

# S-PHM53

Code(d) **603655**

Code(e) **605651**

Refractive Index $n_d$	<b>1.60300</b> 1.603001	Abbe Number $\nu_d$	<b>65.44</b>	Dispersion $n_F-n_C$	<b>0.009215</b>
Refractive Index $n_e$	1.605200	Abbe Number $\nu_e$	65.15	Dispersion $n_F-n_{C'}$	0.009289

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.57583
$n_{1970}$	1.97009	1.58092
$n_{1530}$	1.52958	1.58634
$n_{1129}$	1.12864	1.59103
$n_t$	1.01398	1.59256
$n_s$	0.85211	1.59519
$n_{A'}$	0.76819	1.59697
$n_r$	0.70652	1.59858
$n_C$	0.65627	1.60019
$n_{C'}$	0.64385	1.60064
$n_{\text{He-Ne}}$	0.6328	1.60106
$n_D$	0.58929	1.60292
$n_d$	0.58756	1.60300
$n_e$	0.54607	1.60520
$n_F$	0.48613	1.60940
$n_{F'}$	0.47999	1.60993
$n_{\text{He-Cd}}$	0.44157	1.61372
$n_g$	0.435835	1.61438
$n_h$	0.404656	1.61850
$n_i$	0.365015	1.62547

Constants of Dispersion Formula	
$A_1$	1.09775423E+00
$A_2$	4.34816432E-01
$A_3$	1.13894976E+00
$B_1$	1.23369400E-02
$B_2$	-3.72522903E-04
$B_3$	1.24276984E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	5
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	70.8
Rigidity Modulus G (GPa)	27.5
Poisson's Ratio $\sigma$	0.285
Knoop Hardness Hk(Class)	430   4
Abrasion Aa	407

Partial Dispersions	
$n_C-n_t$	0.007630
$n_C-n_{A'}$	0.003223
$n_d-n_C$	0.002812
$n_e-n_C$	0.005011
$n_g-n_d$	0.011380
$n_g-n_F$	0.004977
$n_h-n_g$	0.004114
$n_i-n_g$	0.011090
$n_C-n_t$	0.008078
$n_e-n_{C'}$	0.004563
$n_{F'}-n_e$	0.004726
$n_i-n_{F'}$	0.015545

Relative Partial Dispersions	
$\theta_{C,t}$	0.8280
$\theta_{C,A'}$	0.3498
$\theta_{d,C}$	0.3052
$\theta_{e,C}$	0.5438
$\theta_{g,d}$	1.2349
$\theta_{g,F}$	0.5401
$\theta_{h,g}$	0.4464
$\theta_{i,g}$	1.2035
$\theta'_{C,t}$	0.8696
$\theta'_{e,C'}$	0.4912
$\theta'_{F',e}$	0.5088
$\theta'_{i,F'}$	1.6735

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	-0.0257
$\Delta\theta_{C,A'}$	-0.0054
$\Delta\theta_{g,d}$	0.0061
$\Delta\theta_{g,F}$	0.0045
$\Delta\theta_{i,g}$	0.0265

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	610
Yield Point At (°C)	644
Softening Point SP (°C)	681
Expansion Coefficients (-30~+70°C)	93
$\alpha$ (10 <sup>-7</sup> K <sup>-1</sup> ) (+100~+300°C)	109
Thermal Conductivity $\lambda$ W/(m·K)	0.615

Coloring			
$\lambda_{80}$	360	$\lambda_5$	300
$\lambda_{70}$			

Internal transmission			
$\lambda_{0.80}$	362	$\lambda_{0.05}$	313

CCI		
B	G	R
0.00	0.56	0.52

Internal Transmittance	
$\lambda(\text{nm})$	$\tau$ 10mm
280	
290	
300	
310	0.03
320	0.10
330	0.25
340	0.45
350	0.64
360	0.78
370	0.88
380	0.935
390	0.963
400	0.977
420	0.986
440	0.987
460	0.989
480	0.992
500	0.994
550	0.998
600	0.997
650	0.996
700	0.996
800	0.997
900	0.997
1000	0.996
1200	0.997
1400	0.993
1600	0.987
1800	0.967
2000	0.941
2200	0.87
2400	0.83

Temperature Coefficients of Refractive Index							
Range of Temperature (°C)	$\Delta n / \Delta T$ relative (10 <sup>-6</sup> K <sup>-1</sup> )						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-3.1	-2.8	-2.8	-2.7	-2.6	-2.4	-2.2
-20~ 0	-3.0	-2.8	-2.8	-2.7	-2.6	-2.4	-2.1
0~20	-3.0	-2.7	-2.7	-2.6	-2.5	-2.3	-2.0
20~40	-2.9	-2.6	-2.6	-2.5	-2.4	-2.1	-1.9
40~60	-2.9	-2.5	-2.5	-2.4	-2.2	-1.9	-1.7
60~80	-2.7	-2.3	-2.3	-2.2	-2.0	-1.7	-1.5

Other Properties	
Photoelastic Constant $\beta$ nm/(cm·10 <sup>5</sup> Pa)	1.21
Specific Gravity d	3.51
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.