	313	

Partial Dispersions	
$n_C - n_t$	0.007 997
$n_C - n_{A'}$	0.003 394
$n_d - n_C$	0.002 971
$n_e - n_C$	0.005 298
$n_g - n_d$	0.012 085
$n_g - n_F$	0.005 296
$n_h - n_g$	0.004 390
$n_i - n_g$	0.011 862
$n_{C'} - n_t$	0.008 469
$n_e - n_{C'}$	0.004 826
$n_{F'} - n_e$	0.005 017
$n_i - n_{F'}$	0.016 603

Relative Partial Dispersions	
$\theta_{C,t}$	0.819 4
$\theta_{C,A'}$	0.347 7
$\theta_{d,C}$	0.304 4
$\theta_{e,C}$	0.542 8
$\theta_{g,d}$	1.238 2
$\theta_{g,F}$	0.542 6
$\theta_{h,g}$	0.449 8
$\theta_{i,g}$	1.215 4
$\theta'_{C',t}$	0.860 4
$\theta'_{e,C'}$	0.490 3
$\theta'_{F',e}$	0.509 7
$\theta'_{i,F'}$	1.686 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.024 4
$\Delta\theta_{C,A'}$	-0.004 9
$\Delta\theta_{g,d}$	0.005 0
$\Delta\theta_{g,F}$	0.003 6
$\Delta\theta_{i,g}$	0.020 6

Coloring			
λ_{80}	365	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	322

CCI		
B	G	R
0.00	0.31	0.29

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.02
330	0.17
340	0.44
350	0.69
360	0.85
370	0.924
380	0.961
390	0.978
400	0.986
420	0.991
440	0.992
460	0.994
480	0.996
500	0.997
550	0.998
600	0.998
650	0.997
700	0.997
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.995
1 600	0.991
1 800	0.978
2 000	0.960
2 200	0.900
2 400	0.85

Thermal Properties		
Strain Point StP (°C)		539
Annealing Point AP (°C)		559
Transformation Temperature Tg (°C)		580
Yield Point At (°C)		620
Softening Point SP (°C)		650
Expansion Coefficients α_l (10^{-7} K^{-1})	(-30 ℃ ~ 70 ℃)	89
	(100 °C ~ 300 °C)	107
Thermal Conductivity λ (W/(m·K))		0.738

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	74
-90 ~ -80	75
-80 ~ -70	76
-70 ~ -60	78
-60 ~ -50	79
-50 ~ -40	81
-40 ~ -30	82
-30 ~ -20	83
-20 ~ -10	85
-10 ~ 0	86
0 ~ 10	87
10 ~ 20	88
20 ~ 30	90
30 ~ 40	91
40 ~ 50	92
50 ~ 60	93
60 ~ 70	94
70 ~ 80	95
80 ~ 90	96
90 ~ 100	98
100 ~ 110	99
110 ~ 120	100
120 ~ 130	101
130 ~ 140	102
140 ~ 150	102
150 ~ 160	103
160 ~ 170	104
170 ~ 180	105
180 ~ 190	106
190 ~ 200	107
200 ~ 210	108
210 ~ 220	108
220 ~ 230	109
230 ~ 240	110
240 ~ 250	111
250 ~ 260	111
260 ~ 270	112
270 ~ 280	113
280 ~ 290	113
290 ~ 300	114

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.41
Specific Gravity *d*	3.51
Remarks	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	$\Delta n_{rel}/\Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-1.3	-1.2	-1.0	-1.0	-0.9	-0.8	-0.6	-0.4	-0.4	-0.2	0.0	0.5
-60 ~ -40	-1.6	-1.4	-1.2	-1.1	-1.1	-1.0	-0.9	-0.7	-0.7	-0.3	-0.1	0.3
-40 ~ -20	-1.7	-1.5	-1.3	-1.2	-1.2	-1.1	-1.0	-0.8	-0.7	-0.5	-0.1	0.3
-20 ~ 0	-1.7	-1.6	-1.3	-1.2	-1.2	-1.1	-1.0	-0.8	-0.7	-0.5	-0.2	0.4
0 ~ 20	-1.7	-1.6	-1.3	-1.3	-1.2	-1.1	-1.0	-0.8	-0.7	-0.4	-0.1	0.4
20 ~ 40	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-0.9	-0.7	-0.6	-0.4	0.0	0.5
40 ~ 60	-1.6	-1.5	-1.2	-1.2	-1.0	-1.0	-0.9	-0.5	-0.5	-0.2	0.1	0.7
60 ~ 80	-1.5	-1.4	-1.1	-1.0	-1.0	-0.9	-0.7	-0.5	-0.4	-0.1	0.2	0.8
80 ~ 100	-1.4	-1.3	-1.0	-0.9	-0.9	-0.8	-0.6	-0.3	-0.3	0.0	0.3	0.9
100 ~ 120	-1.4	-1.2	-0.9	-0.8	-0.8	-0.7	-0.5	-0.2	-0.2	0.2	0.5	1.1
120 ~ 140	-1.3	-1.2	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	-0.1	0.3	0.6	1.2
140 ~ 160	-1.3	-1.1	-0.8	-0.7	-0.7	-0.5	-0.3	0.0	0.0	0.4	0.8	1.5
160 ~ 180	-1.2	-1.0	-0.7	-0.6	-0.5	-0.4	-0.2	0.1	0.2	0.5	0.9	1.6

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.