

# S-NBM51

Code(d) **613443**

Code(e) **617440**

Refractive Index $n_d$	<b>1.61340</b> 1.613397	Abbe Number $\nu_d$	<b>44.27</b>	Dispersion $n_F-n_C$	<b>0.013857</b>
Refractive Index $n_e$	1.616690	Abbe Number $\nu_e$	44.02	Dispersion $n_F-n_C'$	0.014008

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	2.32542	1.57660
$n_{1970}$	1.97009	1.58313
$n_{1530}$	1.52958	1.59012
$n_{1129}$	1.12864	1.59633
$n_t$	1.01398	1.59841
$n_s$	0.85211	1.60206
$n_{A'}$	0.76819	1.60459
$n_r$	0.70652	1.60691
$n_C$	0.65627	1.60925
$n_{C'}$	0.64385	1.60990
$n_{\text{He-Ne}}$	0.6328	1.61052
$n_D$	0.58929	1.61328
$n_d$	0.58756	1.61340
$n_e$	0.54607	1.61669
$n_F$	0.48613	1.62311
$n_{F'}$	0.47999	1.62391
$n_{\text{He-Cd}}$	0.44157	1.62986
$n_g$	0.435835	1.63091
$n_h$	0.404656	1.63755
$n_i$	0.365015	1.64927

Constants of Dispersion Formula	
$A_1$	1.37023101E+00
$A_2$	1.77665568E-01
$A_3$	1.30515471E+00
$B_1$	8.71920342E-03
$B_2$	4.05725552E-02
$B_3$	1.12703058E+02

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

Mechanical Properties	
Young's Modulus E ( $10^9\text{N/m}^2$ )	817
Rigidity Modulus G ( $10^9\text{N/m}^2$ )	329
Poisson's Ratio $\sigma$	0.243
Knoop Hardness Hk[Class]	570   6
Abrasion Aa	125
Photoelastic Constant $\beta$ nm/(cm· $10^5\text{Pa}$ )	3.47

Partial Dispersions	
$n_C-n_t$	0.010843
$n_C-n_{A'}$	0.004663
$n_d-n_C$	0.004149
$n_e-n_C$	0.007442
$n_g-n_d$	0.017514
$n_g-n_F$	0.007806
$n_h-n_g$	0.006644
$n_i-n_g$	0.018359
$n_C-n_t$	0.011500
$n_e-n_{C'}$	0.006785
$n_F-n_e$	0.007223
$n_i-n_{F'}$	0.025357

Relative Partial Dispersions	
$\theta_{C,t}$	0.7825
$\theta_{C,A'}$	0.3365
$\theta_{d,C}$	0.2994
$\theta_{e,C}$	0.5371
$\theta_{g,d}$	1.2639
$\theta_{g,F}$	0.5633
$\theta_{h,g}$	0.4795
$\theta_{i,g}$	1.3249
$\theta'_{C,t}$	0.8210
$\theta'_{e,C'}$	0.4844
$\theta'_{F,e}$	0.5156
$\theta'_{i,F'}$	1.8102

Deviation of Relative Dispersions $\Delta\theta$ from "Normal"	
$\Delta\theta_{C,t}$	0.0281
$\Delta\theta_{C,A'}$	0.0070
$\Delta\theta_{g,d}$	-0.0089
$\Delta\theta_{g,F}$	-0.0065
$\Delta\theta_{i,g}$	-0.0294

Thermal Properties	
Strain Point StP (°C)	509
Annealing Point AP (°C)	531
Transformation Temperature Tg (°C)	554
Yield Point At (°C)	611
Softening Point SP (°C)	693
Expansion Coefficients (-30~+70°C)	65
$\alpha$ ( $10^{-7}/^\circ\text{C}$ ) (+100~+300°C)	78
Thermal Conductivity $\lambda$ W/(m·K)	0.904

Coloring			
$\lambda_{80}$	350	$\lambda_5$	320
$\lambda_{70}$			

Internal transmission			
$\lambda_{0.80}$	344	$\lambda_{0.05}$	319

CCI		
B	G	R
0.00	0.38	0.40

Internal Transmittance	
$\lambda(\text{nm})$	$\tau$ 10mm
280	
290	
300	
310	
320	0.08
330	0.48
340	0.75
350	0.87
360	0.925
370	0.953
380	0.968
390	0.978
400	0.984
420	0.989
440	0.992
460	0.993
480	0.995
500	0.997
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.994
1800	0.987
2000	0.972
2200	0.89
2400	0.76

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	3.0	3.4	3.4	3.6	3.8	4.2	4.7
-20~ 0	3.1	3.6	3.6	3.7	3.9	4.4	4.9
0~20	3.2	3.7	3.7	3.9	4.1	4.6	5.1
20~40	3.2	3.8	3.8	4.0	4.2	4.8	5.3
40~60	3.4	3.9	4.0	4.2	4.4	4.9	5.5
60~80	3.5	4.1	4.1	4.3	4.5	5.1	5.7

Other Properties	
Bubble Quality Group B	
Specific Gravity d	2.93
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.