

L-BAL35

Code(d) 589612
Code(e) 591609

Refractive Index n_d	1.589 13 1.589 130	Abbe Number v_d	61.15	Dispersion $n_F - n_C$	0.009 634
Refractive Index n_e	1.591 428	Abbe Number v_e	60.93	Dispersion $n_{F'} - n_{C'}$	0.009 706

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.557 75
n_{1970}	1.970 09	1.564 07
n_{1530}	1.529 58	1.570 69
n_{1129}	1.128 64	1.576 22
n_t	1.013 98	1.577 95
n_s	0.852 11	1.580 85
$n_{A'}$	0.768 19	1.582 76
n_r	0.706 52	1.584 48
n_C	0.656 27	1.586 18
$n_{C'}$	0.643 85	1.586 65
$n_{\text{He-Ne}}$	0.632 8	1.587 09
n_D	0.589 29	1.589 04
n_d	0.587 56	1.589 13
n_e	0.546 07	1.591 43
n_F	0.486 13	1.595 81
$n_{F'}$	0.479 99	1.596 36
$n_{\text{He-Cd}}$	0.441 57	1.600 31
n_g	0.435 835	1.601 00
n_h	0.404 656	1.605 28
n_i	0.365 015	1.612 56

Constants of Dispersion Formula	
A_1	1.162 626 30E+00
A_2	3.256 610 51E-01
A_3	1.351 324 86E+00
B_1	1.259 574 37E-02
B_2	-3.269 110 50E-03
B_3	1.192 145 96E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.2

Mechanical Properties	
Young's Modulus E (GPa)	100.8
Rigidity Modulus G (GPa)	40.3
Poisson's Ratio σ	0.252
Knoop Hardness Hk[Class]	640 6
Abrasion Aa	100

Partial Dispersions	
$n_C - n_t$	0.008 230
$n_C - n_{A'}$	0.003 418
$n_d - n_C$	0.002 952
$n_e - n_C$	0.005 250
$n_g - n_d$	0.011 867
$n_g - n_F$	0.005 185
$n_h - n_g$	0.004 288
$n_i - n_g$	0.011 567
$n_C - n_t$	0.008 702
$n_e - n_{C'}$	0.004 778
$n_{F'} - n_e$	0.004 928
$n_i - n_{F'}$	0.016 208

Relative Partial Dispersions	
$\theta_{C,t}$	0.854 3
$\theta_{C,A'}$	0.354 8
$\theta_{d,C}$	0.306 4
$\theta_{e,C}$	0.544 9
$\theta_{g,d}$	1.231 8
$\theta_{g,F}$	0.538 2
$\theta_{h,g}$	0.445 1
$\theta_{i,g}$	1.200 6
$\theta'_{C,t}$	0.896 6
$\theta'_{e,C'}$	0.492 3
$\theta'_{F,e}$	0.507 7
$\theta'_{i,F'}$	1.669 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.020 7
$\Delta\theta_{C,A'}$	0.004 8
$\Delta\theta_{g,d}$	-0.005 9
$\Delta\theta_{g,F}$	-0.004 3
$\Delta\theta_{i,g}$	-0.012 4

Coloring			
λ_{80}	345	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	300
CCI			
B	G	R	
0.00	0.23	0.20	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.06
310	0.27
320	0.53
330	0.73
340	0.85
350	0.922
360	0.956
370	0.975
380	0.984
390	0.989
400	0.992
420	0.993
440	0.993
460	0.995
480	0.996
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.991
1 600	0.994
1 800	0.989
2 000	0.978
2 200	0.934
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	489
Annealing Point AP (°C)	520
Transformation Temperature Tg (°C)	530
Yield Point At (°C)	573
Softening Point SP (°C)	619
Expansion Coefficients (-30 °C ~ 70 °C)	66
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	85
Thermal Conductivity λ (W/(m·K))	1.13

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	49
-90 ~ -80	50
-80 ~ -70	52
-70 ~ -60	54
-60 ~ -50	55
-50 ~ -40	57
-40 ~ -30	58
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	66
20 ~ 30	67
30 ~ 40	68
40 ~ 50	69
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	75
100 ~ 110	77
110 ~ 120	78
120 ~ 130	79
130 ~ 140	80
140 ~ 150	81
150 ~ 160	82
160 ~ 170	82
170 ~ 180	83
180 ~ 190	84
190 ~ 200	85
200 ~ 210	86
210 ~ 220	87
220 ~ 230	87
230 ~ 240	88
240 ~ 250	89
250 ~ 260	89
260 ~ 270	90
270 ~ 280	90
280 ~ 290	91
290 ~ 300	92

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	3.3	3.4	3.7	3.8	3.8	3.9	4.1	4.3	4.3	4.7	5.0	5.5
-60 ~ -40	3.2	3.3	3.5	3.7	3.7	3.9	4.0	4.2	4.3	4.5	4.8	5.4
-40 ~ -20	3.1	3.3	3.5	3.6	3.6	3.9	4.0	4.2	4.3	4.6	4.8	5.4
-20 ~ 0	3.2	3.4	3.6	3.7	3.7	3.8	4.1	4.3	4.4	4.6	4.9	5.5
0 ~ 20	3.2	3.5	3.7	3.8	3.8	4.0	4.1	4.4	4.4	4.7	5.0	5.6
20 ~ 40	3.4	3.6	3.8	3.9	3.9	4.1	4.2	4.5	4.5	4.8	5.1	5.7
40 ~ 60	3.5	3.6	3.9	4.0	4.0	4.1	4.3	4.5	4.6	4.9	5.3	5.8
60 ~ 80	3.6	3.7	4.0	4.1	4.1	4.3	4.4	4.7	4.7	5.0	5.3	5.9
80 ~ 100	3.6	3.7	4.1	4.2	4.2	4.3	4.5	4.8	4.8	5.1	5.4	6.0
100 ~ 120	3.6	3.9	4.2	4.3	4.3	4.4	4.6	4.8	4.9	5.2	5.5	6.1
120 ~ 140	3.7	3.9	4.2	4.3	4.3	4.4	4.6	4.9	4.9	5.2	5.5	6.1
140 ~ 160	3.7	3.9	4.2	4.3	4.3	4.4	4.6	4.9	4.9	5.2	5.5	6.2
160 ~ 180	3.7	3.8	4.1	4.3	4.3	4.5	4.5	4.9	5.0	5.3	5.6	6.2

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.29
Specific Gravity d	2.82
Remarks	

OHARA 25-04

L-BAL35P

Code(d) 592610
Code(e) 594608

Refractive Index n_d	1.592 08 1.592 080	Abbe Number v_d	61.00	Dispersion $n_F - n_C$	0.009 707
Refractive Index n_e	1.594 396	Abbe Number v_e	60.77	Dispersion $n_{F'} - n_{C'}$	0.009 781

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.560 51
n_{1970}	1.970 09	1.566 87
n_{1530}	1.529 58	1.573 53
n_{1129}	1.128 64	1.579 08
n_t	1.013 98	1.580 82
n_s	0.852 11	1.583 73
$n_{A'}$	0.768 19	1.585 66
n_r	0.706 52	1.587 40
n_C	0.656 27	1.589 11
$n_{C'}$	0.643 85	1.589 58
$n_{\text{He-Ne}}$	0.632 8	1.590 02
n_D	0.589 29	1.591 99
n_d	0.587 56	1.592 08
n_e	0.546 07	1.594 40
n_F	0.486 13	1.598 81
$n_{F'}$	0.479 99	1.599 36
$n_{\text{He-Cd}}$	0.441 57	1.603 35
n_g	0.435 835	1.604 04
n_h	0.404 656	1.608 36
n_i	0.365 015	1.615 70

Constants of Dispersion Formula	
A_1	8.067 421 94E-01
A_2	6.904 886 48E-01
A_3	1.264 779 47E+00
B_1	1.488 362 31E-02
B_2	2.519 430 58E-03
B_3	1.113 145 70E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.2

Mechanical Properties	
Young's Modulus E (GPa)	100.8
Rigidity Modulus G (GPa)	40.3
Poisson's Ratio σ	0.252
Knoop Hardness Hk[Class]	630 6
Abrasion Aa	100

Partial Dispersions	
$n_C - n_t$	0.008 288
$n_C - n_{A'}$	0.003 444
$n_d - n_C$	0.002 974
$n_e - n_C$	0.005 290
$n_g - n_d$	0.011 957
$n_g - n_F$	0.005 224
$n_h - n_g$	0.004 322
$n_i - n_g$	0.011 660
$n_C - n_t$	0.008 763
$n_e - n_{C'}$	0.004 815
$n_{F'} - n_e$	0.004 966
$n_i - n_{F'}$	0.016 335

Relative Partial Dispersions	
$\theta_{C,t}$	0.853 8
$\theta_{C,A'}$	0.354 8
$\theta_{d,C}$	0.306 4
$\theta_{e,C}$	0.545 0
$\theta_{g,d}$	1.231 8
$\theta_{g,F}$	0.538 2
$\theta_{h,g}$	0.445 2
$\theta_{i,g}$	1.201 2
$\theta'_{C,t}$	0.895 9
$\theta'_{e,C'}$	0.492 3
$\theta'_{F,e}$	0.507 7
$\theta'_{i,F'}$	1.670 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.020 9
$\Delta\theta_{C,A'}$	0.005 0
$\Delta\theta_{g,d}$	-0.006 2
$\Delta\theta_{g,F}$	-0.004 6
$\Delta\theta_{i,g}$	-0.013 0

Coloring			
λ_{80}	345	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	300
CCI			
B	G	R	
0.00	0.23	0.20	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.06
310	0.27
320	0.53
330	0.73
340	0.85
350	0.922
360	0.956
370	0.975
380	0.984
390	0.989
400	0.992
420	0.993
440	0.993
460	0.995
480	0.996
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.991
1 600	0.994
1 800	0.989
2 000	0.978
2 200	0.934
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	489
Annealing Point AP (°C)	520
Transformation Temperature Tg (°C)	531
Yield Point At (°C)	575
Softening Point SP (°C)	619
Expansion Coefficients (-30 °C ~ 70 °C)	66
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	86
Thermal Conductivity λ (W/(m·K))	1.13

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	49
-90 ~ -80	51
-80 ~ -70	52
-70 ~ -60	54
-60 ~ -50	56
-50 ~ -40	57
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	62
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	66
20 ~ 30	67
30 ~ 40	69
40 ~ 50	70
50 ~ 60	71
60 ~ 70	72
70 ~ 80	74
80 ~ 90	75
90 ~ 100	76
100 ~ 110	77
110 ~ 120	78
120 ~ 130	79
130 ~ 140	80
140 ~ 150	81
150 ~ 160	82
160 ~ 170	83
170 ~ 180	84
180 ~ 190	85
190 ~ 200	86
200 ~ 210	87
210 ~ 220	88
220 ~ 230	88
230 ~ 240	89
240 ~ 250	90
250 ~ 260	91
260 ~ 270	91
270 ~ 280	92
280 ~ 290	93
290 ~ 300	93

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	3.3	3.4	3.7	3.8	3.8	3.9	4.0	4.2	4.2	4.5	4.8	5.2
-60 ~ -40	3.2	3.3	3.5	3.7	3.7	3.8	3.9	4.1	4.2	4.4	4.6	5.2
-40 ~ -20	3.2	3.3	3.5	3.6	3.7	3.8	3.9	4.1	4.2	4.4	4.7	5.3
-20 ~ 0	3.2	3.3	3.5	3.6	3.6	3.8	4.0	4.2	4.2	4.5	4.8	5.3
0 ~ 20	3.2	3.4	3.7	3.7	3.8	3.9	4.0	4.3	4.3	4.6	4.9	5.5
20 ~ 40	3.4	3.5	3.7	3.8	3.9	4.0	4.1	4.4	4.4	4.7	5.0	5.7
40 ~ 60	3.4	3.5	3.8	3.9	3.9	4.0	4.2	4.5	4.5	4.9	5.2	5.8
60 ~ 80	3.5	3.6	3.9	4.0	4.0	4.2	4.3	4.6	4.7	5.0	5.3	5.9
80 ~ 100	3.5	3.6	4.0	4.1	4.2	4.3	4.4	4.7	4.8	5.1	5.5	6.1
100 ~ 120	3.6	3.8	4.1	4.2	4.2	4.4	4.5	4.8	4.9	5.2	5.6	6.2
120 ~ 140	3.6	3.8	4.1	4.2	4.3	4.4	4.6	4.9	4.9	5.3	5.7	6.4
140 ~ 160	3.6	3.8	4.2	4.3	4.3	4.5	4.6	5.0	5.0	5.4	5.8	6.6
160 ~ 180	3.6	3.8	4.1	4.3	4.4	4.5	4.7	5.0	5.1	5.5	5.9	6.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.29
Specific Gravity d	2.82
Remarks	

L-BAL42

Code(d) 583594
Code(e) 585591

Refractive Index n_d	1.583 13 1.583 126	Abbe Number v_d	59.38	Dispersion $n_F - n_C$	0.009 820
Refractive Index n_e	1.585 468	Abbe Number v_e	59.13	Dispersion $n_{F'} - n_{C'}$	0.009 901

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.554 02
n_{1970}	1.970 09	1.559 49
n_{1530}	1.529 58	1.565 33
n_{1129}	1.128 64	1.570 38
n_t	1.013 98	1.572 01
n_s	0.852 11	1.574 82
$n_{A'}$	0.768 19	1.576 71
n_r	0.706 52	1.578 43
n_C	0.656 27	1.580 13
$n_{C'}$	0.643 85	1.580 61
$n_{\text{He-Ne}}$	0.632 8	1.581 06
n_D	0.589 29	1.583 04
n_d	0.587 56	1.583 13
n_e	0.546 07	1.585 47
n_F	0.486 13	1.589 95
$n_{F'}$	0.479 99	1.590 51
$n_{\text{He-Cd}}$	0.441 57	1.594 57
n_g	0.435 835	1.595 28
n_h	0.404 656	1.599 69
n_i	0.365 015	1.607 19

Constants of Dispersion Formula	
A_1	1.395 280 97E+00
A_2	7.255 195 20E-02
A_3	1.663 358 48E+00
B_1	1.118 620 30E-02
B_2	-2.467 485 75E-02
B_3	1.677 179 58E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	89.1
Rigidity Modulus G (GPa)	35.7
Poisson's Ratio σ	0.247
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	117

Partial Dispersions	
$n_C - n_t$	0.008 122
$n_C - n_{A'}$	0.003 426
$n_d - n_C$	0.002 992
$n_e - n_C$	0.005 334
$n_g - n_d$	0.012 153
$n_g - n_F$	0.005 325
$n_h - n_g$	0.004 412
$n_i - n_g$	0.011 910
$n_{C'} - n_t$	0.008 599
$n_e - n_{C'}$	0.004 857
$n_{F'} - n_e$	0.005 044
$n_i - n_{F'}$	0.016 677

Relative Partial Dispersions	
$\theta_{C,t}$	0.827 1
$\theta_{C,A'}$	0.348 9
$\theta_{d,C}$	0.304 7
$\theta_{e,C}$	0.543 2
$\theta_{g,d}$	1.237 6
$\theta_{g,F}$	0.542 3
$\theta_{h,g}$	0.449 3
$\theta_{i,g}$	1.212 8
$\theta'_{C,t}$	0.868 5
$\theta'_{e,C'}$	0.490 6
$\theta'_{F,e}$	0.509 4
$\theta'_{i,F'}$	1.684 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 8
$\Delta\theta_{C,A'}$	0.001 0
$\Delta\theta_{g,d}$	-0.003 8
$\Delta\theta_{g,F}$	-0.003 1
$\Delta\theta_{i,g}$	-0.015 0

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	282
CCI			
B	G	R	
0.00	0.17	0.14	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.14
300	0.32
310	0.55
320	0.73
330	0.85
340	0.924
350	0.960
360	0.978
370	0.987
380	0.992
390	0.994
400	0.995
420	0.996
440	0.996
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.988
1 600	0.993
1 800	0.983
2 000	0.968
2 200	0.901
2 400	0.83

Thermal Properties	
Strain Point StP (°C)	467
Annealing Point AP (°C)	494
Transformation Temperature Tg (°C)	502
Yield Point At (°C)	551
Softening Point SP (°C)	607
Expansion Coefficients (-30 °C ~ 70 °C)	72
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	92
Thermal Conductivity λ (W/(m·K))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	55
-90 ~ -80	57
-80 ~ -70	58
-70 ~ -60	60
-60 ~ -50	61
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	66
-20 ~ -10	67
-10 ~ 0	69
0 ~ 10	70
10 ~ 20	72
20 ~ 30	73
30 ~ 40	74
40 ~ 50	75
50 ~ 60	77
60 ~ 70	78
70 ~ 80	79
80 ~ 90	80
90 ~ 100	82
100 ~ 110	83
110 ~ 120	84
120 ~ 130	85
130 ~ 140	86
140 ~ 150	87
150 ~ 160	88
160 ~ 170	89
170 ~ 180	90
180 ~ 190	91
190 ~ 200	92
200 ~ 210	93
210 ~ 220	94
220 ~ 230	94
230 ~ 240	95
240 ~ 250	96
250 ~ 260	97
260 ~ 270	98
270 ~ 280	98
280 ~ 290	99
290 ~ 300	100

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	2.5	2.6	2.9	3.0	3.0	3.1	3.3	3.5	3.5	3.9	4.1	4.6
-60 ~ -40	2.3	2.5	2.7	2.8	2.8	3.0	3.1	3.4	3.4	3.7	4.0	4.6
-40 ~ -20	2.3	2.4	2.6	2.7	2.8	3.0	3.1	3.4	3.4	3.7	4.0	4.5
-20 ~ 0	2.3	2.4	2.7	2.7	2.8	2.9	3.1	3.4	3.4	3.8	4.1	4.6
0 ~ 20	2.2	2.5	2.8	2.8	2.9	3.0	3.2	3.4	3.5	3.8	4.1	4.8
20 ~ 40	2.4	2.5	2.8	2.9	2.9	3.1	3.2	3.5	3.6	3.9	4.2	5.0
40 ~ 60	2.4	2.6	2.9	3.0	3.0	3.1	3.3	3.6	3.6	4.0	4.4	5.1
60 ~ 80	2.5	2.7	3.0	3.1	3.1	3.3	3.4	3.8	3.8	4.2	4.5	5.2
80 ~ 100	2.5	2.7	3.1	3.2	3.2	3.4	3.6	3.9	3.9	4.3	4.7	5.4
100 ~ 120	2.5	2.8	3.2	3.3	3.3	3.5	3.6	4.0	4.0	4.4	4.8	5.5
120 ~ 140	2.7	2.9	3.2	3.3	3.3	3.5	3.7	4.1	4.1	4.5	4.9	5.6
140 ~ 160	2.7	2.9	3.2	3.3	3.4	3.6	3.7	4.1	4.2	4.6	5.0	5.8
160 ~ 180	2.7	2.9	3.2	3.3	3.4	3.7	3.9	4.2	4.3	4.7	5.1	5.9

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.19
Specific Gravity d	3.05
Remarks	

OHARA 25-04

L-BAL42P

Code(d) 586592
Code(e) 588590

Refractive Index n_d	1.585 93 1.585 930	Abbe Number v_d	59.24	Dispersion $n_F - n_C$	0.009 890
Refractive Index n_e	1.588 288	Abbe Number v_e	58.99	Dispersion $n_{F'} - n_{C'}$	0.009 972

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.556 71
n_{1970}	1.970 09	1.562 22
n_{1530}	1.529 58	1.568 06
n_{1129}	1.128 64	1.573 11
n_t	1.013 98	1.574 75
n_s	0.852 11	1.577 57
$n_{A'}$	0.768 19	1.579 47
n_r	0.706 52	1.581 20
n_C	0.656 27	1.582 92
$n_{C'}$	0.643 85	1.583 40
$n_{\text{He-Ne}}$	0.632 8	1.583 85
n_D	0.589 29	1.585 84
n_d	0.587 56	1.585 93
n_e	0.546 07	1.588 29
n_F	0.486 13	1.592 81
$n_{F'}$	0.479 99	1.593 37
$n_{\text{He-Cd}}$	0.441 57	1.597 46
n_g	0.435 835	1.598 17
n_h	0.404 656	1.602 62
n_i	0.365 015	1.610 20

Constants of Dispersion Formula	
A_1	8.810 900 17E-01
A_2	5.950 388 59E-01
A_3	1.225 820 98E+00
B_1	1.484 966 55E-02
B_2	1.635 773 71E-03
B_3	1.251 137 20E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	89.1
Rigidity Modulus G (GPa)	35.7
Poisson's Ratio σ	0.247
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	117

Partial Dispersions	
$n_C - n_t$	0.008 169
$n_C - n_{A'}$	0.003 449
$n_d - n_C$	0.003 013
$n_e - n_C$	0.005 371
$n_g - n_d$	0.012 242
$n_g - n_F$	0.005 365
$n_h - n_g$	0.004 451
$n_i - n_g$	0.012 026
$n_C - n_t$	0.008 649
$n_e - n_{C'}$	0.004 891
$n_{F'} - n_e$	0.005 081
$n_i - n_{F'}$	0.016 829

Relative Partial Dispersions	
$\theta_{C,t}$	0.826 0
$\theta_{C,A'}$	0.348 7
$\theta_{d,C}$	0.304 7
$\theta_{e,C}$	0.543 1
$\theta_{g,d}$	1.237 8
$\theta_{g,F}$	0.542 5
$\theta_{h,g}$	0.450 1
$\theta_{i,g}$	1.216 0
$\theta'_{C,t}$	0.867 3
$\theta'_{e,C'}$	0.490 5
$\theta'_{F,e}$	0.509 5
$\theta'_{i,F'}$	1.687 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 4
$\Delta\theta_{C,A'}$	0.001 0
$\Delta\theta_{g,d}$	-0.003 9
$\Delta\theta_{g,F}$	-0.003 1
$\Delta\theta_{i,g}$	-0.013 0

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	282
CCI			
B	G	R	
0.00	0.17	0.14	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.14
300	0.32
310	0.55
320	0.73
330	0.85
340	0.924
350	0.960
360	0.978
370	0.987
380	0.992
390	0.994
400	0.995
420	0.996
440	0.996
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.988
1 600	0.993
1 800	0.983
2 000	0.968
2 200	0.901
2 400	0.83

Thermal Properties	
Strain Point StP (°C)	467
Annealing Point AP (°C)	494
Transformation Temperature Tg (°C)	502
Yield Point At (°C)	551
Softening Point SP (°C)	607
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(m·K))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	56
-90 ~ -80	57
-80 ~ -70	59
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	64
-40 ~ -30	65
-30 ~ -20	67
-20 ~ -10	68
-10 ~ 0	70
0 ~ 10	71
10 ~ 20	72
20 ~ 30	74
30 ~ 40	75
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	80
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	88
150 ~ 160	89
160 ~ 170	90
170 ~ 180	91
180 ~ 190	92
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	96
230 ~ 240	97
240 ~ 250	98
250 ~ 260	98
260 ~ 270	99
270 ~ 280	100
280 ~ 290	100
290 ~ 300	101

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	2.5	2.6	3.0	3.0	3.0	3.2	3.3	3.5	3.5	3.9	4.2	4.7
-60 ~ -40	2.4	2.5	2.7	2.8	2.8	3.0	3.2	3.4	3.4	3.7	4.0	4.7
-40 ~ -20	2.3	2.4	2.7	2.7	2.8	3.0	3.1	3.4	3.4	3.7	4.0	4.6
-20 ~ 0	2.3	2.4	2.7	2.8	2.8	2.9	3.1	3.4	3.4	3.8	4.1	4.7
0 ~ 20	2.3	2.5	2.8	2.9	2.9	3.0	3.2	3.4	3.5	3.8	4.1	4.8
20 ~ 40	2.3	2.6	2.8	2.9	3.0	3.1	3.2	3.5	3.6	3.9	4.2	5.0
40 ~ 60	2.4	2.6	2.9	3.0	3.0	3.1	3.3	3.6	3.6	4.0	4.4	5.1
60 ~ 80	2.5	2.7	3.0	3.1	3.1	3.3	3.4	3.7	3.8	4.1	4.5	5.2
80 ~ 100	2.5	2.7	3.1	3.2	3.2	3.4	3.5	3.8	3.9	4.3	4.6	5.3
100 ~ 120	2.6	2.8	3.2	3.3	3.3	3.5	3.6	4.0	4.0	4.4	4.8	5.5
120 ~ 140	2.7	2.9	3.2	3.3	3.4	3.5	3.7	4.0	4.1	4.5	4.8	5.6
140 ~ 160	2.7	2.9	3.2	3.4	3.4	3.5	3.7	4.1	4.1	4.5	4.9	5.8
160 ~ 180	2.7	2.9	3.2	3.4	3.4	3.7	3.8	4.2	4.2	4.7	5.1	5.8

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.19
Specific Gravity d	3.05
Remarks	

OHARA 25-04

L-BAL43

Code(d) 586597
Code(e) 588594

Refractive Index n_d	1.585 73 1.585 730	Abbe Number v_d	59.70	Dispersion $n_F - n_C$	0.009 812
Refractive Index n_e	1.588 070	Abbe Number v_e	59.45	Dispersion $n_{F'} - n_{C'}$	0.009 892

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.556 21
n_{1970}	1.970 09	1.561 85
n_{1530}	1.529 58	1.567 81
n_{1129}	1.128 64	1.572 93
n_t	1.013 98	1.574 58
n_s	0.852 11	1.577 40
$n_{A'}$	0.768 19	1.579 30
n_r	0.706 52	1.581 03
n_C	0.656 27	1.582 74
$n_{C'}$	0.643 85	1.583 21
$n_{\text{He-Ne}}$	0.632 8	1.583 66
n_D	0.589 29	1.585 64
n_d	0.587 56	1.585 73
n_e	0.546 07	1.588 07
n_F	0.486 13	1.592 55
$n_{F'}$	0.479 99	1.593 11
$n_{\text{He-Cd}}$	0.441 57	1.597 16
n_g	0.435 835	1.597 86
n_h	0.404 656	1.602 27
n_i	0.365 015	1.609 76

Constants of Dispersion Formula	
A_1	1.047 452 91E+00
A_2	4.284 528 73E-01
A_3	1.141 113 03E+00
B_1	5.632 097 56E-03
B_2	1.883 214 16E-02
B_3	1.141 970 69E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.4
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	90.4
Rigidity Modulus G (GPa)	36.2
Poisson's Ratio σ	0.250
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	118

Partial Dispersions	
$n_C - n_t$	0.008 157
$n_C - n_{A'}$	0.003 435
$n_d - n_C$	0.002 993
$n_e - n_C$	0.005 333
$n_g - n_d$	0.012 132
$n_g - n_F$	0.005 313
$n_h - n_g$	0.004 404
$n_i - n_g$	0.011 900
$n_C - n_t$	0.008 634
$n_e - n_{C'}$	0.004 856
$n_{F'} - n_e$	0.005 036
$n_i - n_{F'}$	0.016 656

Relative Partial Dispersions	
$\theta_{C,t}$	0.831 3
$\theta_{C,A'}$	0.350 1
$\theta_{d,C}$	0.305 0
$\theta_{e,C}$	0.543 5
$\theta_{g,d}$	1.236 4
$\theta_{g,F}$	0.541 5
$\theta_{h,g}$	0.448 8
$\theta_{i,g}$	1.212 8
$\theta'_{C,t}$	0.872 8
$\theta'_{e,C'}$	0.490 9
$\theta'_{F',e}$	0.509 1
$\theta'_{i,F'}$	1.683 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.004 5
$\Delta\theta_{C,A'}$	0.001 9
$\Delta\theta_{g,d}$	-0.004 3
$\Delta\theta_{g,F}$	-0.003 4
$\Delta\theta_{i,g}$	-0.012 3

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	328	$\lambda_{0.05}$	289
CCI			
B	G	R	
0.00	0.10	0.10	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.29
310	0.51
320	0.70
330	0.83
340	0.906
350	0.949
360	0.971
370	0.983
380	0.988
390	0.990
400	0.996
420	0.997
440	0.996
460	0.998
480	0.999
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.993
1 600	0.997
1 800	0.988
2 000	0.975
2 200	0.914
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	451
Annealing Point AP (°C)	482
Transformation Temperature Tg (°C)	506
Yield Point At (°C)	549
Softening Point SP (°C)	596
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(mK))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	56
-90 ~ -80	58
-80 ~ -70	59
-70 ~ -60	61
-60 ~ -50	63
-50 ~ -40	64
-40 ~ -30	66
-30 ~ -20	67
-20 ~ -10	68
-10 ~ 0	70
0 ~ 10	71
10 ~ 20	73
20 ~ 30	74
30 ~ 40	75
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	80
80 ~ 90	81
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	88
150 ~ 160	89
160 ~ 170	90
170 ~ 180	91
180 ~ 190	92
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	96
230 ~ 240	96
240 ~ 250	97
250 ~ 260	98
260 ~ 270	99
270 ~ 280	99
280 ~ 290	100
290 ~ 300	101

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	2.5	2.6	3.0	3.0	3.1	3.2	3.3	3.5	3.5	3.8	4.2	4.6
-60 ~ -40	2.4	2.5	2.7	2.8	2.8	3.1	3.2	3.4	3.5	3.7	4.0	4.6
-40 ~ -20	2.3	2.4	2.7	2.8	2.8	3.0	3.1	3.4	3.4	3.7	4.0	4.5
-20 ~ 0	2.3	2.4	2.7	2.8	2.8	3.0	3.2	3.5	3.5	3.8	4.1	4.7
0 ~ 20	2.3	2.5	2.8	2.9	2.9	3.1	3.2	3.5	3.5	3.9	4.2	4.9
20 ~ 40	2.3	2.6	2.9	3.0	3.0	3.2	3.3	3.6	3.7	4.0	4.3	4.9
40 ~ 60	2.5	2.6	3.0	3.1	3.1	3.2	3.4	3.7	3.7	4.1	4.5	5.2
60 ~ 80	2.6	2.8	3.1	3.2	3.2	3.4	3.6	3.9	3.9	4.3	4.7	5.3
80 ~ 100	2.6	2.8	3.2	3.3	3.3	3.5	3.7	4.0	4.1	4.4	4.8	5.5
100 ~ 120	2.7	2.8	3.3	3.4	3.4	3.6	3.8	4.1	4.2	4.6	5.0	5.7
120 ~ 140	2.8	3.0	3.4	3.5	3.5	3.7	3.9	4.2	4.3	4.7	5.1	5.8
140 ~ 160	2.8	3.0	3.4	3.5	3.6	3.8	3.9	4.3	4.4	4.8	5.2	6.0
160 ~ 180	2.8	3.0	3.4	3.5	3.6	3.9	4.1	4.5	4.5	5.0	5.4	6.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.18
Specific Gravity d	3.05
Remarks	

L-BSL 7

Code(d) 516641
Code(e) 518638

Refractive Index n_d	1.516 33 1.516 330	Abbe Number v_d	64.06	Dispersion $n_F - n_C$	0.008 060
Refractive Index n_e	1.518 253	Abbe Number v_e	63.87	Dispersion $n_{F'} - n_{C'}$	0.008 114

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.488 10
n_{1970}	1.970 09	1.494 04
n_{1530}	1.529 58	1.500 20
n_{1129}	1.128 64	1.505 23
n_t	1.013 98	1.506 77
n_s	0.852 11	1.509 30
$n_{A'}$	0.768 19	1.510 94
n_r	0.706 52	1.512 41
n_C	0.656 27	1.513 85
$n_{C'}$	0.643 85	1.514 24
$n_{\text{He-Ne}}$	0.632 8	1.514 62
n_D	0.589 29	1.516 26
n_d	0.587 56	1.516 33
n_e	0.546 07	1.518 25
n_F	0.486 13	1.521 91
$n_{F'}$	0.479 99	1.522 36
$n_{\text{He-Cd}}$	0.441 57	1.525 64
n_g	0.435 835	1.526 20
n_h	0.404 656	1.529 75
n_i	0.365 015	1.535 74

Constants of Dispersion Formula	
A_1	9.174 739 18E-01
A_2	3.526 876 65E-01
A_3	1.055 797 88E+00
B_1	5.277 014 11E-03
B_2	1.708 094 97E-02
B_3	1.043 025 83E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.2

Mechanical Properties	
Young's Modulus E (GPa)	79.3
Rigidity Modulus G (GPa)	32.7
Poisson's Ratio σ	0.214
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	72

Partial Dispersions	
$n_C - n_t$	0.007 081
$n_C - n_{A'}$	0.002 904
$n_d - n_C$	0.002 484
$n_e - n_C$	0.004 407
$n_g - n_d$	0.009 874
$n_g - n_F$	0.004 298
$n_h - n_g$	0.003 544
$n_i - n_g$	0.009 541
$n_C - n_t$	0.007 479
$n_e - n_{C'}$	0.004 009
$n_{F'} - n_e$	0.004 105
$n_i - n_{F'}$	0.013 387

Relative Partial Dispersions	
$\theta_{C,t}$	0.878 5
$\theta_{C,A'}$	0.360 3
$\theta_{d,C}$	0.308 2
$\theta_{e,C}$	0.546 8
$\theta_{g,d}$	1.225 1
$\theta_{g,F}$	0.533 3
$\theta_{h,g}$	0.439 7
$\theta_{i,g}$	1.183 7
$\theta'_{C,t}$	0.921 7
$\theta'_{e,C'}$	0.494 1
$\theta'_{F,e}$	0.505 9
$\theta'_{i,F'}$	1.649 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.031 2
$\Delta\theta_{C,A'}$	0.006 8
$\Delta\theta_{g,d}$	-0.006 6
$\Delta\theta_{g,F}$	-0.004 5
$\Delta\theta_{i,g}$	-0.004 9

Coloring			
λ_{80}	330	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	299
CCI			
B	G	R	
0.00	0.08	0.09	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.08
310	0.40
320	0.71
330	0.87
340	0.942
350	0.973
360	0.986
370	0.992
380	0.994
390	0.996
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.974
1 600	0.994
1 800	0.988
2 000	0.974
2 200	0.87
2 400	0.80

Thermal Properties	
Strain Point StP (°C)	464
Annealing Point AP (°C)	488
Transformation Temperature Tg (°C)	497
Yield Point At (°C)	560
Softening Point SP (°C)	630
Expansion Coefficients (-30 °C ~ 70 °C)	59
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	72
Thermal Conductivity λ (W/(mK))	1.17

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	45
-90 ~ -80	46
-80 ~ -70	48
-70 ~ -60	49
-60 ~ -50	50
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	58
10 ~ 20	59
20 ~ 30	60
30 ~ 40	61
40 ~ 50	62
50 ~ 60	63
60 ~ 70	63
70 ~ 80	64
80 ~ 90	65
90 ~ 100	66
100 ~ 110	67
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	69
150 ~ 160	70
160 ~ 170	70
170 ~ 180	71
180 ~ 190	71
190 ~ 200	72
200 ~ 210	72
210 ~ 220	73
220 ~ 230	73
230 ~ 240	73
240 ~ 250	73
250 ~ 260	74
260 ~ 270	74
270 ~ 280	74
280 ~ 290	74
290 ~ 300	74

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.93
Specific Gravity d	2.38
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	3.6	3.7	3.8	3.9	3.9	3.9	4.1	4.3	4.3	4.5	4.7	5.1
-60 ~ -40	3.4	3.5	3.7	3.7	3.8	3.8	4.0	4.2	4.2	4.4	4.6	5.0
-40 ~ -20	3.4	3.5	3.7	3.7	3.8	3.9	4.0	4.2	4.2	4.4	4.6	5.0
-20 ~ 0	3.4	3.5	3.7	3.8	3.8	4.0	4.1	4.3	4.3	4.5	4.7	5.2
0 ~ 20	3.5	3.7	3.8	3.9	3.9	4.0	4.1	4.3	4.3	4.6	4.9	5.4
20 ~ 40	3.6	3.7	3.9	4.0	4.0	4.1	4.2	4.5	4.5	4.8	5.1	5.6
40 ~ 60	3.7	3.8	4.1	4.2	4.2	4.3	4.4	4.7	4.7	5.0	5.2	5.7
60 ~ 80	3.8	4.0	4.2	4.3	4.3	4.4	4.5	4.8	4.9	5.2	5.4	6.0
80 ~ 100	4.0	4.1	4.3	4.4	4.4	4.6	4.7	4.9	5.0	5.2	5.5	6.2
100 ~ 120	4.1	4.2	4.5	4.5	4.6	4.7	4.8	5.1	5.1	5.4	5.7	6.4
120 ~ 140	4.1	4.3	4.5	4.6	4.6	4.9	4.9	5.3	5.3	5.6	5.9	6.5
140 ~ 160	4.3	4.4	4.7	4.8	4.8	5.0	5.1	5.4	5.4	5.7	6.1	6.7
160 ~ 180	4.3	4.5	4.8	4.9	4.9	5.0	5.2	5.5	5.5	5.8	6.2	6.8

OHARA 25-04

Refractive Index n_d	1.808 35 1.808 350	Abbe Number v_d	40.55	Dispersion $n_F - n_C$	0.019 936
Refractive Index n_e	1.813 086	Abbe Number v_e	40.30	Dispersion $n_{F'} - n_{C'}$	0.020 178

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.763 97
n_{1970}	1.970 09	1.770 59
n_{1530}	1.529 58	1.777 93
n_{1129}	1.128 64	1.785 05
n_t	1.013 98	1.787 65
n_s	0.852 11	1.792 45
$n_{A'}$	0.768 19	1.795 90
n_r	0.706 52	1.799 14
n_C	0.656 27	1.802 43
$n_{C'}$	0.643 85	1.803 36
$n_{\text{He-Ne}}$	0.632 8	1.804 24
n_D	0.589 29	1.808 18
n_d	0.587 56	1.808 35
n_e	0.546 07	1.813 09
n_F	0.486 13	1.822 37
$n_{F'}$	0.479 99	1.823 54
$n_{\text{He-Cd}}$	0.441 57	1.832 19
n_g	0.435 835	1.833 72
n_h	0.404 656	1.843 40
n_i	0.365 015	1.860 48

Constants of Dispersion Formula	
A_1	1.836 061 27E+00
A_2	3.417 200 32E-01
A_3	1.352 801 73E+00
B_1	9.819 699 03E-03
B_2	3.856 362 64E-02
B_3	1.070 455 30E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.3
Phosphate Resistance PR	2.2

Mechanical Properties	
Young's Modulus E (GPa)	111.6
Rigidity Modulus G (GPa)	42.8
Poisson's Ratio σ	0.303
Knoop Hardness Hk[Class]	640 6
Abrasion Aa	88

Partial Dispersions	
$n_C - n_t$	0.014 785
$n_C - n_{A'}$	0.006 535
$n_d - n_C$	0.005 918
$n_e - n_C$	0.010 654
$n_g - n_d$	0.025 366
$n_g - n_F$	0.011 348
$n_h - n_g$	0.009 680
$n_i - n_g$	0.026 762
$n_C - n_t$	0.015 716
$n_e - n_{C'}$	0.009 723
$n_{F'} - n_e$	0.010 455
$n_i - n_{F'}$	0.036 937

Relative Partial Dispersions	
$\theta_{C,t}$	0.741 6
$\theta_{C,A'}$	0.327 8
$\theta_{d,C}$	0.296 8
$\theta_{e,C}$	0.534 4
$\theta_{g,d}$	1.272 4
$\theta_{g,F}$	0.569 2
$\theta_{h,g}$	0.485 6
$\theta_{i,g}$	1.342 4
$\theta'_{C,t}$	0.778 9
$\theta'_{e,C'}$	0.481 9
$\theta'_{F,e}$	0.518 1
$\theta'_{i,F'}$	1.830 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.004 7
$\Delta\theta_{C,A'}$	0.002 8
$\Delta\theta_{g,d}$	-0.008 1
$\Delta\theta_{g,F}$	-0.006 7
$\Delta\theta_{i,g}$	-0.043 1

Coloring			
λ_{80}	400	λ_5	335
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	364	$\lambda_{0.05}$	336
CCI			
B	G	R	
0.00	0.75	0.77	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.20
350	0.54
360	0.76
370	0.87
380	0.922
390	0.950
400	0.965
420	0.979
440	0.985
460	0.990
480	0.993
500	0.996
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.992
2 000	0.975
2 200	0.942
2 400	0.79

Thermal Properties	
Strain Point StP (°C)	491
Annealing Point AP (°C)	515
Transformation Temperature Tg (°C)	531
Yield Point At (°C)	577
Softening Point SP (°C)	603
Expansion Coefficients (-30 °C ~ 70 °C)	64
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	81
Thermal Conductivity λ (W/(mK))	0.875

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	49
-90 ~ -80	51
-80 ~ -70	52
-70 ~ -60	53
-60 ~ -50	55
-50 ~ -40	56
-40 ~ -30	57
-30 ~ -20	58
-20 ~ -10	60
-10 ~ 0	61
0 ~ 10	62
10 ~ 20	63
20 ~ 30	64
30 ~ 40	66
40 ~ 50	67
50 ~ 60	68
60 ~ 70	69
70 ~ 80	70
80 ~ 90	71
90 ~ 100	72
100 ~ 110	73
110 ~ 120	74
120 ~ 130	75
130 ~ 140	76
140 ~ 150	77
150 ~ 160	78
160 ~ 170	79
170 ~ 180	80
180 ~ 190	80
190 ~ 200	81
200 ~ 210	82
210 ~ 220	83
220 ~ 230	84
230 ~ 240	84
240 ~ 250	85
250 ~ 260	86
260 ~ 270	87
270 ~ 280	87
280 ~ 290	88
290 ~ 300	89

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	5.7	6.0	6.6	6.7	6.8	7.1	7.3	8.0	8.1	8.8	9.7	11.2
-60 ~ -40	5.7	6.1	6.6	6.8	6.8	7.1	7.4	8.1	8.2	8.9	9.7	11.4
-40 ~ -20	5.8	6.1	6.6	6.8	6.9	7.3	7.6	8.2	8.3	9.0	10.0	11.6
-20 ~ 0	5.8	6.1	6.8	7.0	7.0	7.3	7.6	8.3	8.4	9.2	10.1	11.8
0 ~ 20	6.0	6.3	6.9	7.1	7.2	7.5	7.8	8.5	8.6	9.5	10.4	12.1
20 ~ 40	6.0	6.4	7.1	7.3	7.3	7.7	8.0	8.7	8.8	9.6	10.5	12.4
40 ~ 60	6.2	6.5	7.2	7.4	7.4	7.8	8.1	8.8	8.9	9.8	10.7	12.7
60 ~ 80	6.2	6.5	7.2	7.4	7.5	7.8	8.2	8.9	9.1	10.0	10.9	12.9
80 ~ 100	6.3	6.6	7.3	7.5	7.5	7.9	8.2	9.0	9.1	10.0	11.0	13.1
100 ~ 120	6.2	6.6	7.2	7.5	7.5	7.9	8.3	9.0	9.2	10.1	11.1	13.1
120 ~ 140	6.1	6.5	7.2	7.4	7.5	7.9	8.2	9.0	9.1	10.1	11.1	13.2
140 ~ 160	6.0	6.4	7.1	7.3	7.4	7.8	8.1	9.0	9.1	10.1	11.1	13.3
160 ~ 180	5.8	6.1	6.9	7.1	7.2	7.6	8.0	8.8	9.0	10.0	11.1	13.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.35
Specific Gravity d	4.62
Remarks	

L-LAH85V

Code(d) **854404**
Code(e) **859401**

Refractive Index n_d	1.854 00 1.854 000	Abbe Number v_d	40.38	Dispersion $n_F - n_C$	0.021 151
Refractive Index n_e	1.859 025	Abbe Number v_e	40.13	Dispersion $n_{F'} - n_{C'}$	0.021 407

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.807 40
n_{1970}	1.970 09	1.814 25
n_{1530}	1.529 58	1.821 88
n_{1129}	1.128 64	1.829 34
n_t	1.013 98	1.832 07
n_s	0.852 11	1.837 14
$n_{A'}$	0.768 19	1.840 79
n_r	0.706 52	1.844 23
n_C	0.656 27	1.847 72
$n_{C'}$	0.643 85	1.848 71
$n_{\text{He-Ne}}$	0.632 8	1.849 64
n_D	0.589 29	1.853 81
n_d	0.587 56	1.854 00
n_e	0.546 07	1.859 03
n_F	0.486 13	1.868 87
$n_{F'}$	0.479 99	1.870 12
$n_{\text{He-Cd}}$	0.441 57	1.879 29
n_g	0.435 835	1.880 90
n_h	0.404 656	1.891 16
n_i	0.365 015	1.909 23

Constants of Dispersion Formula	
A_1	1.974 605 03E+00
A_2	3.619 035 92E-01
A_3	1.384 332 41E+00
B_1	1.018 542 58E-02
B_2	3.848 291 18E-02
B_3	1.037 136 27E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	4
Acid Resistance(Surface) Group SR	3.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	111.5
Rigidity Modulus G (GPa)	42.7
Poisson's Ratio σ	0.306
Knoop Hardness Hk[Class]	670 7
Abrasion Aa	65

Partial Dispersions	
$n_C - n_t$	0.015 652
$n_C - n_{A'}$	0.006 929
$n_d - n_C$	0.006 279
$n_e - n_C$	0.011 304
$n_g - n_d$	0.026 903
$n_g - n_F$	0.012 031
$n_h - n_g$	0.010 254
$n_i - n_g$	0.028 327
$n_C - n_t$	0.016 640
$n_e - n_{C'}$	0.010 316
$n_{F'} - n_e$	0.011 091
$n_i - n_{F'}$	0.039 114

Relative Partial Dispersions	
$\theta_{C,t}$	0.740 0
$\theta_{C,A'}$	0.327 6
$\theta_{d,C}$	0.296 9
$\theta_{e,C}$	0.534 4
$\theta_{g,d}$	1.271 9
$\theta_{g,F}$	0.568 8
$\theta_{h,g}$	0.484 8
$\theta_{i,g}$	1.339 3
$\theta'_{C,t}$	0.777 3
$\theta'_{e,C'}$	0.481 9
$\theta'_{F,e}$	0.518 1
$\theta'_{i,F'}$	1.827 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 9
$\Delta\theta_{C,A'}$	0.002 8
$\Delta\theta_{g,d}$	-0.008 9
$\Delta\theta_{g,F}$	-0.007 3
$\Delta\theta_{i,g}$	-0.047 6

Coloring			
λ_{80}		λ_5	340
λ_{70}	380		
Internal transmission			
$\lambda_{0.80}$	373	$\lambda_{0.05}$	340
CCI			
B	G	R	
0.00	1.17	1.20	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.05
350	0.30
360	0.58
370	0.77
380	0.86
390	0.915
400	0.944
420	0.971
440	0.981
460	0.987
480	0.992
500	0.995
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.992
2 000	0.973
2 200	0.933
2 400	0.77

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	616
Yield Point At (°C)	658
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	77
Thermal Conductivity λ (W/(mK))	0.819

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	55
-80 ~ -70	55
-70 ~ -60	56
-60 ~ -50	57
-50 ~ -40	58
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	62
0 ~ 10	63
10 ~ 20	63
20 ~ 30	64
30 ~ 40	65
40 ~ 50	66
50 ~ 60	67
60 ~ 70	67
70 ~ 80	68
80 ~ 90	69
90 ~ 100	70
100 ~ 110	70
110 ~ 120	71
120 ~ 130	72
130 ~ 140	73
140 ~ 150	73
150 ~ 160	74
160 ~ 170	75
170 ~ 180	75
180 ~ 190	76
190 ~ 200	77
200 ~ 210	77
210 ~ 220	78
220 ~ 230	79
230 ~ 240	79
240 ~ 250	80
250 ~ 260	81
260 ~ 270	81
270 ~ 280	82
280 ~ 290	82
290 ~ 300	83

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	4.8	5.1	5.6	5.8	5.8	6.1	6.3	7.0	7.1	7.7	8.5	9.9
-60 ~ -40	4.6	4.9	5.5	5.6	5.7	6.0	6.2	6.8	6.9	7.7	8.4	10.0
-40 ~ -20	4.5	4.9	5.4	5.6	5.6	5.9	6.2	6.9	7.0	7.7	8.5	10.2
-20 ~ 0	4.6	4.9	5.4	5.6	5.7	6.1	6.4	7.0	7.1	7.9	8.7	10.4
0 ~ 20	4.6	4.9	5.5	5.7	5.7	6.2	6.5	7.2	7.2	8.1	8.9	10.8
20 ~ 40	4.7	5.0	5.6	5.8	5.9	6.2	6.6	7.3	7.4	8.3	9.2	11.1
40 ~ 60	4.8	5.1	5.8	6.0	6.0	6.4	6.7	7.5	7.6	8.6	9.5	11.4
60 ~ 80	4.9	5.2	6.0	6.2	6.2	6.6	7.0	7.8	7.9	8.8	9.8	11.8
80 ~ 100	5.0	5.4	6.1	6.3	6.4	6.7	7.1	8.0	8.0	9.1	10.1	12.2
100 ~ 120	5.1	5.5	6.2	6.4	6.5	6.9	7.3	8.1	8.3	9.3	10.5	12.6
120 ~ 140	5.2	5.6	6.3	6.6	6.7	7.1	7.5	8.3	8.5	9.5	10.6	13.0
140 ~ 160	5.2	5.6	6.4	6.7	6.8	7.2	7.6	8.6	8.6	9.8	11.0	13.3
160 ~ 180	5.3	5.7	6.5	6.9	7.0	7.4	7.8	8.8	8.9	10.0	11.2	13.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.83
Specific Gravity d	5.25
Remarks	

Refractive Index n_d	1.764 50 1.764 500	Abbe Number v_d	49.09	Dispersion $n_F - n_C$	0.015 572
Refractive Index n_e	1.768 208	Abbe Number v_e	48.85	Dispersion $n_{F'} - n_{C'}$	0.015 726

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.724 04
n_{1970}	1.970 09	1.731 03
n_{1530}	1.529 58	1.738 52
n_{1129}	1.128 64	1.745 27
n_t	1.013 98	1.747 58
n_s	0.852 11	1.751 68
$n_{A'}$	0.768 19	1.754 53
n_r	0.706 52	1.757 16
n_C	0.656 27	1.759 81
$n_{C'}$	0.643 85	1.760 55
$n_{\text{He-Ne}}$	0.632 8	1.761 25
n_D	0.589 29	1.764 36
n_d	0.587 56	1.764 50
n_e	0.546 07	1.768 21
n_F	0.486 13	1.775 38
$n_{F'}$	0.479 99	1.776 28
$n_{\text{He-Cd}}$	0.441 57	1.782 84
n_g	0.435 835	1.783 99
n_h	0.404 656	1.791 20
n_i	0.365 015	1.803 60

Constants of Dispersion Formula	
A_1	1.261 441 28E+00
A_2	7.821 152 73E-01
A_3	1.158 236 45E+00
B_1	5.725 125 82E-03
B_2	2.198 297 52E-02
B_3	8.804 822 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	114.4
Rigidity Modulus G (GPa)	43.9
Poisson's Ratio σ	0.301
Knoop Hardness Hk[Class]	680 7
Abrasion Aa	68

Partial Dispersions	
$n_C - n_t$	0.012 232
$n_C - n_{A'}$	0.005 282
$n_d - n_C$	0.004 692
$n_e - n_C$	0.008 400
$n_g - n_d$	0.019 488
$n_g - n_F$	0.008 608
$n_h - n_g$	0.007 208
$n_i - n_g$	0.019 614
$n_C - n_t$	0.012 975
$n_e - n_{C'}$	0.007 657
$n_{F'} - n_e$	0.008 069
$n_i - n_{F'}$	0.027 325

Relative Partial Dispersions	
$\theta_{C,t}$	0.785 5
$\theta_{C,A'}$	0.339 2
$\theta_{d,C}$	0.301 3
$\theta_{e,C}$	0.539 4
$\theta_{g,d}$	1.251 5
$\theta_{g,F}$	0.552 8
$\theta_{h,g}$	0.462 9
$\theta_{i,g}$	1.259 6
$\theta'_{C,t}$	0.825 1
$\theta'_{e,C'}$	0.486 9
$\theta'_{F,e}$	0.513 1
$\theta'_{i,F'}$	1.737 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 5
$\Delta\theta_{C,A'}$	0.003 8
$\Delta\theta_{g,d}$	-0.011 3
$\Delta\theta_{g,F}$	-0.009 2
$\Delta\theta_{i,g}$	-0.054 4

Coloring			
λ_{80}	365	λ_5	275
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	333	$\lambda_{0.05}$	274
CCI			
B	G	R	
0.00	0.30	0.31	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.15
290	0.32
300	0.46
310	0.59
320	0.69
330	0.78
340	0.85
350	0.902
360	0.937
370	0.954
380	0.973
390	0.981
400	0.986
420	0.991
440	0.993
460	0.996
480	0.997
500	0.998
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.988
2 000	0.963
2 200	0.905
2 400	0.67

Thermal Properties	
Strain Point StP (°C)	578
Annealing Point AP (°C)	599
Transformation Temperature Tg (°C)	620
Yield Point At (°C)	650
Softening Point SP (°C)	676
Expansion Coefficients (-30 °C ~ 70 °C)	59
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(mK))	0.841

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	45
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	49
-60 ~ -50	50
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	64
80 ~ 90	65
90 ~ 100	66
100 ~ 110	67
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	70
160 ~ 170	71
170 ~ 180	72
180 ~ 190	72
190 ~ 200	73
200 ~ 210	74
210 ~ 220	74
220 ~ 230	75
230 ~ 240	75
240 ~ 250	76
250 ~ 260	76
260 ~ 270	77
270 ~ 280	77
280 ~ 290	78
290 ~ 300	78

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.71
Specific Gravity d	4.29
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	4.2	4.5	5.0	5.1	5.2	5.4	5.8	6.2	6.3	6.9	7.5	8.5
-60 ~ -40	4.4	4.6	5.1	5.3	5.3	5.5	5.9	6.4	6.4	7.0	7.5	8.7
-40 ~ -20	4.5	4.9	5.4	5.5	5.5	5.8	6.0	6.5	6.6	7.3	7.8	8.9
-20 ~ 0	4.8	5.0	5.5	5.7	5.7	6.0	6.3	6.8	6.9	7.5	8.1	9.2
0 ~ 20	5.0	5.2	5.7	6.0	6.1	6.3	6.6	7.1	7.1	7.7	8.3	9.4
20 ~ 40	5.2	5.5	6.0	6.2	6.2	6.5	6.7	7.3	7.4	8.0	8.6	9.7
40 ~ 60	5.4	5.7	6.2	6.5	6.5	6.8	7.0	7.6	7.6	8.2	8.8	9.9
60 ~ 80	5.6	5.9	6.4	6.5	6.6	6.9	7.1	7.6	7.7	8.3	8.9	10.1
80 ~ 100	5.7	6.1	6.6	6.8	6.8	7.1	7.3	7.9	8.0	8.6	9.2	10.3
100 ~ 120	5.7	6.0	6.6	6.8	6.9	7.1	7.4	7.9	8.0	8.6	9.2	10.3
120 ~ 140	5.7	6.0	6.6	6.8	6.9	7.1	7.4	7.9	8.0	8.6	9.2	10.3
140 ~ 160	5.9	6.1	6.7	6.9	6.9	7.2	7.4	8.0	8.1	8.7	9.3	10.4
160 ~ 180	5.7	6.0	6.6	6.7	6.8	7.1	7.3	7.9	7.9	8.6	9.2	10.3

Refractive Index n_d	1.861 00 1.861 000	Abbe Number v_d	37.10	Dispersion $n_F - n_C$	0.023 209
Refractive Index n_e	1.866 504	Abbe Number v_e	36.85	Dispersion $n_{F'} - n_{C'}$	0.023 517

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.812 15
n_{1970}	1.970 09	1.819 04
n_{1530}	1.529 58	1.826 77
n_{1129}	1.128 64	1.834 49
n_t	1.013 98	1.837 36
n_s	0.852 11	1.842 76
$n_{A'}$	0.768 19	1.846 67
n_r	0.706 52	1.850 38
n_C	0.656 27	1.854 16
$n_{C'}$	0.643 85	1.855 23
$n_{\text{He-Ne}}$	0.632 8	1.856 24
n_D	0.589 29	1.860 80
n_d	0.587 56	1.861 00
n_e	0.546 07	1.866 50
n_F	0.486 13	1.877 37
$n_{F'}$	0.479 99	1.878 75
$n_{\text{He-Cd}}$	0.441 57	1.888 99
n_g	0.435 835	1.890 80
n_h	0.404 656	1.902 38
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.006 214 20E+00
A_2	3.470 298 88E-01
A_3	1.416 883 82E+00
B_1	1.054 992 38E-02
B_2	4.458 450 13E-02
B_3	1.059 952 50E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	112.1
Rigidity Modulus G (GPa)	43.0
Poisson's Ratio σ	0.305
Knoop Hardness Hk[Class]	650 7
Abrasion Aa	81

Partial Dispersions	
$n_C - n_t$	0.016 800
$n_C - n_{A'}$	0.007 490
$n_d - n_C$	0.006 839
$n_e - n_C$	0.012 343
$n_g - n_d$	0.029 797
$n_g - n_F$	0.013 427
$n_h - n_g$	0.011 584
$n_i - n_g$	
$n_C - n_t$	0.017 873
$n_e - n_{C'}$	0.011 270
$n_{F'} - n_e$	0.012 247
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.723 9
$\theta_{C,A'}$	0.322 7
$\theta_{d,C}$	0.294 7
$\theta_{e,C}$	0.531 8
$\theta_{g,d}$	1.283 9
$\theta_{g,F}$	0.578 5
$\theta_{h,g}$	0.499 1
$\theta_{i,g}$	
$\theta'_{C,t}$	0.760 0
$\theta'_{e,C'}$	0.479 2
$\theta'_{F',e}$	0.520 8
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 2
$\Delta\theta_{C,A'}$	0.001 9
$\Delta\theta_{g,d}$	-0.003 8
$\Delta\theta_{g,F}$	-0.002 9
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	350
λ_{70}	390		
Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	349
CCI			
B	G	R	
0.00	1.80	1.88	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.31
370	0.58
380	0.75
390	0.85
400	0.908
420	0.957
440	0.975
460	0.983
480	0.989
500	0.993
550	0.998
600	0.998
650	0.999
700	0.999
800	0.999
900	0.998
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.989
2 000	0.970
2 200	0.923
2 400	0.74

Thermal Properties	
Strain Point StP (°C)	560
Annealing Point AP (°C)	583
Transformation Temperature Tg (°C)	595
Yield Point At (°C)	635
Softening Point SP (°C)	664
Expansion Coefficients (-30 °C ~ 70 °C)	66
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	81
Thermal Conductivity λ (W/(m·K))	0.817

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	53
-90 ~ -80	54
-80 ~ -70	55
-70 ~ -60	57
-60 ~ -50	58
-50 ~ -40	59
-40 ~ -30	60
-30 ~ -20	61
-20 ~ -10	62
-10 ~ 0	64
0 ~ 10	65
10 ~ 20	66
20 ~ 30	67
30 ~ 40	68
40 ~ 50	69
50 ~ 60	70
60 ~ 70	71
70 ~ 80	72
80 ~ 90	73
90 ~ 100	73
100 ~ 110	74
110 ~ 120	75
120 ~ 130	76
130 ~ 140	77
140 ~ 150	77
150 ~ 160	78
160 ~ 170	79
170 ~ 180	79
180 ~ 190	80
190 ~ 200	81
200 ~ 210	81
210 ~ 220	82
220 ~ 230	82
230 ~ 240	83
240 ~ 250	83
250 ~ 260	84
260 ~ 270	84
270 ~ 280	85
280 ~ 290	85
290 ~ 300	86

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	3.8	4.0	4.6	4.8	4.9	5.2	5.5	6.2	6.3	7.2	8.3	-
-60 ~ -40	3.8	4.1	4.7	4.9	4.9	5.2	5.6	6.3	6.4	7.3	8.4	-
-40 ~ -20	3.8	4.2	4.8	5.0	5.0	5.3	5.7	6.5	6.6	7.5	8.6	-
-20 ~ 0	4.0	4.3	4.9	5.1	5.2	5.6	5.9	6.7	6.8	7.8	8.9	-
0 ~ 20	4.2	4.5	5.1	5.3	5.3	5.8	6.2	6.9	7.1	8.1	9.2	-
20 ~ 40	4.3	4.7	5.3	5.5	5.6	5.9	6.3	7.2	7.3	8.4	9.6	-
40 ~ 60	4.5	4.8	5.4	5.7	5.7	6.1	6.5	7.4	7.6	8.7	9.9	-
60 ~ 80	4.5	4.9	5.7	5.9	6.0	6.3	6.7	7.6	7.7	8.9	10.1	-
80 ~ 100	4.6	5.0	5.7	5.9	6.0	6.4	6.8	7.8	7.9	9.1	10.4	-
100 ~ 120	4.7	5.1	5.8	6.0	6.1	6.5	7.0	7.9	8.0	9.2	10.7	-
120 ~ 140	4.7	5.1	5.8	6.1	6.1	6.6	7.0	8.0	8.1	9.3	10.8	-
140 ~ 160	4.6	5.0	5.8	6.1	6.1	6.6	7.0	8.0	8.1	9.5	10.9	-
160 ~ 180	4.5	4.9	5.8	6.1	6.2	6.6	7.1	8.1	8.2	9.5	11.0	-

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	1.71
Specific Gravity d	4.89
Remarks	

L-LAL13

Code(d) **694532**
Code(e) **697529**

Refractive Index n_d	1.693 50	Abbe Number v_d	53.18	Dispersion $n_F - n_C$	0.013 040
	1.693 500				
Refractive Index n_e	1.696 607	Abbe Number v_e	52.93	Dispersion $n_{F'} - n_{C'}$	0.013 160

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.657 37
n_{1970}	1.970 09	1.663 92
n_{1530}	1.529 58	1.670 89
n_{1129}	1.128 64	1.677 02
n_t	1.013 98	1.679 06
n_s	0.852 11	1.682 63
$n_{A'}$	0.768 19	1.685 07
n_r	0.706 52	1.687 31
n_C	0.656 27	1.689 55
$n_{C'}$	0.643 85	1.690 18
$n_{\text{He-Ne}}$	0.632 8	1.690 76
n_D	0.589 29	1.693 38
n_d	0.587 56	1.693 50
n_e	0.546 07	1.696 61
n_F	0.486 13	1.702 59
$n_{F'}$	0.479 99	1.703 34
$n_{\text{He-Cd}}$	0.441 57	1.708 79
n_g	0.435 835	1.709 74
n_h	0.404 656	1.715 70
n_i	0.365 015	1.725 92

Constants of Dispersion Formula	
A_1	1.177 761 46E+00
A_2	6.345 913 45E-01
A_3	1.204 356 49E+00
B_1	5.576 182 43E-03
B_2	2.068 214 69E-02
B_3	9.963 227 76E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	107.8
Rigidity Modulus G (GPa)	41.9
Poisson's Ratio σ	0.285
Knoop Hardness Hk[Class]	640 6
Abrasion Aa	108

Partial Dispersions	
$n_C - n_t$	0.010 490
$n_C - n_{A'}$	0.004 481
$n_d - n_C$	0.003 949
$n_e - n_C$	0.007 056
$n_g - n_d$	0.016 239
$n_g - n_F$	0.007 148
$n_h - n_g$	0.005 962
$n_i - n_g$	0.016 179
$n_{C'} - n_t$	0.011 117
$n_e - n_{C'}$	0.006 429
$n_{F'} - n_e$	0.006 731
$n_i - n_{F'}$	0.022 580

Relative Partial Dispersions	
$\theta_{C,t}$	0.804 4
$\theta_{C,A'}$	0.343 6
$\theta_{d,C}$	0.302 8
$\theta_{e,C}$	0.541 1
$\theta_{g,d}$	1.245 3
$\theta_{g,F}$	0.548 2
$\theta_{h,g}$	0.457 2
$\theta_{i,g}$	1.240 7
$\theta'_{C,t}$	0.844 8
$\theta'_{e,C'}$	0.488 5
$\theta'_{F',e}$	0.511 5
$\theta'_{i,F'}$	1.715 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 2
$\Delta\theta_{C,A'}$	0.003 3
$\Delta\theta_{g,d}$	-0.009 0
$\Delta\theta_{g,F}$	-0.007 2
$\Delta\theta_{i,g}$	-0.039 0

Coloring			
λ_{80}	360	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	288
CCI			
B	G	R	
0.00	0.35	0.32	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.01
290	0.06
300	0.15
310	0.28
320	0.45
330	0.61
340	0.74
350	0.84
360	0.913
370	0.949
380	0.969
390	0.979
400	0.984
420	0.989
440	0.991
460	0.993
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.995
1 800	0.988
2 000	0.969
2 200	0.918
2 400	0.72

Thermal Properties	
Strain Point StP (°C)	503
Annealing Point AP (°C)	522
Transformation Temperature Tg (°C)	538
Yield Point At (°C)	583
Softening Point SP (°C)	615
Expansion Coefficients (-30 °C ~ 70 °C)	75
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(mK))	0.887

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	58
-90 ~ -80	60
-80 ~ -70	62
-70 ~ -60	63
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	71
-10 ~ 0	72
0 ~ 10	73
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	80
60 ~ 70	81
70 ~ 80	82
80 ~ 90	83
90 ~ 100	84
100 ~ 110	85
110 ~ 120	86
120 ~ 130	87
130 ~ 140	88
140 ~ 150	89
150 ~ 160	90
160 ~ 170	91
170 ~ 180	92
180 ~ 190	93
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	96
230 ~ 240	96
240 ~ 250	97
250 ~ 260	98
260 ~ 270	98
270 ~ 280	99
280 ~ 290	99
290 ~ 300	100

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.91
Specific Gravity d	3.69
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	1.9	2.1	2.5	2.5	2.6	2.7	2.9	3.2	3.3	3.7	4.1	4.9	
-60 ~ -40	1.8	1.9	2.2	2.3	2.4	2.5	2.7	3.1	3.2	3.5	3.9	4.8	
-40 ~ -20	1.6	1.9	2.2	2.3	2.3	2.5	2.7	3.0	3.0	3.5	4.0	4.7	
-20 ~ 0	1.7	1.8	2.1	2.3	2.4	2.5	2.7	3.1	3.1	3.5	3.9	4.8	
0 ~ 20	1.7	1.9	2.3	2.4	2.4	2.6	2.7	3.1	3.2	3.6	4.1	4.9	
20 ~ 40	1.8	1.9	2.4	2.5	2.5	2.7	2.9	3.2	3.3	3.7	4.1	5.1	
40 ~ 60	1.9	2.1	2.4	2.5	2.6	2.8	2.9	3.3	3.4	3.8	4.3	5.2	
60 ~ 80	2.0	2.1	2.5	2.7	2.6	2.8	3.1	3.5	3.6	4.0	4.5	5.3	
80 ~ 100	2.1	2.3	2.6	2.7	2.8	3.0	3.2	3.6	3.6	4.2	4.6	5.5	
100 ~ 120	2.2	2.4	2.7	2.9	2.9	3.1	3.3	3.7	3.7	4.2	4.8	5.7	
120 ~ 140	2.2	2.4	2.8	2.9	3.0	3.2	3.4	3.8	3.8	4.4	4.9	5.8	
140 ~ 160	2.3	2.5	3.0	3.1	3.1	3.3	3.6	4.0	4.0	4.5	5.0	6.0	
160 ~ 180	2.4	2.6	3.0	3.2	3.2	3.4	3.6	4.0	4.1	4.6	5.1	6.0	

L-LAL15

Code(d) 693529
Code(e) 696527

Refractive Index n_d	1.693 04 1.693 040	Abbe Number v_d	52.93	Dispersion $n_F - n_C$	0.013 093
Refractive Index n_e	1.696 160	Abbe Number v_e	52.70	Dispersion $n_{F'} - n_{C'}$	0.013 210

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.654 55
n_{1970}	1.970 09	1.661 89
n_{1530}	1.529 58	1.669 60
n_{1129}	1.128 64	1.676 21
n_t	1.013 98	1.678 35
n_s	0.852 11	1.682 03
$n_{A'}$	0.768 19	1.684 53
n_r	0.706 52	1.686 80
n_C	0.656 27	1.689 06
$n_{C'}$	0.643 85	1.689 70
$n_{\text{He-Ne}}$	0.632 8	1.690 29
n_D	0.589 29	1.692 92
n_d	0.587 56	1.693 04
n_e	0.546 07	1.696 16
n_F	0.486 13	1.702 16
$n_{F'}$	0.479 99	1.702 91
$n_{\text{He-Cd}}$	0.441 57	1.708 37
n_g	0.435 835	1.709 32
n_h	0.404 656	1.715 28
n_i	0.365 015	1.725 50

Constants of Dispersion Formula	
A_1	1.079 596 34E+00
A_2	7.318 721 34E-01
A_3	1.171 111 07E+00
B_1	4.700 475 43E-03
B_2	1.986 157 58E-02
B_3	8.703 599 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	53.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	110.3
Rigidity Modulus G (GPa)	42.7
Poisson's Ratio σ	0.291
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	82

Partial Dispersions	
$n_C - n_t$	0.010 719
$n_C - n_{A'}$	0.004 537
$n_d - n_C$	0.003 975
$n_e - n_C$	0.007 095
$n_g - n_d$	0.016 276
$n_g - n_F$	0.007 158
$n_h - n_g$	0.005 966
$n_i - n_g$	0.016 189
$n_C - n_t$	0.011 351
$n_e - n_{C'}$	0.006 463
$n_{F'} - n_e$	0.006 747
$n_i - n_{F'}$	0.022 598

Relative Partial Dispersions	
$\theta_{C,t}$	0.818 7
$\theta_{C,A'}$	0.346 5
$\theta_{d,C}$	0.303 6
$\theta_{e,C}$	0.541 9
$\theta_{g,d}$	1.243 1
$\theta_{g,F}$	0.546 7
$\theta_{h,g}$	0.455 7
$\theta_{i,g}$	1.236 5
$\theta'_{C,t}$	0.859 3
$\theta'_{e,C'}$	0.489 3
$\theta'_{F',e}$	0.510 7
$\theta'_{i,F'}$	1.710 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.023 7
$\Delta\theta_{C,A'}$	0.006 5
$\Delta\theta_{g,d}$	-0.011 7
$\Delta\theta_{g,F}$	-0.009 1
$\Delta\theta_{i,g}$	-0.045 3

Coloring			
λ_{80}	345	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	320	$\lambda_{0.05}$	
CCI			
B	G	R	
0.00	0.14	0.14	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.39
290	0.53
300	0.64
310	0.73
320	0.80
330	0.87
340	0.916
350	0.948
360	0.968
370	0.980
380	0.987
390	0.991
400	0.993
420	0.995
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.990
1 600	0.991
1 800	0.979
2 000	0.949
2 200	0.85
2 400	0.59

Thermal Properties	
Strain Point StP (°C)	494
Annealing Point AP (°C)	515
Transformation Temperature Tg (°C)	537
Yield Point At (°C)	570
Softening Point SP (°C)	596
Expansion Coefficients (-30 °C ~ 70 °C)	57
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	74
Thermal Conductivity λ (W/(mK))	0.923

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	42
-90 ~ -80	43
-80 ~ -70	44
-70 ~ -60	46
-60 ~ -50	47
-50 ~ -40	49
-40 ~ -30	50
-30 ~ -20	51
-20 ~ -10	52
-10 ~ 0	54
0 ~ 10	55
10 ~ 20	56
20 ~ 30	57
30 ~ 40	58
40 ~ 50	60
50 ~ 60	61
60 ~ 70	62
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	72
170 ~ 180	73
180 ~ 190	73
190 ~ 200	74
200 ~ 210	75
210 ~ 220	76
220 ~ 230	77
230 ~ 240	77
240 ~ 250	78
250 ~ 260	79
260 ~ 270	79
270 ~ 280	80
280 ~ 290	81
290 ~ 300	81

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	5.6	5.8	6.2	6.3	6.3	6.5	6.6	7.0	7.1	7.5	7.8	8.6
-60 ~ -40	5.5	5.7	6.0	6.2	6.2	6.4	6.5	7.0	7.0	7.4	7.8	8.6
-40 ~ -20	5.4	5.7	6.1	6.2	6.2	6.4	6.6	6.9	7.0	7.5	7.9	8.7
-20 ~ 0	5.5	5.7	6.2	6.3	6.3	6.5	6.7	7.1	7.1	7.6	8.0	8.9
0 ~ 20	5.5	5.8	6.2	6.3	6.4	6.6	6.8	7.2	7.2	7.7	8.1	9.1
20 ~ 40	5.6	5.8	6.3	6.5	6.5	6.7	6.9	7.4	7.4	7.9	8.4	9.4
40 ~ 60	5.8	6.0	6.4	6.6	6.6	6.8	7.1	7.5	7.6	8.1	8.6	9.6
60 ~ 80	5.8	6.1	6.5	6.7	6.7	7.0	7.3	7.7	7.8	8.3	8.9	9.9
80 ~ 100	5.9	6.2	6.6	6.8	6.8	7.1	7.3	7.8	7.9	8.5	9.1	10.1
100 ~ 120	6.0	6.3	6.8	6.9	7.0	7.2	7.5	8.0	8.0	8.6	9.3	10.4
120 ~ 140	6.1	6.3	6.9	7.0	7.1	7.3	7.6	8.1	8.2	8.9	9.5	10.6
140 ~ 160	6.1	6.4	7.0	7.2	7.2	7.5	7.8	8.3	8.4	9.0	9.6	10.8
160 ~ 180	6.2	6.5	7.0	7.2	7.3	7.5	7.8	8.4	8.5	9.1	9.8	11.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.44
Specific Gravity d	3.66
Remarks	

OHARA 25-04

L-LAM60

Code(d) 743493
Code(e) 747490

Refractive Index n_d	1.743 20 1.743 198	Abbe Number v_d	49.29	Dispersion $n_F - n_C$	0.015 077
Refractive Index n_e	1.746 788	Abbe Number v_e	49.05	Dispersion $n_{F'} - n_{C'}$	0.015 226

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.704 09
n_{1970}	1.970 09	1.710 82
n_{1530}	1.529 58	1.718 04
n_{1129}	1.128 64	1.724 58
n_t	1.013 98	1.726 81
n_s	0.852 11	1.730 78
$n_{A'}$	0.768 19	1.733 54
n_r	0.706 52	1.736 09
n_C	0.656 27	1.738 66
$n_{C'}$	0.643 85	1.739 37
$n_{\text{He-Ne}}$	0.632 8	1.740 05
n_D	0.589 29	1.743 06
n_d	0.587 56	1.743 20
n_e	0.546 07	1.746 79
n_F	0.486 13	1.753 73
$n_{F'}$	0.479 99	1.754 60
$n_{\text{He-Cd}}$	0.441 57	1.760 96
n_g	0.435 835	1.762 07
n_h	0.404 656	1.769 05
n_i	0.365 015	1.781 08

Constants of Dispersion Formula	
A_1	1.475 741 84E+00
A_2	4.961 327 43E-01
A_3	1.237 962 36E+00
B_1	7.369 500 00E-03
B_2	2.518 917 46E-02
B_3	9.803 066 51E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	114.7
Rigidity Modulus G (GPa)	44.5
Poisson's Ratio σ	0.289
Knoop Hardness Hk[Class]	670 7
Abrasion Aa	92

Partial Dispersions	
$n_C - n_t$	0.011 847
$n_C - n_{A'}$	0.005 115
$n_d - n_C$	0.004 543
$n_e - n_C$	0.008 133
$n_g - n_d$	0.018 870
$n_g - n_F$	0.008 336
$n_h - n_g$	0.006 984
$n_i - n_g$	0.019 016
$n_C - n_t$	0.012 567
$n_e - n_{C'}$	0.007 413
$n_{F'} - n_e$	0.007 813
$n_i - n_{F'}$	0.026 483

Relative Partial Dispersions	
$\theta_{C,t}$	0.785 8
$\theta_{C,A'}$	0.339 3
$\theta_{d,C}$	0.301 3
$\theta_{e,C}$	0.539 4
$\theta_{g,d}$	1.251 6
$\theta_{g,F}$	0.552 9
$\theta_{h,g}$	0.463 2
$\theta_{i,g}$	1.261 3
$\theta'_{C,t}$	0.825 4
$\theta'_{e,C'}$	0.486 9
$\theta'_{F',e}$	0.513 1
$\theta'_{i,F'}$	1.739 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 9
$\Delta\theta_{C,A'}$	0.003 7
$\Delta\theta_{g,d}$	-0.010 8
$\Delta\theta_{g,F}$	-0.008 8
$\Delta\theta_{i,g}$	-0.051 0

Coloring			
λ_{80}	370	λ_5	310
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	308
CCI			
B	G	R	
0.00	0.37	0.38	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.09
320	0.33
330	0.56
340	0.72
350	0.83
360	0.904
370	0.944
380	0.965
390	0.977
400	0.983
420	0.988
440	0.991
460	0.993
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.991
2 000	0.974
2 200	0.936
2 400	0.75

Thermal Properties	
Strain Point StP (°C)	511
Annealing Point AP (°C)	533
Transformation Temperature Tg (°C)	541
Yield Point At (°C)	587
Softening Point SP (°C)	623
Expansion Coefficients (-30 °C ~ 70 °C)	75
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	92
Thermal Conductivity λ (W/(mK))	0.876

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	58
-90 ~ -80	59
-80 ~ -70	61
-70 ~ -60	63
-60 ~ -50	64
-50 ~ -40	66
-40 ~ -30	67
-30 ~ -20	69
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	73
10 ~ 20	74
20 ~ 30	75
30 ~ 40	76
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	88
150 ~ 160	89
160 ~ 170	90
170 ~ 180	91
180 ~ 190	92
190 ~ 200	92
200 ~ 210	93
210 ~ 220	94
220 ~ 230	95
230 ~ 240	95
240 ~ 250	96
250 ~ 260	96
260 ~ 270	97
270 ~ 280	98
280 ~ 290	98
290 ~ 300	99

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	2.7	2.8	3.2	3.4	3.4	3.6	3.7	4.1	4.1	4.6	5.0	5.9
-60 ~ -40	2.4	2.7	3.0	3.2	3.2	3.4	3.6	4.0	4.1	4.5	4.9	5.8
-40 ~ -20	2.4	2.5	2.9	3.0	3.2	3.4	3.5	3.9	4.0	4.4	4.9	5.8
-20 ~ 0	2.4	2.6	3.0	3.1	3.1	3.3	3.5	4.0	4.1	4.6	5.0	5.9
0 ~ 20	2.4	2.6	3.0	3.1	3.1	3.4	3.6	4.1	4.1	4.6	5.1	6.1
20 ~ 40	2.4	2.6	3.1	3.2	3.2	3.5	3.7	4.1	4.2	4.8	5.3	6.3
40 ~ 60	2.5	2.7	3.1	3.3	3.3	3.5	3.8	4.3	4.4	4.9	5.5	6.5
60 ~ 80	2.6	2.8	3.3	3.4	3.5	3.7	3.9	4.4	4.5	5.0	5.6	6.7
80 ~ 100	2.5	2.8	3.4	3.5	3.6	3.8	4.1	4.6	4.6	5.2	5.8	6.9
100 ~ 120	2.6	2.8	3.3	3.5	3.5	3.8	4.2	4.7	4.8	5.4	6.0	7.1
120 ~ 140	2.6	2.9	3.5	3.7	3.7	4.0	4.3	4.8	4.9	5.5	6.1	7.3
140 ~ 160	2.7	3.0	3.5	3.7	3.7	4.0	4.3	4.8	4.9	5.6	6.2	7.4
160 ~ 180	2.7	3.0	3.5	3.7	3.8	4.0	4.3	4.9	5.0	5.7	6.3	7.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.83
Specific Gravity d	4.20
Remarks	

OHARA 25-04

L-LAM69

Code(d) 731405
Code(e) 735403

Refractive Index n_d	1.730 77 1.730 770	Abbe Number v_d	40.51	Dispersion $n_F - n_C$	0.018 040
Refractive Index n_e	1.735 051	Abbe Number v_e	40.25	Dispersion $n_{F'} - n_{C'}$	0.018 262

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.688 05
n_{1970}	1.970 09	1.694 88
n_{1530}	1.529 58	1.702 37
n_{1129}	1.128 64	1.709 39
n_t	1.013 98	1.711 85
n_s	0.852 11	1.716 32
$n_{A'}$	0.768 19	1.719 48
n_r	0.706 52	1.722 43
n_C	0.656 27	1.725 42
$n_{C'}$	0.643 85	1.726 26
$n_{\text{He-Ne}}$	0.632 8	1.727 05
n_D	0.589 29	1.730 61
n_d	0.587 56	1.730 77
n_e	0.546 07	1.735 05
n_F	0.486 13	1.743 46
$n_{F'}$	0.479 99	1.744 52
$n_{\text{He-Cd}}$	0.441 57	1.752 40
n_g	0.435 835	1.753 79
n_h	0.404 656	1.762 67
n_i	0.365 015	1.778 58

Constants of Dispersion Formula	
A_1	1.740 389 60E+00
A_2	1.769 969 17E-01
A_3	1.767 754 13E+00
B_1	1.033 988 70E-02
B_2	4.848 227 65E-02
B_3	1.366 719 96E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.1

Mechanical Properties	
Young's Modulus E (GPa)	113.3
Rigidity Modulus G (GPa)	44.5
Poisson's Ratio σ	0.273
Knoop Hardness Hk[Class]	630 6
Abrasion Aa	121

Partial Dispersions	
$n_C - n_t$	0.013 567
$n_C - n_{A'}$	0.005 939
$n_d - n_C$	0.005 354
$n_e - n_C$	0.009 635
$n_g - n_d$	0.023 019
$n_g - n_F$	0.010 333
$n_h - n_g$	0.008 885
$n_i - n_g$	0.024 789
$n_{C'} - n_t$	0.014 410
$n_e - n_{C'}$	0.008 792
$n_{F'} - n_e$	0.009 470
$n_i - n_{F'}$	0.034 057

Relative Partial Dispersions	
$\theta_{C,t}$	0.752 1
$\theta_{C,A'}$	0.329 2
$\theta_{d,C}$	0.296 8
$\theta_{e,C}$	0.534 1
$\theta_{g,d}$	1.276 0
$\theta_{g,F}$	0.572 8
$\theta_{h,g}$	0.492 5
$\theta_{i,g}$	1.374 1
$\theta'_{C,t}$	0.789 1
$\theta'_{e,C'}$	0.481 4
$\theta'_{F,e}$	0.518 6
$\theta'_{i,F'}$	1.864 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.015 4
$\Delta\theta_{C,A'}$	0.004 2
$\Delta\theta_{g,d}$	-0.004 6
$\Delta\theta_{g,F}$	-0.003 1
$\Delta\theta_{i,g}$	-0.011 7

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	340
CCI			
B	G	R	
0.00	1.88	1.91	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.04
350	0.26
360	0.53
370	0.71
380	0.81
390	0.87
400	0.910
420	0.947
440	0.963
460	0.974
480	0.983
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.997
1 600	0.995
1 800	0.987
2 000	0.971
2 200	0.925
2 400	0.76

Thermal Properties	
Strain Point StP (°C)	461
Annealing Point AP (°C)	489
Transformation Temperature Tg (°C)	500
Yield Point At (°C)	539
Softening Point SP (°C)	574
Expansion Coefficients (-30 °C ~ 70 °C)	87
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	109
Thermal Conductivity λ (W/(mK))	1.11

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	70
-70 ~ -60	72
-60 ~ -50	73
-50 ~ -40	75
-40 ~ -30	77
-30 ~ -20	79
-20 ~ -10	81
-10 ~ 0	82
0 ~ 10	84
10 ~ 20	86
20 ~ 30	87
30 ~ 40	89
40 ~ 50	90
50 ~ 60	92
60 ~ 70	93
70 ~ 80	95
80 ~ 90	96
90 ~ 100	97
100 ~ 110	99
110 ~ 120	100
120 ~ 130	101
130 ~ 140	103
140 ~ 150	104
150 ~ 160	105
160 ~ 170	106
170 ~ 180	107
180 ~ 190	108
190 ~ 200	109
200 ~ 210	110
210 ~ 220	111
220 ~ 230	112
230 ~ 240	113
240 ~ 250	114
250 ~ 260	115
260 ~ 270	116
270 ~ 280	116
280 ~ 290	117
290 ~ 300	118

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	1.5	1.7	2.1	2.3	2.4	2.6	2.8	3.3	3.4	4.1	4.8	6.2
-60 ~ -40	1.3	1.5	2.0	2.1	2.2	2.4	2.7	3.2	3.2	4.0	4.7	6.1
-40 ~ -20	1.2	1.4	1.8	2.0	2.0	2.4	2.6	3.2	3.3	3.9	4.7	6.3
-20 ~ 0	1.1	1.4	1.9	2.0	2.1	2.3	2.6	3.2	3.3	4.1	4.9	6.5
0 ~ 20	1.1	1.4	1.9	2.1	2.1	2.4	2.7	3.4	3.4	4.2	5.0	6.7
20 ~ 40	1.2	1.4	2.0	2.1	2.2	2.5	2.8	3.4	3.5	4.4	5.2	7.0
40 ~ 60	1.2	1.5	2.0	2.2	2.3	2.6	2.9	3.6	3.7	4.6	5.4	7.3
60 ~ 80	1.2	1.6	2.2	2.4	2.4	2.7	3.1	3.7	3.8	4.7	5.6	7.5
80 ~ 100	1.3	1.6	2.2	2.4	2.6	2.8	3.2	3.9	4.0	4.9	5.9	7.9
100 ~ 120	1.4	1.7	2.3	2.5	2.6	2.9	3.4	4.1	4.2	5.1	6.1	8.2
120 ~ 140	1.4	1.7	2.5	2.6	2.7	3.1	3.4	4.2	4.3	5.3	6.3	8.5
140 ~ 160	1.6	1.9	2.5	2.8	2.8	3.2	3.6	4.4	4.5	5.5	6.5	8.7
160 ~ 180	1.6	1.9	2.6	2.8	2.9	3.3	3.6	4.5	4.6	5.6	6.7	9.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.03
Specific Gravity d	3.24
Remarks	

OHARA 25-04

L-TIM28

Code(d) 689310
Code(e) 695308

Refractive Index n_d	1.689 48 1.689 480	Abbe Number v_d	31.02	Dispersion $n_F - n_C$	0.022 225
Refractive Index n_e	1.694 731	Abbe Number v_e	30.78	Dispersion $n_{F'} - n_{C'}$	0.022 569

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.646 32
n_{1970}	1.970 09	1.651 89
n_{1530}	1.529 58	1.658 32
n_{1129}	1.128 64	1.665 00
n_t	1.013 98	1.667 56
n_s	0.852 11	1.672 45
$n_{A'}$	0.768 19	1.676 05
n_r	0.706 52	1.679 49
n_C	0.656 27	1.683 03
$n_{C'}$	0.643 85	1.684 03
$n_{\text{He-Ne}}$	0.632 8	1.684 98
n_D	0.589 29	1.689 29
n_d	0.587 56	1.689 48
n_e	0.546 07	1.694 73
n_F	0.486 13	1.705 25
$n_{F'}$	0.479 99	1.706 60
$n_{\text{He-Cd}}$	0.441 57	1.716 74
n_g	0.435 835	1.718 56
n_h	0.404 656	1.730 34
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.527 808 29E+00
A_2	2.327 763 67E-01
A_3	1.716 387 81E+00
B_1	1.141 358 83E-02
B_2	5.590 685 66E-02
B_3	1.715 118 00E+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 (GPa)	84.5
Rigidity Modulus G (GPa)	33.7
Poisson's Ratio σ	0.254
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	217

Partial Dispersions	
$n_C - n_t$	0.015 462
$n_C - n_{A'}$	0.006 973
$n_d - n_C$	0.006 454
$n_e - n_C$	0.011 705
$n_g - n_d$	0.029 076
$n_g - n_F$	0.013 305
$n_h - n_g$	0.011 789
$n_i - n_g$	
$n_{C'} - n_t$	0.016 470
$n_e - n_{C'}$	0.010 697
$n_{F'} - n_e$	0.011 872
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.695 7
$\theta_{C,A'}$	0.313 7
$\theta_{d,C}$	0.290 4
$\theta_{e,C}$	0.526 7
$\theta_{g,d}$	1.308 3
$\theta_{g,F}$	0.598 7
$\theta_{h,g}$	0.530 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.729 8
$\theta'_{e,C'}$	0.474 0
$\theta'_{F',e}$	0.526 0
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 5
$\Delta\theta_{C,A'}$	0.000 3
$\Delta\theta_{g,d}$	0.008 0
$\Delta\theta_{g,F}$	0.007 4
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	400	λ_5	355
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	352
CCI			
B	G	R	
0.00	1.29	1.27	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.21
370	0.60
380	0.82
390	0.903
400	0.940
420	0.969
440	0.979
460	0.984
480	0.988
500	0.991
550	0.997
600	0.996
650	0.995
700	0.997
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.995
1 800	0.980
2 000	0.962
2 200	0.927
2 400	0.89

Thermal Properties	
Strain Point StP (°C)	453
Annealing Point AP (°C)	484
Transformation Temperature Tg (°C)	503
Yield Point At (°C)	542
Softening Point SP (°C)	582
Expansion Coefficients (-30 °C ~ 70 °C)	106
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	134
Thermal Conductivity λ (W/(m·K))	1.02

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	82
-90 ~ -80	85
-80 ~ -70	87
-70 ~ -60	89
-60 ~ -50	91
-50 ~ -40	93
-40 ~ -30	96
-30 ~ -20	98
-20 ~ -10	100
-10 ~ 0	102
0 ~ 10	104
10 ~ 20	106
20 ~ 30	107
30 ~ 40	109
40 ~ 50	111
50 ~ 60	113
60 ~ 70	115
70 ~ 80	116
80 ~ 90	118
90 ~ 100	120
100 ~ 110	121
110 ~ 120	123
120 ~ 130	125
130 ~ 140	126
140 ~ 150	128
150 ~ 160	129
160 ~ 170	130
170 ~ 180	132
180 ~ 190	133
190 ~ 200	134
200 ~ 210	136
210 ~ 220	137
220 ~ 230	138
230 ~ 240	139
240 ~ 250	141
250 ~ 260	142
260 ~ 270	143
270 ~ 280	144
280 ~ 290	145
290 ~ 300	146

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	-1.6	-1.4	-0.9	-0.7	-0.7	-0.4	-0.1	0.5	0.7	1.7	2.7	-
-60 ~ -40	-1.8	-1.6	-1.1	-0.9	-0.9	-0.6	-0.3	0.5	0.6	1.6	2.8	-
-40 ~ -20	-1.9	-1.7	-1.1	-1.0	-0.9	-0.6	-0.3	0.5	0.6	1.7	2.9	-
-20 ~ 0	-2.0	-1.7	-1.2	-1.0	-1.0	-0.5	-0.2	0.6	0.7	1.8	3.1	-
0 ~ 20	-2.0	-1.7	-1.1	-0.9	-0.9	-0.5	-0.2	0.7	0.8	1.9	3.4	-
20 ~ 40	-2.0	-1.8	-1.1	-0.9	-0.8	-0.5	-0.1	0.8	0.9	2.1	3.5	-
40 ~ 60	-2.0	-1.7	-1.1	-0.9	-0.8	-0.4	0.0	0.9	1.0	2.3	3.9	-
60 ~ 80	-2.1	-1.8	-1.0	-0.9	-0.8	-0.4	0.1	1.0	1.2	2.5	4.0	-
80 ~ 100	-2.1	-1.8	-1.1	-0.9	-0.8	-0.4	0.1	1.1	1.3	2.7	4.3	-
100 ~ 120	-2.1	-1.8	-1.1	-0.9	-0.8	-0.3	0.1	1.1	1.3	2.7	4.5	-
120 ~ 140	-2.2	-1.9	-1.2	-0.9	-0.8	-0.4	0.1	1.2	1.3	2.9	4.6	-
140 ~ 160	-2.3	-2.0	-1.2	-1.0	-0.9	-0.3	0.2	1.3	1.4	2.9	4.7	-
160 ~ 180	-2.4	-2.1	-1.3	-1.0	-0.9	-0.4	0.1	1.2	1.4	3.0	4.8	-

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.62
Specific Gravity d	2.88
Remarks	

OHARA 25-04

S-BAH11

Code(d) **667483**
Code(e) **670480**

Refractive Index n_d	1.666 72 1.666 718	Abbe Number v_d	48.32	Dispersion $n_F - n_C$	0.013 797
Refractive Index n_e	1.670 000	Abbe Number v_e	48.04	Dispersion $n_{F'} - n_{C'}$	0.013 948

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.633 28
n_{1970}	1.970 09	1.638 66
n_{1530}	1.529 58	1.644 56
n_{1129}	1.128 64	1.650 08
n_t	1.013 98	1.652 01
n_s	0.852 11	1.655 51
$n_{A'}$	0.768 19	1.657 98
n_r	0.706 52	1.660 27
n_C	0.656 27	1.662 59
$n_{C'}$	0.643 85	1.663 24
$n_{\text{He-Ne}}$	0.632 8	1.663 85
n_D	0.589 29	1.666 60
n_d	0.587 56	1.666 72
n_e	0.546 07	1.670 00
n_F	0.486 13	1.676 39
$n_{F'}$	0.479 99	1.677 19
$n_{\text{He-Cd}}$	0.441 57	1.683 09
n_g	0.435 835	1.684 12
n_h	0.404 656	1.690 67
n_i	0.365 015	1.702 13

Constants of Dispersion Formula	
A_1	1.571 388 60E+00
A_2	1.478 693 13E-01
A_3	1.280 928 46E+00
B_1	9.108 079 36E-03
B_2	4.024 016 84E-02
B_3	1.303 993 67E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	92.9
Rigidity Modulus G (GPa)	36.5
Poisson's Ratio σ	0.274
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	153

Partial Dispersions	
$n_C - n_t$	0.010 576
$n_C - n_{A'}$	0.004 611
$n_d - n_C$	0.004 129
$n_e - n_C$	0.007 411
$n_g - n_d$	0.017 407
$n_g - n_F$	0.007 739
$n_h - n_g$	0.006 549
$n_i - n_g$	0.018 002
$n_{C'} - n_t$	0.011 228
$n_e - n_{C'}$	0.006 759
$n_{F'} - n_e$	0.007 189
$n_i - n_{F'}$	0.024 938

Relative Partial Dispersions	
$\theta_{C,t}$	0.766 5
$\theta_{C,A'}$	0.334 2
$\theta_{d,C}$	0.299 3
$\theta_{e,C}$	0.537 1
$\theta_{g,d}$	1.261 7
$\theta_{g,F}$	0.560 9
$\theta_{h,g}$	0.474 7
$\theta_{i,g}$	1.304 8
$\theta'_{C,t}$	0.805 0
$\theta'_{e,C'}$	0.484 6
$\theta'_{F,e}$	0.515 4
$\theta'_{i,F'}$	1.787 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.006 9
$\Delta\theta_{C,A'}$	-0.000 2
$\Delta\theta_{g,d}$	-0.002 7
$\Delta\theta_{g,F}$	-0.002 4
$\Delta\theta_{i,g}$	-0.015 6

Coloring			
λ_{80}	380	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	340
CCI			
B	G	R	
0.00	0.98	0.94	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.04
350	0.27
360	0.56
370	0.75
380	0.86
390	0.922
400	0.952
420	0.975
440	0.982
460	0.987
480	0.991
500	0.994
550	0.997
600	0.995
650	0.995
700	0.996
800	0.997
900	0.997
1 000	0.997
1 200	0.998
1 400	0.994
1 600	0.995
1 800	0.988
2 000	0.976
2 200	0.936
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	593
Annealing Point AP (°C)	617
Transformation Temperature Tg (°C)	626
Yield Point At (°C)	682
Softening Point SP (°C)	738
Expansion Coefficients (-30 °C ~ 70 °C)	70
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	84
Thermal Conductivity λ (W/(mK))	0.858

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	57
-90 ~ -80	58
-80 ~ -70	59
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	65
-20 ~ -10	66
-10 ~ 0	68
0 ~ 10	69
10 ~ 20	70
20 ~ 30	71
30 ~ 40	72
40 ~ 50	73
50 ~ 60	74
60 ~ 70	75
70 ~ 80	76
80 ~ 90	76
90 ~ 100	77
100 ~ 110	78
110 ~ 120	79
120 ~ 130	80
130 ~ 140	80
140 ~ 150	81
150 ~ 160	82
160 ~ 170	83
170 ~ 180	83
180 ~ 190	84
190 ~ 200	85
200 ~ 210	85
210 ~ 220	86
220 ~ 230	86
230 ~ 240	87
240 ~ 250	87
250 ~ 260	88
260 ~ 270	88
270 ~ 280	89
280 ~ 290	89
290 ~ 300	90

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	2.5	2.6	3.0	3.1	3.1	3.3	3.6	3.9	4.0	4.4	5.0	5.9
-60 ~ -40	2.3	2.5	2.9	3.0	3.0	3.2	3.4	3.8	3.9	4.4	4.9	5.8
-40 ~ -20	2.3	2.5	2.8	2.9	3.1	3.3	3.5	3.9	3.9	4.4	4.9	6.0
-20 ~ 0	2.3	2.5	2.9	3.0	3.1	3.3	3.5	4.0	4.0	4.6	5.1	6.1
0 ~ 20	2.4	2.6	3.1	3.2	3.2	3.5	3.7	4.1	4.2	4.7	5.2	6.2
20 ~ 40	2.5	2.7	3.1	3.2	3.3	3.5	3.8	4.3	4.3	4.9	5.4	6.5
40 ~ 60	2.7	2.8	3.3	3.5	3.5	3.7	3.9	4.4	4.5	5.0	5.6	6.7
60 ~ 80	2.8	3.0	3.4	3.5	3.6	3.8	4.1	4.5	4.7	5.3	5.9	7.0
80 ~ 100	2.9	3.1	3.6	3.7	3.8	4.0	4.2	4.7	4.8	5.4	6.0	7.3
100 ~ 120	3.0	3.2	3.7	3.8	3.9	4.1	4.4	4.9	5.0	5.6	6.2	7.5
120 ~ 140	3.1	3.3	3.8	4.0	4.0	4.3	4.5	5.0	5.1	5.7	6.4	7.7
140 ~ 160	3.1	3.4	3.9	4.0	4.1	4.3	4.7	5.2	5.3	6.0	6.6	7.9
160 ~ 180	3.3	3.5	4.0	4.2	4.2	4.5	4.8	5.3	5.4	6.1	6.7	8.1

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.06
Specific Gravity d	3.59
Remarks	

S-BAH27

Code(d) 702412
Code(e) 706410

Refractive Index n_d	1.701 54 1.701 536	Abbe Number v_d	41.24	Dispersion $n_F - n_C$	0.017 012
Refractive Index n_e	1.705 571	Abbe Number v_e	40.95	Dispersion $n_{F'} - n_{C'}$	0.017 228

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.662 53
n_{1970}	1.970 09	1.668 58
n_{1530}	1.529 58	1.675 26
n_{1129}	1.128 64	1.681 60
n_t	1.013 98	1.683 86
n_s	0.852 11	1.688 00
$n_{A'}$	0.768 19	1.690 94
n_T	0.706 52	1.693 70
n_C	0.656 27	1.696 50
$n_{C'}$	0.643 85	1.697 29
$n_{\text{He-Ne}}$	0.632 8	1.698 04
n_D	0.589 29	1.701 39
n_d	0.587 56	1.701 54
n_e	0.546 07	1.705 57
n_F	0.486 13	1.713 51
$n_{F'}$	0.479 99	1.714 52
$n_{\text{He-Cd}}$	0.441 57	1.722 00
n_g	0.435 835	1.723 32
n_h	0.404 656	1.731 80
n_i	0.365 015	1.747 12

Constants of Dispersion Formula	
A_1	1.689 390 52E+00
A_2	1.330 810 13E-01
A_3	1.411 655 15E+00
B_1	1.035 981 93E-02
B_2	5.339 822 39E-02
B_3	1.265 155 03E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	93.6
Rigidity Modulus G (GPa)	36.8
Poisson's Ratio σ	0.272
Knoop Hardness Hk[Class]	580 6
Abrasion Aa	138

Partial Dispersions	
$n_C - n_t$	0.012 641
$n_C - n_{A'}$	0.005 561
$n_d - n_C$	0.005 033
$n_e - n_C$	0.009 068
$n_g - n_d$	0.021 787
$n_g - n_F$	0.009 808
$n_h - n_g$	0.008 480
$n_i - n_g$	0.023 797
$n_{C'} - n_t$	0.013 433
$n_e - n_{C'}$	0.008 276
$n_{F'} - n_e$	0.008 952
$n_i - n_{F'}$	0.032 597

Relative Partial Dispersions	
$\theta_{C,t}$	0.743 1
$\theta_{C,A'}$	0.326 9
$\theta_{d,C}$	0.295 8
$\theta_{e,C}$	0.533 0
$\theta_{g,d}$	1.280 7
$\theta_{g,F}$	0.576 5
$\theta_{h,g}$	0.498 5
$\theta_{i,g}$	1.398 8
$\theta'_{C,t}$	0.779 7
$\theta'_{e,C'}$	0.480 4
$\theta'_{F,e}$	0.519 6
$\theta'_{i,F'}$	1.892 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 9
$\Delta\theta_{C,A'}$	0.001 1
$\Delta\theta_{g,d}$	0.001 6
$\Delta\theta_{g,F}$	0.001 8
$\Delta\theta_{i,g}$	0.019 1

Coloring			
λ_{80}	400	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	388	$\lambda_{0.05}$	356
CCI			
B	G	R	
0.00	1.99	2.01	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.16
370	0.47
380	0.70
390	0.83
400	0.89
420	0.955
440	0.971
460	0.979
480	0.985
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.993
1 600	0.994
1 800	0.987
2 000	0.974
2 200	0.921
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	611
Annealing Point AP (°C)	636
Transformation Temperature Tg (°C)	647
Yield Point At (°C)	700
Softening Point SP (°C)	749
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	77
Thermal Conductivity λ (W/(mK))	0.869

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	52
-90 ~ -80	53
-80 ~ -70	55
-70 ~ -60	56
-60 ~ -50	57
-50 ~ -40	58
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	62
0 ~ 10	63
10 ~ 20	64
20 ~ 30	65
30 ~ 40	66
40 ~ 50	67
50 ~ 60	68
60 ~ 70	69
70 ~ 80	70
80 ~ 90	70
90 ~ 100	71
100 ~ 110	72
110 ~ 120	73
120 ~ 130	73
130 ~ 140	74
140 ~ 150	75
150 ~ 160	75
160 ~ 170	76
170 ~ 180	77
180 ~ 190	77
190 ~ 200	78
200 ~ 210	78
210 ~ 220	79
220 ~ 230	79
230 ~ 240	80
240 ~ 250	80
250 ~ 260	80
260 ~ 270	81
270 ~ 280	81
280 ~ 290	82
290 ~ 300	82

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	2.2	2.4	2.8	2.9	3.0	3.2	3.4	4.0	4.0	4.6	5.3	6.9
-60 ~ -40	2.2	2.4	2.8	2.9	2.9	3.1	3.5	4.0	4.0	4.6	5.3	7.0
-40 ~ -20	2.2	2.5	2.9	3.0	3.1	3.3	3.5	4.0	4.2	4.8	5.5	7.1
-20 ~ 0	2.3	2.5	3.0	3.2	3.2	3.5	3.7	4.2	4.3	5.0	5.7	7.4
0 ~ 20	2.4	2.7	3.2	3.3	3.4	3.6	3.9	4.4	4.5	5.2	6.0	7.7
20 ~ 40	2.6	2.8	3.4	3.5	3.6	3.8	4.1	4.6	4.7	5.4	6.2	8.0
40 ~ 60	2.8	3.1	3.5	3.7	3.7	4.0	4.2	4.8	4.9	5.6	6.5	8.3
60 ~ 80	2.9	3.2	3.7	3.9	3.8	4.2	4.5	5.1	5.1	5.9	6.7	8.5
80 ~ 100	3.1	3.3	3.8	4.0	4.0	4.3	4.6	5.3	5.3	6.1	7.0	8.9
100 ~ 120	3.2	3.4	3.9	4.1	4.1	4.4	4.7	5.3	5.4	6.2	7.2	9.1
120 ~ 140	3.3	3.5	4.0	4.2	4.2	4.5	4.8	5.5	5.6	6.5	7.4	9.3
140 ~ 160	3.3	3.5	4.2	4.3	4.4	4.7	5.0	5.6	5.7	6.6	7.5	9.5
160 ~ 180	3.4	3.6	4.2	4.4	4.4	4.7	5.0	5.7	5.8	6.6	7.6	9.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.18
Specific Gravity d	3.67
Remarks	

OHARA 25-04

S-BAH28

Code(d) 723380
Code(e) 728377

Refractive Index n_d	1.723 42 1.723 420	Abbe Number v_d	37.95	Dispersion $n_F - n_C$	0.019 060
Refractive Index n_e	1.727 935	Abbe Number v_e	37.68	Dispersion $n_{F'} - n_{C'}$	0.019 320

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.681 98
n_{1970}	1.970 09	1.688 08
n_{1530}	1.529 58	1.694 90
n_{1129}	1.128 64	1.701 54
n_t	1.013 98	1.703 96
n_s	0.852 11	1.708 44
$n_{A'}$	0.768 19	1.711 67
n_r	0.706 52	1.714 71
n_C	0.656 27	1.717 82
$n_{C'}$	0.643 85	1.718 70
$n_{\text{He-Ne}}$	0.632 8	1.719 52
n_D	0.589 29	1.723 25
n_d	0.587 56	1.723 42
n_e	0.546 07	1.727 94
n_F	0.486 13	1.736 88
$n_{F'}$	0.479 99	1.738 02
$n_{\text{He-Cd}}$	0.441 57	1.746 49
n_g	0.435 835	1.748 00
n_h	0.404 656	1.757 69
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.694 934 84E+00
A_2	1.928 902 98E-01
A_3	1.563 859 48E+00
B_1	1.027 231 90E-02
B_2	5.211 876 40E-02
B_3	1.378 180 35E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	91.1
Rigidity Modulus G (GPa)	37.5
Poisson's Ratio σ	0.213
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	131

Partial Dispersions	
$n_C - n_t$	0.013 857
$n_C - n_{A'}$	0.006 146
$n_d - n_C$	0.005 604
$n_e - n_C$	0.010 119
$n_g - n_d$	0.024 580
$n_g - n_F$	0.011 124
$n_h - n_g$	0.009 689
$n_i - n_g$	
$n_C - n_t$	0.014 736
$n_e - n_{C'}$	0.009 240
$n_{F'} - n_e$	0.010 080
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.727 0
$\theta_{C,A'}$	0.322 5
$\theta_{d,C}$	0.294 0
$\theta_{e,C}$	0.530 9
$\theta_{g,d}$	1.289 6
$\theta_{g,F}$	0.583 6
$\theta_{h,g}$	0.508 3
$\theta_{i,g}$	
$\theta'_{C,t}$	0.762 7
$\theta'_{e,C'}$	0.478 3
$\theta'_{F',e}$	0.521 7
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 3
$\Delta\theta_{C,A'}$	0.000 6
$\Delta\theta_{g,d}$	0.003 7
$\Delta\theta_{g,F}$	0.003 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	415	λ_5	355
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	360
CCI			
B	G	R	
0.00	2.78	2.88	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.06
370	0.32
380	0.58
390	0.75
400	0.85
420	0.934
440	0.963
460	0.975
480	0.982
500	0.987
550	0.994
600	0.995
650	0.995
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.995
1 800	0.990
2 000	0.979
2 200	0.938
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	599
Annealing Point AP (°C)	626
Transformation Temperature Tg (°C)	636
Yield Point At (°C)	691
Softening Point SP (°C)	739
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	79
Thermal Conductivity λ (W/(mK))	0.889

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	51
-90 ~ -80	53
-80 ~ -70	54
-70 ~ -60	55
-60 ~ -50	56
-50 ~ -40	57
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	62
0 ~ 10	63
10 ~ 20	64
20 ~ 30	65
30 ~ 40	66
40 ~ 50	67
50 ~ 60	68
60 ~ 70	69
70 ~ 80	70
80 ~ 90	71
90 ~ 100	71
100 ~ 110	72
110 ~ 120	73
120 ~ 130	74
130 ~ 140	75
140 ~ 150	75
150 ~ 160	76
160 ~ 170	77
170 ~ 180	78
180 ~ 190	78
190 ~ 200	79
200 ~ 210	80
210 ~ 220	80
220 ~ 230	81
230 ~ 240	81
240 ~ 250	82
250 ~ 260	82
260 ~ 270	83
270 ~ 280	83
280 ~ 290	84
290 ~ 300	84

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	3.3	3.5	3.8	3.9	3.9	4.2	4.4	4.9	5.0	5.6	6.5	-
-60 ~ -40	3.2	3.3	3.8	3.9	4.0	4.2	4.4	4.9	5.0	5.8	6.6	-
-40 ~ -20	3.2	3.4	3.8	3.9	3.9	4.2	4.5	5.0	5.1	5.9	6.8	-
-20 ~ 0	3.2	3.4	3.9	4.0	4.1	4.3	4.6	5.2	5.2	6.1	7.1	-
0 ~ 20	3.3	3.5	4.0	4.1	4.2	4.4	4.7	5.3	5.4	6.3	7.3	-
20 ~ 40	3.4	3.7	4.1	4.3	4.3	4.6	4.9	5.5	5.6	6.5	7.7	-
40 ~ 60	3.5	3.8	4.3	4.4	4.5	4.8	5.1	5.8	5.8	6.9	8.0	-
60 ~ 80	3.6	3.9	4.5	4.6	4.7	5.0	5.3	6.0	6.1	7.1	8.2	-
80 ~ 100	3.7	4.0	4.5	4.7	4.7	5.2	5.5	6.2	6.3	7.4	8.6	-
100 ~ 120	3.8	4.1	4.6	4.8	4.9	5.2	5.7	6.4	6.5	7.6	8.9	-
120 ~ 140	3.8	4.1	4.7	4.9	5.0	5.3	5.7	6.6	6.7	7.8	9.1	-
140 ~ 160	3.9	4.2	4.9	5.1	5.1	5.5	5.9	6.7	6.8	8.0	9.3	-
160 ~ 180	3.9	4.3	4.9	5.1	5.2	5.5	5.9	6.8	6.9	8.1	9.5	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.31
Specific Gravity d	3.67
Remarks	

OHARA 25-04

S-BAL 3

Code(d) 571530
Code(e) 574527

Refractive Index n_d	1.571 35 1.571 351	Abbe Number v_d	52.95	Dispersion $n_F - n_C$	0.010 790
Refractive Index n_e	1.573 920	Abbe Number v_e	52.65	Dispersion $n_{F'} - n_{C'}$	0.010 900

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.543 61
n_{1970}	1.970 09	1.548 31
n_{1530}	1.529 58	1.553 41
n_{1129}	1.128 64	1.558 06
n_t	1.013 98	1.559 65
n_s	0.852 11	1.562 48
$n_{A'}$	0.768 19	1.564 45
n_r	0.706 52	1.566 27
n_C	0.656 27	1.568 10
$n_{C'}$	0.643 85	1.568 62
$n_{\text{He-Ne}}$	0.632 8	1.569 10
n_D	0.589 29	1.571 26
n_d	0.587 56	1.571 35
n_e	0.546 07	1.573 92
n_F	0.486 13	1.578 89
$n_{F'}$	0.479 99	1.579 52
$n_{\text{He-Cd}}$	0.441 57	1.584 09
n_g	0.435 835	1.584 89
n_h	0.404 656	1.589 93
n_i	0.365 015	1.598 67

Constants of Dispersion Formula	
A_1	1.293 668 90E+00
A_2	1.324 402 52E-01
A_3	1.101 972 93E+00
B_1	8.003 679 62E-03
B_2	3.547 111 96E-02
B_3	1.345 174 31E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	1.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	71.9
Rigidity Modulus G (GPa)	28.8
Poisson's Ratio σ	0.249
Knoop Hardness Hk[Class]	510 5
Abrasion Aa	172

Partial Dispersions	
$n_C - n_t$	0.008 456
$n_C - n_{A'}$	0.003 653
$n_d - n_C$	0.003 246
$n_e - n_C$	0.005 815
$n_g - n_d$	0.013 536
$n_g - n_F$	0.005 992
$n_h - n_g$	0.005 041
$n_i - n_g$	0.013 784
$n_{C'} - n_t$	0.008 970
$n_e - n_{C'}$	0.005 301
$n_{F'} - n_e$	0.005 599
$n_i - n_{F'}$	0.019 152

Relative Partial Dispersions	
$\theta_{C,t}$	0.783 7
$\theta_{C,A'}$	0.338 6
$\theta_{d,C}$	0.300 8
$\theta_{e,C}$	0.538 9
$\theta_{g,d}$	1.254 5
$\theta_{g,F}$	0.555 3
$\theta_{h,g}$	0.467 2
$\theta_{i,g}$	1.277 5
$\theta'_{C,t}$	0.822 9
$\theta'_{e,C'}$	0.486 3
$\theta'_{F,e}$	0.513 7
$\theta'_{i,F'}$	1.757 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.011 4
$\Delta\theta_{C,A'}$	-0.001 5
$\Delta\theta_{g,d}$	-0.000 3
$\Delta\theta_{g,F}$	-0.000 5
$\Delta\theta_{i,g}$	-0.004 1

Coloring			
λ_{80}	360	λ_5	330
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	332
CCI			
B	G	R	
0.00	0.24	0.25	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.01
340	0.26
350	0.63
360	0.84
370	0.928
380	0.963
390	0.979
400	0.988
420	0.994
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.996
1 400	0.991
1 600	0.990
1 800	0.972
2 000	0.945
2 200	0.88
2 400	0.83

Thermal Properties	
Strain Point StP (°C)	483
Annealing Point AP (°C)	516
Transformation Temperature Tg (°C)	532
Yield Point At (°C)	587
Softening Point SP (°C)	652
Expansion Coefficients (-30 °C ~ 70 °C)	97
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	116
Thermal Conductivity λ (W/(mK))	0.864

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	82
-90 ~ -80	84
-80 ~ -70	85
-70 ~ -60	86
-60 ~ -50	87
-50 ~ -40	89
-40 ~ -30	90
-30 ~ -20	91
-20 ~ -10	92
-10 ~ 0	94
0 ~ 10	95
10 ~ 20	96
20 ~ 30	97
30 ~ 40	98
40 ~ 50	100
50 ~ 60	101
60 ~ 70	102
70 ~ 80	103
80 ~ 90	104
90 ~ 100	105
100 ~ 110	106
110 ~ 120	107
120 ~ 130	109
130 ~ 140	110
140 ~ 150	111
150 ~ 160	112
160 ~ 170	113
170 ~ 180	114
180 ~ 190	115
190 ~ 200	116
200 ~ 210	117
210 ~ 220	118
220 ~ 230	119
230 ~ 240	120
240 ~ 250	121
250 ~ 260	122
260 ~ 270	123
270 ~ 280	124
280 ~ 290	125
290 ~ 300	126

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	-1.5	-1.4	-1.2	-1.2	-1.0	-0.9	-0.8	-0.5	-0.5	-0.2	0.3	1.0
-60 ~ -40	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-0.9	-0.6	-0.5	-0.2	0.2	0.9
-40 ~ -20	-1.6	-1.5	-1.3	-1.2	-1.2	-1.1	-0.9	-0.6	-0.5	-0.2	0.2	1.0
-20 ~ 0	-1.6	-1.5	-1.3	-1.2	-1.2	-1.0	-0.9	-0.5	-0.5	-0.1	0.3	1.1
0 ~ 20	-1.5	-1.4	-1.1	-1.0	-1.0	-0.9	-0.7	-0.4	-0.4	0.0	0.4	1.2
20 ~ 40	-1.5	-1.4	-1.0	-1.0	-0.9	-0.8	-0.7	-0.4	-0.3	0.1	0.5	1.3
40 ~ 60	-1.3	-1.2	-1.0	-0.9	-0.9	-0.7	-0.6	-0.3	-0.3	0.1	0.6	1.5
60 ~ 80	-1.4	-1.2	-0.9	-0.8	-0.8	-0.6	-0.5	-0.2	-0.1	0.3	0.7	1.6
80 ~ 100	-1.3	-1.2	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.4	0.8	1.7
100 ~ 120	-1.3	-1.2	-0.9	-0.7	-0.7	-0.5	-0.4	0.0	0.0	0.4	0.9	1.8
120 ~ 140	-1.2	-1.1	-0.8	-0.7	-0.7	-0.5	-0.4	0.0	0.0	0.4	0.9	1.8
140 ~ 160	-1.3	-1.1	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.4	0.9	1.8
160 ~ 180	-1.4	-1.2	-0.9	-0.8	-0.8	-0.7	-0.5	-0.1	0.0	0.4	0.9	1.9

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.18
Specific Gravity d	2.98
Remarks	

OHARA 25-04

S-BAL12

Code(d) 540595
Code(e) 542592

Refractive Index n_d	1.539 96 1.539 956	Abbe Number v_d	59.46	Dispersion $n_F - n_C$	0.009 081
Refractive Index n_e	1.542 121	Abbe Number v_e	59.20	Dispersion $n_{F'} - n_{C'}$	0.009 158

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.513 58
n_{1970}	1.970 09	1.518 48
n_{1530}	1.529 58	1.523 70
n_{1129}	1.128 64	1.528 25
n_t	1.013 98	1.529 74
n_s	0.852 11	1.532 30
$n_{A'}$	0.768 19	1.534 04
n_r	0.706 52	1.535 62
n_C	0.656 27	1.537 19
$n_{C'}$	0.643 85	1.537 63
$n_{\text{He-Ne}}$	0.632 8	1.538 04
n_D	0.589 29	1.539 88
n_d	0.587 56	1.539 96
n_e	0.546 07	1.542 12
n_F	0.486 13	1.546 27
$n_{F'}$	0.479 99	1.546 79
$n_{\text{He-Cd}}$	0.441 57	1.550 56
n_g	0.435 835	1.551 22
n_h	0.404 656	1.555 32
n_i	0.365 015	1.562 32

Constants of Dispersion Formula	
A_1	7.146 052 58E-01
A_2	6.219 932 89E-01
A_3	1.225 376 81E+00
B_1	3.017 639 13E-03
B_2	1.665 054 50E-02
B_3	1.435 063 14E+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	2.0

Mechanical Properties	
Young's Modulus E (GPa)	71.0
Rigidity Modulus G (GPa)	30.6
Poisson's Ratio σ	0.161
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	112

Partial Dispersions	
$n_C - n_t$	0.007 456
$n_C - n_{A'}$	0.003 156
$n_d - n_C$	0.002 762
$n_e - n_C$	0.004 927
$n_g - n_d$	0.011 260
$n_g - n_F$	0.004 941
$n_h - n_g$	0.004 105
$n_i - n_g$	0.011 107
$n_C - n_t$	0.007 896
$n_e - n_{C'}$	0.004 487
$n_{F'} - n_e$	0.004 671
$n_i - n_{F'}$	0.015 531

Relative Partial Dispersions	
$\theta_{C,t}$	0.821 1
$\theta_{C,A'}$	0.347 5
$\theta_{d,C}$	0.304 2
$\theta_{e,C}$	0.542 6
$\theta_{g,d}$	1.240 0
$\theta_{g,F}$	0.544 1
$\theta_{h,g}$	0.452 0
$\theta_{i,g}$	1.223 1
$\theta'_{C,t}$	0.862 2
$\theta'_{e,C'}$	0.490 0
$\theta'_{F,e}$	0.510 0
$\theta'_{i,F'}$	1.695 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.004 6
$\Delta\theta_{C,A'}$	-0.000 5
$\Delta\theta_{g,d}$	-0.001 2
$\Delta\theta_{g,F}$	-0.001 2
$\Delta\theta_{i,g}$	-0.004 0

Coloring			
λ_{80}	330	λ_5	300
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	330	$\lambda_{0.05}$	301
CCI			
B	G	R	
0.00	0.09	0.06	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.02
310	0.23
320	0.57
330	0.80
340	0.914
350	0.959
360	0.979
370	0.989
380	0.992
390	0.995
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.993
1 600	0.995
1 800	0.983
2 000	0.966
2 200	0.920
2 400	0.89

Thermal Properties	
Strain Point StP (°C)	432
Annealing Point AP (°C)	468
Transformation Temperature Tg (°C)	483
Yield Point At (°C)	543
Softening Point SP (°C)	624
Expansion Coefficients (-30 °C ~ 70 °C)	84
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	105
Thermal Conductivity λ (W/(mK))	0.982

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	68
-90 ~ -80	70
-80 ~ -70	71
-70 ~ -60	73
-60 ~ -50	74
-50 ~ -40	75
-40 ~ -30	77
-30 ~ -20	78
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	82
10 ~ 20	84
20 ~ 30	85
30 ~ 40	86
40 ~ 50	87
50 ~ 60	89
60 ~ 70	90
70 ~ 80	91
80 ~ 90	92
90 ~ 100	94
100 ~ 110	95
110 ~ 120	96
120 ~ 130	97
130 ~ 140	98
140 ~ 150	99
150 ~ 160	101
160 ~ 170	102
170 ~ 180	103
180 ~ 190	104
190 ~ 200	105
200 ~ 210	106
210 ~ 220	107
220 ~ 230	108
230 ~ 240	109
240 ~ 250	110
250 ~ 260	111
260 ~ 270	112
270 ~ 280	113
280 ~ 290	114
290 ~ 300	115

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	0.7	0.8	1.1	1.2	1.2	1.3	1.4	1.6	1.6	2.0	2.2	2.7
-60 ~ -40	0.6	0.7	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.8	2.2	2.7
-40 ~ -20	0.6	0.8	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.8	2.2	2.8
-20 ~ 0	0.6	0.8	1.0	1.1	1.1	1.2	1.4	1.6	1.6	1.9	2.2	2.9
0 ~ 20	0.7	0.8	1.0	1.1	1.1	1.3	1.4	1.7	1.8	2.1	2.4	3.0
20 ~ 40	0.7	0.9	1.1	1.2	1.2	1.3	1.6	1.8	1.9	2.2	2.5	3.1
40 ~ 60	0.9	1.0	1.2	1.3	1.4	1.5	1.6	1.9	1.9	2.3	2.6	3.2
60 ~ 80	0.9	1.0	1.3	1.3	1.4	1.5	1.8	2.0	2.1	2.4	2.8	3.4
80 ~ 100	0.9	1.1	1.3	1.4	1.4	1.6	1.7	2.0	2.2	2.5	2.9	3.6
100 ~ 120	0.9	1.1	1.4	1.5	1.5	1.7	1.8	2.2	2.3	2.6	3.0	3.7
120 ~ 140	0.9	1.1	1.5	1.6	1.6	1.8	1.9	2.2	2.3	2.7	3.0	3.8
140 ~ 160	1.0	1.2	1.5	1.6	1.6	1.7	1.9	2.2	2.3	2.7	3.1	3.8
160 ~ 180	0.9	1.1	1.4	1.5	1.5	1.7	1.9	2.2	2.3	2.7	3.1	3.8

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.60
Specific Gravity d	2.75
Remarks	

OHARA 25-04

S-BAL14

Code(d) 569563
Code(e) 571561

Refractive Index n_d	1.568 83 1.568 832	Abbe Number v_d	56.36	Dispersion $n_F - n_C$	0.010 092
Refractive Index n_e	1.571 237	Abbe Number v_e	56.09	Dispersion $n_{F'} - n_{C'}$	0.010 185

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.540 50
n_{1970}	1.970 09	1.545 65
n_{1530}	1.529 58	1.551 16
n_{1129}	1.128 64	1.556 01
n_t	1.013 98	1.557 61
n_s	0.852 11	1.560 40
$n_{A'}$	0.768 19	1.562 30
n_r	0.706 52	1.564 04
n_C	0.656 27	1.565 77
$n_{C'}$	0.643 85	1.566 26
$n_{\text{He-Ne}}$	0.632 8	1.566 71
n_D	0.589 29	1.568 74
n_d	0.587 56	1.568 83
n_e	0.546 07	1.571 24
n_F	0.486 13	1.575 87
$n_{F'}$	0.479 99	1.576 45
$n_{\text{He-Cd}}$	0.441 57	1.580 67
n_g	0.435 835	1.581 41
n_h	0.404 656	1.586 04
n_i	0.365 015	1.594 00

Constants of Dispersion Formula	
A_1	1.275 536 96E+00
A_2	1.460 833 93E-01
A_3	1.167 546 99E+00
B_1	7.496 923 59E-03
B_2	3.104 215 30E-02
B_3	1.289 470 92E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	81.1
Rigidity Modulus G (GPa)	32.7
Poisson's Ratio σ	0.240
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	140

Partial Dispersions	
$n_C - n_t$	0.008 164
$n_C - n_{A'}$	0.003 476
$n_d - n_C$	0.003 057
$n_e - n_C$	0.005 462
$n_g - n_d$	0.012 574
$n_g - n_F$	0.005 539
$n_h - n_g$	0.004 629
$n_i - n_g$	0.012 595
$n_{C'} - n_t$	0.008 650
$n_e - n_{C'}$	0.004 976
$n_{F'} - n_e$	0.005 209
$n_i - n_{F'}$	0.017 555

Relative Partial Dispersions	
$\theta_{C,t}$	0.809 0
$\theta_{C,A'}$	0.344 4
$\theta_{d,C}$	0.302 9
$\theta_{e,C}$	0.541 2
$\theta_{g,d}$	1.245 9
$\theta_{g,F}$	0.548 9
$\theta_{h,g}$	0.458 7
$\theta_{i,g}$	1.248 0
$\theta'_{C,t}$	0.849 3
$\theta'_{e,C'}$	0.488 6
$\theta'_{F,e}$	0.511 4
$\theta'_{i,F'}$	1.723 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.002 1
$\Delta\theta_{C,A'}$	0.000 2
$\Delta\theta_{g,d}$	-0.001 8
$\Delta\theta_{g,F}$	-0.001 4
$\Delta\theta_{i,g}$	-0.005 1

Coloring			
λ_{80}	360	λ_5	325
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	354	$\lambda_{0.05}$	329
CCI			
B	G	R	
0.00	0.26	0.24	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.09
340	0.44
350	0.74
360	0.88
370	0.946
380	0.970
390	0.983
400	0.989
420	0.992
440	0.993
460	0.994
480	0.995
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.997
1 400	0.989
1 600	0.993
1 800	0.983
2 000	0.967
2 200	0.914
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	533
Annealing Point AP (°C)	562
Transformation Temperature Tg (°C)	582
Yield Point At (°C)	640
Softening Point SP (°C)	700
Expansion Coefficients (-30 °C ~ 70 °C)	79
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	94
Thermal Conductivity λ (W/(mK))	0.967

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	66
-90 ~ -80	67
-80 ~ -70	68
-70 ~ -60	69
-60 ~ -50	71
-50 ~ -40	72
-40 ~ -30	73
-30 ~ -20	74
-20 ~ -10	75
-10 ~ 0	76
0 ~ 10	77
10 ~ 20	78
20 ~ 30	79
30 ~ 40	80
40 ~ 50	81
50 ~ 60	82
60 ~ 70	83
70 ~ 80	84
80 ~ 90	85
90 ~ 100	86
100 ~ 110	87
110 ~ 120	88
120 ~ 130	89
130 ~ 140	90
140 ~ 150	90
150 ~ 160	91
160 ~ 170	92
170 ~ 180	93
180 ~ 190	94
190 ~ 200	94
200 ~ 210	95
210 ~ 220	96
220 ~ 230	96
230 ~ 240	97
240 ~ 250	98
250 ~ 260	98
260 ~ 270	99
270 ~ 280	100
280 ~ 290	100
290 ~ 300	101

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.32
Specific Gravity d	2.89
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	0.7	0.8	1.0	1.0	1.1	1.3	1.4	1.6	1.6	1.9	2.3	2.9
-60 ~ -40	0.6	0.7	0.9	1.0	1.0	1.1	1.2	1.6	1.6	1.9	2.2	2.8
-40 ~ -20	0.6	0.7	0.9	0.9	1.0	1.1	1.2	1.6	1.6	1.9	2.2	2.9
-20 ~ 0	0.6	0.7	0.9	1.0	1.0	1.2	1.3	1.6	1.6	2.0	2.4	3.0
0 ~ 20	0.6	0.7	1.0	1.2	1.2	1.3	1.5	1.7	1.8	2.1	2.4	3.1
20 ~ 40	0.7	0.8	1.2	1.3	1.3	1.4	1.6	1.9	1.9	2.2	2.6	3.3
40 ~ 60	0.9	1.0	1.3	1.4	1.4	1.5	1.7	2.0	2.0	2.4	2.7	3.6
60 ~ 80	0.9	1.2	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.6	2.9	3.7
80 ~ 100	1.1	1.2	1.5	1.6	1.7	1.9	2.0	2.3	2.4	2.7	3.1	3.9
100 ~ 120	1.2	1.3	1.6	1.8	1.8	2.0	2.1	2.4	2.5	2.9	3.3	4.1
120 ~ 140	1.3	1.5	1.8	1.9	1.9	2.1	2.2	2.6	2.6	3.0	3.4	4.2
140 ~ 160	1.4	1.5	1.8	1.9	2.0	2.1	2.3	2.6	2.7	3.1	3.5	4.3
160 ~ 180	1.4	1.5	1.9	2.0	2.0	2.2	2.3	2.7	2.8	3.2	3.7	4.5

S-BAL35

Code(d) 589612
Code(e) 591609

Refractive Index n_d	1.589 13 1.589 130	Abbe Number v_d	61.14	Dispersion $n_F - n_C$	0.009 636
Refractive Index n_e	1.591 429	Abbe Number v_e	60.88	Dispersion $n_{F'} - n_{C'}$	0.009 714

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.559 59
n_{1970}	1.970 09	1.565 31
n_{1530}	1.529 58	1.571 34
n_{1129}	1.128 64	1.576 48
n_t	1.013 98	1.578 13
n_s	0.852 11	1.580 93
$n_{A'}$	0.768 19	1.582 80
n_r	0.706 52	1.584 50
n_C	0.656 27	1.586 19
$n_{C'}$	0.643 85	1.586 66
$n_{\text{He-Ne}}$	0.632 8	1.587 10
n_D	0.589 29	1.589 04
n_d	0.587 56	1.589 13
n_e	0.546 07	1.591 43
n_F	0.486 13	1.595 82
$n_{F'}$	0.479 99	1.596 37
$n_{\text{He-Cd}}$	0.441 57	1.600 34
n_g	0.435 835	1.601 03
n_h	0.404 656	1.605 35
n_i	0.365 015	1.612 68

Constants of Dispersion Formula	
A_1	9.413 572 73E-01
A_2	5.461 748 95E-01
A_3	1.161 689 17E+00
B_1	1.403 339 96E-02
B_2	9.066 356 83E-04
B_3	1.141 637 58E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	4,2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	83.2
Rigidity Modulus G (GPa)	33.3
Poisson's Ratio σ	0.250
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	116

Partial Dispersions	
$n_C - n_t$	0.008 061
$n_C - n_{A'}$	0.003 384
$n_d - n_C$	0.002 942
$n_e - n_C$	0.005 241
$n_g - n_d$	0.011 904
$n_g - n_F$	0.005 210
$n_h - n_g$	0.004 314
$n_i - n_g$	0.011 647
$n_C - n_t$	0.008 530
$n_e - n_{C'}$	0.004 772
$n_{F'} - n_e$	0.004 942
$n_i - n_{F'}$	0.016 310

Relative Partial Dispersions	
$\theta_{C,t}$	0.836 6
$\theta_{C,A'}$	0.351 2
$\theta_{d,C}$	0.305 3
$\theta_{e,C}$	0.543 9
$\theta_{g,d}$	1.235 4
$\theta_{g,F}$	0.540 7
$\theta_{h,g}$	0.447 7
$\theta_{i,g}$	1.208 7
$\theta'_{C,t}$	0.878 1
$\theta'_{e,C'}$	0.491 2
$\theta'_{F,e}$	0.508 8
$\theta'_{i,F'}$	1.679 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 0
$\Delta\theta_{C,A'}$	0.001 2
$\Delta\theta_{g,d}$	-0.002 4
$\Delta\theta_{g,F}$	-0.001 8
$\Delta\theta_{i,g}$	-0.004 4

Coloring			
λ_{80}	345	λ_5	300
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	339	$\lambda_{0.05}$	303
CCI			
B	G	R	
0.00	0.17	0.15	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.01
310	0.16
320	0.43
330	0.67
340	0.82
350	0.904
360	0.949
370	0.972
380	0.983
390	0.989
400	0.993
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.999
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.984
1 600	0.994
1 800	0.987
2 000	0.972
2 200	0.89
2 400	0.80

Thermal Properties	
Strain Point StP (°C)	619
Annealing Point AP (°C)	646
Transformation Temperature Tg (°C)	668
Yield Point At (°C)	715
Softening Point SP (°C)	768
Expansion Coefficients (-30 °C ~ 70 °C)	57
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	69
Thermal Conductivity λ (W/(mK))	0.915

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	47
-90 ~ -80	48
-80 ~ -70	49
-70 ~ -60	50
-60 ~ -50	51
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	55
0 ~ 10	56
10 ~ 20	57
20 ~ 30	58
30 ~ 40	59
40 ~ 50	60
50 ~ 60	60
60 ~ 70	61
70 ~ 80	62
80 ~ 90	63
90 ~ 100	63
100 ~ 110	64
110 ~ 120	65
120 ~ 130	65
130 ~ 140	66
140 ~ 150	67
150 ~ 160	67
160 ~ 170	68
170 ~ 180	68
180 ~ 190	69
190 ~ 200	69
200 ~ 210	70
210 ~ 220	70
220 ~ 230	71
230 ~ 240	71
240 ~ 250	71
250 ~ 260	72
260 ~ 270	72
270 ~ 280	72
280 ~ 290	73
290 ~ 300	73

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	2.2	2.3	2.6	2.6	2.7	2.8	2.8	3.0	3.1	3.4	3.6	4.0	
-60 ~ -40	2.2	2.3	2.5	2.6	2.6	2.7	2.8	3.0	3.1	3.3	3.5	4.1	
-40 ~ -20	2.2	2.3	2.5	2.6	2.6	2.8	2.9	3.1	3.1	3.4	3.6	4.1	
-20 ~ 0	2.3	2.4	2.6	2.7	2.7	2.8	3.0	3.2	3.3	3.5	3.7	4.2	
0 ~ 20	2.4	2.6	2.8	2.9	2.9	3.0	3.1	3.3	3.4	3.6	3.9	4.5	
20 ~ 40	2.6	2.8	3.0	3.0	3.1	3.2	3.3	3.5	3.5	3.8	4.1	4.7	
40 ~ 60	2.8	2.9	3.1	3.2	3.2	3.3	3.4	3.6	3.7	3.9	4.3	4.8	
60 ~ 80	2.8	3.1	3.3	3.4	3.4	3.5	3.6	3.8	3.9	4.2	4.4	5.0	
80 ~ 100	3.0	3.1	3.4	3.5	3.5	3.7	3.8	4.0	4.1	4.3	4.6	5.2	
100 ~ 120	3.2	3.3	3.6	3.7	3.7	3.8	3.9	4.2	4.2	4.5	4.8	5.4	
120 ~ 140	3.3	3.4	3.7	3.8	3.8	3.9	4.0	4.3	4.3	4.6	4.9	5.5	
140 ~ 160	3.4	3.5	3.7	3.8	3.8	4.0	4.1	4.4	4.4	4.7	5.0	5.7	
160 ~ 180	3.4	3.5	3.8	4.0	4.0	4.1	4.3	4.5	4.6	4.9	5.2	5.8	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.15
Specific Gravity d	3.31
Remarks	

S-BAL42

Code(d) 583594
Code(e) 585591

Refractive Index n_d	1.583 13 1.583 126	Abbe Number v_d	59.38	Dispersion $n_F - n_C$	0.009 821
Refractive Index n_e	1.585 468	Abbe Number v_e	59.11	Dispersion $n_{F'} - n_{C'}$	0.009 905

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.554 63
n_{1970}	1.970 09	1.559 92
n_{1530}	1.529 58	1.565 57
n_{1129}	1.128 64	1.570 48
n_t	1.013 98	1.572 08
n_s	0.852 11	1.574 85
$n_{A'}$	0.768 19	1.576 73
n_r	0.706 52	1.578 44
n_C	0.656 27	1.580 14
$n_{C'}$	0.643 85	1.580 61
$n_{\text{He-Ne}}$	0.632 8	1.581 06
n_D	0.589 29	1.583 04
n_d	0.587 56	1.583 13
n_e	0.546 07	1.585 47
n_F	0.486 13	1.589 96
$n_{F'}$	0.479 99	1.590 52
$n_{\text{He-Cd}}$	0.441 57	1.594 59
n_g	0.435 835	1.595 30
n_h	0.404 656	1.599 72
n_i	0.365 015	1.607 24

Constants of Dispersion Formula	
A_1	1.395 706 15E+00
A_2	7.185 050 70E-02
A_3	1.271 292 67E+00
B_1	1.122 188 43E-02
B_2	-2.521 174 22E-02
B_3	1.344 978 60E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	1.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	84.7
Rigidity Modulus G (GPa)	34.0
Poisson's Ratio σ	0.246
Knoop Hardness Hk[Class]	580 6
Abrasion Aa	121

Partial Dispersions	
$n_C - n_t$	0.008 056
$n_C - n_{A'}$	0.003 413
$n_d - n_C$	0.002 987
$n_e - n_C$	0.005 329
$n_g - n_d$	0.012 171
$n_g - n_F$	0.005 337
$n_h - n_g$	0.004 424
$n_i - n_g$	0.011 946
$n_C - n_t$	0.008 531
$n_e - n_{C'}$	0.004 854
$n_{F'} - n_e$	0.005 051
$n_i - n_{F'}$	0.016 724

Relative Partial Dispersions	
$\theta_{C,t}$	0.820 3
$\theta_{C,A'}$	0.347 5
$\theta_{d,C}$	0.304 1
$\theta_{e,C}$	0.542 6
$\theta_{g,d}$	1.239 3
$\theta_{g,F}$	0.543 4
$\theta_{h,g}$	0.450 5
$\theta_{i,g}$	1.216 4
$\theta'_{C,t}$	0.861 3
$\theta'_{e,C'}$	0.490 1
$\theta'_{F,e}$	0.509 9
$\theta'_{i,F'}$	1.688 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.005 0
$\Delta\theta_{C,A'}$	-0.000 4
$\Delta\theta_{g,d}$	-0.002 1
$\Delta\theta_{g,F}$	-0.002 0
$\Delta\theta_{i,g}$	-0.011 4

Coloring			
λ_{80}	340	λ_5	290
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	292
CCI			
B	G	R	
0.00	0.16	0.14	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.03
300	0.15
310	0.36
320	0.58
330	0.75
340	0.86
350	0.932
360	0.964
370	0.979
380	0.986
390	0.991
400	0.993
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.998
900	0.997
1 000	0.997
1 200	0.997
1 400	0.987
1 600	0.994
1 800	0.985
2 000	0.973
2 200	0.917
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	503
Annealing Point AP (°C)	534
Transformation Temperature Tg (°C)	553
Yield Point At (°C)	606
Softening Point SP (°C)	672
Expansion Coefficients (-30 °C ~ 70 °C)	67
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	82
Thermal Conductivity λ (W/(mK))	0.974

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	55
-80 ~ -70	56
-70 ~ -60	57
-60 ~ -50	59
-50 ~ -40	60
-40 ~ -30	61
-30 ~ -20	62
-20 ~ -10	63
-10 ~ 0	64
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	70
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	74
100 ~ 110	75
110 ~ 120	76
120 ~ 130	77
130 ~ 140	78
140 ~ 150	79
150 ~ 160	79
160 ~ 170	80
170 ~ 180	81
180 ~ 190	82
190 ~ 200	82
200 ~ 210	83
210 ~ 220	84
220 ~ 230	84
230 ~ 240	85
240 ~ 250	85
250 ~ 260	86
260 ~ 270	87
270 ~ 280	87
280 ~ 290	88
290 ~ 300	88

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.20
Specific Gravity d	3.19
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	2.2	2.3	2.5	2.7	2.7	2.8	2.9	3.1	3.1	3.4	3.8	4.3
-60 ~ -40	2.2	2.2	2.4	2.5	2.5	2.7	2.8	3.1	3.1	3.4	3.6	4.3
-40 ~ -20	2.2	2.3	2.5	2.5	2.5	2.8	2.8	3.1	3.1	3.4	3.7	4.3
-20 ~ 0	2.2	2.3	2.5	2.6	2.6	2.7	2.8	3.2	3.2	3.5	3.8	4.4
0 ~ 20	2.2	2.5	2.7	2.7	2.8	2.9	3.0	3.3	3.3	3.6	3.9	4.5
20 ~ 40	2.3	2.6	2.8	2.9	2.9	3.0	3.1	3.4	3.4	3.7	4.0	4.7
40 ~ 60	2.5	2.6	2.9	2.9	3.0	3.1	3.2	3.5	3.5	3.8	4.3	4.9
60 ~ 80	2.5	2.8	3.0	3.1	3.1	3.2	3.4	3.6	3.7	4.0	4.3	5.0
80 ~ 100	2.6	2.8	3.1	3.2	3.2	3.4	3.5	3.8	3.8	4.1	4.5	5.2
100 ~ 120	2.7	2.9	3.2	3.3	3.3	3.4	3.6	3.9	3.9	4.3	4.6	5.3
120 ~ 140	2.8	3.0	3.3	3.3	3.4	3.5	3.6	3.9	4.0	4.3	4.7	5.4
140 ~ 160	2.9	3.0	3.3	3.4	3.4	3.5	3.7	4.0	4.0	4.4	4.7	5.5
160 ~ 180	2.8	3.0	3.3	3.4	3.4	3.5	3.8	4.1	4.1	4.5	4.8	5.6

S-BAM 4

Code(d) 606437
Code(e) 609434

Refractive Index n_d	1.605 62 1.605 620	Abbe Number v_d	43.70	Dispersion $n_F - n_C$	0.013 857
Refractive Index n_e	1.608 909	Abbe Number v_e	43.41	Dispersion $n_{F'} - n_{C'}$	0.014 026

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.573 51
n_{1970}	1.970 09	1.578 50
n_{1530}	1.529 58	1.584 02
n_{1129}	1.128 64	1.589 26
n_t	1.013 98	1.591 13
n_s	0.852 11	1.594 53
$n_{A'}$	0.768 19	1.596 95
n_r	0.706 52	1.599 21
n_C	0.656 27	1.601 51
$n_{C'}$	0.643 85	1.602 15
$n_{\text{He-Ne}}$	0.632 8	1.602 76
n_D	0.589 29	1.605 50
n_d	0.587 56	1.605 62
n_e	0.546 07	1.608 91
n_F	0.486 13	1.615 36
$n_{F'}$	0.479 99	1.616 18
$n_{\text{He-Cd}}$	0.441 57	1.622 22
n_g	0.435 835	1.623 29
n_h	0.404 656	1.630 10
n_i	0.365 015	1.642 28

Constants of Dispersion Formula	
A_1	1.410 593 17E+00
A_2	1.112 013 06E-01
A_3	1.341 489 39E+00
B_1	9.633 121 92E-03
B_2	4.987 782 10E-02
B_3	1.522 376 96E+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 (GPa)	76.2
Rigidity Modulus G (GPa)	30.6
Poisson's Ratio σ	0.244
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	159

Partial Dispersions	
$n_C - n_t$	0.010 380
$n_C - n_{A'}$	0.004 557
$n_d - n_C$	0.004 113
$n_e - n_C$	0.007 402
$n_g - n_d$	0.017 671
$n_g - n_F$	0.007 927
$n_h - n_g$	0.006 811
$n_i - n_g$	0.018 992
$n_C - n_t$	0.011 028
$n_e - n_{C'}$	0.006 754
$n_{F'} - n_e$	0.007 272
$n_i - n_{F'}$	0.026 102

Relative Partial Dispersions	
$\theta_{C,t}$	0.749 1
$\theta_{C,A'}$	0.328 9
$\theta_{d,C}$	0.296 8
$\theta_{e,C}$	0.534 2
$\theta_{g,d}$	1.275 2
$\theta_{g,F}$	0.572 1
$\theta_{h,g}$	0.491 5
$\theta_{i,g}$	1.370 6
$\theta'_{C,t}$	0.786 3
$\theta'_{e,C'}$	0.481 5
$\theta'_{F',e}$	0.518 5
$\theta'_{i,F'}$	1.861 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.002 6
$\Delta\theta_{C,A'}$	0.000 1
$\Delta\theta_{g,d}$	0.001 2
$\Delta\theta_{g,F}$	0.001 3
$\Delta\theta_{i,g}$	0.011 5

Coloring			
λ_{80}	380	λ_5	345
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	350
CCI			
B	G	R	
0.00	0.69	0.65	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.41
370	0.72
380	0.87
390	0.938
400	0.965
420	0.986
440	0.991
460	0.991
480	0.993
500	0.995
550	0.998
600	0.997
650	0.996
700	0.997
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.994
1 800	0.980
2 000	0.962
2 200	0.919
2 400	0.89

Thermal Properties	
Strain Point StP (°C)	548
Annealing Point AP (°C)	577
Transformation Temperature Tg (°C)	603
Yield Point At (°C)	650
Softening Point SP (°C)	722
Expansion Coefficients (-30 °C ~ 70 °C)	85
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	101
Thermal Conductivity λ (W/(mK))	0.931

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	71
-90 ~ -80	73
-80 ~ -70	74
-70 ~ -60	75
-60 ~ -50	76
-50 ~ -40	77
-40 ~ -30	78
-30 ~ -20	79
-20 ~ -10	81
-10 ~ 0	82
0 ~ 10	83
10 ~ 20	84
20 ~ 30	85
30 ~ 40	86
40 ~ 50	87
50 ~ 60	88
60 ~ 70	89
70 ~ 80	90
80 ~ 90	91
90 ~ 100	92
100 ~ 110	93
110 ~ 120	94
120 ~ 130	95
130 ~ 140	96
140 ~ 150	96
150 ~ 160	97
160 ~ 170	98
170 ~ 180	99
180 ~ 190	100
190 ~ 200	101
200 ~ 210	102
210 ~ 220	102
220 ~ 230	103
230 ~ 240	104
240 ~ 250	105
250 ~ 260	105
260 ~ 270	106
270 ~ 280	107
280 ~ 290	108
290 ~ 300	108

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	0.1	0.3	0.6	0.7	0.7	0.9	1.0	1.5	1.5	2.0	2.5	3.7
-60 ~ -40	0.0	0.1	0.5	0.6	0.6	0.8	1.0	1.3	1.4	2.0	2.5	3.6
-40 ~ -20	-0.1	0.1	0.5	0.6	0.6	0.8	1.0	1.3	1.4	1.9	2.5	3.7
-20 ~ 0	0.0	0.1	0.4	0.6	0.7	0.9	1.0	1.4	1.5	2.0	2.6	3.9
0 ~ 20	0.1	0.2	0.6	0.7	0.7	0.9	1.1	1.5	1.6	2.1	2.8	4.0
20 ~ 40	0.1	0.3	0.6	0.7	0.8	1.0	1.2	1.6	1.7	2.2	2.8	4.3
40 ~ 60	0.2	0.3	0.7	0.8	0.8	1.1	1.3	1.8	1.9	2.5	3.1	4.4
60 ~ 80	0.3	0.5	0.8	1.0	1.0	1.2	1.4	1.9	2.0	2.6	3.2	4.6
80 ~ 100	0.4	0.5	0.9	1.1	1.1	1.3	1.5	2.0	2.1	2.7	3.4	4.8
100 ~ 120	0.4	0.6	1.0	1.1	1.2	1.4	1.6	2.1	2.2	2.8	3.5	5.0
120 ~ 140	0.5	0.6	1.1	1.2	1.2	1.5	1.7	2.2	2.3	2.9	3.6	5.2
140 ~ 160	0.4	0.6	1.1	1.2	1.3	1.5	1.7	2.3	2.3	3.0	3.8	5.4
160 ~ 180	0.4	0.6	1.1	1.3	1.3	1.6	1.8	2.4	2.5	3.1	3.9	5.5

Other Properties	
Photoelastic Constant β nm/(cm ¹⁰⁵ Pa)	2.41
Specific Gravity d	2.91
Remarks	

OHARA 25-04

S-BAM12

Code(d) 639449
Code(e) 643446

Refractive Index n_d	1.639 30 1.639 300	Abbe Number v_d	44.87	Dispersion $n_F - n_C$	0.014 247
Refractive Index n_e	1.642 684	Abbe Number v_e	44.59	Dispersion $n_{F'} - n_{C'}$	0.014 414

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.604 80
n_{1970}	1.970 09	1.610 40
n_{1530}	1.529 58	1.616 53
n_{1129}	1.128 64	1.622 23
n_t	1.013 98	1.624 22
n_s	0.852 11	1.627 81
$n_{A'}$	0.768 19	1.630 33
n_r	0.706 52	1.632 68
n_C	0.656 27	1.635 06
$n_{C'}$	0.643 85	1.635 73
$n_{\text{He-Ne}}$	0.632 8	1.636 35
n_D	0.589 29	1.639 17
n_d	0.587 56	1.639 30
n_e	0.546 07	1.642 68
n_F	0.486 13	1.649 30
$n_{F'}$	0.479 99	1.650 14
$n_{\text{He-Cd}}$	0.441 57	1.656 31
n_g	0.435 835	1.657 40
n_h	0.404 656	1.664 33
n_i	0.365 015	1.676 65

Constants of Dispersion Formula	
A_1	1.501 616 05E+00
A_2	1.269 874 45E-01
A_3	1.435 440 52E+00
B_1	9.407 618 26E-03
B_2	4.726 021 95E-02
B_3	1.416 664 99E+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	3.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	90.4
Rigidity Modulus G (GPa)	36.1
Poisson's Ratio σ	0.253
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	154

Partial Dispersions	
$n_C - n_t$	0.010 836
$n_C - n_{A'}$	0.004 725
$n_d - n_C$	0.004 243
$n_e - n_C$	0.007 627
$n_g - n_d$	0.018 101
$n_g - n_F$	0.008 097
$n_h - n_g$	0.006 929
$n_i - n_g$	0.019 244
$n_{C'} - n_t$	0.011 505
$n_e - n_{C'}$	0.006 958
$n_{F'} - n_e$	0.007 456
$n_i - n_{F'}$	0.026 505

Relative Partial Dispersions	
$\theta_{C,t}$	0.760 6
$\theta_{C,A'}$	0.331 6
$\theta_{d,C}$	0.297 8
$\theta_{e,C}$	0.535 3
$\theta_{g,d}$	1.270 5
$\theta_{g,F}$	0.568 3
$\theta_{h,g}$	0.486 3
$\theta_{i,g}$	1.350 7
$\theta'_{C,t}$	0.798 2
$\theta'_{e,C'}$	0.482 7
$\theta'_{F,e}$	0.517 3
$\theta'_{i,F'}$	1.838 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 4
$\Delta\theta_{C,A'}$	0.001 4
$\Delta\theta_{g,d}$	-0.001 0
$\Delta\theta_{g,F}$	-0.000 6
$\Delta\theta_{i,g}$	0.001 4

Coloring			
λ_{80}	385	λ_5	345
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	348
CCI			
B	G	R	
0.00	0.93	0.93	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.13
360	0.49
370	0.75
380	0.87
390	0.928
400	0.955
420	0.977
440	0.983
460	0.987
480	0.990
500	0.993
550	0.997
600	0.996
650	0.996
700	0.997
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.992
1 600	0.995
1 800	0.987
2 000	0.976
2 200	0.932
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	565
Annealing Point AP (°C)	592
Transformation Temperature Tg (°C)	605
Yield Point At (°C)	659
Softening Point SP (°C)	717
Expansion Coefficients (-30 °C ~ 70 °C)	76
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	91
Thermal Conductivity λ (W/(mK))	0.954

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	68
-50 ~ -40	69
-40 ~ -30	70
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	77
30 ~ 40	78
40 ~ 50	79
50 ~ 60	80
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	87
150 ~ 160	88
160 ~ 170	89
170 ~ 180	90
180 ~ 190	90
190 ~ 200	91
200 ~ 210	92
210 ~ 220	92
220 ~ 230	93
230 ~ 240	93
240 ~ 250	94
250 ~ 260	94
260 ~ 270	95
270 ~ 280	95
280 ~ 290	96
290 ~ 300	96

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	1.4	1.5	1.9	2.0	2.0	2.2	2.4	2.7	2.8	3.3	3.8	4.9
-60 ~ -40	1.3	1.5	1.8	1.9	1.9	2.1	2.2	2.7	2.8	3.2	3.7	4.9
-40 ~ -20	1.3	1.4	1.8	1.9	1.9	2.1	2.3	2.8	2.8	3.3	3.9	5.0
-20 ~ 0	1.3	1.5	1.8	2.0	2.0	2.2	2.4	2.8	2.9	3.5	4.1	5.3
0 ~ 20	1.3	1.5	1.9	2.0	2.1	2.3	2.5	3.0	3.1	3.6	4.2	5.5
20 ~ 40	1.4	1.6	2.0	2.1	2.2	2.4	2.6	3.1	3.2	3.8	4.5	5.7
40 ~ 60	1.5	1.7	2.2	2.3	2.4	2.6	2.9	3.3	3.4	4.0	4.7	6.0
60 ~ 80	1.7	1.9	2.3	2.4	2.5	2.7	3.0	3.5	3.5	4.2	5.0	6.4
80 ~ 100	1.8	2.0	2.4	2.6	2.6	2.9	3.1	3.7	3.7	4.4	5.1	6.6
100 ~ 120	1.9	2.1	2.6	2.7	2.8	3.0	3.3	3.8	3.9	4.6	5.3	6.8
120 ~ 140	1.9	2.2	2.7	2.8	2.9	3.1	3.4	4.0	4.1	4.8	5.5	7.1
140 ~ 160	2.0	2.2	2.7	2.9	2.9	3.2	3.5	4.2	4.2	5.0	5.8	7.4
160 ~ 180	2.1	2.3	2.9	3.0	3.1	3.4	3.7	4.3	4.3	5.1	5.9	7.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.30
Specific Gravity d	3.18
Remarks	

OHARA 25-04

S-BSL 7

Code(d) **516641**
Code(e) **518639**

Refractive Index n_d	1.516 33 1.516 330	Abbe Number v_d	64.14	Dispersion $n_F - n_C$	0.008 050
Refractive Index n_e	1.518 251	Abbe Number v_e	63.93	Dispersion $n_{F'} - n_{C'}$	0.008 107

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.488 99
n_{1970}	1.970 09	1.494 62
n_{1530}	1.529 58	1.500 50
n_{1129}	1.128 64	1.505 36
n_t	1.013 98	1.506 86
n_s	0.852 11	1.509 35
$n_{A'}$	0.768 19	1.510 97
n_r	0.706 52	1.512 43
n_C	0.656 27	1.513 86
$n_{C'}$	0.643 85	1.514 25
$n_{\text{He-Ne}}$	0.632 8	1.514 62
n_D	0.589 29	1.516 26
n_d	0.587 56	1.516 33
n_e	0.546 07	1.518 25
n_F	0.486 13	1.521 91
$n_{F'}$	0.479 99	1.522 36
$n_{\text{He-Cd}}$	0.441 57	1.525 64
n_g	0.435 835	1.526 21
n_h	0.404 656	1.529 77
n_i	0.365 015	1.535 78

Constants of Dispersion Formula	
A_1	1.151 501 90E+00
A_2	1.185 836 12E-01
A_3	1.263 013 59E+00
B_1	1.059 841 30E-02
B_2	-1.182 251 90E-02
B_3	1.296 176 62E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
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	2.0

Mechanical Properties	
Young's Modulus E (GPa)	80.0
Rigidity Modulus G (GPa)	33.2
Poisson's Ratio σ	0.205
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	94

Partial Dispersions	
$n_C - n_t$	0.006 993
$n_C - n_{A'}$	0.002 882
$n_d - n_C$	0.002 475
$n_e - n_C$	0.004 396
$n_g - n_d$	0.009 884
$n_g - n_F$	0.004 309
$n_h - n_g$	0.003 554
$n_i - n_g$	0.009 571
$n_{C'} - n_t$	0.007 389
$n_e - n_{C'}$	0.004 000
$n_{F'} - n_e$	0.004 107
$n_i - n_{F'}$	0.013 427

Relative Partial Dispersions	
$\theta_{C,t}$	0.868 7
$\theta_{C,A'}$	0.358 0
$\theta_{d,C}$	0.307 5
$\theta_{e,C}$	0.546 1
$\theta_{g,d}$	1.227 8
$\theta_{g,F}$	0.535 3
$\theta_{h,g}$	0.441 5
$\theta_{i,g}$	1.188 9
$\theta'_{C,t}$	0.911 4
$\theta'_{e,C'}$	0.493 4
$\theta'_{F,e}$	0.506 6
$\theta'_{i,F'}$	1.656 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.021 1
$\Delta\theta_{C,A'}$	0.004 4
$\Delta\theta_{g,d}$	-0.003 7
$\Delta\theta_{g,F}$	-0.002 4
$\Delta\theta_{i,g}$	0.001 0

Coloring			
λ_{80}	320	λ_5	280
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	315	$\lambda_{0.05}$	278
CCI			
B	G	R	
0.00	0.06	0.04	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.06
290	0.25
300	0.52
310	0.74
320	0.87
330	0.936
340	0.969
350	0.984
360	0.991
370	0.994
380	0.995
390	0.997
400	0.998
420	0.998
440	0.997
460	0.997
480	0.997
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.973
1 600	0.989
1 800	0.968
2 000	0.933
2 200	0.82
2 400	0.77

Thermal Properties	
Strain Point StP (°C)	532
Annealing Point AP (°C)	563
Transformation Temperature Tg (°C)	569
Yield Point At (°C)	641
Softening Point SP (°C)	718
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	89
Thermal Conductivity λ (W/(mK))	1.13

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	58
-90 ~ -80	59
-80 ~ -70	61
-70 ~ -60	62
-60 ~ -50	64
-50 ~ -40	65
-40 ~ -30	67
-30 ~ -20	68
-20 ~ -10	69
-10 ~ 0	70
0 ~ 10	72
10 ~ 20	73
20 ~ 30	74
30 ~ 40	75
40 ~ 50	76
50 ~ 60	77
60 ~ 70	78
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	85
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	88
180 ~ 190	88
190 ~ 200	89
200 ~ 210	89
210 ~ 220	90
220 ~ 230	90
230 ~ 240	91
240 ~ 250	91
250 ~ 260	92
260 ~ 270	92
270 ~ 280	93
280 ~ 290	93
290 ~ 300	93

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	1.7	1.8	1.9	2.0	2.0	2.1	2.2	2.4	2.4	2.6	2.8	3.3
-60 ~ -40	1.6	1.7	1.8	1.9	1.9	1.9	2.1	2.3	2.3	2.5	2.7	3.1
-40 ~ -20	1.5	1.6	1.8	1.8	1.9	2.0	2.1	2.3	2.3	2.5	2.7	3.2
-20 ~ 0	1.6	1.6	1.8	2.0	2.0	2.1	2.2	2.4	2.4	2.6	2.8	3.3
0 ~ 20	1.7	1.8	1.9	2.0	2.0	2.1	2.2	2.4	2.4	2.7	3.0	3.5
20 ~ 40	1.8	1.8	2.0	2.1	2.1	2.2	2.3	2.5	2.6	2.8	3.2	3.7
40 ~ 60	1.8	1.9	2.2	2.3	2.3	2.4	2.5	2.8	2.8	3.1	3.3	3.9
60 ~ 80	2.0	2.1	2.3	2.4	2.4	2.5	2.6	2.9	3.0	3.3	3.6	4.1
80 ~ 100	2.1	2.2	2.4	2.5	2.5	2.7	2.8	3.0	3.1	3.4	3.7	4.3
100 ~ 120	2.2	2.4	2.6	2.7	2.7	2.8	2.9	3.2	3.2	3.5	4.0	4.6
120 ~ 140	2.3	2.5	2.7	2.8	2.8	2.9	3.1	3.4	3.5	3.8	4.1	4.8
140 ~ 160	2.5	2.7	2.9	3.0	3.0	3.2	3.3	3.6	3.6	3.9	4.3	4.9
160 ~ 180	2.6	2.7	3.0	3.1	3.1	3.2	3.4	3.7	3.7	4.1	4.4	5.1

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.79
Specific Gravity d	2.52
Remarks	

S-BSM 2

Code(d) 607568
Code(e) 610565

Refractive Index n_d	1.607 38 1.607 379	Abbe Number v_d	56.81	Dispersion $n_F - n_C$	0.010 691
Refractive Index n_e	1.609 927	Abbe Number v_e	56.53	Dispersion $n_{F'} - n_{C'}$	0.010 790

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.578 74
n_{1970}	1.970 09	1.583 74
n_{1530}	1.529 58	1.589 13
n_{1129}	1.128 64	1.593 98
n_t	1.013 98	1.595 61
n_s	0.852 11	1.598 49
$n_{A'}$	0.768 19	1.600 48
n_r	0.706 52	1.602 31
n_C	0.656 27	1.604 14
$n_{C'}$	0.643 85	1.604 66
$n_{\text{He-Ne}}$	0.632 8	1.605 14
n_D	0.589 29	1.607 28
n_d	0.587 56	1.607 38
n_e	0.546 07	1.609 93
n_F	0.486 13	1.614 83
$n_{F'}$	0.479 99	1.615 45
$n_{\text{He-Cd}}$	0.441 57	1.619 92
n_g	0.435 835	1.620 70
n_h	0.404 656	1.625 58
n_i	0.365 015	1.633 94

Constants of Dispersion Formula	
A_1	8.671 686 76E-01
A_2	6.728 483 43E-01
A_3	1.184 561 07E+00
B_1	3.693 110 03E-03
B_2	1.816 528 04E-02
B_3	1.323 761 47E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	2.2

Mechanical Properties	
Young's Modulus E (GPa)	78.0
Rigidity Modulus G (GPa)	30.9
Poisson's Ratio σ	0.264
Knoop Hardness Hk[Class]	550 6
Abrasion Aa	139

Partial Dispersions	
$n_C - n_t$	0.008 534
$n_C - n_{A'}$	0.003 662
$n_d - n_C$	0.003 235
$n_e - n_C$	0.005 783
$n_g - n_d$	0.013 318
$n_g - n_F$	0.005 862
$n_h - n_g$	0.004 885
$n_i - n_g$	0.013 244
$n_{C'} - n_t$	0.009 048
$n_e - n_{C'}$	0.005 269
$n_{F'} - n_e$	0.005 521
$n_i - n_{F'}$	0.018 493

Relative Partial Dispersions	
$\theta_{C,t}$	0.798 2
$\theta_{C,A'}$	0.342 5
$\theta_{d,C}$	0.302 6
$\theta_{e,C}$	0.540 9
$\theta_{g,d}$	1.245 7
$\theta_{g,F}$	0.548 3
$\theta_{h,g}$	0.456 9
$\theta_{i,g}$	1.238 8
$\theta'_{C,t}$	0.838 6
$\theta'_{e,C'}$	0.488 3
$\theta'_{F,e}$	0.511 7
$\theta'_{i,F'}$	1.713 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.015 0
$\Delta\theta_{C,A'}$	-0.002 2
$\Delta\theta_{g,d}$	-0.001 0
$\Delta\theta_{g,F}$	-0.001 3
$\Delta\theta_{i,g}$	-0.010 5

Coloring			
λ_{80}	350	λ_5	300
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	343	$\lambda_{0.05}$	310
CCI			
B	G	R	
0.00	0.26	0.25	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.04
320	0.27
330	0.57
340	0.77
350	0.88
360	0.941
370	0.967
380	0.981
390	0.987
400	0.991
420	0.991
440	0.990
460	0.991
480	0.993
500	0.995
550	0.997
600	0.997
650	0.996
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.997
1 800	0.992
2 000	0.984
2 200	0.951
2 400	0.89

Thermal Properties	
Strain Point StP (°C)	612
Annealing Point AP (°C)	643
Transformation Temperature Tg (°C)	659
Yield Point At (°C)	716
Softening Point SP (°C)	778
Expansion Coefficients (-30 °C ~ 70 °C)	64
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	76
Thermal Conductivity λ (W/(mK))	0.802

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	52
-90 ~ -80	54
-80 ~ -70	55
-70 ~ -60	56
-60 ~ -50	57
-50 ~ -40	58
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	60
-10 ~ 0	61
0 ~ 10	62
10 ~ 20	63
20 ~ 30	64
30 ~ 40	65
40 ~ 50	66
50 ~ 60	66
60 ~ 70	67
70 ~ 80	68
80 ~ 90	69
90 ~ 100	70
100 ~ 110	70
110 ~ 120	71
120 ~ 130	72
130 ~ 140	72
140 ~ 150	73
150 ~ 160	74
160 ~ 170	74
170 ~ 180	75
180 ~ 190	75
190 ~ 200	76
200 ~ 210	76
210 ~ 220	77
220 ~ 230	77
230 ~ 240	78
240 ~ 250	78
250 ~ 260	79
260 ~ 270	79
270 ~ 280	80
280 ~ 290	80
290 ~ 300	80

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	2.5	2.7	2.9	3.0	3.0	3.1	3.2	3.6	3.6	3.9	4.2	4.8
-60 ~ -40	2.4	2.5	2.9	2.9	3.0	3.1	3.2	3.4	3.5	3.9	4.2	4.8
-40 ~ -20	2.4	2.5	2.9	3.0	3.0	3.1	3.2	3.5	3.5	3.8	4.3	4.9
-20 ~ 0	2.5	2.6	3.0	3.1	3.1	3.2	3.3	3.6	3.6	4.0	4.3	5.0
0 ~ 20	2.6	2.8	3.0	3.1	3.1	3.3	3.4	3.7	3.7	4.1	4.5	5.2
20 ~ 40	2.8	2.9	3.2	3.3	3.3	3.4	3.6	3.8	3.9	4.2	4.6	5.4
40 ~ 60	2.8	3.0	3.3	3.4	3.4	3.5	3.7	4.1	4.1	4.5	4.8	5.5
60 ~ 80	3.0	3.1	3.4	3.5	3.6	3.7	3.9	4.2	4.2	4.6	4.9	5.6
80 ~ 100	3.1	3.3	3.6	3.7	3.7	3.8	4.0	4.3	4.4	4.7	5.1	5.9
100 ~ 120	3.2	3.4	3.7	3.8	3.8	4.0	4.1	4.5	4.5	4.9	5.3	6.0
120 ~ 140	3.3	3.4	3.8	3.9	3.9	4.1	4.2	4.6	4.6	5.0	5.4	6.2
140 ~ 160	3.3	3.5	3.8	3.9	3.9	4.1	4.3	4.6	4.7	5.1	5.5	6.4
160 ~ 180	3.3	3.5	3.8	4.0	4.1	4.2	4.4	4.8	4.8	5.2	5.6	6.5

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.26
Specific Gravity d	3.53
Remarks	

OHARA 25-04

S-BSM10

Code(d) **623570**
Code(e) **625568**

Refractive Index n_d	1.622 80 1.622 799	Abbe Number v_d	57.05	Dispersion $n_F - n_C$	0.010 916
Refractive Index n_e	1.625 401	Abbe Number v_e	56.78	Dispersion $n_{F'} - n_{C'}$	0.011 014

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.592 71
n_{1970}	1.970 09	1.598 09
n_{1530}	1.529 58	1.603 86
n_{1129}	1.128 64	1.608 98
n_t	1.013 98	1.610 69
n_s	0.852 11	1.613 68
$n_{A'}$	0.768 19	1.615 73
n_r	0.706 52	1.617 61
n_C	0.656 27	1.619 49
$n_{C'}$	0.643 85	1.620 01
$n_{\text{He-Ne}}$	0.632 8	1.620 51
n_D	0.589 29	1.622 70
n_d	0.587 56	1.622 80
n_e	0.546 07	1.625 40
n_F	0.486 13	1.630 41
$n_{F'}$	0.479 99	1.631 03
$n_{\text{He-Cd}}$	0.441 57	1.635 58
n_g	0.435 835	1.636 37
n_h	0.404 656	1.641 33
n_i	0.365 015	1.649 80

Constants of Dispersion Formula	
A_1	9.454 430 81E-01
A_2	6.432 373 76E-01
A_3	1.177 529 68E+00
B_1	1.572 637 98E-02
B_2	1.619 240 66E-03
B_3	1.213 617 48E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	83.5
Rigidity Modulus G (GPa)	33.0
Poisson's Ratio σ	0.266
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	134

Partial Dispersions	
$n_C - n_t$	0.008 800
$n_C - n_{A'}$	0.003 759
$n_d - n_C$	0.003 310
$n_e - n_C$	0.005 912
$n_g - n_d$	0.013 570
$n_g - n_F$	0.005 964
$n_h - n_g$	0.004 960
$n_i - n_g$	0.013 428
$n_{C'} - n_t$	0.009 326
$n_e - n_{C'}$	0.005 386
$n_{F'} - n_e$	0.005 628
$n_i - n_{F'}$	0.018 768

Relative Partial Dispersions	
$\theta_{C,t}$	0.806 2
$\theta_{C,A'}$	0.344 4
$\theta_{d,C}$	0.303 2
$\theta_{e,C}$	0.541 6
$\theta_{g,d}$	1.243 1
$\theta_{g,F}$	0.546 4
$\theta_{h,g}$	0.454 4
$\theta_{i,g}$	1.230 1
$\theta'_{C,t}$	0.846 7
$\theta'_{e,C'}$	0.489 0
$\theta'_{F,e}$	0.511 0
$\theta'_{i,F'}$	1.704 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.008 2
$\Delta\theta_{C,A'}$	-0.000 6
$\Delta\theta_{g,d}$	-0.003 1
$\Delta\theta_{g,F}$	-0.002 8
$\Delta\theta_{i,g}$	-0.017 2

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	345	$\lambda_{0.05}$	309
CCI			
B	G	R	
0.00	0.17	0.15	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.08
320	0.31
330	0.57
340	0.75
350	0.86
360	0.929
370	0.962
380	0.977
390	0.986
400	0.991
420	0.994
440	0.995
460	0.996
480	0.997
500	0.998
550	0.998
600	0.998
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.997
1 400	0.990
1 600	0.993
1 800	0.985
2 000	0.971
2 200	0.913
2 400	0.82

Thermal Properties	
Strain Point StP (°C)	622
Annealing Point AP (°C)	650
Transformation Temperature Tg (°C)	674
Yield Point At (°C)	724
Softening Point SP (°C)	773
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	77
Thermal Conductivity λ (W/(mK))	0.822

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	55
-80 ~ -70	56
-70 ~ -60	57
-60 ~ -50	58
-50 ~ -40	59
-40 ~ -30	60
-30 ~ -20	61
-20 ~ -10	62
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	65
20 ~ 30	66
30 ~ 40	66
40 ~ 50	67
50 ~ 60	68
60 ~ 70	69
70 ~ 80	70
80 ~ 90	70
90 ~ 100	71
100 ~ 110	72
110 ~ 120	73
120 ~ 130	73
130 ~ 140	74
140 ~ 150	74
150 ~ 160	75
160 ~ 170	76
170 ~ 180	76
180 ~ 190	77
190 ~ 200	77
200 ~ 210	78
210 ~ 220	78
220 ~ 230	78
230 ~ 240	79
240 ~ 250	79
250 ~ 260	80
260 ~ 270	80
270 ~ 280	80
280 ~ 290	81
290 ~ 300	81

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	1.5	1.6	1.8	1.9	1.9	2.2	2.3	2.5	2.5	2.8	3.1	3.6
-60 ~ -40	1.3	1.5	1.8	1.8	1.9	2.0	2.1	2.3	2.4	2.7	3.0	3.5
-40 ~ -20	1.3	1.5	1.7	1.8	1.8	2.0	2.1	2.3	2.4	2.8	3.0	3.5
-20 ~ 0	1.3	1.5	1.8	1.9	1.9	2.0	2.2	2.4	2.5	2.8	3.1	3.7
0 ~ 20	1.5	1.6	1.9	1.9	2.0	2.1	2.2	2.5	2.5	3.0	3.3	3.8
20 ~ 40	1.6	1.7	2.0	2.1	2.1	2.2	2.4	2.7	2.7	3.0	3.4	4.0
40 ~ 60	1.6	1.8	2.1	2.2	2.2	2.4	2.6	2.9	2.9	3.3	3.6	4.2
60 ~ 80	1.8	2.0	2.3	2.4	2.4	2.5	2.7	3.0	3.0	3.4	3.7	4.4
80 ~ 100	1.9	2.1	2.4	2.5	2.5	2.7	2.9	3.2	3.2	3.6	3.9	4.6
100 ~ 120	2.1	2.2	2.5	2.7	2.7	2.8	3.0	3.3	3.4	3.7	4.1	4.8
120 ~ 140	2.1	2.3	2.6	2.8	2.8	3.0	3.1	3.5	3.5	3.9	4.3	4.9
140 ~ 160	2.2	2.4	2.7	2.9	2.9	3.1	3.2	3.6	3.6	4.0	4.5	5.2
160 ~ 180	2.3	2.6	2.8	3.0	3.1	3.2	3.4	3.8	3.8	4.2	4.6	5.3

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.88
Specific Gravity d	3.60
Remarks	

OHARA 25-04

S-BSM14

Code(d) 603607
Code(e) 605604

Refractive Index n_d	1.603 11 1.603 112	Abbe Number v_d	60.64	Dispersion $n_F - n_C$	0.009 945
Refractive Index n_e	1.605 484	Abbe Number v_e	60.39	Dispersion $n_{F'} - n_{C'}$	0.010 027

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.573 00
n_{1970}	1.970 09	1.578 80
n_{1530}	1.529 58	1.584 91
n_{1129}	1.128 64	1.590 13
n_t	1.013 98	1.591 80
n_s	0.852 11	1.594 67
$n_{A'}$	0.768 19	1.596 60
n_r	0.706 52	1.598 35
n_C	0.656 27	1.600 08
$n_{C'}$	0.643 85	1.600 56
$n_{\text{He-Ne}}$	0.632 8	1.601 01
n_D	0.589 29	1.603 02
n_d	0.587 56	1.603 11
n_e	0.546 07	1.605 48
n_F	0.486 13	1.610 02
$n_{F'}$	0.479 99	1.610 59
$n_{\text{He-Cd}}$	0.441 57	1.614 70
n_g	0.435 835	1.615 41
n_h	0.404 656	1.619 87
n_i	0.365 015	1.627 45

Constants of Dispersion Formula	
A_1	1.282 862 70E+00
A_2	2.476 474 29E-01
A_3	1.103 839 99E+00
B_1	1.229 023 99E-02
B_2	-6.131 423 61E-03
B_3	1.068 833 78E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.2

Mechanical Properties	
Young's Modulus E (GPa)	84.9
Rigidity Modulus G (GPa)	33.8
Poisson's Ratio σ	0.257
Knoop Hardness Hk[Class]	580 6
Abrasion Aa	126

Partial Dispersions	
$n_C - n_t$	0.008 275
$n_C - n_{A'}$	0.003 482
$n_d - n_C$	0.003 033
$n_e - n_C$	0.005 405
$n_g - n_d$	0.012 297
$n_g - n_F$	0.005 385
$n_h - n_g$	0.004 461
$n_i - n_g$	0.012 043
$n_{C'} - n_t$	0.008 758
$n_e - n_{C'}$	0.004 922
$n_{F'} - n_e$	0.005 105
$n_i - n_{F'}$	0.016 863

Relative Partial Dispersions	
$\theta_{C,t}$	0.832 1
$\theta_{C,A'}$	0.350 1
$\theta_{d,C}$	0.305 0
$\theta_{e,C}$	0.543 5
$\theta_{g,d}$	1.236 5
$\theta_{g,F}$	0.541 5
$\theta_{h,g}$	0.448 6
$\theta_{i,g}$	1.211 0
$\theta'_{C,t}$	0.873 4
$\theta'_{e,C'}$	0.490 9
$\theta'_{F,e}$	0.509 1
$\theta'_{i,F'}$	1.681 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 9
$\Delta\theta_{C,A'}$	0.000 7
$\Delta\theta_{g,d}$	-0.002 3
$\Delta\theta_{g,F}$	-0.001 9
$\Delta\theta_{i,g}$	-0.006 2

Coloring			
λ_{80}	350	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	339	$\lambda_{0.05}$	306
CCI			
B	G	R	
0.00	0.19	0.20	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.17
320	0.45
330	0.68
340	0.82
350	0.906
360	0.948
370	0.968
380	0.980
390	0.987
400	0.991
420	0.994
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.990
1 600	0.995
1 800	0.988
2 000	0.976
2 200	0.919
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	614
Annealing Point AP (°C)	641
Transformation Temperature Tg (°C)	661
Yield Point At (°C)	704
Softening Point SP (°C)	757
Expansion Coefficients (-30 °C ~ 70 °C)	61
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(mK))	0.891

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	50
-90 ~ -80	51
-80 ~ -70	52
-70 ~ -60	53
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	58
-10 ~ 0	59
0 ~ 10	60
10 ~ 20	61
20 ~ 30	61
30 ~ 40	62
40 ~ 50	63
50 ~ 60	64
60 ~ 70	65
70 ~ 80	66
80 ~ 90	66
90 ~ 100	67
100 ~ 110	68
110 ~ 120	68
120 ~ 130	69
130 ~ 140	70
140 ~ 150	70
150 ~ 160	71
160 ~ 170	71
170 ~ 180	72
180 ~ 190	73
190 ~ 200	73
200 ~ 210	74
210 ~ 220	74
220 ~ 230	75
230 ~ 240	75
240 ~ 250	75
250 ~ 260	76
260 ~ 270	76
270 ~ 280	77
280 ~ 290	77
290 ~ 300	77

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	1.6	1.8	2.0	2.0	2.1	2.1	2.2	2.5	2.5	2.7	3.0	3.5
-60 ~ -40	1.6	1.7	2.0	2.0	2.0	2.1	2.2	2.4	2.4	2.6	3.0	3.4
-40 ~ -20	1.6	1.7	2.0	2.1	2.1	2.2	2.3	2.5	2.5	2.7	3.0	3.5
-20 ~ 0	1.7	1.8	2.0	2.1	2.1	2.3	2.4	2.6	2.6	2.9	3.1	3.6
0 ~ 20	1.9	2.0	2.2	2.3	2.3	2.4	2.5	2.7	2.7	3.0	3.4	3.9
20 ~ 40	2.0	2.1	2.3	2.4	2.4	2.5	2.6	2.9	2.9	3.2	3.4	4.1
40 ~ 60	2.1	2.2	2.5	2.5	2.5	2.7	2.8	3.0	3.0	3.4	3.7	4.2
60 ~ 80	2.3	2.4	2.6	2.7	2.7	2.8	3.0	3.2	3.2	3.5	3.8	4.4
80 ~ 100	2.4	2.5	2.8	2.9	2.9	3.0	3.1	3.4	3.4	3.7	4.0	4.6
100 ~ 120	2.5	2.7	2.9	3.0	3.0	3.1	3.2	3.5	3.5	3.8	4.2	4.8
120 ~ 140	2.6	2.7	3.0	3.1	3.1	3.2	3.3	3.6	3.6	3.9	4.3	4.9
140 ~ 160	2.6	2.8	3.0	3.1	3.1	3.3	3.4	3.7	3.7	4.0	4.4	5.1
160 ~ 180	2.6	2.8	3.0	3.2	3.2	3.4	3.5	3.8	3.8	4.2	4.5	5.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.01
Specific Gravity d	3.43
Remarks	

OHARA 25-04

S-BSM15

Code(d) 623582
Code(e) 626579

Refractive Index n_d	1.622 99 1.622 992	Abbe Number v_d	58.16	Dispersion $n_F - n_C$	0.010 711
Refractive Index n_e	1.625 545	Abbe Number v_e	57.89	Dispersion $n_{F'} - n_{C'}$	0.010 805

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.592 36
n_{1970}	1.970 09	1.597 97
n_{1530}	1.529 58	1.603 99
n_{1129}	1.128 64	1.609 27
n_t	1.013 98	1.611 00
n_s	0.852 11	1.613 99
$n_{A'}$	0.768 19	1.616 03
n_r	0.706 52	1.617 89
n_C	0.656 27	1.619 74
$n_{C'}$	0.643 85	1.620 26
$n_{\text{He-Ne}}$	0.632 8	1.620 74
n_D	0.589 29	1.622 90
n_d	0.587 56	1.622 99
n_e	0.546 07	1.625 55
n_F	0.486 13	1.630 45
$n_{F'}$	0.479 99	1.631 06
$n_{\text{He-Cd}}$	0.441 57	1.635 52
n_g	0.435 835	1.636 30
n_h	0.404 656	1.641 16
n_i	0.365 015	1.649 48

Constants of Dispersion Formula	
A_1	9.531 283 28E-01
A_2	6.376 139 77E-01
A_3	1.652 456 47E+00
B_1	3.876 389 85E-03
B_2	1.850 946 32E-02
B_3	1.594 423 67E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.2

Mechanical Properties	
Young's Modulus E (GPa)	85.4
Rigidity Modulus G (GPa)	33.8
Poisson's Ratio σ	0.265
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	150

Partial Dispersions	
$n_C - n_t$	0.008 741
$n_C - n_{A'}$	0.003 709
$n_d - n_C$	0.003 253
$n_e - n_C$	0.005 806
$n_g - n_d$	0.013 304
$n_g - n_F$	0.005 846
$n_h - n_g$	0.004 866
$n_i - n_g$	0.013 186
$n_C - n_t$	0.009 259
$n_e - n_{C'}$	0.005 288
$n_{F'} - n_e$	0.005 517
$n_i - n_{F'}$	0.018 420

Relative Partial Dispersions	
$\theta_{C,t}$	0.816 1
$\theta_{C,A'}$	0.346 3
$\theta_{d,C}$	0.303 7
$\theta_{e,C}$	0.542 1
$\theta_{g,d}$	1.242 1
$\theta_{g,F}$	0.545 8
$\theta_{h,g}$	0.454 3
$\theta_{i,g}$	1.231 1
$\theta'_{C,t}$	0.856 9
$\theta'_{e,C'}$	0.489 4
$\theta'_{F,e}$	0.510 6
$\theta'_{i,F'}$	1.704 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.003 5
$\Delta\theta_{C,A'}$	-0.000 1
$\Delta\theta_{g,d}$	-0.001 8
$\Delta\theta_{g,F}$	-0.001 6
$\Delta\theta_{i,g}$	-0.006 9

Coloring			
λ_{80}	360	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	327
CCI			
B	G	R	
0.00	0.32	0.30	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.13
340	0.44
350	0.70
360	0.85
370	0.926
380	0.959
390	0.976
400	0.985
420	0.991
440	0.992
460	0.994
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.991
1 600	0.994
1 800	0.987
2 000	0.973
2 200	0.918
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	615
Annealing Point AP (°C)	639
Transformation Temperature Tg (°C)	661
Yield Point At (°C)	704
Softening Point SP (°C)	746
Expansion Coefficients (-30 °C ~ 70 °C)	66
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	79
Thermal Conductivity λ (W/(mK))	0.845

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	55
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	59
-50 ~ -40	60
-40 ~ -30	61
-30 ~ -20	62
-20 ~ -10	63
-10 ~ 0	64
0 ~ 10	65
10 ~ 20	66
20 ~ 30	67
30 ~ 40	68
40 ~ 50	69
50 ~ 60	70
60 ~ 70	70
70 ~ 80	71
80 ~ 90	72
90 ~ 100	73
100 ~ 110	73
110 ~ 120	74
120 ~ 130	75
130 ~ 140	76
140 ~ 150	76
150 ~ 160	77
160 ~ 170	77
170 ~ 180	78
180 ~ 190	79
190 ~ 200	79
200 ~ 210	80
210 ~ 220	80
220 ~ 230	81
230 ~ 240	81
240 ~ 250	82
250 ~ 260	82
260 ~ 270	83
270 ~ 280	83
280 ~ 290	83
290 ~ 300	84

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.80
Specific Gravity d	3.60
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	0.9	1.0	1.1	1.2	1.2	1.4	1.5	1.7	1.7	2.0	2.3	2.8
-60 ~ -40	0.8	0.9	1.1	1.1	1.2	1.3	1.4	1.7	1.7	2.0	2.2	2.8
-40 ~ -20	0.7	0.9	1.1	1.2	1.2	1.3	1.4	1.6	1.7	2.0	2.3	2.9
-20 ~ 0	0.8	0.9	1.2	1.3	1.3	1.4	1.5	1.8	1.8	2.1	2.4	3.0
0 ~ 20	1.0	1.1	1.3	1.3	1.4	1.5	1.6	1.9	1.9	2.3	2.6	3.2
20 ~ 40	1.1	1.2	1.4	1.5	1.5	1.6	1.8	2.0	2.1	2.4	2.8	3.4
40 ~ 60	1.2	1.3	1.5	1.6	1.6	1.9	2.0	2.3	2.3	2.6	3.0	3.6
60 ~ 80	1.3	1.5	1.7	1.8	1.8	1.9	2.1	2.4	2.4	2.7	3.1	3.9
80 ~ 100	1.5	1.6	1.9	1.9	2.0	2.1	2.2	2.5	2.6	2.9	3.3	4.0
100 ~ 120	1.6	1.7	2.0	2.1	2.1	2.2	2.4	2.7	2.7	3.1	3.4	4.2
120 ~ 140	1.7	1.8	2.1	2.2	2.2	2.3	2.5	2.8	2.8	3.2	3.6	4.3
140 ~ 160	1.7	1.8	2.1	2.2	2.2	2.4	2.6	2.9	2.9	3.3	3.8	4.5
160 ~ 180	1.8	2.0	2.3	2.4	2.4	2.5	2.7	3.0	3.1	3.5	3.9	4.7

S-BSM16

Code(d) 620603
Code(e) 623601

Refractive Index n_d	1.620 41 1.620 411	Abbe Number v_d	60.29	Dispersion $n_F - n_C$	0.010 290
Refractive Index n_e	1.622 865	Abbe Number v_e	60.03	Dispersion $n_{F'} - n_{C'}$	0.010 376

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.589 57
n_{1970}	1.970 09	1.595 45
n_{1530}	1.529 58	1.601 68
n_{1129}	1.128 64	1.607 02
n_t	1.013 98	1.608 74
n_s	0.852 11	1.611 70
$n_{A'}$	0.768 19	1.613 68
n_r	0.706 52	1.615 49
n_C	0.656 27	1.617 28
$n_{C'}$	0.643 85	1.617 78
$n_{\text{He-Ne}}$	0.632 8	1.618 24
n_D	0.589 29	1.620 32
n_d	0.587 56	1.620 41
n_e	0.546 07	1.622 87
n_F	0.486 13	1.627 57
$n_{F'}$	0.479 99	1.628 15
$n_{\text{He-Cd}}$	0.441 57	1.632 41
n_g	0.435 835	1.633 15
n_h	0.404 656	1.637 78
n_i	0.365 015	1.645 67

Constants of Dispersion Formula	
A_1	1.144 903 83E+00
A_2	4.395 639 11E-01
A_3	1.276 880 79E+00
B_1	1.370 349 16E-02
B_2	-1.865 142 05E-03
B_3	1.195 355 85E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	3
Acid Resistance(Powder) Group RA(P)	5
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.2

Mechanical Properties	
Young's Modulus E (GPa)	87.8
Rigidity Modulus G (GPa)	34.8
Poisson's Ratio σ	0.262
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	155

Partial Dispersions	
$n_C - n_t$	0.008 531
$n_C - n_{A'}$	0.003 595
$n_d - n_C$	0.003 135
$n_e - n_C$	0.005 589
$n_g - n_d$	0.012 739
$n_g - n_F$	0.005 584
$n_h - n_g$	0.004 632
$n_i - n_g$	0.012 520
$n_{C'} - n_t$	0.009 030
$n_e - n_{C'}$	0.005 090
$n_{F'} - n_e$	0.005 286
$n_i - n_{F'}$	0.017 519

Relative Partial Dispersions	
$\theta_{C,t}$	0.829 1
$\theta_{C,A'}$	0.349 4
$\theta_{d,C}$	0.304 7
$\theta_{e,C}$	0.543 1
$\theta_{g,d}$	1.238 0
$\theta_{g,F}$	0.542 7
$\theta_{h,g}$	0.450 1
$\theta_{i,g}$	1.216 7
$\theta'_{C,t}$	0.870 3
$\theta'_{e,C'}$	0.490 6
$\theta'_{F,e}$	0.509 4
$\theta'_{i,F'}$	1.688 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.000 5
$\Delta\theta_{C,A'}$	0.000 4
$\Delta\theta_{g,d}$	-0.001 5
$\Delta\theta_{g,F}$	-0.001 2
$\Delta\theta_{i,g}$	-0.003 5

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	312
CCI			
B	G	R	
0.00	0.28	0.23	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.01
320	0.18
330	0.49
340	0.72
350	0.85
360	0.924
370	0.959
380	0.976
390	0.984
400	0.989
420	0.992
440	0.993
460	0.994
480	0.996
500	0.997
550	0.999
600	0.998
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.992
1 600	0.995
1 800	0.987
2 000	0.972
2 200	0.911
2 400	0.79

Thermal Properties	
Strain Point StP (°C)	606
Annealing Point AP (°C)	634
Transformation Temperature Tg (°C)	657
Yield Point At (°C)	699
Softening Point SP (°C)	738
Expansion Coefficients (-30 °C ~ 70 °C)	67
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	80
Thermal Conductivity λ (W/(mK))	0.835

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	59
-50 ~ -40	60
-40 ~ -30	61
-30 ~ -20	62
-20 ~ -10	63
-10 ~ 0	64
0 ~ 10	65
10 ~ 20	66
20 ~ 30	67
30 ~ 40	68
40 ~ 50	69
50 ~ 60	70
60 ~ 70	71
70 ~ 80	71
80 ~ 90	72
90 ~ 100	73
100 ~ 110	74
110 ~ 120	75
120 ~ 130	75
130 ~ 140	76
140 ~ 150	77
150 ~ 160	78
160 ~ 170	78
170 ~ 180	79
180 ~ 190	79
190 ~ 200	80
200 ~ 210	81
210 ~ 220	81
220 ~ 230	82
230 ~ 240	82
240 ~ 250	83
250 ~ 260	83
260 ~ 270	84
270 ~ 280	84
280 ~ 290	85
290 ~ 300	85

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	0.5	0.6	0.8	0.8	0.9	1.0	1.2	1.4	1.4	1.6	2.0	2.4
-60 ~ -40	0.4	0.6	0.8	0.8	0.8	0.9	1.0	1.2	1.3	1.6	1.9	2.3
-40 ~ -20	0.4	0.6	0.8	0.9	0.9	1.0	1.1	1.3	1.3	1.6	1.9	2.4
-20 ~ 0	0.5	0.6	0.9	1.0	1.0	1.1	1.2	1.4	1.5	1.7	2.0	2.6
0 ~ 20	0.7	0.8	1.0	1.0	1.1	1.2	1.3	1.5	1.5	1.9	2.2	2.7
20 ~ 40	0.8	0.9	1.1	1.2	1.2	1.3	1.4	1.7	1.7	2.0	2.4	2.9
40 ~ 60	0.9	1.0	1.2	1.3	1.3	1.5	1.7	1.9	2.0	2.2	2.5	3.1
60 ~ 80	1.1	1.2	1.4	1.5	1.5	1.6	1.8	2.0	2.1	2.4	2.6	3.3
80 ~ 100	1.2	1.3	1.6	1.7	1.7	1.8	1.9	2.2	2.2	2.5	2.8	3.4
100 ~ 120	1.3	1.5	1.7	1.8	1.8	1.9	2.1	2.3	2.4	2.7	3.0	3.6
120 ~ 140	1.4	1.5	1.8	1.9	1.9	2.0	2.2	2.5	2.5	2.8	3.1	3.7
140 ~ 160	1.5	1.6	1.9	2.0	2.0	2.1	2.3	2.5	2.6	2.9	3.3	3.9
160 ~ 180	1.5	1.7	2.0	2.1	2.1	2.3	2.4	2.7	2.7	3.0	3.4	4.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.81
Specific Gravity d	3.59
Remarks	

OHARA 25-04

S-BSM18

Code(d) 639554
Code(e) 641551

Refractive Index n_d	1.638 54 1.638 539	Abbe Number v_d	55.38	Dispersion $n_F - n_C$	0.011 531
Refractive Index n_e	1.641 287	Abbe Number v_e	55.10	Dispersion $n_{F'} - n_{C'}$	0.011 638

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.607 79
n_{1970}	1.970 09	1.613 14
n_{1530}	1.529 58	1.618 92
n_{1129}	1.128 64	1.624 11
n_t	1.013 98	1.625 86
n_s	0.852 11	1.628 96
$n_{A'}$	0.768 19	1.631 11
n_T	0.706 52	1.633 08
n_C	0.656 27	1.635 05
$n_{C'}$	0.643 85	1.635 60
$n_{\text{He-Ne}}$	0.632 8	1.636 12
n_D	0.589 29	1.638 44
n_d	0.587 56	1.638 54
n_e	0.546 07	1.641 29
n_F	0.486 13	1.646 58
$n_{F'}$	0.479 99	1.647 24
$n_{\text{He-Cd}}$	0.441 57	1.652 07
n_g	0.435 835	1.652 91
n_h	0.404 656	1.658 18
n_i	0.365 015	1.667 20

Constants of Dispersion Formula	
A_1	9.278 860 25E-01
A_2	7.088 585 26E-01
A_3	1.186 108 97E+00
B_1	4.175 491 99E-03
B_2	1.846 918 38E-02
B_3	1.222 104 16E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	88.5
Rigidity Modulus G (GPa)	34.9
Poisson's Ratio σ	0.268
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	155

Partial Dispersions	
$n_C - n_t$	0.009 188
$n_C - n_{A'}$	0.003 946
$n_d - n_C$	0.003 488
$n_e - n_C$	0.006 236
$n_g - n_d$	0.014 367
$n_g - n_F$	0.006 324
$n_h - n_g$	0.005 271
$n_i - n_g$	0.014 291
$n_{C'} - n_t$	0.009 742
$n_e - n_{C'}$	0.005 682
$n_{F'} - n_e$	0.005 956
$n_i - n_{F'}$	0.019 954

Relative Partial Dispersions	
$\theta_{C,t}$	0.796 8
$\theta_{C,A'}$	0.342 2
$\theta_{d,C}$	0.302 5
$\theta_{e,C}$	0.540 8
$\theta_{g,d}$	1.245 9
$\theta_{g,F}$	0.548 4
$\theta_{h,g}$	0.457 1
$\theta_{i,g}$	1.239 4
$\theta'_{C,t}$	0.837 1
$\theta'_{e,C'}$	0.488 2
$\theta'_{F,e}$	0.511 8
$\theta'_{i,F'}$	1.714 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.009 7
$\Delta\theta_{C,A'}$	-0.000 8
$\Delta\theta_{g,d}$	-0.003 8
$\Delta\theta_{g,F}$	-0.003 5
$\Delta\theta_{i,g}$	-0.021 9

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	345	$\lambda_{0.05}$	309
CCI			
B	G	R	
0.00	0.21	0.22	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.08
320	0.31
330	0.57
340	0.75
350	0.86
360	0.929
370	0.961
380	0.977
390	0.985
400	0.990
420	0.993
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.997
1 400	0.993
1 600	0.994
1 800	0.986
2 000	0.973
2 200	0.924
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	567
Annealing Point AP (°C)	600
Transformation Temperature Tg (°C)	617
Yield Point At (°C)	661
Softening Point SP (°C)	717
Expansion Coefficients (-30 °C ~ 70 °C)	70
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	82
Thermal Conductivity λ (W/(mK))	0.815

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	57
-90 ~ -80	59
-80 ~ -70	60
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	65
-20 ~ -10	66
-10 ~ 0	67
0 ~ 10	68
10 ~ 20	69
20 ~ 30	70
30 ~ 40	71
40 ~ 50	71
50 ~ 60	72
60 ~ 70	73
70 ~ 80	74
80 ~ 90	75
90 ~ 100	76
100 ~ 110	76
110 ~ 120	77
120 ~ 130	78
130 ~ 140	78
140 ~ 150	79
150 ~ 160	80
160 ~ 170	80
170 ~ 180	81
180 ~ 190	82
190 ~ 200	82
200 ~ 210	83
210 ~ 220	83
220 ~ 230	84
230 ~ 240	84
240 ~ 250	85
250 ~ 260	85
260 ~ 270	85
270 ~ 280	86
280 ~ 290	86
290 ~ 300	87

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	1.4	1.5	1.8	1.8	1.9	2.0	2.1	2.3	2.3	2.6	3.0	3.5
-60 ~ -40	1.3	1.4	1.6	1.7	1.7	1.8	2.0	2.3	2.3	2.6	2.9	3.6
-40 ~ -20	1.3	1.4	1.6	1.7	1.7	1.8	2.0	2.3	2.3	2.7	3.0	3.6
-20 ~ 0	1.3	1.5	1.7	1.8	1.8	1.9	2.1	2.3	2.4	2.7	3.1	3.7
0 ~ 20	1.4	1.5	1.7	1.8	1.9	2.0	2.1	2.5	2.6	2.9	3.2	3.9
20 ~ 40	1.4	1.6	1.9	1.9	2.0	2.1	2.3	2.6	2.6	3.1	3.4	4.1
40 ~ 60	1.5	1.7	2.0	2.1	2.2	2.3	2.5	2.8	2.8	3.2	3.6	4.3
60 ~ 80	1.7	1.8	2.1	2.2	2.2	2.4	2.5	2.9	2.9	3.3	3.8	4.5
80 ~ 100	1.8	1.9	2.2	2.3	2.4	2.5	2.7	3.0	3.1	3.5	3.9	4.6
100 ~ 120	1.8	2.0	2.3	2.4	2.5	2.6	2.8	3.1	3.2	3.6	4.0	4.8
120 ~ 140	1.9	2.0	2.4	2.5	2.5	2.7	2.9	3.2	3.3	3.7	4.1	5.0
140 ~ 160	1.9	2.1	2.4	2.5	2.5	2.7	2.9	3.3	3.3	3.9	4.3	5.2
160 ~ 180	2.0	2.1	2.5	2.6	2.7	2.8	3.0	3.4	3.4	3.9	4.4	5.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.79
Specific Gravity d	3.69
Remarks	

OHARA 25-04

S-BSM25

Code(d) 658509
Code(e) 662506

Refractive Index n_d	1.658 44 1.658 441	Abbe Number v_d	50.88	Dispersion $n_F - n_C$	0.012 942
Refractive Index n_e	1.661 522	Abbe Number v_e	50.59	Dispersion $n_{F'} - n_{C'}$	0.013 076

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.626 13
n_{1970}	1.970 09	1.631 45
n_{1530}	1.529 58	1.637 27
n_{1129}	1.128 64	1.642 64
n_t	1.013 98	1.644 50
n_s	0.852 11	1.647 85
$n_{A'}$	0.768 19	1.650 19
n_r	0.706 52	1.652 37
n_C	0.656 27	1.654 55
$n_{C'}$	0.643 85	1.655 17
$n_{\text{He-Ne}}$	0.632 8	1.655 74
n_D	0.589 29	1.658 33
n_d	0.587 56	1.658 44
n_e	0.546 07	1.661 52
n_F	0.486 13	1.667 49
$n_{F'}$	0.479 99	1.668 24
$n_{\text{He-Cd}}$	0.441 57	1.673 73
n_g	0.435 835	1.674 69
n_h	0.404 656	1.680 74
n_i	0.365 015	1.691 21

Constants of Dispersion Formula	
A_1	1.348 142 57E+00
A_2	3.475 303 19E-01
A_3	1.387 983 68E+00
B_1	6.953 643 66E-03
B_2	2.778 634 78E-02
B_3	1.421 381 22E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	95.1
Rigidity Modulus G (GPa)	37.4
Poisson's Ratio σ	0.272
Knoop Hardness Hk[Class]	620 6
Abrasion Aa	136

Partial Dispersions	
$n_C - n_t$	0.010 049
$n_C - n_{A'}$	0.004 361
$n_d - n_C$	0.003 888
$n_e - n_C$	0.006 969
$n_g - n_d$	0.016 250
$n_g - n_F$	0.007 196
$n_h - n_g$	0.006 049
$n_i - n_g$	0.016 516
$n_C - n_t$	0.010 664
$n_e - n_{C'}$	0.006 354
$n_{F'} - n_e$	0.006 722
$n_i - n_{F'}$	0.022 963

Relative Partial Dispersions	
$\theta_{C,t}$	0.776 5
$\theta_{C,A'}$	0.337 0
$\theta_{d,C}$	0.300 4
$\theta_{e,C}$	0.538 5
$\theta_{g,d}$	1.255 6
$\theta_{g,F}$	0.556 0
$\theta_{h,g}$	0.467 4
$\theta_{i,g}$	1.276 2
$\theta'_{C,t}$	0.815 5
$\theta'_{e,C'}$	0.485 9
$\theta'_{F,e}$	0.514 1
$\theta'_{i,F'}$	1.756 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.008 9
$\Delta\theta_{C,A'}$	-0.000 5
$\Delta\theta_{g,d}$	-0.003 4
$\Delta\theta_{g,F}$	-0.003 1
$\Delta\theta_{i,g}$	-0.022 8

Coloring			
λ_{80}	375	λ_5	330
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	331
CCI			
B	G	R	
0.00	0.71	0.70	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.03
340	0.19
350	0.48
360	0.71
370	0.84
380	0.910
390	0.945
400	0.964
420	0.980
440	0.984
460	0.988
480	0.991
500	0.994
550	0.996
600	0.995
650	0.995
700	0.996
800	0.997
900	0.997
1 000	0.996
1 200	0.997
1 400	0.995
1 600	0.995
1 800	0.989
2 000	0.980
2 200	0.947
2 400	0.87

Thermal Properties	
Strain Point StP (°C)	605
Annealing Point AP (°C)	630
Transformation Temperature Tg (°C)	637
Yield Point At (°C)	697
Softening Point SP (°C)	760
Expansion Coefficients (-30 °C ~ 70 °C)	68
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	82
Thermal Conductivity λ (W/(mK))	0.891

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	59
-50 ~ -40	61
-40 ~ -30	62
-30 ~ -20	63
-20 ~ -10	64
-10 ~ 0	65
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	70
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	75
100 ~ 110	76
110 ~ 120	76
120 ~ 130	77
130 ~ 140	78
140 ~ 150	79
150 ~ 160	79
160 ~ 170	80
170 ~ 180	81
180 ~ 190	81
190 ~ 200	82
200 ~ 210	83
210 ~ 220	83
220 ~ 230	84
230 ~ 240	84
240 ~ 250	85
250 ~ 260	85
260 ~ 270	86
270 ~ 280	86
280 ~ 290	87
290 ~ 300	87

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	2.8	3.0	3.3	3.4	3.4	3.6	3.7	4.2	4.2	4.6	5.0	5.9
-60 ~ -40	2.7	2.9	3.3	3.4	3.4	3.6	3.7	4.1	4.1	4.5	5.0	5.8
-40 ~ -20	2.7	2.9	3.2	3.3	3.3	3.6	3.8	4.1	4.2	4.6	5.0	5.9
-20 ~ 0	2.7	2.9	3.3	3.4	3.4	3.6	3.7	4.1	4.2	4.7	5.1	6.0
0 ~ 20	2.8	3.0	3.3	3.5	3.6	3.7	3.9	4.3	4.4	4.8	5.3	6.2
20 ~ 40	2.9	3.1	3.4	3.5	3.6	3.8	4.1	4.5	4.5	5.0	5.5	6.4
40 ~ 60	2.9	3.2	3.6	3.7	3.8	4.0	4.2	4.6	4.6	5.1	5.6	6.6
60 ~ 80	3.1	3.3	3.7	3.8	3.8	4.1	4.3	4.7	4.8	5.3	5.9	6.9
80 ~ 100	3.2	3.4	3.8	3.9	4.0	4.2	4.4	4.8	4.9	5.4	6.0	7.1
100 ~ 120	3.3	3.5	3.9	4.0	4.1	4.3	4.5	5.0	5.0	5.6	6.1	7.2
120 ~ 140	3.3	3.6	4.0	4.1	4.2	4.4	4.6	5.1	5.1	5.7	6.3	7.5
140 ~ 160	3.3	3.6	4.0	4.2	4.2	4.4	4.7	5.3	5.3	5.9	6.5	7.6
160 ~ 180	3.4	3.7	4.1	4.3	4.3	4.6	4.8	5.3	5.4	5.9	6.5	7.7

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.08
Specific Gravity d	3.50
Remarks	

S-BSM28

Code(d) 618498
Code(e) 621495

Refractive Index n_d	1.617 72 1.617 722	Abbe Number v_d	49.81	Dispersion $n_F - n_C$	0.012 401
Refractive Index n_e	1.620 671	Abbe Number v_e	49.52	Dispersion $n_{F'} - n_{C'}$	0.012 534

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.586 52
n_{1970}	1.970 09	1.591 73
n_{1530}	1.529 58	1.597 40
n_{1129}	1.128 64	1.602 60
n_t	1.013 98	1.604 39
n_s	0.852 11	1.607 60
$n_{A'}$	0.768 19	1.609 84
n_r	0.706 52	1.611 92
n_C	0.656 27	1.614 01
$n_{C'}$	0.643 85	1.614 59
$n_{\text{He-Ne}}$	0.632 8	1.615 14
n_D	0.589 29	1.617 61
n_d	0.587 56	1.617 72
n_e	0.546 07	1.620 67
n_F	0.486 13	1.626 41
$n_{F'}$	0.479 99	1.627 13
$n_{\text{He-Cd}}$	0.441 57	1.632 42
n_g	0.435 835	1.633 35
n_h	0.404 656	1.639 24
n_i	0.365 015	1.649 53

Constants of Dispersion Formula	
A_1	1.438 228 41E+00
A_2	1.281 000 17E-01
A_3	1.343 555 30E+00
B_1	8.597 797 50E-03
B_2	4.086 178 54E-02
B_3	1.437 098 90E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	85.3
Rigidity Modulus G (GPa)	33.9
Poisson's Ratio σ	0.258
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	176

Partial Dispersions	
$n_C - n_t$	0.009 612
$n_C - n_{A'}$	0.004 166
$n_d - n_C$	0.003 717
$n_e - n_C$	0.006 666
$n_g - n_d$	0.015 632
$n_g - n_F$	0.006 948
$n_h - n_g$	0.005 882
$n_i - n_g$	0.016 179
$n_{C'} - n_t$	0.010 200
$n_e - n_{C'}$	0.006 078
$n_{F'} - n_e$	0.006 456
$n_i - n_{F'}$	0.022 406

Relative Partial Dispersions	
$\theta_{C,t}$	0.775 1
$\theta_{C,A'}$	0.335 9
$\theta_{d,C}$	0.299 7
$\theta_{e,C}$	0.537 5
$\theta_{g,d}$	1.260 5
$\theta_{g,F}$	0.560 3
$\theta_{h,g}$	0.474 3
$\theta_{i,g}$	1.304 7
$\theta'_{C,t}$	0.813 8
$\theta'_{e,C'}$	0.484 9
$\theta'_{F,e}$	0.515 1
$\theta'_{i,F'}$	1.787 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.005 3
$\Delta\theta_{C,A'}$	-0.000 3
$\Delta\theta_{g,d}$	-0.000 8
$\Delta\theta_{g,F}$	-0.000 6
$\Delta\theta_{i,g}$	-0.003 2

Coloring			
λ_{80}	385	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	341
CCI			
B	G	R	
0.00	1.01	1.02	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.02
350	0.24
360	0.54
370	0.74
380	0.85
390	0.918
400	0.950
420	0.975
440	0.982
460	0.987
480	0.990
500	0.993
550	0.997
600	0.996
650	0.996
700	0.997
800	0.997
900	0.997
1 000	0.996
1 200	0.996
1 400	0.994
1 600	0.995
1 800	0.988
2 000	0.978
2 200	0.944
2 400	0.88

Thermal Properties	
Strain Point StP (°C)	530
Annealing Point AP (°C)	559
Transformation Temperature Tg (°C)	579
Yield Point At (°C)	620
Softening Point SP (°C)	680
Expansion Coefficients (-30 °C ~ 70 °C)	84
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	100
Thermal Conductivity λ (W/(m·K))	0.878

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	70
-90 ~ -80	71
-80 ~ -70	73
-70 ~ -60	74
-60 ~ -50	75
-50 ~ -40	76
-40 ~ -30	78
-30 ~ -20	79
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	82
10 ~ 20	83
20 ~ 30	84
30 ~ 40	86
40 ~ 50	87
50 ~ 60	88
60 ~ 70	89
70 ~ 80	90
80 ~ 90	91
90 ~ 100	91
100 ~ 110	92
110 ~ 120	93
120 ~ 130	94
130 ~ 140	95
140 ~ 150	96
150 ~ 160	97
160 ~ 170	98
170 ~ 180	98
180 ~ 190	99
190 ~ 200	100
200 ~ 210	101
210 ~ 220	101
220 ~ 230	102
230 ~ 240	103
240 ~ 250	103
250 ~ 260	104
260 ~ 270	105
270 ~ 280	105
280 ~ 290	106
290 ~ 300	106

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.05
Specific Gravity d	3.23
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	0.1	0.2	0.4	0.5	0.5	0.7	0.9	1.2	1.3	1.6	2.1	2.9
-60 ~ -40	-0.1	0.1	0.4	0.5	0.5	0.6	0.8	1.1	1.2	1.7	2.1	2.9
-40 ~ -20	-0.1	0.1	0.4	0.5	0.5	0.7	0.8	1.2	1.2	1.6	2.1	3.0
-20 ~ 0	-0.1	0.1	0.5	0.6	0.6	0.8	0.9	1.3	1.3	1.8	2.2	3.2
0 ~ 20	0.1	0.2	0.5	0.6	0.7	0.8	1.0	1.4	1.4	2.0	2.4	3.4
20 ~ 40	0.2	0.3	0.6	0.8	0.8	1.0	1.1	1.5	1.6	2.0	2.6	3.6
40 ~ 60	0.2	0.4	0.7	0.9	0.9	1.1	1.3	1.8	1.8	2.3	2.8	3.8
60 ~ 80	0.4	0.6	0.9	1.0	1.1	1.3	1.4	1.9	1.9	2.4	2.9	4.1
80 ~ 100	0.5	0.7	1.0	1.2	1.2	1.4	1.6	2.0	2.1	2.6	3.1	4.2
100 ~ 120	0.6	0.8	1.1	1.3	1.3	1.5	1.7	2.2	2.2	2.8	3.3	4.4
120 ~ 140	0.6	0.8	1.2	1.3	1.4	1.6	1.8	2.3	2.3	2.9	3.4	4.6
140 ~ 160	0.7	0.9	1.3	1.4	1.4	1.7	1.9	2.3	2.4	3.0	3.6	4.8
160 ~ 180	0.7	0.9	1.4	1.5	1.6	1.8	2.0	2.5	2.5	3.1	3.7	4.9

S-BSM71

Code(d) 649530
Code(e) 651527

Refractive Index n_d	1.648 50 1.648 498	Abbe Number v_d	53.02	Dispersion $n_F - n_C$	0.012 231
Refractive Index n_e	1.651 410	Abbe Number v_e	52.73	Dispersion $n_{F'} - n_{C'}$	0.012 353

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.616 57
n_{1970}	1.970 09	1.622 05
n_{1530}	1.529 58	1.627 99
n_{1129}	1.128 64	1.633 36
n_t	1.013 98	1.635 18
n_s	0.852 11	1.638 42
$n_{A'}$	0.768 19	1.640 67
n_r	0.706 52	1.642 74
n_C	0.656 27	1.644 82
$n_{C'}$	0.643 85	1.645 40
$n_{\text{He-Ne}}$	0.632 8	1.645 95
n_D	0.589 29	1.648 39
n_d	0.587 56	1.648 50
n_e	0.546 07	1.651 41
n_F	0.486 13	1.657 05
$n_{F'}$	0.479 99	1.657 75
$n_{\text{He-Cd}}$	0.441 57	1.662 93
n_g	0.435 835	1.663 83
n_h	0.404 656	1.669 54
n_i	0.365 015	1.679 43

Constants of Dispersion Formula	
A_1	1.508 478 85E+00
A_2	1.580 998 26E-01
A_3	1.368 153 68E+00
B_1	8.127 690 76E-03
B_2	3.542 008 98E-02
B_3	1.361 100 38E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	86.2
Rigidity Modulus G (GPa)	33.9
Poisson's Ratio σ	0.273
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	170

Partial Dispersions	
$n_C - n_t$	0.009 631
$n_C - n_{A'}$	0.004 150
$n_d - n_C$	0.003 683
$n_e - n_C$	0.006 595
$n_g - n_d$	0.015 333
$n_g - n_F$	0.006 785
$n_h - n_g$	0.005 706
$n_i - n_g$	0.015 599
$n_{C'} - n_t$	0.010 215
$n_e - n_{C'}$	0.006 011
$n_{F'} - n_e$	0.006 342
$n_i - n_{F'}$	0.021 678

Relative Partial Dispersions	
$\theta_{C,t}$	0.787 4
$\theta_{C,A'}$	0.339 3
$\theta_{d,C}$	0.301 1
$\theta_{e,C}$	0.539 2
$\theta_{g,d}$	1.253 6
$\theta_{g,F}$	0.554 7
$\theta_{h,g}$	0.466 5
$\theta_{i,g}$	1.275 4
$\theta'_{C,t}$	0.826 9
$\theta'_{e,C'}$	0.486 6
$\theta'_{F,e}$	0.513 4
$\theta'_{i,F'}$	1.754 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.008 0
$\Delta\theta_{C,A'}$	-0.000 8
$\Delta\theta_{g,d}$	-0.001 0
$\Delta\theta_{g,F}$	-0.001 0
$\Delta\theta_{i,g}$	-0.005 7

Coloring			
λ_{80}	375	λ_5	335
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	337
CCI			
B	G	R	
0.00	0.59	0.55	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.15
350	0.47
360	0.72
370	0.86
380	0.926
390	0.958
400	0.973
420	0.985
440	0.988
460	0.990
480	0.993
500	0.995
550	0.998
600	0.997
650	0.996
700	0.997
800	0.998
900	0.998
1 000	0.997
1 200	0.997
1 400	0.993
1 600	0.993
1 800	0.985
2 000	0.972
2 200	0.925
2 400	0.82

Thermal Properties	
Strain Point StP (°C)	607
Annealing Point AP (°C)	635
Transformation Temperature Tg (°C)	654
Yield Point At (°C)	697
Softening Point SP (°C)	737
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	86
Thermal Conductivity λ (W/(mK))	0.773

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	62
-80 ~ -70	63
-70 ~ -60	65
-60 ~ -50	66
-50 ~ -40	67
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	69
-10 ~ 0	70
0 ~ 10	71
10 ~ 20	72
20 ~ 30	73
30 ~ 40	74
40 ~ 50	75
50 ~ 60	76
60 ~ 70	77
70 ~ 80	78
80 ~ 90	78
90 ~ 100	79
100 ~ 110	80
110 ~ 120	81
120 ~ 130	82
130 ~ 140	82
140 ~ 150	83
150 ~ 160	84
160 ~ 170	85
170 ~ 180	85
180 ~ 190	86
190 ~ 200	87
200 ~ 210	87
210 ~ 220	88
220 ~ 230	88
230 ~ 240	89
240 ~ 250	90
250 ~ 260	90
260 ~ 270	91
270 ~ 280	91
280 ~ 290	92
290 ~ 300	92

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.81
Specific Gravity d	3.74
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	0.8	0.9	1.2	1.3	1.3	1.4	1.6	1.8	2.0	2.3	2.6	3.4	
-60 ~ -40	0.7	0.8	1.1	1.2	1.3	1.4	1.5	1.8	1.8	2.2	2.5	3.3	
-40 ~ -20	0.7	0.8	1.1	1.2	1.2	1.3	1.5	1.9	1.9	2.3	2.6	3.3	
-20 ~ 0	0.8	0.9	1.2	1.3	1.3	1.4	1.6	1.9	1.9	2.4	2.8	3.5	
0 ~ 20	0.8	1.0	1.2	1.3	1.4	1.5	1.8	2.1	2.1	2.5	2.9	3.7	
20 ~ 40	0.9	1.1	1.4	1.5	1.5	1.7	1.8	2.2	2.3	2.7	3.1	3.9	
40 ~ 60	1.0	1.2	1.6	1.7	1.7	1.9	2.0	2.4	2.4	2.8	3.3	4.1	
60 ~ 80	1.2	1.3	1.7	1.8	1.8	2.0	2.1	2.5	2.5	3.0	3.5	4.4	
80 ~ 100	1.3	1.5	1.8	1.9	2.0	2.1	2.3	2.7	2.7	3.2	3.6	4.5	
100 ~ 120	1.4	1.6	1.9	2.0	2.1	2.3	2.4	2.8	2.9	3.3	3.8	4.7	
120 ~ 140	1.5	1.7	2.0	2.2	2.2	2.4	2.6	3.0	3.0	3.5	4.0	5.0	
140 ~ 160	1.6	1.7	2.1	2.2	2.3	2.4	2.6	3.1	3.1	3.7	4.2	5.1	
160 ~ 180	1.7	1.9	2.2	2.4	2.4	2.6	2.8	3.2	3.3	3.7	4.3	5.2	

S-BSM81

Code(d) 640601
Code(e) 643599

Refractive Index n_d	1.640 00 1.639 999	Abbe Number v_d	60.08	Dispersion $n_F - n_C$	0.010 653
Refractive Index n_e	1.642 540	Abbe Number v_e	59.88	Dispersion $n_{F'} - n_{C'}$	0.010 730

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.603 85
n_{1970}	1.970 09	1.611 38
n_{1530}	1.529 58	1.619 17
n_{1129}	1.128 64	1.625 55
n_t	1.013 98	1.627 52
n_s	0.852 11	1.630 78
$n_{A'}$	0.768 19	1.632 93
n_r	0.706 52	1.634 84
n_C	0.656 27	1.636 73
$n_{C'}$	0.643 85	1.637 25
$n_{\text{He-Ne}}$	0.632 8	1.637 74
n_D	0.589 29	1.639 90
n_d	0.587 56	1.640 00
n_e	0.546 07	1.642 54
n_F	0.486 13	1.647 38
$n_{F'}$	0.479 99	1.647 98
$n_{\text{He-Cd}}$	0.441 57	1.652 35
n_g	0.435 835	1.653 10
n_h	0.404 656	1.657 83
n_i	0.365 015	1.665 86

Constants of Dispersion Formula	
A_1	9.963 568 44E-01
A_2	6.513 928 37E-01
A_3	1.224 326 22E+00
B_1	1.448 215 87E-02
B_2	1.548 263 89E-03
B_3	8.998 186 04E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	4
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	53.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	105.7
Rigidity Modulus G (GPa)	41.6
Poisson's Ratio σ	0.271
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	81

Partial Dispersions	
$n_C - n_t$	0.009 210
$n_C - n_{A'}$	0.003 802
$n_d - n_C$	0.003 271
$n_e - n_C$	0.005 812
$n_g - n_d$	0.013 103
$n_g - n_F$	0.005 721
$n_h - n_g$	0.004 730
$n_i - n_g$	0.012 761
$n_C - n_t$	0.009 734
$n_e - n_{C'}$	0.005 288
$n_{F'} - n_e$	0.005 442
$n_i - n_{F'}$	0.017 881

Relative Partial Dispersions	
$\theta_{C,t}$	0.864 5
$\theta_{C,A'}$	0.356 9
$\theta_{d,C}$	0.307 0
$\theta_{e,C}$	0.545 6
$\theta_{g,d}$	1.230 0
$\theta_{g,F}$	0.537 0
$\theta_{h,g}$	0.444 0
$\theta_{i,g}$	1.197 9
$\theta'_{C,t}$	0.907 2
$\theta'_{e,C'}$	0.492 8
$\theta'_{F,e}$	0.507 2
$\theta'_{i,F'}$	1.666 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.035 9
$\Delta\theta_{C,A'}$	0.008 2
$\Delta\theta_{g,d}$	-0.010 0
$\Delta\theta_{g,F}$	-0.007 3
$\Delta\theta_{i,g}$	-0.024 0

Coloring			
λ_{80}	370	λ_5	305
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	303
CCI			
B	G	R	
0.00	0.55	0.49	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.01
300	0.03
310	0.10
320	0.21
330	0.38
340	0.56
350	0.71
360	0.82
370	0.89
380	0.934
390	0.957
400	0.970
420	0.981
440	0.985
460	0.989
480	0.992
500	0.995
550	0.995
600	0.992
650	0.993
700	0.995
800	0.997
900	0.997
1 000	0.996
1 200	0.996
1 400	0.993
1 600	0.994
1 800	0.985
2 000	0.961
2 200	0.87
2 400	0.61

Thermal Properties	
Strain Point StP (°C)	604
Annealing Point AP (°C)	624
Transformation Temperature Tg (°C)	662
Yield Point At (°C)	688
Softening Point SP (°C)	721
Expansion Coefficients (-30 °C ~ 70 °C)	58
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(m·K))	1.00

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	44
-90 ~ -80	45
-80 ~ -70	47
-70 ~ -60	48
-60 ~ -50	49
-50 ~ -40	51
-40 ~ -30	52
-30 ~ -20	53
-20 ~ -10	54
-10 ~ 0	55
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	64
80 ~ 90	65
90 ~ 100	66
100 ~ 110	67
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	71
170 ~ 180	72
180 ~ 190	73
190 ~ 200	73
200 ~ 210	74
210 ~ 220	75
220 ~ 230	75
230 ~ 240	76
240 ~ 250	76
250 ~ 260	77
260 ~ 270	77
270 ~ 280	78
280 ~ 290	78
290 ~ 300	79

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	2.3	2.4	2.6	2.7	2.7	2.8	2.9	3.1	3.2	3.4	3.7	4.2
-60 ~ -40	2.2	2.3	2.5	2.5	2.6	2.7	2.7	3.0	3.1	3.3	3.6	4.1
-40 ~ -20	2.3	2.4	2.5	2.6	2.6	2.7	2.8	3.1	3.1	3.4	3.6	4.2
-20 ~ 0	2.4	2.5	2.6	2.7	2.7	2.8	2.9	3.1	3.2	3.4	3.8	4.3
0 ~ 20	2.5	2.5	2.7	2.8	2.8	2.9	3.0	3.3	3.4	3.6	3.9	4.5
20 ~ 40	2.6	2.7	2.9	2.9	3.0	3.1	3.2	3.4	3.4	3.8	4.1	4.7
40 ~ 60	2.7	2.8	3.1	3.2	3.2	3.3	3.4	3.6	3.7	3.9	4.2	4.8
60 ~ 80	2.9	3.0	3.2	3.3	3.3	3.4	3.5	3.7	3.8	4.1	4.5	5.0
80 ~ 100	3.0	3.2	3.4	3.4	3.5	3.6	3.7	3.9	3.9	4.2	4.5	5.2
100 ~ 120	3.2	3.3	3.5	3.6	3.6	3.7	3.8	4.1	4.1	4.4	4.7	5.3
120 ~ 140	3.3	3.4	3.6	3.7	3.7	3.8	3.9	4.2	4.2	4.5	4.8	5.4
140 ~ 160	3.3	3.5	3.7	3.7	3.8	3.9	4.0	4.4	4.3	4.7	5.0	5.7
160 ~ 180	3.4	3.6	3.8	3.9	3.9	4.0	4.1	4.4	4.4	4.7	5.1	5.7

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.00
Specific Gravity d	3.06
Remarks	

OHARA 25-04

S-FPL51

Code(d) 497816
Code(e) 498810

Refractive Index n_d	1.497 00 1.496 999	Abbe Number v_d	81.54	Dispersion $n_F - n_C$	0.006 095
Refractive Index n_e	1.498 455	Abbe Number v_e	81.14	Dispersion $n_{F'} - n_{C'}$	0.006 143

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.479 52
n_{1970}	1.970 09	1.482 69
n_{1530}	1.529 58	1.486 10
n_{1129}	1.128 64	1.489 11
n_t	1.013 98	1.490 10
n_s	0.852 11	1.491 83
$n_{A'}$	0.768 19	1.493 00
n_r	0.706 52	1.494 07
n_C	0.656 27	1.495 14
$n_{C'}$	0.643 85	1.495 43
$n_{\text{He-Ne}}$	0.632 8	1.495 71
n_D	0.589 29	1.496 94
n_d	0.587 56	1.497 00
n_e	0.546 07	1.498 45
n_F	0.486 13	1.501 23
$n_{F'}$	0.479 99	1.501 58
$n_{\text{He-Cd}}$	0.441 57	1.504 07
n_g	0.435 835	1.504 51
n_h	0.404 656	1.507 20
n_i	0.365 015	1.511 76

Constants of Dispersion Formula	
A_1	1.170 105 05E+00
A_2	4.757 107 83E-02
A_3	7.638 324 45E-01
B_1	6.162 039 24E-03
B_2	2.633 728 76E-02
B_3	1.418 826 42E+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	52.1
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	72.7
Rigidity Modulus G (GPa)	28.0
Poisson's Ratio σ	0.299
Knoop Hardness Hk[Class]	360 4
Abrasion Aa	493

Partial Dispersions	
$n_C - n_t$	0.005 033
$n_C - n_{A'}$	0.002 134
$n_d - n_C$	0.001 863
$n_e - n_C$	0.003 319
$n_g - n_d$	0.007 508
$n_g - n_F$	0.003 276
$n_h - n_g$	0.002 698
$n_i - n_g$	0.007 253
$n_{C'} - n_t$	0.005 330
$n_e - n_{C'}$	0.003 022
$n_{F'} - n_e$	0.003 121
$n_i - n_{F'}$	0.010 184

Relative Partial Dispersions	
$\theta_{C,t}$	0.825 8
$\theta_{C,A'}$	0.350 1
$\theta_{d,C}$	0.305 7
$\theta_{e,C}$	0.544 5
$\theta_{g,d}$	1.231 8
$\theta_{g,F}$	0.537 5
$\theta_{h,g}$	0.442 7
$\theta_{i,g}$	1.190 0
$\theta'_{C,t}$	0.867 7
$\theta'_{e,C'}$	0.491 9
$\theta'_{F,e}$	0.508 1
$\theta'_{i,F'}$	1.657 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.103 5
$\Delta\theta_{C,A'}$	-0.024 6
$\Delta\theta_{g,d}$	0.036 4
$\Delta\theta_{g,F}$	0.028 0
$\Delta\theta_{i,g}$	0.147 8

Coloring			
λ_{80}	340	λ_5	290
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	333	$\lambda_{0.05}$	290
CCI			
B	G	R	
0.00	0.16	0.13	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.01
290	0.05
300	0.17
310	0.37
320	0.60
330	0.77
340	0.88
350	0.947
360	0.975
370	0.988
380	0.994
390	0.996
400	0.995
420	0.994
440	0.994
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.999
1 800	0.999
2 000	0.999
2 200	0.997
2 400	0.996

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	459
Yield Point At (°C)	488
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	133
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	157
Thermal Conductivity λ (W/(mK))	0.780

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	110
-90 ~ -80	112
-80 ~ -70	114
-70 ~ -60	116
-60 ~ -50	118
-50 ~ -40	120
-40 ~ -30	122
-30 ~ -20	124
-20 ~ -10	126
-10 ~ 0	128
0 ~ 10	130
10 ~ 20	131
20 ~ 30	133
30 ~ 40	135
40 ~ 50	137
50 ~ 60	138
60 ~ 70	140
70 ~ 80	141
80 ~ 90	143
90 ~ 100	145
100 ~ 110	146
110 ~ 120	147
120 ~ 130	149
130 ~ 140	150
140 ~ 150	151
150 ~ 160	153
160 ~ 170	154
170 ~ 180	155
180 ~ 190	156
190 ~ 200	158
200 ~ 210	159
210 ~ 220	160
220 ~ 230	161
230 ~ 240	162
240 ~ 250	163
250 ~ 260	164
260 ~ 270	165
270 ~ 280	165
280 ~ 290	166
290 ~ 300	167

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	-5.3	-5.3	-5.2	-5.2	-5.2	-5.1	-5.1	-4.9	-4.9	-4.7	-4.6	-4.3	
-60 ~ -40	-5.7	-5.7	-5.6	-5.6	-5.6	-5.5	-5.5	-5.3	-5.3	-5.1	-5.0	-4.7	
-40 ~ -20	-6.0	-6.0	-5.9	-5.9	-5.9	-5.8	-5.8	-5.5	-5.5	-5.4	-5.2	-5.0	
-20 ~ 0	-6.2	-6.2	-6.1	-6.1	-6.1	-6.0	-6.0	-5.8	-5.7	-5.6	-5.4	-5.2	
0 ~ 20	-6.4	-6.4	-6.3	-6.2	-6.2	-6.2	-6.1	-6.0	-6.0	-5.8	-5.7	-5.3	
20 ~ 40	-6.5	-6.5	-6.4	-6.4	-6.4	-6.3	-6.2	-6.1	-6.1	-5.9	-5.8	-5.4	
40 ~ 60	-6.7	-6.7	-6.6	-6.5	-6.4	-6.3	-6.3	-6.2	-6.1	-6.0	-5.8	-5.5	
60 ~ 80	-6.8	-6.7	-6.6	-6.6	-6.6	-6.5	-6.5	-6.3	-6.3	-6.1	-6.0	-5.6	
80 ~ 100	-6.9	-6.8	-6.7	-6.7	-6.7	-6.6	-6.5	-6.4	-6.4	-6.2	-6.0	-5.7	
100 ~ 120	-6.9	-6.9	-6.8	-6.8	-6.7	-6.7	-6.6	-6.5	-6.5	-6.3	-6.1	-5.8	
120 ~ 140	-7.1	-7.0	-6.9	-6.9	-6.9	-6.8	-6.7	-6.6	-6.6	-6.3	-6.1	-5.8	
140 ~ 160	-7.1	-7.1	-6.9	-6.9	-6.9	-6.8	-6.7	-6.6	-6.6	-6.4	-6.2	-5.9	
160 ~ 180	-7.2	-7.2	-7.1	-7.0	-7.0	-6.9	-6.9	-6.7	-6.7	-6.5	-6.4	-6.0	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.74
Specific Gravity d	3.62
Remarks	

OHARA 25-04

S-FPL53

Code(d) 439950
Code(e) 440946

Refractive Index n_d	1.438 75 1.438 750	Abbe Number v_d	94.93	Dispersion $n_F - n_C$	0.004 622
Refractive Index n_e	1.439 854	Abbe Number v_e	94.49	Dispersion $n_{F'} - n_{C'}$	0.004 655

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.425 12
n_{1970}	1.970 09	1.427 62
n_{1530}	1.529 58	1.430 32
n_{1129}	1.128 64	1.432 69
n_t	1.013 98	1.433 46
n_s	0.852 11	1.434 80
$n_{A'}$	0.768 19	1.435 70
n_r	0.706 52	1.436 52
n_C	0.656 27	1.437 33
$n_{C'}$	0.643 85	1.437 56
$n_{\text{He-Ne}}$	0.632 8	1.437 77
n_D	0.589 29	1.438 71
n_d	0.587 56	1.438 75
n_e	0.546 07	1.439 85
n_F	0.486 13	1.441 95
$n_{F'}$	0.479 99	1.442 21
$n_{\text{He-Cd}}$	0.441 57	1.444 10
n_g	0.435 835	1.444 42
n_h	0.404 656	1.446 45
n_i	0.365 015	1.449 86

Constants of Dispersion Formula	
A_1	9.835 323 27E-01
A_2	6.956 881 40E-02
A_3	1.114 092 38E+00
B_1	4.922 349 55E-03
B_2	1.935 810 91E-02
B_3	2.642 752 94E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.3
Phosphate Resistance PR	4.3

Mechanical Properties	
Young's Modulus E (GPa)	69.1
Rigidity Modulus G (GPa)	26.5
Poisson's Ratio σ	0.303
Knoop Hardness Hk[Class]	330 3
Abrasion Aa	480

Partial Dispersions	
$n_C - n_t$	0.003 870
$n_C - n_{A'}$	0.001 631
$n_d - n_C$	0.001 417
$n_e - n_C$	0.002 521
$n_g - n_d$	0.005 673
$n_g - n_F$	0.002 468
$n_h - n_g$	0.002 028
$n_i - n_g$	0.005 437
$n_{C'} - n_t$	0.004 097
$n_e - n_{C'}$	0.002 294
$n_{F'} - n_e$	0.002 361
$n_i - n_{F'}$	0.007 645

Relative Partial Dispersions	
$\theta_{C,t}$	0.837 3
$\theta_{C,A'}$	0.352 9
$\theta_{d,C}$	0.306 6
$\theta_{e,C}$	0.545 4
$\theta_{g,d}$	1.227 4
$\theta_{g,F}$	0.534 0
$\theta_{h,g}$	0.438 8
$\theta_{i,g}$	1.176 3
$\theta'_{C,t}$	0.880 1
$\theta'_{e,C'}$	0.492 8
$\theta'_{F',e}$	0.507 2
$\theta'_{i,F'}$	1.642 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.154 8
$\Delta\theta_{C,A'}$	-0.038 1
$\Delta\theta_{g,d}$	0.059 8
$\Delta\theta_{g,F}$	0.046 1
$\Delta\theta_{i,g}$	0.246 2

Coloring			
λ_{80}	330	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	324	$\lambda_{0.05}$	276
CCI			
B	G	R	
0.00	0.06	0.04	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.09
290	0.21
300	0.39
310	0.59
320	0.76
330	0.87
340	0.943
350	0.973
360	0.987
370	0.994
380	0.997
390	0.998
400	0.998
420	0.997
440	0.997
460	0.998
480	0.998
500	0.999
550	0.999
600	0.999
650	0.998
700	0.998
800	0.998
900	0.997
1 000	0.997
1 200	0.997
1 400	0.998
1 600	0.998
1 800	0.998
2 000	0.998
2 200	0.997
2 400	0.997

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	428
Yield Point At (°C)	456
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	143
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	171
Thermal Conductivity λ (W/(mK))	0.857

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	116
-90 ~ -80	119
-80 ~ -70	121
-70 ~ -60	124
-60 ~ -50	126
-50 ~ -40	128
-40 ~ -30	131
-30 ~ -20	133
-20 ~ -10	135
-10 ~ 0	138
0 ~ 10	140
10 ~ 20	142
20 ~ 30	144
30 ~ 40	146
40 ~ 50	148
50 ~ 60	150
60 ~ 70	152
70 ~ 80	153
80 ~ 90	155
90 ~ 100	157
100 ~ 110	159
110 ~ 120	160
120 ~ 130	162
130 ~ 140	163
140 ~ 150	165
150 ~ 160	166
160 ~ 170	168
170 ~ 180	169
180 ~ 190	170
190 ~ 200	172
200 ~ 210	173
210 ~ 220	174
220 ~ 230	175
230 ~ 240	176
240 ~ 250	177
250 ~ 260	178
260 ~ 270	179
270 ~ 280	180
280 ~ 290	181
290 ~ 300	181

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.57
Specific Gravity d	3.62
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	-5.3	-5.3	-5.2	-5.2	-5.2	-5.1	-5.1	-5.0	-5.0	-4.9	-4.7	-4.5	
-60 ~ -40	-5.8	-5.8	-5.7	-5.7	-5.7	-5.6	-5.6	-5.5	-5.5	-5.3	-5.2	-5.0	
-40 ~ -20	-6.2	-6.2	-6.1	-6.1	-6.0	-5.9	-5.9	-5.8	-5.8	-5.7	-5.6	-5.4	
-20 ~ 0	-6.5	-6.5	-6.3	-6.3	-6.3	-6.2	-6.2	-6.1	-6.1	-6.0	-5.9	-5.7	
0 ~ 20	-6.7	-6.7	-6.6	-6.6	-6.6	-6.5	-6.5	-6.4	-6.4	-6.2	-6.1	-5.9	
20 ~ 40	-6.9	-6.9	-6.8	-6.7	-6.7	-6.7	-6.6	-6.5	-6.5	-6.4	-6.3	-6.1	
40 ~ 60	-7.1	-7.1	-7.0	-7.0	-6.9	-6.9	-6.9	-6.8	-6.8	-6.6	-6.5	-6.3	
60 ~ 80	-7.2	-7.2	-7.1	-7.0	-7.0	-7.0	-7.0	-6.9	-6.8	-6.7	-6.6	-6.4	
80 ~ 100	-7.3	-7.3	-7.2	-7.2	-7.2	-7.1	-7.1	-7.0	-7.0	-6.9	-6.8	-6.5	
100 ~ 120	-7.5	-7.5	-7.4	-7.3	-7.3	-7.3	-7.2	-7.1	-7.1	-7.0	-6.9	-6.7	
120 ~ 140	-7.6	-7.6	-7.5	-7.5	-7.5	-7.4	-7.3	-7.3	-7.2	-7.1	-7.0	-6.8	
140 ~ 160	-7.8	-7.8	-7.7	-7.6	-7.6	-7.6	-7.5	-7.3	-7.3	-7.2	-7.1	-6.9	
160 ~ 180	-7.8	-7.8	-7.7	-7.7	-7.7	-7.6	-7.6	-7.5	-7.5	-7.3	-7.2	-7.0	

OHARA 25-04

S-FPL55

Code(d) 439948
Code(e) 440942

Refractive Index n_d	1.438 75 1.438 750	Abbe Number v_d	94.66	Dispersion $n_F - n_C$	0.004 635
Refractive Index n_e	1.439 857	Abbe Number v_e	94.23	Dispersion $n_{F'} - n_{C'}$	0.004 668

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.424 92
n_{1970}	1.970 09	1.427 47
n_{1530}	1.529 58	1.430 23
n_{1129}	1.128 64	1.432 64
n_t	1.013 98	1.433 43
n_s	0.852 11	1.434 78
$n_{A'}$	0.768 19	1.435 69
n_r	0.706 52	1.436 51
n_C	0.656 27	1.437 33
$n_{C'}$	0.643 85	1.437 55
$n_{\text{He-Ne}}$	0.632 8	1.437 77
n_D	0.589 29	1.438 71
n_d	0.587 56	1.438 75
n_e	0.546 07	1.439 86
n_F	0.486 13	1.441 96
$n_{F'}$	0.479 99	1.442 22
$n_{\text{He-Cd}}$	0.441 57	1.444 11
n_g	0.435 835	1.444 44
n_h	0.404 656	1.446 47
n_i	0.365 015	1.449 88

Constants of Dispersion Formula	
A_1	8.390 676 82E-01
A_2	2.140 835 03E-01
A_3	1.479 146 77E+00
B_1	7.952 866 39E-03
B_2	-2.325 817 17E-03
B_3	3.400 437 00E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.1
Phosphate Resistance PR	4.1

Mechanical Properties	
Young's Modulus E (GPa)	69.8
Rigidity Modulus G (GPa)	26.8
Poisson's Ratio σ	0.302
Knoop Hardness Hk[Class]	330 3
Abrasion Aa	470

Partial Dispersions	
$n_C - n_t$	0.003 898
$n_C - n_{A'}$	0.001 639
$n_d - n_C$	0.001 422
$n_e - n_C$	0.002 529
$n_g - n_d$	0.005 688
$n_g - n_F$	0.002 475
$n_h - n_g$	0.002 031
$n_i - n_g$	0.005 445
$n_C - n_t$	0.004 125
$n_e - n_{C'}$	0.002 302
$n_{F'} - n_e$	0.002 366
$n_i - n_{F'}$	0.007 660

Relative Partial Dispersions	
$\theta_{C,t}$	0.841 0
$\theta_{C,A'}$	0.353 6
$\theta_{d,C}$	0.306 8
$\theta_{e,C}$	0.545 6
$\theta_{g,d}$	1.227 2
$\theta_{g,F}$	0.534 0
$\theta_{h,g}$	0.438 2
$\theta_{i,g}$	1.174 8
$\theta'_{C,t}$	0.883 7
$\theta'_{e,C'}$	0.493 1
$\theta'_{F,e}$	0.506 9
$\theta'_{i,F'}$	1.641 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.149 8
$\Delta\theta_{C,A'}$	-0.037 1
$\Delta\theta_{g,d}$	0.059 0
$\Delta\theta_{g,F}$	0.045 7
$\Delta\theta_{i,g}$	0.242 4

Coloring			
λ_{80}	330	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	324	$\lambda_{0.05}$	275
CCI			
B	G	R	
0.00	0.04	0.04	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.10
290	0.22
300	0.39
310	0.59
320	0.76
330	0.87
340	0.941
350	0.972
360	0.987
370	0.994
380	0.997
390	0.998
400	0.998
420	0.998
440	0.998
460	0.998
480	0.999
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.998
900	0.997
1 000	0.997
1 200	0.998
1 400	0.998
1 600	0.998
1 800	0.997
2 000	0.997
2 200	0.996
2 400	0.996

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	439
Yield Point At (°C)	462
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	141
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	168
Thermal Conductivity λ (W/(mK))	0.876

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	115
-90 ~ -80	118
-80 ~ -70	120
-70 ~ -60	122
-60 ~ -50	125
-50 ~ -40	127
-40 ~ -30	129
-30 ~ -20	131
-20 ~ -10	133
-10 ~ 0	135
0 ~ 10	138
10 ~ 20	140
20 ~ 30	142
30 ~ 40	143
40 ~ 50	145
50 ~ 60	147
60 ~ 70	149
70 ~ 80	151
80 ~ 90	152
90 ~ 100	154
100 ~ 110	156
110 ~ 120	157
120 ~ 130	159
130 ~ 140	160
140 ~ 150	162
150 ~ 160	163
160 ~ 170	165
170 ~ 180	166
180 ~ 190	167
190 ~ 200	168
200 ~ 210	170
210 ~ 220	171
220 ~ 230	172
230 ~ 240	173
240 ~ 250	174
250 ~ 260	175
260 ~ 270	176
270 ~ 280	177
280 ~ 290	178
290 ~ 300	179

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	-5.0	-4.9	-4.8	-4.8	-4.8	-4.8	-4.8	-4.7	-4.7	-4.5	-4.4	-4.3	
-60 ~ -40	-5.4	-5.4	-5.4	-5.3	-5.3	-5.3	-5.3	-5.2	-5.2	-5.0	-4.9	-4.8	
-40 ~ -20	-5.9	-5.9	-5.8	-5.8	-5.7	-5.7	-5.6	-5.5	-5.5	-5.4	-5.3	-5.2	
-20 ~ 0	-6.2	-6.2	-6.0	-6.0	-6.0	-5.9	-5.9	-5.8	-5.8	-5.7	-5.6	-5.4	
0 ~ 20	-6.5	-6.4	-6.4	-6.3	-6.3	-6.3	-6.2	-6.1	-6.1	-5.9	-5.8	-5.6	
20 ~ 40	-6.7	-6.7	-6.6	-6.5	-6.5	-6.4	-6.4	-6.3	-6.2	-6.1	-6.0	-5.8	
40 ~ 60	-6.8	-6.8	-6.7	-6.7	-6.7	-6.6	-6.6	-6.4	-6.4	-6.3	-6.2	-6.0	
60 ~ 80	-7.0	-6.9	-6.8	-6.8	-6.8	-6.7	-6.7	-6.6	-6.5	-6.4	-6.3	-6.1	
80 ~ 100	-7.1	-7.1	-7.0	-6.9	-6.9	-6.9	-6.8	-6.7	-6.7	-6.5	-6.4	-6.1	
100 ~ 120	-7.3	-7.2	-7.1	-7.1	-7.1	-7.0	-6.9	-6.8	-6.8	-6.6	-6.5	-6.2	
120 ~ 140	-7.4	-7.3	-7.2	-7.2	-7.2	-7.1	-7.0	-6.9	-6.9	-6.7	-6.6	-6.3	
140 ~ 160	-7.6	-7.5	-7.4	-7.3	-7.3	-7.3	-7.2	-6.9	-6.9	-6.7	-6.6	-6.3	
160 ~ 180	-7.6	-7.5	-7.4	-7.4	-7.3	-7.3	-7.2	-7.0	-7.0	-6.8	-6.7	-6.4	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.59
Specific Gravity d	3.59
Remarks	

OHARA 25-04

S-FPM 2

Code(d) 595677
Code(e) 597674

Refractive Index n_d	1.595 22 1.595 220	Abbe Number v_d	67.74	Dispersion $n_F - n_C$	0.008 787
Refractive Index n_e	1.597 316	Abbe Number v_e	67.37	Dispersion $n_{F'} - n_{C'}$	0.008 866

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.572 52
n_{1970}	1.970 09	1.576 31
n_{1530}	1.529 58	1.580 45
n_{1129}	1.128 64	1.584 26
n_t	1.013 98	1.585 57
n_s	0.852 11	1.587 91
$n_{A'}$	0.768 19	1.589 54
n_r	0.706 52	1.591 05
n_C	0.656 27	1.592 55
$n_{C'}$	0.643 85	1.592 98
$n_{\text{He-Ne}}$	0.632 8	1.593 37
n_D	0.589 29	1.595 14
n_d	0.587 56	1.595 22
n_e	0.546 07	1.597 32
n_F	0.486 13	1.601 34
$n_{F'}$	0.479 99	1.601 84
$n_{\text{He-Cd}}$	0.441 57	1.605 49
n_g	0.435 835	1.606 12
n_h	0.404 656	1.610 08
n_i	0.365 015	1.616 81

Constants of Dispersion Formula	
A_1	7.612 427 85E-01
A_2	7.470 333 75E-01
A_3	9.389 289 47E-01
B_1	3.211 740 95E-03
B_2	1.402 344 23E-02
B_3	1.395 235 30E+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	51.3
Phosphate Resistance PR	4.1

Mechanical Properties	
Young's Modulus E (GPa)	75.7
Rigidity Modulus G (GPa)	29.4
Poisson's Ratio σ	0.287
Knoop Hardness Hk[Class]	400 4
Abrasion Aa	521

Partial Dispersions	
$n_C - n_t$	0.006 988
$n_C - n_{A'}$	0.003 015
$n_d - n_C$	0.002 665
$n_e - n_C$	0.004 761
$n_g - n_d$	0.010 904
$n_g - n_F$	0.004 782
$n_h - n_g$	0.003 960
$n_i - n_g$	0.010 681
$n_{C'} - n_t$	0.007 411
$n_e - n_{C'}$	0.004 338
$n_{F'} - n_e$	0.004 528
$n_i - n_{F'}$	0.014 961

Relative Partial Dispersions	
$\theta_{C,t}$	0.795 3
$\theta_{C,A'}$	0.343 1
$\theta_{d,C}$	0.303 3
$\theta_{e,C}$	0.541 8
$\theta_{g,d}$	1.240 9
$\theta_{g,F}$	0.544 2
$\theta_{h,g}$	0.450 7
$\theta_{i,g}$	1.215 5
$\theta'_{C,t}$	0.835 9
$\theta'_{e,C'}$	0.489 3
$\theta'_{F,e}$	0.510 7
$\theta'_{i,F'}$	1.687 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.069 2
$\Delta\theta_{C,A'}$	-0.014 9
$\Delta\theta_{g,d}$	0.016 9
$\Delta\theta_{g,F}$	0.012 3
$\Delta\theta_{i,g}$	0.057 7

Coloring			
λ_{80}	355	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	302
CCI			
B	G	R	
0.00	0.32	0.27	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.18
320	0.35
330	0.54
340	0.72
350	0.84
360	0.917
370	0.958
380	0.980
390	0.988
400	0.991
420	0.989
440	0.989
460	0.992
480	0.994
500	0.996
550	0.998
600	0.997
650	0.996
700	0.996
800	0.995
900	0.995
1 000	0.996
1 200	0.997
1 400	0.997
1 600	0.997
1 800	0.995
2 000	0.992
2 200	0.989
2 400	0.983

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	569
Yield Point At (°C)	594
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	117
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	137
Thermal Conductivity λ (W/(mK))	0.624

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	100
-90 ~ -80	101
-80 ~ -70	103
-70 ~ -60	104
-60 ~ -50	106
-50 ~ -40	108
-40 ~ -30	109
-30 ~ -20	111
-20 ~ -10	112
-10 ~ 0	113
0 ~ 10	115
10 ~ 20	116
20 ~ 30	118
30 ~ 40	119
40 ~ 50	120
50 ~ 60	122
60 ~ 70	123
70 ~ 80	124
80 ~ 90	125
90 ~ 100	126
100 ~ 110	128
110 ~ 120	129
120 ~ 130	130
130 ~ 140	131
140 ~ 150	132
150 ~ 160	133
160 ~ 170	134
170 ~ 180	135
180 ~ 190	136
190 ~ 200	137
200 ~ 210	138
210 ~ 220	138
220 ~ 230	139
230 ~ 240	140
240 ~ 250	141
250 ~ 260	142
260 ~ 270	142
270 ~ 280	143
280 ~ 290	144
290 ~ 300	144

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	-5.9	-5.8	-5.7	-5.6	-5.6	-5.6	-5.5	-5.4	-5.3	-5.1	-4.9	-4.7
-60 ~ -40	-6.1	-6.1	-5.9	-5.8	-5.8	-5.7	-5.7	-5.5	-5.5	-5.3	-5.2	-4.8
-40 ~ -20	-6.2	-6.2	-6.1	-5.9	-5.9	-5.8	-5.7	-5.6	-5.6	-5.4	-5.2	-4.8
-20 ~ 0	-6.3	-6.2	-6.1	-6.0	-6.0	-5.8	-5.8	-5.6	-5.6	-5.4	-5.2	-4.9
0 ~ 20	-6.3	-6.2	-6.0	-6.0	-6.0	-5.9	-5.8	-5.6	-5.6	-5.4	-5.2	-4.8
20 ~ 40	-6.3	-6.2	-6.0	-6.0	-6.0	-5.9	-5.8	-5.6	-5.6	-5.4	-5.2	-4.7
40 ~ 60	-6.3	-6.2	-6.0	-6.0	-6.0	-5.9	-5.8	-5.6	-5.6	-5.2	-5.0	-4.7
60 ~ 80	-6.2	-6.2	-6.0	-5.9	-5.9	-5.8	-5.7	-5.5	-5.5	-5.3	-5.0	-4.6
80 ~ 100	-6.3	-6.2	-6.0	-5.9	-5.9	-5.8	-5.7	-5.5	-5.4	-5.2	-5.0	-4.6
100 ~ 120	-6.2	-6.2	-6.0	-5.9	-5.9	-5.8	-5.7	-5.4	-5.4	-5.2	-4.9	-4.5
120 ~ 140	-6.3	-6.2	-6.0	-5.9	-5.9	-5.8	-5.7	-5.5	-5.4	-5.2	-4.9	-4.5
140 ~ 160	-6.3	-6.3	-6.0	-6.0	-5.9	-5.8	-5.7	-5.5	-5.5	-5.2	-4.9	-4.4
160 ~ 180	-6.4	-6.4	-6.1	-6.0	-5.9	-5.8	-5.7	-5.5	-5.4	-5.2	-4.9	-4.4

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.51
Specific Gravity d	4.17
Remarks	

OHARA 25-04

S-FPM 3

Code(d) 538747
Code(e) 539743

Refractive Index n_d	1.537 75 1.537 750	Abbe Number v_d	74.70	Dispersion $n_F - n_C$	0.007 199
Refractive Index n_e	1.539 469	Abbe Number v_e	74.34	Dispersion $n_{F'} - n_{C'}$	0.007 257

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.517 38
n_{1970}	1.970 09	1.521 05
n_{1530}	1.529 58	1.525 00
n_{1129}	1.128 64	1.528 49
n_t	1.013 98	1.529 65
n_s	0.852 11	1.531 67
$n_{A'}$	0.768 19	1.533 04
n_r	0.706 52	1.534 30
n_C	0.656 27	1.535 55
$n_{C'}$	0.643 85	1.535 90
$n_{\text{He-Ne}}$	0.632 8	1.536 23
n_D	0.589 29	1.537 69
n_d	0.587 56	1.537 75
n_e	0.546 07	1.539 47
n_F	0.486 13	1.542 75
$n_{F'}$	0.479 99	1.543 16
$n_{\text{He-Cd}}$	0.441 57	1.546 12
n_g	0.435 835	1.546 64
n_h	0.404 656	1.549 84
n_i	0.365 015	1.555 25

Constants of Dispersion Formula	
A_1	8.094 072 86E-01
A_2	5.270 070 33E-01
A_3	9.091 277 04E-01
B_1	3.760 723 89E-03
B_2	1.356 548 95E-02
B_3	1.425 036 12E+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	5.1
Phosphate Resistance PR	4.1

Mechanical Properties	
Young's Modulus E (GPa)	80.6
Rigidity Modulus G (GPa)	31.2
Poisson's Ratio σ	0.291
Knoop Hardness Hk[Class]	400 4
Abrasion Aa	418

Partial Dispersions	
$n_C - n_t$	0.005 905
$n_C - n_{A'}$	0.002 510
$n_d - n_C$	0.002 196
$n_e - n_C$	0.003 915
$n_g - n_d$	0.008 885
$n_g - n_F$	0.003 882
$n_h - n_g$	0.003 203
$n_i - n_g$	0.008 618
$n_{C'} - n_t$	0.006 255
$n_e - n_{C'}$	0.003 565
$n_{F'} - n_e$	0.003 692
$n_i - n_{F'}$	0.012 092

Relative Partial Dispersions	
$\theta_{C,t}$	0.820 3
$\theta_{C,A'}$	0.348 7
$\theta_{d,C}$	0.305 0
$\theta_{e,C}$	0.543 8
$\theta_{g,d}$	1.234 2
$\theta_{g,F}$	0.539 2
$\theta_{h,g}$	0.444 9
$\theta_{i,g}$	1.197 1
$\theta'_{C,t}$	0.861 9
$\theta'_{e,C'}$	0.491 2
$\theta'_{F,e}$	0.508 8
$\theta'_{i,F'}$	1.666 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.076 9
$\Delta\theta_{C,A'}$	-0.017 7
$\Delta\theta_{g,d}$	0.024 6
$\Delta\theta_{g,F}$	0.018 6
$\Delta\theta_{i,g}$	0.097 6

Coloring			
λ_{80}	345	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	284
CCI			
B	G	R	
0.00	0.28	0.23	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.08
300	0.19
310	0.36
320	0.55
330	0.72
340	0.85
350	0.924
360	0.962
370	0.981
380	0.990
390	0.992
400	0.992
420	0.989
440	0.990
460	0.992
480	0.995
500	0.996
550	0.998
600	0.997
650	0.996
700	0.996
800	0.994
900	0.995
1 000	0.996
1 200	0.997
1 400	0.997
1 600	0.996
1 800	0.995
2 000	0.993
2 200	0.987
2 400	0.984

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	505
Yield Point At (°C)	533
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	117
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	138
Thermal Conductivity λ (W/(mK))	0.805

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	96
-90 ~ -80	98
-80 ~ -70	100
-70 ~ -60	102
-60 ~ -50	104
-50 ~ -40	105
-40 ~ -30	107
-30 ~ -20	109
-20 ~ -10	111
-10 ~ 0	112
0 ~ 10	114
10 ~ 20	116
20 ~ 30	117
30 ~ 40	119
40 ~ 50	120
50 ~ 60	122
60 ~ 70	123
70 ~ 80	124
80 ~ 90	126
90 ~ 100	127
100 ~ 110	128
110 ~ 120	130
120 ~ 130	131
130 ~ 140	132
140 ~ 150	133
150 ~ 160	134
160 ~ 170	135
170 ~ 180	136
180 ~ 190	137
190 ~ 200	138
200 ~ 210	139
210 ~ 220	140
220 ~ 230	141
230 ~ 240	142
240 ~ 250	143
250 ~ 260	143
260 ~ 270	144
270 ~ 280	145
280 ~ 290	146
290 ~ 300	146

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	-3.8	-3.8	-3.6	-3.6	-3.6	-3.5	-3.5	-3.4	-3.4	-3.2	-3.0	-2.7	
-60 ~ -40	-4.2	-4.2	-4.0	-4.0	-4.0	-3.9	-3.8	-3.7	-3.7	-3.6	-3.4	-3.0	
-40 ~ -20	-4.5	-4.4	-4.3	-4.2	-4.2	-4.2	-4.1	-4.0	-3.9	-3.8	-3.6	-3.2	
-20 ~ 0	-4.7	-4.6	-4.4	-4.4	-4.4	-4.3	-4.3	-4.1	-4.1	-3.9	-3.7	-3.3	
0 ~ 20	-4.8	-4.7	-4.6	-4.6	-4.6	-4.5	-4.4	-4.3	-4.2	-4.0	-3.8	-3.4	
20 ~ 40	-4.9	-4.9	-4.7	-4.7	-4.7	-4.5	-4.4	-4.3	-4.2	-4.0	-3.9	-3.5	
40 ~ 60	-4.9	-4.9	-4.7	-4.7	-4.6	-4.6	-4.5	-4.3	-4.3	-4.1	-3.9	-3.5	
60 ~ 80	-5.0	-5.0	-4.8	-4.8	-4.7	-4.7	-4.5	-4.3	-4.3	-4.1	-3.8	-3.4	
80 ~ 100	-5.1	-5.0	-4.8	-4.8	-4.8	-4.7	-4.6	-4.4	-4.4	-4.0	-3.8	-3.4	
100 ~ 120	-5.1	-5.0	-4.9	-4.8	-4.8	-4.7	-4.5	-4.4	-4.4	-4.0	-3.8	-3.3	
120 ~ 140	-5.1	-5.1	-4.8	-4.7	-4.7	-4.6	-4.5	-4.3	-4.3	-4.0	-3.8	-3.3	
140 ~ 160	-5.1	-5.0	-4.8	-4.7	-4.7	-4.6	-4.5	-4.3	-4.3	-4.0	-3.8	-3.3	
160 ~ 180	-5.1	-5.1	-4.9	-4.8	-4.8	-4.7	-4.6	-4.3	-4.3	-4.0	-3.8	-3.2	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.85
Specific Gravity d	3.64
Remarks	

OHARA 25-04

S-FPM 4

Code(d) 528765
Code(e) 530760

Refractive Index n_d	1.528 41 1.528 410	Abbe Number v_d	76.46	Dispersion $n_F - n_C$	0.006 911
Refractive Index n_e	1.530 060	Abbe Number v_e	76.07	Dispersion $n_{F'} - n_{C'}$	0.006 968

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.509 11
n_{1970}	1.970 09	1.512 54
n_{1530}	1.529 58	1.516 25
n_{1129}	1.128 64	1.519 55
n_t	1.013 98	1.520 65
n_s	0.852 11	1.522 58
$n_{A'}$	0.768 19	1.523 90
n_r	0.706 52	1.525 10
n_C	0.656 27	1.526 30
$n_{C'}$	0.643 85	1.526 64
$n_{\text{He-Ne}}$	0.632 8	1.526 95
n_D	0.589 29	1.528 35
n_d	0.587 56	1.528 41
n_e	0.546 07	1.530 06
n_F	0.486 13	1.533 21
$n_{F'}$	0.479 99	1.533 61
$n_{\text{He-Cd}}$	0.441 57	1.536 45
n_g	0.435 835	1.536 94
n_h	0.404 656	1.540 02
n_i	0.365 015	1.545 22

Constants of Dispersion Formula	
A_1	6.855 850 84E-01
A_2	6.233 802 15E-01
A_3	9.141 783 86E-01
B_1	2.881 720 10E-03
B_2	1.247 017 07E-02
B_3	1.535 772 00E+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	51.3
Phosphate Resistance PR	4.3

Mechanical Properties	
Young's Modulus E (GPa)	74.7
Rigidity Modulus G (GPa)	28.9
Poisson's Ratio σ	0.295
Knoop Hardness Hk[Class]	380 4
Abrasion Aa	506

Partial Dispersions	
$n_C - n_t$	0.005 650
$n_C - n_{A'}$	0.002 406
$n_d - n_C$	0.002 107
$n_e - n_C$	0.003 757
$n_g - n_d$	0.008 533
$n_g - n_F$	0.003 729
$n_h - n_g$	0.003 076
$n_i - n_g$	0.008 275
$n_{C'} - n_t$	0.005 985
$n_e - n_{C'}$	0.003 422
$n_{F'} - n_e$	0.003 546
$n_i - n_{F'}$	0.011 612

Relative Partial Dispersions	
$\theta_{C,t}$	0.817 5
$\theta_{C,A'}$	0.348 1
$\theta_{d,C}$	0.304 9
$\theta_{e,C}$	0.543 6
$\theta_{g,d}$	1.234 7
$\theta_{g,F}$	0.539 6
$\theta_{h,g}$	0.445 1
$\theta_{i,g}$	1.197 4
$\theta'_{C,t}$	0.858 9
$\theta'_{e,C'}$	0.491 1
$\theta'_{F,e}$	0.508 9
$\theta'_{i,F'}$	1.666 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.087 9
$\Delta\theta_{C,A'}$	-0.020 5
$\Delta\theta_{g,d}$	0.028 8
$\Delta\theta_{g,F}$	0.021 8
$\Delta\theta_{i,g}$	0.112 6

Coloring			
λ_{80}	340	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	283
CCI			
B	G	R	
0.00	0.14	0.11	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.09
300	0.20
310	0.37
320	0.58
330	0.75
340	0.86
350	0.934
360	0.968
370	0.984
380	0.992
390	0.995
400	0.996
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.997
800	0.997
900	0.997
1 000	0.997
1 200	0.998
1 400	0.999
1 600	0.998
1 800	0.998
2 000	0.998
2 200	0.996
2 400	0.995

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	487
Yield Point At (°C)	515
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	125
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	148
Thermal Conductivity λ (W/(mK))	0.746

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	104
-90 ~ -80	106
-80 ~ -70	108
-70 ~ -60	110
-60 ~ -50	112
-50 ~ -40	114
-40 ~ -30	116
-30 ~ -20	117
-20 ~ -10	119
-10 ~ 0	121
0 ~ 10	122
10 ~ 20	124
20 ~ 30	126
30 ~ 40	127
40 ~ 50	129
50 ~ 60	130
60 ~ 70	132
70 ~ 80	133
80 ~ 90	135
90 ~ 100	136
100 ~ 110	137
110 ~ 120	139
120 ~ 130	140
130 ~ 140	141
140 ~ 150	142
150 ~ 160	144
160 ~ 170	145
170 ~ 180	146
180 ~ 190	147
190 ~ 200	148
200 ~ 210	149
210 ~ 220	150
220 ~ 230	151
230 ~ 240	152
240 ~ 250	153
250 ~ 260	154
260 ~ 270	154
270 ~ 280	155
280 ~ 290	156
290 ~ 300	157

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	-5.1	-5.1	-4.9	-4.8	-4.8	-4.8	-4.7	-4.6	-4.6	-4.5	-4.3	-4.1	
-60 ~ -40	-5.5	-5.4	-5.3	-5.2	-5.2	-5.1	-5.1	-5.0	-4.9	-4.8	-4.7	-4.3	
-40 ~ -20	-5.8	-5.7	-5.5	-5.5	-5.5	-5.4	-5.3	-5.2	-5.2	-5.1	-4.9	-4.6	
-20 ~ 0	-5.9	-5.9	-5.7	-5.6	-5.6	-5.6	-5.5	-5.4	-5.3	-5.2	-5.0	-4.8	
0 ~ 20	-6.0	-6.0	-5.9	-5.8	-5.8	-5.7	-5.7	-5.5	-5.5	-5.2	-5.1	-4.8	
20 ~ 40	-6.2	-6.1	-6.0	-5.9	-5.9	-5.8	-5.8	-5.5	-5.5	-5.3	-5.2	-4.9	
40 ~ 60	-6.2	-6.1	-6.0	-5.9	-5.9	-5.8	-5.8	-5.6	-5.6	-5.4	-5.2	-4.9	
60 ~ 80	-6.3	-6.2	-6.1	-6.0	-6.0	-5.9	-5.8	-5.7	-5.6	-5.4	-5.2	-4.8	
80 ~ 100	-6.3	-6.3	-6.1	-6.1	-6.0	-6.0	-5.9	-5.7	-5.7	-5.4	-5.2	-4.8	
100 ~ 120	-6.4	-6.3	-6.1	-6.1	-6.1	-6.0	-5.9	-5.7	-5.7	-5.5	-5.2	-4.8	
120 ~ 140	-6.4	-6.4	-6.1	-6.1	-6.1	-5.9	-5.9	-5.6	-5.6	-5.4	-5.2	-4.8	
140 ~ 160	-6.4	-6.3	-6.1	-6.1	-6.1	-6.0	-5.8	-5.6	-5.6	-5.4	-5.2	-4.8	
160 ~ 180	-6.5	-6.4	-6.2	-6.1	-6.1	-6.0	-5.9	-5.7	-5.6	-5.4	-5.2	-4.8	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.72
Specific Gravity d	3.76
Remarks	

OHARA 25-04

S-FPM 5

Code(d) 552708
Code(e) 554703

Refractive Index n_d	1.552 00 1.552 000	Abbe Number v_d	70.70	Dispersion $n_F - n_C$	0.007 808
Refractive Index n_e	1.553 863	Abbe Number v_e	70.33	Dispersion $n_{F'} - n_{C'}$	0.007 875

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.530 66
n_{1970}	1.970 09	1.534 41
n_{1530}	1.529 58	1.538 45
n_{1129}	1.128 64	1.542 08
n_t	1.013 98	1.543 30
n_s	0.852 11	1.545 45
$n_{A'}$	0.768 19	1.546 92
n_r	0.706 52	1.548 28
n_C	0.656 27	1.549 63
$n_{C'}$	0.643 85	1.550 00
$n_{\text{He-Ne}}$	0.632 8	1.550 36
n_D	0.589 29	1.551 93
n_d	0.587 56	1.552 00
n_e	0.546 07	1.553 86
n_F	0.486 13	1.557 43
$n_{F'}$	0.479 99	1.557 88
$n_{\text{He-Cd}}$	0.441 57	1.561 11
n_g	0.435 835	1.561 67
n_h	0.404 656	1.565 17
n_i	0.365 015	1.571 11

Constants of Dispersion Formula	
A_1	8.398 997 64E-01
A_2	5.377 213 12E-01
A_3	9.532 477 59E-01
B_1	3.764 482 95E-03
B_2	1.480 226 22E-02
B_3	1.456 755 50E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	52.1
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	76.9
Rigidity Modulus G (GPa)	29.7
Poisson's Ratio σ	0.296
Knoop Hardness Hk[Class]	390 4
Abrasion Aa	413

Partial Dispersions	
$n_C - n_t$	0.006 321
$n_C - n_{A'}$	0.002 702
$n_d - n_C$	0.002 375
$n_e - n_C$	0.004 238
$n_g - n_d$	0.009 666
$n_g - n_F$	0.004 233
$n_h - n_g$	0.003 502
$n_i - n_g$	0.009 440
$n_{C'} - n_t$	0.006 699
$n_e - n_{C'}$	0.003 860
$n_{F'} - n_e$	0.004 015
$n_i - n_{F'}$	0.013 228

Relative Partial Dispersions	
$\theta_{C,t}$	0.809 6
$\theta_{C,A'}$	0.346 1
$\theta_{d,C}$	0.304 2
$\theta_{e,C}$	0.542 8
$\theta_{g,d}$	1.238 0
$\theta_{g,F}$	0.542 1
$\theta_{h,g}$	0.448 5
$\theta_{i,g}$	1.209 0
$\theta'_{C,t}$	0.850 7
$\theta'_{e,C'}$	0.490 2
$\theta'_{F,e}$	0.509 8
$\theta'_{i,F'}$	1.679 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.068 8
$\Delta\theta_{C,A'}$	-0.015 5
$\Delta\theta_{g,d}$	0.020 1
$\Delta\theta_{g,F}$	0.015 0
$\Delta\theta_{i,g}$	0.076 0

Coloring			
λ_{80}	345	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	282
CCI			
B	G	R	
0.00	0.14	0.12	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.04
290	0.10
300	0.20
310	0.35
320	0.56
330	0.73
340	0.86
350	0.929
360	0.967
370	0.984
380	0.992
390	0.995
400	0.996
420	0.995
440	0.995
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.999
1 600	0.998
1 800	0.998
2 000	0.997
2 200	0.994
2 400	0.993

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	474
Yield Point At (°C)	501
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	111
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	132
Thermal Conductivity λ (W/(mK))	0.765

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	91
-90 ~ -80	93
-80 ~ -70	94
-70 ~ -60	96
-60 ~ -50	98
-50 ~ -40	100
-40 ~ -30	102
-30 ~ -20	103
-20 ~ -10	105
-10 ~ 0	107
0 ~ 10	108
10 ~ 20	110
20 ~ 30	111
30 ~ 40	113
40 ~ 50	114
50 ~ 60	116
60 ~ 70	117
70 ~ 80	118
80 ~ 90	120
90 ~ 100	121
100 ~ 110	122
110 ~ 120	124
120 ~ 130	125
130 ~ 140	126
140 ~ 150	127
150 ~ 160	128
160 ~ 170	129
170 ~ 180	130
180 ~ 190	131
190 ~ 200	132
200 ~ 210	133
210 ~ 220	134
220 ~ 230	135
230 ~ 240	136
240 ~ 250	136
250 ~ 260	137
260 ~ 270	138
270 ~ 280	139
280 ~ 290	139
290 ~ 300	140

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	-2.6	-2.6	-2.5	-2.4	-2.4	-2.3	-2.3	-2.0	-2.0	-1.8	-1.6	-1.2
-60 ~ -40	-3.0	-2.8	-2.7	-2.6	-2.6	-2.6	-2.5	-2.3	-2.3	-2.0	-1.8	-1.4
-40 ~ -20	-3.0	-3.0	-2.9	-2.8	-2.8	-2.7	-2.6	-2.4	-2.4	-2.2	-1.9	-1.5
-20 ~ 0	-3.2	-3.1	-3.0	-2.9	-2.9	-2.8	-2.7	-2.5	-2.5	-2.3	-2.1	-1.5
0 ~ 20	-3.3	-3.2	-3.1	-2.9	-3.0	-2.8	-2.7	-2.5	-2.5	-2.3	-2.0	-1.6
20 ~ 40	-3.3	-3.3	-3.1	-3.0	-2.9	-2.8	-2.8	-2.6	-2.5	-2.3	-2.0	-1.6
40 ~ 60	-3.3	-3.2	-3.1	-3.0	-3.0	-2.9	-2.8	-2.6	-2.6	-2.3	-2.1	-1.5
60 ~ 80	-3.4	-3.3	-3.1	-3.0	-3.1	-2.9	-2.8	-2.6	-2.5	-2.3	-2.0	-1.5
80 ~ 100	-3.4	-3.3	-3.2	-3.1	-3.1	-3.0	-2.8	-2.6	-2.5	-2.3	-2.0	-1.4
100 ~ 120	-3.5	-3.4	-3.2	-3.1	-3.1	-3.0	-2.8	-2.6	-2.5	-2.3	-2.0	-1.4
120 ~ 140	-3.5	-3.3	-3.1	-3.1	-3.0	-2.9	-2.8	-2.6	-2.6	-2.3	-2.0	-1.4
140 ~ 160	-3.5	-3.4	-3.2	-3.2	-3.1	-3.0	-2.9	-2.7	-2.6	-2.3	-2.0	-1.4
160 ~ 180	-3.6	-3.5	-3.3	-3.3	-3.2	-3.1	-3.0	-2.8	-2.7	-2.4	-2.1	-1.4

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.29
Specific Gravity d	3.74
Remarks	

OHARA 25-04

S-FSL 5

Code(d) 487702
Code(e) 489701

Refractive Index n_d	1.487 49 1.487 490	Abbe Number v_d	70.23	Dispersion $n_F - n_C$	0.006 941
Refractive Index n_e	1.489 147	Abbe Number v_e	70.04	Dispersion $n_{F'} - n_{C'}$	0.006 984

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.462 27
n_{1970}	1.970 09	1.467 65
n_{1530}	1.529 58	1.473 24
n_{1129}	1.128 64	1.477 78
n_t	1.013 98	1.479 15
n_s	0.852 11	1.481 38
$n_{A'}$	0.768 19	1.482 82
n_r	0.706 52	1.484 10
n_C	0.656 27	1.485 34
$n_{C'}$	0.643 85	1.485 69
$n_{\text{He-Ne}}$	0.632 8	1.486 01
n_D	0.589 29	1.487 43
n_d	0.587 56	1.487 49
n_e	0.546 07	1.489 15
n_F	0.486 13	1.492 28
$n_{F'}$	0.479 99	1.492 67
$n_{\text{He-Cd}}$	0.441 57	1.495 48
n_g	0.435 835	1.495 96
n_h	0.404 656	1.498 98
n_i	0.365 015	1.504 06

Constants of Dispersion Formula	
A_1	1.174 470 43E+00
A_2	1.400 561 54E-02
A_3	1.192 724 35E+00
B_1	8.418 551 81E-03
B_2	-5.817 907 67E-02
B_3	1.295 997 26E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	3
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	3.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	62.3
Rigidity Modulus G (GPa)	25.4
Poisson's Ratio σ	0.227
Knoop Hardness Hk[Class]	520 5
Abrasion Aa	117

Partial Dispersions	
$n_C - n_t$	0.006 194
$n_C - n_{A'}$	0.002 522
$n_d - n_C$	0.002 146
$n_e - n_C$	0.003 803
$n_g - n_d$	0.008 474
$n_g - n_F$	0.003 679
$n_h - n_g$	0.003 019
$n_i - n_g$	0.008 099
$n_{C'} - n_t$	0.006 539
$n_e - n_{C'}$	0.003 458
$n_{F'} - n_e$	0.003 526
$n_i - n_{F'}$	0.011 390

Relative Partial Dispersions	
$\theta_{C,t}$	0.892 4
$\theta_{C,A'}$	0.363 3
$\theta_{d,C}$	0.309 2
$\theta_{e,C}$	0.547 9
$\theta_{g,d}$	1.220 9
$\theta_{g,F}$	0.530 0
$\theta_{h,g}$	0.435 0
$\theta_{i,g}$	1.166 8
$\theta'_{C,t}$	0.936 3
$\theta'_{e,C'}$	0.495 1
$\theta'_{F,e}$	0.504 9
$\theta'_{i,F'}$	1.630 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.016 2
$\Delta\theta_{C,A'}$	0.002 3
$\Delta\theta_{g,d}$	0.002 0
$\Delta\theta_{g,F}$	0.002 2
$\Delta\theta_{i,g}$	0.029 9

Coloring			
λ_{80}	300	λ_5	265
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	304	$\lambda_{0.05}$	277
CCI			
B	G	R	
0.00	0.00	0.00	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.13
290	0.43
300	0.73
310	0.89
320	0.961
330	0.984
340	0.992
350	0.995
360	0.995
370	0.998
380	0.998
390	0.999
400	0.999
420	0.999
440	0.999
460	0.999
480	0.999
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.998
1 200	0.998
1 400	0.982
1 600	0.992
1 800	0.985
2 000	0.971
2 200	0.88
2 400	0.87

Thermal Properties	
Strain Point StP (°C)	457
Annealing Point AP (°C)	491
Transformation Temperature Tg (°C)	497
Yield Point At (°C)	592
Softening Point SP (°C)	679
Expansion Coefficients (-30 °C ~ 70 °C)	90
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(m·K))	1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	81
-90 ~ -80	82
-80 ~ -70	82
-70 ~ -60	83
-60 ~ -50	84
-50 ~ -40	85
-40 ~ -30	86
-30 ~ -20	87
-20 ~ -10	87
-10 ~ 0	88
0 ~ 10	89
10 ~ 20	90
20 ~ 30	90
30 ~ 40	91
40 ~ 50	92
50 ~ 60	92
60 ~ 70	93
70 ~ 80	93
80 ~ 90	94
90 ~ 100	94
100 ~ 110	95
110 ~ 120	95
120 ~ 130	96
130 ~ 140	96
140 ~ 150	96
150 ~ 160	97
160 ~ 170	97
170 ~ 180	97
180 ~ 190	98
190 ~ 200	98
200 ~ 210	98
210 ~ 220	98
220 ~ 230	98
230 ~ 240	99
240 ~ 250	99
250 ~ 260	99
260 ~ 270	99
270 ~ 280	99
280 ~ 290	99
290 ~ 300	99

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.87
Specific Gravity d	2.46
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	-2.2	-2.1	-2.0	-1.9	-1.9	-1.8	-1.8	-1.6	-1.6	-1.4	-1.2	-0.9	
-60 ~ -40	-2.2	-2.1	-2.0	-1.9	-1.9	-1.8	-1.8	-1.6	-1.6	-1.5	-1.2	-0.9	
-40 ~ -20	-2.0	-2.0	-1.9	-1.9	-1.8	-1.8	-1.7	-1.6	-1.6	-1.3	-1.1	-0.8	
-20 ~ 0	-1.9	-1.9	-1.8	-1.7	-1.7	-1.6	-1.6	-1.4	-1.4	-1.1	-1.0	-0.6	
0 ~ 20	-1.7	-1.7	-1.5	-1.5	-1.5	-1.4	-1.4	-1.2	-1.2	-1.0	-0.9	-0.5	
20 ~ 40	-1.5	-1.5	-1.4	-1.3	-1.3	-1.2	-1.2	-1.0	-1.0	-0.9	-0.7	-0.3	
40 ~ 60	-1.4	-1.3	-1.2	-1.2	-1.2	-1.0	-1.0	-0.8	-0.8	-0.6	-0.4	-0.1	
60 ~ 80	-1.2	-1.1	-1.0	-1.0	-0.9	-0.9	-0.8	-0.7	-0.7	-0.5	-0.3	0.1	
80 ~ 100	-1.0	-0.9	-0.8	-0.8	-0.7	-0.7	-0.6	-0.5	-0.5	-0.3	-0.1	0.2	
100 ~ 120	-0.8	-0.8	-0.6	-0.6	-0.6	-0.5	-0.5	-0.3	-0.3	-0.1	0.0	0.3	
120 ~ 140	-0.7	-0.6	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.2	0.0	0.1	0.6	
140 ~ 160	-0.6	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	0.0	0.0	0.2	0.3	0.6	
160 ~ 180	-0.4	-0.4	-0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.1	0.2	0.4	0.7	

Refractive Index n_d	1.592 70 1.592 701	Abbe Number v_d	35.31	Dispersion $n_F - n_C$	0.016 785
Refractive Index n_e	1.596 670	Abbe Number v_e	35.03	Dispersion $n_{F'} - n_{C'}$	0.017 031

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.556 03
n_{1970}	1.970 09	1.561 54
n_{1530}	1.529 58	1.567 67
n_{1129}	1.128 64	1.573 57
n_t	1.013 98	1.575 69
n_s	0.852 11	1.579 62
$n_{A'}$	0.768 19	1.582 43
n_r	0.706 52	1.585 08
n_C	0.656 27	1.587 79
$n_{C'}$	0.643 85	1.588 56
$n_{\text{He-Ne}}$	0.632 8	1.589 29
n_D	0.589 29	1.592 55
n_d	0.587 56	1.592 70
n_e	0.546 07	1.596 67
n_F	0.486 13	1.604 58
$n_{F'}$	0.479 99	1.605 59
$n_{\text{He-Cd}}$	0.441 57	1.613 18
n_g	0.435 835	1.614 54
n_h	0.404 656	1.623 34
n_i	0.365 015	1.639 74

Constants of Dispersion Formula	
A_1	1.329 409 07E+00
A_2	1.415 121 25E-01
A_3	1.442 990 68E+00
B_1	1.023 772 87E-02
B_2	5.780 819 56E-02
B_3	1.505 971 39E+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	2.0

Mechanical Properties	
Young's Modulus E (GPa)	65.3
Rigidity Modulus G (GPa)	26.4
Poisson's Ratio σ	0.238
Knoop Hardness Hk[Class]	450 5
Abrasion Aa	181

Partial Dispersions	
$n_C - n_t$	0.012 104
$n_C - n_{A'}$	0.005 365
$n_d - n_C$	0.004 906
$n_e - n_C$	0.008 875
$n_g - n_d$	0.021 838
$n_g - n_F$	0.009 959
$n_h - n_g$	0.008 800
$n_i - n_g$	0.025 202
$n_C - n_t$	0.012 872
$n_e - n_{C'}$	0.008 107
$n_{F'} - n_e$	0.008 924
$n_i - n_{F'}$	0.034 147

Relative Partial Dispersions	
$\theta_{C,t}$	0.721 1
$\theta_{C,A'}$	0.319 6
$\theta_{d,C}$	0.292 3
$\theta_{e,C}$	0.528 7
$\theta_{g,d}$	1.301 0
$\theta_{g,F}$	0.593 3
$\theta_{h,g}$	0.524 3
$\theta_{i,g}$	1.501 5
$\theta'_{C,t}$	0.755 8
$\theta'_{e,C'}$	0.476 0
$\theta'_{F',e}$	0.524 0
$\theta'_{i,F'}$	2.005 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 8
$\Delta\theta_{C,A'}$	0.001 0
$\Delta\theta_{g,d}$	0.009 6
$\Delta\theta_{g,F}$	0.009 0
$\Delta\theta_{i,g}$	0.072 1

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	370	$\lambda_{0.05}$	350
CCI			
B	G	R	
0.00	0.43	0.42	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.04
360	0.43
370	0.81
380	0.934
390	0.973
400	0.984
420	0.989
440	0.990
460	0.991
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.996
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.994
1 800	0.989
2 000	0.987
2 200	0.959
2 400	0.953

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	502
Yield Point At (°C)	559
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	90
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	102
Thermal Conductivity λ (W/(mK))	0.947

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	79
-90 ~ -80	80
-80 ~ -70	81
-70 ~ -60	82
-60 ~ -50	83
-50 ~ -40	84
-40 ~ -30	85
-30 ~ -20	86
-20 ~ -10	86
-10 ~ 0	87
0 ~ 10	88
10 ~ 20	89
20 ~ 30	90
30 ~ 40	91
40 ~ 50	91
50 ~ 60	92
60 ~ 70	93
70 ~ 80	94
80 ~ 90	94
90 ~ 100	95
100 ~ 110	96
110 ~ 120	97
120 ~ 130	97
130 ~ 140	98
140 ~ 150	99
150 ~ 160	99
160 ~ 170	100
170 ~ 180	100
180 ~ 190	101
190 ~ 200	102
200 ~ 210	102
210 ~ 220	103
220 ~ 230	103
230 ~ 240	104
240 ~ 250	104
250 ~ 260	105
260 ~ 270	105
270 ~ 280	106
280 ~ 290	106
290 ~ 300	106

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	3.33
Specific Gravity d	2.64
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	-1.5	-1.3	-0.9	-0.8	-0.8	-0.6	-0.4	0.1	0.3	0.9	1.7	3.7
-60 ~ -40	-1.5	-1.4	-1.0	-0.8	-0.8	-0.6	-0.4	0.1	0.2	0.9	1.8	3.8
-40 ~ -20	-1.5	-1.4	-1.0	-0.9	-0.7	-0.5	-0.3	0.3	0.3	1.1	1.9	4.1
-20 ~ 0	-1.5	-1.3	-0.9	-0.8	-0.7	-0.5	-0.1	0.4	0.5	1.3	2.2	4.5
0 ~ 20	-1.4	-1.1	-0.7	-0.6	-0.5	-0.3	0.0	0.6	0.7	1.5	2.5	4.8
20 ~ 40	-1.2	-1.0	-0.6	-0.4	-0.4	-0.1	0.1	0.8	0.9	1.7	2.7	5.2
40 ~ 60	-1.1	-0.9	-0.5	-0.3	-0.3	0.0	0.3	1.0	1.0	2.0	3.1	5.6
60 ~ 80	-1.0	-0.8	-0.3	-0.1	-0.1	0.2	0.5	1.2	1.3	2.2	3.3	5.9
80 ~ 100	-1.0	-0.8	-0.2	0.0	0.1	0.4	0.7	1.4	1.5	2.5	3.6	6.3
100 ~ 120	-0.9	-0.6	0.0	0.1	0.2	0.5	0.8	1.6	1.7	2.7	3.9	6.7
120 ~ 140	-0.8	-0.5	0.0	0.2	0.3	0.6	0.9	1.7	1.8	2.9	4.1	7.0
140 ~ 160	-0.7	-0.5	0.1	0.3	0.3	0.7	1.0	1.8	1.9	3.0	4.3	7.4
160 ~ 180	-0.8	-0.5	0.1	0.4	0.5	0.8	1.2	2.0	2.1	3.2	4.5	7.7

S-LAH51

Code(d) 786442
Code(e) 790439

Refractive Index n_d	1.785 90 1.785 896	Abbe Number v_d	44.20	Dispersion $n_F - n_C$	0.017 780
Refractive Index n_e	1.790 123	Abbe Number v_e	43.95	Dispersion $n_{F'} - n_{C'}$	0.017 979

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.742 65
n_{1970}	1.970 09	1.749 72
n_{1530}	1.529 58	1.757 40
n_{1129}	1.128 64	1.764 52
n_t	1.013 98	1.767 00
n_s	0.852 11	1.771 50
$n_{A'}$	0.768 19	1.774 66
n_r	0.706 52	1.777 61
n_C	0.656 27	1.780 58
$n_{C'}$	0.643 85	1.781 42
$n_{\text{He-Ne}}$	0.632 8	1.782 21
n_D	0.589 29	1.785 74
n_d	0.587 56	1.785 90
n_e	0.546 07	1.790 12
n_F	0.486 13	1.798 36
$n_{F'}$	0.479 99	1.799 40
$n_{\text{He-Cd}}$	0.441 57	1.807 04
n_g	0.435 835	1.808 38
n_h	0.404 656	1.816 87
n_i	0.365 015	1.831 75

Constants of Dispersion Formula	
A_1	1.825 869 91E+00
A_2	2.830 233 49E-01
A_3	1.359 643 19E+00
B_1	9.352 971 52E-03
B_2	3.738 030 57E-02
B_3	1.006 557 98E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	112.9
Rigidity Modulus G (GPa)	43.5
Poisson's Ratio σ	0.297
Knoop Hardness Hk[Class]	650 7
Abrasion Aa	80

Partial Dispersions	
$n_C - n_t$	0.013 580
$n_C - n_{A'}$	0.005 923
$n_d - n_C$	0.005 312
$n_e - n_C$	0.009 539
$n_g - n_d$	0.022 480
$n_g - n_F$	0.010 012
$n_h - n_g$	0.008 492
$n_i - n_g$	0.023 375
$n_C - n_t$	0.014 419
$n_e - n_{C'}$	0.008 700
$n_{F'} - n_e$	0.009 279
$n_i - n_{F'}$	0.032 349

Relative Partial Dispersions	
$\theta_{C,t}$	0.763 8
$\theta_{C,A'}$	0.333 1
$\theta_{d,C}$	0.298 8
$\theta_{e,C}$	0.536 5
$\theta_{g,d}$	1.264 3
$\theta_{g,F}$	0.563 1
$\theta_{h,g}$	0.477 6
$\theta_{i,g}$	1.314 7
$\theta'_{C,t}$	0.802 0
$\theta'_{e,C'}$	0.483 9
$\theta'_{F,e}$	0.516 1
$\theta'_{i,F'}$	1.799 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.009 7
$\Delta\theta_{C,A'}$	0.003 7
$\Delta\theta_{g,d}$	-0.008 6
$\Delta\theta_{g,F}$	-0.006 9
$\Delta\theta_{i,g}$	-0.040 2

Coloring			
λ_{80}	390	λ_5	335
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	333
CCI			
B	G	R	
0.00	0.83	0.82	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.01
340	0.17
350	0.51
360	0.73
370	0.84
380	0.910
390	0.942
400	0.961
420	0.977
440	0.984
460	0.989
480	0.993
500	0.995
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.997
1 000	0.996
1 200	0.996
1 400	0.991
1 600	0.989
1 800	0.981
2 000	0.957
2 200	0.89
2 400	0.68

Thermal Properties	
Strain Point StP (°C)	568
Annealing Point AP (°C)	598
Transformation Temperature Tg (°C)	614
Yield Point At (°C)	649
Softening Point SP (°C)	677
Expansion Coefficients (-30 °C ~ 70 °C)	59
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(mK))	0.826

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	47
-90 ~ -80	48
-80 ~ -70	49
-70 ~ -60	50
-60 ~ -50	51
-50 ~ -40	53
-40 ~ -30	54
-30 ~ -20	55
-20 ~ -10	56
-10 ~ 0	57
0 ~ 10	58
10 ~ 20	59
20 ~ 30	60
30 ~ 40	61
40 ~ 50	62
50 ~ 60	63
60 ~ 70	64
70 ~ 80	65
80 ~ 90	65
90 ~ 100	66
100 ~ 110	67
110 ~ 120	68
120 ~ 130	69
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	72
170 ~ 180	72
180 ~ 190	73
190 ~ 200	73
200 ~ 210	74
210 ~ 220	75
220 ~ 230	75
230 ~ 240	76
240 ~ 250	76
250 ~ 260	77
260 ~ 270	77
270 ~ 280	78
280 ~ 290	78
290 ~ 300	78

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.88
Specific Gravity d	4.40
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	3.7	3.9	4.4	4.5	4.7	4.9	5.1	5.6	5.7	6.4	6.9	8.2
-60 ~ -40	3.7	4.0	4.4	4.7	4.7	4.9	5.2	5.7	5.7	6.4	7.0	8.2
-40 ~ -20	3.8	4.1	4.6	4.7	4.8	5.0	5.3	5.9	5.9	6.6	7.2	8.5
-20 ~ 0	4.0	4.2	4.8	4.9	5.0	5.3	5.5	6.0	6.1	6.7	7.3	8.7
0 ~ 20	4.1	4.4	4.9	5.1	5.1	5.4	5.7	6.2	6.3	6.9	7.6	8.9
20 ~ 40	4.3	4.5	5.0	5.2	5.3	5.6	5.9	6.4	6.5	7.1	7.8	9.1
40 ~ 60	4.4	4.7	5.3	5.5	5.5	5.8	6.0	6.6	6.7	7.3	8.0	9.3
60 ~ 80	4.6	4.8	5.4	5.5	5.6	5.9	6.1	6.7	6.8	7.5	8.2	9.5
80 ~ 100	4.7	4.9	5.5	5.6	5.7	6.0	6.3	6.8	6.9	7.6	8.3	9.6
100 ~ 120	4.6	5.0	5.5	5.7	5.8	6.1	6.3	6.9	7.0	7.7	8.4	9.8
120 ~ 140	4.7	5.0	5.6	5.7	5.8	6.1	6.4	7.0	7.0	7.7	8.5	9.8
140 ~ 160	4.6	4.9	5.5	5.7	5.7	6.0	6.3	6.9	7.0	7.7	8.4	9.9
160 ~ 180	4.5	4.8	5.4	5.6	5.6	5.9	6.2	6.8	6.9	7.7	8.5	9.9

OHARA 25-04

S-LAH52

Code(d) **800422**
Code(e) **804420**

Refractive Index n_d	1.799 52 1.799 516	Abbe Number v_d	42.22	Dispersion $n_F - n_C$	0.018 935
Refractive Index n_e	1.804 015	Abbe Number v_e	41.97	Dispersion $n_{F'} - n_{C'}$	0.019 157

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.754 95
n_{1970}	1.970 09	1.762 02
n_{1530}	1.529 58	1.769 76
n_{1129}	1.128 64	1.777 03
n_t	1.013 98	1.779 61
n_s	0.852 11	1.784 30
$n_{A'}$	0.768 19	1.787 62
n_r	0.706 52	1.790 73
n_C	0.656 27	1.793 88
$n_{C'}$	0.643 85	1.794 77
$n_{\text{He-Ne}}$	0.632 8	1.795 60
n_D	0.589 29	1.799 35
n_d	0.587 56	1.799 52
n_e	0.546 07	1.804 01
n_F	0.486 13	1.812 81
$n_{F'}$	0.479 99	1.813 93
$n_{\text{He-Cd}}$	0.441 57	1.822 11
n_g	0.435 835	1.823 55
n_h	0.404 656	1.832 71
n_i	0.365 015	1.848 85

Constants of Dispersion Formula	
A_1	1.853 909 25E+00
A_2	2.979 255 55E-01
A_3	1.393 820 86E+00
B_1	9.553 206 87E-03
B_2	3.938 168 50E-02
B_3	1.027 068 48E+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	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	111.9
Rigidity Modulus G (GPa)	43.1
Poisson's Ratio σ	0.297
Knoop Hardness Hk[Class]	650 7
Abrasion Aa	85

Partial Dispersions	
$n_C - n_t$	0.014 274
$n_C - n_{A'}$	0.006 258
$n_d - n_C$	0.005 637
$n_e - n_C$	0.010 136
$n_g - n_d$	0.024 038
$n_g - n_F$	0.010 740
$n_h - n_g$	0.009 152
$n_i - n_g$	0.025 292
$n_C - n_t$	0.015 163
$n_e - n_{C'}$	0.009 247
$n_{F'} - n_e$	0.009 910
$n_i - n_{F'}$	0.034 921

Relative Partial Dispersions	
$\theta_{C,t}$	0.753 8
$\theta_{C,A'}$	0.330 5
$\theta_{d,C}$	0.297 7
$\theta_{e,C}$	0.535 3
$\theta_{g,d}$	1.269 5
$\theta_{g,F}$	0.567 2
$\theta_{h,g}$	0.483 3
$\theta_{i,g}$	1.335 7
$\theta'_{C,t}$	0.791 5
$\theta'_{e,C'}$	0.482 7
$\theta'_{F,e}$	0.517 3
$\theta'_{i,F'}$	1.822 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.009 0
$\Delta\theta_{C,A'}$	0.003 5
$\Delta\theta_{g,d}$	-0.007 5
$\Delta\theta_{g,F}$	-0.006 0
$\Delta\theta_{i,g}$	-0.035 8

Coloring			
λ_{80}	395	λ_5	330
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	331
CCI			
B	G	R	
0.00	1.03	1.10	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.02
340	0.23
350	0.52
360	0.72
370	0.83
380	0.89
390	0.931
400	0.951
420	0.971
440	0.979
460	0.985
480	0.990
500	0.993
550	0.997
600	0.997
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.997
1 400	0.994
1 600	0.993
1 800	0.986
2 000	0.965
2 200	0.910
2 400	0.71

Thermal Properties	
Strain Point StP (°C)	565
Annealing Point AP (°C)	596
Transformation Temperature Tg (°C)	612
Yield Point At (°C)	648
Softening Point SP (°C)	679
Expansion Coefficients (-30 °C ~ 70 °C)	60
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	74
Thermal Conductivity λ (W/(mK))	0.828

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	48
-90 ~ -80	49
-80 ~ -70	50
-70 ~ -60	51
-60 ~ -50	52
-50 ~ -40	53
-40 ~ -30	54
-30 ~ -20	55
-20 ~ -10	57
-10 ~ 0	58
0 ~ 10	59
10 ~ 20	60
20 ~ 30	61
30 ~ 40	62
40 ~ 50	62
50 ~ 60	63
60 ~ 70	64
70 ~ 80	65
80 ~ 90	66
90 ~ 100	67
100 ~ 110	68
110 ~ 120	68
120 ~ 130	69
130 ~ 140	70
140 ~ 150	71
150 ~ 160	71
160 ~ 170	72
170 ~ 180	73
180 ~ 190	73
190 ~ 200	74
200 ~ 210	75
210 ~ 220	75
220 ~ 230	76
230 ~ 240	77
240 ~ 250	77
250 ~ 260	78
260 ~ 270	78
270 ~ 280	79
280 ~ 290	79
290 ~ 300	79

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.92
Specific Gravity d	4.41
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	4.2	4.4	4.9	5.1	5.1	5.4	5.6	6.2	6.3	6.9	7.5	8.9	
-60 ~ -40	4.0	4.3	4.8	5.0	5.0	5.3	5.5	6.1	6.1	6.9	7.5	9.0	
-40 ~ -20	4.1	4.3	4.8	5.0	5.0	5.3	5.6	6.2	6.3	6.9	7.6	9.1	
-20 ~ 0	4.1	4.3	4.9	5.1	5.2	5.4	5.7	6.3	6.4	7.1	7.9	9.3	
0 ~ 20	4.2	4.5	5.1	5.2	5.3	5.6	5.9	6.5	6.5	7.4	8.1	9.6	
20 ~ 40	4.3	4.6	5.3	5.4	5.5	5.8	6.1	6.7	6.8	7.5	8.3	10.0	
40 ~ 60	4.5	4.9	5.4	5.6	5.7	6.0	6.3	6.9	7.0	7.8	8.6	10.3	
60 ~ 80	4.7	5.0	5.6	5.7	5.8	6.1	6.4	7.1	7.3	8.0	8.9	10.6	
80 ~ 100	4.8	5.2	5.8	6.0	6.0	6.4	6.7	7.4	7.5	8.3	9.1	11.0	
100 ~ 120	5.0	5.3	6.0	6.2	6.2	6.6	6.9	7.6	7.7	8.5	9.4	11.2	
120 ~ 140	5.1	5.5	6.1	6.3	6.4	6.7	7.1	7.8	7.9	8.8	9.7	11.5	
140 ~ 160	5.2	5.6	6.2	6.5	6.5	6.9	7.2	8.0	8.1	9.0	9.9	11.9	
160 ~ 180	5.3	5.7	6.3	6.6	6.6	7.0	7.4	8.1	8.3	9.3	10.2	12.1	

S-LAH52Q

Code(d) **800422**
Code(e) **804420**

Refractive Index n_d	1.799 52 1.799 520	Abbe Number v_d	42.24	Dispersion $n_F - n_C$	0.018 928
Refractive Index n_e	1.804 018	Abbe Number v_e	41.98	Dispersion $n_{F'} - n_{C'}$	0.019 154

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.757 08
n_{1970}	1.970 09	1.763 45
n_{1530}	1.529 58	1.770 50
n_{1129}	1.128 64	1.777 32
n_t	1.013 98	1.779 80
n_s	0.852 11	1.784 38
$n_{A'}$	0.768 19	1.787 67
n_r	0.706 52	1.790 76
n_C	0.656 27	1.793 89
$n_{C'}$	0.643 85	1.794 78
$n_{\text{He-Ne}}$	0.632 8	1.795 61
n_D	0.589 29	1.799 35
n_d	0.587 56	1.799 52
n_e	0.546 07	1.804 02
n_F	0.486 13	1.812 82
$n_{F'}$	0.479 99	1.813 93
$n_{\text{He-Cd}}$	0.441 57	1.822 12
n_g	0.435 835	1.823 56
n_h	0.404 656	1.832 71
n_i	0.365 015	1.848 83

Constants of Dispersion Formula	
A_1	1.910 823 18E+00
A_2	2.398 545 89E-01
A_3	1.161 597 33E+00
B_1	1.035 653 52E-02
B_2	4.138 050 81E-02
B_3	9.660 373 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	109.8
Rigidity Modulus G (GPa)	41.8
Poisson's Ratio σ	0.313
Knoop Hardness Hk[Class]	620 6
Abrasion Aa	66

Partial Dispersions	
$n_C - n_t$	0.014 094
$n_C - n_{A'}$	0.006 224
$n_d - n_C$	0.005 627
$n_e - n_C$	0.010 125
$n_g - n_d$	0.024 043
$n_g - n_F$	0.010 742
$n_h - n_g$	0.009 149
$n_i - n_g$	0.025 268
$n_C - n_t$	0.014 980
$n_e - n_{C'}$	0.009 239
$n_{F'} - n_e$	0.009 915
$n_i - n_{F'}$	0.034 898

Relative Partial Dispersions	
$\theta_{C,t}$	0.744 6
$\theta_{C,A'}$	0.328 8
$\theta_{d,C}$	0.297 3
$\theta_{e,C}$	0.534 9
$\theta_{g,d}$	1.270 2
$\theta_{g,F}$	0.567 5
$\theta_{h,g}$	0.483 4
$\theta_{i,g}$	1.335 0
$\theta'_{C,t}$	0.782 1
$\theta'_{e,C'}$	0.482 4
$\theta'_{F',e}$	0.517 6
$\theta'_{i,F'}$	1.822 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.000 3
$\Delta\theta_{C,A'}$	0.001 7
$\Delta\theta_{g,d}$	-0.006 8
$\Delta\theta_{g,F}$	-0.005 6
$\Delta\theta_{i,g}$	-0.036 3

Coloring			
λ_{80}	390	λ_5	335
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	365	$\lambda_{0.05}$	334
CCI			
B	G	R	
0.00	0.67	0.68	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.13
350	0.46
360	0.73
370	0.86
380	0.926
390	0.954
400	0.969
420	0.982
440	0.988
460	0.992
480	0.995
500	0.997
550	0.999
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.989
2 000	0.967
2 200	0.924
2 400	0.75

Thermal Properties	
Strain Point StP (°C)	553
Annealing Point AP (°C)	576
Transformation Temperature Tg (°C)	596
Yield Point At (°C)	627
Softening Point SP (°C)	651
Expansion Coefficients (-30 °C ~ 70 °C)	63
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	76
Thermal Conductivity λ (W/(mK))	0.852

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	48
-90 ~ -80	50
-80 ~ -70	51
-70 ~ -60	52
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	59
-10 ~ 0	60
0 ~ 10	61
10 ~ 20	62
20 ~ 30	63
30 ~ 40	64
40 ~ 50	65
50 ~ 60	66
60 ~ 70	67
70 ~ 80	68
80 ~ 90	69
90 ~ 100	70
100 ~ 110	71
110 ~ 120	71
120 ~ 130	72
130 ~ 140	73
140 ~ 150	74
150 ~ 160	74
160 ~ 170	75
170 ~ 180	76
180 ~ 190	76
190 ~ 200	77
200 ~ 210	77
210 ~ 220	78
220 ~ 230	78
230 ~ 240	79
240 ~ 250	79
250 ~ 260	80
260 ~ 270	80
270 ~ 280	80
280 ~ 290	81
290 ~ 300	81

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	7.2	7.5	8.2	8.4	8.4	8.8	9.1	9.8	9.9	10.7	11.4	13.1
-60 ~ -40	7.1	7.4	8.1	8.3	8.4	8.7	9.0	9.7	9.9	10.7	11.5	13.2
-40 ~ -20	7.1	7.5	8.1	8.3	8.4	8.7	9.1	9.8	9.9	10.8	11.6	13.3
-20 ~ 0	7.2	7.5	8.3	8.5	8.6	8.9	9.3	10.0	10.1	10.9	11.9	13.6
0 ~ 20	7.3	7.7	8.4	8.6	8.7	9.1	9.4	10.1	10.2	11.1	12.1	13.9
20 ~ 40	7.5	7.8	8.6	8.9	8.9	9.3	9.7	10.4	10.5	11.5	12.4	14.3
40 ~ 60	7.6	8.0	8.8	9.1	9.1	9.5	9.9	10.7	10.8	11.7	12.7	14.7
60 ~ 80	7.9	8.3	9.0	9.3	9.3	9.7	10.1	10.9	11.2	12.1	13.1	15.1
80 ~ 100	8.1	8.5	9.2	9.5	9.6	10.0	10.4	11.2	11.3	12.3	13.4	15.5
100 ~ 120	8.3	8.7	9.5	9.7	9.8	10.2	10.7	11.5	11.6	12.7	13.7	15.8
120 ~ 140	8.4	8.9	9.7	9.9	10.0	10.5	10.9	11.8	11.9	13.0	14.0	16.1
140 ~ 160	8.6	9.0	9.9	10.1	10.2	10.7	11.1	12.0	12.1	13.2	14.3	16.6
160 ~ 180	8.7	9.1	10.0	10.3	10.4	10.8	11.3	12.2	12.4	13.5	14.7	16.9

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.31
Specific Gravity d	4.47
Remarks	

OHARA 25-04

S-LAH53V

Code(d) 806409
Code(e) 811407

Refractive Index n_d	1.806 10 1.806 100	Abbe Number v_d	40.93	Dispersion $n_F - n_C$	0.019 695
Refractive Index n_e	1.810 776	Abbe Number v_e	40.67	Dispersion $n_{F'} - n_{C'}$	0.019 937

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.762 01
n_{1970}	1.970 09	1.768 65
n_{1530}	1.529 58	1.776 00
n_{1129}	1.128 64	1.783 09
n_t	1.013 98	1.785 66
n_s	0.852 11	1.790 41
$n_{A'}$	0.768 19	1.793 81
n_r	0.706 52	1.797 01
n_C	0.656 27	1.800 26
$n_{C'}$	0.643 85	1.801 18
$n_{\text{He-Ne}}$	0.632 8	1.802 04
n_D	0.589 29	1.805 93
n_d	0.587 56	1.806 10
n_e	0.546 07	1.810 78
n_F	0.486 13	1.819 95
$n_{F'}$	0.479 99	1.821 11
$n_{\text{He-Cd}}$	0.441 57	1.829 69
n_g	0.435 835	1.831 21
n_h	0.404 656	1.840 84
n_i	0.365 015	1.857 98

Constants of Dispersion Formula	
A_1	1.966 009 55E+00
A_2	2.051 433 05E-01
A_3	1.232 009 34E+00
B_1	1.078 177 85E-02
B_2	4.637 278 69E-02
B_3	9.769 406 00E+01

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	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	113.5
Rigidity Modulus G (GPa)	43.4
Poisson's Ratio σ	0.309
Knoop Hardness Hk[Class]	650 7
Abrasion Aa	66

Partial Dispersions	
$n_C - n_t$	0.014 601
$n_C - n_{A'}$	0.006 450
$n_d - n_C$	0.005 841
$n_e - n_C$	0.010 517
$n_g - n_d$	0.025 106
$n_g - n_F$	0.011 252
$n_h - n_g$	0.009 639
$n_i - n_g$	0.026 774
$n_C - n_t$	0.015 520
$n_e - n_{C'}$	0.009 598
$n_{F'} - n_e$	0.010 339
$n_i - n_{F'}$	0.036 865

Relative Partial Dispersions	
$\theta_{C,t}$	0.741 4
$\theta_{C,A'}$	0.327 5
$\theta_{d,C}$	0.296 6
$\theta_{e,C}$	0.534 0
$\theta_{g,d}$	1.274 7
$\theta_{g,F}$	0.571 3
$\theta_{h,g}$	0.489 4
$\theta_{i,g}$	1.359 4
$\theta'_{C,t}$	0.778 5
$\theta'_{e,C'}$	0.481 4
$\theta'_{F,e}$	0.518 6
$\theta'_{i,F'}$	1.849 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 7
$\Delta\theta_{C,A'}$	0.002 0
$\Delta\theta_{g,d}$	-0.005 0
$\Delta\theta_{g,F}$	-0.003 9
$\Delta\theta_{i,g}$	-0.022 9

Coloring			
λ_{80}	400	λ_5	345
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	372	$\lambda_{0.05}$	341
CCI			
B	G	R	
0.00	0.95	0.98	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.02
350	0.23
360	0.56
370	0.78
380	0.88
390	0.931
400	0.954
420	0.975
440	0.984
460	0.989
480	0.992
500	0.995
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.995
1 800	0.987
2 000	0.966
2 200	0.916
2 400	0.73

Thermal Properties	
Strain Point StP (°C)	569
Annealing Point AP (°C)	589
Transformation Temperature Tg (°C)	610
Yield Point At (°C)	645
Softening Point SP (°C)	670
Expansion Coefficients (-30 °C ~ 70 °C)	60
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	76
Thermal Conductivity λ (W/(mK))	0.859

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	46
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	50
-60 ~ -50	51
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	55
-20 ~ -10	56
-10 ~ 0	57
0 ~ 10	58
10 ~ 20	59
20 ~ 30	61
30 ~ 40	62
40 ~ 50	63
50 ~ 60	64
60 ~ 70	65
70 ~ 80	66
80 ~ 90	67
90 ~ 100	68
100 ~ 110	69
110 ~ 120	70
120 ~ 130	70
130 ~ 140	71
140 ~ 150	72
150 ~ 160	73
160 ~ 170	74
170 ~ 180	74
180 ~ 190	75
190 ~ 200	76
200 ~ 210	77
210 ~ 220	77
220 ~ 230	78
230 ~ 240	79
240 ~ 250	79
250 ~ 260	80
260 ~ 270	80
270 ~ 280	81
280 ~ 290	81
290 ~ 300	82

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.13
Specific Gravity d	4.41
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	6.2	6.4	7.1	7.3	7.3	7.6	7.9	8.6	8.7	9.5	10.3	12.0
-60 ~ -40	6.1	6.4	7.1	7.3	7.3	7.6	7.9	8.7	8.7	9.5	10.4	12.2
-40 ~ -20	6.2	6.5	7.1	7.3	7.4	7.8	8.1	8.8	8.9	9.7	10.6	12.4
-20 ~ 0	6.3	6.6	7.3	7.5	7.6	7.9	8.3	9.0	9.1	10.0	10.9	12.7
0 ~ 20	6.5	6.9	7.5	7.7	7.8	8.1	8.5	9.2	9.3	10.3	11.2	13.1
20 ~ 40	6.7	7.0	7.8	8.0	8.0	8.4	8.7	9.5	9.6	10.5	11.5	13.5
40 ~ 60	6.8	7.3	7.9	8.2	8.2	8.6	9.0	9.7	9.8	10.8	11.7	13.8
60 ~ 80	7.0	7.4	8.1	8.3	8.4	8.8	9.1	9.9	10.1	11.1	12.1	14.2
80 ~ 100	7.2	7.6	8.3	8.5	8.6	9.0	9.4	10.2	10.3	11.3	12.4	14.6
100 ~ 120	7.3	7.7	8.5	8.7	8.8	9.2	9.6	10.4	10.5	11.5	12.6	14.8
120 ~ 140	7.4	7.8	8.6	8.8	8.9	9.3	9.7	10.6	10.7	11.7	12.9	15.1
140 ~ 160	7.5	7.9	8.6	8.9	9.0	9.4	9.8	10.7	10.8	11.9	13.0	15.4
160 ~ 180	7.5	7.9	8.7	8.9	9.0	9.4	9.9	10.8	11.0	12.1	13.3	15.6

OHARA 25-04

S-LAH55V

Code(d) 835427
Code(e) 839425

Refractive Index n_d	1.834 81 1.834 807	Abbe Number v_d	42.73	Dispersion $n_F - n_C$	0.019 539
Refractive Index n_e	1.839 452	Abbe Number v_e	42.47	Dispersion $n_{F'} - n_{C'}$	0.019 764

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.788 70
n_{1970}	1.970 09	1.796 02
n_{1530}	1.529 58	1.804 02
n_{1129}	1.128 64	1.811 54
n_t	1.013 98	1.814 20
n_s	0.852 11	1.819 06
$n_{A'}$	0.768 19	1.822 50
n_r	0.706 52	1.825 72
n_C	0.656 27	1.828 98
$n_{C'}$	0.643 85	1.829 90
$n_{\text{He-Ne}}$	0.632 8	1.830 76
n_D	0.589 29	1.834 64
n_d	0.587 56	1.834 81
n_e	0.546 07	1.839 45
n_F	0.486 13	1.848 52
$n_{F'}$	0.479 99	1.849 66
$n_{\text{He-Cd}}$	0.441 57	1.858 08
n_g	0.435 835	1.859 56
n_h	0.404 656	1.868 93
n_i	0.365 015	1.885 39

Constants of Dispersion Formula	
A_1	1.970 253 25E+00
A_2	3.048 941 40E-01
A_3	1.392 146 65E+00
B_1	9.910 881 34E-03
B_2	3.832 022 95E-02
B_3	9.777 852 49E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	4
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	117.8
Rigidity Modulus G (GPa)	47.0
Poisson's Ratio σ	0.253
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	63

Partial Dispersions	
$n_C - n_t$	0.014 778
$n_C - n_{A'}$	0.006 476
$n_d - n_C$	0.005 826
$n_e - n_C$	0.010 471
$n_g - n_d$	0.024 749
$n_g - n_F$	0.011 036
$n_h - n_g$	0.009 373
$n_i - n_g$	0.025 830
$n_C - n_t$	0.015 697
$n_e - n_{C'}$	0.009 552
$n_{F'} - n_e$	0.010 212
$n_i - n_{F'}$	0.035 722

Relative Partial Dispersions	
$\theta_{C,t}$	0.756 3
$\theta_{C,A'}$	0.331 4
$\theta_{d,C}$	0.298 2
$\theta_{e,C}$	0.535 9
$\theta_{g,d}$	1.266 6
$\theta_{g,F}$	0.564 8
$\theta_{h,g}$	0.479 7
$\theta_{i,g}$	1.322 0
$\theta'_{C,t}$	0.794 2
$\theta'_{e,C'}$	0.483 3
$\theta'_{F,e}$	0.516 7
$\theta'_{i,F'}$	1.807 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.009 1
$\Delta\theta_{C,A'}$	0.003 7
$\Delta\theta_{g,d}$	-0.009 4
$\Delta\theta_{g,F}$	-0.007 5
$\Delta\theta_{i,g}$	-0.045 2

Coloring			
λ_{80}	400	λ_5	325
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	363	$\lambda_{0.05}$	327
CCI			
B	G	R	
0.00	0.93	0.96	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.14
340	0.42
350	0.64
360	0.78
370	0.86
380	0.910
390	0.939
400	0.956
420	0.974
440	0.982
460	0.987
480	0.992
500	0.995
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.995
1 800	0.987
2 000	0.966
2 200	0.909
2 400	0.71

Thermal Properties	
Strain Point StP (°C)	645
Annealing Point AP (°C)	672
Transformation Temperature Tg (°C)	697
Yield Point At (°C)	717
Softening Point SP (°C)	749
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	78
Thermal Conductivity λ (W/(mK))	0.853

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	52
-90 ~ -80	53
-80 ~ -70	54
-70 ~ -60	55
-60 ~ -50	56
-50 ~ -40	58
-40 ~ -30	59
-30 ~ -20	60
-20 ~ -10	61
-10 ~ 0	62
0 ~ 10	63
10 ~ 20	64
20 ~ 30	65
30 ~ 40	66
40 ~ 50	67
50 ~ 60	68
60 ~ 70	68
70 ~ 80	69
80 ~ 90	70
90 ~ 100	71
100 ~ 110	72
110 ~ 120	72
120 ~ 130	73
130 ~ 140	74
140 ~ 150	75
150 ~ 160	75
160 ~ 170	76
170 ~ 180	77
180 ~ 190	77
190 ~ 200	78
200 ~ 210	78
210 ~ 220	79
220 ~ 230	79
230 ~ 240	80
240 ~ 250	80
250 ~ 260	81
260 ~ 270	81
270 ~ 280	82
280 ~ 290	82
290 ~ 300	82

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	2.8	3.0	3.3	3.4	3.6	3.7	3.9	4.3	4.4	5.0	5.5	6.6
-60 ~ -40	2.5	2.7	3.1	3.2	3.3	3.6	3.8	4.2	4.3	4.8	5.5	6.5
-40 ~ -20	2.4	2.6	3.1	3.2	3.3	3.5	3.7	4.2	4.3	4.9	5.5	6.7
-20 ~ 0	2.4	2.6	3.1	3.2	3.2	3.5	3.7	4.4	4.4	5.0	5.7	7.1
0 ~ 20	2.4	2.6	3.1	3.3	3.3	3.6	3.9	4.5	4.5	5.3	6.0	7.3
20 ~ 40	2.5	2.7	3.3	3.4	3.5	3.8	4.0	4.6	4.7	5.4	6.3	7.8
40 ~ 60	2.6	2.8	3.4	3.6	3.6	3.9	4.2	4.9	5.0	5.8	6.6	8.2
60 ~ 80	2.6	2.9	3.5	3.7	3.8	4.1	4.5	5.2	5.3	6.1	6.9	8.6
80 ~ 100	2.8	3.1	3.7	3.9	4.0	4.3	4.7	5.4	5.5	6.5	7.3	9.1
100 ~ 120	2.9	3.3	3.9	4.2	4.2	4.6	4.9	5.7	5.8	6.7	7.6	9.6
120 ~ 140	3.1	3.4	4.1	4.4	4.4	4.8	5.2	6.0	6.1	7.0	8.0	10.1
140 ~ 160	3.2	3.6	4.3	4.5	4.6	5.0	5.4	6.2	6.3	7.3	8.5	10.5
160 ~ 180	3.3	3.7	4.5	4.8	4.9	5.3	5.7	6.6	6.7	7.8	8.8	11.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.30
Specific Gravity d	4.73
Remarks	

S-LAH55VS

Code(d) **835427**
Code(e) **839425**

Refractive Index n_d	1.834 81 1.834 810	Abbe Number v_d	42.74	Dispersion $n_F - n_C$	0.019 531
Refractive Index n_e	1.839 452	Abbe Number v_e	42.49	Dispersion $n_{F'} - n_{C'}$	0.019 756

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.789 45
n_{1970}	1.970 09	1.796 52
n_{1530}	1.529 58	1.804 27
n_{1129}	1.128 64	1.811 64
n_t	1.013 98	1.814 28
n_s	0.852 11	1.819 10
$n_{A'}$	0.768 19	1.822 53
n_r	0.706 52	1.825 74
n_C	0.656 27	1.828 99
$n_{C'}$	0.643 85	1.829 91
$n_{\text{He-Ne}}$	0.632 8	1.830 77
n_D	0.589 29	1.834 64
n_d	0.587 56	1.834 81
n_e	0.546 07	1.839 45
n_F	0.486 13	1.848 52
$n_{F'}$	0.479 99	1.849 66
$n_{\text{He-Cd}}$	0.441 57	1.858 07
n_g	0.435 835	1.859 55
n_h	0.404 656	1.868 92
n_i	0.365 015	1.885 34

Constants of Dispersion Formula	
A_1	1.925 910 95E+00
A_2	3.489 534 60E-01
A_3	1.422 307 44E+00
B_1	9.611 524 90E-03
B_2	3.651 329 80E-02
B_3	1.033 640 90E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	122.3
Rigidity Modulus G (GPa)	47.2
Poisson's Ratio σ	0.297
Knoop Hardness Hk[Class]	730 7
Abrasion Aa	60

Partial Dispersions	
$n_C - n_t$	0.014 712
$n_C - n_{A'}$	0.006 462
$n_d - n_C$	0.005 822
$n_e - n_C$	0.010 464
$n_g - n_d$	0.024 741
$n_g - n_F$	0.011 032
$n_h - n_g$	0.009 365
$n_i - n_g$	0.025 786
$n_C - n_t$	0.015 630
$n_e - n_{C'}$	0.009 546
$n_{F'} - n_e$	0.010 210
$n_i - n_{F'}$	0.035 675

Relative Partial Dispersions	
$\theta_{C,t}$	0.753 3
$\theta_{C,A'}$	0.330 9
$\theta_{d,C}$	0.298 1
$\theta_{e,C}$	0.535 8
$\theta_{g,d}$	1.266 8
$\theta_{g,F}$	0.564 8
$\theta_{h,g}$	0.479 5
$\theta_{i,g}$	1.320 3
$\theta'_{C,t}$	0.791 2
$\theta'_{e,C'}$	0.483 2
$\theta'_{F,e}$	0.516 8
$\theta'_{i,F'}$	1.805 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.006 1
$\Delta\theta_{C,A'}$	0.003 2
$\Delta\theta_{g,d}$	-0.009 1
$\Delta\theta_{g,F}$	-0.007 5
$\Delta\theta_{i,g}$	-0.046 8

Coloring			
λ_{80}	395	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	356	$\lambda_{0.05}$	319
CCI			
B	G	R	
0.00	0.65	0.68	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.06
330	0.28
340	0.55
350	0.73
360	0.84
370	0.90
380	0.936
390	0.957
400	0.970
420	0.982
440	0.988
460	0.991
480	0.994
500	0.996
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.988
2 000	0.968
2 200	0.920
2 400	0.74

Thermal Properties	
Strain Point StP (°C)	639
Annealing Point AP (°C)	667
Transformation Temperature Tg (°C)	685
Yield Point At (°C)	714
Softening Point SP (°C)	738
Expansion Coefficients (-30 °C ~ 70 °C)	66
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	79
Thermal Conductivity λ (W/(mK))	0.864

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	52
-90 ~ -80	54
-80 ~ -70	55
-70 ~ -60	56
-60 ~ -50	57
-50 ~ -40	59
-40 ~ -30	60
-30 ~ -20	61
-20 ~ -10	62
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	65
20 ~ 30	66
30 ~ 40	67
40 ~ 50	68
50 ~ 60	69
60 ~ 70	70
70 ~ 80	71
80 ~ 90	72
90 ~ 100	73
100 ~ 110	74
110 ~ 120	74
120 ~ 130	75
130 ~ 140	76
140 ~ 150	77
150 ~ 160	77
160 ~ 170	78
170 ~ 180	79
180 ~ 190	79
190 ~ 200	80
200 ~ 210	80
210 ~ 220	81
220 ~ 230	81
230 ~ 240	82
240 ~ 250	82
250 ~ 260	83
260 ~ 270	83
270 ~ 280	83
280 ~ 290	84
290 ~ 300	84

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	2.6	2.7	3.1	3.2	3.4	3.6	3.8	4.2	4.3	4.9	5.4	6.6
-60 ~ -40	2.5	2.7	3.1	3.2	3.2	3.5	3.8	4.2	4.3	4.8	5.5	6.7
-40 ~ -20	2.4	2.7	3.2	3.3	3.3	3.6	3.8	4.3	4.4	5.0	5.7	6.9
-20 ~ 0	2.6	2.8	3.2	3.4	3.4	3.7	3.9	4.5	4.6	5.2	5.9	7.3
0 ~ 20	2.7	2.9	3.4	3.5	3.6	3.8	4.1	4.7	4.8	5.4	6.1	7.5
20 ~ 40	2.7	3.0	3.5	3.7	3.7	4.0	4.3	4.8	4.9	5.6	6.4	7.9
40 ~ 60	2.9	3.2	3.7	3.8	3.9	4.2	4.5	5.0	5.1	6.0	6.7	8.2
60 ~ 80	3.0	3.2	3.8	3.9	4.0	4.3	4.7	5.3	5.4	6.1	6.9	8.5
80 ~ 100	3.1	3.4	3.9	4.1	4.2	4.5	4.8	5.4	5.5	6.4	7.2	8.8
100 ~ 120	3.1	3.4	4.0	4.2	4.3	4.6	4.9	5.6	5.7	6.5	7.3	9.1
120 ~ 140	3.2	3.5	4.1	4.3	4.3	4.7	5.0	5.7	5.8	6.6	7.5	9.4
140 ~ 160	3.2	3.5	4.1	4.3	4.4	4.7	5.0	5.8	5.9	6.7	7.8	9.6
160 ~ 180	3.1	3.4	4.1	4.4	4.5	4.8	5.2	5.9	6.0	6.9	7.8	9.7

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.31
Specific Gravity d	4.58
Remarks	

OHARA 25-04

Refractive Index n_d	1.883 00 1.882 997	Abbe Number v_d	40.76	Dispersion $n_F - n_C$	0.021 661
Refractive Index n_e	1.888 146	Abbe Number v_e	40.52	Dispersion $n_{F'} - n_{C'}$	0.021 919

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.835 90
n_{1970}	1.970 09	1.842 64
n_{1530}	1.529 58	1.850 23
n_{1129}	1.128 64	1.857 76
n_t	1.013 98	1.860 54
n_s	0.852 11	1.865 72
$n_{A'}$	0.768 19	1.869 46
n_r	0.706 52	1.872 98
n_C	0.656 27	1.876 56
$n_{C'}$	0.643 85	1.877 57
$n_{\text{He-Ne}}$	0.632 8	1.878 52
n_D	0.589 29	1.882 81
n_d	0.587 56	1.883 00
n_e	0.546 07	1.888 15
n_F	0.486 13	1.898 22
$n_{F'}$	0.479 99	1.899 49
$n_{\text{He-Cd}}$	0.441 57	1.908 85
n_g	0.435 835	1.910 50
n_h	0.404 656	1.920 92
n_i	0.365 015	1.939 17

Constants of Dispersion Formula	
A_1	1.787 649 64E+00
A_2	6.526 356 00E-01
A_3	1.799 145 64E+00
B_1	8.473 785 36E-03
B_2	3.131 264 08E-02
B_3	1.327 880 01E+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	2.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	126.8
Rigidity Modulus G (GPa)	48.7
Poisson's Ratio σ	0.301
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	62

Partial Dispersions	
$n_C - n_t$	0.016 022
$n_C - n_{A'}$	0.007 103
$n_d - n_C$	0.006 437
$n_e - n_C$	0.011 586
$n_g - n_d$	0.027 500
$n_g - n_F$	0.012 276
$n_h - n_g$	0.010 422
$n_i - n_g$	0.028 677
$n_C - n_t$	0.017 035
$n_e - n_{C'}$	0.010 573
$n_{F'} - n_e$	0.011 346
$n_i - n_{F'}$	0.039 682

Relative Partial Dispersions	
$\theta_{C,t}$	0.739 7
$\theta_{C,A'}$	0.327 9
$\theta_{d,C}$	0.297 2
$\theta_{e,C}$	0.534 9
$\theta_{g,d}$	1.269 6
$\theta_{g,F}$	0.566 7
$\theta_{h,g}$	0.481 1
$\theta_{i,g}$	1.323 9
$\theta'_{C,t}$	0.777 2
$\theta'_{e,C'}$	0.482 4
$\theta'_{F,e}$	0.517 6
$\theta'_{i,F'}$	1.810 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 8
$\Delta\theta_{C,A'}$	0.002 6
$\Delta\theta_{g,d}$	-0.010 5
$\Delta\theta_{g,F}$	-0.008 8
$\Delta\theta_{i,g}$	-0.059 8

Coloring			
λ_{80}		λ_5	315
λ_{70}	375		
Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	320
CCI			
B	G	R	
0.00	1.69	1.75	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.05
330	0.17
340	0.34
350	0.51
360	0.66
370	0.77
380	0.84
390	0.89
400	0.924
420	0.951
440	0.965
460	0.974
480	0.982
500	0.988
550	0.995
600	0.995
650	0.995
700	0.995
800	0.995
900	0.995
1 000	0.995
1 200	0.996
1 400	0.996
1 600	0.996
1 800	0.992
2 000	0.980
2 200	0.956
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	666
Annealing Point AP (°C)	714
Transformation Temperature Tg (°C)	737
Yield Point At (°C)	767
Softening Point SP (°C)	803
Expansion Coefficients (-30 °C ~ 70 °C)	67
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	80
Thermal Conductivity λ (W/(m·K))	0.827

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	54
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	59
-50 ~ -40	60
-40 ~ -30	61
-30 ~ -20	63
-20 ~ -10	64
-10 ~ 0	65
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	69
50 ~ 60	70
60 ~ 70	71
70 ~ 80	72
80 ~ 90	73
90 ~ 100	74
100 ~ 110	74
110 ~ 120	75
120 ~ 130	76
130 ~ 140	77
140 ~ 150	77
150 ~ 160	78
160 ~ 170	79
170 ~ 180	79
180 ~ 190	80
190 ~ 200	80
200 ~ 210	81
210 ~ 220	81
220 ~ 230	82
230 ~ 240	82
240 ~ 250	83
250 ~ 260	83
260 ~ 270	84
270 ~ 280	84
280 ~ 290	84
290 ~ 300	85

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	1.30
Specific Gravity d	5.52
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	2.4	2.7	3.2	3.4	3.4	3.8	4.0	4.6	4.7	5.3	6.1	7.5
-60 ~ -40	2.3	2.6	3.1	3.3	3.4	3.6	4.0	4.6	4.6	5.3	6.1	7.5
-40 ~ -20	2.3	2.6	3.1	3.3	3.4	3.7	4.0	4.6	4.7	5.4	6.2	7.7
-20 ~ 0	2.4	2.6	3.3	3.5	3.5	3.8	4.1	4.7	4.8	5.5	6.4	7.9
0 ~ 20	2.5	2.7	3.4	3.6	3.6	4.0	4.3	4.9	5.0	5.7	6.6	8.1
20 ~ 40	2.6	2.9	3.5	3.7	3.7	4.1	4.5	5.1	5.2	6.0	6.8	8.4
40 ~ 60	2.7	3.0	3.6	3.8	3.9	4.3	4.5	5.3	5.4	6.2	7.0	8.7
60 ~ 80	2.8	3.2	3.9	4.1	4.1	4.5	4.8	5.5	5.6	6.4	7.3	9.0
80 ~ 100	3.0	3.3	3.9	4.2	4.2	4.7	5.0	5.7	5.8	6.7	7.5	9.2
100 ~ 120	3.1	3.4	4.1	4.3	4.4	4.7	5.1	5.8	5.9	6.9	7.8	9.5
120 ~ 140	3.2	3.5	4.2	4.4	4.5	4.9	5.2	6.0	6.1	7.1	8.0	9.8
140 ~ 160	3.2	3.6	4.3	4.5	4.6	4.9	5.3	6.2	6.3	7.2	8.2	10.0
160 ~ 180	3.3	3.7	4.4	4.7	4.7	5.1	5.5	6.3	6.4	7.3	8.3	10.2

S-LAH59

Code(d) 816466
Code(e) 820464

Refractive Index n_d	1.816 00 1.816 000	Abbe Number v_d	46.62	Dispersion $n_F - n_C$	0.017 503
Refractive Index n_e	1.820 167	Abbe Number v_e	46.37	Dispersion $n_{F'} - n_{C'}$	0.017 688

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.773 45
n_{1970}	1.970 09	1.780 33
n_{1530}	1.529 58	1.787 84
n_{1129}	1.128 64	1.794 83
n_t	1.013 98	1.797 29
n_s	0.852 11	1.801 74
$n_{A'}$	0.768 19	1.804 88
n_r	0.706 52	1.807 80
n_C	0.656 27	1.810 75
$n_{C'}$	0.643 85	1.811 58
$n_{\text{He-Ne}}$	0.632 8	1.812 36
n_D	0.589 29	1.815 85
n_d	0.587 56	1.816 00
n_e	0.546 07	1.820 17
n_F	0.486 13	1.828 25
$n_{F'}$	0.479 99	1.829 27
$n_{\text{He-Cd}}$	0.441 57	1.836 70
n_g	0.435 835	1.838 00
n_h	0.404 656	1.846 19
n_i	0.365 015	1.860 34

Constants of Dispersion Formula	
A_1	1.513 729 67E+00
A_2	7.024 623 43E-01
A_3	1.336 009 82E+00
B_1	7.052 469 01E-03
B_2	2.494 886 89E-02
B_3	1.000 859 08E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	3.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	125.0
Rigidity Modulus G (GPa)	48.2
Poisson's Ratio σ	0.298
Knoop Hardness Hk[Class]	740 7
Abrasion Aa	50

Partial Dispersions	
$n_C - n_t$	0.013 459
$n_C - n_{A'}$	0.005 870
$n_d - n_C$	0.005 251
$n_e - n_C$	0.009 418
$n_g - n_d$	0.021 997
$n_g - n_F$	0.009 745
$n_h - n_g$	0.008 188
$n_i - n_g$	0.022 341
$n_C - n_t$	0.014 289
$n_e - n_{C'}$	0.008 588
$n_{F'} - n_e$	0.009 100
$n_i - n_{F'}$	0.031 071

Relative Partial Dispersions	
$\theta_{C,t}$	0.769 0
$\theta_{C,A'}$	0.335 4
$\theta_{d,C}$	0.300 0
$\theta_{e,C}$	0.538 1
$\theta_{g,d}$	1.256 8
$\theta_{g,F}$	0.556 8
$\theta_{h,g}$	0.467 8
$\theta_{i,g}$	1.276 4
$\theta'_{C,t}$	0.807 8
$\theta'_{e,C'}$	0.485 5
$\theta'_{F,e}$	0.514 5
$\theta'_{i,F'}$	1.756 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 6
$\Delta\theta_{C,A'}$	0.003 0
$\Delta\theta_{g,d}$	-0.011 1
$\Delta\theta_{g,F}$	-0.009 2
$\Delta\theta_{i,g}$	-0.058 2

Coloring			
λ_{80}	390	λ_5	290
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	359	$\lambda_{0.05}$	298
CCI			
B	G	R	
0.00	0.94	0.93	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.02
300	0.06
310	0.09
320	0.28
330	0.43
340	0.58
350	0.71
360	0.81
370	0.88
380	0.921
390	0.943
400	0.958
420	0.973
440	0.979
460	0.984
480	0.989
500	0.994
550	0.997
600	0.996
650	0.996
700	0.996
800	0.996
900	0.995
1 000	0.995
1 200	0.995
1 400	0.995
1 600	0.994
1 800	0.989
2 000	0.973
2 200	0.938
2 400	0.76

Thermal Properties	
Strain Point StP (°C)	644
Annealing Point AP (°C)	690
Transformation Temperature Tg (°C)	715
Yield Point At (°C)	750
Softening Point SP (°C)	773
Expansion Coefficients (-30 °C ~ 70 °C)	64
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	77
Thermal Conductivity λ (W/(mK))	0.816

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	51
-90 ~ -80	53
-80 ~ -70	54
-70 ~ -60	55
-60 ~ -50	56
-50 ~ -40	57
-40 ~ -30	58
-30 ~ -20	59
-20 ~ -10	60
-10 ~ 0	61
0 ~ 10	62
10 ~ 20	63
20 ~ 30	64
30 ~ 40	65
40 ~ 50	66
50 ~ 60	67
60 ~ 70	68
70 ~ 80	69
80 ~ 90	70
90 ~ 100	71
100 ~ 110	71
110 ~ 120	72
120 ~ 130	73
130 ~ 140	74
140 ~ 150	74
150 ~ 160	75
160 ~ 170	76
170 ~ 180	76
180 ~ 190	77
190 ~ 200	77
200 ~ 210	78
210 ~ 220	78
220 ~ 230	79
230 ~ 240	79
240 ~ 250	80
250 ~ 260	80
260 ~ 270	81
270 ~ 280	81
280 ~ 290	82
290 ~ 300	82

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	3.2	3.4	3.8	4.0	4.0	4.2	4.4	4.9	5.0	5.4	6.0	6.9
-60 ~ -40	3.0	3.3	3.7	3.8	3.9	4.1	4.3	4.8	4.9	5.4	5.9	6.9
-40 ~ -20	3.0	3.2	3.6	3.8	3.9	4.1	4.3	4.8	4.9	5.4	6.0	7.0
-20 ~ 0	2.9	3.3	3.7	3.9	3.9	4.2	4.4	4.9	4.9	5.6	6.1	7.1
0 ~ 20	3.1	3.3	3.8	4.0	4.0	4.3	4.5	5.0	5.1	5.7	6.3	7.4
20 ~ 40	3.1	3.4	4.0	4.1	4.2	4.4	4.7	5.2	5.3	5.9	6.5	7.7
40 ~ 60	3.3	3.6	4.1	4.3	4.3	4.6	4.9	5.4	5.5	6.1	6.8	8.0
60 ~ 80	3.4	3.7	4.2	4.4	4.4	4.7	5.0	5.6	5.7	6.4	7.0	8.2
80 ~ 100	3.6	3.9	4.4	4.6	4.6	4.9	5.2	5.8	5.9	6.5	7.2	8.5
100 ~ 120	3.7	4.0	4.6	4.8	4.8	5.1	5.4	6.0	6.1	6.8	7.4	8.7
120 ~ 140	3.8	4.1	4.7	4.9	5.0	5.3	5.6	6.2	6.3	7.0	7.7	9.0
140 ~ 160	3.9	4.2	4.9	5.0	5.1	5.4	5.7	6.4	6.4	7.2	7.9	9.4
160 ~ 180	4.0	4.3	4.9	5.2	5.2	5.5	5.9	6.6	6.7	7.4	8.2	9.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.37
Specific Gravity d	5.07
Remarks	

OHARA 25-04

S-LAH60MQ

Code(d) 834372
Code(e) 839369

Table with 3 columns: Refractive Index, Abbe Number, and Dispersion. Rows show values for nd, vd, nF-nC, ne, ve, and nF'-nC'.

Table with 3 columns: Wavelength (λ), and two columns for Refractive Indices. Rows include values for 2325, 1970, 1530, 1129 nm and nt, ns, nA', nF, nC, nC', nHe-Ne, nD, nd, ne, nF, nF', nHe-Cd, ng, nh, ni.

Table with 2 columns: Partial Dispersion and values. Rows include nC-nt, nC-nA', nd-nC, ne-nC, ng-nd, ng-nF, nh-ng, ni-ng, nC'-nt, ne-nC', nF'-ne, ni-nF'.

Table with 4 columns: Coloring (λ80, 425, λ5, 340), Internal transmission (λ0.80, 377, λ0.05, 336), and CCI (B, G, R).

Table with 2 columns: Thermal Property and value. Rows include Strain Point StP, Annealing Point AP, Transformation Temperature Tg, Yield Point At, Softening Point SP, Expansion Coefficients, and Thermal Conductivity λ.

Table with 2 columns: Constants of Dispersion Formula (A1, A2, A3, B1, B2, B3) and values.

Table with 2 columns: Relative Partial Dispersion (θC,t, θC,A', θd,C, θe,C, θg,d, θg,F, θh,g, θi,g, θ'C,t, θ'e,C', θ'F,e, θ'i,F') and values.

Table with 2 columns: Internal Transmittance (λ (nm) and τi (10 mm)) and values for wavelengths from 280 to 2400 nm.

Table with 2 columns: Linear coefficient of thermal expansion (Temperature range (°C) and αi (10^-7 K^-1)) and values for temperature ranges from -100 to 290°C.

Table with 2 columns: Chemical Properties (Water Resistance, Acid Resistance, Weathering Resistance, etc.) and values.

Table with 2 columns: Anomalous dispersion (ΔθC,t, ΔθC,A', Δθg,d, Δθg,F, Δθi,g) and values.

Table with 2 columns: Mechanical Properties (Young's Modulus, Rigidity Modulus, Poisson's Ratio, etc.) and values.

Large table with 13 columns: Range of Temperature (°C) and Temperature Coefficients of Refractive Index (Δnrel / ΔT (10^-6 K^-1)) for parameters 1550, t, r, C, C', d, e, F, F', g, h, i.

Table with 2 columns: Other Properties (Photoelastic Constant, Specific Gravity, Remarks) and values.

S-LAH71

Code(d) **850323**
Code(e) **856320**

Refractive Index n_d	1.850 26 1.850 259	Abbe Number v_d	32.27	Dispersion $n_F - n_C$	0.026 349
Refractive Index n_e	1.856 493	Abbe Number v_e	32.03	Dispersion $n_{F'} - n_{C'}$	0.026 744

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.800 95
n_{1970}	1.970 09	1.806 85
n_{1530}	1.529 58	1.813 80
n_{1129}	1.128 64	1.821 33
n_t	1.013 98	1.824 29
n_s	0.852 11	1.830 04
$n_{A'}$	0.768 19	1.834 30
n_r	0.706 52	1.838 38
n_C	0.656 27	1.842 59
$n_{C'}$	0.643 85	1.843 78
$n_{\text{He-Ne}}$	0.632 8	1.844 91
n_D	0.589 29	1.850 03
n_d	0.587 56	1.850 26
n_e	0.546 07	1.856 49
n_F	0.486 13	1.868 93
$n_{F'}$	0.479 99	1.870 53
$n_{\text{He-Cd}}$	0.441 57	1.882 43
n_g	0.435 835	1.884 56
n_h	0.404 656	1.898 27
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.982 800 31E+00
A_2	3.167 584 50E-01
A_3	2.444 726 46E+00
B_1	1.189 874 59E-02
B_2	5.271 560 01E-02
B_3	2.132 206 97E+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	2.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	110.0
Rigidity Modulus G (GPa)	42.9
Poisson's Ratio σ	0.281
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	136

Partial Dispersions	
$n_C - n_t$	0.018 292
$n_C - n_{A'}$	0.008 288
$n_d - n_C$	0.007 673
$n_e - n_C$	0.013 907
$n_g - n_d$	0.034 299
$n_g - n_F$	0.015 623
$n_h - n_g$	0.013 716
$n_i - n_g$	
$n_C - n_t$	0.019 490
$n_e - n_{C'}$	0.012 709
$n_{F'} - n_e$	0.014 035
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.694 2
$\theta_{C,A'}$	0.314 5
$\theta_{d,C}$	0.291 2
$\theta_{e,C}$	0.527 8
$\theta_{g,d}$	1.301 7
$\theta_{g,F}$	0.592 9
$\theta_{h,g}$	0.520 6
$\theta_{i,g}$	
$\theta'_{C,t}$	0.728 8
$\theta'_{e,C'}$	0.475 2
$\theta'_{F',e}$	0.524 8
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.003 9
$\Delta\theta_{C,A'}$	-0.000 5
$\Delta\theta_{g,d}$	0.004 0
$\Delta\theta_{g,F}$	0.003 6
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	370
λ_{70}	425		
Internal transmission			
$\lambda_{0.80}$	417	$\lambda_{0.05}$	364
CCI			
B	G	R	
0.00	6.64	6.89	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.11
380	0.29
390	0.49
400	0.65
420	0.83
440	0.913
460	0.945
480	0.963
500	0.976
550	0.992
600	0.995
650	0.995
700	0.997
800	0.998
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.993
2 000	0.989
2 200	0.982
2 400	0.959

Thermal Properties	
Strain Point StP (°C)	656
Annealing Point AP (°C)	685
Transformation Temperature Tg (°C)	704
Yield Point At (°C)	753
Softening Point SP (°C)	802
Expansion Coefficients (-30 °C ~ 70 °C)	78
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(mK))	0.874

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	66
-70 ~ -60	67
-60 ~ -50	68
-50 ~ -40	70
-40 ~ -30	71
-30 ~ -20	72
-20 ~ -10	74
-10 ~ 0	75
0 ~ 10	76
10 ~ 20	77
20 ~ 30	78
30 ~ 40	79
40 ~ 50	80
50 ~ 60	81
60 ~ 70	83
70 ~ 80	84
80 ~ 90	84
90 ~ 100	85
100 ~ 110	86
110 ~ 120	87
120 ~ 130	88
130 ~ 140	89
140 ~ 150	90
150 ~ 160	91
160 ~ 170	91
170 ~ 180	92
180 ~ 190	93
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	95
230 ~ 240	96
240 ~ 250	96
250 ~ 260	97
260 ~ 270	97
270 ~ 280	98
280 ~ 290	98
290 ~ 300	99

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	0.5	0.8	1.4	1.6	1.7	2.0	2.4	3.3	3.4	4.5	5.8	-
-60 ~ -40	0.5	0.8	1.5	1.7	1.8	2.1	2.5	3.3	3.4	4.6	5.9	-
-40 ~ -20	0.6	1.0	1.6	1.8	1.9	2.2	2.6	3.6	3.7	4.8	6.1	-
-20 ~ 0	0.8	1.1	1.7	1.9	2.0	2.4	2.9	3.7	3.9	5.0	6.4	-
0 ~ 20	0.9	1.2	1.9	2.1	2.2	2.6	3.1	4.0	4.1	5.3	6.7	-
20 ~ 40	1.1	1.4	2.1	2.3	2.4	2.8	3.2	4.2	4.3	5.7	7.1	-
40 ~ 60	1.2	1.6	2.3	2.5	2.6	3.0	3.4	4.4	4.5	5.9	7.4	-
60 ~ 80	1.3	1.7	2.5	2.7	2.7	3.2	3.7	4.7	4.8	6.1	7.7	-
80 ~ 100	1.5	1.8	2.5	2.8	2.9	3.3	3.8	4.8	5.0	6.4	7.9	-
100 ~ 120	1.5	1.9	2.6	2.9	3.0	3.4	3.9	4.9	5.1	6.5	8.2	-
120 ~ 140	1.6	1.9	2.7	3.0	3.0	3.5	4.0	5.0	5.2	6.6	8.3	-
140 ~ 160	1.5	1.9	2.7	3.0	3.0	3.5	4.0	5.2	5.2	6.8	8.4	-
160 ~ 180	1.4	1.8	2.6	3.0	3.1	3.6	4.1	5.2	5.3	6.8	8.5	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.52
Specific Gravity d	4.36
Remarks	

Refractive Index n_d	1.916 50 1.916 500	Abbe Number v_d	31.60	Dispersion $n_F - n_C$	0.028 999
Refractive Index n_e	1.923 361	Abbe Number v_e	31.38	Dispersion $n_{F'} - n_{C'}$	0.029 426

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.858 14
n_{1970}	1.970 09	1.866 07
n_{1530}	1.529 58	1.875 03
n_{1129}	1.128 64	1.884 13
n_t	1.013 98	1.887 56
n_s	0.852 11	1.894 08
$n_{A'}$	0.768 19	1.898 84
n_r	0.706 52	1.903 38
n_C	0.656 27	1.908 03
$n_{C'}$	0.643 85	1.909 36
$n_{\text{He-Ne}}$	0.632 8	1.910 60
n_D	0.589 29	1.916 25
n_d	0.587 56	1.916 50
n_e	0.546 07	1.923 36
n_F	0.486 13	1.937 03
$n_{F'}$	0.479 99	1.938 78
$n_{\text{He-Cd}}$	0.441 57	1.951 85
n_g	0.435 835	1.954 18
n_h	0.404 656	1.969 20
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.128 443 40E+00
A_2	4.050 821 39E-01
A_3	1.679 184 61E+00
B_1	1.173 098 15E-02
B_2	5.087 065 99E-02
B_3	1.070 914 56E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	3.2
Phosphate Resistance PR	1.1

Mechanical Properties	
Young's Modulus E (GPa)	113.5
Rigidity Modulus G (GPa)	45.7
Poisson's Ratio σ	0.242
Knoop Hardness Hk[Class]	670 7
Abrasion Aa	69

Partial Dispersions	
$n_C - n_t$	0.020 471
$n_C - n_{A'}$	0.009 192
$n_d - n_C$	0.008 465
$n_e - n_C$	0.015 326
$n_g - n_d$	0.037 676
$n_g - n_F$	0.017 142
$n_h - n_g$	0.015 029
$n_i - n_g$	
$n_C - n_t$	0.021 794
$n_e - n_{C'}$	0.014 003
$n_{F'} - n_e$	0.015 423
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.705 9
$\theta_{C,A'}$	0.317 0
$\theta_{d,C}$	0.291 9
$\theta_{e,C}$	0.528 5
$\theta_{g,d}$	1.299 2
$\theta_{g,F}$	0.591 1
$\theta_{h,g}$	0.518 3
$\theta_{i,g}$	
$\theta'_{C,t}$	0.740 6
$\theta'_{e,C'}$	0.475 9
$\theta'_{F,e}$	0.524 1
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.011 0
$\Delta\theta_{C,A'}$	0.002 9
$\Delta\theta_{g,d}$	0.000 1
$\Delta\theta_{g,F}$	0.000 8
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	355
λ_{70}	400		
Internal transmission			
$\lambda_{0.80}$	389	$\lambda_{0.05}$	353
CCI			
B	G	R	
0.00	2.51	2.67	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.16
370	0.45
380	0.68
390	0.81
400	0.87
420	0.936
440	0.961
460	0.973
480	0.981
500	0.987
550	0.994
600	0.996
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.994
1 800	0.985
2 000	0.963
2 200	0.89
2 400	0.71

Thermal Properties	
Strain Point StP (°C)	581
Annealing Point AP (°C)	601
Transformation Temperature Tg (°C)	625
Yield Point At (°C)	658
Softening Point SP (°C)	677
Expansion Coefficients (-30 °C ~ 70 °C)	59
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	72
Thermal Conductivity λ (W/(mK))	0.894

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	46
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	50
-60 ~ -50	51
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	64
80 ~ 90	65
90 ~ 100	66
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	69
150 ~ 160	70
160 ~ 170	71
170 ~ 180	71
180 ~ 190	72
190 ~ 200	72
200 ~ 210	73
210 ~ 220	74
220 ~ 230	74
230 ~ 240	75
240 ~ 250	75
250 ~ 260	75
260 ~ 270	76
270 ~ 280	76
280 ~ 290	77
290 ~ 300	77

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.90
Specific Gravity d	4.74
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	3.7	4.0	4.6	4.8	4.9	5.2	5.7	6.5	6.6	7.8	9.1	-
-60 ~ -40	3.7	4.0	4.7	4.9	5.0	5.4	5.8	6.6	6.8	8.0	9.3	-
-40 ~ -20	3.8	4.1	4.9	5.1	5.2	5.5	5.9	7.0	7.1	8.3	9.7	-
-20 ~ 0	3.9	4.4	5.1	5.3	5.4	5.8	6.2	7.3	7.4	8.7	10.2	-
0 ~ 20	4.1	4.6	5.3	5.6	5.6	6.1	6.5	7.5	7.7	9.1	10.7	-
20 ~ 40	4.4	4.7	5.5	5.9	5.9	6.4	6.8	7.9	8.0	9.4	11.2	-
40 ~ 60	4.5	4.9	5.8	6.1	6.2	6.7	7.1	8.2	8.4	9.9	11.6	-
60 ~ 80	4.8	5.2	6.0	6.3	6.4	6.9	7.4	8.5	8.7	10.2	12.1	-
80 ~ 100	4.8	5.3	6.2	6.5	6.6	7.1	7.7	8.9	9.0	10.6	12.5	-
100 ~ 120	5.0	5.4	6.3	6.6	6.7	7.2	7.9	9.1	9.3	11.0	12.9	-
120 ~ 140	5.0	5.5	6.4	6.8	6.9	7.4	8.0	9.4	9.5	11.3	13.2	-
140 ~ 160	5.1	5.5	6.5	6.8	6.9	7.6	8.2	9.5	9.7	11.5	13.5	-
160 ~ 180	5.1	5.6	6.6	7.0	7.1	7.7	8.3	9.6	9.8	11.7	13.8	-

Refractive Index n_d	1.851 50 1.851 500	Abbe Number v_d	40.78	Dispersion $n_F - n_C$	0.020 880
Refractive Index n_e	1.856 460	Abbe Number v_e	40.53	Dispersion $n_{F'} - n_{C'}$	0.021 134

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.805 61
n_{1970}	1.970 09	1.812 33
n_{1530}	1.529 58	1.819 83
n_{1129}	1.128 64	1.827 18
n_t	1.013 98	1.829 87
n_s	0.852 11	1.834 87
$n_{A'}$	0.768 19	1.838 47
n_r	0.706 52	1.841 86
n_C	0.656 27	1.845 30
$n_{C'}$	0.643 85	1.846 28
$n_{\text{He-Ne}}$	0.632 8	1.847 19
n_D	0.589 29	1.851 32
n_d	0.587 56	1.851 50
n_e	0.546 07	1.856 46
n_F	0.486 13	1.866 18
$n_{F'}$	0.479 99	1.867 41
$n_{\text{He-Cd}}$	0.441 57	1.876 48
n_g	0.435 835	1.878 07
n_h	0.404 656	1.888 22
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.951 188 27E+00
A_2	3.776 072 23E-01
A_3	1.477 572 62E+00
B_1	9.765 607 99E-03
B_2	3.822 320 43E-02
B_3	1.122 367 20E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	2
Weathering Resistance(Surface) Group WS	2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	120.8
Rigidity Modulus G (GPa)	46.3
Poisson's Ratio σ	0.303
Knoop Hardness Hk[Class]	690 7
Abrasion Aa	68

Partial Dispersions	
$n_C - n_t$	0.015 434
$n_C - n_{A'}$	0.006 834
$n_d - n_C$	0.006 196
$n_e - n_C$	0.011 156
$n_g - n_d$	0.026 575
$n_g - n_F$	0.011 891
$n_h - n_g$	0.010 143
$n_i - n_g$	
$n_{C'} - n_t$	0.016 409
$n_e - n_{C'}$	0.010 181
$n_{F'} - n_e$	0.010 953
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.739 2
$\theta_{C,A'}$	0.327 3
$\theta_{d,C}$	0.296 7
$\theta_{e,C}$	0.534 3
$\theta_{g,d}$	1.272 7
$\theta_{g,F}$	0.569 5
$\theta_{h,g}$	0.485 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.776 4
$\theta'_{e,C'}$	0.481 7
$\theta'_{F',e}$	0.518 3
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 2
$\Delta\theta_{C,A'}$	0.002 0
$\Delta\theta_{g,d}$	-0.007 3
$\Delta\theta_{g,F}$	-0.006 0
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	340
λ_{70}	380		
Internal transmission			
$\lambda_{0.80}$	376	$\lambda_{0.05}$	339
CCI			
B	G	R	
0.00	1.47	1.52	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.07
350	0.31
360	0.57
370	0.74
380	0.84
390	0.89
400	0.930
420	0.962
440	0.975
460	0.983
480	0.989
500	0.993
550	0.998
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.992
2 000	0.975
2 200	0.938
2 400	0.78

Thermal Properties	
Strain Point StP (°C)	634
Annealing Point AP (°C)	660
Transformation Temperature Tg (°C)	680
Yield Point At (°C)	717
Softening Point SP (°C)	743
Expansion Coefficients (-30 °C ~ 70 °C)	68
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	81
Thermal Conductivity λ (W/(mK))	0.861

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	55
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	60
-50 ~ -40	61
-40 ~ -30	62
-30 ~ -20	63
-20 ~ -10	64
-10 ~ 0	65
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	70
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	75
100 ~ 110	76
110 ~ 120	76
120 ~ 130	77
130 ~ 140	78
140 ~ 150	78
150 ~ 160	79
160 ~ 170	80
170 ~ 180	80
180 ~ 190	81
190 ~ 200	82
200 ~ 210	82
210 ~ 220	83
220 ~ 230	83
230 ~ 240	84
240 ~ 250	84
250 ~ 260	85
260 ~ 270	85
270 ~ 280	85
280 ~ 290	86
290 ~ 300	86

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.27
Specific Gravity d	4.70
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	2.8	3.0	3.5	3.7	3.8	4.0	4.3	4.9	5.0	5.7	6.6	-
-60 ~ -40	2.7	2.9	3.5	3.7	3.7	4.0	4.3	4.9	5.0	5.8	6.6	-
-40 ~ -20	2.7	3.0	3.5	3.7	3.8	4.1	4.3	5.1	5.1	5.9	6.7	-
-20 ~ 0	2.8	3.1	3.6	3.8	3.9	4.2	4.6	5.2	5.3	6.1	6.9	-
0 ~ 20	2.9	3.2	3.8	4.0	4.0	4.4	4.7	5.4	5.5	6.3	7.2	-
20 ~ 40	3.1	3.4	4.0	4.2	4.2	4.6	4.9	5.6	5.7	6.6	7.6	-
40 ~ 60	3.3	3.6	4.2	4.4	4.4	4.8	5.1	5.8	5.9	6.9	7.9	-
60 ~ 80	3.4	3.7	4.4	4.5	4.6	5.0	5.4	6.1	6.2	7.1	8.1	-
80 ~ 100	3.5	3.9	4.5	4.7	4.8	5.2	5.5	6.3	6.4	7.4	8.4	-
100 ~ 120	3.7	4.0	4.7	4.9	5.0	5.3	5.7	6.5	6.6	7.6	8.6	-
120 ~ 140	3.8	4.1	4.8	5.0	5.1	5.5	5.9	6.7	6.8	7.8	8.9	-
140 ~ 160	3.8	4.2	4.9	5.1	5.2	5.6	6.0	6.8	6.9	8.0	9.2	-
160 ~ 180	3.8	4.2	4.9	5.3	5.3	5.7	6.1	7.0	7.1	8.2	9.3	-

S-LAH92

Code(d) 892371
Code(e) 898369

Refractive Index n_d	1.891 90 1.891 900	Abbe Number v_d	37.13	Dispersion $n_F - n_C$	0.024 019
Refractive Index n_e	1.897 597	Abbe Number v_e	36.88	Dispersion $n_{F'} - n_{C'}$	0.024 337

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.842 59
n_{1970}	1.970 09	1.849 27
n_{1530}	1.529 58	1.856 86
n_{1129}	1.128 64	1.864 60
n_t	1.013 98	1.867 52
n_s	0.852 11	1.873 05
$n_{A'}$	0.768 19	1.877 09
n_r	0.706 52	1.880 91
n_C	0.656 27	1.884 82
$n_{C'}$	0.643 85	1.885 93
$n_{\text{He-Ne}}$	0.632 8	1.886 98
n_D	0.589 29	1.891 69
n_d	0.587 56	1.891 90
n_e	0.546 07	1.897 60
n_F	0.486 13	1.908 84
$n_{F'}$	0.479 99	1.910 27
$n_{\text{He-Cd}}$	0.441 57	1.920 85
n_g	0.435 835	1.922 73
n_h	0.404 656	1.934 69
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.104 403 11E+00
A_2	3.583 461 61E-01
A_3	1.630 100 64E+00
B_1	1.085 318 11E-02
B_2	4.434 059 20E-02
B_3	1.232 498 00E+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	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	123.0
Rigidity Modulus G (GPa)	47.1
Poisson's Ratio σ	0.306
Knoop Hardness Hk[Class]	700 7
Abrasion Aa	63

Partial Dispersions	
$n_C - n_t$	0.017 302
$n_C - n_{A'}$	0.007 739
$n_d - n_C$	0.007 076
$n_e - n_C$	0.012 773
$n_g - n_d$	0.030 827
$n_g - n_F$	0.013 884
$n_h - n_g$	0.011 965
$n_i - n_g$	
$n_C - n_t$	0.018 412
$n_e - n_{C'}$	0.011 663
$n_{F'} - n_e$	0.012 674
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.720 3
$\theta_{C,A'}$	0.322 2
$\theta_{d,C}$	0.294 6
$\theta_{e,C}$	0.531 8
$\theta_{g,d}$	1.283 4
$\theta_{g,F}$	0.578 0
$\theta_{h,g}$	0.498 1
$\theta_{i,g}$	
$\theta'_{C,t}$	0.756 5
$\theta'_{e,C'}$	0.479 2
$\theta'_{F',e}$	0.520 8
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.000 6
$\Delta\theta_{C,A'}$	0.001 3
$\Delta\theta_{g,d}$	-0.004 2
$\Delta\theta_{g,F}$	-0.003 4
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	350
λ_{70}	400		
Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	349
CCI			
B	G	R	
0.00	2.55	2.68	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.08
360	0.28
370	0.52
380	0.69
390	0.80
400	0.87
420	0.936
440	0.962
460	0.976
480	0.984
500	0.990
550	0.997
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.992
2 000	0.977
2 200	0.946
2 400	0.82

Thermal Properties	
Strain Point StP (°C)	646
Annealing Point AP (°C)	678
Transformation Temperature Tg (°C)	692
Yield Point At (°C)	735
Softening Point SP (°C)	761
Expansion Coefficients (-30 °C ~ 70 °C)	72
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	85
Thermal Conductivity λ (W/(mK))	0.873

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	58
-90 ~ -80	59
-80 ~ -70	60
-70 ~ -60	62
-60 ~ -50	63
-50 ~ -40	64
-40 ~ -30	65
-30 ~ -20	67
-20 ~ -10	68
-10 ~ 0	69
0 ~ 10	70
10 ~ 20	71
20 ~ 30	72
30 ~ 40	73
40 ~ 50	74
50 ~ 60	75
60 ~ 70	76
70 ~ 80	77
80 ~ 90	78
90 ~ 100	78
100 ~ 110	79
110 ~ 120	80
120 ~ 130	81
130 ~ 140	82
140 ~ 150	82
150 ~ 160	83
160 ~ 170	84
170 ~ 180	84
180 ~ 190	85
190 ~ 200	85
200 ~ 210	86
210 ~ 220	86
220 ~ 230	87
230 ~ 240	87
240 ~ 250	88
250 ~ 260	88
260 ~ 270	89
270 ~ 280	89
280 ~ 290	89
290 ~ 300	90

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	2.1	2.3	2.9	3.2	3.2	3.6	3.9	4.6	4.8	5.7	6.8	-
-60 ~ -40	2.0	2.4	2.9	3.1	3.2	3.5	4.0	4.7	4.8	5.7	6.9	-
-40 ~ -20	2.1	2.4	3.0	3.2	3.4	3.7	4.1	4.8	4.9	5.9	7.1	-
-20 ~ 0	2.2	2.5	3.2	3.5	3.5	3.9	4.2	5.0	5.1	6.2	7.3	-
0 ~ 20	2.4	2.7	3.4	3.6	3.7	4.0	4.4	5.2	5.3	6.4	7.6	-
20 ~ 40	2.6	2.9	3.5	3.8	3.8	4.2	4.7	5.5	5.6	6.6	7.8	-
40 ~ 60	2.7	3.0	3.7	3.9	4.1	4.5	4.8	5.7	5.8	6.8	8.0	-
60 ~ 80	2.8	3.3	3.9	4.1	4.2	4.6	5.0	5.8	5.9	7.0	8.2	-
80 ~ 100	3.0	3.3	4.0	4.2	4.4	4.8	5.2	6.0	6.1	7.2	8.4	-
100 ~ 120	3.1	3.4	4.1	4.3	4.4	4.8	5.2	6.1	6.3	7.4	8.6	-
120 ~ 140	3.1	3.4	4.1	4.4	4.5	4.9	5.3	6.2	6.3	7.5	8.8	-
140 ~ 160	3.1	3.4	4.1	4.4	4.5	4.9	5.3	6.3	6.4	7.6	8.8	-
160 ~ 180	3.1	3.5	4.2	4.4	4.5	4.9	5.3	6.3	6.4	7.6	8.8	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.12
Specific Gravity d	4.87
Remarks	

OHARA 25-04

S-LAH93

Code(d) 905350
Code(e) 911348

Refractive Index n_d	1.905 25 1.905 250	Abbe Number v_d	35.04	Dispersion $n_F - n_C$	0.025 838
Refractive Index n_e	1.911 372	Abbe Number v_e	34.79	Dispersion $n_{F'} - n_{C'}$	0.026 200

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.854 01
n_{1970}	1.970 09	1.860 68
n_{1530}	1.529 58	1.868 34
n_{1129}	1.128 64	1.876 30
n_t	1.013 98	1.879 35
n_s	0.852 11	1.885 17
$n_{A'}$	0.768 19	1.889 44
n_r	0.706 52	1.893 50
n_C	0.656 27	1.897 68
$n_{C'}$	0.643 85	1.898 86
$n_{\text{He-Ne}}$	0.632 8	1.899 98
n_D	0.589 29	1.905 02
n_d	0.587 56	1.905 25
n_e	0.546 07	1.911 37
n_F	0.486 13	1.923 51
$n_{F'}$	0.479 99	1.925 06
$n_{\text{He-Cd}}$	0.441 57	1.936 58
n_g	0.435 835	1.938 62
n_h	0.404 656	1.951 76
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.178 843 78E+00
A_2	3.255 086 83E-01
A_3	1.706 086 46E+00
B_1	1.157 608 79E-02
B_2	4.959 825 03E-02
B_3	1.289 135 80E+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	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	124.7
Rigidity Modulus G (GPa)	47.8
Poisson's Ratio σ	0.304
Knoop Hardness Hk[Class]	690 7
Abrasion Aa	60

Partial Dispersions	
$n_C - n_t$	0.018 330
$n_C - n_{A'}$	0.008 240
$n_d - n_C$	0.007 573
$n_e - n_C$	0.013 695
$n_g - n_d$	0.033 374
$n_g - n_F$	0.015 109
$n_h - n_g$	0.013 137
$n_i - n_g$	
$n_{C'} - n_t$	0.019 516
$n_e - n_{C'}$	0.012 509
$n_{F'} - n_e$	0.013 691
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.709 4
$\theta_{C,A'}$	0.318 9
$\theta_{d,C}$	0.293 1
$\theta_{e,C}$	0.530 0
$\theta_{g,d}$	1.291 7
$\theta_{g,F}$	0.584 8
$\theta_{h,g}$	0.508 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.744 9
$\theta'_{e,C'}$	0.477 4
$\theta'_{F',e}$	0.522 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.001 7
$\Delta\theta_{C,A'}$	0.000 6
$\Delta\theta_{g,d}$	-0.000 2
$\Delta\theta_{g,F}$	0.000 0
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	355
λ_{70}	410		
Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	353
CCI			
B	G	R	
0.00	3.75	3.96	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.22
370	0.48
380	0.65
390	0.75
400	0.82
420	0.901
440	0.938
460	0.959
480	0.974
500	0.984
550	0.996
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.993
2 000	0.979
2 200	0.952
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	645
Annealing Point AP (°C)	672
Transformation Temperature Tg (°C)	688
Yield Point At (°C)	733
Softening Point SP (°C)	761
Expansion Coefficients (-30 °C ~ 70 °C)	74
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	89
Thermal Conductivity λ (W/(mK))	0.892

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	60
-90 ~ -80	61
-80 ~ -70	63
-70 ~ -60	64
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	72
10 ~ 20	73
20 ~ 30	74
30 ~ 40	76
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	85
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	88
180 ~ 190	88
190 ~ 200	89
200 ~ 210	89
210 ~ 220	90
220 ~ 230	91
230 ~ 240	91
240 ~ 250	92
250 ~ 260	92
260 ~ 270	93
270 ~ 280	93
280 ~ 290	93
290 ~ 300	94

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	2.3	2.5	3.2	3.4	3.5	3.8	4.1	5.0	5.1	6.1	7.4	-
-60 ~ -40	2.3	2.6	3.2	3.5	3.5	3.9	4.3	5.1	5.2	6.3	7.5	-
-40 ~ -20	2.4	2.7	3.4	3.6	3.7	4.0	4.4	5.3	5.4	6.6	7.8	-
-20 ~ 0	2.5	2.8	3.6	3.8	3.8	4.2	4.6	5.5	5.6	6.8	8.1	-
0 ~ 20	2.7	3.1	3.8	4.0	4.1	4.5	4.9	5.8	5.9	7.2	8.5	-
20 ~ 40	2.9	3.2	3.9	4.3	4.3	4.8	5.2	6.1	6.2	7.5	8.8	-
40 ~ 60	3.0	3.4	4.1	4.5	4.6	5.0	5.4	6.4	6.5	7.8	9.2	-
60 ~ 80	3.2	3.6	4.4	4.6	4.7	5.2	5.6	6.6	6.7	8.0	9.6	-
80 ~ 100	3.3	3.7	4.5	4.7	4.9	5.4	5.8	6.9	7.0	8.4	9.9	-
100 ~ 120	3.4	3.8	4.6	4.9	5.0	5.4	6.0	7.1	7.2	8.6	10.2	-
120 ~ 140	3.4	3.9	4.7	5.0	5.1	5.5	6.0	7.2	7.4	8.8	10.4	-
140 ~ 160	3.5	3.9	4.7	5.0	5.1	5.6	6.2	7.3	7.5	8.9	10.6	-
160 ~ 180	3.5	3.9	4.8	5.1	5.2	5.7	6.2	7.4	7.5	9.0	10.7	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.10
Specific Gravity d	4.83
Remarks	

OHARA 25-04

Refractive Index n_d	1.903 66 1.903 660	Abbe Number v_d	31.34	Dispersion $n_F - n_C$	0.028 832
Refractive Index n_e	1.910 476	Abbe Number v_e	31.10	Dispersion $n_{F'} - n_{C'}$	0.029 272

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.848 25
n_{1970}	1.970 09	1.855 30
n_{1530}	1.529 58	1.863 42
n_{1129}	1.128 64	1.871 94
n_t	1.013 98	1.875 23
n_s	0.852 11	1.881 55
$n_{A'}$	0.768 19	1.886 22
n_r	0.706 52	1.890 68
n_C	0.656 27	1.895 28
$n_{C'}$	0.643 85	1.896 59
$n_{\text{He-Ne}}$	0.632 8	1.897 82
n_D	0.589 29	1.903 41
n_d	0.587 56	1.903 66
n_e	0.546 07	1.910 48
n_F	0.486 13	1.924 11
$n_{F'}$	0.479 99	1.925 86
$n_{\text{He-Cd}}$	0.441 57	1.938 96
n_g	0.435 835	1.941 30
n_h	0.404 656	1.956 48
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.156 366 17E+00
A_2	3.295 581 78E-01
A_3	1.721 789 35E+00
B_1	1.228 805 10E-02
B_2	5.555 078 35E-02
B_3	1.244 393 40E+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	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	117.7
Rigidity Modulus G (GPa)	45.2
Poisson's Ratio σ	0.302
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	85

Partial Dispersions	
$n_C - n_t$	0.020 047
$n_C - n_{A'}$	0.009 057
$n_d - n_C$	0.008 383
$n_e - n_C$	0.015 199
$n_g - n_d$	0.037 641
$n_g - n_F$	0.017 192
$n_h - n_g$	0.015 178
$n_i - n_g$	
$n_{C'} - n_t$	0.021 356
$n_e - n_{C'}$	0.013 890
$n_{F'} - n_e$	0.015 382
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.695 3
$\theta_{C,A'}$	0.314 1
$\theta_{d,C}$	0.290 8
$\theta_{e,C}$	0.527 2
$\theta_{g,d}$	1.305 5
$\theta_{g,F}$	0.596 3
$\theta_{h,g}$	0.526 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.729 6
$\theta'_{e,C'}$	0.474 5
$\theta'_{F,e}$	0.525 5
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 6
$\Delta\theta_{C,A'}$	0.000 3
$\Delta\theta_{g,d}$	0.005 9
$\Delta\theta_{g,F}$	0.005 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	360
λ_{70}	410		
Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	360
CCI			
B	G	R	
0.00	4.11	4.35	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.06
370	0.31
380	0.56
390	0.71
400	0.80
420	0.89
440	0.934
460	0.956
480	0.970
500	0.980
550	0.992
600	0.995
650	0.996
700	0.997
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.997
1 600	0.995
1 800	0.988
2 000	0.972
2 200	0.933
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	615
Annealing Point AP (°C)	638
Transformation Temperature Tg (°C)	650
Yield Point At (°C)	686
Softening Point SP (°C)	713
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	87
Thermal Conductivity λ (W/(mK))	0.861

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	59
-90 ~ -80	60
-80 ~ -70	62
-70 ~ -60	63
-60 ~ -50	64
-50 ~ -40	65
-40 ~ -30	66
-30 ~ -20	68
-20 ~ -10	69
-10 ~ 0	70
0 ~ 10	71
10 ~ 20	72
20 ~ 30	73
30 ~ 40	74
40 ~ 50	75
50 ~ 60	76
60 ~ 70	77
70 ~ 80	78
80 ~ 90	79
90 ~ 100	80
100 ~ 110	81
110 ~ 120	81
120 ~ 130	82
130 ~ 140	83
140 ~ 150	84
150 ~ 160	85
160 ~ 170	85
170 ~ 180	86
180 ~ 190	87
190 ~ 200	87
200 ~ 210	88
210 ~ 220	89
220 ~ 230	89
230 ~ 240	90
240 ~ 250	90
250 ~ 260	91
260 ~ 270	91
270 ~ 280	92
280 ~ 290	92
290 ~ 300	93

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	1.4	1.6	2.4	2.6	2.6	3.0	3.4	4.3	4.5	5.6	7.1	-
-60 ~ -40	1.4	1.7	2.4	2.7	2.8	3.1	3.5	4.4	4.6	5.9	7.3	-
-40 ~ -20	1.5	1.9	2.6	2.8	2.9	3.3	3.7	4.7	4.8	6.2	7.7	-
-20 ~ 0	1.7	2.0	2.8	3.1	3.1	3.6	4.0	5.1	5.2	6.6	8.1	-
0 ~ 20	1.9	2.3	3.1	3.3	3.4	3.8	4.3	5.3	5.5	7.0	8.6	-
20 ~ 40	2.1	2.5	3.2	3.6	3.7	4.1	4.6	5.7	5.8	7.3	9.0	-
40 ~ 60	2.3	2.7	3.5	3.7	3.9	4.4	4.9	6.0	6.1	7.6	9.4	-
60 ~ 80	2.4	2.9	3.7	4.0	4.1	4.6	5.1	6.2	6.4	8.0	9.9	-
80 ~ 100	2.6	3.0	3.8	4.1	4.3	4.8	5.4	6.5	6.7	8.3	10.2	-
100 ~ 120	2.7	3.1	4.0	4.3	4.4	4.9	5.5	6.8	6.9	8.6	10.5	-
120 ~ 140	2.7	3.2	4.1	4.4	4.5	5.0	5.6	6.9	7.1	8.8	10.8	-
140 ~ 160	2.7	3.2	4.1	4.4	4.5	5.1	5.8	7.0	7.2	9.0	11.0	-
160 ~ 180	2.8	3.2	4.2	4.5	4.6	5.2	5.8	7.1	7.3	9.1	11.1	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.43
Specific Gravity d	4.64
Remarks	

S-LAH96

Code(d) 764485
Code(e) 768482

Refractive Index n_d	1.763 85 1.763 850	Abbe Number v_d	48.49	Dispersion $n_F - n_C$	0.015 753
Refractive Index n_e	1.767 599	Abbe Number v_e	48.21	Dispersion $n_{F'} - n_{C'}$	0.015 923

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.725 43
n_{1970}	1.970 09	1.731 68
n_{1530}	1.529 58	1.738 48
n_{1129}	1.128 64	1.744 81
n_t	1.013 98	1.747 02
n_s	0.852 11	1.751 03
$n_{A'}$	0.768 19	1.753 85
n_r	0.706 52	1.756 48
n_C	0.656 27	1.759 13
$n_{C'}$	0.643 85	1.759 88
$n_{\text{He-Ne}}$	0.632 8	1.760 57
n_D	0.589 29	1.763 71
n_d	0.587 56	1.763 85
n_e	0.546 07	1.767 60
n_F	0.486 13	1.774 88
$n_{F'}$	0.479 99	1.775 80
$n_{\text{He-Cd}}$	0.441 57	1.782 51
n_g	0.435 835	1.783 69
n_h	0.404 656	1.791 12
n_i	0.365 015	1.804 05

Constants of Dispersion Formula	
A_1	1.850 785 19E+00
A_2	1.892 048 54E-01
A_3	1.197 631 37E+00
B_1	9.406 575 41E-03
B_2	3.803 451 87E-02
B_3	1.014 268 35E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	118.7
Rigidity Modulus G (GPa)	45.8
Poisson's Ratio σ	0.296
Knoop Hardness Hk[Class]	690 7
Abrasion Aa	81

Partial Dispersions	
$n_C - n_t$	0.012 108
$n_C - n_{A'}$	0.005 277
$n_d - n_C$	0.004 721
$n_e - n_C$	0.008 470
$n_g - n_d$	0.019 837
$n_g - n_F$	0.008 805
$n_h - n_g$	0.007 429
$n_i - n_g$	0.020 364
$n_C - n_t$	0.012 854
$n_e - n_{C'}$	0.007 724
$n_{F'} - n_e$	0.008 199
$n_i - n_{F'}$	0.028 253

Relative Partial Dispersions	
$\theta_{C,t}$	0.768 6
$\theta_{C,A'}$	0.335 0
$\theta_{d,C}$	0.299 7
$\theta_{e,C}$	0.537 7
$\theta_{g,d}$	1.259 3
$\theta_{g,F}$	0.558 9
$\theta_{h,g}$	0.471 6
$\theta_{i,g}$	1.292 7
$\theta'_{C,t}$	0.807 3
$\theta'_{e,C'}$	0.485 1
$\theta'_{F,e}$	0.514 9
$\theta'_{i,F'}$	1.774 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.005 6
$\Delta\theta_{C,A'}$	0.000 4
$\Delta\theta_{g,d}$	-0.004 7
$\Delta\theta_{g,F}$	-0.004 1
$\Delta\theta_{i,g}$	-0.026 3

Coloring			
λ_{80}	400	λ_5	345
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	342
CCI			
B	G	R	
0.00	1.09	1.11	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.02
350	0.19
360	0.48
370	0.71
380	0.83
390	0.905
400	0.941
420	0.972
440	0.982
460	0.988
480	0.992
500	0.994
550	0.996
600	0.996
650	0.996
700	0.997
800	0.997
900	0.996
1 000	0.996
1 200	0.997
1 400	0.995
1 600	0.995
1 800	0.989
2 000	0.972
2 200	0.930
2 400	0.76

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	632
Yield Point At (°C)	660
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	71
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	85
Thermal Conductivity λ (W/(mK))	0.890

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	57
-90 ~ -80	58
-80 ~ -70	59
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	65
-20 ~ -10	67
-10 ~ 0	68
0 ~ 10	69
10 ~ 20	70
20 ~ 30	71
30 ~ 40	72
40 ~ 50	73
50 ~ 60	74
60 ~ 70	75
70 ~ 80	76
80 ~ 90	77
90 ~ 100	78
100 ~ 110	79
110 ~ 120	80
120 ~ 130	80
130 ~ 140	81
140 ~ 150	82
150 ~ 160	83
160 ~ 170	84
170 ~ 180	84
180 ~ 190	85
190 ~ 200	86
200 ~ 210	86
210 ~ 220	87
220 ~ 230	87
230 ~ 240	88
240 ~ 250	89
250 ~ 260	89
260 ~ 270	90
270 ~ 280	90
280 ~ 290	90
290 ~ 300	91

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	1.5	1.8	2.1	2.2	2.3	2.4	2.6	3.1	3.2	3.6	4.2	5.1
-60 ~ -40	1.5	1.6	2.0	2.1	2.2	2.3	2.6	3.0	3.1	3.6	4.1	5.1
-40 ~ -20	1.4	1.7	2.0	2.2	2.2	2.4	2.6	3.0	3.1	3.7	4.2	5.2
-20 ~ 0	1.5	1.7	2.1	2.2	2.2	2.4	2.8	3.2	3.2	3.8	4.3	5.3
0 ~ 20	1.5	1.7	2.1	2.4	2.4	2.6	2.8	3.3	3.4	3.9	4.5	5.6
20 ~ 40	1.6	1.8	2.3	2.4	2.5	2.7	2.9	3.5	3.5	4.1	4.7	5.8
40 ~ 60	1.7	1.9	2.4	2.5	2.7	2.9	3.1	3.6	3.7	4.3	4.9	6.0
60 ~ 80	1.8	2.1	2.5	2.7	2.7	3.0	3.2	3.7	3.8	4.4	5.0	6.3
80 ~ 100	1.9	2.1	2.7	2.8	2.9	3.1	3.4	3.9	3.9	4.6	5.2	6.4
100 ~ 120	1.9	2.2	2.7	2.8	3.0	3.2	3.5	4.0	4.1	4.7	5.4	6.6
120 ~ 140	1.9	2.3	2.8	3.0	3.0	3.3	3.5	4.1	4.2	4.8	5.5	6.8
140 ~ 160	2.0	2.3	2.8	3.0	3.0	3.3	3.6	4.2	4.2	4.9	5.6	6.9
160 ~ 180	2.0	2.3	2.8	3.0	3.0	3.3	3.6	4.2	4.2	4.9	5.6	7.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.12
Specific Gravity d	4.54
Remarks	

OHARA 25-04

Refractive Index n_d	1.755 00 1.755 000	Abbe Number v_d	52.32	Dispersion $n_F - n_C$	0.014 431
Refractive Index n_e	1.758 440	Abbe Number v_e	52.08	Dispersion $n_{F'} - n_{C'}$	0.014 562

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.714 14
n_{1970}	1.970 09	1.721 71
n_{1530}	1.529 58	1.729 70
n_{1129}	1.128 64	1.736 66
n_t	1.013 98	1.738 95
n_s	0.852 11	1.742 93
$n_{A'}$	0.768 19	1.745 65
n_r	0.706 52	1.748 14
n_C	0.656 27	1.750 63
$n_{C'}$	0.643 85	1.751 32
$n_{\text{He-Ne}}$	0.632 8	1.751 97
n_D	0.589 29	1.754 87
n_d	0.587 56	1.755 00
n_e	0.546 07	1.758 44
n_F	0.486 13	1.765 06
$n_{F'}$	0.479 99	1.765 88
$n_{\text{He-Cd}}$	0.441 57	1.771 91
n_g	0.435 835	1.772 96
n_h	0.404 656	1.779 54
n_i	0.365 015	1.790 82

Constants of Dispersion Formula	
A_1	1.027 301 80E+00
A_2	9.892 935 64E-01
A_3	1.257 810 57E+00
B_1	1.834 061 29E-02
B_2	3.712 641 95E-03
B_3	8.785 105 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	120.9
Rigidity Modulus G (GPa)	46.7
Poisson's Ratio σ	0.295
Knoop Hardness Hk[Class]	730 7
Abrasion Aa	62

Partial Dispersions	
$n_C - n_t$	0.011 678
$n_C - n_{A'}$	0.004 974
$n_d - n_C$	0.004 373
$n_e - n_C$	0.007 813
$n_g - n_d$	0.017 958
$n_g - n_F$	0.007 900
$n_h - n_g$	0.006 585
$n_i - n_g$	0.017 860
$n_C - n_t$	0.012 373
$n_e - n_{C'}$	0.007 118
$n_{F'} - n_e$	0.007 444
$n_i - n_{F'}$	0.024 934

Relative Partial Dispersions	
$\theta_{C,t}$	0.809 2
$\theta_{C,A'}$	0.344 7
$\theta_{d,C}$	0.303 0
$\theta_{e,C}$	0.541 4
$\theta_{g,d}$	1.244 4
$\theta_{g,F}$	0.547 4
$\theta_{h,g}$	0.456 3
$\theta_{i,g}$	1.237 6
$\theta'_{C,t}$	0.849 7
$\theta'_{e,C'}$	0.488 8
$\theta'_{F,e}$	0.511 2
$\theta'_{i,F'}$	1.712 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.017 0
$\Delta\theta_{C,A'}$	0.005 4
$\Delta\theta_{g,d}$	-0.011 7
$\Delta\theta_{g,F}$	-0.009 4
$\Delta\theta_{i,g}$	-0.049 3

Coloring			
λ_{80}	355	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	328	$\lambda_{0.05}$	272
CCI			
B	G	R	
0.00	0.21	0.21	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.28
290	0.43
300	0.55
310	0.65
320	0.74
330	0.82
340	0.88
350	0.923
360	0.951
370	0.969
380	0.980
390	0.986
400	0.990
420	0.993
440	0.995
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.994
1 800	0.984
2 000	0.956
2 200	0.87
2 400	0.61

Thermal Properties	
Strain Point StP (°C)	644
Annealing Point AP (°C)	670
Transformation Temperature Tg (°C)	690
Yield Point At (°C)	710
Softening Point SP (°C)	721
Expansion Coefficients (-30 °C ~ 70 °C)	60
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	74
Thermal Conductivity λ (W/(mK))	0.863

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	47
-90 ~ -80	48
-80 ~ -70	50
-70 ~ -60	51
-60 ~ -50	52
-50 ~ -40	53
-40 ~ -30	54
-30 ~ -20	55
-20 ~ -10	56
-10 ~ 0	57
0 ~ 10	58
10 ~ 20	59
20 ~ 30	60
30 ~ 40	61
40 ~ 50	62
50 ~ 60	63
60 ~ 70	64
70 ~ 80	65
80 ~ 90	66
90 ~ 100	67
100 ~ 110	68
110 ~ 120	68
120 ~ 130	69
130 ~ 140	70
140 ~ 150	71
150 ~ 160	71
160 ~ 170	72
170 ~ 180	73
180 ~ 190	73
190 ~ 200	74
200 ~ 210	75
210 ~ 220	75
220 ~ 230	76
230 ~ 240	76
240 ~ 250	77
250 ~ 260	77
260 ~ 270	78
270 ~ 280	78
280 ~ 290	79
290 ~ 300	79

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.39
Specific Gravity d	4.17
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	2.4	2.7	2.9	3.0	3.0	3.2	3.3	3.7	3.7	4.1	4.4	5.1
-60 ~ -40	2.2	2.5	2.8	2.9	2.9	3.0	3.2	3.6	3.6	4.0	4.3	5.1
-40 ~ -20	2.2	2.4	2.8	2.9	2.9	3.1	3.2	3.5	3.6	3.9	4.4	5.1
-20 ~ 0	2.3	2.5	2.8	2.9	2.9	3.1	3.2	3.7	3.7	4.1	4.5	5.2
0 ~ 20	2.4	2.5	2.9	3.1	3.0	3.3	3.4	3.8	3.8	4.2	4.6	5.3
20 ~ 40	2.5	2.7	3.0	3.1	3.1	3.3	3.5	3.9	4.0	4.4	4.8	5.6
40 ~ 60	2.6	2.8	3.1	3.2	3.3	3.5	3.7	4.1	4.1	4.6	5.0	5.8
60 ~ 80	2.7	2.9	3.3	3.4	3.5	3.6	3.8	4.2	4.3	4.7	5.1	6.1
80 ~ 100	2.8	3.0	3.5	3.6	3.6	3.8	4.0	4.4	4.5	4.9	5.4	6.2
100 ~ 120	2.9	3.1	3.5	3.7	3.8	4.0	4.2	4.6	4.6	5.1	5.6	6.4
120 ~ 140	3.0	3.3	3.7	3.9	3.9	4.1	4.3	4.7	4.8	5.3	5.8	6.6
140 ~ 160	3.2	3.4	3.8	4.0	4.0	4.2	4.4	4.8	4.9	5.4	5.9	6.8
160 ~ 180	3.2	3.4	3.9	4.0	4.1	4.3	4.5	4.9	5.0	5.5	6.0	7.0

Refractive Index n_d	1.953 75 1.953 750	Abbe Number v_d	32.32	Dispersion $n_F - n_C$	0.029 506
Refractive Index n_e	1.960 733	Abbe Number v_e	32.09	Dispersion $n_{F'} - n_{C'}$	0.029 940

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.897 37
n_{1970}	1.970 09	1.904 36
n_{1530}	1.529 58	1.912 50
n_{1129}	1.128 64	1.921 15
n_t	1.013 98	1.924 52
n_s	0.852 11	1.931 02
$n_{A'}$	0.768 19	1.935 82
n_r	0.706 52	1.940 42
n_C	0.656 27	1.945 14
$n_{C'}$	0.643 85	1.946 49
$n_{\text{He-Ne}}$	0.632 8	1.947 75
n_D	0.589 29	1.953 49
n_d	0.587 56	1.953 75
n_e	0.546 07	1.960 73
n_F	0.486 13	1.974 65
$n_{F'}$	0.479 99	1.976 43
$n_{\text{He-Cd}}$	0.441 57	1.989 70
n_g	0.435 835	1.992 07
n_h	0.404 656	2.007 32
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.285 106 29E+00
A_2	3.855 322 64E-01
A_3	2.065 511 20E+00
B_1	1.221 789 62E-02
B_2	5.147 523 42E-02
B_3	1.459 208 70E+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	3.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	129.3
Rigidity Modulus G (GPa)	49.5
Poisson's Ratio σ	0.306
Knoop Hardness Hk[Class]	730 7
Abrasion Aa	55

Partial Dispersions	
$n_C - n_t$	0.020 620
$n_C - n_{A'}$	0.009 319
$n_d - n_C$	0.008 609
$n_e - n_C$	0.015 592
$n_g - n_d$	0.038 320
$n_g - n_F$	0.017 423
$n_h - n_g$	0.015 249
$n_i - n_g$	
$n_C - n_t$	0.021 965
$n_e - n_{C'}$	0.014 247
$n_{F'} - n_e$	0.015 693
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.698 8
$\theta_{C,A'}$	0.315 8
$\theta_{d,C}$	0.291 8
$\theta_{e,C}$	0.528 4
$\theta_{g,d}$	1.298 7
$\theta_{g,F}$	0.590 5
$\theta_{h,g}$	0.516 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.733 6
$\theta'_{e,C'}$	0.475 9
$\theta'_{F,e}$	0.524 1
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 5
$\Delta\theta_{C,A'}$	0.000 8
$\Delta\theta_{g,d}$	0.001 1
$\Delta\theta_{g,F}$	0.001 3
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	355
λ_{70}	405		
Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	352
CCI			
B	G	R	
0.00	2.90	3.06	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.02
360	0.18
370	0.47
380	0.68
390	0.80
400	0.86
420	0.927
440	0.953
460	0.967
480	0.978
500	0.986
550	0.996
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.993
2 000	0.979
2 200	0.952
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	680
Annealing Point AP (°C)	716
Transformation Temperature Tg (°C)	724
Yield Point At (°C)	757
Softening Point SP (°C)	791
Expansion Coefficients (-30 °C ~ 70 °C)	74
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	88
Thermal Conductivity λ (W/(mK))	0.924

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	60
-90 ~ -80	61
-80 ~ -70	63
-70 ~ -60	64
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	72
10 ~ 20	74
20 ~ 30	75
30 ~ 40	76
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	80
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	85
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	87
180 ~ 190	88
190 ~ 200	89
200 ~ 210	89
210 ~ 220	90
220 ~ 230	90
230 ~ 240	91
240 ~ 250	91
250 ~ 260	92
260 ~ 270	92
270 ~ 280	92
280 ~ 290	93
290 ~ 300	93

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.86
Specific Gravity d	4.94
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	1.1	1.4	2.1	2.3	2.3	2.7	3.0	4.0	4.1	5.2	6.7	-
-60 ~ -40	1.0	1.4	2.0	2.2	2.3	2.7	3.1	4.0	4.1	5.3	6.8	-
-40 ~ -20	1.2	1.5	2.1	2.3	2.4	2.8	3.3	4.2	4.3	5.6	7.2	-
-20 ~ 0	1.3	1.6	2.2	2.5	2.5	3.1	3.5	4.4	4.6	5.9	7.5	-
0 ~ 20	1.4	1.7	2.4	2.7	2.8	3.3	3.7	4.7	4.9	6.2	7.8	-
20 ~ 40	1.5	1.9	2.7	2.9	3.0	3.5	3.9	5.0	5.1	6.6	8.3	-
40 ~ 60	1.8	2.1	2.9	3.2	3.2	3.7	4.2	5.3	5.4	7.0	8.7	-
60 ~ 80	1.9	2.2	3.0	3.3	3.4	3.9	4.4	5.6	5.8	7.3	9.1	-
80 ~ 100	1.9	2.4	3.3	3.5	3.6	4.1	4.6	5.8	6.0	7.6	9.4	-
100 ~ 120	2.0	2.4	3.3	3.7	3.8	4.3	4.9	6.1	6.2	7.9	9.8	-
120 ~ 140	2.1	2.5	3.5	3.8	3.9	4.4	5.0	6.2	6.4	8.1	10.1	-
140 ~ 160	2.1	2.6	3.6	3.9	4.0	4.5	5.1	6.4	6.6	8.3	10.4	-
160 ~ 180	2.2	2.6	3.6	3.9	4.0	4.6	5.2	6.5	6.7	8.5	10.6	-

Refractive Index n_d	2.001 00 2.001 000	Abbe Number v_d	29.14	Dispersion $n_F - n_C$	0.034 352
Refractive Index n_e	2.009 118	Abbe Number v_e	28.92	Dispersion $n_{F'} - n_{C'}$	0.034 895

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.938 63
n_{1970}	1.970 09	1.945 85
n_{1530}	1.529 58	1.954 40
n_{1129}	1.128 64	1.963 80
n_t	1.013 98	1.967 56
n_s	0.852 11	1.974 88
$n_{A'}$	0.768 19	1.980 35
n_r	0.706 52	1.985 61
n_C	0.656 27	1.991 05
$n_{C'}$	0.643 85	1.992 60
$n_{\text{He-Ne}}$	0.632 8	1.994 06
n_D	0.589 29	2.000 70
n_d	0.587 56	2.001 00
n_e	0.546 07	2.009 12
n_F	0.486 13	2.025 40
$n_{F'}$	0.479 99	2.027 49
$n_{\text{He-Cd}}$	0.441 57	2.043 19
n_g	0.435 835	2.046 00
n_h	0.404 656	2.064 24
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.391 406 62E+00
A_2	4.392 192 28E-01
A_3	2.383 584 67E+00
B_1	1.314 675 00E-02
B_2	5.532 260 42E-02
B_3	1.612 599 00E+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	2.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	131.3
Rigidity Modulus G (GPa)	50.2
Poisson's Ratio σ	0.307
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	55

Partial Dispersions	
$n_C - n_t$	0.023 490
$n_C - n_{A'}$	0.010 695
$n_d - n_C$	0.009 952
$n_e - n_C$	0.018 070
$n_g - n_d$	0.045 001
$n_g - n_F$	0.020 601
$n_h - n_g$	0.018 235
$n_i - n_g$	
$n_C - n_t$	0.025 041
$n_e - n_{C'}$	0.016 519
$n_{F'} - n_e$	0.018 376
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.683 8
$\theta_{C,A'}$	0.311 3
$\theta_{d,C}$	0.289 7
$\theta_{e,C}$	0.526 0
$\theta_{g,d}$	1.310 0
$\theta_{g,F}$	0.599 7
$\theta_{h,g}$	0.530 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.717 6
$\theta'_{e,C'}$	0.473 4
$\theta'_{F,e}$	0.526 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 4
$\Delta\theta_{C,A'}$	0.000 1
$\Delta\theta_{g,d}$	0.005 8
$\Delta\theta_{g,F}$	0.005 4
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	360
λ_{70}	425		
Internal transmission			
$\lambda_{0.80}$	407	$\lambda_{0.05}$	360
CCI			
B	G	R	
0.00	5.00	5.23	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.25
380	0.49
390	0.66
400	0.76
420	0.87
440	0.924
460	0.951
480	0.968
500	0.980
550	0.995
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.995
2 000	0.983
2 200	0.964
2 400	0.88

Thermal Properties	
Strain Point StP (°C)	682
Annealing Point AP (°C)	718
Transformation Temperature Tg (°C)	727
Yield Point At (°C)	763
Softening Point SP (°C)	792
Expansion Coefficients (-30 °C ~ 70 °C)	76
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	90
Thermal Conductivity λ (W/(mK))	0.944

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	62
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	70
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	84
120 ~ 130	85
130 ~ 140	86
140 ~ 150	87
150 ~ 160	87
160 ~ 170	88
170 ~ 180	89
180 ~ 190	89
190 ~ 200	90
200 ~ 210	91
210 ~ 220	91
220 ~ 230	92
230 ~ 240	92
240 ~ 250	93
250 ~ 260	93
260 ~ 270	94
270 ~ 280	94
280 ~ 290	94
290 ~ 300	95

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.76
Specific Gravity d	5.02
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	0.7	1.0	1.7	2.0	2.1	2.5	2.9	4.0	4.2	5.5	7.2	-
-60 ~ -40	0.6	0.9	1.7	2.0	2.0	2.5	2.9	4.1	4.2	5.7	7.5	-
-40 ~ -20	0.6	1.0	1.8	2.1	2.2	2.6	3.1	4.3	4.5	6.0	7.8	-
-20 ~ 0	0.7	1.2	2.0	2.3	2.4	2.8	3.3	4.6	4.8	6.3	8.2	-
0 ~ 20	0.9	1.3	2.2	2.5	2.6	3.1	3.6	4.8	5.0	6.7	8.7	-
20 ~ 40	1.1	1.5	2.4	2.7	2.8	3.3	4.0	5.2	5.4	7.1	9.1	-
40 ~ 60	1.3	1.7	2.6	2.9	3.0	3.6	4.2	5.6	5.8	7.5	9.6	-
60 ~ 80	1.4	1.8	2.8	3.2	3.2	3.9	4.5	5.9	6.1	7.9	10.1	-
80 ~ 100	1.6	2.1	3.1	3.4	3.5	4.1	4.7	6.1	6.3	8.4	10.6	-
100 ~ 120	1.7	2.2	3.3	3.6	3.7	4.4	5.0	6.4	6.7	8.6	11.0	-
120 ~ 140	1.8	2.4	3.4	3.8	3.9	4.6	5.2	6.7	6.9	9.0	11.4	-
140 ~ 160	1.9	2.4	3.5	3.9	4.1	4.7	5.4	7.0	7.2	9.3	11.8	-
160 ~ 180	2.0	2.5	3.6	4.0	4.1	4.8	5.5	7.1	7.4	9.6	12.2	-

S-LAH99W

Code(d) 001291
Code(e) 009289

Refractive Index n_d	2.001 00 2.001 000	Abbe Number v_d	29.14	Dispersion $n_F - n_C$	0.034 352
Refractive Index n_e	2.009 118	Abbe Number v_e	28.92	Dispersion $n_{F'} - n_{C'}$	0.034 895

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.938 63
n_{1970}	1.970 09	1.945 85
n_{1530}	1.529 58	1.954 40
n_{1129}	1.128 64	1.963 80
n_t	1.013 98	1.967 56
n_s	0.852 11	1.974 88
$n_{A'}$	0.768 19	1.980 35
n_r	0.706 52	1.985 61
n_C	0.656 27	1.991 05
$n_{C'}$	0.643 85	1.992 60
$n_{\text{He-Ne}}$	0.632 8	1.994 06
n_D	0.589 29	2.000 70
n_d	0.587 56	2.001 00
n_e	0.546 07	2.009 12
n_F	0.486 13	2.025 40
$n_{F'}$	0.479 99	2.027 49
$n_{\text{He-Cd}}$	0.441 57	2.043 19
n_g	0.435 835	2.046 00
n_h	0.404 656	2.064 24
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.391 406 62E+00
A_2	4.392 192 28E-01
A_3	2.383 584 67E+00
B_1	1.314 675 00E-02
B_2	5.532 260 42E-02
B_3	1.612 599 00E+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	2.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	131.3
Rigidity Modulus G (GPa)	50.2
Poisson's Ratio σ	0.307
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	55

Partial Dispersions	
$n_C - n_t$	0.023 490
$n_C - n_{A'}$	0.010 695
$n_d - n_C$	0.009 952
$n_e - n_C$	0.018 070
$n_g - n_d$	0.045 001
$n_g - n_F$	0.020 601
$n_h - n_g$	0.018 235
$n_i - n_g$	
$n_C - n_t$	0.025 041
$n_e - n_{C'}$	0.016 519
$n_{F'} - n_e$	0.018 376
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.683 8
$\theta_{C,A'}$	0.311 3
$\theta_{d,C}$	0.289 7
$\theta_{e,C}$	0.526 0
$\theta_{g,d}$	1.310 0
$\theta_{g,F}$	0.599 7
$\theta_{h,g}$	0.530 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.717 6
$\theta'_{e,C'}$	0.473 4
$\theta'_{F',e}$	0.526 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 4
$\Delta\theta_{C,A'}$	0.000 1
$\Delta\theta_{g,d}$	0.005 8
$\Delta\theta_{g,F}$	0.005 4
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	360
λ_{70}	405		
Internal transmission			
$\lambda_{0.80}$	393	$\lambda_{0.05}$	358
CCI			
B	G	R	
0.00	2.83	2.98	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.06
370	0.31
380	0.61
390	0.78
400	0.86
420	0.933
440	0.959
460	0.973
480	0.982
500	0.988
550	0.996
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.998
1 800	0.992
2 000	0.980
2 200	0.955
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	682
Annealing Point AP (°C)	718
Transformation Temperature Tg (°C)	727
Yield Point At (°C)	763
Softening Point SP (°C)	792
Expansion Coefficients (-30 °C ~ 70 °C)	76
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	90
Thermal Conductivity λ (W/(mK))	0.944

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	62
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	70
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	84
120 ~ 130	85
130 ~ 140	86
140 ~ 150	87
150 ~ 160	87
160 ~ 170	88
170 ~ 180	89
180 ~ 190	89
190 ~ 200	90
200 ~ 210	91
210 ~ 220	91
220 ~ 230	92
230 ~ 240	92
240 ~ 250	93
250 ~ 260	93
260 ~ 270	94
270 ~ 280	94
280 ~ 290	94
290 ~ 300	95

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	0.7	1.0	1.7	2.0	2.1	2.5	2.9	4.0	4.2	5.5	7.2	-
-60 ~ -40	0.6	0.9	1.7	2.0	2.0	2.5	2.9	4.1	4.2	5.7	7.5	-
-40 ~ -20	0.6	1.0	1.8	2.1	2.2	2.6	3.1	4.3	4.5	6.0	7.8	-
-20 ~ 0	0.7	1.2	2.0	2.3	2.4	2.8	3.3	4.6	4.8	6.3	8.2	-
0 ~ 20	0.9	1.3	2.2	2.5	2.6	3.1	3.6	4.8	5.0	6.7	8.7	-
20 ~ 40	1.1	1.5	2.4	2.7	2.8	3.3	4.0	5.2	5.4	7.1	9.1	-
40 ~ 60	1.3	1.7	2.6	2.9	3.0	3.6	4.2	5.6	5.8	7.5	9.6	-
60 ~ 80	1.4	1.8	2.8	3.2	3.2	3.9	4.5	5.9	6.1	7.9	10.1	-
80 ~ 100	1.6	2.1	3.1	3.4	3.5	4.1	4.7	6.1	6.3	8.4	10.6	-
100 ~ 120	1.7	2.2	3.3	3.6	3.7	4.4	5.0	6.4	6.7	8.6	11.0	-
120 ~ 140	1.8	2.4	3.4	3.8	3.9	4.6	5.2	6.7	6.9	9.0	11.4	-
140 ~ 160	1.9	2.4	3.5	3.9	4.1	4.7	5.4	7.0	7.2	9.3	11.8	-
160 ~ 180	2.0	2.5	3.6	4.0	4.1	4.8	5.5	7.1	7.4	9.6	12.2	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	0.76
Specific Gravity d	5.02
Remarks	

S-LAL 7Q

Code(d) 652585
Code(e) 654584

Refractive Index n_d	1.651 60 1.651 600	Abbe Number v_d	58.54	Dispersion $n_F - n_C$	0.011 130
Refractive Index n_e	1.654 255	Abbe Number v_e	58.34	Dispersion $n_{F'} - n_{C'}$	0.011 215

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.615 23
n_{1970}	1.970 09	1.622 65
n_{1530}	1.529 58	1.630 34
n_{1129}	1.128 64	1.636 71
n_t	1.013 98	1.638 70
n_s	0.852 11	1.642 04
$n_{A'}$	0.768 19	1.644 25
n_r	0.706 52	1.646 24
n_C	0.656 27	1.648 19
$n_{C'}$	0.643 85	1.648 74
$n_{\text{He-Ne}}$	0.632 8	1.649 24
n_D	0.589 29	1.651 50
n_d	0.587 56	1.651 60
n_e	0.546 07	1.654 26
n_F	0.486 13	1.659 32
$n_{F'}$	0.479 99	1.659 95
$n_{\text{He-Cd}}$	0.441 57	1.664 53
n_g	0.435 835	1.665 32
n_h	0.404 656	1.670 29
n_i	0.365 015	1.678 73

Constants of Dispersion Formula	
A_1	9.052 771 43E-01
A_2	7.779 556 84E-01
A_3	1.181 372 86E+00
B_1	1.556 065 07E-02
B_2	2.847 186 26E-03
B_3	8.807 379 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	110.8
Rigidity Modulus G (GPa)	43.3
Poisson's Ratio σ	0.280
Knoop Hardness Hk[Class]	680 7
Abrasion Aa	75

Partial Dispersions	
$n_C - n_t$	0.009 488
$n_C - n_{A'}$	0.003 943
$n_d - n_C$	0.003 408
$n_e - n_C$	0.006 063
$n_g - n_d$	0.013 721
$n_g - n_F$	0.005 999
$n_h - n_g$	0.004 966
$n_i - n_g$	0.013 410
$n_{C'} - n_t$	0.010 033
$n_e - n_{C'}$	0.005 518
$n_{F'} - n_e$	0.005 697
$n_i - n_{F'}$	0.018 779

Relative Partial Dispersions	
$\theta_{C,t}$	0.852 5
$\theta_{C,A'}$	0.354 3
$\theta_{d,C}$	0.306 2
$\theta_{e,C}$	0.544 7
$\theta_{g,d}$	1.232 8
$\theta_{g,F}$	0.539 0
$\theta_{h,g}$	0.446 2
$\theta_{i,g}$	1.204 9
$\theta'_{C,t}$	0.894 6
$\theta'_{e,C'}$	0.492 0
$\theta'_{F,e}$	0.508 0
$\theta'_{i,F'}$	1.674 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.031 2
$\Delta\theta_{C,A'}$	0.007 5
$\Delta\theta_{g,d}$	-0.010 3
$\Delta\theta_{g,F}$	-0.007 8
$\Delta\theta_{i,g}$	-0.029 9

Coloring			
λ_{80}	365	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	351	$\lambda_{0.05}$	294
CCI			
B	G	R	
0.00	0.32	0.29	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.01
290	0.03
300	0.08
310	0.19
320	0.34
330	0.51
340	0.67
350	0.79
360	0.88
370	0.930
380	0.960
390	0.974
400	0.983
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.984
1 600	0.989
1 800	0.977
2 000	0.948
2 200	0.83
2 400	0.59

Thermal Properties	
Strain Point StP (°C)	580
Annealing Point AP (°C)	601
Transformation Temperature Tg (°C)	619
Yield Point At (°C)	656
Softening Point SP (°C)	683
Expansion Coefficients (-30 °C ~ 70 °C)	58
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(mK))	0.989

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	45
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	49
-60 ~ -50	50
-50 ~ -40	51
-40 ~ -30	52
-30 ~ -20	53
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	68
140 ~ 150	69
150 ~ 160	70
160 ~ 170	71
170 ~ 180	71
180 ~ 190	72
190 ~ 200	73
200 ~ 210	73
210 ~ 220	74
220 ~ 230	75
230 ~ 240	75
240 ~ 250	76
250 ~ 260	76
260 ~ 270	77
270 ~ 280	78
280 ~ 290	78
290 ~ 300	79

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	2.9	3.1	3.3	3.4	3.4	3.5	3.6	3.9	4.0	4.2	4.5	5.0
-60 ~ -40	2.9	3.0	3.2	3.3	3.4	3.5	3.6	3.8	3.8	4.1	4.4	4.9
-40 ~ -20	2.9	3.0	3.2	3.2	3.3	3.4	3.5	3.8	3.9	4.1	4.4	4.9
-20 ~ 0	2.9	3.1	3.3	3.4	3.4	3.5	3.6	3.8	3.9	4.3	4.5	5.1
0 ~ 20	3.0	3.1	3.3	3.4	3.4	3.7	3.8	4.0	4.1	4.4	4.6	5.2
20 ~ 40	3.1	3.2	3.5	3.5	3.6	3.7	3.8	4.2	4.2	4.5	4.8	5.4
40 ~ 60	3.2	3.3	3.7	3.8	3.8	3.9	4.0	4.3	4.3	4.7	5.0	5.6
60 ~ 80	3.3	3.5	3.8	3.8	3.9	4.0	4.1	4.4	4.4	4.9	5.2	5.8
80 ~ 100	3.5	3.6	3.9	4.0	4.0	4.2	4.3	4.6	4.6	5.0	5.3	6.0
100 ~ 120	3.6	3.7	4.0	4.1	4.1	4.3	4.4	4.7	4.7	5.1	5.4	6.1
120 ~ 140	3.6	3.8	4.1	4.2	4.2	4.4	4.5	4.8	4.9	5.2	5.6	6.3
140 ~ 160	3.7	3.9	4.2	4.3	4.3	4.5	4.6	5.0	5.0	5.3	5.8	6.5
160 ~ 180	3.8	4.0	4.3	4.4	4.4	4.6	4.8	5.1	5.1	5.5	5.9	6.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.98
Specific Gravity d	3.24
Remarks	

OHARA 25-04

S-LAL 8

Code(d) 713539
Code(e) 716536

Refractive Index n_d	1.713 00 1.712 995	Abbe Number v_d	53.87	Dispersion $n_F - n_C$	0.013 236
Refractive Index n_e	1.716 150	Abbe Number v_e	53.64	Dispersion $n_{F'} - n_{C'}$	0.013 352

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.674 18
n_{1970}	1.970 09	1.681 55
n_{1530}	1.529 58	1.689 30
n_{1129}	1.128 64	1.695 97
n_t	1.013 98	1.698 13
n_s	0.852 11	1.701 86
$n_{A'}$	0.768 19	1.704 38
n_T	0.706 52	1.706 69
n_C	0.656 27	1.708 97
$n_{C'}$	0.643 85	1.709 61
$n_{\text{He-Ne}}$	0.632 8	1.710 21
n_D	0.589 29	1.712 88
n_d	0.587 56	1.713 00
n_e	0.546 07	1.716 15
n_F	0.486 13	1.722 21
$n_{F'}$	0.479 99	1.722 97
$n_{\text{He-Cd}}$	0.441 57	1.728 48
n_g	0.435 835	1.729 43
n_h	0.404 656	1.735 45
n_i	0.365 015	1.745 75

Constants of Dispersion Formula	
A_1	1.306 632 91E+00
A_2	5.713 772 53E-01
A_3	1.243 036 05E+00
B_1	6.118 624 48E-03
B_2	2.127 214 70E-02
B_3	9.062 856 86E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	114.0
Rigidity Modulus G (GPa)	44.2
Poisson's Ratio σ	0.289
Knoop Hardness Hk[Class]	670 7
Abrasion Aa	81

Partial Dispersions	
$n_C - n_t$	0.010 846
$n_C - n_{A'}$	0.004 591
$n_d - n_C$	0.004 021
$n_e - n_C$	0.007 176
$n_g - n_d$	0.016 440
$n_g - n_F$	0.007 225
$n_h - n_g$	0.006 016
$n_i - n_g$	0.016 311
$n_C - n_t$	0.011 486
$n_e - n_{C'}$	0.006 536
$n_{F'} - n_e$	0.006 816
$n_i - n_{F'}$	0.022 780

Relative Partial Dispersions	
$\theta_{C,t}$	0.819 4
$\theta_{C,A'}$	0.346 9
$\theta_{d,C}$	0.303 8
$\theta_{e,C}$	0.542 2
$\theta_{g,d}$	1.242 1
$\theta_{g,F}$	0.545 9
$\theta_{h,g}$	0.454 5
$\theta_{i,g}$	1.232 3
$\theta'_{C,t}$	0.860 2
$\theta'_{e,C'}$	0.489 5
$\theta'_{F,e}$	0.510 5
$\theta'_{i,F'}$	1.706 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.020 0
$\Delta\theta_{C,A'}$	0.005 7
$\Delta\theta_{g,d}$	-0.010 7
$\Delta\theta_{g,F}$	-0.008 4
$\Delta\theta_{i,g}$	-0.041 6

Coloring			
λ_{80}	375	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	356	$\lambda_{0.05}$	295
CCI			
B	G	R	
0.00	0.42	0.39	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.03
300	0.07
310	0.15
320	0.28
330	0.44
340	0.60
350	0.74
360	0.84
370	0.905
380	0.944
390	0.965
400	0.977
420	0.988
440	0.991
460	0.994
480	0.996
500	0.997
550	0.998
600	0.996
650	0.997
700	0.997
800	0.998
900	0.997
1 000	0.997
1 200	0.997
1 400	0.991
1 600	0.991
1 800	0.981
2 000	0.955
2 200	0.87
2 400	0.62

Thermal Properties	
Strain Point StP (°C)	590
Annealing Point AP (°C)	617
Transformation Temperature Tg (°C)	627
Yield Point At (°C)	665
Softening Point SP (°C)	698
Expansion Coefficients (-30 °C ~ 70 °C)	62
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	77
Thermal Conductivity λ (W/(mK))	0.894

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	48
-90 ~ -80	50
-80 ~ -70	51
-70 ~ -60	52
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	58
-10 ~ 0	59
0 ~ 10	61
10 ~ 20	62
20 ~ 30	63
30 ~ 40	64
40 ~ 50	65
50 ~ 60	66
60 ~ 70	67
70 ~ 80	68
80 ~ 90	69
90 ~ 100	69
100 ~ 110	70
110 ~ 120	71
120 ~ 130	72
130 ~ 140	73
140 ~ 150	74
150 ~ 160	74
160 ~ 170	75
170 ~ 180	76
180 ~ 190	76
190 ~ 200	77
200 ~ 210	78
210 ~ 220	78
220 ~ 230	79
230 ~ 240	79
240 ~ 250	80
250 ~ 260	80
260 ~ 270	81
270 ~ 280	81
280 ~ 290	82
290 ~ 300	82

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	2.5	2.7	3.0	3.1	3.1	3.2	3.4	3.7	3.8	4.1	4.4	5.2
-60 ~ -40	2.5	2.6	2.9	3.1	3.1	3.2	3.4	3.6	3.7	4.0	4.5	5.1
-40 ~ -20	2.4	2.6	2.9	3.0	3.0	3.2	3.3	3.7	3.8	4.1	4.4	5.1
-20 ~ 0	2.5	2.7	3.0	3.1	3.2	3.3	3.5	3.8	3.8	4.2	4.5	5.3
0 ~ 20	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.9	3.9	4.4	4.7	5.4
20 ~ 40	2.8	3.0	3.3	3.4	3.4	3.5	3.7	4.0	4.1	4.4	4.8	5.6
40 ~ 60	2.9	3.1	3.4	3.5	3.5	3.7	3.8	4.1	4.2	4.6	5.1	5.8
60 ~ 80	3.0	3.1	3.5	3.6	3.7	3.8	4.0	4.3	4.4	4.8	5.2	5.9
80 ~ 100	3.1	3.3	3.6	3.7	3.7	3.9	4.1	4.5	4.5	4.9	5.3	6.1
100 ~ 120	3.2	3.4	3.7	3.8	3.8	4.0	4.2	4.5	4.6	5.1	5.5	6.3
120 ~ 140	3.3	3.4	3.8	3.9	3.9	4.1	4.2	4.7	4.7	5.2	5.6	6.4
140 ~ 160	3.3	3.5	3.9	4.0	4.0	4.2	4.4	4.7	4.8	5.2	5.6	6.4
160 ~ 180	3.4	3.5	3.9	4.0	4.0	4.2	4.4	4.8	4.8	5.2	5.7	6.5

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.75
Specific Gravity d	3.79
Remarks	

OHARA 25-04

S-LAL 9

Code(d) 691548
Code(e) 694546

Refractive Index n_d	1.691 00 1.691 002	Abbe Number v_d	54.82	Dispersion $n_F - n_C$	0.012 605
Refractive Index n_e	1.694 007	Abbe Number v_e	54.59	Dispersion $n_{F'} - n_{C'}$	0.012 714

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.653 43
n_{1970}	1.970 09	1.660 64
n_{1530}	1.529 58	1.668 22
n_{1129}	1.128 64	1.674 70
n_t	1.013 98	1.676 78
n_s	0.852 11	1.680 37
$n_{A'}$	0.768 19	1.682 79
n_r	0.706 52	1.684 99
n_C	0.656 27	1.687 17
$n_{C'}$	0.643 85	1.687 78
$n_{\text{He-Ne}}$	0.632 8	1.688 35
n_D	0.589 29	1.690 89
n_d	0.587 56	1.691 00
n_e	0.546 07	1.694 01
n_F	0.486 13	1.699 77
$n_{F'}$	0.479 99	1.700 49
$n_{\text{He-Cd}}$	0.441 57	1.705 73
n_g	0.435 835	1.706 64
n_h	0.404 656	1.712 36
n_i	0.365 015	1.722 12

Constants of Dispersion Formula	
A_1	1.161 956 87E+00
A_2	6.448 600 99E-01
A_3	1.250 622 21E+00
B_1	1.596 595 09E-02
B_2	5.055 024 67E-04
B_3	9.382 841 69E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	107.5
Rigidity Modulus G (GPa)	41.8
Poisson's Ratio σ	0.287
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	89

Partial Dispersions	
$n_C - n_t$	0.010 384
$n_C - n_{A'}$	0.004 384
$n_d - n_C$	0.003 833
$n_e - n_C$	0.006 838
$n_g - n_d$	0.015 640
$n_g - n_F$	0.006 868
$n_h - n_g$	0.005 714
$n_i - n_g$	0.015 476
$n_C - n_t$	0.010 994
$n_e - n_{C'}$	0.006 228
$n_{F'} - n_e$	0.006 486
$n_i - n_{F'}$	0.021 625

Relative Partial Dispersions	
$\theta_{C,t}$	0.823 8
$\theta_{C,A'}$	0.347 8
$\theta_{d,C}$	0.304 1
$\theta_{e,C}$	0.542 5
$\theta_{g,d}$	1.240 8
$\theta_{g,F}$	0.544 9
$\theta_{h,g}$	0.453 3
$\theta_{i,g}$	1.227 8
$\theta'_{C,t}$	0.864 7
$\theta'_{e,C'}$	0.489 9
$\theta'_{F,e}$	0.510 1
$\theta'_{i,F'}$	1.700 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.019 9
$\Delta\theta_{C,A'}$	0.005 5
$\Delta\theta_{g,d}$	-0.010 1
$\Delta\theta_{g,F}$	-0.007 9
$\Delta\theta_{i,g}$	-0.038 2

Coloring			
λ_{80}	375	λ_5	295
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	301
CCI			
B	G	R	
0.00	0.51	0.52	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.01
300	0.04
310	0.11
320	0.22
330	0.38
340	0.55
350	0.70
360	0.82
370	0.89
380	0.936
390	0.960
400	0.973
420	0.985
440	0.988
460	0.992
480	0.994
500	0.995
550	0.997
600	0.996
650	0.997
700	0.998
800	0.998
900	0.997
1 000	0.996
1 200	0.996
1 400	0.992
1 600	0.992
1 800	0.984
2 000	0.963
2 200	0.89
2 400	0.66

Thermal Properties	
Strain Point StP (°C)	606
Annealing Point AP (°C)	630
Transformation Temperature Tg (°C)	649
Yield Point At (°C)	681
Softening Point SP (°C)	707
Expansion Coefficients (-30 °C ~ 70 °C)	61
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	73
Thermal Conductivity λ (W/(mK))	0.895

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	50
-90 ~ -80	51
-80 ~ -70	52
-70 ~ -60	53
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	57
-10 ~ 0	58
0 ~ 10	59
10 ~ 20	60
20 ~ 30	61
30 ~ 40	62
40 ~ 50	62
50 ~ 60	63
60 ~ 70	64
70 ~ 80	65
80 ~ 90	66
90 ~ 100	66
100 ~ 110	67
110 ~ 120	68
120 ~ 130	68
130 ~ 140	69
140 ~ 150	70
150 ~ 160	71
160 ~ 170	71
170 ~ 180	72
180 ~ 190	73
190 ~ 200	73
200 ~ 210	74
210 ~ 220	75
220 ~ 230	75
230 ~ 240	76
240 ~ 250	76
250 ~ 260	77
260 ~ 270	78
270 ~ 280	78
280 ~ 290	79
290 ~ 300	79

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	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.7	3.8	4.2	4.4	5.0
-60 ~ -40	2.6	2.7	2.9	3.0	3.1	3.2	3.3	3.7	3.7	4.0	4.3	4.9
-40 ~ -20	2.4	2.7	3.0	3.0	3.1	3.2	3.3	3.6	3.7	4.0	4.4	5.0
-20 ~ 0	2.5	2.6	2.9	3.0	3.0	3.3	3.4	3.7	3.8	4.1	4.4	5.2
0 ~ 20	2.5	2.8	3.1	3.2	3.2	3.4	3.5	3.8	3.9	4.2	4.6	5.3
20 ~ 40	2.6	2.8	3.2	3.3	3.3	3.5	3.7	4.0	4.0	4.4	4.8	5.5
40 ~ 60	2.8	3.0	3.3	3.4	3.5	3.6	3.8	4.1	4.2	4.6	5.0	5.8
60 ~ 80	2.9	3.1	3.4	3.5	3.6	3.8	4.0	4.4	4.4	4.8	5.2	5.9
80 ~ 100	3.0	3.2	3.6	3.7	3.7	3.9	4.1	4.5	4.5	5.0	5.5	6.2
100 ~ 120	3.2	3.4	3.7	3.9	3.9	4.1	4.3	4.7	4.7	5.2	5.7	6.5
120 ~ 140	3.3	3.5	3.9	4.0	4.0	4.2	4.4	4.8	4.9	5.3	5.9	6.7
140 ~ 160	3.4	3.6	4.1	4.2	4.3	4.5	4.7	5.1	5.1	5.6	6.1	6.9
160 ~ 180	3.5	3.8	4.2	4.3	4.4	4.6	4.8	5.2	5.3	5.7	6.2	7.1

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.85
Specific Gravity d	3.63
Remarks	

OHARA 25-04

S-LAL10

Code(d) 720502
Code(e) 723500

Refractive Index n_d	1.720 00 1.719 995	Abbe Number v_d	50.23	Dispersion $n_F - n_C$	0.014 334
Refractive Index n_e	1.723 409	Abbe Number v_e	49.98	Dispersion $n_{F'} - n_{C'}$	0.014 474

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.681 59
n_{1970}	1.970 09	1.688 41
n_{1530}	1.529 58	1.695 67
n_{1129}	1.128 64	1.702 13
n_t	1.013 98	1.704 30
n_s	0.852 11	1.708 14
$n_{A'}$	0.768 19	1.710 79
n_r	0.706 52	1.713 23
n_C	0.656 27	1.715 67
$n_{C'}$	0.643 85	1.716 36
$n_{\text{He-Ne}}$	0.632 8	1.717 00
n_D	0.589 29	1.719 87
n_d	0.587 56	1.720 00
n_e	0.546 07	1.723 41
n_F	0.486 13	1.730 00
$n_{F'}$	0.479 99	1.730 83
$n_{\text{He-Cd}}$	0.441 57	1.736 86
n_g	0.435 835	1.737 92
n_h	0.404 656	1.744 55
n_i	0.365 015	1.755 97

Constants of Dispersion Formula	
A_1	1.528 125 75E+00
A_2	3.679 652 67E-01
A_3	1.117 517 84E+00
B_1	7.768 176 44E-03
B_2	2.720 265 48E-02
B_3	8.886 974 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	106.1
Rigidity Modulus G (GPa)	41.0
Poisson's Ratio σ	0.294
Knoop Hardness Hk[Class]	640 6
Abrasion Aa	89

Partial Dispersions	
$n_C - n_t$	0.011 368
$n_C - n_{A'}$	0.004 885
$n_d - n_C$	0.004 325
$n_e - n_C$	0.007 739
$n_g - n_d$	0.017 923
$n_g - n_F$	0.007 914
$n_h - n_g$	0.006 628
$n_i - n_g$	0.018 051
$n_{C'} - n_t$	0.012 054
$n_e - n_{C'}$	0.007 053
$n_{F'} - n_e$	0.007 421
$n_i - n_{F'}$	0.025 139

Relative Partial Dispersions	
$\theta_{C,t}$	0.793 1
$\theta_{C,A'}$	0.340 8
$\theta_{d,C}$	0.301 7
$\theta_{e,C}$	0.539 9
$\theta_{g,d}$	1.250 4
$\theta_{g,F}$	0.552 1
$\theta_{h,g}$	0.462 4
$\theta_{i,g}$	1.259 3
$\theta'_{C,t}$	0.832 8
$\theta'_{e,C'}$	0.487 3
$\theta'_{F',e}$	0.512 7
$\theta'_{i,F'}$	1.736 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.010 7
$\Delta\theta_{C,A'}$	0.004 0
$\Delta\theta_{g,d}$	-0.010 0
$\Delta\theta_{g,F}$	-0.008 1
$\Delta\theta_{i,g}$	-0.045 1

Coloring			
λ_{80}	380	λ_5	310
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	309
CCI			
B	G	R	
0.00	0.59	0.60	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.07
320	0.22
330	0.40
340	0.58
350	0.72
360	0.83
370	0.89
380	0.937
390	0.959
400	0.972
420	0.983
440	0.988
460	0.991
480	0.994
500	0.996
550	0.998
600	0.997
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.997
1 600	0.996
1 800	0.990
2 000	0.971
2 200	0.922
2 400	0.71

Thermal Properties	
Strain Point StP (°C)	582
Annealing Point AP (°C)	600
Transformation Temperature Tg (°C)	628
Yield Point At (°C)	658
Softening Point SP (°C)	692
Expansion Coefficients (-30 °C ~ 70 °C)	62
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	76
Thermal Conductivity λ (W/(mK))	0.850

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	48
-90 ~ -80	50
-80 ~ -70	51
-70 ~ -60	52
-60 ~ -50	54
-50 ~ -40	55
-40 ~ -30	56
-30 ~ -20	57
-20 ~ -10	58
-10 ~ 0	59
0 ~ 10	60
10 ~ 20	61
20 ~ 30	63
30 ~ 40	64
40 ~ 50	64
50 ~ 60	65
60 ~ 70	66
70 ~ 80	67
80 ~ 90	68
90 ~ 100	69
100 ~ 110	70
110 ~ 120	71
120 ~ 130	71
130 ~ 140	72
140 ~ 150	73
150 ~ 160	74
160 ~ 170	74
170 ~ 180	75
180 ~ 190	76
190 ~ 200	76
200 ~ 210	77
210 ~ 220	77
220 ~ 230	78
230 ~ 240	78
240 ~ 250	79
250 ~ 260	79
260 ~ 270	80
270 ~ 280	80
280 ~ 290	80
290 ~ 300	81

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	3.5	3.7	4.0	4.1	4.1	4.3	4.5	4.8	4.9	5.3	5.8	6.6
-60 ~ -40	3.4	3.5	3.9	4.1	4.1	4.3	4.4	4.8	4.8	5.2	5.8	6.6
-40 ~ -20	3.4	3.6	3.9	4.0	4.1	4.2	4.4	4.9	4.9	5.4	5.8	6.7
-20 ~ 0	3.4	3.7	4.1	4.2	4.2	4.4	4.6	4.9	5.0	5.4	6.0	6.9
0 ~ 20	3.6	3.8	4.1	4.2	4.3	4.5	4.6	5.0	5.1	5.6	6.1	7.0
20 ~ 40	3.7	3.9	4.3	4.4	4.4	4.6	4.8	5.2	5.3	5.7	6.3	7.3
40 ~ 60	3.8	4.0	4.4	4.5	4.6	4.8	5.0	5.4	5.4	6.0	6.5	7.5
60 ~ 80	3.9	4.2	4.6	4.7	4.7	4.9	5.2	5.6	5.6	6.1	6.6	7.6
80 ~ 100	4.0	4.2	4.6	4.7	4.8	5.0	5.3	5.7	5.8	6.3	6.8	7.8
100 ~ 120	4.1	4.3	4.7	4.9	4.9	5.1	5.3	5.9	5.9	6.4	7.0	8.0
120 ~ 140	4.2	4.4	4.8	4.9	5.0	5.3	5.4	6.0	6.0	6.6	7.1	8.2
140 ~ 160	4.2	4.4	4.9	5.1	5.1	5.3	5.5	6.0	6.1	6.6	7.2	8.3
160 ~ 180	4.3	4.5	4.9	5.1	5.1	5.3	5.6	6.0	6.1	6.7	7.2	8.3

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.17
Specific Gravity d	3.86
Remarks	

OHARA 25-04

S-LAL12

Code(d) 678553
Code(e) 681551

Refractive Index n_d	1.677 90 1.677 900	Abbe Number v_d	55.34	Dispersion $n_F - n_C$	0.012 250
Refractive Index n_e	1.680 820	Abbe Number v_e	55.08	Dispersion $n_{F'} - n_{C'}$	0.012 361

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.644 14
n_{1970}	1.970 09	1.650 21
n_{1530}	1.529 58	1.656 69
n_{1129}	1.128 64	1.662 42
n_t	1.013 98	1.664 33
n_s	0.852 11	1.667 68
$n_{A'}$	0.768 19	1.669 98
n_T	0.706 52	1.672 08
n_C	0.656 27	1.674 19
$n_{C'}$	0.643 85	1.674 78
$n_{\text{He-Ne}}$	0.632 8	1.675 33
n_D	0.589 29	1.677 79
n_d	0.587 56	1.677 90
n_e	0.546 07	1.680 82
n_F	0.486 13	1.686 44
$n_{F'}$	0.479 99	1.687 14
$n_{\text{He-Cd}}$	0.441 57	1.692 25
n_g	0.435 835	1.693 14
n_h	0.404 656	1.698 72
n_i	0.365 015	1.708 26

Constants of Dispersion Formula	
A_1	9.920 538 95E-01
A_2	7.713 777 31E-01
A_3	1.182 962 64E+00
B_1	1.670 950 63E-02
B_2	2.367 501 56E-03
B_3	1.059 010 80E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	5
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.0
Phosphate Resistance PR	4.2

Mechanical Properties	
Young's Modulus E (GPa)	91.0
Rigidity Modulus G (GPa)	35.4
Poisson's Ratio σ	0.284
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	166

Partial Dispersions	
$n_C - n_t$	0.009 855
$n_C - n_{A'}$	0.004 212
$n_d - n_C$	0.003 712
$n_e - n_C$	0.006 632
$n_g - n_d$	0.015 241
$n_g - n_F$	0.006 703
$n_h - n_g$	0.005 580
$n_i - n_g$	0.015 119
$n_C - n_t$	0.010 445
$n_e - n_{C'}$	0.006 042
$n_{F'} - n_e$	0.006 319
$n_i - n_{F'}$	0.021 121

Relative Partial Dispersions	
$\theta_{C,t}$	0.804 5
$\theta_{C,A'}$	0.343 8
$\theta_{d,C}$	0.303 0
$\theta_{e,C}$	0.541 4
$\theta_{g,d}$	1.244 2
$\theta_{g,F}$	0.547 2
$\theta_{h,g}$	0.455 5
$\theta_{i,g}$	1.234 2
$\theta'_{C,t}$	0.845 0
$\theta'_{e,C'}$	0.488 8
$\theta'_{F,e}$	0.511 2
$\theta'_{i,F'}$	1.708 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.001 8
$\Delta\theta_{C,A'}$	0.000 8
$\Delta\theta_{g,d}$	-0.005 6
$\Delta\theta_{g,F}$	-0.004 7
$\Delta\theta_{i,g}$	-0.027 4

Coloring			
λ_{80}	360	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	337	$\lambda_{0.05}$	279
CCI			
B	G	R	
0.00	0.26	0.24	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.06
290	0.15
300	0.29
310	0.45
320	0.61
330	0.73
340	0.83
350	0.89
360	0.938
370	0.962
380	0.976
390	0.984
400	0.988
420	0.992
440	0.994
460	0.995
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.997
1 000	0.996
1 200	0.996
1 400	0.991
1 600	0.991
1 800	0.981
2 000	0.963
2 200	0.901
2 400	0.73

Thermal Properties	
Strain Point StP (°C)	604
Annealing Point AP (°C)	630
Transformation Temperature Tg (°C)	652
Yield Point At (°C)	682
Softening Point SP (°C)	716
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	86
Thermal Conductivity λ (W/(mK))	0.717

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	62
-80 ~ -70	63
-70 ~ -60	64
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	72
10 ~ 20	73
20 ~ 30	74
30 ~ 40	75
40 ~ 50	75
50 ~ 60	76
60 ~ 70	77
70 ~ 80	78
80 ~ 90	79
90 ~ 100	80
100 ~ 110	80
110 ~ 120	81
120 ~ 130	82
130 ~ 140	83
140 ~ 150	83
150 ~ 160	84
160 ~ 170	85
170 ~ 180	85
180 ~ 190	86
190 ~ 200	86
200 ~ 210	87
210 ~ 220	87
220 ~ 230	88
230 ~ 240	88
240 ~ 250	89
250 ~ 260	89
260 ~ 270	90
270 ~ 280	90
280 ~ 290	91
290 ~ 300	91

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	-0.2	-0.1	0.1	0.2	0.3	0.4	0.5	0.8	0.8	1.1	1.4	2.0
-60 ~ -40	-0.4	-0.2	0.1	0.1	0.2	0.3	0.4	0.7	0.7	1.1	1.4	1.9
-40 ~ -20	-0.4	-0.3	0.1	0.2	0.2	0.3	0.5	0.7	0.7	1.0	1.4	2.0
-20 ~ 0	-0.3	-0.2	0.1	0.2	0.2	0.3	0.6	0.8	0.9	1.2	1.5	2.1
0 ~ 20	-0.2	-0.1	0.3	0.4	0.4	0.5	0.7	0.9	1.0	1.3	1.6	2.3
20 ~ 40	-0.1	0.0	0.3	0.5	0.5	0.7	0.8	1.1	1.1	1.5	1.8	2.4
40 ~ 60	0.1	0.2	0.5	0.6	0.6	0.8	0.9	1.2	1.2	1.6	1.9	2.7
60 ~ 80	0.1	0.3	0.6	0.7	0.7	0.8	1.0	1.4	1.4	1.8	2.1	2.8
80 ~ 100	0.3	0.4	0.7	0.8	0.8	1.0	1.1	1.4	1.5	1.8	2.3	3.0
100 ~ 120	0.3	0.5	0.8	0.9	0.9	1.1	1.2	1.6	1.6	2.0	2.3	3.1
120 ~ 140	0.4	0.5	0.9	1.0	1.0	1.1	1.3	1.6	1.7	2.1	2.5	3.2
140 ~ 160	0.4	0.6	0.9	1.0	1.0	1.2	1.4	1.8	1.8	2.2	2.6	3.3
160 ~ 180	0.5	0.6	1.0	1.1	1.1	1.3	1.4	1.8	1.8	2.2	2.6	3.3

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.61
Specific Gravity d	4.01
Remarks	

OHARA 25-04

S-LAL12Q

Code(d) 678553
Code(e) 681551

Refractive Index n_d	1.677 90 1.677 900	Abbe Number v_d	55.35	Dispersion $n_F - n_C$	0.012 248
Refractive Index n_e	1.680 821	Abbe Number v_e	55.12	Dispersion $n_{F'} - n_{C'}$	0.012 351

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.641 08
n_{1970}	1.970 09	1.648 21
n_{1530}	1.529 58	1.655 66
n_{1129}	1.128 64	1.662 00
n_t	1.013 98	1.664 04
n_s	0.852 11	1.667 54
$n_{A'}$	0.768 19	1.669 90
n_r	0.706 52	1.672 04
n_C	0.656 27	1.674 17
$n_{C'}$	0.643 85	1.674 76
$n_{\text{He-Ne}}$	0.632 8	1.675 32
n_D	0.589 29	1.677 79
n_d	0.587 56	1.677 90
n_e	0.546 07	1.680 82
n_F	0.486 13	1.686 42
$n_{F'}$	0.479 99	1.687 12
$n_{\text{He-Cd}}$	0.441 57	1.692 19
n_g	0.435 835	1.693 07
n_h	0.404 656	1.698 60
n_i	0.365 015	1.708 03

Constants of Dispersion Formula	
A_1	1.098 870 25E+00
A_2	6.655 004 82E-01
A_3	1.071 836 58E+00
B_1	5.381 037 54E-03
B_2	1.867 177 09E-02
B_3	8.308 165 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	106.8
Rigidity Modulus G (GPa)	41.4
Poisson's Ratio σ	0.289
Knoop Hardness Hk[Class]	700 7
Abrasion Aa	62

Partial Dispersions	
$n_C - n_t$	0.010 130
$n_C - n_{A'}$	0.004 273
$n_d - n_C$	0.003 729
$n_e - n_C$	0.006 650
$n_g - n_d$	0.015 174
$n_g - n_F$	0.006 655
$n_h - n_g$	0.005 527
$n_i - n_g$	0.014 954
$n_C - n_t$	0.010 724
$n_e - n_{C'}$	0.006 056
$n_{F'} - n_e$	0.006 295
$n_i - n_{F'}$	0.020 912

Relative Partial Dispersions	
$\theta_{C,t}$	0.827 1
$\theta_{C,A'}$	0.348 9
$\theta_{d,C}$	0.304 5
$\theta_{e,C}$	0.542 9
$\theta_{g,d}$	1.238 9
$\theta_{g,F}$	0.543 4
$\theta_{h,g}$	0.451 3
$\theta_{i,g}$	1.220 9
$\theta'_{C,t}$	0.868 3
$\theta'_{e,C'}$	0.490 3
$\theta'_{F',e}$	0.509 7
$\theta'_{i,F'}$	1.693 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.020 7
$\Delta\theta_{C,A'}$	0.005 9
$\Delta\theta_{g,d}$	-0.010 9
$\Delta\theta_{g,F}$	-0.008 5
$\Delta\theta_{i,g}$	-0.040 6

Coloring			
λ_{80}	380	λ_5	310
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	363	$\lambda_{0.05}$	308
CCI			
B	G	R	
0.00	0.53	0.50	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.01
310	0.06
320	0.15
330	0.30
340	0.48
350	0.64
360	0.77
370	0.86
380	0.917
390	0.950
400	0.969
420	0.987
440	0.993
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.998
900	0.996
1 000	0.996
1 200	0.996
1 400	0.981
1 600	0.988
1 800	0.975
2 000	0.944
2 200	0.82
2 400	0.59

Thermal Properties	
Strain Point StP (°C)	637
Annealing Point AP (°C)	670
Transformation Temperature Tg (°C)	690
Yield Point At (°C)	718
Softening Point SP (°C)	750
Expansion Coefficients (-30 °C ~ 70 °C)	49
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	61
Thermal Conductivity λ (W/(mK))	0.914

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	37
-90 ~ -80	38
-80 ~ -70	39
-70 ~ -60	41
-60 ~ -50	42
-50 ~ -40	43
-40 ~ -30	44
-30 ~ -20	45
-20 ~ -10	46
-10 ~ 0	47
0 ~ 10	48
10 ~ 20	49
20 ~ 30	50
30 ~ 40	50
40 ~ 50	51
50 ~ 60	52
60 ~ 70	53
70 ~ 80	54
80 ~ 90	55
90 ~ 100	55
100 ~ 110	56
110 ~ 120	57
120 ~ 130	57
130 ~ 140	58
140 ~ 150	59
150 ~ 160	59
160 ~ 170	60
170 ~ 180	60
180 ~ 190	61
190 ~ 200	62
200 ~ 210	62
210 ~ 220	63
220 ~ 230	63
230 ~ 240	63
240 ~ 250	64
250 ~ 260	64
260 ~ 270	65
270 ~ 280	65
280 ~ 290	65
290 ~ 300	66

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	4.5	4.6	4.8	4.9	4.9	5.2	5.3	5.5	5.6	5.9	6.2	6.8
-60 ~ -40	4.3	4.5	4.8	4.8	4.9	5.0	5.1	5.4	5.4	5.8	6.1	6.7
-40 ~ -20	4.3	4.4	4.8	4.9	4.9	5.0	5.1	5.4	5.5	5.8	6.2	6.8
-20 ~ 0	4.3	4.5	4.7	4.8	4.9	5.0	5.2	5.5	5.6	5.9	6.2	6.8
0 ~ 20	4.4	4.5	4.9	5.0	5.0	5.2	5.3	5.6	5.7	6.0	6.3	7.1
20 ~ 40	4.5	4.6	4.9	5.1	5.2	5.3	5.5	5.8	5.8	6.2	6.5	7.2
40 ~ 60	4.7	4.8	5.2	5.3	5.3	5.4	5.6	5.9	6.0	6.3	6.7	7.4
60 ~ 80	4.7	4.9	5.2	5.3	5.4	5.5	5.8	6.1	6.2	6.5	6.9	7.6
80 ~ 100	4.9	5.1	5.4	5.5	5.5	5.7	5.9	6.2	6.3	6.7	7.1	7.8
100 ~ 120	5.0	5.2	5.5	5.7	5.7	5.9	6.0	6.4	6.4	6.8	7.2	8.0
120 ~ 140	5.1	5.3	5.7	5.8	5.8	6.0	6.2	6.5	6.6	7.0	7.5	8.3
140 ~ 160	5.2	5.4	5.8	5.9	5.9	6.1	6.4	6.7	6.8	7.2	7.6	8.4
160 ~ 180	5.4	5.6	5.9	6.0	6.1	6.3	6.5	6.8	6.9	7.3	7.7	8.5

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.97
Specific Gravity d	3.59
Remarks	

S-LAL14

Code(d) 697555
Code(e) 700553

Refractive Index n_d	1.696 80 1.696 797	Abbe Number v_d	55.53	Dispersion $n_F - n_C$	0.012 548
Refractive Index n_e	1.699 788	Abbe Number v_e	55.31	Dispersion $n_{F'} - n_{C'}$	0.012 653

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.658 20
n_{1970}	1.970 09	1.665 78
n_{1530}	1.529 58	1.673 69
n_{1129}	1.128 64	1.680 39
n_t	1.013 98	1.682 52
n_s	0.852 11	1.686 15
$n_{A'}$	0.768 19	1.688 58
n_r	0.706 52	1.690 79
n_C	0.656 27	1.692 97
$n_{C'}$	0.643 85	1.693 58
$n_{\text{He-Ne}}$	0.632 8	1.694 15
n_D	0.589 29	1.696 69
n_d	0.587 56	1.696 80
n_e	0.546 07	1.699 79
n_F	0.486 13	1.705 52
$n_{F'}$	0.479 99	1.706 24
$n_{\text{He-Cd}}$	0.441 57	1.711 44
n_g	0.435 835	1.712 34
n_h	0.404 656	1.718 00
n_i	0.365 015	1.727 67

Constants of Dispersion Formula	
A_1	1.237 209 70E+00
A_2	5.897 226 23E-01
A_3	1.319 218 80E+00
B_1	1.535 513 20E-02
B_2	-3.078 962 50E-04
B_3	9.372 029 47E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	111.8
Rigidity Modulus G (GPa)	43.5
Poisson's Ratio σ	0.284
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	83

Partial Dispersions	
$n_C - n_t$	0.010 452
$n_C - n_{A'}$	0.004 389
$n_d - n_C$	0.003 823
$n_e - n_C$	0.006 814
$n_g - n_d$	0.015 543
$n_g - n_F$	0.006 818
$n_h - n_g$	0.005 665
$n_i - n_g$	0.015 333
$n_{C'} - n_t$	0.011 061
$n_e - n_{C'}$	0.006 205
$n_{F'} - n_e$	0.006 448
$n_i - n_{F'}$	0.021 437

Relative Partial Dispersions	
$\theta_{C,t}$	0.833 0
$\theta_{C,A'}$	0.349 8
$\theta_{d,C}$	0.304 7
$\theta_{e,C}$	0.543 0
$\theta_{g,d}$	1.238 7
$\theta_{g,F}$	0.543 4
$\theta_{h,g}$	0.451 5
$\theta_{i,g}$	1.221 9
$\theta'_{C,t}$	0.874 2
$\theta'_{e,C'}$	0.490 4
$\theta'_{F,e}$	0.509 6
$\theta'_{i,F'}$	1.694 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.025 8
$\Delta\theta_{C,A'}$	0.006 6
$\Delta\theta_{g,d}$	-0.010 7
$\Delta\theta_{g,F}$	-0.008 2
$\Delta\theta_{i,g}$	-0.038 1

Coloring			
λ_{80}	365	λ_5	285
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	349	$\lambda_{0.05}$	285
CCI			
B	G	R	
0.00	0.32	0.29	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.03
290	0.07
300	0.15
310	0.27
320	0.41
330	0.56
340	0.70
350	0.81
360	0.88
370	0.931
380	0.959
390	0.974
400	0.982
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.991
1 600	0.992
1 800	0.982
2 000	0.954
2 200	0.86
2 400	0.59

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	643
Yield Point At (°C)	677
Softening Point SP (°C)	700
Expansion Coefficients (-30 °C ~ 70 °C)	58
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	70
Thermal Conductivity λ (W/(mK))	0.908

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	44
-90 ~ -80	46
-80 ~ -70	47
-70 ~ -60	49
-60 ~ -50	50
-50 ~ -40	51
-40 ~ -30	52
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	66
120 ~ 130	67
130 ~ 140	68
140 ~ 150	68
150 ~ 160	69
160 ~ 170	69
170 ~ 180	69
180 ~ 190	70
190 ~ 200	70
200 ~ 210	71
210 ~ 220	71
220 ~ 230	71
230 ~ 240	71
240 ~ 250	71
250 ~ 260	72
260 ~ 270	72
270 ~ 280	72
280 ~ 290	72
290 ~ 300	72

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	2.6	2.7	3.0	3.1	3.1	3.2	3.3	3.5	3.6	3.9	4.2	4.8
-60 ~ -40	2.5	2.7	2.9	3.0	3.0	3.1	3.2	3.5	3.6	3.8	4.1	4.7
-40 ~ -20	2.5	2.7	2.9	3.0	3.0	3.1	3.3	3.5	3.6	3.9	4.2	4.8
-20 ~ 0	2.5	2.7	3.0	3.1	3.1	3.3	3.4	3.7	3.7	4.0	4.3	5.0
0 ~ 20	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.8	3.8	4.2	4.5	5.2
20 ~ 40	2.7	2.9	3.3	3.3	3.4	3.5	3.7	4.0	4.0	4.3	4.7	5.3
40 ~ 60	2.9	3.1	3.4	3.5	3.5	3.6	3.8	4.1	4.1	4.5	4.9	5.7
60 ~ 80	3.0	3.1	3.6	3.7	3.6	3.9	4.0	4.3	4.4	4.8	5.2	5.9
80 ~ 100	3.1	3.3	3.6	3.7	3.7	3.9	4.1	4.4	4.5	5.0	5.4	6.1
100 ~ 120	3.2	3.4	3.7	3.9	3.9	4.1	4.2	4.6	4.6	5.1	5.6	6.3
120 ~ 140	3.3	3.5	3.8	4.0	4.0	4.2	4.4	4.7	4.8	5.3	5.7	6.5
140 ~ 160	3.3	3.5	4.0	4.1	4.2	4.3	4.5	4.9	5.0	5.4	5.9	6.7
160 ~ 180	3.4	3.6	4.0	4.2	4.2	4.4	4.6	5.0	5.0	5.5	6.0	6.8

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.86
Specific Gravity d	3.70
Remarks	

OHARA 25-04

S-LAL18N

Code(d) 729546
Code(e) 732544

Refractive Index n_d	1.729 16 1.729 157	Abbe Number v_d	54.59	Dispersion $n_F - n_C$	0.013 356
Refractive Index n_e	1.732 341	Abbe Number v_e	54.37	Dispersion $n_{F'} - n_{C'}$	0.013 470

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.689 32
n_{1970}	1.970 09	1.697 00
n_{1530}	1.529 58	1.705 03
n_{1129}	1.128 64	1.711 87
n_t	1.013 98	1.714 08
n_s	0.852 11	1.717 88
$n_{A'}$	0.768 19	1.720 44
n_T	0.706 52	1.722 78
n_C	0.656 27	1.725 09
$n_{C'}$	0.643 85	1.725 74
$n_{\text{He-Ne}}$	0.632 8	1.726 34
n_D	0.589 29	1.729 04
n_d	0.587 56	1.729 16
n_e	0.546 07	1.732 34
n_F	0.486 13	1.738 45
$n_{F'}$	0.479 99	1.739 21
$n_{\text{He-Cd}}$	0.441 57	1.744 75
n_g	0.435 835	1.745 72
n_h	0.404 656	1.751 76
n_i	0.365 015	1.762 08

Constants of Dispersion Formula	
A_1	1.431 317 27E+00
A_2	5.012 968 55E-01
A_3	1.154 648 35E+00
B_1	6.827 832 22E-03
B_2	2.158 403 29E-02
B_3	8.098 327 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	120.4
Rigidity Modulus G (GPa)	46.7
Poisson's Ratio σ	0.289
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	69

Partial Dispersions	
$n_C - n_t$	0.011 009
$n_C - n_{A'}$	0.004 650
$n_d - n_C$	0.004 064
$n_e - n_C$	0.007 248
$n_g - n_d$	0.016 561
$n_g - n_F$	0.007 269
$n_h - n_g$	0.006 042
$n_i - n_g$	0.016 363
$n_{C'} - n_t$	0.011 656
$n_e - n_{C'}$	0.006 601
$n_{F'} - n_e$	0.006 869
$n_i - n_{F'}$	0.022 871

Relative Partial Dispersions	
$\theta_{C,t}$	0.824 3
$\theta_{C,A'}$	0.348 2
$\theta_{d,C}$	0.304 3
$\theta_{e,C}$	0.542 7
$\theta_{g,d}$	1.240 0
$\theta_{g,F}$	0.544 2
$\theta_{h,g}$	0.452 4
$\theta_{i,g}$	1.225 1
$\theta'_{C,t}$	0.865 3
$\theta'_{e,C'}$	0.490 1
$\theta'_{F,e}$	0.509 9
$\theta'_{i,F'}$	1.697 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.021 5
$\Delta\theta_{C,A'}$	0.006 2
$\Delta\theta_{g,d}$	-0.011 3
$\Delta\theta_{g,F}$	-0.008 9
$\Delta\theta_{i,g}$	-0.042 8

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	343	$\lambda_{0.05}$	281
CCI			
B	G	R	
0.00	0.30	0.31	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.04
290	0.21
300	0.30
310	0.32
320	0.55
330	0.68
340	0.78
350	0.86
360	0.912
370	0.946
380	0.967
390	0.978
400	0.984
420	0.991
440	0.994
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.999
700	0.999
800	0.998
900	0.998
1 000	0.997
1 200	0.996
1 400	0.991
1 600	0.991
1 800	0.982
2 000	0.956
2 200	0.87
2 400	0.60

Thermal Properties	
Strain Point StP (°C)	632
Annealing Point AP (°C)	655
Transformation Temperature Tg (°C)	679
Yield Point At (°C)	703
Softening Point SP (°C)	731
Expansion Coefficients (-30 °C ~ 70 °C)	58
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	72
Thermal Conductivity λ (W/(mK))	0.871

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	44
-90 ~ -80	46
-80 ~ -70	47
-70 ~ -60	48
-60 ~ -50	50
-50 ~ -40	51
-40 ~ -30	52
-30 ~ -20	53
-20 ~ -10	54
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	64
80 ~ 90	65
90 ~ 100	65
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	69
140 ~ 150	69
150 ~ 160	70
160 ~ 170	71
170 ~ 180	71
180 ~ 190	72
190 ~ 200	72
200 ~ 210	73
210 ~ 220	74
220 ~ 230	74
230 ~ 240	74
240 ~ 250	75
250 ~ 260	75
260 ~ 270	76
270 ~ 280	76
280 ~ 290	76
290 ~ 300	77

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	2.5	2.6	2.9	2.9	3.0	3.2	3.3	3.6	3.6	3.9	4.3	4.9
-60 ~ -40	2.4	2.5	2.8	2.9	2.9	3.1	3.2	3.5	3.5	3.9	4.3	4.9
-40 ~ -20	2.4	2.5	2.8	2.9	2.9	3.0	3.3	3.5	3.6	3.9	4.2	5.0
-20 ~ 0	2.5	2.6	2.9	3.0	3.0	3.1	3.3	3.6	3.6	4.1	4.4	5.1
0 ~ 20	2.5	2.7	3.0	3.1	3.1	3.2	3.4	3.7	3.7	4.2	4.5	5.2
20 ~ 40	2.7	2.8	3.1	3.2	3.2	3.4	3.5	3.9	3.9	4.2	4.7	5.4
40 ~ 60	2.8	2.9	3.2	3.3	3.4	3.5	3.7	4.0	4.0	4.5	4.9	5.6
60 ~ 80	2.9	3.1	3.4	3.5	3.6	3.7	3.9	4.2	4.2	4.6	5.0	5.7
80 ~ 100	3.0	3.2	3.5	3.6	3.7	3.9	4.1	4.4	4.4	4.8	5.2	6.0
100 ~ 120	3.1	3.3	3.6	3.7	3.7	3.9	4.2	4.5	4.5	5.0	5.4	6.1
120 ~ 140	3.2	3.4	3.8	3.8	3.9	4.1	4.2	4.6	4.7	5.1	5.5	6.3
140 ~ 160	3.4	3.6	3.9	4.0	4.0	4.2	4.4	4.7	4.8	5.2	5.6	6.4
160 ~ 180	3.4	3.6	3.9	4.0	4.1	4.3	4.4	4.8	4.8	5.3	5.7	6.5

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.58
Specific Gravity d	4.18
Remarks	

OHARA 25-04

S-LAL19

Code(d) 729541
Code(e) 732539

Refractive Index n_d	1.729 16 1.729 160	Abbe Number v_d	54.09	Dispersion $n_F - n_C$	0.013 480
Refractive Index n_e	1.732 373	Abbe Number v_e	53.87	Dispersion $n_{F'} - n_{C'}$	0.013 596

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.689 12
n_{1970}	1.970 09	1.696 82
n_{1530}	1.529 58	1.704 87
n_{1129}	1.128 64	1.711 75
n_t	1.013 98	1.713 97
n_s	0.852 11	1.717 79
$n_{A'}$	0.768 19	1.720 38
n_r	0.706 52	1.722 73
n_C	0.656 27	1.725 06
$n_{C'}$	0.643 85	1.725 71
$n_{\text{He-Ne}}$	0.632 8	1.726 32
n_D	0.589 29	1.729 04
n_d	0.587 56	1.729 16
n_e	0.546 07	1.732 37
n_F	0.486 13	1.738 54
$n_{F'}$	0.479 99	1.739 31
$n_{\text{He-Cd}}$	0.441 57	1.744 91
n_g	0.435 835	1.745 88
n_h	0.404 656	1.751 99
n_i	0.365 015	1.762 43

Constants of Dispersion Formula	
A_1	9.739 975 77E-01
A_2	9.581 863 22E-01
A_3	1.201 633 59E+00
B_1	3.793 326 78E-03
B_2	1.775 745 81E-02
B_3	8.379 896 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	119.8
Rigidity Modulus G (GPa)	46.3
Poisson's Ratio σ	0.295
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	65

Partial Dispersions	
$n_C - n_t$	0.011 088
$n_C - n_{A'}$	0.004 686
$n_d - n_C$	0.004 099
$n_e - n_C$	0.007 312
$n_g - n_d$	0.016 725
$n_g - n_F$	0.007 344
$n_h - n_g$	0.006 108
$n_i - n_g$	0.016 544
$n_{C'} - n_t$	0.011 740
$n_e - n_{C'}$	0.006 660
$n_{F'} - n_e$	0.006 936
$n_i - n_{F'}$	0.023 120

Relative Partial Dispersions	
$\theta_{C,t}$	0.822 6
$\theta_{C,A'}$	0.347 6
$\theta_{d,C}$	0.304 1
$\theta_{e,C}$	0.542 4
$\theta_{g,d}$	1.240 7
$\theta_{g,F}$	0.544 8
$\theta_{h,g}$	0.453 1
$\theta_{i,g}$	1.227 3
$\theta'_{C,t}$	0.863 5
$\theta'_{e,C'}$	0.489 8
$\theta'_{F',e}$	0.510 2
$\theta'_{i,F'}$	1.700 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.022 1
$\Delta\theta_{C,A'}$	0.006 2
$\Delta\theta_{g,d}$	-0.011 7
$\Delta\theta_{g,F}$	-0.009 2
$\Delta\theta_{i,g}$	-0.044 8

Coloring			
λ_{80}	355	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	327	$\lambda_{0.05}$	
CCI			
B	G	R	
0.00	0.21	0.21	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.29
290	0.43
300	0.55
310	0.66
320	0.75
330	0.82
340	0.88
350	0.925
360	0.953
370	0.970
380	0.980
390	0.986
400	0.990
420	0.993
440	0.995
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.993
1 600	0.993
1 800	0.981
2 000	0.951
2 200	0.85
2 400	0.58

Thermal Properties	
Strain Point StP (°C)	610
Annealing Point AP (°C)	634
Transformation Temperature Tg (°C)	657
Yield Point At (°C)	690
Softening Point SP (°C)	708
Expansion Coefficients (-30 °C ~ 70 °C)	56
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	70
Thermal Conductivity λ (W/(mK))	0.895

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	43
-90 ~ -80	44
-80 ~ -70	45
-70 ~ -60	47
-60 ~ -50	48
-50 ~ -40	49
-40 ~ -30	50
-30 ~ -20	52
-20 ~ -10	53
-10 ~ 0	54
0 ~ 10	55
10 ~ 20	56
20 ~ 30	57
30 ~ 40	58
40 ~ 50	59
50 ~ 60	60
60 ~ 70	61
70 ~ 80	62
80 ~ 90	63
90 ~ 100	63
100 ~ 110	64
110 ~ 120	65
120 ~ 130	66
130 ~ 140	66
140 ~ 150	67
150 ~ 160	68
160 ~ 170	68
170 ~ 180	69
180 ~ 190	69
190 ~ 200	70
200 ~ 210	70
210 ~ 220	71
220 ~ 230	71
230 ~ 240	72
240 ~ 250	72
250 ~ 260	72
260 ~ 270	72
270 ~ 280	73
280 ~ 290	73
290 ~ 300	73

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	3.3	3.4	3.7	3.7	3.8	4.0	4.1	4.4	4.4	4.8	5.2	5.8
-60 ~ -40	3.1	3.2	3.6	3.7	3.7	3.9	4.0	4.3	4.3	4.7	5.1	5.7
-40 ~ -20	3.1	3.3	3.5	3.6	3.6	3.8	3.9	4.3	4.4	4.7	5.1	5.8
-20 ~ 0	3.2	3.3	3.6	3.7	3.8	3.9	4.1	4.4	4.4	4.9	5.2	5.9
0 ~ 20	3.3	3.4	3.7	3.8	3.8	4.0	4.2	4.5	4.5	5.0	5.4	6.1
20 ~ 40	3.4	3.5	3.8	3.9	4.0	4.1	4.3	4.6	4.7	5.1	5.6	6.3
40 ~ 60	3.5	3.7	4.0	4.1	4.1	4.3	4.4	4.8	4.9	5.3	5.7	6.5
60 ~ 80	3.5	3.8	4.2	4.3	4.3	4.5	4.6	5.0	5.0	5.5	5.9	6.7
80 ~ 100	3.7	3.9	4.2	4.3	4.5	4.5	4.8	5.2	5.2	5.7	6.1	6.9
100 ~ 120	3.8	4.0	4.4	4.5	4.5	4.7	5.0	5.3	5.3	5.8	6.3	7.1
120 ~ 140	3.9	4.1	4.5	4.6	4.6	4.9	5.0	5.5	5.5	6.0	6.4	7.3
140 ~ 160	4.1	4.3	4.7	4.8	4.8	5.0	5.2	5.6	5.6	6.1	6.6	7.5
160 ~ 180	4.1	4.3	4.7	4.8	4.9	5.1	5.3	5.7	5.7	6.2	6.7	7.6

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.61
Specific Gravity d	3.98
Remarks	

OHARA 25-04

S-LAL20

Code(d) 699511
Code(e) 703508

Refractive Index n_d	1.699 30 1.699 300	Abbe Number v_d	51.11	Dispersion $n_F - n_C$	0.013 682
Refractive Index n_e	1.702 559	Abbe Number v_e	50.82	Dispersion $n_{F'} - n_{C'}$	0.013 825

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.668 04
n_{1970}	1.970 09	1.672 70
n_{1530}	1.529 58	1.677 91
n_{1129}	1.128 64	1.682 97
n_t	1.013 98	1.684 81
n_s	0.852 11	1.688 20
$n_{A'}$	0.768 19	1.690 63
n_r	0.706 52	1.692 90
n_C	0.656 27	1.695 20
$n_{C'}$	0.643 85	1.695 84
$n_{\text{He-Ne}}$	0.632 8	1.696 45
n_D	0.589 29	1.699 18
n_d	0.587 56	1.699 30
n_e	0.546 07	1.702 56
n_F	0.486 13	1.708 88
$n_{F'}$	0.479 99	1.709 67
$n_{\text{He-Cd}}$	0.441 57	1.715 46
n_g	0.435 835	1.716 47
n_h	0.404 656	1.722 83
n_i	0.365 015	1.733 76

Constants of Dispersion Formula	
A_1	1.067 884 67E+00
A_2	7.587 353 50E-01
A_3	1.028 046 82E+00
B_1	5.188 960 58E-03
B_2	2.040 043 57E-02
B_3	1.208 263 20E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	53.1
Phosphate Resistance PR	4.2

Mechanical Properties	
Young's Modulus E (GPa)	78.7
Rigidity Modulus G (GPa)	30.2
Poisson's Ratio σ	0.302
Knoop Hardness Hk[Class]	490 5
Abrasion Aa	254

Partial Dispersions	
$n_C - n_t$	0.010 389
$n_C - n_{A'}$	0.004 570
$n_d - n_C$	0.004 104
$n_e - n_C$	0.007 363
$n_g - n_d$	0.017 174
$n_g - n_F$	0.007 596
$n_h - n_g$	0.006 359
$n_i - n_g$	0.017 290
$n_C - n_t$	0.011 038
$n_e - n_{C'}$	0.006 714
$n_{F'} - n_e$	0.007 111
$n_i - n_{F'}$	0.024 094

Relative Partial Dispersions	
$\theta_{C,t}$	0.759 3
$\theta_{C,A'}$	0.334 0
$\theta_{d,C}$	0.300 0
$\theta_{e,C}$	0.538 2
$\theta_{g,d}$	1.255 2
$\theta_{g,F}$	0.555 2
$\theta_{h,g}$	0.464 8
$\theta_{i,g}$	1.263 7
$\theta'_{C,t}$	0.798 4
$\theta'_{e,C'}$	0.485 6
$\theta'_{F,e}$	0.514 4
$\theta'_{i,F'}$	1.742 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.027 2
$\Delta\theta_{C,A'}$	-0.003 8
$\Delta\theta_{g,d}$	-0.003 4
$\Delta\theta_{g,F}$	-0.003 6
$\Delta\theta_{i,g}$	-0.033 3

Coloring			
λ_{80}	370	λ_5	310
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	350	$\lambda_{0.05}$	305
CCI			
B	G	R	
0.00	0.40	0.36	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.01
310	0.09
320	0.27
330	0.49
340	0.67
350	0.80
360	0.88
370	0.934
380	0.960
390	0.974
400	0.982
420	0.987
440	0.987
460	0.989
480	0.992
500	0.994
550	0.996
600	0.995
650	0.994
700	0.996
800	0.998
900	0.997
1 000	0.997
1 200	0.998
1 400	0.997
1 600	0.995
1 800	0.985
2 000	0.969
2 200	0.935
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	593
Annealing Point AP (°C)	621
Transformation Temperature Tg (°C)	633
Yield Point At (°C)	680
Softening Point SP (°C)	717
Expansion Coefficients (-30 °C ~ 70 °C)	93
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	107
Thermal Conductivity λ (W/(mK))	0.602

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	81
-90 ~ -80	82
-80 ~ -70	83
-70 ~ -60	84
-60 ~ -50	85
-50 ~ -40	86
-40 ~ -30	87
-30 ~ -20	88
-20 ~ -10	89
-10 ~ 0	90
0 ~ 10	91
10 ~ 20	92
20 ~ 30	93
30 ~ 40	94
40 ~ 50	95
50 ~ 60	96
60 ~ 70	97
70 ~ 80	98
80 ~ 90	99
90 ~ 100	99
100 ~ 110	100
110 ~ 120	101
120 ~ 130	102
130 ~ 140	103
140 ~ 150	103
150 ~ 160	104
160 ~ 170	105
170 ~ 180	105
180 ~ 190	106
190 ~ 200	107
200 ~ 210	107
210 ~ 220	108
220 ~ 230	108
230 ~ 240	109
240 ~ 250	110
250 ~ 260	110
260 ~ 270	111
270 ~ 280	111
280 ~ 290	112
290 ~ 300	112

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.23
Specific Gravity d	4.38
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	-2.5	-2.3	-2.0	-1.9	-1.8	-1.7	-1.5	-1.2	-1.1	-0.7	-0.3	0.6
-60 ~ -40	-2.5	-2.4	-2.1	-2.0	-2.0	-1.8	-1.6	-1.2	-1.2	-0.8	-0.4	0.5
-40 ~ -20	-2.6	-2.4	-2.1	-2.0	-2.0	-1.8	-1.6	-1.3	-1.3	-0.8	-0.3	0.5
-20 ~ 0	-2.6	-2.4	-2.0	-1.9	-1.9	-1.7	-1.5	-1.2	-1.2	-0.7	-0.3	0.6
0 ~ 20	-2.4	-2.3	-2.0	-1.9	-1.8	-1.7	-1.5	-1.1	-1.1	-0.7	-0.1	0.7
20 ~ 40	-2.4	-2.3	-1.9	-1.8	-1.7	-1.6	-1.4	-1.0	-1.0	-0.5	-0.1	0.9
40 ~ 60	-2.3	-2.1	-1.8	-1.7	-1.7	-1.5	-1.3	-0.9	-0.9	-0.4	0.1	1.0
60 ~ 80	-2.2	-2.1	-1.7	-1.5	-1.6	-1.3	-1.1	-0.8	-0.7	-0.3	0.2	1.1
80 ~ 100	-2.1	-2.0	-1.7	-1.5	-1.5	-1.3	-1.0	-0.7	-0.6	-0.1	0.3	1.2
100 ~ 120	-2.1	-1.9	-1.6	-1.5	-1.4	-1.2	-1.1	-0.7	-0.6	-0.1	0.4	1.3
120 ~ 140	-2.0	-1.9	-1.5	-1.4	-1.4	-1.2	-1.0	-0.6	-0.6	0.0	0.5	1.4
140 ~ 160	-2.1	-1.9	-1.4	-1.3	-1.3	-1.1	-0.9	-0.5	-0.4	0.0	0.5	1.5
160 ~ 180	-2.0	-1.8	-1.5	-1.4	-1.3	-1.1	-0.9	-0.5	-0.5	0.0	0.5	1.5

OHARA 25-04

S-LAL21

Code(d) 703524
Code(e) 706521

Refractive Index n_d	1.703 00 1.703 000	Abbe Number v_d	52.38	Dispersion $n_F - n_C$	0.013 422
Refractive Index n_e	1.706 198	Abbe Number v_e	52.11	Dispersion $n_{F'} - n_{C'}$	0.013 553

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.669 40
n_{1970}	1.970 09	1.674 90
n_{1530}	1.529 58	1.680 93
n_{1129}	1.128 64	1.686 52
n_t	1.013 98	1.688 46
n_s	0.852 11	1.691 95
$n_{A'}$	0.768 19	1.694 40
n_r	0.706 52	1.696 67
n_C	0.656 27	1.698 95
$n_{C'}$	0.643 85	1.699 59
$n_{\text{He-Ne}}$	0.632 8	1.700 19
n_D	0.589 29	1.702 88
n_d	0.587 56	1.703 00
n_e	0.546 07	1.706 20
n_F	0.486 13	1.712 37
$n_{F'}$	0.479 99	1.713 15
$n_{\text{He-Cd}}$	0.441 57	1.718 78
n_g	0.435 835	1.719 76
n_h	0.404 656	1.725 93
n_i	0.365 015	1.736 49

Constants of Dispersion Formula	
A_1	9.352 507 79E-01
A_2	9.059 887 06E-01
A_3	1.433 512 12E+00
B_1	1.808 360 47E-02
B_2	4.084 526 43E-03
B_3	1.386 834 10E+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	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	112.9
Rigidity Modulus G (GPa)	43.6
Poisson's Ratio σ	0.293
Knoop Hardness Hk[Class]	700 7
Abrasion Aa	60

Partial Dispersions	
$n_C - n_t$	0.010 494
$n_C - n_{A'}$	0.004 551
$n_d - n_C$	0.004 048
$n_e - n_C$	0.007 246
$n_g - n_d$	0.016 764
$n_g - n_F$	0.007 390
$n_h - n_g$	0.006 165
$n_i - n_g$	0.016 723
$n_C - n_t$	0.011 135
$n_e - n_{C'}$	0.006 605
$n_{F'} - n_e$	0.006 948
$n_i - n_{F'}$	0.023 341

Relative Partial Dispersions	
$\theta_{C,t}$	0.781 9
$\theta_{C,A'}$	0.339 1
$\theta_{d,C}$	0.301 6
$\theta_{e,C}$	0.539 9
$\theta_{g,d}$	1.249 0
$\theta_{g,F}$	0.550 6
$\theta_{h,g}$	0.459 3
$\theta_{i,g}$	1.245 9
$\theta'_{C,t}$	0.821 6
$\theta'_{e,C'}$	0.487 3
$\theta'_{F,e}$	0.512 7
$\theta'_{i,F'}$	1.722 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.010 5
$\Delta\theta_{C,A'}$	-0.000 3
$\Delta\theta_{g,d}$	-0.006 9
$\Delta\theta_{g,F}$	-0.006 1
$\Delta\theta_{i,g}$	-0.040 5

Coloring			
λ_{80}	395	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	320
CCI			
B	G	R	
0.00	1.01	0.99	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.01
320	0.05
330	0.15
340	0.30
350	0.48
360	0.65
370	0.77
380	0.85
390	0.909
400	0.942
420	0.975
440	0.986
460	0.991
480	0.994
500	0.996
550	0.998
600	0.997
650	0.997
700	0.996
800	0.995
900	0.992
1 000	0.991
1 200	0.992
1 400	0.989
1 600	0.992
1 800	0.987
2 000	0.979
2 200	0.949
2 400	0.87

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	769
Yield Point At (°C)	823
Softening Point SP (°C)	879
Expansion Coefficients (-30 °C ~ 70 °C)	51
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	64
Thermal Conductivity λ (W/(mK))	0.983

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	39
-90 ~ -80	40
-80 ~ -70	41
-70 ~ -60	42
-60 ~ -50	44
-50 ~ -40	45
-40 ~ -30	46
-30 ~ -20	47
-20 ~ -10	48
-10 ~ 0	49
0 ~ 10	50
10 ~ 20	51
20 ~ 30	52
30 ~ 40	53
40 ~ 50	54
50 ~ 60	54
60 ~ 70	55
70 ~ 80	56
80 ~ 90	57
90 ~ 100	58
100 ~ 110	58
110 ~ 120	59
120 ~ 130	60
130 ~ 140	60
140 ~ 150	61
150 ~ 160	62
160 ~ 170	62
170 ~ 180	63
180 ~ 190	63
190 ~ 200	64
200 ~ 210	64
210 ~ 220	65
220 ~ 230	65
230 ~ 240	66
240 ~ 250	66
250 ~ 260	66
260 ~ 270	67
270 ~ 280	67
280 ~ 290	67
290 ~ 300	68

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	5.9	6.1	6.5	6.6	6.6	6.8	6.9	7.4	7.4	7.8	8.2	9.0
-60 ~ -40	5.8	6.0	6.3	6.4	6.5	6.6	6.9	7.2	7.3	7.7	8.1	9.0
-40 ~ -20	5.7	6.0	6.3	6.4	6.5	6.7	6.8	7.2	7.2	7.7	8.2	9.0
-20 ~ 0	5.8	6.0	6.4	6.5	6.6	6.8	6.9	7.3	7.3	7.8	8.2	9.1
0 ~ 20	5.9	6.1	6.5	6.6	6.6	6.8	7.0	7.4	7.4	7.9	8.4	9.3
20 ~ 40	5.9	6.2	6.6	6.7	6.8	7.0	7.2	7.5	7.6	8.1	8.5	9.5
40 ~ 60	6.1	6.3	6.7	6.8	6.9	7.1	7.3	7.7	7.7	8.2	8.7	9.7
60 ~ 80	6.2	6.4	6.9	7.0	7.0	7.3	7.5	7.9	7.9	8.4	8.9	9.8
80 ~ 100	6.3	6.5	6.9	7.1	7.1	7.3	7.5	8.0	8.0	8.6	9.1	10.1
100 ~ 120	6.4	6.6	7.1	7.2	7.2	7.5	7.7	8.1	8.2	8.7	9.3	10.3
120 ~ 140	6.5	6.7	7.1	7.3	7.3	7.6	7.8	8.2	8.3	8.9	9.4	10.4
140 ~ 160	6.5	6.8	7.3	7.4	7.5	7.7	7.9	8.4	8.5	9.0	9.5	10.6
160 ~ 180	6.6	6.9	7.3	7.5	7.5	7.8	8.0	8.5	8.5	9.1	9.6	10.7

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.64
Specific Gravity d	3.85
Remarks	

OHARA 25-04

S-LAL54Q

Code(d) 651562
Code(e) 654560

Refractive Index n_d	1.651 00 1.651 000	Abbe Number v_d	56.24	Dispersion $n_F - n_C$	0.011 576
Refractive Index n_e	1.653 761	Abbe Number v_e	56.02	Dispersion $n_{F'} - n_{C'}$	0.011 670

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.615 32
n_{1970}	1.970 09	1.622 34
n_{1530}	1.529 58	1.629 66
n_{1129}	1.128 64	1.635 84
n_t	1.013 98	1.637 81
n_s	0.852 11	1.641 17
$n_{A'}$	0.768 19	1.643 41
n_r	0.706 52	1.645 45
n_C	0.656 27	1.647 47
$n_{C'}$	0.643 85	1.648 03
$n_{\text{He-Ne}}$	0.632 8	1.648 56
n_D	0.589 29	1.650 90
n_d	0.587 56	1.651 00
n_e	0.546 07	1.653 76
n_F	0.486 13	1.659 05
$n_{F'}$	0.479 99	1.659 70
$n_{\text{He-Cd}}$	0.441 57	1.664 49
n_g	0.435 835	1.665 32
n_h	0.404 656	1.670 53
n_i	0.365 015	1.679 39

Constants of Dispersion Formula	
A_1	9.200 850 87E-01
A_2	7.586 461 15E-01
A_3	1.070 730 96E+00
B_1	1.608 296 67E-02
B_2	2.920 593 06E-03
B_3	8.512 112 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	101.9
Rigidity Modulus G (GPa)	39.6
Poisson's Ratio σ	0.287
Knoop Hardness Hk[Class]	670 7
Abrasion Aa	61

Partial Dispersions	
$n_C - n_t$	0.009 660
$n_C - n_{A'}$	0.004 056
$n_d - n_C$	0.003 530
$n_e - n_C$	0.006 291
$n_g - n_d$	0.014 320
$n_g - n_F$	0.006 274
$n_h - n_g$	0.005 206
$n_i - n_g$	0.014 075
$n_{C'} - n_t$	0.010 223
$n_e - n_{C'}$	0.005 728
$n_{F'} - n_e$	0.005 942
$n_i - n_{F'}$	0.019 692

Relative Partial Dispersions	
$\theta_{C,t}$	0.834 5
$\theta_{C,A'}$	0.350 4
$\theta_{d,C}$	0.304 9
$\theta_{e,C}$	0.543 5
$\theta_{g,d}$	1.237 0
$\theta_{g,F}$	0.542 0
$\theta_{h,g}$	0.449 7
$\theta_{i,g}$	1.215 9
$\theta'_{C,t}$	0.876 0
$\theta'_{e,C'}$	0.490 8
$\theta'_{F,e}$	0.509 2
$\theta'_{i,F'}$	1.687 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.023 9
$\Delta\theta_{C,A'}$	0.006 4
$\Delta\theta_{g,d}$	-0.010 9
$\Delta\theta_{g,F}$	-0.008 5
$\Delta\theta_{i,g}$	-0.038 2

Coloring			
λ_{80}	385	λ_5	
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	311
CCI			
B	G	R	
0.00	0.62	0.63	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	0.04
320	0.11
330	0.24
340	0.41
350	0.58
360	0.73
370	0.83
380	0.90
390	0.938
400	0.962
420	0.984
440	0.991
460	0.995
480	0.997
500	0.997
550	0.998
600	0.997
650	0.998
700	0.997
800	0.997
900	0.995
1 000	0.993
1 200	0.994
1 400	0.976
1 600	0.986
1 800	0.973
2 000	0.942
2 200	0.81
2 400	0.58

Thermal Properties	
Strain Point StP (°C)	646
Annealing Point AP (°C)	679
Transformation Temperature Tg (°C)	688
Yield Point At (°C)	725
Softening Point SP (°C)	748
Expansion Coefficients (-30 °C ~ 70 °C)	46
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	57
Thermal Conductivity λ (W/(mK))	0.921

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	34
-90 ~ -80	35
-80 ~ -70	36
-70 ~ -60	37
-60 ~ -50	38
-50 ~ -40	39
-40 ~ -30	40
-30 ~ -20	41
-20 ~ -10	42
-10 ~ 0	43
0 ~ 10	44
10 ~ 20	45
20 ~ 30	46
30 ~ 40	47
40 ~ 50	48
50 ~ 60	48
60 ~ 70	49
70 ~ 80	50
80 ~ 90	51
90 ~ 100	51
100 ~ 110	52
110 ~ 120	53
120 ~ 130	53
130 ~ 140	54
140 ~ 150	55
150 ~ 160	55
160 ~ 170	56
170 ~ 180	56
180 ~ 190	57
190 ~ 200	57
200 ~ 210	58
210 ~ 220	58
220 ~ 230	59
230 ~ 240	59
240 ~ 250	59
250 ~ 260	60
260 ~ 270	60
270 ~ 280	60
280 ~ 290	61
290 ~ 300	61

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	4.9	5.1	5.4	5.5	5.5	5.6	5.8	6.1	6.2	6.5	6.8	7.4
-60 ~ -40	4.8	5.0	5.2	5.3	5.5	5.6	5.7	6.0	6.1	6.4	6.7	7.3
-40 ~ -20	4.8	5.0	5.3	5.4	5.4	5.6	5.8	6.1	6.1	6.4	6.7	7.3
-20 ~ 0	4.9	5.1	5.4	5.5	5.5	5.7	5.8	6.1	6.1	6.5	6.9	7.4
0 ~ 20	5.0	5.2	5.5	5.6	5.6	5.9	6.0	6.3	6.3	6.7	7.0	7.6
20 ~ 40	5.2	5.3	5.6	5.7	5.8	5.9	6.1	6.5	6.5	6.8	7.2	7.7
40 ~ 60	5.3	5.4	5.8	6.0	6.0	6.1	6.3	6.6	6.6	7.0	7.3	7.9
60 ~ 80	5.4	5.6	5.9	6.0	6.1	6.2	6.4	6.7	6.7	7.1	7.5	8.1
80 ~ 100	5.6	5.8	6.1	6.2	6.2	6.4	6.5	6.9	6.9	7.2	7.6	8.3
100 ~ 120	5.7	5.9	6.2	6.3	6.4	6.5	6.7	7.0	7.0	7.4	7.7	8.3
120 ~ 140	5.8	6.0	6.3	6.4	6.4	6.6	6.8	7.1	7.1	7.5	7.8	8.5
140 ~ 160	5.8	6.0	6.4	6.5	6.5	6.7	6.8	7.2	7.2	7.7	8.0	8.6
160 ~ 180	6.0	6.2	6.5	6.6	6.6	6.8	7.0	7.3	7.3	7.7	8.1	8.7

Other Properties	
Photoelastic Constant β nm/(cm ¹⁰⁵ Pa)	2.17
Specific Gravity d	3.36
Remarks	

S-LAL58

Code(d) 694508
Code(e) 697505

Refractive Index n_d	1.693 50 1.693 495	Abbe Number v_d	50.81	Dispersion $n_F - n_C$	0.013 649
Refractive Index n_e	1.696 745	Abbe Number v_e	50.53	Dispersion $n_{F'} - n_{C'}$	0.013 789

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.659 98
n_{1970}	1.970 09	1.665 38
n_{1530}	1.529 58	1.671 33
n_{1129}	1.128 64	1.676 89
n_t	1.013 98	1.678 83
n_s	0.852 11	1.682 33
$n_{A'}$	0.768 19	1.684 80
n_r	0.706 52	1.687 09
n_C	0.656 27	1.689 39
$n_{C'}$	0.643 85	1.690 04
$n_{\text{He-Ne}}$	0.632 8	1.690 65
n_D	0.589 29	1.693 37
n_d	0.587 56	1.693 50
n_e	0.546 07	1.696 75
n_F	0.486 13	1.703 04
$n_{F'}$	0.479 99	1.703 83
$n_{\text{He-Cd}}$	0.441 57	1.709 60
n_g	0.435 835	1.710 61
n_h	0.404 656	1.716 96
n_i	0.365 015	1.727 88

Constants of Dispersion Formula	
A_1	1.063 687 89E+00
A_2	7.449 390 67E-01
A_3	1.591 789 42E+00
B_1	1.851 996 40E-02
B_2	1.162 958 62E-03
B_3	1.566 360 25E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.2

Mechanical Properties	
Young's Modulus E (GPa)	92.8
Rigidity Modulus G (GPa)	36.1
Poisson's Ratio σ	0.285
Knoop Hardness Hk[Class]	580 6
Abrasion Aa	158

Partial Dispersions	
$n_C - n_t$	0.010 565
$n_C - n_{A'}$	0.004 596
$n_d - n_C$	0.004 102
$n_e - n_C$	0.007 352
$n_g - n_d$	0.017 117
$n_g - n_F$	0.007 570
$n_h - n_g$	0.006 343
$n_i - n_g$	0.017 264
$n_C - n_t$	0.011 214
$n_e - n_{C'}$	0.006 703
$n_{F'} - n_e$	0.007 086
$n_i - n_{F'}$	0.024 045

Relative Partial Dispersions	
$\theta_{C,t}$	0.774 0
$\theta_{C,A'}$	0.336 7
$\theta_{d,C}$	0.300 5
$\theta_{e,C}$	0.538 6
$\theta_{g,d}$	1.254 1
$\theta_{g,F}$	0.554 6
$\theta_{h,g}$	0.464 7
$\theta_{i,g}$	1.264 9
$\theta'_{C,t}$	0.813 3
$\theta'_{e,C'}$	0.486 1
$\theta'_{F,e}$	0.513 9
$\theta'_{i,F'}$	1.743 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.011 1
$\Delta\theta_{C,A'}$	-0.000 8
$\Delta\theta_{g,d}$	-0.005 1
$\Delta\theta_{g,F}$	-0.004 7
$\Delta\theta_{i,g}$	-0.034 7

Coloring			
λ_{80}	370	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	354	$\lambda_{0.05}$	322
CCI			
B	G	R	
0.00	0.30	0.28	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.02
330	0.22
340	0.53
350	0.75
360	0.87
370	0.935
380	0.962
390	0.977
400	0.986
420	0.991
440	0.992
460	0.994
480	0.996
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.989
2 000	0.977
2 200	0.942
2 400	0.84

Thermal Properties	
Strain Point StP (°C)	633
Annealing Point AP (°C)	659
Transformation Temperature Tg (°C)	678
Yield Point At (°C)	730
Softening Point SP (°C)	770
Expansion Coefficients (-30 °C ~ 70 °C)	74
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	87
Thermal Conductivity λ (W/(mK))	0.728

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	62
-90 ~ -80	63
-80 ~ -70	64
-70 ~ -60	65
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	69
-30 ~ -20	70
-20 ~ -10	71
-10 ~ 0	72
0 ~ 10	73
10 ~ 20	74
20 ~ 30	75
30 ~ 40	76
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	83
130 ~ 140	84
140 ~ 150	85
150 ~ 160	85
160 ~ 170	86
170 ~ 180	86
180 ~ 190	87
190 ~ 200	88
200 ~ 210	88
210 ~ 220	89
220 ~ 230	89
230 ~ 240	90
240 ~ 250	90
250 ~ 260	90
260 ~ 270	91
270 ~ 280	91
280 ~ 290	91
290 ~ 300	92

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	0.9	1.0	1.4	1.5	1.5	1.7	1.8	2.2	2.2	2.7	3.1	3.9
-60 ~ -40	0.8	0.9	1.2	1.3	1.4	1.5	1.7	2.1	2.2	2.6	2.9	3.8
-40 ~ -20	0.7	0.9	1.2	1.3	1.4	1.5	1.7	2.1	2.1	2.6	3.0	3.8
-20 ~ 0	0.7	0.9	1.3	1.4	1.4	1.6	1.8	2.2	2.2	2.6	3.0	3.9
0 ~ 20	0.7	1.0	1.4	1.5	1.5	1.7	1.9	2.2	2.3	2.7	3.3	4.1
20 ~ 40	0.8	1.0	1.5	1.6	1.6	1.8	2.0	2.4	2.4	2.9	3.3	4.3
40 ~ 60	1.0	1.2	1.6	1.7	1.7	1.9	2.1	2.5	2.6	3.0	3.5	4.5
60 ~ 80	1.1	1.3	1.6	1.8	1.8	2.1	2.3	2.7	2.8	3.2	3.7	4.6
80 ~ 100	1.2	1.4	1.8	1.9	1.9	2.1	2.3	2.8	2.8	3.4	3.9	4.8
100 ~ 120	1.3	1.5	1.9	2.0	2.1	2.3	2.5	2.9	3.0	3.5	4.1	5.0
120 ~ 140	1.3	1.6	2.0	2.1	2.1	2.4	2.6	3.0	3.1	3.7	4.2	5.2
140 ~ 160	1.4	1.6	2.1	2.3	2.3	2.5	2.8	3.2	3.3	3.8	4.3	5.3
160 ~ 180	1.5	1.7	2.2	2.3	2.3	2.6	2.8	3.3	3.3	3.9	4.4	5.4

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.70
Specific Gravity d	4.03
Remarks	

OHARA 25-04

S-LAL59

Code(d) 734515
Code(e) 737512

Refractive Index n_d	1.734 00 1.733 997	Abbe Number v_d	51.47	Dispersion $n_F - n_C$	0.014 261
Refractive Index n_e	1.737 395	Abbe Number v_e	51.24	Dispersion $n_{F'} - n_{C'}$	0.014 392

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.693 93
n_{1970}	1.970 09	1.701 30
n_{1530}	1.529 58	1.709 11
n_{1129}	1.128 64	1.715 93
n_t	1.013 98	1.718 17
n_s	0.852 11	1.722 10
$n_{A'}$	0.768 19	1.724 77
n_r	0.706 52	1.727 23
n_C	0.656 27	1.729 68
$n_{C'}$	0.643 85	1.730 36
$n_{\text{He-Ne}}$	0.632 8	1.731 01
n_D	0.589 29	1.733 87
n_d	0.587 56	1.734 00
n_e	0.546 07	1.737 39
n_F	0.486 13	1.743 94
$n_{F'}$	0.479 99	1.744 76
$n_{\text{He-Cd}}$	0.441 57	1.750 72
n_g	0.435 835	1.751 76
n_h	0.404 656	1.758 29
n_i	0.365 015	1.769 50

Constants of Dispersion Formula	
A_1	1.139 627 42E+00
A_2	8.052 278 38E-01
A_3	1.294 880 61E+00
B_1	4.932 948 62E-03
B_2	2.024 799 60E-02
B_3	9.347 465 07E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	113.7
Rigidity Modulus G (GPa)	44.0
Poisson's Ratio σ	0.293
Knoop Hardness Hk[Class]	680 7
Abrasion Aa	69

Partial Dispersions	
$n_C - n_t$	0.011 504
$n_C - n_{A'}$	0.004 905
$n_d - n_C$	0.004 318
$n_e - n_C$	0.007 716
$n_g - n_d$	0.017 767
$n_g - n_F$	0.007 824
$n_h - n_g$	0.006 531
$n_i - n_g$	0.017 734
$n_{C'} - n_t$	0.012 190
$n_e - n_{C'}$	0.007 030
$n_{F'} - n_e$	0.007 362
$n_i - n_{F'}$	0.024 741

Relative Partial Dispersions	
$\theta_{C,t}$	0.806 7
$\theta_{C,A'}$	0.343 9
$\theta_{d,C}$	0.302 8
$\theta_{e,C}$	0.541 1
$\theta_{g,d}$	1.245 8
$\theta_{g,F}$	0.548 6
$\theta_{h,g}$	0.458 0
$\theta_{i,g}$	1.243 5
$\theta'_{C,t}$	0.847 0
$\theta'_{e,C'}$	0.488 5
$\theta'_{F,e}$	0.511 5
$\theta'_{i,F'}$	1.719 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.018 5
$\Delta\theta_{C,A'}$	0.005 6
$\Delta\theta_{g,d}$	-0.012 0
$\Delta\theta_{g,F}$	-0.009 6
$\Delta\theta_{i,g}$	-0.050 5

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	283
CCI			
B	G	R	
0.00	0.36	0.33	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	0.02
290	0.11
300	0.20
310	0.34
320	0.48
330	0.62
340	0.74
350	0.83
360	0.89
370	0.934
380	0.959
390	0.973
400	0.982
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.994
1 600	0.994
1 800	0.986
2 000	0.964
2 200	0.905
2 400	0.65

Thermal Properties	
Strain Point StP (°C)	591
Annealing Point AP (°C)	620
Transformation Temperature Tg (°C)	641
Yield Point At (°C)	675
Softening Point SP (°C)	696
Expansion Coefficients (-30 °C ~ 70 °C)	55
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	69
Thermal Conductivity λ (W/(mK))	0.863

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	42
-90 ~ -80	43
-80 ~ -70	45
-70 ~ -60	46
-60 ~ -50	47
-50 ~ -40	48
-40 ~ -30	49
-30 ~ -20	50
-20 ~ -10	51
-10 ~ 0	52
0 ~ 10	53
10 ~ 20	54
20 ~ 30	55
30 ~ 40	56
40 ~ 50	57
50 ~ 60	58
60 ~ 70	59
70 ~ 80	60
80 ~ 90	61
90 ~ 100	62
100 ~ 110	63
110 ~ 120	63
120 ~ 130	64
130 ~ 140	65
140 ~ 150	66
150 ~ 160	67
160 ~ 170	67
170 ~ 180	68
180 ~ 190	69
190 ~ 200	69
200 ~ 210	70
210 ~ 220	70
220 ~ 230	71
230 ~ 240	72
240 ~ 250	72
250 ~ 260	73
260 ~ 270	73
270 ~ 280	74
280 ~ 290	74
290 ~ 300	74

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	4.3	4.4	4.7	4.8	5.0	5.1	5.2	5.6	5.6	6.0	6.4	7.1
-60 ~ -40	4.1	4.3	4.7	4.8	4.8	5.0	5.1	5.4	5.5	6.0	6.3	7.1
-40 ~ -20	4.1	4.3	4.6	4.7	4.7	5.0	5.2	5.5	5.5	5.9	6.3	7.2
-20 ~ 0	4.2	4.3	4.7	4.8	4.8	5.0	5.2	5.5	5.6	6.1	6.5	7.3
0 ~ 20	4.2	4.4	4.7	4.9	4.9	5.1	5.3	5.7	5.8	6.2	6.6	7.5
20 ~ 40	4.3	4.5	4.9	5.0	5.0	5.2	5.4	5.8	5.8	6.4	6.9	7.7
40 ~ 60	4.4	4.6	5.0	5.1	5.2	5.4	5.5	6.0	6.1	6.6	7.0	8.0
60 ~ 80	4.5	4.8	5.2	5.3	5.4	5.6	5.7	6.2	6.2	6.7	7.2	8.2
80 ~ 100	4.6	4.8	5.2	5.4	5.5	5.7	5.9	6.4	6.4	6.9	7.4	8.4
100 ~ 120	4.7	5.0	5.4	5.5	5.6	5.8	6.1	6.6	6.6	7.1	7.7	8.7
120 ~ 140	4.8	5.0	5.6	5.6	5.7	6.0	6.1	6.7	6.7	7.3	7.8	8.9
140 ~ 160	5.0	5.2	5.7	5.8	5.9	6.1	6.3	6.8	6.9	7.4	8.0	9.1
160 ~ 180	5.0	5.3	5.7	5.9	5.9	6.2	6.4	6.9	7.0	7.5	8.1	9.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.87
Specific Gravity d	4.04
Remarks	

S-LAL61

Code(d) 741527
Code(e) 744524

Refractive Index n_d	1.741 00 1.740 999	Abbe Number v_d	52.64	Dispersion $n_F - n_C$	0.014 078
Refractive Index n_e	1.744 354	Abbe Number v_e	52.41	Dispersion $n_{F'} - n_{C'}$	0.014 203

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.700 16
n_{1970}	1.970 09	1.707 87
n_{1530}	1.529 58	1.715 98
n_{1129}	1.128 64	1.722 97
n_t	1.013 98	1.725 25
n_s	0.852 11	1.729 18
$n_{A'}$	0.768 19	1.731 86
n_r	0.706 52	1.734 30
n_C	0.656 27	1.736 73
$n_{C'}$	0.643 85	1.737 41
$n_{\text{He-Ne}}$	0.632 8	1.738 04
n_D	0.589 29	1.740 87
n_d	0.587 56	1.741 00
n_e	0.546 07	1.744 35
n_F	0.486 13	1.750 80
$n_{F'}$	0.479 99	1.751 61
$n_{\text{He-Cd}}$	0.441 57	1.757 48
n_g	0.435 835	1.758 50
n_h	0.404 656	1.764 91
n_i	0.365 015	1.775 89

Constants of Dispersion Formula	
A_1	1.110 732 92E+00
A_2	8.593 477 73E-01
A_3	1.267 074 33E+00
B_1	4.641 812 48E-03
B_2	1.929 892 61E-02
B_3	8.739 176 98E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1~2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	119.0
Rigidity Modulus G (GPa)	46.1
Poisson's Ratio σ	0.291
Knoop Hardness Hk[Class]	720 7
Abrasion Aa	71

Partial Dispersions	
$n_C - n_t$	0.011 481
$n_C - n_{A'}$	0.004 871
$n_d - n_C$	0.004 272
$n_e - n_C$	0.007 627
$n_g - n_d$	0.017 502
$n_g - n_F$	0.007 696
$n_h - n_g$	0.006 413
$n_i - n_g$	0.017 393
$n_C - n_t$	0.012 160
$n_e - n_{C'}$	0.006 948
$n_{F'} - n_e$	0.007 255
$n_i - n_{F'}$	0.024 285

Relative Partial Dispersions	
$\theta_{C,t}$	0.815 5
$\theta_{C,A'}$	0.346 0
$\theta_{d,C}$	0.303 5
$\theta_{e,C}$	0.541 8
$\theta_{g,d}$	1.243 2
$\theta_{g,F}$	0.546 7
$\theta_{h,g}$	0.455 5
$\theta_{i,g}$	1.235 5
$\theta'_{C,t}$	0.856 2
$\theta'_{e,C'}$	0.489 2
$\theta'_{F,e}$	0.510 8
$\theta'_{i,F'}$	1.709 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.021 8
$\Delta\theta_{C,A'}$	0.006 3
$\Delta\theta_{g,d}$	-0.012 2
$\Delta\theta_{g,F}$	-0.009 6
$\Delta\theta_{i,g}$	-0.048 7

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	296
CCI			
B	G	R	
0.00	0.58	0.59	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	0.02
300	0.07
310	0.15
320	0.27
330	0.43
340	0.59
350	0.72
360	0.82
370	0.89
380	0.935
390	0.958
400	0.971
420	0.982
440	0.988
460	0.991
480	0.994
500	0.996
550	0.997
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.994
1 800	0.985
2 000	0.959
2 200	0.88
2 400	0.62

Thermal Properties	
Strain Point StP (°C)	631
Annealing Point AP (°C)	646
Transformation Temperature Tg (°C)	668
Yield Point At (°C)	690
Softening Point SP (°C)	724
Expansion Coefficients (-30 °C ~ 70 °C)	58
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	72
Thermal Conductivity λ (W/(mK))	0.861

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	45
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	49
-60 ~ -50	50
-50 ~ -40	51
-40 ~ -30	52
-30 ~ -20	53
-20 ~ -10	54
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	59
40 ~ 50	60
50 ~ 60	61
60 ~ 70	62
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	66
120 ~ 130	67
130 ~ 140	68
140 ~ 150	69
150 ~ 160	69
160 ~ 170	70
170 ~ 180	71
180 ~ 190	71
190 ~ 200	72
200 ~ 210	72
210 ~ 220	73
220 ~ 230	74
230 ~ 240	74
240 ~ 250	75
250 ~ 260	75
260 ~ 270	76
270 ~ 280	76
280 ~ 290	76
290 ~ 300	77

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	2.6	2.7	3.1	3.2	3.2	3.3	3.5	3.7	3.8	4.2	4.5	5.2
-60 ~ -40	2.5	2.7	3.0	3.1	3.1	3.2	3.4	3.7	3.7	4.1	4.5	5.1
-40 ~ -20	2.5	2.7	2.9	3.0	3.1	3.3	3.4	3.7	3.8	4.1	4.5	5.2
-20 ~ 0	2.6	2.8	3.1	3.2	3.2	3.3	3.5	3.9	3.9	4.3	4.7	5.3
0 ~ 20	2.7	2.8	3.2	3.3	3.3	3.4	3.6	4.0	4.1	4.4	4.8	5.5
20 ~ 40	2.8	3.0	3.3	3.4	3.4	3.6	3.8	4.1	4.1	4.5	5.0	5.7
40 ~ 60	2.9	3.1	3.4	3.5	3.6	3.7	3.9	4.3	4.4	4.8	5.2	5.9
60 ~ 80	3.0	3.3	3.6	3.7	3.7	3.9	4.1	4.4	4.5	4.9	5.3	6.1
80 ~ 100	3.1	3.3	3.7	3.9	3.9	4.1	4.2	4.6	4.7	5.1	5.5	6.3
100 ~ 120	3.2	3.4	3.7	3.9	3.9	4.1	4.4	4.7	4.8	5.2	5.6	6.4
120 ~ 140	3.3	3.5	3.9	4.0	4.1	4.3	4.4	4.8	4.9	5.3	5.8	6.6
140 ~ 160	3.4	3.6	4.0	4.1	4.1	4.3	4.5	4.9	4.9	5.4	5.8	6.7
160 ~ 180	3.4	3.6	3.9	4.1	4.1	4.3	4.5	4.9	4.9	5.4	5.9	6.7

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.55
Specific Gravity d	4.04
Remarks	

OHARA 25-04

S-LAL61Q

Code(d) 741526
Code(e) 744523

Refractive Index n_d	1.741 00 1.741 000	Abbe Number v_d	52.60	Dispersion $n_F - n_C$	0.014 087
Refractive Index n_e	1.744 357	Abbe Number v_e	52.36	Dispersion $n_{F'} - n_{C'}$	0.014 216

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.702 06
n_{1970}	1.970 09	1.709 13
n_{1530}	1.529 58	1.716 62
n_{1129}	1.128 64	1.723 22
n_t	1.013 98	1.725 41
n_s	0.852 11	1.729 25
$n_{A'}$	0.768 19	1.731 89
n_r	0.706 52	1.734 31
n_C	0.656 27	1.736 73
$n_{C'}$	0.643 85	1.737 41
$n_{\text{He-Ne}}$	0.632 8	1.738 04
n_D	0.589 29	1.740 87
n_d	0.587 56	1.741 00
n_e	0.546 07	1.744 36
n_F	0.486 13	1.750 82
$n_{F'}$	0.479 99	1.751 63
$n_{\text{He-Cd}}$	0.441 57	1.757 51
n_g	0.435 835	1.758 54
n_h	0.404 656	1.764 97
n_i	0.365 015	1.775 98

Constants of Dispersion Formula	
A_1	1.381 442 25E+00
A_2	5.876 900 89E-01
A_3	1.152 454 65E+00
B_1	6.691 926 52E-03
B_2	2.159 812 33E-02
B_3	8.719 233 00E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	2.0

Mechanical Properties	
Young's Modulus E (GPa)	116.5
Rigidity Modulus G (GPa)	45.1
Poisson's Ratio σ	0.292
Knoop Hardness Hk[Class]	710 7
Abrasion Aa	66

Partial Dispersions	
$n_C - n_t$	0.011 323
$n_C - n_{A'}$	0.004 841
$n_d - n_C$	0.004 267
$n_e - n_C$	0.007 624
$n_g - n_d$	0.017 538
$n_g - n_F$	0.007 718
$n_h - n_g$	0.006 432
$n_i - n_g$	0.017 446
$n_C - n_t$	0.012 001
$n_e - n_{C'}$	0.006 946
$n_{F'} - n_e$	0.007 270
$n_i - n_{F'}$	0.024 357

Relative Partial Dispersions	
$\theta_{C,t}$	0.803 8
$\theta_{C,A'}$	0.343 7
$\theta_{d,C}$	0.302 9
$\theta_{e,C}$	0.541 2
$\theta_{g,d}$	1.245 0
$\theta_{g,F}$	0.547 9
$\theta_{h,g}$	0.456 6
$\theta_{i,g}$	1.238 4
$\theta'_{C,t}$	0.844 2
$\theta'_{e,C'}$	0.488 6
$\theta'_{F,e}$	0.511 4
$\theta'_{i,F'}$	1.713 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.010 3
$\Delta\theta_{C,A'}$	0.004 1
$\Delta\theta_{g,d}$	-0.010 5
$\Delta\theta_{g,F}$	-0.008 5
$\Delta\theta_{i,g}$	-0.046 2

Coloring			
λ_{80}	360	λ_5	300
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	337	$\lambda_{0.05}$	298
CCI			
B	G	R	
0.00	0.26	0.26	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	0.06
310	0.26
320	0.52
330	0.72
340	0.83
350	0.902
360	0.940
370	0.962
380	0.975
390	0.983
400	0.988
420	0.992
440	0.994
460	0.996
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.995
1 800	0.986
2 000	0.962
2 200	0.89
2 400	0.66

Thermal Properties	
Strain Point StP (°C)	644
Annealing Point AP (°C)	670
Transformation Temperature Tg (°C)	687
Yield Point At (°C)	713
Softening Point SP (°C)	737
Expansion Coefficients (-30 °C ~ 70 °C)	61
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	74
Thermal Conductivity λ (W/(mK))	0.850

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	48
-90 ~ -80	49
-80 ~ -70	50
-70 ~ -60	52
-60 ~ -50	53
-50 ~ -40	54
-40 ~ -30	55
-30 ~ -20	56
-20 ~ -10	57
-10 ~ 0	58
0 ~ 10	59
10 ~ 20	60
20 ~ 30	61
30 ~ 40	62
40 ~ 50	63
50 ~ 60	64
60 ~ 70	65
70 ~ 80	66
80 ~ 90	67
90 ~ 100	68
100 ~ 110	68
110 ~ 120	69
120 ~ 130	70
130 ~ 140	71
140 ~ 150	71
150 ~ 160	72
160 ~ 170	73
170 ~ 180	73
180 ~ 190	74
190 ~ 200	75
200 ~ 210	75
210 ~ 220	76
220 ~ 230	76
230 ~ 240	77
240 ~ 250	77
250 ~ 260	78
260 ~ 270	78
270 ~ 280	78
280 ~ 290	79
290 ~ 300	79

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	2.8	2.9	3.2	3.3	3.3	3.5	3.6	3.9	4.0	4.4	4.8	5.7
-60 ~ -40	2.7	2.8	3.1	3.2	3.3	3.4	3.5	3.8	3.9	4.3	4.7	5.5
-40 ~ -20	2.7	2.8	3.1	3.2	3.3	3.4	3.6	3.9	3.9	4.3	4.7	5.6
-20 ~ 0	2.8	2.9	3.2	3.3	3.3	3.5	3.6	3.9	4.0	4.5	4.9	5.7
0 ~ 20	2.9	3.0	3.3	3.4	3.4	3.6	3.7	4.1	4.2	4.6	5.0	5.8
20 ~ 40	3.0	3.1	3.4	3.5	3.5	3.7	3.8	4.2	4.2	4.7	5.1	6.0
40 ~ 60	3.1	3.2	3.5	3.6	3.6	3.8	4.0	4.4	4.4	4.8	5.3	6.1
60 ~ 80	3.2	3.4	3.7	3.8	3.8	4.0	4.1	4.4	4.5	4.9	5.3	6.2
80 ~ 100	3.2	3.4	3.7	3.9	3.9	4.1	4.2	4.6	4.6	5.0	5.5	6.4
100 ~ 120	3.3	3.5	3.8	3.9	3.9	4.1	4.3	4.7	4.7	5.1	5.6	6.5
120 ~ 140	3.3	3.5	3.9	4.0	4.0	4.2	4.4	4.7	4.8	5.2	5.6	6.5
140 ~ 160	3.4	3.6	3.9	4.0	4.0	4.2	4.4	4.7	4.8	5.2	5.6	6.6
160 ~ 180	3.4	3.5	3.8	3.9	4.0	4.1	4.3	4.7	4.7	5.1	5.6	6.5

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.47
Specific Gravity d	4.09
Remarks	

OHARA 25-04

S-LAM 2

Code(d) 744448
Code(e) 748445

Refractive Index n_d	1.744 00 1.743 997	Abbe Number v_d	44.78	Dispersion $n_F - n_C$	0.016 613
Refractive Index n_e	1.747 946	Abbe Number v_e	44.50	Dispersion $n_{F'} - n_{C'}$	0.016 806

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.705 97
n_{1970}	1.970 09	1.711 77
n_{1530}	1.529 58	1.718 20
n_{1129}	1.128 64	1.724 36
n_t	1.013 98	1.726 58
n_s	0.852 11	1.730 65
$n_{A'}$	0.768 19	1.733 56
n_r	0.706 52	1.736 29
n_C	0.656 27	1.739 05
$n_{C'}$	0.643 85	1.739 83
$n_{\text{He-Ne}}$	0.632 8	1.740 56
n_D	0.589 29	1.743 85
n_d	0.587 56	1.744 00
n_e	0.546 07	1.747 95
n_F	0.486 13	1.755 66
$n_{F'}$	0.479 99	1.756 63
$n_{\text{He-Cd}}$	0.441 57	1.763 80
n_g	0.435 835	1.765 06
n_h	0.404 656	1.773 04
n_i	0.365 015	1.787 08

Constants of Dispersion Formula	
A_1	1.771 300 00E+00
A_2	1.958 142 30E-01
A_3	1.194 878 34E+00
B_1	9.766 524 44E-03
B_2	4.127 186 28E-02
B_3	1.104 581 22E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties	
Young's Modulus E (GPa)	93.5
Rigidity Modulus G (GPa)	36.1
Poisson's Ratio σ	0.295
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	157

Partial Dispersions	
$n_C - n_t$	0.012 472
$n_C - n_{A'}$	0.005 488
$n_d - n_C$	0.004 949
$n_e - n_C$	0.008 898
$n_g - n_d$	0.021 058
$n_g - n_F$	0.009 394
$n_h - n_g$	0.007 986
$n_i - n_g$	0.022 027
$n_C - n_t$	0.013 252
$n_e - n_{C'}$	0.008 118
$n_{F'} - n_e$	0.008 688
$n_i - n_{F'}$	0.030 448

Relative Partial Dispersions	
$\theta_{C,t}$	0.750 7
$\theta_{C,A'}$	0.330 3
$\theta_{d,C}$	0.297 9
$\theta_{e,C}$	0.535 6
$\theta_{g,d}$	1.267 6
$\theta_{g,F}$	0.565 5
$\theta_{h,g}$	0.480 7
$\theta_{i,g}$	1.325 9
$\theta'_{C,t}$	0.788 5
$\theta'_{e,C'}$	0.483 0
$\theta'_{F,e}$	0.517 0
$\theta'_{i,F'}$	1.811 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.006 1
$\Delta\theta_{C,A'}$	0.000 2
$\Delta\theta_{g,d}$	-0.004 1
$\Delta\theta_{g,F}$	-0.003 5
$\Delta\theta_{i,g}$	-0.024 2

Coloring			
λ_{80}	395	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	372	$\lambda_{0.05}$	340
CCI			
B	G	R	
0.00	1.00	1.02	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.04
350	0.29
360	0.59
370	0.78
380	0.87
390	0.925
400	0.950
420	0.973
440	0.983
460	0.987
480	0.992
500	0.995
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.997
1 000	0.997
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.988
2 000	0.971
2 200	0.928
2 400	0.79

Thermal Properties	
Strain Point StP (°C)	590
Annealing Point AP (°C)	617
Transformation Temperature Tg (°C)	631
Yield Point At (°C)	677
Softening Point SP (°C)	711
Expansion Coefficients (-30 °C ~ 70 °C)	75
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	88
Thermal Conductivity λ (W/(mK))	0.698

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	70
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	75
30 ~ 40	76
40 ~ 50	77
50 ~ 60	78
60 ~ 70	79
70 ~ 80	80
80 ~ 90	81
90 ~ 100	82
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	85
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	87
180 ~ 190	88
190 ~ 200	88
200 ~ 210	89
210 ~ 220	90
220 ~ 230	90
230 ~ 240	91
240 ~ 250	91
250 ~ 260	92
260 ~ 270	92
270 ~ 280	93
280 ~ 290	93
290 ~ 300	93

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.72
Specific Gravity d	4.32
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	1.4	1.6	2.0	2.1	2.2	2.4	2.5	3.0	3.0	3.6	4.1	5.3
-60 ~ -40	1.2	1.5	1.8	2.0	2.0	2.2	2.4	2.8	3.0	3.5	4.1	5.3
-40 ~ -20	1.2	1.3	1.7	1.9	2.0	2.2	2.4	2.9	2.9	3.5	4.2	5.3
-20 ~ 0	1.2	1.4	1.8	1.9	2.0	2.2	2.4	3.0	3.1	3.6	4.3	5.5
0 ~ 20	1.2	1.4	1.8	2.0	2.0	2.3	2.5	3.1	3.2	3.8	4.4	5.7
20 ~ 40	1.3	1.5	2.0	2.1	2.2	2.4	2.6	3.2	3.2	4.0	4.6	6.0
40 ~ 60	1.4	1.6	2.1	2.2	2.3	2.5	2.8	3.4	3.5	4.1	4.8	6.2
60 ~ 80	1.5	1.8	2.2	2.4	2.4	2.7	3.0	3.5	3.6	4.3	5.0	6.5
80 ~ 100	1.5	1.8	2.4	2.6	2.6	2.9	3.1	3.7	3.8	4.5	5.3	6.7
100 ~ 120	1.6	1.9	2.4	2.6	2.6	3.0	3.3	3.9	4.0	4.7	5.5	7.0
120 ~ 140	1.7	2.0	2.6	2.8	2.8	3.1	3.4	4.0	4.1	4.9	5.7	7.3
140 ~ 160	1.8	2.1	2.7	2.9	2.9	3.2	3.5	4.2	4.2	5.0	5.8	7.5
160 ~ 180	1.9	2.2	2.7	2.9	3.0	3.3	3.6	4.3	4.4	5.2	6.0	7.7

OHARA 25-04

S-LAM 3

Code(d) 717479
Code(e) 721476

Refractive Index n_d	1.717 00 1.717 004	Abbe Number v_d	47.92	Dispersion $n_F - n_C$	0.014 961
Refractive Index n_e	1.720 563	Abbe Number v_e	47.64	Dispersion $n_{F'} - n_{C'}$	0.015 124

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.681 33
n_{1970}	1.970 09	1.686 99
n_{1530}	1.529 58	1.693 20
n_{1129}	1.128 64	1.699 05
n_t	1.013 98	1.701 11
n_s	0.852 11	1.704 88
$n_{A'}$	0.768 19	1.707 54
n_r	0.706 52	1.710 02
n_C	0.656 27	1.712 53
$n_{C'}$	0.643 85	1.713 23
$n_{\text{He-Ne}}$	0.632 8	1.713 90
n_D	0.589 29	1.716 87
n_d	0.587 56	1.717 00
n_e	0.546 07	1.720 56
n_F	0.486 13	1.727 49
$n_{F'}$	0.479 99	1.728 36
$n_{\text{He-Cd}}$	0.441 57	1.734 75
n_g	0.435 835	1.735 87
n_h	0.404 656	1.742 96
n_i	0.365 015	1.755 31

Constants of Dispersion Formula	
A_1	1.642 587 13E+00
A_2	2.396 346 10E-01
A_3	1.224 830 26E+00
B_1	8.682 460 20E-03
B_2	3.512 262 42E-02
B_3	1.166 043 69E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.2

Mechanical Properties	
Young's Modulus E (GPa)	86.8
Rigidity Modulus G (GPa)	33.5
Poisson's Ratio σ	0.294
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	184

Partial Dispersions	
$n_C - n_t$	0.011 413
$n_C - n_{A'}$	0.004 990
$n_d - n_C$	0.004 476
$n_e - n_C$	0.008 035
$n_g - n_d$	0.018 871
$n_g - n_F$	0.008 386
$n_h - n_g$	0.007 085
$n_i - n_g$	0.019 433
$n_C - n_t$	0.012 120
$n_e - n_{C'}$	0.007 328
$n_{F'} - n_e$	0.007 796
$n_i - n_{F'}$	0.026 949

Relative Partial Dispersions	
$\theta_{C,t}$	0.762 9
$\theta_{C,A'}$	0.333 5
$\theta_{d,C}$	0.299 2
$\theta_{e,C}$	0.537 1
$\theta_{g,d}$	1.261 3
$\theta_{g,F}$	0.560 5
$\theta_{h,g}$	0.473 6
$\theta_{i,g}$	1.298 9
$\theta'_{C,t}$	0.801 4
$\theta'_{e,C'}$	0.484 5
$\theta'_{F',e}$	0.515 5
$\theta'_{i,F'}$	1.781 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.008 6
$\Delta\theta_{C,A'}$	-0.000 4
$\Delta\theta_{g,d}$	-0.003 9
$\Delta\theta_{g,F}$	-0.003 4
$\Delta\theta_{i,g}$	-0.024 9

Coloring			
λ_{80}	385	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	368	$\lambda_{0.05}$	338
CCI			
B	G	R	
0.00	0.65	0.63	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.10
350	0.41
360	0.69
370	0.83
380	0.916
390	0.951
400	0.968
420	0.982
440	0.987
460	0.990
480	0.993
500	0.995
550	0.997
600	0.996
650	0.996
700	0.997
800	0.999
900	0.997
1 000	0.997
1 200	0.996
1 400	0.994
1 600	0.992
1 800	0.983
2 000	0.966
2 200	0.920
2 400	0.77

Thermal Properties	
Strain Point StP (°C)	588
Annealing Point AP (°C)	614
Transformation Temperature Tg (°C)	631
Yield Point At (°C)	666
Softening Point SP (°C)	701
Expansion Coefficients (-30 °C ~ 70 °C)	84
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	97
Thermal Conductivity λ (W/(mK))	0.655

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	71
-90 ~ -80	72
-80 ~ -70	74
-70 ~ -60	75
-60 ~ -50	76
-50 ~ -40	77
-40 ~ -30	78
-30 ~ -20	79
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	82
10 ~ 20	83
20 ~ 30	84
30 ~ 40	85
40 ~ 50	86
50 ~ 60	87
60 ~ 70	88
70 ~ 80	89
80 ~ 90	90
90 ~ 100	91
100 ~ 110	91
110 ~ 120	92
120 ~ 130	93
130 ~ 140	94
140 ~ 150	94
150 ~ 160	95
160 ~ 170	96
170 ~ 180	96
180 ~ 190	97
190 ~ 200	97
200 ~ 210	98
210 ~ 220	99
220 ~ 230	99
230 ~ 240	100
240 ~ 250	100
250 ~ 260	101
260 ~ 270	101
270 ~ 280	101
280 ~ 290	102
290 ~ 300	102

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.51
Specific Gravity d	4.25
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	-1.2	-1.0	-0.8	-0.7	-0.7	-0.5	-0.3	0.0	0.1	0.5	1.0	1.7
-60 ~ -40	-1.4	-1.3	-1.0	-0.8	-0.8	-0.6	-0.5	-0.1	-0.1	0.3	0.9	1.7
-40 ~ -20	-1.5	-1.3	-1.0	-0.9	-0.9	-0.7	-0.5	-0.1	-0.1	0.4	0.8	1.8
-20 ~ 0	-1.5	-1.4	-1.0	-0.9	-0.8	-0.7	-0.5	-0.1	0.0	0.4	1.0	1.9
0 ~ 20	-1.4	-1.3	-0.9	-0.8	-0.8	-0.6	-0.4	0.0	0.0	0.6	1.1	2.1
20 ~ 40	-1.3	-1.2	-0.8	-0.7	-0.7	-0.5	-0.3	0.1	0.2	0.7	1.2	2.4
40 ~ 60	-1.3	-1.1	-0.7	-0.6	-0.6	-0.4	-0.2	0.3	0.3	1.0	1.5	2.6
60 ~ 80	-1.3	-1.0	-0.6	-0.5	-0.4	-0.2	0.0	0.5	0.5	1.1	1.7	2.8
80 ~ 100	-1.1	-1.0	-0.5	-0.4	-0.4	-0.1	0.1	0.7	0.7	1.3	1.9	3.1
100 ~ 120	-1.1	-0.8	-0.4	-0.3	-0.2	0.0	0.3	0.7	0.8	1.5	2.1	3.4
120 ~ 140	-1.0	-0.8	-0.3	-0.2	-0.1	0.2	0.4	1.0	1.0	1.7	2.3	3.6
140 ~ 160	-0.9	-0.6	-0.1	0.0	0.1	0.3	0.6	1.1	1.2	1.8	2.5	3.8
160 ~ 180	-0.8	-0.6	-0.1	0.1	0.1	0.4	0.7	1.2	1.3	2.0	2.7	4.0

OHARA 25-04

S-LAM 7

Code(d) 750353
Code(e) 755350

Refractive Index n_d	1.749 50 1.749 497	Abbe Number v_d	35.28	Dispersion $n_F - n_C$	0.021 243
Refractive Index n_e	1.754 527	Abbe Number v_e	35.02	Dispersion $n_{F'} - n_{C'}$	0.021 544

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.705 83
n_{1970}	1.970 09	1.711 84
n_{1530}	1.529 58	1.718 66
n_{1129}	1.128 64	1.725 53
n_t	1.013 98	1.728 11
n_s	0.852 11	1.732 96
$n_{A'}$	0.768 19	1.736 49
n_r	0.706 52	1.739 84
n_C	0.656 27	1.743 28
$n_{C'}$	0.643 85	1.744 25
$n_{\text{He-Ne}}$	0.632 8	1.745 17
n_D	0.589 29	1.749 31
n_d	0.587 56	1.749 50
n_e	0.546 07	1.754 53
n_F	0.486 13	1.764 52
$n_{F'}$	0.479 99	1.765 79
$n_{\text{He-Cd}}$	0.441 57	1.775 30
n_g	0.435 835	1.776 99
n_h	0.404 656	1.787 87
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.710 147 12E+00
A_2	2.569 432 92E-01
A_3	1.639 862 71E+00
B_1	1.051 610 80E-02
B_2	5.028 096 36E-02
B_3	1.461 812 17E+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 (GPa)	97.0
Rigidity Modulus G (GPa)	38.1
Poisson's Ratio σ	0.273
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	140

Partial Dispersions	
$n_C - n_t$	0.015 167
$n_C - n_{A'}$	0.006 783
$n_d - n_C$	0.006 222
$n_e - n_C$	0.011 252
$n_g - n_d$	0.027 489
$n_g - n_F$	0.012 468
$n_h - n_g$	0.010 884
$n_i - n_g$	
$n_{C'} - n_t$	0.016 141
$n_e - n_{C'}$	0.010 278
$n_{F'} - n_e$	0.011 266
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.714 0
$\theta_{C,A'}$	0.319 3
$\theta_{d,C}$	0.292 9
$\theta_{e,C}$	0.529 7
$\theta_{g,d}$	1.294 0
$\theta_{g,F}$	0.586 9
$\theta_{h,g}$	0.512 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.749 2
$\theta'_{e,C'}$	0.477 1
$\theta'_{F',e}$	0.522 9
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 8
$\Delta\theta_{C,A'}$	0.000 7
$\Delta\theta_{g,d}$	0.002 6
$\Delta\theta_{g,F}$	0.002 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	420	λ_5	355
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	396	$\lambda_{0.05}$	359
CCI			
B	G	R	
0.00	2.84	2.97	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.08
370	0.34
380	0.59
390	0.75
400	0.84
420	0.935
440	0.965
460	0.977
480	0.984
500	0.989
550	0.996
600	0.997
650	0.998
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.996
1 800	0.990
2 000	0.982
2 200	0.950
2 400	0.88

Thermal Properties	
Strain Point StP (°C)	583
Annealing Point AP (°C)	615
Transformation Temperature Tg (°C)	626
Yield Point At (°C)	690
Softening Point SP (°C)	739
Expansion Coefficients (-30 °C ~ 70 °C)	68
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	81
Thermal Conductivity λ (W/(mK))	0.871

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	55
-90 ~ -80	56
-80 ~ -70	57
-70 ~ -60	58
-60 ~ -50	60
-50 ~ -40	61
-40 ~ -30	62
-30 ~ -20	63
-20 ~ -10	64
-10 ~ 0	65
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	70
50 ~ 60	71
60 ~ 70	72
70 ~ 80	73
80 ~ 90	74
90 ~ 100	75
100 ~ 110	75
110 ~ 120	76
120 ~ 130	77
130 ~ 140	78
140 ~ 150	78
150 ~ 160	79
160 ~ 170	79
170 ~ 180	80
180 ~ 190	81
190 ~ 200	81
200 ~ 210	82
210 ~ 220	82
220 ~ 230	83
230 ~ 240	83
240 ~ 250	83
250 ~ 260	84
260 ~ 270	84
270 ~ 280	84
280 ~ 290	85
290 ~ 300	85

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	3.2	3.4	4.0	4.1	4.2	4.4	4.8	5.5	5.6	6.5	7.4	-
-60 ~ -40	3.1	3.4	3.9	4.1	4.1	4.4	4.7	5.5	5.6	6.5	7.5	-
-40 ~ -20	3.2	3.4	3.9	4.1	4.2	4.5	4.8	5.5	5.6	6.5	7.7	-
-20 ~ 0	3.3	3.5	4.1	4.3	4.3	4.6	4.9	5.8	5.9	6.8	7.9	-
0 ~ 20	3.4	3.6	4.2	4.4	4.4	4.8	5.2	5.9	6.0	7.0	8.1	-
20 ~ 40	3.5	3.8	4.4	4.6	4.6	4.9	5.3	6.1	6.2	7.2	8.4	-
40 ~ 60	3.6	3.9	4.5	4.7	4.8	5.1	5.6	6.3	6.4	7.5	8.6	-
60 ~ 80	3.8	4.1	4.7	4.9	5.0	5.3	5.7	6.5	6.6	7.6	8.8	-
80 ~ 100	3.8	4.1	4.9	5.1	5.1	5.5	5.8	6.6	6.8	7.8	9.1	-
100 ~ 120	3.9	4.3	4.9	5.2	5.3	5.6	6.0	6.8	6.9	8.1	9.3	-
120 ~ 140	4.0	4.3	5.1	5.3	5.3	5.7	6.1	6.9	7.1	8.2	9.5	-
140 ~ 160	4.1	4.4	5.1	5.3	5.4	5.7	6.1	7.0	7.1	8.3	9.6	-
160 ~ 180	4.1	4.4	5.1	5.3	5.4	5.8	6.2	7.1	7.2	8.4	9.7	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.53
Specific Gravity d	3.81
Remarks	

OHARA 25-04

S-LAM55

Code(d) **762401**
Code(e) **767398**

Refractive Index n_d 1.762 00 1.762 001	Abbe Number ν_d 40.10	Dispersion $n_F - n_C$ 0.019 003
Refractive Index n_e 1.766 509	Abbe Number ν_e 39.82	Dispersion $n_F - n_C$ 0.019 247

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.720 20
n_{1970}	1.970 09	1.726 40
n_{1530}	1.529 58	1.733 28
n_{1129}	1.128 64	1.739 98
n_t	1.013 98	1.742 42
n_s	0.852 11	1.746 95
$n_{A'}$	0.768 19	1.750 20
n_r	0.706 52	1.753 27
n_C	0.656 27	1.756 39
$n_{C'}$	0.643 85	1.757 27
$n_{\text{He-Ne}}$	0.632 8	1.758 10
n_D	0.589 29	1.761 83
n_d	0.587 56	1.762 00
n_e	0.546 07	1.766 51
n_F	0.486 13	1.775 39
$n_{F'}$	0.479 99	1.776 52
$n_{\text{He-Cd}}$	0.441 57	1.784 87
n_g	0.435 835	1.786 34
n_h	0.404 656	1.795 80
n_i	0.365 015	1.812 80

Constants of Dispersion Formula	
A_1	1.854 129 79E+00
A_2	1.654 503 23E-01
A_3	1.272 554 22E+00
B_1	1.084 381 52E-02
B_2	5.140 509 80E-02
B_3	1.099 868 37E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	96.7
Rigidity Modulus G (GPa)	37.4
Poisson's Ratio σ	0.292
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	145

Partial Dispersions	
$n_C - n_t$	0.013 960
$n_C - n_{A'}$	0.006 182
$n_d - n_C$	0.005 616
$n_e - n_C$	0.010 124
$n_g - n_d$	0.024 342
$n_g - n_F$	0.010 955
$n_h - n_g$	0.009 453
$n_i - n_g$	0.026 457
$n_C - n_t$	0.014 843
$n_e - n_{C'}$	0.009 241
$n_{F'} - n_e$	0.010 006
$n_i - n_{F'}$	0.036 285

Relative Partial Dispersions	
$\theta_{C,t}$	0.734 6
$\theta_{C,A'}$	0.325 3
$\theta_{d,C}$	0.295 5
$\theta_{e,C}$	0.532 8
$\theta_{g,d}$	1.281 0
$\theta_{g,F}$	0.576 5
$\theta_{h,g}$	0.497 4
$\theta_{i,g}$	1.392 3
$\theta'_{C,t}$	0.771 2
$\theta'_{e,C'}$	0.480 1
$\theta'_{F,e}$	0.519 9
$\theta'_{i,F'}$	1.885 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.000 2
$\Delta\theta_{C,A'}$	0.000 8
$\Delta\theta_{g,d}$	-0.000 4
$\Delta\theta_{g,F}$	-0.000 1
$\Delta\theta_{i,g}$	0.003 1

Coloring			
λ_{80}	405	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	350
CCI			
B	G	R	
0.00	1.43	1.46	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.37
370	0.67
380	0.82
390	0.89
400	0.932
420	0.963
440	0.976
460	0.984
480	0.989
500	0.993
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.994
1 800	0.986
2 000	0.970
2 200	0.923
2 400	0.78

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	589
Annealing Point AP ($^{\circ}\text{C}$)	617
Transformation Temperature Tg ($^{\circ}\text{C}$)	633
Yield Point At ($^{\circ}\text{C}$)	671
Softening Point SP ($^{\circ}\text{C}$)	709
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	72
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	85
Thermal Conductivity λ (W/(mK))	0.741

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	59
-90 ~ -80	61
-80 ~ -70	62
-70 ~ -60	63
-60 ~ -50	64
-50 ~ -40	65
-40 ~ -30	66
-30 ~ -20	67
-20 ~ -10	69
-10 ~ 0	70
0 ~ 10	71
10 ~ 20	72
20 ~ 30	73
30 ~ 40	73
40 ~ 50	74
50 ~ 60	75
60 ~ 70	76
70 ~ 80	77
80 ~ 90	78
90 ~ 100	79
100 ~ 110	79
110 ~ 120	80
120 ~ 130	81
130 ~ 140	82
140 ~ 150	82
150 ~ 160	83
160 ~ 170	84
170 ~ 180	84
180 ~ 190	85
190 ~ 200	86
200 ~ 210	86
210 ~ 220	87
220 ~ 230	87
230 ~ 240	88
240 ~ 250	88
250 ~ 260	89
260 ~ 270	89
270 ~ 280	89
280 ~ 290	90
290 ~ 300	90

Temperature Coefficients of Refractive Index													
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})												
	1550	t	r	C	C'	d	e	F	F'	g	h	i	
-80 ~ -60	1.7	2.0	2.4	2.5	2.5	2.8	3.1	3.6	3.7	4.3	5.1	6.5	
-60 ~ -40	1.6	1.8	2.2	2.3	2.4	2.6	3.0	3.5	3.6	4.2	4.9	6.5	
-40 ~ -20	1.4	1.7	2.2	2.4	2.4	2.7	2.9	3.5	3.6	4.4	5.1	6.7	
-20 ~ 0	1.5	1.7	2.2	2.4	2.4	2.7	3.1	3.7	3.7	4.5	5.3	7.1	
0 ~ 20	1.5	1.8	2.3	2.6	2.5	2.8	3.2	3.8	3.9	4.7	5.5	7.4	
20 ~ 40	1.7	1.9	2.5	2.6	2.7	3.0	3.3	4.1	4.1	5.0	5.8	7.7	
40 ~ 60	1.8	2.0	2.6	2.8	3.0	3.3	3.6	4.3	4.4	5.2	6.2	8.1	
60 ~ 80	2.0	2.2	2.8	3.0	3.1	3.4	3.8	4.5	4.6	5.5	6.6	8.6	
80 ~ 100	2.0	2.3	3.0	3.2	3.3	3.7	4.0	4.8	4.9	5.8	6.8	8.9	
100 ~ 120	2.2	2.5	3.1	3.4	3.5	3.9	4.2	5.0	5.1	6.1	7.2	9.4	
120 ~ 140	2.3	2.7	3.4	3.6	3.7	4.1	4.5	5.3	5.4	6.4	7.5	9.8	
140 ~ 160	2.5	2.9	3.6	3.8	3.9	4.3	4.7	5.5	5.6	6.7	7.8	10.2	
160 ~ 180	2.6	3.0	3.7	4.0	4.0	4.4	4.8	5.7	5.8	6.9	8.1	10.7	

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	1.88
Specific Gravity d	4.22
Remarks	

OHARA 25-04

S-LAM60

Code(d) 743493
Code(e) 747491

Table with refractive indices, Abbe numbers, and dispersion values for n_d and n_e.

Refractive Indices table listing values for various wavelengths (lambda) and indices (n).

Partial Dispersions table listing differences between various refractive indices (n_c, n_d, n_e, n_g, n_h, n_i).

Relative Partial Dispersions table listing theta values for different indices (C,t, C,A', d,C, e,C, g,d, g,F, h,g, i,g).

Anomalous dispersion table listing delta theta values for different indices (C,t, C,A', g,d, g,F, i,g).

Constants of Dispersion Formula table listing A1, A2, A3, B1, B2, B3.

Chemical Properties table listing water resistance, acid resistance, weathering resistance, phosphate resistance.

Mechanical Properties table listing Young's modulus, rigidity modulus, Poisson's ratio, Knoop hardness, abrasion.

Coloring and Internal transmission tables listing values for lambda_80, lambda_70, lambda_0.80, lambda_0.05, B, G, R.

Internal Transmittance table listing tau_i values for various wavelengths (lambda) from 280 to 2400 nm.

Thermal Properties table listing Strain Point StP, Annealing Point AP, Transformation Temperature Tg, Yield Point At, Softening Point SP, Expansion Coefficients, Thermal Conductivity lambda.

Linear coefficient of thermal expansion table listing alpha_i values for various temperature ranges from -100 to 290 degrees Celsius.

Other Properties table listing Photoelastic Constant beta, Specific Gravity d, Remarks.

Temperature Coefficients of Refractive Index table with columns for Range of Temperature (C) and coefficients (1550, t, r, C, C', d, e, F, F', g, h, i).

S-LAM66

Code(d) **801350**
Code(e) **806347**

Refractive Index n_d	1.801 00 1.800 999	Abbe Number v_d	34.97	Dispersion $n_F - n_C$	0.022 907
Refractive Index n_e	1.806 423	Abbe Number v_e	34.72	Dispersion $n_{F'} - n_{C'}$	0.023 227

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.750 94
n_{1970}	1.970 09	1.758 42
n_{1530}	1.529 58	1.766 72
n_{1129}	1.128 64	1.774 75
n_t	1.013 98	1.777 66
n_s	0.852 11	1.783 04
$n_{A'}$	0.768 19	1.786 91
n_T	0.706 52	1.790 55
n_C	0.656 27	1.794 27
$n_{C'}$	0.643 85	1.795 33
$n_{\text{He-Ne}}$	0.632 8	1.796 32
n_D	0.589 29	1.800 80
n_d	0.587 56	1.801 00
n_e	0.546 07	1.806 42
n_F	0.486 13	1.817 18
$n_{F'}$	0.479 99	1.818 56
$n_{\text{He-Cd}}$	0.441 57	1.828 79
n_g	0.435 835	1.830 61
n_h	0.404 656	1.842 36
n_i	0.365 015	1.863 91

Constants of Dispersion Formula	
A_1	1.920 942 21E+00
A_2	2.199 012 08E-01
A_3	1.727 052 31E+00
B_1	1.150 752 41E-02
B_2	5.479 935 43E-02
B_3	1.201 336 74E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group WS	1~2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	121.0
Rigidity Modulus G (GPa)	47.3
Poisson's Ratio σ	0.280
Knoop Hardness Hk[Class]	660 7
Abrasion Aa	93

Partial Dispersions	
$n_C - n_t$	0.016 620
$n_C - n_{A'}$	0.007 369
$n_d - n_C$	0.006 724
$n_e - n_C$	0.012 148
$n_g - n_d$	0.029 615
$n_g - n_F$	0.013 432
$n_h - n_g$	0.011 747
$n_i - n_g$	0.033 294
$n_{C'} - n_t$	0.017 674
$n_e - n_{C'}$	0.011 094
$n_{F'} - n_e$	0.012 133
$n_i - n_{F'}$	0.045 352

Relative Partial Dispersions	
$\theta_{C,t}$	0.725 5
$\theta_{C,A'}$	0.321 7
$\theta_{d,C}$	0.293 5
$\theta_{e,C}$	0.530 3
$\theta_{g,d}$	1.292 8
$\theta_{g,F}$	0.586 4
$\theta_{h,g}$	0.512 8
$\theta_{i,g}$	1.453 4
$\theta'_{C,t}$	0.760 9
$\theta'_{e,C'}$	0.477 6
$\theta'_{F,e}$	0.522 4
$\theta'_{i,F'}$	1.952 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.014 8
$\Delta\theta_{C,A'}$	0.003 5
$\Delta\theta_{g,d}$	0.000 7
$\Delta\theta_{g,F}$	0.001 5
$\Delta\theta_{i,g}$	0.021 2

Coloring			
λ_{80}	430	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	388	$\lambda_{0.05}$	351
CCI			
B	G	R	
0.00	2.58	2.67	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.03
360	0.28
370	0.57
380	0.73
390	0.82
400	0.87
420	0.932
440	0.954
460	0.968
480	0.977
500	0.985
550	0.994
600	0.994
650	0.994
700	0.997
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.992
2 000	0.976
2 200	0.937
2 400	0.77

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	514
Annealing Point AP ($^{\circ}\text{C}$)	544
Transformation Temperature Tg ($^{\circ}\text{C}$)	556
Yield Point At ($^{\circ}\text{C}$)	596
Softening Point SP ($^{\circ}\text{C}$)	629
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	80
α_l (10^{-7} K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	97
Thermal Conductivity λ (W/(mK))	1.06

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7} K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	66
-70 ~ -60	68
-60 ~ -50	69
-50 ~ -40	71
-40 ~ -30	72
-30 ~ -20	74
-20 ~ -10	75
-10 ~ 0	77
0 ~ 10	78
10 ~ 20	79
20 ~ 30	80
30 ~ 40	82
40 ~ 50	83
50 ~ 60	84
60 ~ 70	85
70 ~ 80	86
80 ~ 90	88
90 ~ 100	89
100 ~ 110	90
110 ~ 120	91
120 ~ 130	92
130 ~ 140	93
140 ~ 150	94
150 ~ 160	94
160 ~ 170	95
170 ~ 180	96
180 ~ 190	97
190 ~ 200	98
200 ~ 210	98
210 ~ 220	99
220 ~ 230	100
230 ~ 240	100
240 ~ 250	101
250 ~ 260	101
260 ~ 270	102
270 ~ 280	102
280 ~ 290	103
290 ~ 300	103

Other Properties	
Photoelastic Constant β nm/(cm 105 Pa)	1.92
Specific Gravity d	3.55
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	1.3	1.5	2.1	2.2	2.3	2.6	2.8	3.6	3.7	4.5	5.5	7.5
-60 ~ -40	1.1	1.4	2.0	2.1	2.2	2.5	2.8	3.5	3.6	4.5	5.5	7.7
-40 ~ -20	1.0	1.4	1.9	2.1	2.2	2.5	2.8	3.6	3.7	4.6	5.7	8.0
-20 ~ 0	1.1	1.4	2.0	2.2	2.3	2.6	3.0	3.7	3.8	4.9	6.0	8.4
0 ~ 20	1.2	1.5	2.1	2.3	2.4	2.8	3.1	3.9	4.0	5.1	6.3	8.8
20 ~ 40	1.3	1.6	2.3	2.5	2.6	3.0	3.3	4.2	4.3	5.3	6.6	9.4
40 ~ 60	1.4	1.8	2.4	2.7	2.8	3.1	3.5	4.4	4.5	5.6	6.9	9.8
60 ~ 80	1.6	1.9	2.6	2.8	2.9	3.3	3.7	4.6	4.8	6.0	7.3	10.3
80 ~ 100	1.7	2.0	2.8	3.0	3.1	3.5	3.9	4.9	5.0	6.3	7.6	10.8
100 ~ 120	1.8	2.2	2.9	3.2	3.3	3.7	4.2	5.1	5.3	6.6	8.0	11.2
120 ~ 140	1.9	2.3	3.1	3.3	3.4	3.9	4.3	5.4	5.5	6.9	8.3	11.7
140 ~ 160	2.0	2.4	3.2	3.5	3.6	4.0	4.5	5.6	5.7	7.1	8.7	12.2
160 ~ 180	2.0	2.4	3.3	3.6	3.7	4.1	4.6	5.7	6.0	7.4	9.0	12.6

OHARA 25-04

S-LAM73

Code(d) **794371**
Code(e) **799368**

Refractive Index n_d 1.793 60 1.793 600	Abbe Number v_d 37.09	Dispersion $n_F - n_C$ 0.021 397
Refractive Index n_e 1.798 672	Abbe Number v_e 36.82	Dispersion $n_{F'} - n_{C'}$ 0.021 692

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.750 73
n_{1970}	1.970 09	1.756 38
n_{1530}	1.529 58	1.762 85
n_{1129}	1.128 64	1.769 52
n_t	1.013 98	1.772 07
n_s	0.852 11	1.776 92
$n_{A'}$	0.768 19	1.780 47
n_F	0.706 52	1.783 85
n_C	0.656 27	1.787 32
$n_{C'}$	0.643 85	1.788 30
$n_{\text{He-Ne}}$	0.632 8	1.789 23
n_D	0.589 29	1.793 41
n_d	0.587 56	1.793 60
n_e	0.546 07	1.798 67
n_F	0.486 13	1.808 72
$n_{F'}$	0.479 99	1.810 00
$n_{\text{He-Cd}}$	0.441 57	1.819 50
n_g	0.435 835	1.821 19
n_h	0.404 656	1.832 00
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.863 531 23E+00
A_2	2.552 156 17E-01
A_3	1.233 991 33E+00
B_1	1.076 206 73E-02
B_2	4.872 486 79E-02
B_3	1.171 251 10E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group WS	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.2

Mechanical Properties	
Young's Modulus E (GPa)	86.8
Rigidity Modulus G (GPa)	33.2
Poisson's Ratio σ	0.306
Knoop Hardness Hk[Class]	520 5
Abrasion Aa	182

Partial Dispersions	
$n_C - n_t$	0.015 250
$n_C - n_{A'}$	0.006 846
$n_d - n_C$	0.006 281
$n_e - n_C$	0.011 353
$n_g - n_d$	0.027 586
$n_g - n_F$	0.012 470
$n_h - n_g$	0.010 815
$n_i - n_g$	
$n_{C'} - n_t$	0.016 234
$n_{e'} - n_{C'}$	0.010 369
$n_{F'} - n_e$	0.011 323
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.712 7
$\theta_{C,A'}$	0.320 0
$\theta_{d,C}$	0.293 5
$\theta_{e,C}$	0.530 6
$\theta_{g,d}$	1.289 2
$\theta_{g,F}$	0.582 8
$\theta_{h,g}$	0.505 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.748 4
$\theta'_{e,C'}$	0.478 0
$\theta'_{F,e}$	0.522 0
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.008 0
$\Delta\theta_{C,A'}$	-0.000 8
$\Delta\theta_{g,d}$	0.001 5
$\Delta\theta_{g,F}$	0.001 3
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	415	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	382	$\lambda_{0.05}$	349
CCI			
B	G	R	
0.00	1.77	1.79	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.08
360	0.34
370	0.62
380	0.78
390	0.87
400	0.916
420	0.954
440	0.968
460	0.976
480	0.983
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.997
1 600	0.995
1 800	0.984
2 000	0.964
2 200	0.925
2 400	0.80

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	584
Annealing Point AP ($^{\circ}\text{C}$)	607
Transformation Temperature Tg ($^{\circ}\text{C}$)	625
Yield Point At ($^{\circ}\text{C}$)	665
Softening Point SP ($^{\circ}\text{C}$)	695
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	95
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	107
Thermal Conductivity λ (W/(mK))	0.648

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	83
-90 ~ -80	84
-80 ~ -70	85
-70 ~ -60	86
-60 ~ -50	87
-50 ~ -40	88
-40 ~ -30	89
-30 ~ -20	90
-20 ~ -10	91
-10 ~ 0	92
0 ~ 10	93
10 ~ 20	94
20 ~ 30	95
30 ~ 40	96
40 ~ 50	97
50 ~ 60	98
60 ~ 70	99
70 ~ 80	99
80 ~ 90	100
90 ~ 100	101
100 ~ 110	102
110 ~ 120	102
120 ~ 130	103
130 ~ 140	104
140 ~ 150	104
150 ~ 160	105
160 ~ 170	105
170 ~ 180	106
180 ~ 190	106
190 ~ 200	107
200 ~ 210	107
210 ~ 220	108
220 ~ 230	108
230 ~ 240	109
240 ~ 250	109
250 ~ 260	110
260 ~ 270	110
270 ~ 280	110
280 ~ 290	111
290 ~ 300	111

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-2.6	-2.4	-1.9	-1.7	-1.4	-1.2	-0.5	-0.4	0.4	1.1	-	-
-60 ~ -40	-2.8	-2.6	-2.0	-1.9	-1.8	-1.6	-1.3	-0.7	-0.6	0.3	1.1	-
-40 ~ -20	-2.8	-2.6	-2.1	-2.0	-1.9	-1.6	-1.3	-0.6	-0.5	0.3	1.2	-
-20 ~ 0	-2.9	-2.7	-2.0	-1.9	-1.8	-1.5	-1.2	-0.5	-0.4	0.4	1.4	-
0 ~ 20	-2.9	-2.5	-2.0	-1.8	-1.7	-1.4	-1.1	-0.4	-0.3	0.6	1.7	-
20 ~ 40	-2.8	-2.5	-1.9	-1.6	-1.6	-1.2	-0.9	-0.2	-0.1	0.8	1.9	-
40 ~ 60	-2.7	-2.4	-1.7	-1.5	-1.4	-1.1	-0.7	0.0	0.1	1.1	2.1	-
60 ~ 80	-2.5	-2.2	-1.6	-1.4	-1.3	-1.0	-0.6	0.2	0.3	1.4	2.5	-
80 ~ 100	-2.4	-2.1	-1.5	-1.2	-1.2	-0.8	-0.4	0.4	0.5	1.6	2.7	-
100 ~ 120	-2.3	-2.0	-1.3	-1.1	-1.0	-0.6	-0.2	0.6	0.7	1.8	3.0	-
120 ~ 140	-2.2	-1.9	-1.2	-1.0	-0.9	-0.5	-0.1	0.8	0.9	2.1	3.3	-
140 ~ 160	-2.2	-1.8	-1.1	-0.8	-0.8	-0.4	0.1	1.0	1.1	2.3	3.5	-
160 ~ 180	-2.1	-1.8	-1.0	-0.8	-0.7	-0.3	0.2	1.1	1.4	2.6	3.9	-

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	1.52
Specific Gravity d	4.45
Remarks	

OHARA 25-04

S-NBH 5

Code(d) **654397**
Code(e) **658395**

Refractive Index n_d 1.654 12 1.654 115	Abbe Number v_d 39.68	Dispersion $n_F - n_C$ 0.016 484
Refractive Index n_e 1.658 026	Abbe Number v_e 39.43	Dispersion $n_{F'} - n_{C'}$ 0.016 687

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.614 10
n_{1970}	1.970 09	1.620 70
n_{1530}	1.529 58	1.627 87
n_{1129}	1.128 64	1.634 48
n_t	1.013 98	1.636 77
n_s	0.852 11	1.640 90
$n_{A'}$	0.768 19	1.643 79
n_r	0.706 52	1.646 49
n_C	0.656 27	1.649 23
$n_{C'}$	0.643 85	1.650 00
n_{He-Ne}	0.632 8	1.650 72
n_D	0.589 29	1.653 97
n_d	0.587 56	1.654 12
n_e	0.546 07	1.658 03
n_F	0.486 13	1.665 71
$n_{F'}$	0.479 99	1.666 68
n_{He-Cd}	0.441 57	1.673 89
n_g	0.435 835	1.675 17
n_h	0.404 656	1.683 31
n_i	0.365 015	1.697 91

Constants of Dispersion Formula	
A_1	1.475 445 21E+00
A_2	1.930 600 95E-01
A_3	1.509 390 10E+00
B_1	9.558 367 40E-03
B_2	4.604 304 83E-02
B_3	1.264 227 46E+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 (GPa)	90.2
Rigidity Modulus G (GPa)	36.1
Poisson's Ratio σ	0.248
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	123

Partial Dispersions	
$n_C - n_t$	0.012 452
$n_C - n_{A'}$	0.005 432
$n_d - n_C$	0.004 890
$n_e - n_C$	0.008 801
$n_g - n_d$	0.021 051
$n_g - n_F$	0.009 457
$n_h - n_g$	0.008 144
$n_i - n_g$	0.022 741
$n_{C'} - n_t$	0.013 223
$n_e - n_{C'}$	0.008 030
$n_{F'} - n_e$	0.008 657
$n_i - n_{F'}$	0.031 224

Relative Partial Dispersions	
$\theta_{C,t}$	0.755 4
$\theta_{C,A'}$	0.329 5
$\theta_{d,C}$	0.296 7
$\theta_{e,C}$	0.533 9
$\theta_{g,d}$	1.277 1
$\theta_{g,F}$	0.573 7
$\theta_{h,g}$	0.494 1
$\theta_{i,g}$	1.379 6
$\theta'_{C,t}$	0.792 4
$\theta'_{e,C'}$	0.481 2
$\theta'_{F',e}$	0.518 8
$\theta'_{i,F'}$	1.871 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.022 6
$\Delta\theta_{C,A'}$	0.005 6
$\Delta\theta_{g,d}$	-0.005 2
$\Delta\theta_{g,F}$	-0.003 6
$\Delta\theta_{i,g}$	-0.013 2

Coloring			
λ_{80}	370	λ_5	325
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	328
CCI			
B	G	R	
0.00	0.66	0.69	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.12
340	0.47
350	0.71
360	0.83
370	0.902
380	0.936
390	0.957
400	0.969
420	0.980
440	0.985
460	0.988
480	0.991
500	0.994
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.991
1 600	0.994
1 800	0.989
2 000	0.976
2 200	0.919
2 400	0.80

Thermal Properties	
Strain Point StP (°C)	489
Annealing Point AP (°C)	511
Transformation Temperature Tg (°C)	526
Yield Point At (°C)	585
Softening Point SP (°C)	645
Expansion Coefficients (-30 °C ~ 70 °C)	68
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	85
Thermal Conductivity λ (W/(mK))	0.965

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	53
-90 ~ -80	55
-80 ~ -70	56
-70 ~ -60	57
-60 ~ -50	59
-50 ~ -40	60
-40 ~ -30	61
-30 ~ -20	62
-20 ~ -10	64
-10 ~ 0	65
0 ~ 10	66
10 ~ 20	67
20 ~ 30	68
30 ~ 40	69
40 ~ 50	70
50 ~ 60	72
60 ~ 70	73
70 ~ 80	74
80 ~ 90	75
90 ~ 100	76
100 ~ 110	77
110 ~ 120	78
120 ~ 130	78
130 ~ 140	79
140 ~ 150	80
150 ~ 160	81
160 ~ 170	82
170 ~ 180	83
180 ~ 190	84
190 ~ 200	84
200 ~ 210	85
210 ~ 220	86
220 ~ 230	87
230 ~ 240	87
240 ~ 250	88
250 ~ 260	89
260 ~ 270	89
270 ~ 280	90
280 ~ 290	91
290 ~ 300	91

Other Properties	
Photoelastic Constant β nm/(cm ¹⁰⁵ Pa)	3.22
Specific Gravity d	3.02
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	2.7	3.0	3.4	3.5	3.5	3.7	3.9	4.5	4.5	5.1	5.7	7.1
-60 ~ -40	2.7	2.9	3.2	3.5	3.5	3.7	3.9	4.4	4.5	5.1	5.8	7.1
-40 ~ -20	2.7	2.9	3.3	3.4	3.5	3.8	4.0	4.5	4.6	5.2	5.9	7.4
-20 ~ 0	2.8	3.0	3.4	3.5	3.6	3.8	4.1	4.6	4.6	5.4	6.1	7.6
0 ~ 20	2.8	3.1	3.5	3.8	3.7	4.0	4.3	4.8	4.9	5.6	6.3	7.9
20 ~ 40	3.0	3.2	3.7	3.8	3.9	4.1	4.4	5.0	5.1	5.8	6.6	8.2
40 ~ 60	3.1	3.3	3.9	4.1	4.1	4.4	4.7	5.2	5.3	6.1	6.9	8.5
60 ~ 80	3.3	3.5	4.0	4.2	4.3	4.5	4.8	5.4	5.6	6.4	7.2	8.9
80 ~ 100	3.5	3.7	4.2	4.4	4.5	4.8	5.1	5.7	5.8	6.6	7.4	9.3
100 ~ 120	3.6	3.9	4.4	4.6	4.6	4.9	5.2	5.9	6.0	6.8	7.7	9.7
120 ~ 140	3.7	4.0	4.5	4.7	4.8	5.1	5.4	6.1	6.2	7.0	8.0	10.0
140 ~ 160	3.8	4.1	4.7	4.9	4.9	5.2	5.6	6.4	6.5	7.3	8.3	10.3
160 ~ 180	4.0	4.3	4.9	5.1	5.1	5.5	5.8	6.5	6.6	7.5	8.5	10.5

OHARA 25-04

S-NBH 8

Code(d) **720347**
Code(e) **725345**

Refractive Index n_d	1.720 47	Abbe Number v_d	34.71	Dispersion $n_F - n_C$	0.020 758
	1.720 467				
Refractive Index n_e	1.725 385	Abbe Number v_e	34.47	Dispersion $n_F - n_C'$	0.021 042

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.675 34
n_{1970}	1.970 09	1.681 98
n_{1530}	1.529 58	1.689 41
n_{1129}	1.128 64	1.696 65
n_t	1.013 98	1.699 28
n_s	0.852 11	1.704 16
$n_{A'}$	0.768 19	1.707 67
n_T	0.706 52	1.710 99
n_C	0.656 27	1.714 37
$n_{C'}$	0.643 85	1.715 32
$n_{\text{He-Ne}}$	0.632 8	1.716 22
n_D	0.589 29	1.720 29
n_d	0.587 56	1.720 47
n_e	0.546 07	1.725 38
n_F	0.486 13	1.735 12
$n_{F'}$	0.479 99	1.736 36
$n_{\text{He-Cd}}$	0.441 57	1.745 59
n_g	0.435 835	1.747 23
n_h	0.404 656	1.757 77
n_i	0.365 015	1.776 89

Constants of Dispersion Formula	
A_1	1.613 441 36E+00
A_2	2.572 958 88E-01
A_3	1.983 644 55E+00
B_1	1.063 867 52E-02
B_2	4.870 716 24E-02
B_3	1.597 844 04E+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 (GPa)	101.7
Rigidity Modulus G (GPa)	40.7
Poisson's Ratio σ	0.250
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	153

Partial Dispersions	
$n_C - n_t$	0.015 084
$n_C - n_{A'}$	0.006 690
$n_d - n_C$	0.006 102
$n_e - n_C$	0.011 020
$n_g - n_d$	0.026 767
$n_g - n_F$	0.012 111
$n_h - n_g$	0.010 534
$n_i - n_g$	0.029 660
$n_C - n_t$	0.016 041
$n_e - n_{C'}$	0.010 063
$n_{F'} - n_e$	0.010 979
$n_i - n_{F'}$	0.040 530

Relative Partial Dispersions	
$\theta_{C,t}$	0.726 7
$\theta_{C,A'}$	0.322 3
$\theta_{d,C}$	0.294 0
$\theta_{e,C}$	0.530 9
$\theta_{g,d}$	1.289 5
$\theta_{g,F}$	0.583 4
$\theta_{h,g}$	0.507 5
$\theta_{i,g}$	1.428 8
$\theta'_{C,t}$	0.762 3
$\theta'_{e,C'}$	0.478 2
$\theta'_{F',e}$	0.521 8
$\theta'_{i,F'}$	1.926 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.017 2
$\Delta\theta_{C,A'}$	0.004 4
$\Delta\theta_{g,d}$	-0.003 1
$\Delta\theta_{g,F}$	-0.001 9
$\Delta\theta_{i,g}$	-0.005 6

Coloring			
λ_{80}	390	λ_5	330
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	371	$\lambda_{0.05}$	331
CCI			
B	G	R	
0.00	1.38	1.48	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.03
340	0.24
350	0.49
360	0.67
370	0.79
380	0.86
390	0.908
400	0.936
420	0.962
440	0.972
460	0.979
480	0.984
500	0.989
550	0.996
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.997
1 800	0.992
2 000	0.984
2 200	0.955
2 400	0.88

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	476
Annealing Point AP ($^{\circ}\text{C}$)	499
Transformation Temperature Tg ($^{\circ}\text{C}$)	514
Yield Point At ($^{\circ}\text{C}$)	564
Softening Point SP ($^{\circ}\text{C}$)	611
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	80
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	103
Thermal Conductivity λ (W/(m·K))	1.05

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	63
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	68
-50 ~ -40	70
-40 ~ -30	71
-30 ~ -20	73
-20 ~ -10	75
-10 ~ 0	76
0 ~ 10	78
10 ~ 20	79
20 ~ 30	81
30 ~ 40	82
40 ~ 50	84
50 ~ 60	85
60 ~ 70	87
70 ~ 80	88
80 ~ 90	89
90 ~ 100	91
100 ~ 110	92
110 ~ 120	93
120 ~ 130	94
130 ~ 140	96
140 ~ 150	97
150 ~ 160	98
160 ~ 170	99
170 ~ 180	100
180 ~ 190	102
190 ~ 200	103
200 ~ 210	104
210 ~ 220	105
220 ~ 230	106
230 ~ 240	107
240 ~ 250	108
250 ~ 260	109
260 ~ 270	109
270 ~ 280	110
280 ~ 290	111
290 ~ 300	112

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.90
Specific Gravity d	3.19
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	1.7	2.0	2.4	2.5	2.6	2.8	3.2	3.8	3.9	4.6	5.6	7.7
-60 ~ -40	1.6	1.8	2.3	2.5	2.6	2.8	3.1	3.7	3.8	4.7	5.6	7.6
-40 ~ -20	1.6	1.9	2.3	2.5	2.5	2.8	3.1	3.8	3.9	4.7	5.7	7.8
-20 ~ 0	1.6	1.9	2.4	2.6	2.7	2.9	3.2	3.9	4.0	4.9	5.9	8.0
0 ~ 20	1.8	2.0	2.5	2.7	2.7	3.0	3.3	4.0	4.1	5.1	6.0	8.3
20 ~ 40	1.9	2.1	2.7	2.8	2.9	3.2	3.5	4.2	4.3	5.2	6.3	8.5
40 ~ 60	2.0	2.2	2.8	2.9	3.0	3.3	3.6	4.3	4.4	5.5	6.5	8.8
60 ~ 80	2.0	2.3	2.9	3.1	3.2	3.5	3.8	4.5	4.6	5.6	6.6	9.0
80 ~ 100	2.1	2.4	2.9	3.1	3.2	3.5	4.0	4.7	4.8	5.8	6.9	9.3
100 ~ 120	2.2	2.5	3.0	3.2	3.3	3.6	4.0	4.8	4.9	5.9	7.0	9.5
120 ~ 140	2.2	2.5	3.1	3.3	3.4	3.8	4.1	4.9	5.0	6.1	7.2	9.7
140 ~ 160	2.2	2.5	3.2	3.4	3.5	3.8	4.2	5.0	5.1	6.1	7.3	9.9
160 ~ 180	2.3	2.6	3.2	3.4	3.5	3.8	4.2	5.0	5.1	6.2	7.4	10.0

OHARA 25-04

Refractive Index n_d	1.749 50	Abbe Number v_d	35.33	Dispersion $n_F - n_C$	0.021 214
Refractive Index n_e	1.749 505	Abbe Number v_e	35.10	Dispersion $n_{F'} - n_{C'}$	0.021 498

λ (μm)		
n_{2325}	2.325 42	1.702 60
n_{1970}	1.970 09	1.709 65
n_{1530}	1.529 58	1.717 48
n_{1129}	1.128 64	1.725 03
n_t	1.013 98	1.727 76
n_s	0.852 11	1.732 79
$n_{A'}$	0.768 19	1.736 40
n_r	0.706 52	1.739 80
n_C	0.656 27	1.743 26
$n_{C'}$	0.643 85	1.744 24
n_{He-Ne}	0.632 8	1.745 16
n_D	0.589 29	1.749 32
n_d	0.587 56	1.749 50
n_e	0.546 07	1.754 53
n_F	0.486 13	1.764 47
$n_{F'}$	0.479 99	1.765 74
n_{He-Cd}	0.441 57	1.775 15
n_g	0.435 835	1.776 81
n_h	0.404 656	1.787 53
n_i	0.365 015	1.806 95

A_1	1.712 036 89E+00
A_2	2.559 895 88E-01
A_3	1.814 569 98E+00
B_1	1.077 241 34E-02
B_2	4.885 935 04E-02
B_3	1.363 590 13E+02

Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group WS	3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Young's Modulus E (GPa)	109.7
Rigidity Modulus G (GPa)	43.8
Poisson's Ratio σ	0.253
Knoop Hardness Hk[Class]	610 6
Abrasion Aa	113

$n_C - n_t$	0.015 503
$n_C - n_{A'}$	0.006 860
$n_d - n_C$	0.006 246
$n_e - n_C$	0.011 272
$n_g - n_d$	0.027 310
$n_g - n_F$	0.012 342
$n_h - n_g$	0.010 718
$n_i - n_g$	0.030 139
$n_C - n_t$	0.016 484
$n_e - n_{C'}$	0.010 291
$n_{F'} - n_e$	0.011 207
$n_i - n_{F'}$	0.041 216

$\theta_{C,t}$	0.730 8
$\theta_{C,A'}$	0.323 4
$\theta_{d,C}$	0.294 4
$\theta_{e,C}$	0.531 3
$\theta_{g,d}$	1.287 4
$\theta_{g,F}$	0.581 8
$\theta_{h,g}$	0.505 2
$\theta_{i,g}$	1.420 7
$\theta'_{C,t}$	0.766 8
$\theta'_{e,C'}$	0.478 7
$\theta'_{F,e}$	0.521 3
$\theta'_{i,F'}$	1.917 2

$\Delta\theta_{C,t}$	0.018 4
$\Delta\theta_{C,A'}$	0.004 7
$\Delta\theta_{g,d}$	-0.003 9
$\Delta\theta_{g,F}$	-0.002 5
$\Delta\theta_{i,g}$	-0.008 5

λ_{80}	400	λ_5	330
λ_{70}			

$\lambda_{0.80}$	370	$\lambda_{0.05}$	331
------------------	-----	------------------	-----

B	G	R
0.00	1.22	1.30

λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.02
340	0.22
350	0.49
360	0.68
370	0.80
380	0.87
390	0.918
400	0.943
420	0.967
440	0.976
460	0.982
480	0.987
500	0.991
550	0.997
600	0.997
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.994
1 800	0.989
2 000	0.980
2 200	0.945
2 400	0.87

Strain Point StP (°C)	500
Annealing Point AP (°C)	521
Transformation Temperature Tg (°C)	542
Yield Point At (°C)	589
Softening Point SP (°C)	631
Expansion Coefficients (-30 °C ~ 70 °C)	73
α_l ($10^{-7} K^{-1}$) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(m·K))	1.12

Temperature range (°C)	α_l ($10^{-7} K^{-1}$)
-100 ~ -90	53
-90 ~ -80	55
-80 ~ -70	57
-70 ~ -60	59
-60 ~ -50	61
-50 ~ -40	62
-40 ~ -30	64
-30 ~ -20	66
-20 ~ -10	67
-10 ~ 0	69
0 ~ 10	70
10 ~ 20	72
20 ~ 30	73
30 ~ 40	75
40 ~ 50	76
50 ~ 60	77
60 ~ 70	79
70 ~ 80	80
80 ~ 90	81
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	88
150 ~ 160	89
160 ~ 170	90
170 ~ 180	91
180 ~ 190	92
190 ~ 200	93
200 ~ 210	94
210 ~ 220	94
220 ~ 230	95
230 ~ 240	96
240 ~ 250	97
250 ~ 260	97
260 ~ 270	98
270 ~ 280	99
280 ~ 290	99
290 ~ 300	100

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	3.2	3.4	4.0	4.1	4.2	4.4	4.7	5.3	5.4	6.2	7.0	8.8
-60 ~ -40	3.0	3.2	3.8	4.0	4.0	4.3	4.6	5.3	5.4	6.1	7.0	8.9
-40 ~ -20	3.0	3.2	3.9	4.0	4.1	4.4	4.7	5.3	5.4	6.2	7.2	9.1
-20 ~ 0	3.0	3.3	3.9	4.0	4.1	4.4	4.7	5.5	5.6	6.4	7.4	9.5
0 ~ 20	3.1	3.3	3.9	4.1	4.2	4.5	4.9	5.6	5.7	6.6	7.6	9.8
20 ~ 40	3.2	3.5	4.1	4.3	4.3	4.7	5.0	5.9	6.0	6.9	8.0	10.2
40 ~ 60	3.2	3.5	4.2	4.4	4.4	4.8	5.3	6.0	6.1	7.1	8.2	10.5
60 ~ 80	3.4	3.7	4.3	4.6	4.6	5.0	5.4	6.2	6.3	7.3	8.5	11.0
80 ~ 100	3.4	3.7	4.5	4.7	4.8	5.2	5.6	6.4	6.5	7.6	8.8	11.3
100 ~ 120	3.4	3.8	4.5	4.8	4.9	5.3	5.7	6.6	6.7	7.8	9.0	11.7
120 ~ 140	3.5	3.8	4.7	4.9	5.0	5.4	5.8	6.7	6.9	8.0	9.3	12.0
140 ~ 160	3.6	3.9	4.7	5.0	5.0	5.5	5.9	6.9	7.0	8.2	9.5	12.3
160 ~ 180	3.5	3.9	4.7	5.0	5.1	5.5	6.0	6.9	7.1	8.3	9.7	12.6

Photoelastic Constant β nm/(cm·105Pa)	2.66
Specific Gravity d	3.29
Remarks	

Refractive Index n_d	1.673 00 1.673 000	Abbe Number v_d	38.26	Dispersion $n_F - n_C$	0.017 592
Refractive Index n_e	1.677 172	Abbe Number v_e	38.01	Dispersion $n_{F'} - n_{C'}$	0.017 815

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.631 49
n_{1970}	1.970 09	1.638 15
n_{1530}	1.529 58	1.645 44
n_{1129}	1.128 64	1.652 25
n_t	1.013 98	1.654 63
n_s	0.852 11	1.658 96
$n_{A'}$	0.768 19	1.662 03
n_r	0.706 52	1.664 89
n_C	0.656 27	1.667 79
$n_{C'}$	0.643 85	1.668 61
$n_{\text{He-Ne}}$	0.632 8	1.669 38
n_D	0.589 29	1.672 85
n_d	0.587 56	1.673 00
n_e	0.546 07	1.677 17
n_F	0.486 13	1.685 38
$n_{F'}$	0.479 99	1.686 43
$n_{\text{He-Cd}}$	0.441 57	1.694 15
n_g	0.435 835	1.695 51
n_h	0.404 656	1.704 25
n_i	0.365 015	1.719 94

Constants of Dispersion Formula	
A_1	1.513 368 68E+00
A_2	2.123 414 78E-01
A_3	1.541 491 43E+00
B_1	9.870 778 27E-03
B_2	4.628 436 62E-02
B_3	1.269 785 10E+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 (GPa)	96.3
Rigidity Modulus G (GPa)	38.6
Poisson's Ratio σ	0.246
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	139

Partial Dispersions	
$n_C - n_t$	0.013 160
$n_C - n_{A'}$	0.005 766
$n_d - n_C$	0.005 208
$n_e - n_C$	0.009 380
$n_g - n_d$	0.022 512
$n_g - n_F$	0.010 128
$n_h - n_g$	0.008 738
$n_i - n_g$	0.024 433
$n_{C'} - n_t$	0.013 979
$n_{e'} - n_{C'}$	0.008 561
$n_{F'} - n_e$	0.009 254
$n_i - n_{F'}$	0.033 519

Relative Partial Dispersions	
$\theta_{C,t}$	0.748 1
$\theta_{C,A'}$	0.327 8
$\theta_{d,C}$	0.296 0
$\theta_{e,C}$	0.533 2
$\theta_{g,d}$	1.279 7
$\theta_{g,F}$	0.575 7
$\theta_{h,g}$	0.496 7
$\theta_{i,g}$	1.388 9
$\theta'_{C,t}$	0.784 7
$\theta'_{e,C'}$	0.480 6
$\theta'_{F,e}$	0.519 4
$\theta'_{i,F'}$	1.881 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.021 9
$\Delta\theta_{C,A'}$	0.005 6
$\Delta\theta_{g,d}$	-0.005 5
$\Delta\theta_{g,F}$	-0.003 9
$\Delta\theta_{i,g}$	-0.015 8

Coloring			
λ_{80}	360	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	348	$\lambda_{0.05}$	320
CCI			
B	G	R	
0.00	0.25	0.26	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.04
330	0.31
340	0.65
350	0.84
360	0.919
370	0.956
380	0.974
390	0.983
400	0.988
420	0.992
440	0.993
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.992
1 600	0.993
1 800	0.986
2 000	0.973
2 200	0.922
2 400	0.82

Thermal Properties	
Strain Point StP (°C)	460
Annealing Point AP (°C)	483
Transformation Temperature Tg (°C)	501
Yield Point At (°C)	549
Softening Point SP (°C)	592
Expansion Coefficients (-30 °C ~ 70 °C)	79
α_l (10^{-7} K^{-1}) (100 °C ~ 300 °C)	102
Thermal Conductivity λ (W/(m·K))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	60
-90 ~ -80	62
-80 ~ -70	63
-70 ~ -60	65
-60 ~ -50	67
-50 ~ -40	69
-40 ~ -30	70
-30 ~ -20	72
-20 ~ -10	74
-10 ~ 0	75
0 ~ 10	77
10 ~ 20	78
20 ~ 30	80
30 ~ 40	81
40 ~ 50	83
50 ~ 60	84
60 ~ 70	86
70 ~ 80	87
80 ~ 90	89
90 ~ 100	90
100 ~ 110	91
110 ~ 120	93
120 ~ 130	94
130 ~ 140	95
140 ~ 150	96
150 ~ 160	97
160 ~ 170	99
170 ~ 180	100
180 ~ 190	101
190 ~ 200	102
200 ~ 210	103
210 ~ 220	104
220 ~ 230	105
230 ~ 240	106
240 ~ 250	107
250 ~ 260	108
260 ~ 270	109
270 ~ 280	110
280 ~ 290	111
290 ~ 300	111

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	2.3	2.5	2.8	2.9	3.0	3.3	3.5	3.9	4.0	4.6	5.3	6.6	
-60 ~ -40	2.0	2.2	2.7	2.8	2.9	3.1	3.3	3.8	3.8	4.5	5.2	6.6	
-40 ~ -20	2.0	2.1	2.5	2.8	2.8	3.1	3.3	3.8	3.9	4.5	5.3	6.8	
-20 ~ 0	1.9	2.1	2.6	2.7	2.8	3.0	3.3	3.9	3.9	4.6	5.4	7.0	
0 ~ 20	1.9	2.1	2.7	2.8	2.9	3.1	3.4	3.9	4.0	4.7	5.5	7.3	
20 ~ 40	1.9	2.2	2.6	2.8	2.8	3.2	3.5	4.1	4.2	4.9	5.7	7.4	
40 ~ 60	1.9	2.3	2.8	2.9	3.0	3.3	3.6	4.2	4.2	5.0	5.9	7.8	
60 ~ 80	2.0	2.3	2.8	3.0	3.0	3.3	3.6	4.4	4.4	5.3	6.1	8.0	
80 ~ 100	2.1	2.4	2.9	3.1	3.1	3.4	3.7	4.4	4.5	5.5	6.4	8.3	
100 ~ 120	2.1	2.4	2.9	3.1	3.2	3.5	3.8	4.5	4.6	5.5	6.4	8.6	
120 ~ 140	2.1	2.4	3.0	3.2	3.2	3.6	3.9	4.6	4.7	5.6	6.6	8.8	
140 ~ 160	2.1	2.4	3.1	3.4	3.4	3.7	4.1	4.9	4.9	5.9	6.9	9.2	
160 ~ 180	2.2	2.5	3.1	3.3	3.4	3.7	4.1	4.8	4.9	5.9	7.0	9.2	

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	3.11
Specific Gravity d	3.01
Remarks	

Refractive Index n_d	1.738 00	Abbe Number v_d	32.33	Dispersion $n_F - n_C$	0.022 830
	1.738 000				
Refractive Index n_e	1.743 402	Abbe Number v_e	32.10	Dispersion $n_F - n_{C'}$	0.023 159

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.690 06
n_{1970}	1.970 09	1.696 88
n_{1530}	1.529 58	1.704 57
n_{1129}	1.128 64	1.712 18
n_t	1.013 98	1.714 99
n_s	0.852 11	1.720 24
$n_{A'}$	0.768 19	1.724 04
n_r	0.706 52	1.727 64
n_C	0.656 27	1.731 32
$n_{C'}$	0.643 85	1.732 37
$n_{\text{He-Ne}}$	0.632 8	1.733 35
n_D	0.589 29	1.737 80
n_d	0.587 56	1.738 00
n_e	0.546 07	1.743 40
n_F	0.486 13	1.754 15
$n_{F'}$	0.479 99	1.755 53
$n_{\text{He-Cd}}$	0.441 57	1.765 79
n_g	0.435 835	1.767 62
n_h	0.404 656	1.779 43
n_i	0.365 015	1.801 14

Constants of Dispersion Formula	
A_1	1.654 441 41E+00
A_2	2.674 539 27E-01
A_3	2.145 303 47E+00
B_1	1.124 855 33E-02
B_2	5.202 727 40E-02
B_3	1.673 661 00E+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 (GPa)	102.7
Rigidity Modulus G (GPa)	41.5
Poisson's Ratio σ	0.237
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	126

Partial Dispersions	
$n_C - n_t$	0.016 332
$n_C - n_{A'}$	0.007 282
$n_d - n_C$	0.006 678
$n_e - n_C$	0.012 080
$n_g - n_d$	0.029 621
$n_g - n_F$	0.013 469
$n_h - n_g$	0.011 812
$n_i - n_g$	0.033 515
$n_C - n_t$	0.017 378
$n_e - n_{C'}$	0.011 034
$n_F - n_e$	0.012 125
$n_i - n_{F'}$	0.045 609

Relative Partial Dispersions	
$\theta_{C,t}$	0.715 4
$\theta_{C,A'}$	0.319 0
$\theta_{d,C}$	0.292 5
$\theta_{e,C}$	0.529 1
$\theta_{g,d}$	1.297 5
$\theta_{g,F}$	0.590 0
$\theta_{h,g}$	0.517 4
$\theta_{i,g}$	1.468 0
$\theta'_{C,t}$	0.750 4
$\theta'_{e,C'}$	0.476 4
$\theta'_{F,e}$	0.523 6
$\theta'_{i,F'}$	1.969 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.017 0
$\Delta\theta_{C,A'}$	0.004 0
$\Delta\theta_{g,d}$	-0.000 1
$\Delta\theta_{g,F}$	0.000 8
$\Delta\theta_{i,g}$	0.013 7

Coloring			
λ_{80}	385	λ_5	330
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	361	$\lambda_{0.05}$	331
CCI			
B	G	R	
0.00	0.61	0.67	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.03
340	0.28
350	0.61
360	0.79
370	0.88
380	0.927
390	0.952
400	0.968
420	0.982
440	0.988
460	0.991
480	0.993
500	0.995
550	0.997
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.995
1 800	0.990
2 000	0.984
2 200	0.951
2 400	0.928

Thermal Properties	
Strain Point StP (°C)	501
Annealing Point AP (°C)	523
Transformation Temperature Tg (°C)	543
Yield Point At (°C)	593
Softening Point SP (°C)	640
Expansion Coefficients (-30 °C ~ 70 °C)	74
α_l (10^{-7} K ⁻¹) (100 °C ~ 300 °C)	96
Thermal Conductivity λ (W/(mK))	1.13

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K ⁻¹)
-100 ~ -90	55
-90 ~ -80	57
-80 ~ -70	59
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	64
-40 ~ -30	66
-30 ~ -20	67
-20 ~ -10	69
-10 ~ 0	70
0 ~ 10	72
10 ~ 20	73
20 ~ 30	75
30 ~ 40	76
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	82
80 ~ 90	83
90 ~ 100	84
100 ~ 110	86
110 ~ 120	87
120 ~ 130	88
130 ~ 140	89
140 ~ 150	90
150 ~ 160	91
160 ~ 170	92
170 ~ 180	93
180 ~ 190	95
190 ~ 200	96
200 ~ 210	97
210 ~ 220	97
220 ~ 230	98
230 ~ 240	99
240 ~ 250	100
250 ~ 260	101
260 ~ 270	102
270 ~ 280	103
280 ~ 290	103
290 ~ 300	104

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	2.8	3.0	3.5	3.6	3.8	4.0	4.3	4.9	5.0	5.9	6.9	9.2
-60 ~ -40	2.7	2.9	3.5	3.7	3.7	4.0	4.3	5.1	5.2	6.0	7.0	9.5
-40 ~ -20	2.8	3.0	3.5	3.7	3.7	4.1	4.4	5.1	5.2	6.1	7.3	9.7
-20 ~ 0	2.8	3.1	3.7	3.9	3.9	4.2	4.5	5.2	5.3	6.4	7.4	10.0
0 ~ 20	3.0	3.2	3.8	4.0	4.0	4.3	4.7	5.5	5.6	6.6	7.7	10.3
20 ~ 40	3.1	3.3	3.9	4.1	4.2	4.5	4.8	5.6	5.7	6.8	8.0	10.7
40 ~ 60	3.1	3.4	4.0	4.2	4.2	4.6	4.9	5.8	5.9	7.0	8.2	11.0
60 ~ 80	3.1	3.5	4.1	4.3	4.4	4.7	5.1	5.9	6.0	7.1	8.4	11.4
80 ~ 100	3.2	3.5	4.1	4.4	4.5	4.8	5.2	6.1	6.2	7.3	8.6	11.6
100 ~ 120	3.2	3.5	4.1	4.3	4.4	4.8	5.3	6.1	6.3	7.4	8.7	11.8
120 ~ 140	3.1	3.4	4.2	4.4	4.5	4.9	5.3	6.2	6.3	7.5	8.8	12.0
140 ~ 160	3.0	3.4	4.1	4.3	4.4	4.8	5.2	6.1	6.2	7.5	8.8	12.1
160 ~ 180	2.9	3.2	3.9	4.2	4.2	4.6	5.1	6.0	6.1	7.4	8.8	12.1

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.99
Specific Gravity d	3.19
Remarks	

S-NBH55

Code(d) 800299
Code(e) 806296

Refractive Index n_d	1.800 00 1.800 000	Abbe Number v_d	29.84	Dispersion $n_F - n_C$	0.026 806
Refractive Index n_e	1.806 331	Abbe Number v_e	29.61	Dispersion $n_{F'} - n_{C'}$	0.027 232

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.749 89
n_{1970}	1.970 09	1.756 00
n_{1530}	1.529 58	1.763 16
n_{1129}	1.128 64	1.770 82
n_t	1.013 98	1.773 81
n_s	0.852 11	1.779 59
$n_{A'}$	0.768 19	1.783 88
n_r	0.706 52	1.787 99
n_C	0.656 27	1.792 24
$n_{C'}$	0.643 85	1.793 45
$n_{\text{He-Ne}}$	0.632 8	1.794 59
n_D	0.589 29	1.799 77
n_d	0.587 56	1.800 00
n_e	0.546 07	1.806 33
n_F	0.486 13	1.819 04
$n_{F'}$	0.479 99	1.820 68
$n_{\text{He-Cd}}$	0.441 57	1.832 97
n_g	0.435 835	1.835 17
n_h	0.404 656	1.849 51
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.831 451 56E+00
A_2	2.878 180 24E-01
A_3	2.152 083 00E+00
B_1	1.224 431 39E-02
B_2	5.738 773 10E-02
B_3	1.860 991 24E+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 (GPa)	105.3
Rigidity Modulus G (GPa)	41.5
Poisson's Ratio σ	0.269
Knoop Hardness Hk[Class]	600 6
Abrasion Aa	148

Partial Dispersions	
$n_C - n_t$	0.018 427
$n_C - n_{A'}$	0.008 355
$n_d - n_C$	0.007 763
$n_e - n_C$	0.014 094
$n_g - n_d$	0.035 172
$n_g - n_F$	0.016 129
$n_h - n_g$	0.014 338
$n_i - n_g$	
$n_{C'} - n_t$	0.019 637
$n_e - n_{C'}$	0.012 884
$n_{F'} - n_e$	0.014 348
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.687 4
$\theta_{C,A'}$	0.311 7
$\theta_{d,C}$	0.289 6
$\theta_{e,C}$	0.525 8
$\theta_{g,d}$	1.312 1
$\theta_{g,F}$	0.601 7
$\theta_{h,g}$	0.534 9
$\theta_{i,g}$	
$\theta'_{C,t}$	0.721 1
$\theta'_{e,C'}$	0.473 1
$\theta'_{F',e}$	0.526 9
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.000 7
$\Delta\theta_{C,A'}$	-0.000 3
$\Delta\theta_{g,d}$	0.009 4
$\Delta\theta_{g,F}$	0.008 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	435	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	392	$\lambda_{0.05}$	360
CCI			
B	G	R	
0.00	2.72	2.91	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.04
370	0.34
380	0.63
390	0.78
400	0.86
420	0.931
440	0.958
460	0.970
480	0.978
500	0.983
550	0.992
600	0.995
650	0.995
700	0.997
800	0.998
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.991
2 000	0.985
2 200	0.969
2 400	0.943

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	618
Yield Point At (°C)	675
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	76
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	91
Thermal Conductivity λ (W/(mK))	0.994

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	62
-90 ~ -80	63
-80 ~ -70	64
-70 ~ -60	66
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	69
-30 ~ -20	70
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	86
130 ~ 140	87
140 ~ 150	87
150 ~ 160	88
160 ~ 170	89
170 ~ 180	90
180 ~ 190	91
190 ~ 200	91
200 ~ 210	92
210 ~ 220	93
220 ~ 230	93
230 ~ 240	94
240 ~ 250	95
250 ~ 260	95
260 ~ 270	96
270 ~ 280	96
280 ~ 290	97
290 ~ 300	97

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.50
Specific Gravity d	3.68
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	1.4	1.6	2.3	2.5	2.5	2.9	3.2	4.1	4.3	5.4	6.8	-
-60 ~ -40	1.3	1.6	2.3	2.5	2.6	2.9	3.3	4.3	4.4	5.6	6.9	-
-40 ~ -20	1.5	1.7	2.4	2.6	2.7	3.1	3.5	4.4	4.6	5.8	7.3	-
-20 ~ 0	1.5	1.8	2.6	2.8	2.9	3.3	3.7	4.6	4.8	6.2	7.7	-
0 ~ 20	1.7	2.1	2.8	3.0	3.1	3.5	3.9	4.9	5.0	6.5	8.1	-
20 ~ 40	1.8	2.2	2.9	3.2	3.3	3.8	4.2	5.2	5.4	6.7	8.4	-
40 ~ 60	2.0	2.3	3.2	3.4	3.5	4.0	4.4	5.5	5.6	7.1	8.9	-
60 ~ 80	2.1	2.5	3.3	3.6	3.6	4.1	4.6	5.7	5.9	7.4	9.2	-
80 ~ 100	2.3	2.7	3.5	3.7	3.8	4.3	4.8	5.9	6.1	7.6	9.5	-
100 ~ 120	2.4	2.7	3.6	3.9	4.0	4.5	5.0	6.1	6.3	7.9	9.8	-
120 ~ 140	2.4	2.8	3.6	3.9	4.0	4.6	5.1	6.3	6.5	8.1	10.0	-
140 ~ 160	2.4	2.8	3.7	4.0	4.1	4.6	5.1	6.4	6.6	8.3	10.3	-
160 ~ 180	2.3	2.7	3.6	3.9	4.0	4.6	5.1	6.4	6.7	8.4	10.5	-

Refractive Index n_d	1.854 78 1.854 780	Abbe Number ν_d	24.80	Dispersion $n_F - n_C$	0.034 469
Refractive Index n_e	1.862 904	Abbe Number ν_e	24.61	Dispersion $n_{F'} - n_{C'}$	0.035 057

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.792 34
n_{1970}	1.970 09	1.799 74
n_{1530}	1.529 58	1.808 47
n_{1129}	1.128 64	1.817 92
n_t	1.013 98	1.821 65
n_s	0.852 11	1.828 89
$n_{A'}$	0.768 19	1.834 29
n_r	0.706 52	1.839 49
n_C	0.656 27	1.844 88
$n_{C'}$	0.643 85	1.846 42
$n_{\text{He-Ne}}$	0.632 8	1.847 87
n_D	0.589 29	1.854 48
n_d	0.587 56	1.854 78
n_e	0.546 07	1.862 90
n_F	0.486 13	1.879 35
$n_{F'}$	0.479 99	1.881 47
$n_{\text{He-Cd}}$	0.441 57	1.897 55
n_g	0.435 835	1.900 45
n_h	0.404 656	1.919 44
n_i	0.365 015	

Partial Dispersions	
$n_C - n_t$	0.023 230
$n_C - n_{A'}$	0.010 586
$n_d - n_C$	0.009 904
$n_e - n_C$	0.018 028
$n_g - n_d$	0.045 668
$n_g - n_F$	0.021 103
$n_h - n_g$	0.018 989
$n_i - n_g$	
$n_{C'} - n_t$	0.024 770
$n_e - n_{C'}$	0.016 488
$n_{F'} - n_e$	0.018 569
$n_i - n_{F'}$	

Coloring			
λ_{80}		λ_5	360
λ_{70}	395		
Internal transmission			
$\lambda_{0.80}$	389	$\lambda_{0.05}$	358
CCI			
B	G	R	
0.00	2.57	2.76	

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	584
Yield Point At (°C)	627
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	79
α_l (10^{-7} K^{-1}) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(m·K))	1.12

Constants of Dispersion Formula	
A_1	1.851 914 38E+00
A_2	4.311 028 52E-01
A_3	3.452 782 84E+00
B_1	1.327 326 20E-02
B_2	5.859 446 44E-02
B_3	2.393 570 89E+02

Relative Partial Dispersions	
$\theta_{C,t}$	0.673 9
$\theta_{C,A'}$	0.307 1
$\theta_{d,C}$	0.287 3
$\theta_{e,C}$	0.523 0
$\theta_{g,d}$	1.324 9
$\theta_{g,F}$	0.612 2
$\theta_{h,g}$	0.550 9
$\theta_{i,g}$	
$\theta'_{C,t}$	0.706 6
$\theta'_{e,C'}$	0.470 3
$\theta'_{F,e}$	0.529 7
$\theta'_{i,F'}$	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.11
370	0.44
380	0.69
390	0.81
400	0.87
420	0.933
440	0.958
460	0.970
480	0.978
500	0.983
550	0.993
600	0.996
650	0.996
700	0.997
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.997
1 800	0.993
2 000	0.991
2 200	0.977
2 400	0.966

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.010 9
$\Delta\theta_{C,A'}$	0.001 2
$\Delta\theta_{g,d}$	0.011 7
$\Delta\theta_{g,F}$	0.010 9
$\Delta\theta_{i,g}$	

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	106.7
Rigidity Modulus G (GPa)	42.7
Poisson's Ratio σ	0.249
Knoop Hardness Hk[Class]	600
Abrasion Aa	138

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	61
-90 ~ -80	63
-80 ~ -70	65
-70 ~ -60	66
-60 ~ -50	68
-50 ~ -40	69
-40 ~ -30	71
-30 ~ -20	72
-20 ~ -10	74
-10 ~ 0	75
0 ~ 10	77
10 ~ 20	78
20 ~ 30	80
30 ~ 40	81
40 ~ 50	82
50 ~ 60	84
60 ~ 70	85
70 ~ 80	86
80 ~ 90	87
90 ~ 100	88
100 ~ 110	89
110 ~ 120	91
120 ~ 130	92
130 ~ 140	93
140 ~ 150	94
150 ~ 160	95
160 ~ 170	96
170 ~ 180	97
180 ~ 190	97
190 ~ 200	98
200 ~ 210	99
210 ~ 220	100
220 ~ 230	101
230 ~ 240	101
240 ~ 250	102
250 ~ 260	103
260 ~ 270	104
270 ~ 280	104
280 ~ 290	105
290 ~ 300	105

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	1.6	2.3	2.6	2.6	3.0	3.4	4.5	4.6	6.0	7.8	-
-60 ~ -40	1.2	1.5	2.2	2.5	2.5	3.0	3.4	4.5	4.7	6.2	8.0	-
-40 ~ -20	1.0	1.5	2.2	2.4	2.5	3.0	3.5	4.7	4.8	6.4	8.5	-
-20 ~ 0	1.1	1.4	2.2	2.5	2.6	3.2	3.7	4.9	5.0	6.8	9.0	-
0 ~ 20	1.1	1.5	2.3	2.6	2.7	3.3	3.9	5.2	5.3	7.2	9.5	-
20 ~ 40	1.2	1.6	2.5	2.8	2.9	3.5	4.0	5.5	5.7	7.6	10.0	-
40 ~ 60	1.3	1.7	2.7	3.0	3.1	3.7	4.3	5.8	6.0	8.1	10.6	-
60 ~ 80	1.3	1.8	2.8	3.2	3.2	3.9	4.6	6.1	6.3	8.5	11.1	-
80 ~ 100	1.5	1.9	3.0	3.3	3.4	4.1	4.8	6.5	6.7	8.9	11.7	-
100 ~ 120	1.5	2.0	3.1	3.5	3.6	4.3	5.0	6.7	6.9	9.3	12.3	-
120 ~ 140	1.6	2.1	3.3	3.7	3.8	4.5	5.2	7.0	7.2	9.8	12.9	-
140 ~ 160	1.6	2.2	3.4	3.8	3.9	4.7	5.4	7.3	7.5	10.2	13.4	-
160 ~ 180	1.6	2.2	3.4	4.0	4.1	4.9	5.7	7.6	7.8	10.5	13.9	-

Other Properties	
Photoelastic Constant β nm/(cm ¹⁰⁵ Pa)	3.35
Specific Gravity d	3.49
Remarks	

S-NBH57

Code(d) 850300
Code(e) 857298

Refractive Index n_d 1.850 25 1.850 250	Abbe Number v_d 30.05	Dispersion $n_F - n_C$ 0.028 299
Refractive Index n_e 1.856 938	Abbe Number v_e 29.82	Dispersion $n_{F'} - n_{C'}$ 0.028 738

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.797 33
n_{1970}	1.970 09	1.803 74
n_{1530}	1.529 58	1.811 27
n_{1129}	1.128 64	1.819 35
n_t	1.013 98	1.822 52
n_s	0.852 11	1.828 64
$n_{A'}$	0.768 19	1.833 19
n_r	0.706 52	1.837 54
n_C	0.656 27	1.842 04
$n_{C'}$	0.643 85	1.843 32
$n_{\text{He-Ne}}$	0.632 8	1.844 53
n_D	0.589 29	1.850 00
n_d	0.587 56	1.850 25
n_e	0.546 07	1.856 94
n_F	0.486 13	1.870 34
$n_{F'}$	0.479 99	1.872 06
$n_{\text{He-Cd}}$	0.441 57	1.884 95
n_g	0.435 835	1.887 26
n_h	0.404 656	1.902 20
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.920 264 88E+00
A_2	3.715 352 40E-01
A_3	2.552 057 04E+00
B_1	1.184 680 28E-02
B_2	5.321 054 72E-02
B_3	2.045 493 00E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group WS	1
Acid Resistance(Surface) Group SR	3.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	111.7
Rigidity Modulus G (GPa)	43.8
Poisson's Ratio σ	0.275
Knoop Hardness Hk[Class]	580 6
Abrasion Aa	143

Partial Dispersions	
$n_C - n_t$	0.019 520
$n_C - n_{A'}$	0.008 849
$n_d - n_C$	0.008 213
$n_e - n_C$	0.014 901
$n_g - n_d$	0.037 005
$n_g - n_F$	0.016 919
$n_h - n_g$	0.014 947
$n_i - n_g$	
$n_{C'} - n_t$	0.020 801
$n_e - n_{C'}$	0.013 620
$n_{F'} - n_e$	0.015 118
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.689 8
$\theta_{C,A'}$	0.312 7
$\theta_{d,C}$	0.290 2
$\theta_{e,C}$	0.526 6
$\theta_{g,d}$	1.307 6
$\theta_{g,F}$	0.597 9
$\theta_{h,g}$	0.528 2
$\theta_{i,g}$	
$\theta'_{C,t}$	0.723 8
$\theta'_{e,C'}$	0.473 9
$\theta'_{F,e}$	0.526 1
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 1
$\Delta\theta_{C,A'}$	0.000 4
$\Delta\theta_{g,d}$	0.005 3
$\Delta\theta_{g,F}$	0.005 1
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	355
λ_{70}	410		
Internal transmission			
$\lambda_{0.80}$	399	$\lambda_{0.05}$	355
CCI			
B	G	R	
0.00	3.97	4.14	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.17
370	0.42
380	0.60
390	0.72
400	0.81
420	0.89
440	0.936
460	0.955
480	0.968
500	0.978
550	0.993
600	0.994
650	0.994
700	0.996
800	0.998
900	0.999
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.992
2 000	0.984
2 200	0.968
2 400	0.921

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	637
Yield Point At (°C)	694
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	79
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	96
Thermal Conductivity λ (W/(m·K))	0.988

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	62
-90 ~ -80	64
-80 ~ -70	66
-70 ~ -60	67
-60 ~ -50	69
-50 ~ -40	70
-40 ~ -30	72
-30 ~ -20	73
-20 ~ -10	75
-10 ~ 0	76
0 ~ 10	77
10 ~ 20	79
20 ~ 30	80
30 ~ 40	81
40 ~ 50	83
50 ~ 60	84
60 ~ 70	85
70 ~ 80	86
80 ~ 90	87
90 ~ 100	88
100 ~ 110	89
110 ~ 120	90
120 ~ 130	91
130 ~ 140	92
140 ~ 150	93
150 ~ 160	94
160 ~ 170	95
170 ~ 180	95
180 ~ 190	96
190 ~ 200	97
200 ~ 210	98
210 ~ 220	98
220 ~ 230	99
230 ~ 240	99
240 ~ 250	100
250 ~ 260	100
260 ~ 270	101
270 ~ 280	101
280 ~ 290	102
290 ~ 300	102

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	0.2	0.4	1.0	1.2	1.3	1.6	2.0	2.8	3.0	4.0	5.4	-
-60 ~ -40	0.1	0.3	1.0	1.2	1.3	1.6	2.0	2.8	3.0	4.2	5.6	-
-40 ~ -20	0.1	0.4	1.1	1.3	1.3	1.7	2.1	3.1	3.2	4.4	5.8	-
-20 ~ 0	0.2	0.5	1.2	1.4	1.5	1.8	2.3	3.3	3.4	4.7	6.2	-
0 ~ 20	0.3	0.6	1.3	1.5	1.6	2.1	2.6	3.5	3.7	5.0	6.6	-
20 ~ 40	0.5	0.8	1.5	1.8	1.9	2.3	2.7	3.8	3.9	5.4	7.0	-
40 ~ 60	0.6	1.0	1.7	2.0	2.1	2.5	3.0	4.1	4.3	5.8	7.5	-
60 ~ 80	0.7	1.1	2.0	2.2	2.2	2.8	3.3	4.4	4.5	6.1	7.9	-
80 ~ 100	0.9	1.2	2.0	2.3	2.4	2.9	3.4	4.7	4.8	6.4	8.3	-
100 ~ 120	1.0	1.4	2.2	2.5	2.6	3.1	3.6	4.8	5.0	6.7	8.7	-
120 ~ 140	1.0	1.5	2.3	2.6	2.7	3.3	3.8	5.1	5.2	6.9	9.0	-
140 ~ 160	1.1	1.5	2.4	2.7	2.8	3.4	4.0	5.3	5.4	7.3	9.4	-
160 ~ 180	1.1	1.5	2.5	2.8	3.0	3.6	4.2	5.5	5.7	7.5	9.6	-

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	1.95
Specific Gravity d	4.00
Remarks	

S-NBH59

Code(d) **766358**

Code(e) **771356**

Refractive Index n_d 1.766 34 1.766 342	Abbe Number v_d 35.82	Dispersion $n_F - n_C$ 0.021 393
Refractive Index n_e 1.771 415	Abbe Number v_e 35.59	Dispersion $n_{F'} - n_{C'}$ 0.021 677

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.720 69
n_{1970}	1.970 09	1.727 21
n_{1530}	1.529 58	1.734 54
n_{1129}	1.128 64	1.741 82
n_t	1.013 98	1.744 50
n_s	0.852 11	1.749 51
$n_{A'}$	0.768 19	1.753 13
n_F	0.706 52	1.756 55
n_C	0.656 27	1.760 04
$n_{C'}$	0.643 85	1.761 03
$n_{\text{He-Ne}}$	0.632 8	1.761 96
n_D	0.589 29	1.766 15
n_d	0.587 56	1.766 34
n_e	0.546 07	1.771 41
n_F	0.486 13	1.781 43
$n_{F'}$	0.479 99	1.782 70
$n_{\text{He-Cd}}$	0.441 57	1.792 15
n_g	0.435 835	1.793 82
n_h	0.404 656	1.804 53
n_i	0.365 015	1.823 78

Constants of Dispersion Formula	
A_1	1.736 898 64E+00
A_2	2.873 625 41E-01
A_3	1.851 261 36E+00
B_1	1.078 665 06E-02
B_2	4.580 850 77E-02
B_3	1.496 469 00E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	112.1
Rigidity Modulus G (GPa)	44.4
Poisson's Ratio σ	0.261
Knoop Hardness Hk[Class]	590 6
Abrasion Aa	135

Partial Dispersions	
$n_C - n_t$	0.015 542
$n_C - n_{A'}$	0.006 912
$n_d - n_C$	0.006 303
$n_e - n_C$	0.011 376
$n_g - n_d$	0.027 481
$n_g - n_F$	0.012 391
$n_h - n_g$	0.010 708
$n_i - n_g$	0.029 960
$n_{C'} - n_t$	0.016 531
$n_e - n_{C'}$	0.010 387
$n_{F'} - n_e$	0.011 290
$n_i - n_{F'}$	0.041 078

Relative Partial Dispersions	
$\theta_{C,t}$	0.726 5
$\theta_{C,A'}$	0.323 1
$\theta_{d,C}$	0.294 6
$\theta_{e,C}$	0.531 8
$\theta_{g,d}$	1.284 6
$\theta_{g,F}$	0.579 2
$\theta_{h,g}$	0.500 5
$\theta_{i,g}$	1.400 5
$\theta'_{C,t}$	0.762 6
$\theta'_{e,C'}$	0.479 2
$\theta'_{F,e}$	0.520 8
$\theta'_{i,F'}$	1.895 0

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.011 8
$\Delta\theta_{C,A'}$	0.003 8
$\Delta\theta_{g,d}$	-0.005 7
$\Delta\theta_{g,F}$	-0.004 3
$\Delta\theta_{i,g}$	-0.024 6

Coloring			
λ_{80}	395	λ_5	325
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	322
CCI			
B	G	R	
0.00	1.09	1.08	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.02
330	0.17
340	0.42
350	0.62
360	0.75
370	0.84
380	0.90
390	0.932
400	0.952
420	0.970
440	0.976
460	0.982
480	0.987
500	0.991
550	0.997
600	0.996
650	0.995
700	0.997
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.995
1 800	0.987
2 000	0.975
2 200	0.942
2 400	0.87

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	493
Annealing Point AP ($^{\circ}\text{C}$)	516
Transformation Temperature Tg ($^{\circ}\text{C}$)	528
Yield Point At ($^{\circ}\text{C}$)	578
Softening Point SP ($^{\circ}\text{C}$)	623
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	84
α_l (10^{-7} K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	107
Thermal Conductivity λ (W/(m·K))	1.10

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7} K^{-1})
-100 ~ -90	64
-90 ~ -80	66
-80 ~ -70	68
-70 ~ -60	69
-60 ~ -50	71
-50 ~ -40	73
-40 ~ -30	75
-30 ~ -20	76
-20 ~ -10	78
-10 ~ 0	80
0 ~ 10	81
10 ~ 20	83
20 ~ 30	84
30 ~ 40	86
40 ~ 50	88
50 ~ 60	89
60 ~ 70	90
70 ~ 80	92
80 ~ 90	93
90 ~ 100	95
100 ~ 110	96
110 ~ 120	97
120 ~ 130	99
130 ~ 140	100
140 ~ 150	101
150 ~ 160	102
160 ~ 170	103
170 ~ 180	105
180 ~ 190	106
190 ~ 200	107
200 ~ 210	108
210 ~ 220	109
220 ~ 230	110
230 ~ 240	111
240 ~ 250	112
250 ~ 260	113
260 ~ 270	114
270 ~ 280	115
280 ~ 290	115
290 ~ 300	116

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	1.8	2.2	2.6	2.8	2.8	3.1	3.5	4.0	4.1	4.8	5.7	7.4
-60 ~ -40	1.7	1.9	2.4	2.6	2.6	2.9	3.3	3.9	4.0	4.8	5.7	7.4
-40 ~ -20	1.5	1.8	2.4	2.6	2.6	2.9	3.2	3.9	4.0	4.9	5.7	7.6
-20 ~ 0	1.5	1.8	2.3	2.5	2.6	3.0	3.3	4.0	4.1	4.9	5.9	7.9
0 ~ 20	1.5	1.8	2.4	2.7	2.6	3.0	3.4	4.1	4.2	5.1	6.0	8.1
20 ~ 40	1.5	1.8	2.5	2.7	2.7	3.1	3.5	4.3	4.4	5.3	6.3	8.4
40 ~ 60	1.6	1.9	2.5	2.7	2.8	3.2	3.6	4.4	4.5	5.5	6.5	8.7
60 ~ 80	1.7	2.0	2.6	2.9	2.9	3.3	3.7	4.5	4.6	5.6	6.8	9.1
80 ~ 100	1.6	2.0	2.7	3.0	3.1	3.4	3.8	4.7	4.8	5.8	7.0	9.3
100 ~ 120	1.7	2.0	2.7	3.1	3.1	3.5	3.9	4.8	4.9	6.0	7.2	9.6
120 ~ 140	1.7	2.1	2.9	3.1	3.2	3.6	4.0	4.9	5.0	6.2	7.4	9.9
140 ~ 160	1.7	2.1	2.9	3.2	3.2	3.6	4.1	5.0	5.2	6.3	7.6	10.3
160 ~ 180	1.7	2.1	2.9	3.1	3.2	3.7	4.1	5.1	5.2	6.4	7.7	10.5

Other Properties	
Photoelastic Constant β nm/(cm 2 105Pa)	2.40
Specific Gravity d	3.47
Remarks	

OHARA 25-04

S-NBM51

Code(d) **613443**
Code(e) **617440**

Refractive Index n_d 1.613 40 1.613 397	Abbe Number v_d 44.27	Dispersion $n_F - n_C$ 0.013 857
Refractive Index n_e 1.616 690	Abbe Number v_e 44.02	Dispersion $n_F - n_{C'}$ 0.014 008

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.576 60
n_{1970}	1.970 09	1.583 13
n_{1530}	1.529 58	1.590 12
n_{1129}	1.128 64	1.596 33
n_t	1.013 98	1.598 41
n_s	0.852 11	1.602 06
$n_{A'}$	0.768 19	1.604 59
n_f	0.706 52	1.606 91
n_C	0.656 27	1.609 25
$n_{C'}$	0.643 85	1.609 90
n_{He-Ne}	0.632 8	1.610 52
n_D	0.589 29	1.613 28
n_d	0.587 56	1.613 40
n_e	0.546 07	1.616 69
n_F	0.486 13	1.623 11
$n_{F'}$	0.479 99	1.623 91
n_{He-Cd}	0.441 57	1.629 86
n_g	0.435 835	1.630 91
n_h	0.404 656	1.637 55
n_i	0.365 015	1.649 27

Constants of Dispersion Formula	
A_1	1.370 231 01E+00
A_2	1.776 655 68E-01
A_3	1.305 154 71E+00
B_1	8.719 203 42E-03
B_2	4.057 255 52E-02
B_3	1.127 030 58E+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 (GPa)	81.7
Rigidity Modulus G (GPa)	32.9
Poisson's Ratio σ	0.243
Knoop Hardness Hk[Class]	560
Abrasion Aa	125

Partial Dispersions	
$n_C - n_t$	0.010 843
$n_C - n_{A'}$	0.004 663
$n_d - n_C$	0.004 149
$n_e - n_C$	0.007 442
$n_g - n_d$	0.017 514
$n_g - n_F$	0.007 806
$n_h - n_g$	0.006 644
$n_i - n_g$	0.018 359
$n_C - n_t$	0.011 500
$n_e - n_{C'}$	0.006 785
$n_{F'} - n_e$	0.007 223
$n_i - n_{F'}$	0.025 357

Relative Partial Dispersions	
$\theta_{C,t}$	0.782 5
$\theta_{C,A'}$	0.336 5
$\theta_{d,C}$	0.299 4
$\theta_{e,C}$	0.537 1
$\theta_{g,d}$	1.263 9
$\theta_{g,F}$	0.563 3
$\theta_{h,g}$	0.479 5
$\theta_{i,g}$	1.324 9
$\theta'_{C,t}$	0.821 0
$\theta'_{e,C'}$	0.484 4
$\theta'_{F,e}$	0.515 6
$\theta'_{i,F'}$	1.810 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.028 1
$\Delta\theta_{C,A'}$	0.007 0
$\Delta\theta_{g,d}$	-0.008 9
$\Delta\theta_{g,F}$	-0.006 5
$\Delta\theta_{i,g}$	-0.029 4

Coloring			
λ_{80}	350	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	344	$\lambda_{0.05}$	319
CCI			
B	G	R	
0.00	0.38	0.40	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
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
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.994
1 800	0.987
2 000	0.972
2 200	0.89
2 400	0.76

Thermal Properties	
Strain Point StP (°C)	509
Annealing Point AP (°C)	531
Transformation Temperature Tg (°C)	559
Yield Point At (°C)	620
Softening Point SP (°C)	693
Expansion Coefficients (-30 °C ~ 70 °C)	65
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	80
Thermal Conductivity λ (W/(m·K))	0.904

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	53
-90 ~ -80	54
-80 ~ -70	55
-70 ~ -60	57
-60 ~ -50	58
-50 ~ -40	59
-40 ~ -30	60
-30 ~ -20	61
-20 ~ -10	62
-10 ~ 0	63
0 ~ 10	64
10 ~ 20	65
20 ~ 30	66
30 ~ 40	67
40 ~ 50	68
50 ~ 60	69
60 ~ 70	70
70 ~ 80	71
80 ~ 90	72
90 ~ 100	73
100 ~ 110	73
110 ~ 120	74
120 ~ 130	75
130 ~ 140	76
140 ~ 150	77
150 ~ 160	77
160 ~ 170	78
170 ~ 180	79
180 ~ 190	79
190 ~ 200	80
200 ~ 210	81
210 ~ 220	81
220 ~ 230	82
230 ~ 240	82
240 ~ 250	83
250 ~ 260	84
260 ~ 270	84
270 ~ 280	85
280 ~ 290	85
290 ~ 300	85

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	2.2	2.3	2.6	2.7	2.7	2.8	3.1	3.4	3.4	3.8	4.3	5.3
-60 ~ -40	2.2	2.3	2.6	2.7	2.8	2.9	3.0	3.4	3.4	3.9	4.4	5.4
-40 ~ -20	2.2	2.5	2.8	2.8	2.9	3.0	3.2	3.5	3.6	4.0	4.6	5.6
-20 ~ 0	2.4	2.5	2.8	3.0	3.0	3.2	3.4	3.7	3.8	4.2	4.7	5.8
0 ~ 20	2.6	2.7	3.0	3.1	3.1	3.3	3.5	3.9	3.9	4.5	5.0	6.1
20 ~ 40	2.7	2.9	3.2	3.3	3.3	3.5	3.7	4.0	4.1	4.6	5.2	6.3
40 ~ 60	2.8	3.0	3.3	3.4	3.4	3.6	3.8	4.3	4.3	4.8	5.4	6.5
60 ~ 80	2.9	3.1	3.4	3.5	3.6	3.8	3.9	4.4	4.4	4.9	5.5	6.8
80 ~ 100	3.0	3.2	3.5	3.7	3.7	3.9	4.1	4.5	4.5	5.1	5.6	6.9
100 ~ 120	3.1	3.2	3.6	3.7	3.7	3.9	4.1	4.6	4.6	5.2	5.8	7.0
120 ~ 140	3.0	3.2	3.6	3.7	3.7	3.9	4.1	4.6	4.6	5.2	5.8	7.1
140 ~ 160	3.0	3.2	3.5	3.7	3.7	3.9	4.1	4.6	4.6	5.2	5.9	7.2
160 ~ 180	2.9	3.1	3.5	3.7	3.7	3.9	4.1	4.6	4.7	5.2	5.9	7.2

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	3.47
Specific Gravity d	2.93
Remarks	

S-NBM52

Code(d) 622411
Code(e) 626408

Refractive Index n_d 1.622 05 1.622 050	Abbe Number v_d 41.08	Dispersion $n_F - n_C$ 0.015 143
Refractive Index n_e 1.625 645	Abbe Number v_e 40.84	Dispersion $n_{F'} - n_{C'}$ 0.015 320

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.583 73
n_{1970}	1.970 09	1.590 30
n_{1530}	1.529 58	1.597 37
n_{1129}	1.128 64	1.603 75
n_t	1.013 98	1.605 92
n_s	0.852 11	1.609 80
$n_{A'}$	0.768 19	1.612 50
n_r	0.706 52	1.615 01
n_C	0.656 27	1.617 54
$n_{C'}$	0.643 85	1.618 25
$n_{\text{He-Ne}}$	0.632 8	1.618 92
n_D	0.589 29	1.621 92
n_d	0.587 56	1.622 05
n_e	0.546 07	1.625 64
n_F	0.486 13	1.632 68
$n_{F'}$	0.479 99	1.633 57
$n_{\text{He-Cd}}$	0.441 57	1.640 14
n_g	0.435 835	1.641 30
n_h	0.404 656	1.648 68
n_i	0.365 015	1.661 82

Constants of Dispersion Formula	
A_1	1.397 992 04E+00
A_2	1.722 380 41E-01
A_3	1.217 429 91E+00
B_1	9.461 136 86E-03
B_2	4.440 777 36E-02
B_3	1.053 139 30E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	80.8
Rigidity Modulus G (GPa)	32.5
Poisson's Ratio σ	0.243
Knoop Hardness Hk[Class]	540 5
Abrasion Aa	120

Partial Dispersions	
$n_C - n_t$	0.011 617
$n_C - n_{A'}$	0.005 036
$n_d - n_C$	0.004 511
$n_e - n_C$	0.008 106
$n_g - n_d$	0.019 249
$n_g - n_F$	0.008 617
$n_h - n_g$	0.007 384
$n_i - n_g$	0.020 524
$n_{C'} - n_t$	0.012 329
$n_e - n_{C'}$	0.007 394
$n_{F'} - n_e$	0.007 926
$n_i - n_{F'}$	0.028 252

Relative Partial Dispersions	
$\theta_{C,t}$	0.767 2
$\theta_{C,A'}$	0.332 6
$\theta_{d,C}$	0.297 9
$\theta_{e,C}$	0.535 3
$\theta_{g,d}$	1.271 1
$\theta_{g,F}$	0.569 0
$\theta_{h,g}$	0.487 6
$\theta_{i,g}$	1.355 3
$\theta'_{C,t}$	0.804 8
$\theta'_{e,C'}$	0.482 6
$\theta'_{F',e}$	0.517 4
$\theta'_{i,F'}$	1.844 1

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.027 8
$\Delta\theta_{C,A'}$	0.007 0
$\Delta\theta_{g,d}$	-0.008 3
$\Delta\theta_{g,F}$	-0.006 0
$\Delta\theta_{i,g}$	-0.025 7

Coloring			
λ_{80}	355	λ_5	320
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	320
CCI			
B	G	R	
0.00	0.24	0.25	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.04
330	0.33
340	0.69
350	0.86
360	0.933
370	0.962
380	0.976
390	0.984
400	0.989
420	0.993
440	0.994
460	0.996
480	0.997
500	0.998
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.984
1 600	0.991
1 800	0.984
2 000	0.967
2 200	0.87
2 400	0.75

Thermal Properties	
Strain Point StP (°C)	541
Annealing Point AP (°C)	568
Transformation Temperature Tg (°C)	584
Yield Point At (°C)	645
Softening Point SP (°C)	701
Expansion Coefficients (-30 °C ~ 70 °C)	74
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	87
Thermal Conductivity λ (W/(m·K))	0.957

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	62
-80 ~ -70	64
-70 ~ -60	65
-60 ~ -50	66
-50 ~ -40	67
-40 ~ -30	68
-30 ~ -20	69
-20 ~ -10	71
-10 ~ 0	72
0 ~ 10	73
10 ~ 20	74
20 ~ 30	75
30 ~ 40	76
40 ~ 50	76
50 ~ 60	77
60 ~ 70	78
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	81
110 ~ 120	82
120 ~ 130	83
130 ~ 140	83
140 ~ 150	84
150 ~ 160	85
160 ~ 170	85
170 ~ 180	86
180 ~ 190	86
190 ~ 200	87
200 ~ 210	87
210 ~ 220	88
220 ~ 230	88
230 ~ 240	88
240 ~ 250	89
250 ~ 260	89
260 ~ 270	89
270 ~ 280	90
280 ~ 290	90
290 ~ 300	90

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	1.9	2.1	2.4	2.5	2.5	2.8	2.9	3.3	3.4	3.9	4.5	5.7
-60 ~ -40	1.7	2.0	2.3	2.4	2.5	2.6	2.8	3.3	3.4	3.9	4.4	5.6
-40 ~ -20	1.7	2.0	2.3	2.4	2.5	2.7	2.9	3.3	3.3	4.0	4.5	5.8
-20 ~ 0	1.8	2.0	2.4	2.5	2.6	2.8	3.0	3.4	3.5	4.0	4.6	6.0
0 ~ 20	2.0	2.1	2.5	2.6	2.6	2.9	3.1	3.5	3.6	4.3	4.9	6.2
20 ~ 40	2.1	2.3	2.6	2.8	2.8	3.0	3.2	3.7	3.8	4.5	5.1	6.5
40 ~ 60	2.2	2.4	2.8	2.9	2.9	3.2	3.5	4.0	4.0	4.6	5.3	6.7
60 ~ 80	2.4	2.5	3.0	3.1	3.1	3.4	3.6	4.1	4.2	4.8	5.5	7.1
80 ~ 100	2.5	2.7	3.1	3.3	3.3	3.5	3.8	4.3	4.4	5.0	5.7	7.2
100 ~ 120	2.6	2.8	3.3	3.4	3.5	3.7	4.0	4.5	4.6	5.2	6.0	7.5
120 ~ 140	2.7	3.0	3.4	3.5	3.6	3.8	4.1	4.6	4.7	5.4	6.1	7.7
140 ~ 160	2.8	3.0	3.5	3.7	3.7	4.0	4.2	4.8	4.9	5.6	6.4	8.1
160 ~ 180	2.9	3.2	3.7	3.8	3.9	4.1	4.4	5.0	5.1	5.8	6.6	8.3

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	3.62
Specific Gravity d	2.86
Remarks	

S-NPH 1

Code(d) **808228**
Code(e) **816226**

Refractive Index n_d 1.808 09 1.808 095	Abbe Number v_d 22.76	Dispersion $n_F - n_C$ 0.035 504
Refractive Index n_e 1.816 434	Abbe Number v_e 22.57	Dispersion $n_F - n_{C'}$ 0.036 174

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.744 55
n_{1970}	1.970 09	1.752 26
n_{1530}	1.529 58	1.761 25
n_{1129}	1.128 64	1.770 84
n_t	1.013 98	1.774 59
n_s	0.852 11	1.781 87
$n_{A'}$	0.768 19	1.787 31
n_r	0.706 52	1.792 56
n_C	0.656 27	1.798 01
$n_{C'}$	0.643 85	1.799 57
$n_{\text{He-Ne}}$	0.632 8	1.801 05
n_D	0.589 29	1.807 79
n_d	0.587 56	1.808 09
n_e	0.546 07	1.816 43
n_F	0.486 13	1.833 51
$n_{F'}$	0.479 99	1.835 75
$n_{\text{He-Cd}}$	0.441 57	1.852 79
n_g	0.435 835	1.855 90
n_h	0.404 656	1.876 58
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.751 566 23E+00
A_2	3.640 063 04E-01
A_3	2.478 741 41E+00
B_1	1.350 046 81E-02
B_2	6.682 451 47E-02
B_3	1.707 560 06E+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 (GPa)	89.3
Rigidity Modulus G (GPa)	35.7
Poisson's Ratio σ	0.250
Knoop Hardness Hk(Class)	470 5
Abrasion Aa	320

Partial Dispersions	
$n_C - n_t$	0.023 420
$n_C - n_{A'}$	0.010 701
$n_d - n_C$	0.010 086
$n_e - n_C$	0.018 425
$n_g - n_d$	0.047 809
$n_g - n_F$	0.022 391
$n_h - n_g$	0.020 676
$n_i - n_g$	
$n_{C'} - n_t$	0.024 983
$n_e - n_{C'}$	0.016 862
$n_{F'} - n_e$	0.019 312
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.659 6
$\theta_{C,A'}$	0.301 4
$\theta_{d,C}$	0.284 1
$\theta_{e,C}$	0.519 0
$\theta_{g,d}$	1.346 6
$\theta_{g,F}$	0.630 7
$\theta_{h,g}$	0.582 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.690 6
$\theta'_{e,C'}$	0.466 1
$\theta'_{F,e}$	0.533 9
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.006 1
$\Delta\theta_{C,A'}$	-0.002 0
$\Delta\theta_{g,d}$	0.029 2
$\Delta\theta_{g,F}$	0.026 1
$\Delta\theta_{i,g}$	

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

Internal Transmittance	
λ (nm)	τ_i (10 mm)
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
1 000	0.996
1 200	0.997
1 400	0.994
1 600	0.992
1 800	0.984
2 000	0.973
2 200	0.934
2 400	0.88

Thermal Properties	
Strain Point StP (°C)	516
Annealing Point AP (°C)	547
Transformation Temperature Tg (°C)	556
Yield Point At (°C)	604
Softening Point SP (°C)	645
Expansion Coefficients (-30 °C ~ 70 °C)	84
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	106
Thermal Conductivity λ (W/(mK))	0.882

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	70
-70 ~ -60	71
-60 ~ -50	73
-50 ~ -40	75
-40 ~ -30	76
-30 ~ -20	78
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	83
10 ~ 20	84
20 ~ 30	86
30 ~ 40	87
40 ~ 50	89
50 ~ 60	90
60 ~ 70	91
70 ~ 80	93
80 ~ 90	94
90 ~ 100	95
100 ~ 110	96
110 ~ 120	97
120 ~ 130	99
130 ~ 140	100
140 ~ 150	101
150 ~ 160	102
160 ~ 170	103
170 ~ 180	104
180 ~ 190	105
190 ~ 200	106
200 ~ 210	107
210 ~ 220	108
220 ~ 230	109
230 ~ 240	109
240 ~ 250	110
250 ~ 260	111
260 ~ 270	112
270 ~ 280	112
280 ~ 290	113
290 ~ 300	114

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	-3.0	-2.9	-2.3	-2.1	-2.0	-1.7	-1.3	-0.2	-0.1	1.6	3.8	-
-60 ~ -40	-3.1	-2.9	-2.3	-2.1	-2.0	-1.6	-1.2	-0.1	0.1	1.8	4.2	-
-40 ~ -20	-3.1	-2.9	-2.3	-2.1	-2.0	-1.5	-1.0	0.1	0.3	2.2	4.7	-
-20 ~ 0	-3.1	-2.8	-2.1	-1.9	-1.8	-1.3	-0.9	0.3	0.5	2.5	5.2	-
0 ~ 20	-3.1	-2.7	-2.0	-1.7	-1.7	-1.2	-0.7	0.6	0.8	2.9	5.7	-
20 ~ 40	-2.9	-2.6	-1.9	-1.5	-1.5	-1.0	-0.4	0.9	1.1	3.3	6.3	-
40 ~ 60	-2.8	-2.5	-1.7	-1.4	-1.3	-0.8	-0.2	1.2	1.4	3.7	6.9	-
60 ~ 80	-2.8	-2.4	-1.6	-1.3	-1.2	-0.7	-0.1	1.5	1.7	4.1	7.4	-
80 ~ 100	-2.7	-2.3	-1.5	-1.2	-1.1	-0.5	0.2	1.7	1.9	4.5	7.9	-
100 ~ 120	-2.7	-2.3	-1.4	-1.1	-1.0	-0.4	0.3	1.9	2.2	4.7	8.3	-
120 ~ 140	-2.7	-2.3	-1.4	-1.0	-0.9	-0.3	0.4	2.1	2.3	5.0	8.7	-
140 ~ 160	-2.8	-2.4	-1.4	-1.0	-0.9	-0.2	0.5	2.2	2.5	5.3	9.2	-
160 ~ 180	-2.9	-2.5	-1.4	-1.1	-0.9	-0.3	0.5	2.4	2.7	5.6	9.5	-

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	3.23
Specific Gravity d	3.29
Remarks	

OHARA 25-04

Refractive Index n_d	1.922 86 1.922 860	Abbe Number v_d	18.90	Dispersion $n_F - n_C$	0.048 838
Refractive Index n_e	1.934 291	Abbe Number v_e	18.74	Dispersion $n_{F'} - n_{C'}$	0.049 853

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.842 14
n_{1970}	1.970 09	1.850 93
n_{1530}	1.529 58	1.861 46
n_{1129}	1.128 64	1.873 27
n_t	1.013 98	1.878 07
n_s	0.852 11	1.887 58
$n_{A'}$	0.768 19	1.894 79
n_r	0.706 52	1.901 81
n_C	0.656 27	1.909 16
$n_{C'}$	0.643 85	1.911 27
$n_{\text{He-Ne}}$	0.632 8	1.913 27
n_D	0.589 29	1.922 45
n_d	0.587 56	1.922 86
n_e	0.546 07	1.934 29
n_F	0.486 13	1.958 00
$n_{F'}$	0.479 99	1.961 12
$n_{\text{He-Cd}}$	0.441 57	1.985 26
n_g	0.435 835	1.989 72
n_h	0.404 656	2.019 76
n_i	0.365 015	

Partial Dispersions	
$n_C - n_t$	0.031 086
$n_C - n_{A'}$	0.014 367
$n_d - n_C$	0.013 702
$n_e - n_C$	0.025 133
$n_g - n_d$	0.066 857
$n_g - n_F$	0.031 721
$n_h - n_g$	0.030 046
$n_i - n_g$	
$n_{C'} - n_t$	0.033 200
$n_e - n_{C'}$	0.023 019
$n_{F'} - n_e$	0.026 834
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.636 5
$\theta_{C,A'}$	0.294 2
$\theta_{d,C}$	0.280 6
$\theta_{e,C}$	0.514 6
$\theta_{g,d}$	1.369 0
$\theta_{g,F}$	0.649 5
$\theta_{h,g}$	0.615 2
$\theta_{i,g}$	
$\theta'_{C,t}$	0.666 0
$\theta'_{e,C'}$	0.461 7
$\theta'_{F,e}$	0.538 3
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 2
$\Delta\theta_{C,A'}$	-0.004 5
$\Delta\theta_{g,d}$	0.043 6
$\Delta\theta_{g,F}$	0.038 6
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	390
λ_{70}	440		
Internal transmission			
$\lambda_{0.80}$	433	$\lambda_{0.05}$	391
CCI			
B	G	R	
0.00	12.87	13.51	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	
390	0.02
400	0.24
420	0.70
440	0.85
460	0.910
480	0.936
500	0.953
550	0.978
600	0.988
650	0.990
700	0.993
800	0.996
900	0.996
1 000	0.996
1 200	0.997
1 400	0.997
1 600	0.996
1 800	0.992
2 000	0.988
2 200	0.977
2 400	0.961

Constants of Dispersion Formula	
A_1	2.038 695 10E+00
A_2	4.372 696 41E-01
A_3	2.967 114 61E+00
B_1	1.707 962 24E-02
B_2	7.492 548 13E-02
B_3	1.741 553 54E+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 (GPa)	99.1
Rigidity Modulus G (GPa)	39.7
Poisson's Ratio σ	0.249
Knoop Hardness Hk[Class]	470 5
Abrasion Aa	237

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-2.6	-2.3	-1.4	-1.1	-1.1	-0.5	0.2	1.6	2.0	4.4	8.1	-
-60 ~ -40	-2.5	-2.1	-1.2	-0.9	-0.8	-0.2	0.4	2.1	2.3	5.1	8.9	-
-40 ~ -20	-2.3	-1.9	-1.0	-0.6	-0.5	0.1	0.8	2.6	2.8	5.6	9.8	-
-20 ~ 0	-2.1	-1.7	-0.7	-0.3	-0.2	0.4	1.3	3.1	3.4	6.4	10.8	-
0 ~ 20	-1.9	-1.4	-0.3	0.0	0.2	0.9	1.6	3.7	4.0	7.1	11.7	-
20 ~ 40	-1.6	-1.2	-0.1	0.4	0.6	1.3	2.1	4.2	4.5	7.9	12.7	-
40 ~ 60	-1.4	-0.9	0.3	0.8	0.9	1.7	2.5	4.7	5.0	8.7	13.7	-
60 ~ 80	-1.2	-0.6	0.6	1.0	1.2	2.0	2.9	5.2	5.6	9.3	14.6	-
80 ~ 100	-1.1	-0.5	0.9	1.4	1.5	2.4	3.3	5.7	6.1	9.9	15.5	-
100 ~ 120	-0.9	-0.3	1.0	1.5	1.7	2.6	3.7	6.1	6.5	10.5	16.3	-
120 ~ 140	-0.8	-0.2	1.2	1.7	1.9	2.8	3.9	6.5	6.9	11.1	17.1	-
140 ~ 160	-0.8	-0.2	1.3	1.8	2.1	3.1	4.2	6.9	7.3	11.6	17.9	-
160 ~ 180	-0.7	-0.1	1.4	2.0	2.2	3.2	4.3	7.1	7.5	12.1	18.5	-

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	604
Annealing Point AP ($^{\circ}\text{C}$)	631
Transformation Temperature Tg ($^{\circ}\text{C}$)	651
Yield Point At ($^{\circ}\text{C}$)	683
Softening Point SP ($^{\circ}\text{C}$)	716
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	70
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	85
Thermal Conductivity λ (W/(mK))	0.969

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	57
-90 ~ -80	58
-80 ~ -70	59
-70 ~ -60	60
-60 ~ -50	62
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	65
-20 ~ -10	67
-10 ~ 0	68
0 ~ 10	69
10 ~ 20	70
20 ~ 30	71
30 ~ 40	72
40 ~ 50	73
50 ~ 60	74
60 ~ 70	75
70 ~ 80	76
80 ~ 90	77
90 ~ 100	78
100 ~ 110	79
110 ~ 120	80
120 ~ 130	80
130 ~ 140	81
140 ~ 150	82
150 ~ 160	83
160 ~ 170	83
170 ~ 180	84
180 ~ 190	85
190 ~ 200	85
200 ~ 210	86
210 ~ 220	87
220 ~ 230	87
230 ~ 240	88
240 ~ 250	88
250 ~ 260	89
260 ~ 270	89
270 ~ 280	90
280 ~ 290	90
290 ~ 300	91

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	3.31
Specific Gravity d	3.58
Remarks	

S-NPH 3

Code(d) **959175**
Code(e) **972173**

Refractive Index n_d 1.959 06 1.959 060	Abbe Number v_d 17.47	Dispersion $n_F - n_C$ 0.054 895
Refractive Index n_e 1.971 885	Abbe Number v_e 17.33	Dispersion $n_{F'} - n_{C'}$ 0.056 091

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.870 64
n_{1970}	1.970 09	1.880 02
n_{1530}	1.529 58	1.891 31
n_{1129}	1.128 64	1.904 12
n_t	1.013 98	1.909 37
n_s	0.852 11	1.919 84
$n_{A'}$	0.768 19	1.927 80
n_T	0.706 52	1.935 59
n_C	0.656 27	1.943 76
$n_{C'}$	0.643 85	1.946 12
$n_{\text{He-Ne}}$	0.632 8	1.948 34
n_D	0.589 29	1.958 60
n_d	0.587 56	1.959 06
n_e	0.546 07	1.971 88
n_F	0.486 13	1.998 66
$n_{F'}$	0.479 99	2.002 21
$n_{\text{He-Cd}}$	0.441 57	2.029 76
n_g	0.435 835	2.034 88
n_h	0.404 656	2.069 65
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.098 349 03E+00
A_2	4.890 883 88E-01
A_3	2.940 092 68E+00
B_1	1.791 238 69E-02
B_2	7.766 533 53E-02
B_3	1.609 304 28E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	102.2
Rigidity Modulus G (GPa)	41.1
Poisson's Ratio σ	0.243
Knoop Hardness Hk[Class]	500 5
Abrasion Aa	215

Partial Dispersions	
$n_C - n_t$	0.034 388
$n_C - n_{A'}$	0.015 956
$n_d - n_C$	0.015 300
$n_e - n_C$	0.028 125
$n_g - n_d$	0.075 817
$n_g - n_F$	0.036 222
$n_h - n_g$	0.034 773
$n_i - n_g$	
$n_C - n_t$	0.036 744
$n_e - n_{C'}$	0.025 769
$n_{F'} - n_e$	0.030 322
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.626 4
$\theta_{C,A'}$	0.290 7
$\theta_{d,C}$	0.278 7
$\theta_{e,C}$	0.512 3
$\theta_{g,d}$	1.381 1
$\theta_{g,F}$	0.659 8
$\theta_{h,g}$	0.633 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.655 1
$\theta'_{e,C'}$	0.459 4
$\theta'_{F,e}$	0.540 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.002 2
$\Delta\theta_{C,A'}$	-0.006 3
$\Delta\theta_{g,d}$	0.052 7
$\Delta\theta_{g,F}$	0.046 6
$\Delta\theta_{i,g}$	

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	
λ (nm)	τ_i (10 mm)
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
1 000	0.998
1 200	0.999
1 400	0.998
1 600	0.995
1 800	0.989
2 000	0.983
2 200	0.968
2 400	0.949

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	672
Yield Point At (°C)	707
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	
α_l (10 ⁻⁷ K ⁻¹)	59
(100 °C ~ 300 °C)	
α_l (10 ⁻⁷ K ⁻¹)	72
Thermal Conductivity λ (W/(m·K))	1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	46
-90 ~ -80	47
-80 ~ -70	48
-70 ~ -60	50
-60 ~ -50	51
-50 ~ -40	52
-40 ~ -30	53
-30 ~ -20	54
-20 ~ -10	55
-10 ~ 0	56
0 ~ 10	57
10 ~ 20	58
20 ~ 30	59
30 ~ 40	60
40 ~ 50	61
50 ~ 60	62
60 ~ 70	63
70 ~ 80	63
80 ~ 90	64
90 ~ 100	65
100 ~ 110	66
110 ~ 120	67
120 ~ 130	68
130 ~ 140	68
140 ~ 150	69
150 ~ 160	70
160 ~ 170	71
170 ~ 180	71
180 ~ 190	72
190 ~ 200	73
200 ~ 210	73
210 ~ 220	74
220 ~ 230	74
230 ~ 240	75
240 ~ 250	76
250 ~ 260	76
260 ~ 270	77
270 ~ 280	77
280 ~ 290	78
290 ~ 300	78

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	3.35
Specific Gravity d	3.59
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	-0.9	-0.1	0.3	0.4	1.0	1.6	3.4	3.7	6.7	11.3	-
-60 ~ -40	-1.1	-0.8	0.2	0.5	0.6	1.4	2.1	4.0	4.3	7.4	12.4	-
-40 ~ -20	-0.9	-0.4	0.5	0.9	1.0	1.8	2.6	4.5	4.8	8.3	13.7	-
-20 ~ 0	-0.6	-0.1	0.9	1.3	1.4	2.3	3.1	5.2	5.5	9.2	14.8	-
0 ~ 20	-0.3	0.2	1.3	1.8	1.9	2.8	3.7	5.9	6.2	10.2	16.1	-
20 ~ 40	0.0	0.5	1.8	2.2	2.4	3.2	4.1	6.6	7.0	11.1	17.3	-
40 ~ 60	0.3	0.9	2.2	2.7	2.8	3.7	4.7	7.2	7.7	12.0	18.6	-
60 ~ 80	0.6	1.1	2.5	3.0	3.2	4.1	5.2	7.9	8.3	12.8	19.7	-
80 ~ 100	0.7	1.3	2.8	3.4	3.6	4.5	5.6	8.4	8.8	13.7	21.0	-
100 ~ 120	0.9	1.5	3.0	3.7	3.9	4.9	6.1	9.0	9.4	14.4	22.0	-
120 ~ 140	1.0	1.7	3.4	4.0	4.1	5.2	6.4	9.5	9.9	15.1	23.1	-
140 ~ 160	1.1	1.8	3.5	4.2	4.3	5.4	6.7	9.9	10.4	15.8	24.0	-
160 ~ 180	1.2	1.9	3.6	4.3	4.5	5.6	6.9	10.2	10.7	16.4	25.1	-

OHARA 25-04

S-NPH 4

Code(d) 893204
Code(e) 903202

Refractive Index n_d	1.892 86 1.892 860	Abbe Number v_d	20.36	Dispersion $n_F - n_C$	0.043 851
Refractive Index n_e	1.903 144	Abbe Number v_e	20.20	Dispersion $n_{F'} - n_{C'}$	0.044 721

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.818 64
n_{1970}	1.970 09	1.826 94
n_{1530}	1.529 58	1.836 81
n_{1129}	1.128 64	1.847 77
n_t	1.013 98	1.852 18
n_s	0.852 11	1.860 88
$n_{A'}$	0.768 19	1.867 45
n_r	0.706 52	1.873 83
n_C	0.656 27	1.880 48
$n_{C'}$	0.643 85	1.882 40
$n_{\text{He-Ne}}$	0.632 8	1.884 20
n_D	0.589 29	1.892 49
n_d	0.587 56	1.892 86
n_e	0.546 07	1.903 14
n_F	0.486 13	1.924 33
$n_{F'}$	0.479 99	1.927 12
$n_{\text{He-Cd}}$	0.441 57	1.948 46
n_g	0.435 835	1.952 37
n_h	0.404 656	1.978 53
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.935 639 31E+00
A_2	4.495 964 78E-01
A_3	2.718 285 73E+00
B_1	1.525 852 89E-02
B_2	6.968 157 78E-02
B_3	1.703 271 49E+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 (GPa)	94.5
Rigidity Modulus G (GPa)	37.7
Poisson's Ratio σ	0.254
Knoop Hardness Hk[Class]	450 5
Abrasion Aa	268

Partial Dispersions	
$n_C - n_t$	0.028 304
$n_C - n_{A'}$	0.013 036
$n_d - n_C$	0.012 376
$n_e - n_C$	0.022 660
$n_g - n_d$	0.059 511
$n_g - n_F$	0.028 036
$n_h - n_g$	0.026 158
$n_i - n_g$	
$n_C - n_t$	0.030 217
$n_e - n_{C'}$	0.020 747
$n_{F'} - n_e$	0.023 974
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.645 5
$\theta_{C,A'}$	0.297 3
$\theta_{d,C}$	0.282 2
$\theta_{e,C}$	0.516 7
$\theta_{g,d}$	1.357 1
$\theta_{g,F}$	0.639 3
$\theta_{h,g}$	0.596 5
$\theta_{i,g}$	
$\theta'_{C,t}$	0.675 7
$\theta'_{e,C'}$	0.463 9
$\theta'_{F',e}$	0.536 1
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 3
$\Delta\theta_{C,A'}$	-0.003 2
$\Delta\theta_{g,d}$	0.034 7
$\Delta\theta_{g,F}$	0.030 8
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	380
λ_{70}	410		
Internal transmission			
$\lambda_{0.80}$	409	$\lambda_{0.05}$	380
CCI			
B	G	R	
0.00	4.93	5.17	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	0.06
390	0.39
400	0.71
420	0.915
440	0.951
460	0.966
480	0.975
500	0.982
550	0.993
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.999
1 600	0.995
1 800	0.984
2 000	0.971
2 200	0.948
2 400	0.915

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	-
Annealing Point AP ($^{\circ}\text{C}$)	-
Transformation Temperature Tg ($^{\circ}\text{C}$)	650
Yield Point At ($^{\circ}\text{C}$)	685
Softening Point SP ($^{\circ}\text{C}$)	711
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	74
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	89
Thermal Conductivity λ (W/(mK))	0.925

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	59
-90 ~ -80	61
-80 ~ -70	62
-70 ~ -60	63
-60 ~ -50	65
-50 ~ -40	66
-40 ~ -30	67
-30 ~ -20	68
-20 ~ -10	70
-10 ~ 0	71
0 ~ 10	72
10 ~ 20	73
20 ~ 30	74
30 ~ 40	75
40 ~ 50	76
50 ~ 60	77
60 ~ 70	78
70 ~ 80	79
80 ~ 90	80
90 ~ 100	81
100 ~ 110	82
110 ~ 120	83
120 ~ 130	84
130 ~ 140	84
140 ~ 150	85
150 ~ 160	86
160 ~ 170	87
170 ~ 180	87
180 ~ 190	88
190 ~ 200	89
200 ~ 210	89
210 ~ 220	90
220 ~ 230	90
230 ~ 240	91
240 ~ 250	91
250 ~ 260	92
260 ~ 270	92
270 ~ 280	93
280 ~ 290	93
290 ~ 300	94

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	3.39
Specific Gravity d	3.61
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-2.5	-2.2	-1.6	-1.4	-1.2	-0.8	-0.3	1.0	1.2	3.2	6.1	-
-60 ~ -40	-2.5	-2.2	-1.5	-1.3	-1.2	-0.7	-0.1	1.2	1.4	3.6	6.7	-
-40 ~ -20	-2.4	-2.1	-1.4	-1.0	-0.9	-0.4	0.1	1.5	1.7	4.1	7.4	-
-20 ~ 0	-2.3	-2.0	-1.1	-0.8	-0.7	-0.2	0.4	1.9	2.3	4.7	8.1	-
0 ~ 20	-2.1	-1.8	-0.8	-0.5	-0.4	0.2	0.8	2.4	2.6	5.3	9.0	-
20 ~ 40	-1.9	-1.5	-0.6	-0.3	-0.2	0.4	1.2	2.9	3.1	5.8	9.8	-
40 ~ 60	-1.7	-1.3	-0.4	0.0	0.2	0.8	1.6	3.3	3.6	6.5	10.6	-
60 ~ 80	-1.6	-1.1	-0.1	0.3	0.4	1.1	1.9	3.7	4.0	7.0	11.4	-
80 ~ 100	-1.4	-1.0	0.1	0.5	0.6	1.4	2.2	4.2	4.5	7.6	12.1	-
100 ~ 120	-1.3	-0.8	0.3	0.7	0.9	1.6	2.4	4.5	4.9	8.2	12.9	-
120 ~ 140	-1.2	-0.7	0.5	0.9	1.1	1.8	2.7	4.9	5.3	8.7	13.6	-
140 ~ 160	-1.1	-0.6	0.6	1.1	1.2	2.0	3.0	5.3	5.6	9.2	14.2	-
160 ~ 180	-1.0	-0.6	0.8	1.3	1.4	2.3	3.2	5.5	5.9	9.6	14.8	-

OHARA 25-04

S-NPH 5

Code(d) 859227
Code(e) 868225

Refractive Index n_d 1.858 96 1.858 956	Abbe Number v_d 22.73	Dispersion $n_F - n_C$ 0.037 792
Refractive Index n_e 1.867 836	Abbe Number v_e 22.54	Dispersion $n_{F'} - n_{C'}$ 0.038 499

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.792 47
n_{1970}	1.970 09	1.800 27
n_{1530}	1.529 58	1.809 44
n_{1129}	1.128 64	1.819 38
n_t	1.013 98	1.823 33
n_s	0.852 11	1.831 03
$n_{A'}$	0.768 19	1.836 81
n_T	0.706 52	1.842 40
n_C	0.656 27	1.848 21
$n_{C'}$	0.643 85	1.849 87
$n_{\text{He-Ne}}$	0.632 8	1.851 45
n_D	0.589 29	1.858 63
n_d	0.587 56	1.858 96
n_e	0.546 07	1.867 84
n_F	0.486 13	1.886 00
$n_{F'}$	0.479 99	1.888 37
$n_{\text{He-Cd}}$	0.441 57	1.906 45
n_g	0.435 835	1.909 75
n_h	0.404 656	1.931 60
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.891 089 96E+00
A_2	3.952 201 26E-01
A_3	2.204 921 27E+00
B_1	1.411 644 99E-02
B_2	6.628 344 45E-02
B_3	1.486 807 00E+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 (GPa)	92.9
Rigidity Modulus G (GPa)	37.0
Poisson's Ratio σ	0.256
Knoop Hardness Hk[Class]	460 5
Abrasion Aa	277

Partial Dispersions	
$n_C - n_t$	0.024 883
$n_C - n_{A'}$	0.011 397
$n_d - n_C$	0.010 747
$n_e - n_C$	0.019 627
$n_g - n_d$	0.050 792
$n_g - n_F$	0.023 747
$n_h - n_g$	0.021 851
$n_i - n_g$	
$n_{C'} - n_t$	0.026 548
$n_e - n_{C'}$	0.017 962
$n_{F'} - n_e$	0.020 537
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.658 4
$\theta_{C,A'}$	0.301 6
$\theta_{d,C}$	0.284 4
$\theta_{e,C}$	0.519 3
$\theta_{g,d}$	1.344 0
$\theta_{g,F}$	0.628 4
$\theta_{h,g}$	0.578 2
$\theta_{i,g}$	
$\theta'_{C,t}$	0.689 6
$\theta'_{e,C'}$	0.466 6
$\theta'_{F,e}$	0.533 4
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.005 1
$\Delta\theta_{C,A'}$	-0.001 8
$\Delta\theta_{g,d}$	0.026 5
$\Delta\theta_{g,F}$	0.023 7
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	370
λ_{70}	400		
Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	364
CCI			
B	G	R	
0.00	3.38	3.62	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.03
370	0.08
380	0.41
390	0.72
400	0.84
420	0.924
440	0.949
460	0.962
480	0.971
500	0.979
550	0.991
600	0.994
650	0.995
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.996
1 600	0.993
1 800	0.984
2 000	0.972
2 200	0.944
2 400	0.915

Thermal Properties	
Strain Point StP (°C)	573
Annealing Point AP (°C)	599
Transformation Temperature Tg (°C)	619
Yield Point At (°C)	662
Softening Point SP (°C)	704
Expansion Coefficients (-30 °C ~ 70 °C)	69
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	86
Thermal Conductivity λ (W/(mK))	0.877

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	57
-90 ~ -80	59
-80 ~ -70	60
-70 ~ -60	61
-60 ~ -50	62
-50 ~ -40	63
-40 ~ -30	64
-30 ~ -20	66
-20 ~ -10	67
-10 ~ 0	68
0 ~ 10	69
10 ~ 20	70
20 ~ 30	71
30 ~ 40	72
40 ~ 50	73
50 ~ 60	74
60 ~ 70	75
70 ~ 80	76
80 ~ 90	77
90 ~ 100	78
100 ~ 110	79
110 ~ 120	80
120 ~ 130	81
130 ~ 140	82
140 ~ 150	82
150 ~ 160	83
160 ~ 170	84
170 ~ 180	85
180 ~ 190	86
190 ~ 200	86
200 ~ 210	87
210 ~ 220	88
220 ~ 230	89
230 ~ 240	89
240 ~ 250	90
250 ~ 260	91
260 ~ 270	91
270 ~ 280	92
280 ~ 290	93
290 ~ 300	93

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	-1.5	-1.3	-0.6	-0.4	-0.4	0.0	0.4	1.5	1.7	3.4	5.6	-
-60 ~ -40	-1.4	-1.2	-0.5	-0.3	-0.2	0.2	0.6	1.8	1.9	3.7	6.1	-
-40 ~ -20	-1.4	-1.0	-0.4	-0.2	-0.1	0.3	0.8	2.1	2.2	4.1	6.7	-
-20 ~ 0	-1.2	-0.9	-0.2	0.0	0.1	0.7	1.2	2.4	2.6	4.5	7.3	-
0 ~ 20	-1.0	-0.7	0.0	0.4	0.4	1.0	1.5	2.8	3.0	5.1	8.0	-
20 ~ 40	-0.8	-0.5	0.3	0.6	0.7	1.2	1.8	3.2	3.4	5.6	8.6	-
40 ~ 60	-0.6	-0.3	0.5	0.8	0.9	1.5	2.1	3.6	3.8	6.1	9.2	-
60 ~ 80	-0.5	-0.2	0.8	1.0	1.1	1.8	2.4	3.9	4.1	6.5	9.8	-
80 ~ 100	-0.4	0.0	0.9	1.2	1.3	1.9	2.6	4.3	4.5	7.0	10.4	-
100 ~ 120	-0.3	0.1	1.1	1.4	1.5	2.1	2.8	4.5	4.7	7.4	11.0	-
120 ~ 140	-0.2	0.2	1.2	1.5	1.6	2.3	3.0	4.7	5.0	7.8	11.4	-
140 ~ 160	-0.2	0.2	1.2	1.6	1.7	2.4	3.1	5.0	5.3	8.1	11.9	-
160 ~ 180	-0.3	0.2	1.2	1.7	1.8	2.5	3.3	5.1	5.4	8.3	12.3	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	3.18
Specific Gravity d	3.71
Remarks	

OHARA 25-04

S-NPH 7

Code(d) **778239**
Code(e) **786237**

Refractive Index n_d 1.778 30 1.778 300	Abbe Number v_d 23.91	Dispersion $n_F - n_C$ 0.032 549
Refractive Index n_e 1.785 954	Abbe Number v_e 23.71	Dispersion $n_{F'} - n_{C'}$ 0.033 147

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.720 77
n_{1970}	1.970 09	1.727 50
n_{1530}	1.529 58	1.735 44
n_{1129}	1.128 64	1.744 06
n_t	1.013 98	1.747 49
n_s	0.852 11	1.754 17
$n_{A'}$	0.768 19	1.759 17
n_T	0.706 52	1.764 00
n_C	0.656 27	1.769 02
$n_{C'}$	0.643 85	1.770 46
$n_{\text{He-Ne}}$	0.632 8	1.771 82
n_D	0.589 29	1.778 02
n_d	0.587 56	1.778 30
n_e	0.546 07	1.785 95
n_F	0.486 13	1.801 57
$n_{F'}$	0.479 99	1.803 61
$n_{\text{He-Cd}}$	0.441 57	1.819 09
n_g	0.435 835	1.821 91
n_h	0.404 656	1.840 53
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.682 365 54E+00
A_2	3.396 496 44E-01
A_3	2.250 492 08E+00
B_1	1.314 316 82E-02
B_2	6.450 400 12E-02
B_3	1.813 863 00E+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 (GPa)	75.3
Rigidity Modulus G (GPa)	29.6
Poisson's Ratio σ	0.269
Knoop Hardness Hk[Class]	380 4
Abrasion Aa	448

Partial Dispersions	
$n_C - n_t$	0.021 538
$n_C - n_{A'}$	0.009 855
$n_d - n_C$	0.009 276
$n_e - n_C$	0.016 930
$n_g - n_d$	0.043 611
$n_g - n_F$	0.020 338
$n_h - n_g$	0.018 622
$n_i - n_g$	
$n_{C'} - n_t$	0.022 976
$n_e - n_{C'}$	0.015 492
$n_{F'} - n_e$	0.017 655
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.661 7
$\theta_{C,A'}$	0.302 8
$\theta_{d,C}$	0.285 0
$\theta_{e,C}$	0.520 1
$\theta_{g,d}$	1.339 9
$\theta_{g,F}$	0.624 8
$\theta_{h,g}$	0.572 1
$\theta_{i,g}$	
$\theta'_{C,t}$	0.693 2
$\theta'_{e,C'}$	0.467 4
$\theta'_{F',e}$	0.532 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 9
$\Delta\theta_{C,A'}$	-0.002 0
$\Delta\theta_{g,d}$	0.024 9
$\Delta\theta_{g,F}$	0.022 0
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	420	λ_5	370
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	365
CCI			
B	G	R	
0.00	2.61	2.69	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.11
380	0.45
390	0.74
400	0.87
420	0.949
440	0.971
460	0.980
480	0.986
500	0.990
550	0.996
600	0.997
650	0.997
700	0.997
800	0.998
900	0.998
1 000	0.998
1 200	0.999
1 400	0.999
1 600	0.995
1 800	0.984
2 000	0.970
2 200	0.951
2 400	0.920

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	520
Annealing Point AP ($^{\circ}\text{C}$)	541
Transformation Temperature Tg ($^{\circ}\text{C}$)	570
Yield Point At ($^{\circ}\text{C}$)	598
Softening Point SP ($^{\circ}\text{C}$)	630
Expansion Coefficients (-30 $^{\circ}\text{C}$ ~ 70 $^{\circ}\text{C}$)	109
α_l (10^{-7}K^{-1}) (100 $^{\circ}\text{C}$ ~ 300 $^{\circ}\text{C}$)	132
Thermal Conductivity λ (W/(mK))	0.826

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	89
-90 ~ -80	91
-80 ~ -70	93
-70 ~ -60	95
-60 ~ -50	97
-50 ~ -40	99
-40 ~ -30	100
-30 ~ -20	102
-20 ~ -10	104
-10 ~ 0	106
0 ~ 10	107
10 ~ 20	109
20 ~ 30	110
30 ~ 40	112
40 ~ 50	113
50 ~ 60	115
60 ~ 70	116
70 ~ 80	118
80 ~ 90	119
90 ~ 100	121
100 ~ 110	122
110 ~ 120	123
120 ~ 130	124
130 ~ 140	126
140 ~ 150	127
150 ~ 160	128
160 ~ 170	129
170 ~ 180	130
180 ~ 190	131
190 ~ 200	132
200 ~ 210	133
210 ~ 220	134
220 ~ 230	135
230 ~ 240	136
240 ~ 250	137
250 ~ 260	137
260 ~ 270	138
270 ~ 280	139
280 ~ 290	140
290 ~ 300	140

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-5.8	-5.6	-5.1	-5.0	-4.9	-4.5	-4.1	-3.3	-3.1	-1.6	0.4	-
-60 ~ -40	-6.0	-5.8	-5.3	-5.1	-5.0	-4.6	-4.3	-3.3	-3.2	-1.6	0.5	-
-40 ~ -20	-6.1	-5.9	-5.3	-5.1	-5.1	-4.7	-4.3	-3.2	-3.1	-1.5	0.7	-
-20 ~ 0	-6.2	-6.0	-5.3	-5.2	-5.1	-4.6	-4.2	-3.2	-3.0	-1.3	1.1	-
0 ~ 20	-6.2	-6.0	-5.3	-5.0	-5.0	-4.6	-4.1	-3.0	-2.8	-1.0	1.5	-
20 ~ 40	-6.2	-5.9	-5.3	-5.1	-5.0	-4.5	-4.0	-2.8	-2.6	-0.8	1.8	-
40 ~ 60	-6.2	-5.9	-5.2	-4.9	-4.8	-4.4	-3.9	-2.6	-2.5	-0.5	2.1	-
60 ~ 80	-6.1	-5.8	-5.1	-4.9	-4.8	-4.3	-3.8	-2.5	-2.3	-0.2	2.6	-
80 ~ 100	-6.2	-5.9	-5.0	-4.8	-4.7	-4.2	-3.6	-2.3	-2.1	0.0	2.9	-
100 ~ 120	-6.2	-5.9	-5.0	-4.7	-4.6	-4.1	-3.5	-2.1	-1.9	0.3	3.3	-
120 ~ 140	-6.2	-5.8	-5.0	-4.7	-4.6	-4.1	-3.5	-2.0	-1.8	0.5	3.6	-
140 ~ 160	-6.2	-5.8	-5.0	-4.7	-4.6	-4.0	-3.4	-1.9	-1.7	0.7	3.9	-
160 ~ 180	-6.3	-5.9	-5.1	-4.7	-4.6	-4.1	-3.4	-1.9	-1.6	0.9	4.2	-

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	3.45
Specific Gravity d	3.30
Remarks	

OHARA 25-04

S-NSL 3

Code(d) **518590**
Code(e) **520586**

Refractive Index n_d 1.518 23 1.518 229	Abbe Number v_d 58.90	Dispersion $n_F - n_C$ 0.008 798
Refractive Index n_e 1.520 326	Abbe Number v_e 58.63	Dispersion $n_{F'} - n_{C'}$ 0.008 875

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.492 73
n_{1970}	1.970 09	1.497 47
n_{1530}	1.529 58	1.502 52
n_{1129}	1.128 64	1.506 92
n_t	1.013 98	1.508 35
n_s	0.852 11	1.510 83
$n_{A'}$	0.768 19	1.512 50
n_T	0.706 52	1.514 03
n_C	0.656 27	1.515 56
$n_{C'}$	0.643 85	1.515 98
$n_{\text{He-Ne}}$	0.632 8	1.516 38
n_D	0.589 29	1.518 15
n_d	0.587 56	1.518 23
n_e	0.546 07	1.520 33
n_F	0.486 13	1.524 35
$n_{F'}$	0.479 99	1.524 86
$n_{\text{He-Cd}}$	0.441 57	1.528 52
n_g	0.435 835	1.529 15
n_h	0.404 656	1.533 15
n_i	0.365 015	1.539 99

Constants of Dispersion Formula	
A_1	8.825 147 64E-01
A_2	3.892 719 07E-01
A_3	1.106 934 48E+00
B_1	4.645 045 82E-03
B_2	2.005 513 97E-02
B_3	1.362 343 39E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	3
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group WS	1
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	70.0
Rigidity Modulus G (GPa)	28.8
Poisson's Ratio σ	0.217
Knoop Hardness Hk[Class]	520 5
Abrasion Aa	117

Partial Dispersions	
$n_C - n_t$	0.007 206
$n_C - n_{A'}$	0.003 052
$n_d - n_C$	0.002 673
$n_e - n_C$	0.004 770
$n_g - n_d$	0.010 926
$n_g - n_F$	0.004 801
$n_h - n_g$	0.003 996
$n_i - n_g$	0.010 832
$n_C - n_t$	0.007 631
$n_e - n_{C'}$	0.004 345
$n_{F'} - n_e$	0.004 530
$n_i - n_{F'}$	0.015 131

Relative Partial Dispersions	
$\theta_{C,t}$	0.819 0
$\theta_{C,A'}$	0.346 9
$\theta_{d,C}$	0.303 8
$\theta_{e,C}$	0.542 2
$\theta_{g,d}$	1.241 9
$\theta_{g,F}$	0.545 7
$\theta_{h,g}$	0.454 2
$\theta_{i,g}$	1.231 2
$\theta'_{C,t}$	0.859 8
$\theta'_{e,C'}$	0.489 6
$\theta'_{F',e}$	0.510 4
$\theta'_{i,F'}$	1.704 9

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.004 0
$\Delta\theta_{C,A'}$	-0.000 4
$\Delta\theta_{g,d}$	-0.000 5
$\Delta\theta_{g,F}$	-0.000 5
$\Delta\theta_{i,g}$	-0.000 6

Coloring			
λ_{80}	340	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	340	$\lambda_{0.05}$	317

CCI		
B	G	R
0.00	0.09	0.06

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	0.15
330	0.53
340	0.80
350	0.924
360	0.968
370	0.984
380	0.990
390	0.995
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.998
900	0.998
1 000	0.997
1 200	0.997
1 400	0.992
1 600	0.991
1 800	0.968
2 000	0.930
2 200	0.86
2 400	0.81

Thermal Properties	
Strain Point StP (°C)	455
Annealing Point AP (°C)	492
Transformation Temperature Tg (°C)	508
Yield Point At (°C)	559
Softening Point SP (°C)	668
Expansion Coefficients (-30 °C ~ 70 °C)	92
α_i (10^{-7} K^{-1}) (100 °C ~ 300 °C)	114
Thermal Conductivity λ (W/(mK))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_i (10^{-7} K^{-1})
-100 ~ -90	75
-90 ~ -80	76
-80 ~ -70	78
-70 ~ -60	80
-60 ~ -50	81
-50 ~ -40	83
-40 ~ -30	85
-30 ~ -20	86
-20 ~ -10	88
-10 ~ 0	89
0 ~ 10	91
10 ~ 20	92
20 ~ 30	94
30 ~ 40	95
40 ~ 50	96
50 ~ 60	98
60 ~ 70	99
70 ~ 80	100
80 ~ 90	102
90 ~ 100	103
100 ~ 110	104
110 ~ 120	105
120 ~ 130	106
130 ~ 140	107
140 ~ 150	109
150 ~ 160	110
160 ~ 170	111
170 ~ 180	112
180 ~ 190	113
190 ~ 200	113
200 ~ 210	114
210 ~ 220	115
220 ~ 230	116
230 ~ 240	117
240 ~ 250	118
250 ~ 260	118
260 ~ 270	119
270 ~ 280	120
280 ~ 290	120
290 ~ 300	121

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.60
Specific Gravity d	2.48
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	-0.3	-0.2	0.0	0.1	0.2	0.4	0.5	0.7	0.8	1.1	1.4	1.9	
-60 ~ -40	-0.5	-0.4	-0.1	0.1	0.1	0.2	0.4	0.6	0.7	1.0	1.2	1.8	
-40 ~ -20	-0.6	-0.4	-0.2	0.0	0.0	0.2	0.3	0.6	0.6	0.9	1.2	1.8	
-20 ~ 0	-0.6	-0.5	-0.1	0.0	0.0	0.2	0.3	0.6	0.6	0.9	1.2	1.8	
0 ~ 20	-0.6	-0.4	-0.1	0.0	0.0	0.1	0.3	0.5	0.6	1.0	1.3	1.8	
20 ~ 40	-0.5	-0.4	-0.1	0.0	0.0	0.2	0.3	0.6	0.6	1.0	1.3	1.9	
40 ~ 60	-0.6	-0.3	0.0	0.1	0.1	0.2	0.4	0.7	0.7	1.0	1.3	1.9	
60 ~ 80	-0.6	-0.4	-0.1	0.0	0.0	0.2	0.3	0.7	0.8	1.1	1.4	2.0	
80 ~ 100	-0.6	-0.4	-0.1	0.0	0.0	0.2	0.3	0.6	0.7	1.0	1.4	2.0	
100 ~ 120	-0.6	-0.4	-0.1	0.0	0.0	0.2	0.3	0.6	0.7	1.0	1.4	2.0	
120 ~ 140	-0.7	-0.5	-0.1	-0.1	-0.1	0.2	0.3	0.7	0.7	1.1	1.4	2.0	
140 ~ 160	-0.7	-0.5	-0.2	-0.1	-0.1	0.1	0.3	0.6	0.6	1.0	1.3	1.9	
160 ~ 180	-0.8	-0.7	-0.3	-0.2	-0.2	0.0	0.1	0.4	0.5	0.8	1.2	1.8	

OHARA 25-04

S-NSL36

Code(d) **517524**
Code(e) **520522**

Refractive Index n_d 1.517 42 1.517 417	Abbe Number v_d 52.43	Dispersion $n_F - n_C$ 0.009 869
Refractive Index n_e 1.519 765	Abbe Number v_e 52.14	Dispersion $n_F - n_{C'}$ 0.009 968

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.490 04
n_{1970}	1.970 09	1.495 01
n_{1530}	1.529 58	1.500 33
n_{1129}	1.128 64	1.505 01
n_t	1.013 98	1.506 56
n_s	0.852 11	1.509 24
$n_{A'}$	0.768 19	1.511 08
n_T	0.706 52	1.512 76
n_C	0.656 27	1.514 44
$n_{C'}$	0.643 85	1.514 92
n_{He-Ne}	0.632 8	1.515 36
n_D	0.589 29	1.517 33
n_d	0.587 56	1.517 42
n_e	0.546 07	1.519 76
n_F	0.486 13	1.524 31
$n_{F'}$	0.479 99	1.524 88
n_{He-Cd}	0.441 57	1.529 07
n_g	0.435 835	1.529 80
n_h	0.404 656	1.534 44
n_i	0.365 015	1.542 52

Constants of Dispersion Formula	
A_1	1.096 661 53E+00
A_2	1.689 900 73E-01
A_3	1.205 808 27E+00
B_1	6.674 911 23E-03
B_2	3.360 954 50E-02
B_3	1.416 687 38E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	64.0
Rigidity Modulus G (GPa)	28.1
Poisson's Ratio σ	0.139
Knoop Hardness Hk(Class)	480 5
Abrasion Aa	113

Partial Dispersions	
$n_C - n_t$	0.007 887
$n_C - n_{A'}$	0.003 365
$n_d - n_C$	0.002 973
$n_e - n_C$	0.005 321
$n_g - n_d$	0.012 387
$n_g - n_F$	0.005 491
$n_h - n_g$	0.004 635
$n_i - n_g$	0.012 715
$n_C - n_t$	0.008 359
$n_e - n_{C'}$	0.004 849
$n_F - n_e$	0.005 119
$n_i - n_{F'}$	0.017 635

Relative Partial Dispersions	
$\theta_{C,t}$	0.799 2
$\theta_{C,A'}$	0.341 0
$\theta_{d,C}$	0.301 2
$\theta_{e,C}$	0.539 2
$\theta_{g,d}$	1.255 1
$\theta_{g,F}$	0.556 4
$\theta_{h,g}$	0.469 7
$\theta_{i,g}$	1.288 4
$\theta'_{C,t}$	0.838 6
$\theta'_{e,C'}$	0.486 5
$\theta'_{F,e}$	0.513 5
$\theta'_{i,F'}$	1.769 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.006 5
$\Delta\theta_{C,A'}$	0.001 6
$\Delta\theta_{g,d}$	-0.000 7
$\Delta\theta_{g,F}$	-0.000 2
$\Delta\theta_{i,g}$	0.002 4

Coloring			
λ_{80}	360	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	360	$\lambda_{0.05}$	337

CCI		
B	G	R
0.00	0.22	0.20

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.18
350	0.57
360	0.81
370	0.917
380	0.960
390	0.980
400	0.989
420	0.995
440	0.996
460	0.997
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.996
1 600	0.994
1 800	0.978
2 000	0.950
2 200	0.89
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	429
Annealing Point AP (°C)	465
Transformation Temperature Tg (°C)	473
Yield Point At (°C)	546
Softening Point SP (°C)	655
Expansion Coefficients (-30 °C ~ 70 °C)	81
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(m·K))	1.09

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	69
-70 ~ -60	71
-60 ~ -50	72
-50 ~ -40	74
-40 ~ -30	75
-30 ~ -20	77
-20 ~ -10	78
-10 ~ 0	79
0 ~ 10	81
10 ~ 20	82
20 ~ 30	83
30 ~ 40	84
40 ~ 50	85
50 ~ 60	86
60 ~ 70	88
70 ~ 80	89
80 ~ 90	90
90 ~ 100	90
100 ~ 110	91
110 ~ 120	92
120 ~ 130	93
130 ~ 140	94
140 ~ 150	95
150 ~ 160	95
160 ~ 170	96
170 ~ 180	97
180 ~ 190	97
190 ~ 200	98
200 ~ 210	98
210 ~ 220	99
220 ~ 230	99
230 ~ 240	100
240 ~ 250	100
250 ~ 260	100
260 ~ 270	101
270 ~ 280	101
280 ~ 290	101
290 ~ 300	101

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	1.4	1.6	1.8	1.8	1.9	2.0	2.3	2.3	2.6	3.1	3.8
-60 ~ -40	1.1	1.2	1.5	1.6	1.7	1.8	1.9	2.2	2.2	2.6	2.9	3.8
-40 ~ -20	1.0	1.2	1.5	1.6	1.6	1.7	1.9	2.1	2.2	2.5	2.9	3.8
-20 ~ 0	1.0	1.2	1.5	1.6	1.6	1.7	1.9	2.2	2.2	2.6	3.0	3.9
0 ~ 20	1.1	1.2	1.5	1.6	1.6	1.7	1.9	2.2	2.2	2.7	3.1	4.0
20 ~ 40	1.1	1.3	1.5	1.6	1.7	1.8	2.0	2.4	2.4	2.8	3.3	4.1
40 ~ 60	1.1	1.4	1.7	1.8	1.8	1.9	2.1	2.4	2.5	2.9	3.3	4.3
60 ~ 80	1.2	1.4	1.7	1.8	1.8	2.0	2.1	2.6	2.6	3.1	3.5	4.5
80 ~ 100	1.3	1.4	1.8	1.9	1.9	2.1	2.2	2.6	2.6	3.2	3.7	4.6
100 ~ 120	1.3	1.5	1.8	1.9	1.9	2.1	2.3	2.7	2.7	3.2	3.7	4.8
120 ~ 140	1.3	1.5	1.9	1.9	2.0	2.2	2.4	2.8	2.9	3.3	3.9	4.9
140 ~ 160	1.4	1.6	1.9	2.0	2.1	2.3	2.4	2.8	2.9	3.4	3.9	5.0
160 ~ 180	1.4	1.6	1.9	2.0	2.1	2.2	2.4	2.8	2.9	3.4	3.9	5.1

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.82
Specific Gravity d	2.46
Remarks	

OHARA 25-04

S-PHM52

Code(d) 618634
Code(e) 620630

Refractive Index n_d	1.618 00 1.618 000	Abbe Number v_d	63.33	Dispersion $n_F - n_C$	0.009 758
Refractive Index n_e	1.620 327	Abbe Number v_e	63.02	Dispersion $n_{F'} - n_{C'}$	0.009 844

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.591 08
n_{1970}	1.970 09	1.595 87
n_{1530}	1.529 58	1.601 03
n_{1129}	1.128 64	1.605 61
n_t	1.013 98	1.607 14
n_s	0.852 11	1.609 83
$n_{A'}$	0.768 19	1.611 67
n_T	0.706 52	1.613 35
n_C	0.656 27	1.615 04
$n_{C'}$	0.643 85	1.615 51
$n_{\text{He-Ne}}$	0.632 8	1.615 95
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 35
$n_{\text{He-Cd}}$	0.441 57	1.629 40
n_g	0.435 835	1.630 10
n_h	0.404 656	1.634 51
n_i	0.365 015	1.641 99

Constants of Dispersion Formula	
A_1	1.099 665 50E+00
A_2	4.781 254 22E-01
A_3	1.132 140 74E+00
B_1	1.327 185 59E-02
B_2	-6.016 496 85E-04
B_3	1.305 954 72E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group WS	2
Acid Resistance(Surface) Group SR	5.0
Phosphate Resistance PR	4.0

Mechanical Properties	
Young's Modulus E (GPa)	71.5
Rigidity Modulus G (GPa)	27.7
Poisson's Ratio σ	0.292
Knoop Hardness Hk[Class]	380 4
Abrasion Aa	468

Partial Dispersions	
$n_C - n_t$	0.007 893
$n_C - n_{A'}$	0.003 370
$n_d - n_C$	0.002 964
$n_e - n_C$	0.005 291
$n_g - n_d$	0.012 103
$n_g - n_F$	0.005 309
$n_h - n_g$	0.004 403
$n_i - n_g$	0.011 891
$n_{C'} - n_t$	0.008 364
$n_e - n_{C'}$	0.004 820
$n_{F'} - n_e$	0.005 024
$n_i - n_{F'}$	0.016 643

Relative Partial Dispersions	
$\theta_{C,t}$	0.808 9
$\theta_{C,A'}$	0.345 4
$\theta_{d,C}$	0.303 8
$\theta_{e,C}$	0.542 2
$\theta_{g,d}$	1.240 3
$\theta_{g,F}$	0.544 1
$\theta_{h,g}$	0.451 2
$\theta_{i,g}$	1.218 6
$\theta'_{C,t}$	0.849 7
$\theta'_{e,C'}$	0.489 6
$\theta'_{F',e}$	0.510 4
$\theta'_{i,F'}$	1.690 7

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.034 9
$\Delta\theta_{C,A'}$	-0.007 2
$\Delta\theta_{g,d}$	0.007 1
$\Delta\theta_{g,F}$	0.005 1
$\Delta\theta_{i,g}$	0.023 9

Coloring			
λ_{80}	370	λ_5	325
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	330
CCI			
B	G	R	
0.00	0.55	0.57	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	0.05
340	0.25
350	0.51
360	0.72
370	0.85
380	0.923
390	0.957
400	0.974
420	0.986
440	0.990
460	0.992
480	0.994
500	0.996
550	0.998
600	0.998
650	0.998
700	0.998
800	0.997
900	0.996
1 000	0.996
1 200	0.996
1 400	0.996
1 600	0.991
1 800	0.979
2 000	0.961
2 200	0.926
2 400	0.89

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	585
Yield Point At (°C)	626
Softening Point SP (°C)	-
Expansion Coefficients (-30 °C ~ 70 °C)	102
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	120
Thermal Conductivity λ (W/(mK))	0.599

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	86
-90 ~ -80	87
-80 ~ -70	89
-70 ~ -60	90
-60 ~ -50	92
-50 ~ -40	93
-40 ~ -30	95
-30 ~ -20	96
-20 ~ -10	97
-10 ~ 0	99
0 ~ 10	100
10 ~ 20	101
20 ~ 30	103
30 ~ 40	104
40 ~ 50	105
50 ~ 60	106
60 ~ 70	108
70 ~ 80	109
80 ~ 90	110
90 ~ 100	111
100 ~ 110	112
110 ~ 120	113
120 ~ 130	114
130 ~ 140	115
140 ~ 150	116
150 ~ 160	117
160 ~ 170	118
170 ~ 180	119
180 ~ 190	120
190 ~ 200	120
200 ~ 210	121
210 ~ 220	122
220 ~ 230	123
230 ~ 240	123
240 ~ 250	124
250 ~ 260	125
260 ~ 270	125
270 ~ 280	126
280 ~ 290	127
290 ~ 300	127

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	-4.1	-4.0	-3.9	-3.8	-3.8	-3.7	-3.5	-3.4	-3.3	-3.1	-2.8	-2.4
-60 ~ -40	-4.3	-4.2	-4.0	-4.0	-4.0	-3.9	-3.8	-3.6	-3.6	-3.3	-3.0	-2.6
-40 ~ -20	-4.4	-4.2	-4.1	-4.0	-4.0	-3.9	-3.8	-3.6	-3.6	-3.4	-3.0	-2.6
-20 ~ 0	-4.4	-4.3	-4.1	-4.0	-4.0	-3.9	-3.8	-3.6	-3.6	-3.3	-3.1	-2.6
0 ~ 20	-4.3	-4.3	-4.1	-4.0	-4.0	-3.9	-3.8	-3.6	-3.6	-3.2	-3.0	-2.6
20 ~ 40	-4.3	-4.2	-4.0	-3.9	-3.9	-3.8	-3.7	-3.5	-3.5	-3.2	-2.9	-2.5
40 ~ 60	-4.2	-4.1	-3.9	-3.9	-3.9	-3.8	-3.6	-3.3	-3.3	-3.1	-2.8	-2.4
60 ~ 80	-4.1	-4.0	-3.8	-3.8	-3.7	-3.6	-3.5	-3.3	-3.3	-3.0	-2.8	-2.3
80 ~ 100	-4.0	-3.9	-3.7	-3.7	-3.6	-3.5	-3.4	-3.2	-3.2	-2.9	-2.7	-2.2
100 ~ 120	-4.0	-3.9	-3.7	-3.6	-3.6	-3.5	-3.3	-3.1	-3.1	-2.8	-2.6	-2.1
120 ~ 140	-3.9	-3.8	-3.6	-3.5	-3.5	-3.4	-3.3	-3.1	-3.0	-2.7	-2.5	-2.0
140 ~ 160	-3.9	-3.8	-3.6	-3.5	-3.5	-3.4	-3.3	-3.0	-3.0	-2.7	-2.3	-1.8
160 ~ 180	-3.9	-3.7	-3.5	-3.4	-3.4	-3.3	-3.2	-2.9	-2.9	-2.6	-2.3	-1.8

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.00
Specific Gravity d	3.67
Remarks	

OHARA 25-04

S-PHM52Q

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

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

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-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-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

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

Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group WS	1
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	4.0

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

$n_C - n_t$	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

$\theta_{C,t}$	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

$\Delta\theta_{C,t}$	-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

λ_{80} 365	λ_5 325
λ_{70}	
Internal transmission	
$\lambda_{0.80}$ 357	$\lambda_{0.05}$ 322
CCI	
B 0.00	G 0.31 R 0.29

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

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 (-30 °C ~ 70 °C)	89
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	107
Thermal Conductivity λ (W/(m·K))	0.738

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

Photoelastic Constant β nm/(cm ² ·105Pa)	1.41
Specific Gravity d	3.51
Remarks	

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 25-04

S-PHM53

Code(d) **603655**
 Code(e) **605651**

Refractive Index n_d 1.603 00 1.603 001	Abbe Number v_d 65.44	Dispersion $n_F - n_C$ 0.009 215
Refractive Index n_e 1.605 200	Abbe Number v_e 65.15	Dispersion $n_{F'} - n_{C'}$ 0.009 289

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.575 83
n_{1970}	1.970 09	1.580 92
n_{1530}	1.529 58	1.586 34
n_{1129}	1.128 64	1.591 03
n_t	1.013 98	1.592 56
n_s	0.852 11	1.595 19
$n_{A'}$	0.768 19	1.596 97
n_r	0.706 52	1.598 58
n_C	0.656 27	1.600 19
$n_{C'}$	0.643 85	1.600 64
$n_{\text{He-Ne}}$	0.632 8	1.601 06
n_D	0.589 29	1.602 92
n_d	0.587 56	1.603 00
n_e	0.546 07	1.605 20
n_F	0.486 13	1.609 40
$n_{F'}$	0.479 99	1.609 93
$n_{\text{He-Cd}}$	0.441 57	1.613 72
n_g	0.435 835	1.614 38
n_h	0.404 656	1.618 50
n_i	0.365 015	1.625 47

Partial Dispersions	
$n_C - n_t$	0.007 630
$n_C - n_{A'}$	0.003 223
$n_d - n_C$	0.002 812
$n_e - n_C$	0.005 011
$n_g - n_d$	0.011 380
$n_g - n_F$	0.004 977
$n_h - n_g$	0.004 114
$n_i - n_g$	0.011 090
$n_{C'} - n_t$	0.008 078
$n_e - n_{C'}$	0.004 563
$n_{F'} - n_e$	0.004 726
$n_i - n_{F'}$	0.015 545

Coloring			
λ_{80}	360	λ_5	300
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	362	$\lambda_{0.05}$	313
CCI			
B	G	R	
0.00	0.56	0.52	

Thermal Properties	
Strain Point StP (°C)	-
Annealing Point AP (°C)	-
Transformation Temperature Tg (°C)	619
Yield Point At (°C)	650
Softening Point SP (°C)	681
Expansion Coefficients (-30 °C ~ 70 °C)	95
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	113
Thermal Conductivity λ (W/(m·K))	0.615

Constants of Dispersion Formula	
A_1	1.097 754 23E+00
A_2	4.348 164 32E-01
A_3	1.138 949 76E+00
B_1	1.233 694 00E-02
B_2	-3.725 229 03E-04
B_3	1.242 769 84E+02

Relative Partial Dispersions	
$\theta_{C,t}$	0.828 0
$\theta_{C,A'}$	0.349 8
$\theta_{d,C}$	0.305 2
$\theta_{e,C}$	0.543 8
$\theta_{g,d}$	1.234 9
$\theta_{g,F}$	0.540 1
$\theta_{h,g}$	0.446 4
$\theta_{i,g}$	1.203 5
$\theta'_{C,t}$	0.869 6
$\theta'_{e,C'}$	0.491 2
$\theta'_{F,e}$	0.508 8
$\theta'_{i,F'}$	1.673 5

Internal Transmittance	
λ (nm)	τ_i (10 mm)
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
1 000	0.996
1 200	0.997
1 400	0.993
1 600	0.987
1 800	0.967
2 000	0.941
2 200	0.87
2 400	0.83

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	79
-90 ~ -80	81
-80 ~ -70	82
-70 ~ -60	84
-60 ~ -50	85
-50 ~ -40	87
-40 ~ -30	88
-30 ~ -20	90
-20 ~ -10	91
-10 ~ 0	92
0 ~ 10	94
10 ~ 20	95
20 ~ 30	96
30 ~ 40	97
40 ~ 50	98
50 ~ 60	100
60 ~ 70	101
70 ~ 80	102
80 ~ 90	103
90 ~ 100	104
100 ~ 110	105
110 ~ 120	106
120 ~ 130	107
130 ~ 140	108
140 ~ 150	109
150 ~ 160	110
160 ~ 170	111
170 ~ 180	111
180 ~ 190	112
190 ~ 200	113
200 ~ 210	114
210 ~ 220	114
220 ~ 230	115
230 ~ 240	116
240 ~ 250	116
250 ~ 260	117
260 ~ 270	118
270 ~ 280	118
280 ~ 290	119
290 ~ 300	119

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

Anomalous dispersion	
$\Delta\theta_{C,t}$	-0.025 7
$\Delta\theta_{C,A'}$	-0.005 4
$\Delta\theta_{g,d}$	0.006 1
$\Delta\theta_{g,F}$	0.004 5
$\Delta\theta_{i,g}$	0.026 5

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

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	-3.3	-3.2	-3.1	-3.1	-3.1	-3.0	-3.0	-2.7	-2.7	-2.5	-2.4	-1.9
-60 ~ -40	-3.4	-3.4	-3.2	-3.1	-3.1	-3.0	-3.0	-2.8	-2.8	-2.6	-2.3	-2.0
-40 ~ -20	-3.4	-3.4	-3.2	-3.1	-3.1	-3.0	-3.0	-2.8	-2.8	-2.6	-2.4	-1.9
-20 ~ 0	-3.4	-3.3	-3.2	-3.1	-3.0	-3.0	-2.9	-2.7	-2.7	-2.5	-2.3	-1.9
0 ~ 20	-3.2	-3.2	-3.1	-3.0	-3.0	-2.9	-2.8	-2.7	-2.6	-2.4	-2.2	-1.7
20 ~ 40	-3.2	-3.1	-3.0	-2.9	-2.9	-2.8	-2.7	-2.6	-2.5	-2.3	-2.1	-1.6
40 ~ 60	-3.1	-3.1	-2.9	-2.9	-2.8	-2.8	-2.7	-2.5	-2.5	-2.1	-1.9	-1.5
60 ~ 80	-3.0	-3.0	-2.8	-2.7	-2.7	-2.6	-2.5	-2.4	-2.3	-2.1	-1.9	-1.4
80 ~ 100	-2.9	-2.9	-2.7	-2.6	-2.6	-2.5	-2.4	-2.2	-2.2	-2.0	-1.7	-1.3
100 ~ 120	-2.9	-2.8	-2.7	-2.6	-2.6	-2.5	-2.4	-2.2	-2.2	-1.9	-1.7	-1.2
120 ~ 140	-2.9	-2.8	-2.7	-2.6	-2.6	-2.5	-2.4	-2.2	-2.1	-1.9	-1.6	-1.1
140 ~ 160	-3.0	-2.9	-2.7	-2.6	-2.6	-2.5	-2.4	-2.2	-2.2	-1.9	-1.6	-1.0
160 ~ 180	-3.0	-2.8	-2.8	-2.6	-2.6	-2.5	-2.4	-2.1	-2.1	-1.8	-1.6	-1.0

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	1.21
Specific Gravity d	3.51
Remarks	

OHARA 25-04

S-TIH 1

Code(d) 717295
Code(e) 723293

Table with 3 columns: Refractive Index (nd, ne), Abbe Number (vd, ve), and Dispersion (nF - nC, nF' - nC').

Table titled 'Refractive Indices' showing refractive index values for various wavelengths (lambda) and lines (d, e, F, g, h, i).

Table titled 'Partial Dispersions' showing dispersion values for various wavelength lines.

Table titled 'Coloring' showing lambda values and internal transmission (lambda 0.80, lambda 0.05) and CCI values (B, G, R).

Table titled 'Thermal Properties' showing Strain Point StP, Annealing Point AP, Transformation Temperature Tg, Yield Point At, Softening Point SP, Expansion Coefficients, and Thermal Conductivity lambda.

Table titled 'Constants of Dispersion Formula' showing constants A1, A2, A3, B1, B2, B3.

Table titled 'Relative Partial Dispersions' showing theta values for various lines and dispersion lines.

Table titled 'Internal Transmittance' showing lambda (nm) and tau_i (10 mm) values for various wavelengths from 280 to 2400 nm.

Table titled 'Linear coefficient of thermal expansion' showing alpha_i values for various temperature ranges.

Table titled 'Chemical Properties' showing resistance values for Water, Acid, and Phosphate.

Table titled 'Anomalous dispersion' showing delta theta values for various lines.

Table titled 'Mechanical Properties' showing Young's Modulus E, Rigidity Modulus G, Poisson's Ratio sigma, Knoop Hardness Hk, and Abrasion Aa.

Table titled 'Temperature Coefficients of Refractive Index' showing Delta n_rel / Delta T values for various lines and temperatures.

Table titled 'Other Properties' showing Photoelastic Constant beta, Specific Gravity d, and Remarks.

S-TIH 3

Code(d) **740283**
Code(e) **746281**

Refractive Index n_d 1.740 00 1.739 998	Abbe Number v_d 28.30	Dispersion $n_F - n_C$ 0.026 152
Refractive Index n_e 1.746 167	Abbe Number v_e 28.07	Dispersion $n_{F'} - n_{C'}$ 0.026 584

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.690 65
n_{1970}	1.970 09	1.696 85
n_{1530}	1.529 58	1.704 05
n_{1129}	1.128 64	1.711 62
n_t	1.013 98	1.714 55
n_s	0.852 11	1.720 18
$n_{A'}$	0.768 19	1.724 34
n_r	0.706 52	1.728 33
n_C	0.656 27	1.732 45
$n_{C'}$	0.643 85	1.733 63
$n_{\text{He-Ne}}$	0.632 8	1.734 74
n_D	0.589 29	1.739 77
n_d	0.587 56	1.740 00
n_e	0.546 07	1.746 17
n_F	0.486 13	1.758 61
$n_{F'}$	0.479 99	1.760 21
$n_{\text{He-Cd}}$	0.441 57	1.772 32
n_g	0.435 835	1.774 50
n_h	0.404 656	1.788 76
n_i	0.365 015	

Partial Dispersions	
$n_C - n_t$	0.017 900
$n_C - n_{A'}$	0.008 108
$n_d - n_C$	0.007 545
$n_e - n_C$	0.013 714
$n_g - n_d$	0.034 504
$n_g - n_F$	0.015 897
$n_h - n_g$	0.014 254
$n_i - n_g$	
$n_C - n_t$	0.019 075
$n_e - n_{C'}$	0.012 539
$n_{F'} - n_e$	0.014 045
$n_i - n_{F'}$	

Coloring			
λ_{80}	420	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	367
CCI			
B	G	R	
0.00	2.81	2.86	

Thermal Properties	
Strain Point StP (°C)	566
Annealing Point AP (°C)	591
Transformation Temperature Tg (°C)	616
Yield Point At (°C)	654
Softening Point SP (°C)	723
Expansion Coefficients (-30 °C ~ 70 °C)	85
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	103
Thermal Conductivity λ (W/(m·K))	1.03

Relative Partial Dispersions	
$\theta_{C,t}$	0.684 5
$\theta_{C,A'}$	0.310 0
$\theta_{d,C}$	0.288 5
$\theta_{e,C}$	0.524 4
$\theta_{g,d}$	1.319 4
$\theta_{g,F}$	0.607 9
$\theta_{h,g}$	0.545 0
$\theta_{i,g}$	
$\theta'_{C,t}$	0.717 5
$\theta'_{e,C'}$	0.471 7
$\theta'_{F,e}$	0.528 3
$\theta'_{i,F'}$	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.16
380	0.51
390	0.74
400	0.85
420	0.940
440	0.964
460	0.975
480	0.981
500	0.986
550	0.994
600	0.994
650	0.993
700	0.995
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.988
2 000	0.980
2 200	0.955
2 400	0.933

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	70
-90 ~ -80	71
-80 ~ -70	72
-70 ~ -60	74
-60 ~ -50	75
-50 ~ -40	76
-40 ~ -30	78
-30 ~ -20	79
-20 ~ -10	80
-10 ~ 0	82
0 ~ 10	83
10 ~ 20	84
20 ~ 30	85
30 ~ 40	87
40 ~ 50	88
50 ~ 60	89
60 ~ 70	90
70 ~ 80	91
80 ~ 90	92
90 ~ 100	93
100 ~ 110	94
110 ~ 120	95
120 ~ 130	96
130 ~ 140	97
140 ~ 150	98
150 ~ 160	99
160 ~ 170	100
170 ~ 180	101
180 ~ 190	102
190 ~ 200	103
200 ~ 210	104
210 ~ 220	105
220 ~ 230	105
230 ~ 240	106
240 ~ 250	107
250 ~ 260	108
260 ~ 270	108
270 ~ 280	109
280 ~ 290	110
290 ~ 300	111

Constants of Dispersion Formula	
A_1	1.647 976 48E+00
A_2	2.672 619 17E-01
A_3	2.197 728 45E+00
B_1	1.219 176 93E-02
B_2	5.978 930 39E-02
B_3	1.921 583 40E+02

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.005 1
$\Delta\theta_{C,A'}$	-0.000 1
$\Delta\theta_{g,d}$	0.013 5
$\Delta\theta_{g,F}$	0.012 2
$\Delta\theta_{i,g}$	

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 (GPa)	90.8
Rigidity Modulus G (GPa)	36.2
Poisson's Ratio σ	0.254
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	173

Range of Temperature (°C)	Temperature Coefficients of Refractive Index												
	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})												
	1550	t	r	C	C'	d	e	F	F'	g	h	i	
-80 ~ -60	-0.1	0.1	0.6	0.8	1.0	1.3	1.6	2.4	2.6	3.6	4.9	-	
-60 ~ -40	-0.3	0.0	0.6	0.8	0.9	1.2	1.6	2.5	2.6	3.7	5.1	-	
-40 ~ -20	-0.3	0.0	0.6	0.8	0.9	1.3	1.7	2.5	2.7	3.9	5.4	-	
-20 ~ 0	-0.2	0.1	0.7	0.9	1.0	1.4	1.8	2.8	2.9	4.2	5.7	-	
0 ~ 20	-0.1	0.1	0.8	1.0	1.1	1.5	1.9	3.0	3.1	4.5	6.1	-	
20 ~ 40	0.0	0.3	1.0	1.2	1.3	1.7	2.2	3.2	3.4	4.8	6.5	-	
40 ~ 60	0.1	0.4	1.1	1.4	1.4	1.9	2.3	3.5	3.7	5.1	6.9	-	
60 ~ 80	0.1	0.5	1.3	1.6	1.7	2.1	2.6	3.7	3.9	5.4	7.3	-	
80 ~ 100	0.2	0.6	1.4	1.7	1.9	2.4	2.9	4.0	4.2	5.8	7.7	-	
100 ~ 120	0.3	0.7	1.6	1.9	1.9	2.4	3.1	4.3	4.5	6.1	8.1	-	
120 ~ 140	0.4	0.8	1.8	2.0	2.1	2.7	3.3	4.5	4.7	6.4	8.5	-	
140 ~ 160	0.6	1.0	1.9	2.2	2.3	2.8	3.4	4.7	4.9	6.7	8.9	-	
160 ~ 180	0.6	1.0	1.9	2.3	2.4	2.9	3.5	4.9	5.1	6.9	9.2	-	

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.81
Specific Gravity d	3.11
Remarks	

S-TIH 4

Code(d) 755275
Code(e) 762273

Refractive Index n_d 1.755 20 1.755 199	Abbe Number v_d 27.51	Dispersion $n_F - n_C$ 0.027 450
Refractive Index n_e 1.761 671	Abbe Number v_e 27.29	Dispersion $n_{F'} - n_{C'}$ 0.027 911

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.704 30
n_{1970}	1.970 09	1.710 54
n_{1530}	1.529 58	1.717 84
n_{1129}	1.128 64	1.725 61
n_t	1.013 98	1.728 64
n_s	0.852 11	1.734 48
$n_{A'}$	0.768 19	1.738 82
n_F	0.706 52	1.742 99
n_C	0.656 27	1.747 30
$n_{C'}$	0.643 85	1.748 53
$n_{\text{He-Ne}}$	0.632 8	1.749 68
n_D	0.589 29	1.754 96
n_d	0.587 56	1.755 20
n_e	0.546 07	1.761 67
n_F	0.486 13	1.774 75
$n_{F'}$	0.479 99	1.776 44
$n_{\text{He-Cd}}$	0.441 57	1.789 20
n_g	0.435 835	1.791 50
n_h	0.404 656	1.806 56
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.667 555 31E+00
A_2	2.944 118 65E-01
A_3	2.494 221 19E+00
B_1	1.220 521 37E-02
B_2	5.977 753 29E-02
B_3	2.148 696 18E+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 (GPa)	91.9
Rigidity Modulus G (GPa)	36.7
Poisson's Ratio σ	0.254
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	168

Partial Dispersions	
$n_C - n_t$	0.018 659
$n_C - n_{A'}$	0.008 473
$n_d - n_C$	0.007 904
$n_e - n_C$	0.014 376
$n_g - n_d$	0.036 298
$n_g - n_F$	0.016 752
$n_h - n_g$	0.015 059
$n_i - n_g$	
$n_C' - n_t$	0.019 889
$n_e - n_{C'}$	0.013 146
$n_{F'} - n_e$	0.014 765
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.679 7
$\theta_{C,A'}$	0.308 7
$\theta_{d,C}$	0.287 9
$\theta_{e,C}$	0.523 7
$\theta_{g,d}$	1.322 3
$\theta_{g,F}$	0.610 3
$\theta_{h,g}$	0.548 6
$\theta_{i,g}$	
$\theta'_{C,t}$	0.712 6
$\theta'_{e,C}$	0.471 0
$\theta'_{F,e}$	0.529 0
$\theta'_{i,F}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.004 0
$\Delta\theta_{C,A'}$	-0.000 5
$\Delta\theta_{g,d}$	0.014 7
$\Delta\theta_{g,F}$	0.013 3
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	415	λ_5	365
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	398	$\lambda_{0.05}$	368
CCI			
B	G	R	
0.00	3.28	3.30	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.12
380	0.45
390	0.70
400	0.82
420	0.929
440	0.962
460	0.973
480	0.980
500	0.986
550	0.995
600	0.994
650	0.993
700	0.995
800	0.999
900	0.999
1 000	0.999
1 200	0.997
1 400	0.995
1 600	0.994
1 800	0.987
2 000	0.981
2 200	0.961
2 400	0.942

Thermal Properties	
Strain Point StP (°C)	565
Annealing Point AP (°C)	591
Transformation Temperature Tg (°C)	614
Yield Point At (°C)	650
Softening Point SP (°C)	694
Expansion Coefficients (-30 °C ~ 70 °C)	86
α_i (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	105
Thermal Conductivity λ (W/(mK))	1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_i (10 ⁻⁷ K ⁻¹)
-100 ~ -90	70
-90 ~ -80	72
-80 ~ -70	73
-70 ~ -60	75
-60 ~ -50	76
-50 ~ -40	77
-40 ~ -30	79
-30 ~ -20	80
-20 ~ -10	82
-10 ~ 0	83
0 ~ 10	84
10 ~ 20	86
20 ~ 30	87
30 ~ 40	88
40 ~ 50	89
50 ~ 60	91
60 ~ 70	92
70 ~ 80	93
80 ~ 90	94
90 ~ 100	95
100 ~ 110	96
110 ~ 120	97
120 ~ 130	99
130 ~ 140	100
140 ~ 150	101
150 ~ 160	102
160 ~ 170	103
170 ~ 180	103
180 ~ 190	104
190 ~ 200	105
200 ~ 210	106
210 ~ 220	107
220 ~ 230	108
230 ~ 240	109
240 ~ 250	109
250 ~ 260	110
260 ~ 270	111
270 ~ 280	112
280 ~ 290	112
290 ~ 300	113

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.76
Specific Gravity d	3.15
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	-0.4	-0.2	0.4	0.6	0.7	1.0	1.3	2.2	2.3	3.5	5.0	-
-60 ~ -40	-0.5	-0.2	0.4	0.6	0.6	1.0	1.3	2.3	2.4	3.6	5.2	-
-40 ~ -20	-0.5	-0.2	0.4	0.7	0.7	1.1	1.5	2.4	2.5	3.9	5.4	-
-20 ~ 0	-0.4	-0.1	0.5	0.7	0.8	1.2	1.7	2.6	2.8	4.1	5.7	-
0 ~ 20	-0.3	-0.1	0.6	0.8	0.9	1.4	1.8	2.8	3.0	4.4	6.1	-
20 ~ 40	-0.2	0.1	0.8	1.0	1.1	1.5	2.0	3.1	3.3	4.7	6.6	-
40 ~ 60	-0.1	0.2	0.9	1.2	1.2	1.8	2.3	3.4	3.5	5.1	7.0	-
60 ~ 80	0.0	0.3	1.1	1.4	1.5	1.9	2.4	3.6	3.7	5.4	7.4	-
80 ~ 100	0.0	0.4	1.3	1.6	1.7	2.1	2.7	3.8	4.0	5.7	7.8	-
100 ~ 120	0.1	0.5	1.3	1.7	1.8	2.3	2.9	4.1	4.3	6.0	8.2	-
120 ~ 140	0.2	0.5	1.5	1.8	1.9	2.4	3.0	4.3	4.5	6.3	8.5	-
140 ~ 160	0.3	0.7	1.6	1.9	2.0	2.5	3.1	4.4	4.6	6.5	8.8	-
160 ~ 180	0.3	0.7	1.6	1.9	2.0	2.6	3.2	4.6	4.8	6.7	9.2	-

S-TIH 6

Code(d) 805254
Code(e) 813252

Refractive Index n_d	1.805 18 1.805 181	Abbe Number v_d	25.42	Dispersion $n_F - n_C$	0.031 669
Refractive Index n_e	1.812 641	Abbe Number v_e	25.22	Dispersion $n_{F'} - n_{C'}$	0.032 223

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.749 17
n_{1970}	1.970 09	1.755 58
n_{1530}	1.529 58	1.763 21
n_{1129}	1.128 64	1.771 60
n_t	1.013 98	1.774 95
n_s	0.852 11	1.781 51
$n_{A'}$	0.768 19	1.786 43
n_r	0.706 52	1.791 18
n_C	0.656 27	1.796 11
$n_{C'}$	0.643 85	1.797 52
$n_{\text{He-Ne}}$	0.632 8	1.798 85
n_D	0.589 29	1.804 91
n_d	0.587 56	1.805 18
n_e	0.546 07	1.812 64
n_F	0.486 13	1.827 77
$n_{F'}$	0.479 99	1.829 74
$n_{\text{He-Cd}}$	0.441 57	1.844 60
n_g	0.435 835	1.847 29
n_h	0.404 656	1.864 94
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.772 276 11E+00
A_2	3.456 912 50E-01
A_3	2.407 885 01E+00
B_1	1.311 826 33E-02
B_2	6.144 796 19E-02
B_3	2.007 532 54E+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 (GPa)	93.1
Rigidity Modulus G (GPa)	36.9
Poisson's Ratio σ	0.261
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	196

Partial Dispersions	
$n_C - n_t$	0.021 155
$n_C - n_{A'}$	0.009 673
$n_d - n_C$	0.009 075
$n_e - n_C$	0.016 535
$n_g - n_d$	0.042 105
$n_g - n_F$	0.019 511
$n_h - n_g$	0.017 653
$n_i - n_g$	
$n_{C'} - n_t$	0.022 564
$n_e - n_{C'}$	0.015 126
$n_{F'} - n_e$	0.017 097
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.668 0
$\theta_{C,A'}$	0.305 4
$\theta_{d,C}$	0.286 6
$\theta_{e,C}$	0.522 1
$\theta_{g,d}$	1.329 5
$\theta_{g,F}$	0.616 1
$\theta_{h,g}$	0.557 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.700 2
$\theta'_{e,C'}$	0.469 4
$\theta'_{F',e}$	0.530 6
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.002 1
$\Delta\theta_{C,A'}$	-0.001 2
$\Delta\theta_{g,d}$	0.017 6
$\Delta\theta_{g,F}$	0.015 8
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	440	λ_5	365
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	398	$\lambda_{0.05}$	368
CCI			
B	G	R	
0.00	3.44	3.56	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.12
380	0.48
390	0.70
400	0.82
420	0.919
440	0.955
460	0.970
480	0.978
500	0.984
550	0.993
600	0.995
650	0.994
700	0.996
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.997
1 600	0.995
1 800	0.986
2 000	0.978
2 200	0.958
2 400	0.928

Thermal Properties	
Strain Point StP (°C)	571
Annealing Point AP (°C)	587
Transformation Temperature Tg (°C)	607
Yield Point At (°C)	640
Softening Point SP (°C)	690
Expansion Coefficients (-30 °C ~ 70 °C)	90
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	109
Thermal Conductivity λ (W/(m·K))	1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	74
-90 ~ -80	76
-80 ~ -70	77
-70 ~ -60	79
-60 ~ -50	80
-50 ~ -40	81
-40 ~ -30	83
-30 ~ -20	84
-20 ~ -10	86
-10 ~ 0	87
0 ~ 10	88
10 ~ 20	89
20 ~ 30	91
30 ~ 40	92
40 ~ 50	93
50 ~ 60	94
60 ~ 70	95
70 ~ 80	97
80 ~ 90	98
90 ~ 100	99
100 ~ 110	100
110 ~ 120	101
120 ~ 130	102
130 ~ 140	103
140 ~ 150	104
150 ~ 160	105
160 ~ 170	106
170 ~ 180	107
180 ~ 190	108
190 ~ 200	109
200 ~ 210	110
210 ~ 220	111
220 ~ 230	112
230 ~ 240	113
240 ~ 250	114
250 ~ 260	114
260 ~ 270	115
270 ~ 280	116
280 ~ 290	117
290 ~ 300	118

Temperature Coefficients of Refractive Index												
Range of Temperature (°C)	$\Delta n_{\text{rel}} / \Delta T$ (10^{-6}K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	-1.9	-1.7	-1.1	-0.9	-0.8	-0.4	-0.1	0.9	1.1	2.4	4.1	-
-60 ~ -40	-2.0	-1.7	-1.0	-0.8	-0.7	-0.3	0.1	1.1	1.3	2.7	4.5	-
-40 ~ -20	-1.9	-1.6	-0.9	-0.7	-0.6	-0.1	0.3	1.4	1.5	3.0	5.0	-
-20 ~ 0	-1.8	-1.5	-0.7	-0.4	-0.4	0.1	0.6	1.7	1.8	3.5	5.5	-
0 ~ 20	-1.7	-1.3	-0.5	-0.2	-0.2	0.3	0.8	2.0	2.2	4.0	6.1	-
20 ~ 40	-1.5	-1.2	-0.4	0.0	0.1	0.6	1.1	2.4	2.6	4.4	6.7	-
40 ~ 60	-1.4	-1.0	-0.1	0.2	0.3	0.8	1.4	2.7	2.9	4.8	7.3	-
60 ~ 80	-1.2	-0.8	0.1	0.4	0.5	1.0	1.6	3.1	3.3	5.3	7.8	-
80 ~ 100	-1.1	-0.7	0.3	0.6	0.7	1.3	1.9	3.4	3.6	5.6	8.3	-
100 ~ 120	-1.0	-0.6	0.4	0.8	0.9	1.5	2.1	3.6	3.8	6.0	8.7	-
120 ~ 140	-1.0	-0.5	0.5	0.9	1.0	1.6	2.3	3.9	4.1	6.3	9.1	-
140 ~ 160	-1.0	-0.5	0.5	0.9	1.0	1.7	2.4	4.0	4.3	6.6	9.6	-
160 ~ 180	-1.1	-0.6	0.5	0.9	1.1	1.7	2.5	4.2	4.5	6.9	10.0	-

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	2.81
Specific Gravity d	3.37
Remarks	

OHARA 25-04

S-TIH11

Code(d) 785257
Code(e) 792255

Refractive Index n_d 1.784 72 1.784 723	Abbe Number v_d 25.68	Dispersion $n_F - n_C$ 0.030 554
Refractive Index n_e 1.791 920	Abbe Number v_e 25.47	Dispersion $n_F' - n_C'$ 0.031 088

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.729 98
n_{1970}	1.970 09	1.736 39
n_{1530}	1.529 58	1.743 97
n_{1129}	1.128 64	1.752 22
n_t	1.013 98	1.755 49
n_s	0.852 11	1.761 86
$n_{A'}$	0.768 19	1.766 62
n_r	0.706 52	1.771 21
n_C	0.656 27	1.775 96
$n_{C'}$	0.643 85	1.777 33
n_{He-Ne}	0.632 8	1.778 61
n_D	0.589 29	1.784 46
n_d	0.587 56	1.784 72
n_e	0.546 07	1.791 92
n_F	0.486 13	1.806 52
$n_{F'}$	0.479 99	1.808 41
n_{He-Cd}	0.441 57	1.822 75
n_g	0.435 835	1.825 34
n_h	0.404 656	1.842 39
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.726 774 71E+00
A_2	3.245 686 28E-01
A_3	2.658 168 09E+00
B_1	1.293 699 58E-02
B_2	6.182 552 45E-02
B_3	2.219 046 37E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	91.2
Rigidity Modulus G (GPa)	36.3
Poisson's Ratio σ	0.255
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	180

Partial Dispersions	
$n_C - n_t$	0.020 476
$n_C - n_{A'}$	0.009 346
$n_d - n_C$	0.008 758
$n_e - n_C$	0.015 955
$n_g - n_d$	0.040 621
$n_g - n_F$	0.018 825
$n_h - n_g$	0.017 044
$n_i - n_g$	
$n_{C'} - n_t$	0.021 836
$n_e - n_{C'}$	0.014 595
$n_{F'} - n_e$	0.016 493
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.670 2
$\theta_{C,A'}$	0.305 9
$\theta_{d,C}$	0.286 6
$\theta_{e,C}$	0.522 2
$\theta_{g,d}$	1.329 5
$\theta_{g,F}$	0.616 1
$\theta_{h,g}$	0.557 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.702 4
$\theta'_{e,C'}$	0.469 5
$\theta'_{F,e}$	0.530 5
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 0
$\Delta\theta_{C,A'}$	-0.001 1
$\Delta\theta_{g,d}$	0.018 1
$\Delta\theta_{g,F}$	0.016 2
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	430	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	369

CCI		
B	G	R
0.00	3.80	3.85

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.08
380	0.40
390	0.66
400	0.80
420	0.915
440	0.948
460	0.964
480	0.973
500	0.980
550	0.992
600	0.992
650	0.990
700	0.992
800	0.998
900	0.998
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.989
2 000	0.982
2 200	0.964
2 400	0.942

Thermal Properties	
Strain Point StP (°C)	569
Annealing Point AP (°C)	588
Transformation Temperature Tg (°C)	608
Yield Point At (°C)	639
Softening Point SP (°C)	686
Expansion Coefficients (-30 °C ~ 70 °C)	88
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	107
Thermal Conductivity λ (W/(mK))	1.02

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	72
-90 ~ -80	74
-80 ~ -70	75
-70 ~ -60	77
-60 ~ -50	78
-50 ~ -40	79
-40 ~ -30	81
-30 ~ -20	82
-20 ~ -10	83
-10 ~ 0	85
0 ~ 10	86
10 ~ 20	87
20 ~ 30	89
30 ~ 40	90
40 ~ 50	91
50 ~ 60	92
60 ~ 70	93
70 ~ 80	95
80 ~ 90	96
90 ~ 100	97
100 ~ 110	98
110 ~ 120	99
120 ~ 130	100
130 ~ 140	101
140 ~ 150	102
150 ~ 160	103
160 ~ 170	104
170 ~ 180	105
180 ~ 190	106
190 ~ 200	107
200 ~ 210	108
210 ~ 220	109
220 ~ 230	110
230 ~ 240	110
240 ~ 250	111
250 ~ 260	112
260 ~ 270	113
270 ~ 280	114
280 ~ 290	114
290 ~ 300	115

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	-1.5	-1.2	-0.7	-0.5	-0.4	0.0	0.4	1.3	1.4	2.8	4.5	-
-60 ~ -40	-1.4	-1.2	-0.6	-0.3	-0.3	0.1	0.5	1.5	1.6	3.1	4.9	-
-40 ~ -20	-1.4	-1.1	-0.5	-0.2	-0.2	0.2	0.6	1.7	1.9	3.4	5.3	-
-20 ~ 0	-1.2	-1.0	-0.3	0.0	0.1	0.5	0.9	2.0	2.2	3.7	5.8	-
0 ~ 20	-1.1	-0.8	0.0	0.2	0.3	0.7	1.2	2.3	2.5	4.2	6.3	-
20 ~ 40	-1.0	-0.6	0.1	0.3	0.5	1.0	1.5	2.6	2.8	4.5	6.7	-
40 ~ 60	-0.8	-0.5	0.4	0.6	0.7	1.2	1.7	2.9	3.1	4.9	7.1	-
60 ~ 80	-0.7	-0.3	0.5	0.8	0.8	1.4	1.9	3.2	3.3	5.3	7.7	-
80 ~ 100	-0.6	-0.2	0.6	0.9	1.0	1.6	2.1	3.4	3.6	5.6	8.0	-
100 ~ 120	-0.6	-0.2	0.8	1.1	1.2	1.7	2.3	3.7	3.8	5.9	8.4	-
120 ~ 140	-0.6	-0.1	0.8	1.1	1.2	1.8	2.4	3.8	4.0	6.1	8.7	-
140 ~ 160	-0.5	-0.1	0.8	1.2	1.3	1.8	2.5	3.9	4.1	6.3	9.0	-
160 ~ 180	-0.6	-0.2	0.8	1.1	1.2	1.8	2.5	4.0	4.3	6.5	9.3	-

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.81
Specific Gravity d	3.24
Remarks	

OHARA 25-04

Summary table with 3 columns: Refractive Index (n_d, n_e), Abbe Number (v_d, v_e), and Dispersion (n_F - n_C). Values for n_d, v_d, n_F - n_C are 1.740 77, 27.79, 0.026 657 respectively.

Refractive Indices table with columns for wavelength lambda (um) and refractive index n. Includes values for n_2325, n_1970, n_1530, n_1129, n_t, n_s, n_A', n_F, n_C, n_C', n_He-Ne, n_D, n_d, n_e, n_F, n_F', n_He-Cd, n_g, n_h, n_i.

Partial Dispersions table with columns for refractive index difference (n_C - n_t, n_C - n_A', etc.) and values. Includes n_C - n_t: 0.018 185, n_C - n_A': 0.008 244, etc.

Relative Partial Dispersions table with columns for theta_C,t, theta_C,A', theta_d,C, etc. and values. Includes theta_C,t: 0.682 2, theta_C,A': 0.309 3, etc.

Anomalous dispersion table with columns for Delta theta_C,t, Delta theta_C,A', Delta theta_g,d, etc. and values. Includes Delta theta_C,t: 0.005 1, Delta theta_C,A': -0.000 2, etc.

Coloring table with columns for wavelength (lambda_80, lambda_70, lambda_5) and values. Includes lambda_80: 415, lambda_5: 365. Internal transmission table below with values for lambda_0.80 and lambda_0.05.

Internal Transmittance table with columns for wavelength lambda (nm) and transmittance tau_i (10 mm). Lists values from 280 nm to 2400 nm.

Thermal Properties table with columns for property and value. Includes Strain Point StP (573), Annealing Point AP (595), Transformation Temperature Tg (619), Yield Point At (656), Softening Point SP (700), Expansion Coefficients (83, 101), Thermal Conductivity lambda (1.03).

Constants of Dispersion Formula table with columns for coefficient (A_1, A_2, A_3, B_1, B_2, B_3) and values. Includes A_1: 1.622 246 74E+00, B_1: 1.183 683 86E-02.

Chemical Properties table with columns for property and value. Includes Water Resistance (Group RW(P)) 1, Acid Resistance (Group RA(P)) 1, Weathering Resistance (Group W(S)) 1, Acid Resistance (Surface) Group SR 1.0, Phosphate Resistance PR 1.0.

Mechanical Properties table with columns for property and value. Includes Young's Modulus E (89.9 GPa), Rigidity Modulus G (36.0 GPa), Poisson's Ratio sigma (0.249), Knoop Hardness Hk (Class) 590/6, Abrasion Aa 167.

Linear coefficient of thermal expansion table with columns for temperature range (degrees C) and alpha_i (10^-7 K^-1). Lists values from -100 to 290 degrees C.

Temperature Coefficients of Refractive Index table with columns for Range of Temperature (degrees C) and coefficients (1550, t, r, C, C', d, e, F, F', g, h, i). Lists values for various temperature ranges.

Other Properties table with columns for property and value. Includes Photoelastic Constant beta (2.83 nm/(cm*105Pa)), Specific Gravity d (3.10), and Remarks.

S-TIH14

Code(d) 762265
Code(e) 769263

Refractive Index n_d 1.761 82 1.761 821	Abbe Number v_d 26.52	Dispersion $n_F - n_C$ 0.028 729
Refractive Index n_e 1.768 591	Abbe Number v_e 26.30	Dispersion $n_{F'} - n_{C'}$ 0.029 221

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.709 16
n_{1970}	1.970 09	1.715 54
n_{1530}	1.529 58	1.723 02
n_{1129}	1.128 64	1.731 02
n_t	1.013 98	1.734 15
n_s	0.852 11	1.740 22
$n_{A'}$	0.768 19	1.744 74
n_r	0.706 52	1.749 08
n_C	0.656 27	1.753 57
$n_{C'}$	0.643 85	1.754 85
n_{He-Ne}	0.632 8	1.756 06
n_D	0.589 29	1.761 57
n_d	0.587 56	1.761 82
n_e	0.546 07	1.768 59
n_F	0.486 13	1.782 30
$n_{F'}$	0.479 99	1.784 07
n_{He-Cd}	0.441 57	1.797 50
n_g	0.435 835	1.799 92
n_h	0.404 656	1.815 84
n_i	0.365 015	

Partial Dispersions	
$n_C - n_t$	0.019 413
$n_C - n_{A'}$	0.008 831
$n_d - n_C$	0.008 254
$n_e - n_C$	0.015 024
$n_g - n_d$	0.038 102
$n_g - n_F$	0.017 627
$n_h - n_g$	0.015 917
$n_i - n_g$	
$n_{C'} - n_t$	0.020 697
$n_e - n_{C'}$	0.013 740
$n_{F'} - n_e$	0.015 481
$n_i - n_{F'}$	

Coloring			
λ_{80}	420	λ_5	365
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	368
CCI			
B	G	R	
0.00	3.11	3.10	

Thermal Properties	
Strain Point StP (°C)	565
Annealing Point AP (°C)	590
Transformation Temperature Tg (°C)	616
Yield Point At (°C)	649
Softening Point SP (°C)	693
Expansion Coefficients (-30 °C ~ 70 °C)	86
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	104
Thermal Conductivity λ (W/(m·K))	1.03

Constants of Dispersion Formula	
A ₁	1.689 151 08E+00
A ₂	2.904 620 24E-01
A ₃	2.379 715 16E+00
B ₁	1.282 025 14E-02
B ₂	6.180 908 41E-02
B ₃	2.010 943 52E+02

Relative Partial Dispersions	
$\theta_{C,t}$	0.675 7
$\theta_{C,A'}$	0.307 4
$\theta_{d,C}$	0.287 3
$\theta_{e,C}$	0.523 0
$\theta_{g,d}$	1.326 3
$\theta_{g,F}$	0.613 6
$\theta_{h,g}$	0.554 0
$\theta_{i,g}$	
$\theta'_{C,t}$	0.708 3
$\theta'_{e,C'}$	0.470 2
$\theta'_{F,e}$	0.529 8
$\theta'_{i,F'}$	

Internal Transmittance	
λ (nm)	τ _i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.10
380	0.43
390	0.70
400	0.84
420	0.934
440	0.960
460	0.971
480	0.977
500	0.983
550	0.993
600	0.993
650	0.990
700	0.992
800	0.997
900	0.999
1 000	0.999
1 200	0.999
1 400	0.997
1 600	0.996
1 800	0.988
2 000	0.982
2 200	0.961
2 400	0.942

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	71
-90 ~ -80	72
-80 ~ -70	74
-70 ~ -60	75
-60 ~ -50	76
-50 ~ -40	78
-40 ~ -30	79
-30 ~ -20	80
-20 ~ -10	82
-10 ~ 0	83
0 ~ 10	84
10 ~ 20	85
20 ~ 30	87
30 ~ 40	88
40 ~ 50	89
50 ~ 60	90
60 ~ 70	91
70 ~ 80	92
80 ~ 90	93
90 ~ 100	95
100 ~ 110	96
110 ~ 120	97
120 ~ 130	98
130 ~ 140	99
140 ~ 150	100
150 ~ 160	101
160 ~ 170	102
170 ~ 180	103
180 ~ 190	104
190 ~ 200	104
200 ~ 210	105
210 ~ 220	106
220 ~ 230	107
230 ~ 240	108
240 ~ 250	109
250 ~ 260	110
260 ~ 270	110
270 ~ 280	111
280 ~ 290	112
290 ~ 300	113

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

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.004 6
$\Delta\theta_{C,A'}$	-0.000 6
$\Delta\theta_{g,d}$	0.016 7
$\Delta\theta_{g,F}$	0.015 0
$\Delta\theta_{i,g}$	

Mechanical Properties	
Young's Modulus E (GPa)	88.8
Rigidity Modulus G (GPa)	35.4
Poisson's Ratio σ	0.254
Knoop Hardness Hk(Class)	550 6
Abrasion Aa	171

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	-1.0	-0.8	-0.2	0.0	0.0	0.4	0.7	1.6	1.8	3.0	4.6	-
-60 ~ -40	-1.0	-0.7	-0.2	0.0	0.1	0.4	0.9	1.8	1.9	3.2	5.0	-
-40 ~ -20	-0.9	-0.7	0.0	0.2	0.3	0.6	1.0	2.0	2.1	3.6	5.3	-
-20 ~ 0	-0.8	-0.5	0.1	0.3	0.4	0.8	1.3	2.3	2.5	3.9	5.8	-
0 ~ 20	-0.7	-0.4	0.3	0.6	0.6	1.1	1.6	2.6	2.8	4.3	6.4	-
20 ~ 40	-0.5	-0.2	0.5	0.8	0.8	1.3	1.8	3.0	3.1	4.8	6.8	-
40 ~ 60	-0.4	0.0	0.7	1.0	1.0	1.6	2.1	3.3	3.4	5.2	7.3	-
60 ~ 80	-0.2	0.2	0.9	1.2	1.3	1.8	2.3	3.5	3.7	5.5	7.9	-
80 ~ 100	-0.2	0.2	1.0	1.4	1.5	2.0	2.6	3.8	4.0	5.9	8.2	-
100 ~ 120	-0.1	0.3	1.1	1.6	1.6	2.2	2.8	4.1	4.3	6.2	8.7	-
120 ~ 140	0.0	0.4	1.3	1.7	1.8	2.3	2.9	4.3	4.5	6.5	9.1	-
140 ~ 160	0.1	0.5	1.4	1.7	1.8	2.4	3.0	4.5	4.7	6.8	9.4	-
160 ~ 180	0.0	0.4	1.4	1.7	1.8	2.4	3.1	4.6	4.8	7.0	9.8	-

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.86
Specific Gravity d	3.17
Remarks	

S-TIH18

Code(d) **722292**
Code(e) **727290**

Refractive Index n_d 1.721 51 1.721 507	Abbe Number v_d 29.23	Dispersion $n_F - n_C$ 0.024 683
Refractive Index n_e 1.727 331	Abbe Number v_e 29.00	Dispersion $n_{F'} - n_{C'}$ 0.025 081

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.673 84
n_{1970}	1.970 09	1.680 02
n_{1530}	1.529 58	1.687 15
n_{1129}	1.128 64	1.694 53
n_t	1.013 98	1.697 34
n_s	0.852 11	1.702 72
$n_{A'}$	0.768 19	1.706 68
n_r	0.706 52	1.710 47
n_C	0.656 27	1.714 37
$n_{C'}$	0.643 85	1.715 48
$n_{\text{He-Ne}}$	0.632 8	1.716 53
n_D	0.589 29	1.721 29
n_d	0.587 56	1.721 51
n_e	0.546 07	1.727 33
n_F	0.486 13	1.739 05
$n_{F'}$	0.479 99	1.740 57
$n_{\text{He-Cd}}$	0.441 57	1.751 95
n_g	0.435 835	1.753 99
n_h	0.404 656	1.767 35
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.599 216 08E+00
A_2	2.595 321 64E-01
A_3	2.124 545 43E+00
B_1	1.164 693 04E-02
B_2	5.848 248 83E-02
B_3	1.869 277 79E+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 (GPa)	89.1
Rigidity Modulus G (GPa)	35.7
Poisson's Ratio σ	0.248
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	160

Partial Dispersions	
$n_C - n_t$	0.017 028
$n_C - n_{A'}$	0.007 687
$n_d - n_C$	0.007 136
$n_e - n_C$	0.012 960
$n_g - n_d$	0.032 488
$n_g - n_F$	0.014 941
$n_h - n_g$	0.013 358
$n_i - n_g$	
$n_{C'} - n_t$	0.018 141
$n_e - n_{C'}$	0.011 847
$n_{F'} - n_e$	0.013 234
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.689 9
$\theta_{C,A'}$	0.311 4
$\theta_{d,C}$	0.289 1
$\theta_{e,C}$	0.525 1
$\theta_{g,d}$	1.316 2
$\theta_{g,F}$	0.605 3
$\theta_{h,g}$	0.541 2
$\theta_{i,g}$	
$\theta'_{C,t}$	0.723 3
$\theta'_{e,C'}$	0.472 3
$\theta'_{F',e}$	0.527 7
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.006 1
$\Delta\theta_{C,A'}$	0.000 1
$\Delta\theta_{g,d}$	0.012 2
$\Delta\theta_{g,F}$	0.011 1
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	410	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	393	$\lambda_{0.05}$	366
CCI			
B	G	R	
0.00	2.43	2.44	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.18
380	0.54
390	0.77
400	0.87
420	0.951
440	0.971
460	0.979
480	0.984
500	0.988
550	0.995
600	0.995
650	0.993
700	0.995
800	0.998
900	0.999
1 000	0.999
1 200	0.999
1 400	0.996
1 600	0.995
1 800	0.986
2 000	0.978
2 200	0.948
2 400	0.928

Thermal Properties	
Strain Point StP (°C)	570
Annealing Point AP (°C)	596
Transformation Temperature Tg (°C)	622
Yield Point At (°C)	660
Softening Point SP (°C)	703
Expansion Coefficients (-30 °C ~ 70 °C)	85
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	100
Thermal Conductivity λ (W/(mK))	1.03

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	68
-90 ~ -80	70
-80 ~ -70	72
-70 ~ -60	73
-60 ~ -50	75
-50 ~ -40	76
-40 ~ -30	77
-30 ~ -20	79
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	83
10 ~ 20	84
20 ~ 30	85
30 ~ 40	86
40 ~ 50	87
50 ~ 60	88
60 ~ 70	90
70 ~ 80	91
80 ~ 90	92
90 ~ 100	93
100 ~ 110	94
110 ~ 120	94
120 ~ 130	95
130 ~ 140	96
140 ~ 150	97
150 ~ 160	98
160 ~ 170	98
170 ~ 180	99
180 ~ 190	100
190 ~ 200	101
200 ~ 210	101
210 ~ 220	102
220 ~ 230	102
230 ~ 240	103
240 ~ 250	103
250 ~ 260	104
260 ~ 270	104
270 ~ 280	105
280 ~ 290	105
290 ~ 300	105

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.87
Specific Gravity d	3.07
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	-0.2	0.1	0.6	0.8	0.9	1.3	1.6	2.3	2.4	3.6	4.9	-
-60 ~ -40	0.0	0.2	0.7	1.0	1.0	1.4	1.7	2.5	2.6	3.8	5.2	-
-40 ~ -20	0.1	0.4	0.9	1.1	1.2	1.5	1.9	2.8	2.9	4.1	5.5	-
-20 ~ 0	0.2	0.5	1.1	1.3	1.4	1.8	2.1	3.0	3.1	4.4	5.9	-
0 ~ 20	0.5	0.7	1.3	1.5	1.6	2.0	2.4	3.3	3.4	4.8	6.3	-
20 ~ 40	0.6	0.9	1.5	1.8	1.8	2.2	2.6	3.6	3.7	5.1	6.7	-
40 ~ 60	0.8	1.0	1.7	1.9	2.0	2.4	2.8	3.8	3.9	5.4	7.0	-
60 ~ 80	0.8	1.1	1.9	2.1	2.2	2.6	3.1	4.0	4.2	5.6	7.3	-
80 ~ 100	0.9	1.2	1.9	2.2	2.2	2.8	3.2	4.3	4.4	5.9	7.6	-
100 ~ 120	0.9	1.3	2.0	2.2	2.3	2.8	3.2	4.4	4.5	6.1	7.9	-
120 ~ 140	0.9	1.3	2.0	2.3	2.4	2.8	3.3	4.5	4.6	6.2	8.1	-
140 ~ 160	0.8	1.2	2.1	2.3	2.4	2.9	3.4	4.5	4.7	6.3	8.2	-
160 ~ 180	0.8	1.2	1.9	2.2	2.3	2.8	3.3	4.5	4.6	6.3	8.2	-

S-TIH53

Code(d) **847238**
Code(e) **855236**

Refractive Index n_d	1.846 66	Abbe Number v_d	23.78	Dispersion $n_F - n_C$	0.035 608
Refractive Index n_e	1.846 660	Abbe Number v_e	23.59	Dispersion $n_{F'} - n_{C'}$	0.036 247

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.785 19
n_{1970}	1.970 09	1.791 99
n_{1530}	1.529 58	1.800 13
n_{1129}	1.128 64	1.809 25
n_t	1.013 98	1.812 94
n_s	0.852 11	1.820 21
$n_{A'}$	0.768 19	1.825 68
n_r	0.706 52	1.830 98
n_C	0.656 27	1.836 49
$n_{C'}$	0.643 85	1.838 07
n_{He-Ne}	0.632 8	1.839 56
n_D	0.589 29	1.846 35
n_d	0.587 56	1.846 66
n_e	0.546 07	1.855 04
n_F	0.486 13	1.872 10
$n_{F'}$	0.479 99	1.874 31
n_{He-Cd}	0.441 57	1.891 14
n_g	0.435 835	1.894 19
n_h	0.404 656	1.914 29
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.879 048 86E+00
A_2	3.697 197 75E-01
A_3	2.337 308 63E+00
B_1	1.441 217 70E-02
B_2	6.388 179 90E-02
B_3	1.826 681 80E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	96.0
Rigidity Modulus G (GPa)	37.9
Poisson's Ratio σ	0.266
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	188

Partial Dispersions	
$n_C - n_t$	0.023 550
$n_C - n_{A'}$	0.010 806
$n_d - n_C$	0.010 172
$n_e - n_C$	0.018 553
$n_g - n_d$	0.047 529
$n_g - n_F$	0.022 093
$n_h - n_g$	0.020 105
$n_i - n_g$	
$n_{C'} - n_t$	0.025 128
$n_{e'} - n_{C'}$	0.016 975
$n_{F'} - n_{e'}$	0.019 272
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.661 4
$\theta_{C,A'}$	0.303 5
$\theta_{d,C}$	0.285 7
$\theta_{e,C}$	0.521 0
$\theta_{g,d}$	1.334 8
$\theta_{g,F}$	0.620 5
$\theta_{h,g}$	0.564 6
$\theta_{i,g}$	
$\theta'_{C,t}$	0.693 2
$\theta'_{e,C'}$	0.468 3
$\theta'_{F,e}$	0.531 7
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.003 2
$\Delta\theta_{C,A'}$	-0.001 2
$\Delta\theta_{g,d}$	0.019 5
$\Delta\theta_{g,F}$	0.017 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	370
λ_{70}	420		
Internal transmission			
$\lambda_{0.80}$	408	$\lambda_{0.05}$	370
CCI			
B	G	R	
0.00	4.97	5.06	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.06
380	0.35
390	0.61
400	0.75
420	0.87
440	0.927
460	0.948
480	0.961
500	0.971
550	0.987
600	0.989
650	0.985
700	0.989
800	0.997
900	0.998
1 000	0.999
1 200	0.999
1 400	0.998
1 600	0.997
1 800	0.991
2 000	0.986
2 200	0.974
2 400	0.955

Thermal Properties	
Strain Point StP (°C)	576
Annealing Point AP (°C)	596
Transformation Temperature Tg (°C)	630
Yield Point At (°C)	663
Softening Point SP (°C)	692
Expansion Coefficients (-30 °C ~ 70 °C)	88
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	104
Thermal Conductivity λ (W/(m·K))	1.00

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	72
-90 ~ -80	74
-80 ~ -70	75
-70 ~ -60	77
-60 ~ -50	78
-50 ~ -40	80
-40 ~ -30	81
-30 ~ -20	82
-20 ~ -10	83
-10 ~ 0	85
0 ~ 10	86
10 ~ 20	87
20 ~ 30	88
30 ~ 40	90
40 ~ 50	91
50 ~ 60	92
60 ~ 70	93
70 ~ 80	94
80 ~ 90	95
90 ~ 100	96
100 ~ 110	97
110 ~ 120	98
120 ~ 130	99
130 ~ 140	99
140 ~ 150	100
150 ~ 160	101
160 ~ 170	102
170 ~ 180	103
180 ~ 190	103
190 ~ 200	104
200 ~ 210	105
210 ~ 220	105
220 ~ 230	106
230 ~ 240	107
240 ~ 250	107
250 ~ 260	108
260 ~ 270	108
270 ~ 280	109
280 ~ 290	109
290 ~ 300	110

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	-1.4	-1.1	-0.6	-0.2	-0.2	0.2	0.6	1.6	1.8	3.2	5.0	-
-60 ~ -40	-1.6	-1.3	-0.7	-0.3	-0.3	0.1	0.6	1.6	1.8	3.4	5.3	-
-40 ~ -20	-1.7	-1.4	-0.6	-0.3	-0.3	0.2	0.7	1.9	2.1	3.7	5.9	-
-20 ~ 0	-1.6	-1.3	-0.6	-0.3	-0.2	0.3	0.9	2.1	2.3	4.1	6.5	-
0 ~ 20	-1.6	-1.2	-0.4	-0.1	0.0	0.5	1.2	2.5	2.7	4.6	7.1	-
20 ~ 40	-1.5	-1.1	-0.2	0.1	0.2	0.8	1.4	2.8	3.1	5.2	7.8	-
40 ~ 60	-1.4	-1.0	0.0	0.3	0.4	1.0	1.7	3.3	3.5	5.7	8.5	-
60 ~ 80	-1.3	-0.9	0.2	0.5	0.6	1.4	2.1	3.7	3.9	6.2	9.2	-
80 ~ 100	-1.1	-0.6	0.4	0.8	0.9	1.6	2.3	4.1	4.4	6.8	9.9	-
100 ~ 120	-1.0	-0.5	0.7	1.1	1.2	1.9	2.7	4.5	4.7	7.3	10.7	-
120 ~ 140	-0.8	-0.3	0.9	1.3	1.5	2.2	3.0	4.9	5.2	7.9	11.4	-
140 ~ 160	-0.7	-0.2	1.1	1.6	1.7	2.5	3.3	5.3	5.6	8.6	12.1	-
160 ~ 180	-0.6	0.0	1.3	1.9	2.0	2.8	3.7	5.8	6.1	9.1	12.8	-

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.81
Specific Gravity d	3.54
Remarks	

S-TIH53WN

Code(d) 847239
Code(e) 855237

Refractive Index n_d 1.846 66, Abbe Number v_d 23.86, Dispersion n_F - n_C 0.035 480
Refractive Index n_e 1.855 009, Abbe Number v_e 23.67, Dispersion n_F' - n_C' 0.036 118

Refractive Indices table with columns lambda (um) and values for various wavelengths like n_2325, n_1970, etc.

Partial Dispersions table with values for n_C - n_t, n_C - n_A', n_d - n_C, etc.

Coloring table with values for lambda_80, lambda_70, lambda_5, lambda_0.80, lambda_0.05, CCI values B, G, R.

Thermal Properties table with Strain Point StP (°C) 576, Annealing Point AP (°C) 596, Transformation Temperature Tg (°C) 630, etc.

Constants of Dispersion Formula table with A1, A2, A3, B1, B2, B3 values.

Relative Partial Dispersions table with theta values for various glass types like theta_C,t, theta_C,A', etc.

Internal Transmittance table with lambda (nm) and tau_i (10 mm) values for various wavelengths from 280 to 2400 nm.

Linear coefficient of thermal expansion table with Temperature range (°C) and alpha_i (10^-7 K^-1) values.

Chemical Properties table with Water Resistance, Acid Resistance, Weathering Resistance, etc.

Anomalous dispersion table with Delta theta values for C,t, C,A', g,d, g,F, i,g.

Mechanical Properties table with Young's Modulus E (GPa) 96.0, Rigidity Modulus G (GPa) 37.9, Poisson's Ratio sigma 0.266, Knoop Hardness Hk[Class] 550, 6, Abrasion Aa 188.

Temperature Coefficients of Refractive Index table with Range of Temperature (°C) and Delta n_rel / Delta T (10^-6 K^-1) values for various parameters like t, r, C, C', d, e, F, F', g, h, i.

Other Properties table with Photoelastic Constant beta nm/(cm*105Pa) 2.81, Specific Gravity d 3.54, Remarks.

S-TIH57

Code(d) 963241
Code(e) 97239

Refractive Index n_d 1.963 00 1.963 000	Abbe Number v_d 24.11	Dispersion $n_F - n_C$ 0.039 935
Refractive Index n_e 1.972 398	Abbe Number v_e 23.92	Dispersion $n_{F'} - n_{C'}$ 0.040 656

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.893 94
n_{1970}	1.970 09	1.901 63
n_{1530}	1.529 58	1.910 82
n_{1129}	1.128 64	1.921 06
n_t	1.013 98	1.925 20
n_s	0.852 11	1.933 35
$n_{A'}$	0.768 19	1.939 49
n_r	0.706 52	1.945 42
n_C	0.656 27	1.951 60
$n_{C'}$	0.643 85	1.953 37
$n_{\text{He-Ne}}$	0.632 8	1.955 04
n_D	0.589 29	1.962 66
n_d	0.587 56	1.963 00
n_e	0.546 07	1.972 40
n_F	0.486 13	1.991 53
$n_{F'}$	0.479 99	1.994 02
$n_{\text{He-Cd}}$	0.441 57	2.012 91
n_g	0.435 835	2.016 34
n_h	0.404 656	2.038 93
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	2.211 032 56E+00
A_2	4.503 469 86E-01
A_3	2.477 466 63E+00
B_1	1.423 302 68E-02
B_2	6.385 733 92E-02
B_3	1.619 376 00E+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	3.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	117.0
Rigidity Modulus G (GPa)	45.3
Poisson's Ratio σ	0.292
Knoop Hardness Hk[Class]	640 6
Abrasion Aa	102

Partial Dispersions	
$n_C - n_t$	0.026 394
$n_C - n_{A'}$	0.012 111
$n_d - n_C$	0.011 402
$n_e - n_C$	0.020 800
$n_g - n_d$	0.053 340
$n_g - n_F$	0.024 807
$n_h - n_g$	0.022 594
$n_i - n_g$	
$n_C - n_t$	0.028 162
$n_e - n_{C'}$	0.019 032
$n_{F'} - n_e$	0.021 624
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.660 9
$\theta_{C,A'}$	0.303 3
$\theta_{d,C}$	0.285 5
$\theta_{e,C}$	0.520 8
$\theta_{g,d}$	1.335 7
$\theta_{g,F}$	0.621 2
$\theta_{h,g}$	0.565 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.692 7
$\theta'_{e,C'}$	0.468 1
$\theta'_{F',e}$	0.531 9
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.001 1
$\Delta\theta_{C,A'}$	-0.001 8
$\Delta\theta_{g,d}$	0.021 1
$\Delta\theta_{g,F}$	0.018 7
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}		λ_5	375
λ_{70}	450		
Internal transmission			
$\lambda_{0.80}$	433	$\lambda_{0.05}$	373
CCI			
B	G	R	
0.00	10.27	10.95	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.02
380	0.13
390	0.33
400	0.51
420	0.73
440	0.84
460	0.90
480	0.929
500	0.950
550	0.979
600	0.988
650	0.991
700	0.994
800	0.997
900	0.997
1 000	0.997
1 200	0.997
1 400	0.997
1 600	0.995
1 800	0.989
2 000	0.977
2 200	0.947
2 400	0.85

Thermal Properties	
Strain Point StP (°C)	634
Annealing Point AP (°C)	661
Transformation Temperature Tg (°C)	677
Yield Point At (°C)	713
Softening Point SP (°C)	732
Expansion Coefficients (-30 °C ~ 70 °C)	78
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	93
Thermal Conductivity λ (W/(mK))	0.970

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	66
-70 ~ -60	67
-60 ~ -50	68
-50 ~ -40	70
-40 ~ -30	71
-30 ~ -20	72
-20 ~ -10	74
-10 ~ 0	75
0 ~ 10	76
10 ~ 20	77
20 ~ 30	78
30 ~ 40	79
40 ~ 50	81
50 ~ 60	82
60 ~ 70	83
70 ~ 80	84
80 ~ 90	85
90 ~ 100	86
100 ~ 110	86
110 ~ 120	87
120 ~ 130	88
130 ~ 140	89
140 ~ 150	90
150 ~ 160	91
160 ~ 170	91
170 ~ 180	92
180 ~ 190	93
190 ~ 200	93
200 ~ 210	94
210 ~ 220	95
220 ~ 230	95
230 ~ 240	96
240 ~ 250	96
250 ~ 260	97
260 ~ 270	97
270 ~ 280	98
280 ~ 290	98
290 ~ 300	98

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	-1.0	-0.7	0.1	0.3	0.4	0.9	1.5	2.7	2.9	4.7	7.1	-
-60 ~ -40	-1.1	-0.7	0.1	0.4	0.4	1.0	1.6	2.8	3.0	5.0	7.4	-
-40 ~ -20	-0.9	-0.6	0.2	0.5	0.6	1.2	1.8	3.1	3.3	5.4	7.9	-
-20 ~ 0	-0.8	-0.4	0.4	0.8	0.9	1.5	2.1	3.5	3.7	5.8	8.5	-
0 ~ 20	-0.6	-0.2	0.7	1.0	1.1	1.8	2.4	3.9	4.1	6.3	9.1	-
20 ~ 40	-0.5	0.0	1.0	1.3	1.4	2.0	2.7	4.3	4.5	6.8	9.6	-
40 ~ 60	-0.2	0.2	1.2	1.6	1.7	2.3	3.0	4.6	4.8	7.3	10.3	-
60 ~ 80	-0.1	0.4	1.4	1.8	1.9	2.6	3.4	5.0	5.3	7.7	10.8	-
80 ~ 100	0.0	0.6	1.7	2.1	2.2	2.9	3.6	5.3	5.6	8.2	11.4	-
100 ~ 120	0.2	0.6	1.9	2.3	2.4	3.1	3.9	5.6	5.9	8.5	11.9	-
120 ~ 140	0.2	0.8	2.0	2.4	2.6	3.3	4.1	5.9	6.2	8.9	12.4	-
140 ~ 160	0.3	0.8	2.1	2.6	2.7	3.4	4.3	6.2	6.5	9.3	12.8	-
160 ~ 180	0.4	0.9	2.2	2.6	2.8	3.6	4.4	6.4	6.7	9.5	13.3	-

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	1.73
Specific Gravity d	4.20
Remarks	

OHARA 25-04

S-TIL 1

Code(d) 548458
Code(e) 551455

Table with 3 columns: Refractive Index (nd, ne), Abbe Number (vd, ve), and Dispersion (nF - nC, nF' - nC'). Values include 1.548 14, 45.79, 0.011 972, 1.550 984, 45.49, 0.012 112.

Refractive Indices table with columns for wavelength lambda (um) and refractive indices nd, ne. Values range from 1.517 97 to 1.579 59.

Partial Dispersions table with columns for wavelength and refractive indices for various points (nct, nca', nd-nC, etc.). Values range from 0.009 202 to 0.022 340.

Coloring table with columns for wavelength lambda (nm) and coloring values lambda_80, lambda_70, lambda_5, lambda_0.80, lambda_0.05. Values range from 370 to 341.

Thermal Properties table with columns for property name and value. Properties include Strain Point StP, Annealing Point AP, Transformation Temperature Tg, Yield Point At, Softening Point SP, Expansion Coefficients, and Thermal Conductivity lambda.

Constants of Dispersion Formula table with columns for coefficient name (A1, A2, A3, B1, B2, B3) and value. Values range from 1.250 889 44E+00 to 1.374 149 53E+02.

Relative Partial Dispersions table with columns for coefficient name (theta_C,t, theta_C,A', theta_d,C, etc.) and value. Values range from 0.298 1 to 1.844 5.

Internal Transmittance table with columns for wavelength lambda (nm) and transmittance tau_i (10 mm). Values range from 280 to 2 400 nm.

Linear coefficient of thermal expansion table with columns for temperature range (C) and alpha_i (10^-7 K^-1). Values range from -100 ~ -90 to 290 ~ 300 C.

Chemical Properties table with columns for property name (Water Resistance, Acid Resistance, etc.) and group value. Values range from 1 to 3.

Anomalous dispersion table with columns for coefficient name (Delta theta_C,t, Delta theta_C,A', etc.) and value. Values range from 0.001 1 to 0.014 6.

Mechanical Properties table with columns for property name (Young's Modulus E, Rigidity Modulus G, etc.) and value. Values range from 70.5 to 132.

Temperature Coefficients of Refractive Index table with columns for Range of Temperature (C) and coefficients (1550, t, r, C, C', d, e, F, F', g, h, i). Values range from -80 ~ -60 to 160 ~ 180 C.

Other Properties table with columns for property name (Photoelastic Constant beta, Specific Gravity d) and value. Values include 2.68 and 2.54.

OHARA 25-04

S-TIL 2

Code(d) 541472
Code(e) 543469

Refractive Index n_d	1.540 72	Abbe Number v_d	47.23	Dispersion $n_F - n_C$	0.011 449
Refractive Index n_e	1.540 720	Abbe Number v_e	46.94	Dispersion $n_F - n_C$	0.011 577

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.511 18
n_{1970}	1.970 09	1.516 26
n_{1530}	1.529 58	1.521 76
n_{1129}	1.128 64	1.526 72
n_t	1.013 98	1.528 41
n_s	0.852 11	1.531 39
$n_{A'}$	0.768 19	1.533 46
n_r	0.706 52	1.535 37
n_C	0.656 27	1.537 30
$n_{C'}$	0.643 85	1.537 84
$n_{\text{He-Ne}}$	0.632 8	1.538 35
n_D	0.589 29	1.540 62
n_d	0.587 56	1.540 72
n_e	0.546 07	1.543 44
n_F	0.486 13	1.548 75
$n_{F'}$	0.479 99	1.549 42
$n_{\text{He-Cd}}$	0.441 57	1.554 35
n_g	0.435 835	1.555 22
n_h	0.404 656	1.560 74
n_i	0.365 015	1.570 52

Constants of Dispersion Formula	
A_1	1.234 014 99E+00
A_2	9.597 968 33E-02
A_3	1.205 039 91E+00
B_1	8.695 078 01E-03
B_2	4.656 114 29E-02
B_3	1.379 533 01E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
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 (GPa)	69.9
Rigidity Modulus G (GPa)	28.6
Poisson's Ratio σ	0.220
Knoop Hardness Hk[Class]	500 5
Abrasion Aa	122

Partial Dispersions	
$n_C - n_t$	0.008 891
$n_C - n_{A'}$	0.003 839
$n_d - n_C$	0.003 423
$n_e - n_C$	0.006 143
$n_g - n_d$	0.014 496
$n_g - n_F$	0.006 470
$n_h - n_g$	0.005 521
$n_i - n_g$	0.015 308
$n_C - n_t$	0.009 432
$n_e - n_{C'}$	0.005 602
$n_{F'} - n_e$	0.005 975
$n_i - n_{F'}$	0.021 109

Relative Partial Dispersions	
$\theta_{C,t}$	0.776 6
$\theta_{C,A'}$	0.335 3
$\theta_{d,C}$	0.299 0
$\theta_{e,C}$	0.536 6
$\theta_{g,d}$	1.266 1
$\theta_{g,F}$	0.565 1
$\theta_{h,g}$	0.482 2
$\theta_{i,g}$	1.337 1
$\theta'_{C,t}$	0.814 7
$\theta'_{e,C'}$	0.483 9
$\theta'_{F',e}$	0.516 1
$\theta'_{i,F'}$	1.823 4

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 3
$\Delta\theta_{C,A'}$	0.002 2
$\Delta\theta_{g,d}$	-0.000 5
$\Delta\theta_{g,F}$	0.000 0
$\Delta\theta_{i,g}$	0.007 6

Coloring			
λ_{80}	370	λ_5	340
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	368	$\lambda_{0.05}$	340
CCI			
B	G	R	
0.00	0.40	0.38	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.04
350	0.32
360	0.66
370	0.84
380	0.925
390	0.962
400	0.979
420	0.990
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.998
1 000	0.997
1 200	0.997
1 400	0.997
1 600	0.995
1 800	0.987
2 000	0.970
2 200	0.942
2 400	0.917

Thermal Properties	
Strain Point StP (°C)	448
Annealing Point AP (°C)	484
Transformation Temperature Tg (°C)	498
Yield Point At (°C)	571
Softening Point SP (°C)	658
Expansion Coefficients (-30 °C ~ 70 °C)	82
α_I (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(m·K))	1.05

Linear coefficient of thermal expansion	
Temperature range (°C)	α_I (10 ⁻⁷ K ⁻¹)
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	69
-70 ~ -60	71
-60 ~ -50	72
-50 ~ -40	74
-40 ~ -30	75
-30 ~ -20	77
-20 ~ -10	78
-10 ~ 0	80
0 ~ 10	81
10 ~ 20	82
20 ~ 30	83
30 ~ 40	85
40 ~ 50	86
50 ~ 60	87
60 ~ 70	88
70 ~ 80	89
80 ~ 90	90
90 ~ 100	91
100 ~ 110	92
110 ~ 120	93
120 ~ 130	94
130 ~ 140	94
140 ~ 150	95
150 ~ 160	96
160 ~ 170	97
170 ~ 180	97
180 ~ 190	98
190 ~ 200	98
200 ~ 210	99
210 ~ 220	100
220 ~ 230	100
230 ~ 240	101
240 ~ 250	101
250 ~ 260	101
260 ~ 270	102
270 ~ 280	102
280 ~ 290	102
290 ~ 300	102

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.74
Specific Gravity d	2.52
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	1.1	1.2	1.5	1.6	1.7	1.8	2.0	2.3	2.3	2.8	3.2	4.2
-60 ~ -40	0.9	1.1	1.4	1.5	1.5	1.7	1.8	2.2	2.2	2.6	3.2	4.2
-40 ~ -20	0.9	1.0	1.4	1.4	1.5	1.6	1.8	2.1	2.2	2.6	3.2	4.2
-20 ~ 0	0.8	1.0	1.4	1.5	1.5	1.7	1.8	2.2	2.2	2.7	3.2	4.3
0 ~ 20	0.9	1.1	1.3	1.5	1.5	1.7	1.8	2.3	2.4	2.8	3.3	4.4
20 ~ 40	0.9	1.1	1.4	1.5	1.5	1.7	2.0	2.4	2.4	2.9	3.5	4.6
40 ~ 60	1.0	1.2	1.5	1.7	1.7	1.9	2.1	2.5	2.5	3.0	3.6	4.8
60 ~ 80	1.0	1.2	1.5	1.7	1.7	1.9	2.2	2.6	2.7	3.2	3.8	5.0
80 ~ 100	1.1	1.3	1.6	1.8	1.8	2.0	2.2	2.7	2.8	3.3	3.9	5.2
100 ~ 120	1.2	1.3	1.7	1.8	1.9	2.1	2.3	2.8	2.8	3.4	4.1	5.3
120 ~ 140	1.2	1.3	1.8	2.0	2.0	2.2	2.4	2.9	2.9	3.5	4.2	5.5
140 ~ 160	1.3	1.4	1.8	2.0	2.0	2.2	2.4	2.9	3.0	3.6	4.2	5.6
160 ~ 180	1.2	1.4	1.8	2.0	2.0	2.2	2.4	2.9	3.0	3.6	4.3	5.8

OHARA 25-04

S-TIL 6

Code(d) 532489
Code(e) 534485

Refractive Index n_d	1.531 72 1.531 717	Abbe Number v_d	48.84	Dispersion $n_F - n_C$	0.010 887
Refractive Index n_e	1.534 304	Abbe Number v_e	48.55	Dispersion $n_{F'} - n_{C'}$	0.011 006

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.502 92
n_{1970}	1.970 09	1.507 97
n_{1530}	1.529 58	1.513 42
n_{1129}	1.128 64	1.518 29
n_t	1.013 98	1.519 93
n_s	0.852 11	1.522 80
$n_{A'}$	0.768 19	1.524 79
n_T	0.706 52	1.526 62
n_C	0.656 27	1.528 46
$n_{C'}$	0.643 85	1.528 97
$n_{\text{He-Ne}}$	0.632 8	1.529 46
n_D	0.589 29	1.531 62
n_d	0.587 56	1.531 72
n_e	0.546 07	1.534 30
n_F	0.486 13	1.539 34
$n_{F'}$	0.479 99	1.539 98
$n_{\text{He-Cd}}$	0.441 57	1.544 65
n_g	0.435 835	1.545 47
n_h	0.404 656	1.550 69
n_i	0.365 015	1.559 89

Constants of Dispersion Formula	
A_1	1.177 017 77E+00
A_2	1.279 580 30E-01
A_3	1.347 401 24E+00
B_1	7.710 876 86E-03
B_2	4.113 253 28E-02
B_3	1.545 316 92E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	3
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group WS	2~3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Mechanical Properties	
Young's Modulus E (GPa)	64.8
Rigidity Modulus G (GPa)	28.3
Poisson's Ratio σ	0.146
Knoop Hardness Hk[Class]	490 5
Abrasion Aa	121

Partial Dispersions	
$n_C - n_t$	0.008 529
$n_C - n_{A'}$	0.003 667
$n_d - n_C$	0.003 261
$n_e - n_C$	0.005 848
$n_g - n_d$	0.013 756
$n_g - n_F$	0.006 130
$n_h - n_g$	0.005 216
$n_i - n_g$	0.014 418
$n_{C'} - n_t$	0.009 045
$n_e - n_{C'}$	0.005 332
$n_{F'} - n_e$	0.005 674
$n_i - n_{F'}$	0.019 913

Relative Partial Dispersions	
$\theta_{C,t}$	0.783 4
$\theta_{C,A'}$	0.336 8
$\theta_{d,C}$	0.299 5
$\theta_{e,C}$	0.537 2
$\theta_{g,d}$	1.263 5
$\theta_{g,F}$	0.563 1
$\theta_{h,g}$	0.479 1
$\theta_{i,g}$	1.324 3
$\theta'_{C,t}$	0.821 8
$\theta'_{e,C'}$	0.484 5
$\theta'_{F',e}$	0.515 5
$\theta'_{i,F'}$	1.809 3

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 6
$\Delta\theta_{C,A'}$	0.001 7
$\Delta\theta_{g,d}$	0.000 2
$\Delta\theta_{g,F}$	0.000 7
$\Delta\theta_{i,g}$	0.008 2

Coloring			
λ_{80}	365	λ_5	335
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	364	$\lambda_{0.05}$	339
CCI			
B	G	R	
0.00	0.28	0.24	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	0.07
350	0.44
360	0.74
370	0.88
380	0.948
390	0.973
400	0.985
420	0.990
440	0.989
460	0.990
480	0.991
500	0.993
550	0.994
600	0.994
650	0.992
700	0.996
800	0.998
900	0.997
1 000	0.997
1 200	0.996
1 400	0.995
1 600	0.993
1 800	0.977
2 000	0.947
2 200	0.89
2 400	0.85

Thermal Properties	
Strain Point StP (°C)	438
Annealing Point AP (°C)	468
Transformation Temperature Tg (°C)	478
Yield Point At (°C)	552
Softening Point SP (°C)	648
Expansion Coefficients (-30 °C ~ 70 °C)	83
α_i (10^{-7} K^{-1}) (100 °C ~ 300 °C)	101
Thermal Conductivity λ (W/(mK))	1.06

Linear coefficient of thermal expansion	
Temperature range (°C)	α_i (10^{-7} K^{-1})
-100 ~ -90	67
-90 ~ -80	69
-80 ~ -70	71
-70 ~ -60	72
-60 ~ -50	74
-50 ~ -40	75
-40 ~ -30	77
-30 ~ -20	78
-20 ~ -10	80
-10 ~ 0	81
0 ~ 10	83
10 ~ 20	84
20 ~ 30	85
30 ~ 40	87
40 ~ 50	88
50 ~ 60	89
60 ~ 70	90
70 ~ 80	91
80 ~ 90	92
90 ~ 100	93
100 ~ 110	94
110 ~ 120	95
120 ~ 130	96
130 ~ 140	97
140 ~ 150	98
150 ~ 160	98
160 ~ 170	99
170 ~ 180	100
180 ~ 190	100
190 ~ 200	101
200 ~ 210	102
210 ~ 220	102
220 ~ 230	103
230 ~ 240	103
240 ~ 250	103
250 ~ 260	104
260 ~ 270	104
270 ~ 280	104
280 ~ 290	105
290 ~ 300	105

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	1.0	1.1	1.4	1.5	1.5	1.7	1.8	2.1	2.1	2.5	3.0	3.8
-60 ~ -40	0.8	0.9	1.3	1.4	1.4	1.5	1.7	2.0	2.0	2.4	2.8	3.8
-40 ~ -20	0.7	0.8	1.2	1.3	1.3	1.5	1.6	1.9	2.0	2.4	2.8	3.8
-20 ~ 0	0.7	0.8	1.2	1.3	1.3	1.5	1.6	2.0	2.0	2.4	2.9	3.9
0 ~ 20	0.7	0.9	1.2	1.3	1.3	1.4	1.6	2.0	2.0	2.6	3.0	4.0
20 ~ 40	0.8	0.9	1.2	1.3	1.3	1.5	1.7	2.2	2.2	2.7	3.1	4.1
40 ~ 60	0.9	1.0	1.3	1.4	1.5	1.7	1.8	2.2	2.3	2.7	3.2	4.3
60 ~ 80	0.8	1.0	1.3	1.4	1.5	1.7	2.0	2.3	2.4	2.9	3.4	4.5
80 ~ 100	0.9	1.1	1.4	1.5	1.6	1.8	1.9	2.4	2.4	3.0	3.6	4.6
100 ~ 120	0.9	1.1	1.5	1.6	1.6	1.8	2.0	2.4	2.5	3.1	3.7	4.8
120 ~ 140	1.0	1.1	1.6	1.6	1.7	2.0	2.2	2.6	2.7	3.2	3.8	4.9
140 ~ 160	1.0	1.2	1.6	1.7	1.8	2.0	2.2	2.6	2.7	3.2	3.8	5.0
160 ~ 180	1.0	1.2	1.6	1.7	1.8	2.0	2.2	2.7	2.7	3.3	3.9	5.1

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.81
Specific Gravity d	2.50
Remarks	

OHARA 25-04

S-TIL25

Code(d) **581407**
Code(e) **585405**

Refractive Index n_d	1.581 44 1.581 439	Abbe Number v_d	40.75	Dispersion $n_F - n_C$	0.014 270
Refractive Index n_e	1.584 822	Abbe Number v_e	40.47	Dispersion $n_{F'} - n_{C'}$	0.014 451

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.547 41
n_{1970}	1.970 09	1.552 92
n_{1530}	1.529 58	1.558 95
n_{1129}	1.128 64	1.564 56
n_t	1.013 98	1.566 51
n_s	0.852 11	1.570 05
$n_{A'}$	0.768 19	1.572 54
n_r	0.706 52	1.574 86
n_C	0.656 27	1.577 22
$n_{C'}$	0.643 85	1.577 88
$n_{\text{He-Ne}}$	0.632 8	1.578 50
n_D	0.589 29	1.581 31
n_d	0.587 56	1.581 44
n_e	0.546 07	1.584 82
n_F	0.486 13	1.591 49
$n_{F'}$	0.479 99	1.592 33
$n_{\text{He-Cd}}$	0.441 57	1.598 61
n_g	0.435 835	1.599 73
n_h	0.404 656	1.606 87
n_i	0.365 015	1.619 79

Constants of Dispersion Formula	
A_1	1.321 225 34E+00
A_2	1.238 249 76E-01
A_3	1.436 852 54E+00
B_1	9.520 914 36E-03
B_2	5.160 626 65E-02
B_3	1.490 648 83E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	75.3
Rigidity Modulus G (GPa)	30.9
Poisson's Ratio σ	0.220
Knoop Hardness Hk[Class]	540 5
Abrasion Aa	117

Partial Dispersions	
$n_C - n_t$	0.010 703
$n_C - n_{A'}$	0.004 679
$n_d - n_C$	0.004 223
$n_e - n_C$	0.007 606
$n_g - n_d$	0.018 287
$n_g - n_F$	0.008 240
$n_h - n_g$	0.007 140
$n_i - n_g$	0.020 066
$n_C - n_t$	0.011 368
$n_e - n_{C'}$	0.006 941
$n_{F'} - n_e$	0.007 510
$n_i - n_{F'}$	0.027 460

Relative Partial Dispersions	
$\theta_{C,t}$	0.750 0
$\theta_{C,A'}$	0.327 9
$\theta_{d,C}$	0.295 9
$\theta_{e,C}$	0.533 0
$\theta_{g,d}$	1.281 5
$\theta_{g,F}$	0.577 4
$\theta_{h,g}$	0.500 4
$\theta_{i,g}$	1.406 2
$\theta'_{C,t}$	0.786 7
$\theta'_{e,C'}$	0.480 3
$\theta'_{F',e}$	0.519 7
$\theta'_{i,F'}$	1.900 2

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.012 1
$\Delta\theta_{C,A'}$	0.002 7
$\Delta\theta_{g,d}$	0.001 4
$\Delta\theta_{g,F}$	0.001 9
$\Delta\theta_{i,g}$	0.022 4

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	351
CCI			
B	G	R	
0.00	0.73	0.73	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.28
370	0.65
380	0.85
390	0.929
400	0.964
420	0.986
440	0.991
460	0.993
480	0.994
500	0.995
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.999
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.994
1 800	0.981
2 000	0.963
2 200	0.911
2 400	0.89

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	536
Annealing Point AP ($^{\circ}\text{C}$)	564
Transformation Temperature Tg ($^{\circ}\text{C}$)	590
Yield Point At ($^{\circ}\text{C}$)	631
Softening Point SP ($^{\circ}\text{C}$)	715
Expansion Coefficients ($-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$)	75
α_l (10^{-7}K^{-1}) ($100^{\circ}\text{C} \sim 300^{\circ}\text{C}$)	90
Thermal Conductivity λ (W/(mK))	1.05

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	62
-80 ~ -70	63
-70 ~ -60	65
-60 ~ -50	66
-50 ~ -40	68
-40 ~ -30	69
-30 ~ -20	70
-20 ~ -10	71
-10 ~ 0	73
0 ~ 10	74
10 ~ 20	75
20 ~ 30	76
30 ~ 40	77
40 ~ 50	78
50 ~ 60	79
60 ~ 70	80
70 ~ 80	81
80 ~ 90	82
90 ~ 100	83
100 ~ 110	84
110 ~ 120	85
120 ~ 130	85
130 ~ 140	86
140 ~ 150	87
150 ~ 160	88
160 ~ 170	88
170 ~ 180	89
180 ~ 190	89
190 ~ 200	90
200 ~ 210	91
210 ~ 220	91
220 ~ 230	91
230 ~ 240	92
240 ~ 250	92
250 ~ 260	93
260 ~ 270	93
270 ~ 280	93
280 ~ 290	94
290 ~ 300	94

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	2.84
Specific Gravity d	2.59
Remarks	

Temperature Coefficients of Refractive Index													
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6}K^{-1})												
	1550	t	r	C	C'	d	e	F	F'	g	h	i	i
-80 ~ -60	2.2	2.3	2.6	2.8	2.8	3.0	3.2	3.6	3.6	4.2	4.8	6.0	6.0
-60 ~ -40	2.0	2.1	2.4	2.6	2.6	2.8	3.1	3.5	3.5	4.0	4.6	6.0	6.0
-40 ~ -20	1.9	2.0	2.4	2.5	2.5	2.8	3.0	3.4	3.5	4.1	4.7	6.1	6.1
-20 ~ 0	1.9	2.0	2.4	2.5	2.5	2.7	2.9	3.5	3.6	4.1	4.8	6.2	6.2
0 ~ 20	1.8	2.1	2.5	2.6	2.6	2.9	3.1	3.5	3.6	4.2	4.9	6.5	6.5
20 ~ 40	1.9	2.1	2.5	2.7	2.7	2.9	3.2	3.6	3.7	4.3	5.0	6.7	6.7
40 ~ 60	2.0	2.2	2.6	2.7	2.8	3.0	3.2	3.7	3.8	4.5	5.3	6.9	6.9
60 ~ 80	2.0	2.3	2.7	2.9	2.9	3.1	3.4	3.9	4.0	4.7	5.4	7.1	7.1
80 ~ 100	2.1	2.3	2.8	3.0	3.0	3.2	3.5	4.0	4.1	4.8	5.6	7.3	7.3
100 ~ 120	2.1	2.3	2.8	3.0	3.1	3.3	3.6	4.2	4.3	5.0	5.8	7.6	7.6
120 ~ 140	2.3	2.5	2.9	3.1	3.1	3.4	3.7	4.3	4.4	5.1	6.0	7.8	7.8
140 ~ 160	2.3	2.5	3.0	3.1	3.2	3.5	3.7	4.4	4.4	5.2	6.1	8.0	8.0
160 ~ 180	2.2	2.5	3.0	3.2	3.2	3.5	3.8	4.5	4.6	5.4	6.3	8.2	8.2

OHARA 25-04

S-TIL26

Code(d) 567428
Code(e) 570425

Refractive Index n_d 1.567 32 1.567 322	Abbe Number v_d 42.82	Dispersion $n_F - n_C$ 0.013 250
Refractive Index n_e 1.570 466	Abbe Number v_e 42.54	Dispersion $n_{F'} - n_{C'}$ 0.013 411

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.534 93
n_{1970}	1.970 09	1.540 28
n_{1530}	1.529 58	1.546 11
n_{1129}	1.128 64	1.551 48
n_t	1.013 98	1.553 33
n_s	0.852 11	1.556 67
$n_{A'}$	0.768 19	1.559 01
n_T	0.706 52	1.561 19
n_C	0.656 27	1.563 39
$n_{C'}$	0.643 85	1.564 01
n_{He-Ne}	0.632 8	1.564 59
n_D	0.589 29	1.567 21
n_d	0.587 56	1.567 32
n_e	0.546 07	1.570 47
n_F	0.486 13	1.576 64
$n_{F'}$	0.479 99	1.577 42
n_{He-Cd}	0.441 57	1.583 21
n_g	0.435 835	1.584 23
n_h	0.404 656	1.590 77
n_i	0.365 015	1.602 56

Constants of Dispersion Formula	
A_1	1.310 664 88E+00
A_2	9.419 030 94E-02
A_3	1.232 926 44E+00
B_1	9.688 978 12E-03
B_2	5.277 631 06E-02
B_3	1.332 964 22E+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 (GPa)	73.9
Rigidity Modulus G (GPa)	30.2
Poisson's Ratio σ	0.222
Knoop Hardness Hk[Class]	500 5
Abrasion Aa	120

Partial Dispersions	
$n_C - n_t$	0.010 055
$n_C - n_{A'}$	0.004 379
$n_d - n_C$	0.003 936
$n_e - n_C$	0.007 080
$n_g - n_d$	0.016 907
$n_g - n_F$	0.007 593
$n_h - n_g$	0.006 546
$n_i - n_g$	0.018 329
$n_C - n_t$	0.010 676
$n_e - n_{C'}$	0.006 459
$n_{F'} - n_e$	0.006 952
$n_i - n_{F'}$	0.025 140

Relative Partial Dispersions	
$\theta_{C,t}$	0.758 9
$\theta_{C,A'}$	0.330 5
$\theta_{d,C}$	0.297 1
$\theta_{e,C}$	0.534 3
$\theta_{g,d}$	1.276 0
$\theta_{g,F}$	0.573 1
$\theta_{h,g}$	0.494 0
$\theta_{i,g}$	1.383 3
$\theta'_{C,t}$	0.796 1
$\theta'_{e,C'}$	0.481 6
$\theta'_{F,e}$	0.518 4
$\theta'_{i,F'}$	1.874 6

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.011 3
$\Delta\theta_{C,A'}$	0.002 7
$\Delta\theta_{g,d}$	0.000 2
$\Delta\theta_{g,F}$	0.000 9
$\Delta\theta_{i,g}$	0.016 8

Coloring			
λ_{80}	380	λ_5	345
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	349
CCI			
B	G	R	
0.00	0.56	0.54	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.07
360	0.44
370	0.74
380	0.88
390	0.945
400	0.971
420	0.989
440	0.993
460	0.995
480	0.995
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.993
1 800	0.977
2 000	0.950
2 200	0.89
2 400	0.86

Thermal Properties	
Strain Point StP (°C)	495
Annealing Point AP (°C)	533
Transformation Temperature Tg (°C)	556
Yield Point At (°C)	616
Softening Point SP (°C)	694
Expansion Coefficients (-30 °C ~ 70 °C)	78
α_I (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	95
Thermal Conductivity λ (W/(mK))	1.05

Linear coefficient of thermal expansion	
Temperature range (°C)	α_I (10 ⁻⁷ K ⁻¹)
-100 ~ -90	62
-90 ~ -80	63
-80 ~ -70	65
-70 ~ -60	67
-60 ~ -50	68
-50 ~ -40	70
-40 ~ -30	71
-30 ~ -20	73
-20 ~ -10	74
-10 ~ 0	75
0 ~ 10	77
10 ~ 20	78
20 ~ 30	79
30 ~ 40	80
40 ~ 50	82
50 ~ 60	83
60 ~ 70	84
70 ~ 80	85
80 ~ 90	86
90 ~ 100	87
100 ~ 110	88
110 ~ 120	89
120 ~ 130	90
130 ~ 140	91
140 ~ 150	91
150 ~ 160	92
160 ~ 170	93
170 ~ 180	94
180 ~ 190	94
190 ~ 200	95
200 ~ 210	95
210 ~ 220	96
220 ~ 230	96
230 ~ 240	97
240 ~ 250	97
250 ~ 260	98
260 ~ 270	98
270 ~ 280	98
280 ~ 290	99
290 ~ 300	99

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.75
Specific Gravity d	2.57
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	1.8	1.9	2.2	2.3	2.3	2.5	2.7	3.1	3.1	3.6	4.2	5.4
-60 ~ -40	1.7	1.8	2.1	2.2	2.2	2.4	2.6	3.1	3.1	3.6	4.2	5.5
-40 ~ -20	1.6	1.8	2.1	2.2	2.2	2.4	2.6	3.1	3.2	3.7	4.3	5.6
-20 ~ 0	1.6	1.8	2.1	2.3	2.3	2.5	2.7	3.1	3.2	3.8	4.5	5.8
0 ~ 20	1.6	1.8	2.3	2.4	2.4	2.6	2.8	3.3	3.4	3.9	4.6	6.0
20 ~ 40	1.7	1.9	2.4	2.5	2.5	2.7	3.0	3.4	3.5	4.1	4.8	6.3
40 ~ 60	1.9	2.0	2.4	2.6	2.6	2.8	3.1	3.6	3.6	4.3	5.0	6.6
60 ~ 80	1.9	2.0	2.6	2.7	2.7	3.0	3.2	3.7	3.8	4.5	5.2	6.8
80 ~ 100	1.9	2.1	2.6	2.7	2.8	3.1	3.3	3.9	4.0	4.7	5.4	7.1
100 ~ 120	2.0	2.2	2.6	2.8	2.8	3.2	3.4	4.0	4.1	4.8	5.6	7.4
120 ~ 140	2.0	2.3	2.8	2.9	3.0	3.2	3.5	4.1	4.2	4.9	5.7	7.6
140 ~ 160	2.1	2.3	2.8	2.9	3.0	3.3	3.5	4.1	4.2	5.0	5.9	7.8
160 ~ 180	2.0	2.3	2.8	2.9	3.0	3.3	3.5	4.2	4.3	5.2	6.0	8.0



Refractive Index n_d	1.575 01 1.575 006	Abbe Number v_d	41.50	Dispersion $n_F - n_C$	0.013 854
Refractive Index n_e	1.578 291	Abbe Number v_e	41.22	Dispersion $n_{F'} - n_{C'}$	0.014 028

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.541 62
n_{1970}	1.970 09	1.547 07
n_{1530}	1.529 58	1.553 04
n_{1129}	1.128 64	1.558 55
n_t	1.013 98	1.560 47
n_s	0.852 11	1.563 92
$n_{A'}$	0.768 19	1.566 35
n_r	0.706 52	1.568 61
n_C	0.656 27	1.570 90
$n_{C'}$	0.643 85	1.571 55
$n_{\text{He-Ne}}$	0.632 8	1.572 16
n_D	0.589 29	1.574 88
n_d	0.587 56	1.575 01
n_e	0.546 07	1.578 29
n_F	0.486 13	1.584 76
$n_{F'}$	0.479 99	1.585 58
$n_{\text{He-Cd}}$	0.441 57	1.591 67
n_g	0.435 835	1.592 75
n_h	0.404 656	1.599 66
n_i	0.365 015	1.612 18

Constants of Dispersion Formula	
A_1	1.314 331 54E+00
A_2	1.123 001 68E-01
A_3	1.413 901 00E+00
B_1	9.504 044 77E-03
B_2	5.241 127 72E-02
B_3	1.484 299 72E+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 (GPa)	74.9
Rigidity Modulus G (GPa)	30.8
Poisson's Ratio σ	0.217
Knoop Hardness Hk[Class]	540 5
Abrasion Aa	125

Partial Dispersions	
$n_C - n_t$	0.010 433
$n_C - n_{A'}$	0.004 553
$n_d - n_C$	0.004 104
$n_e - n_C$	0.007 389
$n_g - n_d$	0.017 739
$n_g - n_F$	0.007 989
$n_h - n_g$	0.006 918
$n_i - n_g$	0.019 440
$n_{C'} - n_t$	0.011 080
$n_e - n_{C'}$	0.006 742
$n_{F'} - n_e$	0.007 286
$n_i - n_{F'}$	0.026 608

Relative Partial Dispersions	
$\theta_{C,t}$	0.753 1
$\theta_{C,A'}$	0.328 6
$\theta_{d,C}$	0.296 2
$\theta_{e,C}$	0.533 3
$\theta_{g,d}$	1.280 4
$\theta_{g,F}$	0.576 7
$\theta_{h,g}$	0.499 4
$\theta_{i,g}$	1.403 2
$\theta'_{C,t}$	0.789 8
$\theta'_{e,C'}$	0.480 6
$\theta'_{F,e}$	0.519 4
$\theta'_{i,F'}$	1.896 8

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.011 7
$\Delta\theta_{C,A'}$	0.002 4
$\Delta\theta_{g,d}$	0.001 9
$\Delta\theta_{g,F}$	0.002 4
$\Delta\theta_{i,g}$	0.025 7

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	371	$\lambda_{0.05}$	350
CCI			
B	G	R	
0.00	0.45	0.47	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.05
360	0.44
370	0.78
380	0.913
390	0.961
400	0.979
420	0.990
440	0.993
460	0.994
480	0.995
500	0.996
550	0.998
600	0.998
650	0.998
700	0.998
800	0.999
900	0.999
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.993
1 800	0.978
2 000	0.955
2 200	0.89
2 400	0.87

Thermal Properties	
Strain Point StP (°C)	511
Annealing Point AP (°C)	547
Transformation Temperature Tg (°C)	566
Yield Point At (°C)	623
Softening Point SP (°C)	700
Expansion Coefficients (-30 °C ~ 70 °C)	76
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	91
Thermal Conductivity λ (W/(m·K))	1.07

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	61
-90 ~ -80	62
-80 ~ -70	64
-70 ~ -60	65
-60 ~ -50	67
-50 ~ -40	68
-40 ~ -30	69
-30 ~ -20	71
-20 ~ -10	72
-10 ~ 0	73
0 ~ 10	75
10 ~ 20	76
20 ~ 30	77
30 ~ 40	78
40 ~ 50	79
50 ~ 60	80
60 ~ 70	81
70 ~ 80	82
80 ~ 90	83
90 ~ 100	84
100 ~ 110	85
110 ~ 120	86
120 ~ 130	87
130 ~ 140	87
140 ~ 150	88
150 ~ 160	89
160 ~ 170	90
170 ~ 180	90
180 ~ 190	91
190 ~ 200	92
200 ~ 210	92
210 ~ 220	93
220 ~ 230	93
230 ~ 240	94
240 ~ 250	94
250 ~ 260	95
260 ~ 270	95
270 ~ 280	95
280 ~ 290	96
290 ~ 300	96

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	1.7	1.8	2.1	2.3	2.3	2.6	2.7	3.1	3.2	3.7	4.4	5.6
-60 ~ -40	1.6	1.8	2.1	2.2	2.2	2.4	2.7	3.1	3.2	3.7	4.3	5.8
-40 ~ -20	1.6	1.8	2.1	2.2	2.2	2.4	2.6	3.2	3.2	3.8	4.4	5.8
-20 ~ 0	1.6	1.8	2.1	2.3	2.3	2.5	2.7	3.3	3.3	3.9	4.6	6.0
0 ~ 20	1.6	1.8	2.3	2.4	2.4	2.7	2.9	3.4	3.4	4.0	4.7	6.3
20 ~ 40	1.7	1.9	2.4	2.5	2.6	2.8	3.0	3.5	3.6	4.2	4.9	6.6
40 ~ 60	1.8	2.0	2.4	2.6	2.6	2.8	3.1	3.6	3.7	4.3	5.2	6.8
60 ~ 80	1.9	2.1	2.6	2.7	2.8	3.0	3.2	3.8	3.8	4.5	5.3	7.0
80 ~ 100	1.9	2.1	2.6	2.8	2.8	3.1	3.4	3.9	4.0	4.7	5.5	7.2
100 ~ 120	2.0	2.2	2.6	2.8	2.8	3.2	3.4	4.0	4.1	4.8	5.6	7.4
120 ~ 140	2.0	2.3	2.7	2.9	2.9	3.2	3.5	4.1	4.1	4.9	5.7	7.6
140 ~ 160	2.0	2.2	2.7	2.9	2.9	3.2	3.5	4.1	4.2	5.0	5.8	7.8
160 ~ 180	1.9	2.2	2.7	2.8	2.9	3.2	3.4	4.1	4.3	5.1	5.9	7.9

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.81
Specific Gravity d	2.58
Remarks	

S-TIM 2

Code(d) 620363
Code(e) 624360

Refractive Index n_d	1.620 04 1.620 041	Abbe Number v_d	36.26	Dispersion $n_F - n_C$	0.017 099
Refractive Index n_e	1.624 088	Abbe Number v_e	35.99	Dispersion $n_{F'} - n_{C'}$	0.017 339

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.582 40
n_{1970}	1.970 09	1.588 06
n_{1530}	1.529 58	1.594 35
n_{1129}	1.128 64	1.600 41
n_t	1.013 98	1.602 60
n_s	0.852 11	1.606 63
$n_{A'}$	0.768 19	1.609 52
n_r	0.706 52	1.612 25
n_C	0.656 27	1.615 02
$n_{C'}$	0.643 85	1.615 81
$n_{\text{He-Ne}}$	0.632 8	1.616 55
n_D	0.589 29	1.619 89
n_d	0.587 56	1.620 04
n_e	0.546 07	1.624 09
n_F	0.486 13	1.632 12
$n_{F'}$	0.479 99	1.633 15
$n_{\text{He-Cd}}$	0.441 57	1.640 81
n_g	0.435 835	1.642 18
n_h	0.404 656	1.651 00
n_i	0.365 015	1.667 28

Constants of Dispersion Formula	
A_1	1.421 938 46E+00
A_2	1.338 279 68E-01
A_3	1.450 605 74E+00
B_1	1.072 915 11E-02
B_2	5.725 875 46E-02
B_3	1.453 818 05E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	77.6
Rigidity Modulus G (GPa)	31.5
Poisson's Ratio σ	0.230
Knoop Hardness Hk[Class]	540 5
Abrasion Aa	141

Partial Dispersions	
$n_C - n_t$	0.012 426
$n_C - n_{A'}$	0.005 500
$n_d - n_C$	0.005 017
$n_e - n_C$	0.009 064
$n_g - n_d$	0.022 135
$n_g - n_F$	0.010 053
$n_h - n_g$	0.008 822
$n_i - n_g$	0.025 105
$n_{C'} - n_t$	0.013 213
$n_e - n_{C'}$	0.008 277
$n_{F'} - n_e$	0.009 062
$n_i - n_{F'}$	0.034 131

Relative Partial Dispersions	
$\theta_{C,t}$	0.726 7
$\theta_{C,A'}$	0.321 7
$\theta_{d,C}$	0.293 4
$\theta_{e,C}$	0.530 1
$\theta_{g,d}$	1.294 5
$\theta_{g,F}$	0.587 9
$\theta_{h,g}$	0.515 9
$\theta_{i,g}$	1.468 2
$\theta'_{C,t}$	0.762 0
$\theta'_{e,C'}$	0.477 4
$\theta'_{F,e}$	0.522 6
$\theta'_{i,F'}$	1.968 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.009 9
$\Delta\theta_{C,A'}$	0.001 9
$\Delta\theta_{g,d}$	0.005 1
$\Delta\theta_{g,F}$	0.005 1
$\Delta\theta_{i,g}$	0.046 8

Coloring			
λ_{80}	390	λ_5	355
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	359
CCI			
B	G	R	
0.00	1.20	1.19	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.08
370	0.44
380	0.73
390	0.87
400	0.942
420	0.978
440	0.987
460	0.990
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.997
800	0.999
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.995
1 800	0.984
2 000	0.971
2 200	0.930
2 400	0.914

Thermal Properties	
Strain Point StP (°C)	551
Annealing Point AP (°C)	576
Transformation Temperature Tg (°C)	599
Yield Point At (°C)	640
Softening Point SP (°C)	703
Expansion Coefficients (-30 °C ~ 70 °C)	84
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	101
Thermal Conductivity λ (W/(m·K))	1.04

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	65
-90 ~ -80	67
-80 ~ -70	69
-70 ~ -60	71
-60 ~ -50	73
-50 ~ -40	75
-40 ~ -30	76
-30 ~ -20	78
-20 ~ -10	79
-10 ~ 0	81
0 ~ 10	83
10 ~ 20	84
20 ~ 30	85
30 ~ 40	87
40 ~ 50	88
50 ~ 60	89
60 ~ 70	91
70 ~ 80	92
80 ~ 90	93
90 ~ 100	94
100 ~ 110	95
110 ~ 120	96
120 ~ 130	97
130 ~ 140	98
140 ~ 150	99
150 ~ 160	99
160 ~ 170	100
170 ~ 180	101
180 ~ 190	101
190 ~ 200	102
200 ~ 210	102
210 ~ 220	103
220 ~ 230	103
230 ~ 240	104
240 ~ 250	104
250 ~ 260	104
260 ~ 270	104
270 ~ 280	105
280 ~ 290	105
290 ~ 300	105

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	1.0	1.2	1.6	1.7	1.7	1.9	2.2	2.7	2.8	3.5	4.3	6.1
-60 ~ -40	0.9	1.0	1.5	1.6	1.7	1.9	2.1	2.7	2.8	3.5	4.3	6.3
-40 ~ -20	0.8	1.0	1.5	1.6	1.7	1.9	2.1	2.7	2.8	3.6	4.4	6.4
-20 ~ 0	0.9	1.1	1.6	1.7	1.8	2.0	2.2	2.8	2.9	3.7	4.5	6.7
0 ~ 20	1.0	1.2	1.6	1.7	1.8	2.0	2.3	2.9	3.0	3.9	4.8	7.0
20 ~ 40	1.0	1.2	1.7	1.9	1.9	2.2	2.4	3.1	3.2	4.1	5.0	7.3
40 ~ 60	1.1	1.3	1.8	1.9	2.0	2.3	2.6	3.3	3.4	4.2	5.2	7.6
60 ~ 80	1.2	1.4	1.9	2.1	2.1	2.4	2.7	3.4	3.5	4.4	5.4	7.9
80 ~ 100	1.2	1.5	2.0	2.1	2.2	2.5	2.8	3.5	3.6	4.5	5.6	8.1
100 ~ 120	1.3	1.5	2.0	2.2	2.3	2.6	2.9	3.6	3.7	4.7	5.8	8.4
120 ~ 140	1.3	1.5	2.1	2.2	2.3	2.6	3.0	3.7	3.8	4.8	6.0	8.7
140 ~ 160	1.2	1.5	2.0	2.2	2.3	2.6	3.0	3.7	3.8	4.9	6.1	8.9
160 ~ 180	1.1	1.4	2.1	2.3	2.4	2.7	3.0	3.8	3.9	5.0	6.2	9.1

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.86
Specific Gravity d	2.69
Remarks	

OHARA 25-04

S-TIM 5

Code(d) 603380
Code(e) 607378

Refractive Index n_d	1.603 42 1.603 420	Abbe Number v_d	38.03	Dispersion $n_F - n_C$	0.015 868
Refractive Index n_e	1.607 179	Abbe Number v_e	37.76	Dispersion $n_{F'} - n_{C'}$	0.016 082

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.567 53
n_{1970}	1.970 09	1.573 06
n_{1530}	1.529 58	1.579 18
n_{1129}	1.128 64	1.585 00
n_t	1.013 98	1.587 08
n_s	0.852 11	1.590 89
$n_{A'}$	0.768 19	1.593 60
n_r	0.706 52	1.596 15
n_C	0.656 27	1.598 75
$n_{C'}$	0.643 85	1.599 48
$n_{\text{He-Ne}}$	0.632 8	1.600 17
n_D	0.589 29	1.603 28
n_d	0.587 56	1.603 42
n_e	0.546 07	1.607 18
n_F	0.486 13	1.614 62
$n_{F'}$	0.479 99	1.615 56
$n_{\text{He-Cd}}$	0.441 57	1.622 62
n_g	0.435 835	1.623 88
n_h	0.404 656	1.631 96
n_i	0.365 015	1.646 76

Constants of Dispersion Formula	
A_1	1.385 313 42E+00
A_2	1.223 729 45E-01
A_3	1.405 083 26E+00
B_1	1.040 745 67E-02
B_2	5.574 400 88E-02
B_3	1.448 787 33E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
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	1.2

Mechanical Properties	
Young's Modulus E (GPa)	76.3
Rigidity Modulus G (GPa)	30.9
Poisson's Ratio σ	0.233
Knoop Hardness Hk[Class]	540 5
Abrasion Aa	131

Partial Dispersions	
$n_C - n_t$	0.011 667
$n_C - n_{A'}$	0.005 143
$n_d - n_C$	0.004 672
$n_e - n_C$	0.008 431
$n_g - n_d$	0.020 455
$n_g - n_F$	0.009 259
$n_h - n_g$	0.008 081
$n_i - n_g$	0.022 880
$n_C - n_t$	0.012 401
$n_e - n_{C'}$	0.007 697
$n_{F'} - n_e$	0.008 385
$n_i - n_{F'}$	0.031 191

Relative Partial Dispersions	
$\theta_{C,t}$	0.735 3
$\theta_{C,A'}$	0.324 1
$\theta_{d,C}$	0.294 4
$\theta_{e,C}$	0.531 3
$\theta_{g,d}$	1.289 1
$\theta_{g,F}$	0.583 5
$\theta_{h,g}$	0.509 3
$\theta_{i,g}$	1.441 9
$\theta'_{C,t}$	0.771 1
$\theta'_{e,C'}$	0.478 6
$\theta'_{F,e}$	0.521 4
$\theta'_{i,F'}$	1.939 5

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.010 2
$\Delta\theta_{C,A'}$	0.002 2
$\Delta\theta_{g,d}$	0.003 4
$\Delta\theta_{g,F}$	0.003 6
$\Delta\theta_{i,g}$	0.035 3

Coloring			
λ_{80}	385	λ_5	350
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	357
CCI			
B	G	R	
0.00	0.79	0.81	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.19
370	0.60
380	0.84
390	0.931
400	0.963
420	0.984
440	0.989
460	0.991
480	0.993
500	0.995
550	0.997
600	0.997
650	0.997
700	0.997
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.994
1 600	0.994
1 800	0.982
2 000	0.966
2 200	0.923
2 400	0.902

Thermal Properties	
Strain Point StP (°C)	535
Annealing Point AP (°C)	565
Transformation Temperature Tg (°C)	596
Yield Point At (°C)	632
Softening Point SP (°C)	700
Expansion Coefficients (-30 °C ~ 70 °C)	82
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	100
Thermal Conductivity λ (W/(m·K))	1.04

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	65
-90 ~ -80	67
-80 ~ -70	68
-70 ~ -60	70
-60 ~ -50	72
-50 ~ -40	73
-40 ~ -30	75
-30 ~ -20	77
-20 ~ -10	78
-10 ~ 0	80
0 ~ 10	81
10 ~ 20	82
20 ~ 30	84
30 ~ 40	85
40 ~ 50	86
50 ~ 60	88
60 ~ 70	89
70 ~ 80	90
80 ~ 90	91
90 ~ 100	92
100 ~ 110	93
110 ~ 120	94
120 ~ 130	95
130 ~ 140	96
140 ~ 150	97
150 ~ 160	97
160 ~ 170	98
170 ~ 180	99
180 ~ 190	100
190 ~ 200	100
200 ~ 210	101
210 ~ 220	101
220 ~ 230	102
230 ~ 240	102
240 ~ 250	103
250 ~ 260	103
260 ~ 270	103
270 ~ 280	104
280 ~ 290	104
290 ~ 300	104

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	1.0	1.2	1.5	1.6	1.7	1.9	2.1	2.6	2.7	3.3	3.9	5.6
-60 ~ -40	0.8	1.0	1.4	1.5	1.6	1.8	2.0	2.4	2.5	3.2	3.9	5.6
-40 ~ -20	0.8	0.9	1.4	1.5	1.5	1.7	2.0	2.4	2.5	3.1	4.0	5.7
-20 ~ 0	0.8	0.9	1.3	1.4	1.5	1.8	2.0	2.5	2.6	3.2	4.0	5.9
0 ~ 20	0.8	1.0	1.4	1.5	1.6	1.8	2.0	2.6	2.6	3.4	4.2	6.1
20 ~ 40	0.9	1.0	1.5	1.6	1.6	1.9	2.1	2.7	2.7	3.5	4.4	6.3
40 ~ 60	0.9	1.1	1.5	1.6	1.7	1.9	2.2	2.8	2.8	3.7	4.6	6.5
60 ~ 80	1.0	1.2	1.6	1.8	1.8	2.1	2.3	2.9	3.0	3.8	4.7	6.9
80 ~ 100	0.9	1.3	1.7	1.9	1.9	2.2	2.5	3.1	3.1	4.0	4.9	7.0
100 ~ 120	1.0	1.3	1.8	1.9	2.0	2.3	2.5	3.2	3.3	4.1	5.0	7.2
120 ~ 140	1.1	1.3	1.8	2.0	2.0	2.3	2.6	3.3	3.4	4.2	5.2	7.5
140 ~ 160	1.1	1.3	1.8	2.0	2.1	2.3	2.6	3.3	3.4	4.3	5.3	7.7
160 ~ 180	1.1	1.3	1.8	2.1	2.2	2.5	2.8	3.4	3.5	4.5	5.5	7.9

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	2.84
Specific Gravity d	2.63
Remarks	

OHARA 25-04

S-TIM 8

Code(d) 596392
Code(e) 599390

Refractive Index n_d	1.595 51 1.595 509	Abbe Number ν_d	39.24	Dispersion $n_F - n_C$	0.015 176
Refractive Index n_e	1.599 106	Abbe Number ν_e	38.97	Dispersion $n_{F'} - n_{C'}$	0.015 375

λ (µm)		
n_{2325}	2.325 42	1.560 75
n_{1970}	1.970 09	1.566 15
n_{1530}	1.529 58	1.572 12
n_{1129}	1.128 64	1.577 78
n_t	1.013 98	1.579 80
n_s	0.852 11	1.583 47
$n_{A'}$	0.768 19	1.586 09
n_T	0.706 52	1.588 54
n_C	0.656 27	1.591 03
$n_{C'}$	0.643 85	1.591 73
n_{He-Ne}	0.632 8	1.592 40
n_D	0.589 29	1.595 38
n_d	0.587 56	1.595 51
n_e	0.546 07	1.599 11
n_F	0.486 13	1.606 21
$n_{F'}$	0.479 99	1.607 11
n_{He-Cd}	0.441 57	1.613 82
n_g	0.435 835	1.615 01
n_h	0.404 656	1.622 67
n_i	0.365 015	1.636 61

$n_C - n_t$	0.011 234
$n_C - n_{A'}$	0.004 942
$n_d - n_C$	0.004 479
$n_e - n_C$	0.008 076
$n_g - n_d$	0.019 504
$n_g - n_F$	0.008 807
$n_h - n_g$	0.007 657
$n_i - n_g$	0.021 600
$n_C' - n_t$	0.011 938
$n_e - n_{C'}$	0.007 372
$n_{F'} - n_e$	0.008 003
$n_i - n_{F'}$	0.029 504

$\theta_{C,t}$	0.740 2
$\theta_{C,A'}$	0.325 6
$\theta_{d,C}$	0.295 1
$\theta_{e,C}$	0.532 2
$\theta_{g,d}$	1.285 2
$\theta_{g,F}$	0.580 3
$\theta_{h,g}$	0.504 5
$\theta_{i,g}$	1.423 3
$\theta'_{C,t}$	0.776 5
$\theta'_{e,C'}$	0.479 5
$\theta'_{F',e}$	0.520 5
$\theta'_{i,F'}$	1.919 0

$\Delta\theta_{C,t}$	0.009 4
$\Delta\theta_{C,A'}$	0.002 2
$\Delta\theta_{g,d}$	0.002 0
$\Delta\theta_{g,F}$	0.002 3
$\Delta\theta_{i,g}$	0.026 9

λ_{80}	380	λ_5	350
λ_{70}			

$\lambda_{0.80}$	378	$\lambda_{0.05}$	351
------------------	-----	------------------	-----

B	G	R
0.00	0.82	0.82

λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	0.02
360	0.27
370	0.64
380	0.84
390	0.928
400	0.962
420	0.982
440	0.988
460	0.990
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.997
800	0.998
900	0.997
1 000	0.996
1 200	0.996
1 400	0.994
1 600	0.993
1 800	0.983
2 000	0.968
2 200	0.935
2 400	0.915

A_1	1.372 627 13E+00
A_2	1.126 362 76E-01
A_3	1.397 864 21E+00
B_1	1.032 200 68E-02
B_2	5.501 950 44E-02
B_3	1.477 356 09E+02

Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	2~3
Acid Resistance(Surface) Group SR	1.0
Phosphate Resistance PR	1.0

Young's Modulus E (GPa)	75.0
Rigidity Modulus G (GPa)	30.5
Poisson's Ratio σ	0.231
Knoop Hardness Hk[Class]	530 5
Abrasion Aa	135

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	0.8	1.0	1.3	1.4	1.4	1.6	1.8	2.2	2.3	2.8	3.3	4.6
-60 ~ -40	0.7	0.8	1.1	1.3	1.3	1.5	1.7	2.0	2.1	2.6	3.3	4.6
-40 ~ -20	0.5	0.7	1.0	1.1	1.2	1.4	1.6	2.0	2.1	2.7	3.3	4.8
-20 ~ 0	0.5	0.6	1.0	1.1	1.1	1.4	1.6	2.1	2.2	2.8	3.4	5.1
0 ~ 20	0.4	0.7	1.0	1.1	1.2	1.4	1.6	2.1	2.2	2.8	3.6	5.3
20 ~ 40	0.5	0.6	1.0	1.2	1.2	1.5	1.7	2.2	2.3	3.0	3.7	5.6
40 ~ 60	0.4	0.6	1.0	1.2	1.2	1.5	1.7	2.3	2.4	3.2	4.0	5.8
60 ~ 80	0.5	0.7	1.1	1.3	1.3	1.6	1.8	2.4	2.5	3.3	4.1	6.1
80 ~ 100	0.4	0.6	1.2	1.3	1.4	1.6	1.9	2.5	2.6	3.4	4.3	6.4
100 ~ 120	0.4	0.7	1.2	1.3	1.4	1.7	2.0	2.6	2.7	3.6	4.5	6.7
120 ~ 140	0.4	0.6	1.2	1.3	1.4	1.7	2.0	2.7	2.8	3.7	4.7	6.9
140 ~ 160	0.3	0.6	1.1	1.3	1.4	1.7	2.0	2.7	2.8	3.7	4.8	7.2
160 ~ 180	0.2	0.5	1.1	1.3	1.4	1.7	2.1	2.8	2.9	3.9	5.0	7.4

Strain Point StP (°C)	529
Annealing Point AP (°C)	560
Transformation Temperature Tg (°C)	582
Yield Point At (°C)	627
Softening Point SP (°C)	695
Expansion Coefficients (-30 °C ~ 70 °C)	86
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	105
Thermal Conductivity λ (W/(m·K))	1.03

Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	68
-90 ~ -80	70
-80 ~ -70	72
-70 ~ -60	74
-60 ~ -50	75
-50 ~ -40	77
-40 ~ -30	79
-30 ~ -20	80
-20 ~ -10	82
-10 ~ 0	84
0 ~ 10	85
10 ~ 20	86
20 ~ 30	88
30 ~ 40	89
40 ~ 50	91
50 ~ 60	92
60 ~ 70	93
70 ~ 80	94
80 ~ 90	95
90 ~ 100	97
100 ~ 110	98
110 ~ 120	99
120 ~ 130	100
130 ~ 140	101
140 ~ 150	101
150 ~ 160	102
160 ~ 170	103
170 ~ 180	104
180 ~ 190	105
190 ~ 200	105
200 ~ 210	106
210 ~ 220	107
220 ~ 230	107
230 ~ 240	108
240 ~ 250	108
250 ~ 260	108
260 ~ 270	109
270 ~ 280	109
280 ~ 290	110
290 ~ 300	110

Photoelastic Constant β nm/(cm·105Pa)	2.79
Specific Gravity d	2.63
Remarks	

OHARA 25-04

Refractive Index n_d 1.672 70 1.672 700	Abbe Number ν_d 32.10	Dispersion $n_F - n_C$ 0.020 957
Refractive Index n_e 1.677 651	Abbe Number ν_e 31.84	Dispersion $n_{F'} - n_{C'}$ 0.021 280

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.629 88
n_{1970}	1.970 09	1.635 83
n_{1530}	1.529 58	1.642 58
n_{1129}	1.128 64	1.649 33
n_t	1.013 98	1.651 84
n_s	0.852 11	1.656 56
$n_{A'}$	0.768 19	1.660 00
n_r	0.706 52	1.663 26
n_C	0.656 27	1.666 61
$n_{C'}$	0.643 85	1.667 56
$n_{\text{He-Ne}}$	0.632 8	1.668 46
n_D	0.589 29	1.672 52
n_d	0.587 56	1.672 70
n_e	0.546 07	1.677 65
n_F	0.486 13	1.687 56
$n_{F'}$	0.479 99	1.688 84
$n_{\text{He-Cd}}$	0.441 57	1.698 40
n_g	0.435 835	1.700 11
n_h	0.404 656	1.711 26
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.506 592 33E+00
A_2	2.047 861 35E-01
A_3	1.920 366 68E+00
B_1	1.095 015 62E-02
B_2	5.749 802 85E-02
B_3	1.781 285 35E+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	1.2

Mechanical Properties	
Young's Modulus E (GPa)	84.1
Rigidity Modulus G (GPa)	34.0
Poisson's Ratio σ	0.236
Knoop Hardness Hk[Class]	570 6
Abrasion Aa	146

Partial Dispersions	
$n_C - n_t$	0.014 766
$n_C - n_{A'}$	0.006 611
$n_d - n_C$	0.006 093
$n_e - n_C$	0.011 044
$n_g - n_d$	0.027 414
$n_g - n_F$	0.012 550
$n_h - n_g$	0.011 144
$n_i - n_g$	
$n_{C'} - n_t$	0.015 718
$n_e - n_{C'}$	0.010 092
$n_{F'} - n_e$	0.011 188
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.704 6
$\theta_{C,A'}$	0.315 5
$\theta_{d,C}$	0.290 7
$\theta_{e,C}$	0.527 0
$\theta_{g,d}$	1.308 1
$\theta_{g,F}$	0.598 8
$\theta_{h,g}$	0.531 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.738 6
$\theta'_{e,C'}$	0.474 2
$\theta'_{F,e}$	0.525 8
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 3
$\Delta\theta_{C,A'}$	0.000 7
$\Delta\theta_{g,d}$	0.010 1
$\Delta\theta_{g,F}$	0.009 3
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	400	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	362
CCI			
B	G	R	
0.00	2.11	2.17	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.24
380	0.60
390	0.80
400	0.89
420	0.957
440	0.974
460	0.981
480	0.986
500	0.989
550	0.995
600	0.996
650	0.995
700	0.996
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.995
1 800	0.987
2 000	0.977
2 200	0.944
2 400	0.930

Thermal Properties	
Strain Point StP (°C)	556
Annealing Point AP (°C)	585
Transformation Temperature Tg (°C)	613
Yield Point At (°C)	649
Softening Point SP (°C)	700
Expansion Coefficients (-30 °C ~ 70 °C)	82
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	98
Thermal Conductivity λ (W/(mK))	1.05

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	69
-90 ~ -80	70
-80 ~ -70	71
-70 ~ -60	72
-60 ~ -50	73
-50 ~ -40	75
-40 ~ -30	76
-30 ~ -20	77
-20 ~ -10	78
-10 ~ 0	79
0 ~ 10	80
10 ~ 20	81
20 ~ 30	82
30 ~ 40	83
40 ~ 50	84
50 ~ 60	85
60 ~ 70	86
70 ~ 80	87
80 ~ 90	88
90 ~ 100	89
100 ~ 110	90
110 ~ 120	91
120 ~ 130	92
130 ~ 140	93
140 ~ 150	94
150 ~ 160	94
160 ~ 170	95
170 ~ 180	96
180 ~ 190	97
190 ~ 200	98
200 ~ 210	99
210 ~ 220	99
220 ~ 230	100
230 ~ 240	101
240 ~ 250	102
250 ~ 260	102
260 ~ 270	103
270 ~ 280	104
280 ~ 290	104
290 ~ 300	105

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	0.6	0.8	1.3	1.4	1.5	1.8	2.1	2.8	2.9	3.8	4.9	-
-60 ~ -40	0.5	0.7	1.3	1.5	1.5	1.8	2.1	2.8	2.9	3.9	5.0	-
-40 ~ -20	0.6	0.8	1.3	1.6	1.6	1.9	2.3	3.0	3.1	4.1	5.3	-
-20 ~ 0	0.7	0.9	1.5	1.6	1.7	2.0	2.4	3.2	3.3	4.3	5.5	-
0 ~ 20	0.8	1.0	1.7	1.9	1.9	2.3	2.6	3.4	3.5	4.5	5.8	-
20 ~ 40	0.9	1.2	1.7	2.0	2.1	2.5	2.8	3.6	3.7	4.8	6.1	-
40 ~ 60	1.0	1.4	2.0	2.2	2.3	2.6	3.0	3.8	3.9	5.1	6.4	-
60 ~ 80	1.2	1.5	2.1	2.3	2.4	2.7	3.2	4.1	4.2	5.4	6.8	-
80 ~ 100	1.3	1.6	2.2	2.5	2.5	2.9	3.3	4.2	4.3	5.6	7.1	-
100 ~ 120	1.4	1.7	2.3	2.6	2.6	3.0	3.4	4.4	4.5	5.8	7.2	-
120 ~ 140	1.4	1.7	2.4	2.7	2.7	3.1	3.6	4.5	4.6	6.0	7.6	-
140 ~ 160	1.4	1.7	2.4	2.7	2.8	3.2	3.7	4.7	4.8	6.2	7.7	-
160 ~ 180	1.5	1.8	2.5	2.8	2.9	3.3	3.7	4.7	4.9	6.3	7.9	-

Other Properties	
Photoelastic Constant β nm/(cm ³ 105Pa)	2.81
Specific Gravity d	2.91
Remarks	

Refractive Index n_d	1.639 80 1.639 799	Abbe Number v_d	34.46	Dispersion $n_F - n_C$	0.018 564
Refractive Index n_e	1.644 189	Abbe Number v_e	34.20	Dispersion $n_{F'} - n_{C'}$	0.018 835

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.600 36
n_{1970}	1.970 09	1.606 08
n_{1530}	1.529 58	1.612 49
n_{1129}	1.128 64	1.618 78
n_t	1.013 98	1.621 08
n_s	0.852 11	1.625 37
$n_{A'}$	0.768 19	1.628 46
n_r	0.706 52	1.631 38
n_C	0.656 27	1.634 38
$n_{C'}$	0.643 85	1.635 22
$n_{\text{He-Ne}}$	0.632 8	1.636 02
n_D	0.589 29	1.639 64
n_d	0.587 56	1.639 80
n_e	0.546 07	1.644 19
n_F	0.486 13	1.652 94
$n_{F'}$	0.479 99	1.654 06
$n_{\text{He-Cd}}$	0.441 57	1.662 44
n_g	0.435 835	1.663 93
n_h	0.404 656	1.673 61
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.416 804 70E+00
A_2	1.967 850 57E-01
A_3	1.680 013 22E+00
B_1	1.007 321 58E-02
B_2	5.376 169 08E-02
B_3	1.646 724 36E+02

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

Mechanical Properties	
Young's Modulus E (GPa)	79.3
Rigidity Modulus G (GPa)	32.1
Poisson's Ratio σ	0.236
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	146

Partial Dispersions	
$n_C - n_t$	0.013 292
$n_C - n_{A'}$	0.005 916
$n_d - n_C$	0.005 424
$n_e - n_C$	0.009 814
$n_g - n_d$	0.024 134
$n_g - n_F$	0.010 994
$n_h - n_g$	0.009 680
$n_i - n_g$	
$n_C - n_t$	0.014 141
$n_e - n_{C'}$	0.008 965
$n_{F'} - n_e$	0.009 870
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.716 0
$\theta_{C,A'}$	0.318 7
$\theta_{d,C}$	0.292 2
$\theta_{e,C}$	0.528 7
$\theta_{g,d}$	1.300 0
$\theta_{g,F}$	0.592 2
$\theta_{h,g}$	0.521 4
$\theta_{i,g}$	
$\theta'_{C,t}$	0.750 8
$\theta'_{e,C'}$	0.476 0
$\theta'_{F',e}$	0.524 0
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 6
$\Delta\theta_{C,A'}$	0.001 1
$\Delta\theta_{g,d}$	0.006 9
$\Delta\theta_{g,F}$	0.006 5
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	390	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	360
CCI			
B	G	R	
0.00	1.37	1.38	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.41
380	0.73
390	0.87
400	0.935
420	0.973
440	0.983
460	0.987
480	0.990
500	0.992
550	0.997
600	0.997
650	0.996
700	0.997
800	0.999
900	0.998
1 000	0.998
1 200	0.998
1 400	0.995
1 600	0.994
1 800	0.984
2 000	0.973
2 200	0.936
2 400	0.919

Thermal Properties	
Strain Point StP ($^{\circ}\text{C}$)	543
Annealing Point AP ($^{\circ}\text{C}$)	572
Transformation Temperature Tg ($^{\circ}\text{C}$)	598
Yield Point At ($^{\circ}\text{C}$)	638
Softening Point SP ($^{\circ}\text{C}$)	696
Expansion Coefficients ($-30\text{ }^{\circ}\text{C} \sim 70\text{ }^{\circ}\text{C}$)	85
α_l (10^{-7} K^{-1}) ($100\text{ }^{\circ}\text{C} \sim 300\text{ }^{\circ}\text{C}$)	102
Thermal Conductivity λ (W/(m·K))	1.04

Linear coefficient of thermal expansion	
Temperature range ($^{\circ}\text{C}$)	α_l (10^{-7} K^{-1})
-100 ~ -90	68
-90 ~ -80	70
-80 ~ -70	72
-70 ~ -60	74
-60 ~ -50	75
-50 ~ -40	77
-40 ~ -30	78
-30 ~ -20	80
-20 ~ -10	81
-10 ~ 0	83
0 ~ 10	84
10 ~ 20	85
20 ~ 30	87
30 ~ 40	88
40 ~ 50	89
50 ~ 60	90
60 ~ 70	91
70 ~ 80	92
80 ~ 90	93
90 ~ 100	94
100 ~ 110	95
110 ~ 120	96
120 ~ 130	97
130 ~ 140	98
140 ~ 150	99
150 ~ 160	100
160 ~ 170	100
170 ~ 180	101
180 ~ 190	102
190 ~ 200	102
200 ~ 210	103
210 ~ 220	103
220 ~ 230	104
230 ~ 240	104
240 ~ 250	104
250 ~ 260	105
260 ~ 270	105
270 ~ 280	105
280 ~ 290	106
290 ~ 300	106

Other Properties	
Photoelastic Constant β nm/(cm \cdot 105Pa)	2.83
Specific Gravity d	2.76
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature ($^{\circ}\text{C}$)	$\Delta n_{rel} / \Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	0.6	0.8	1.2	1.4	1.4	1.6	1.8	2.3	2.5	3.2	4.0	-
-60 ~ -40	0.6	0.7	1.1	1.2	1.3	1.5	1.8	2.4	2.5	3.2	4.1	-
-40 ~ -20	0.5	0.7	1.1	1.2	1.3	1.5	1.8	2.5	2.6	3.4	4.3	-
-20 ~ 0	0.5	0.8	1.2	1.3	1.4	1.7	1.9	2.5	2.6	3.6	4.6	-
0 ~ 20	0.6	0.8	1.2	1.4	1.4	1.7	2.0	2.8	2.9	3.8	4.8	-
20 ~ 40	0.6	0.8	1.3	1.5	1.6	1.9	2.2	3.0	3.1	4.0	5.1	-
40 ~ 60	0.7	0.9	1.4	1.7	1.8	2.1	2.4	3.1	3.2	4.2	5.4	-
60 ~ 80	0.8	1.0	1.6	1.8	1.8	2.1	2.5	3.3	3.4	4.4	5.7	-
80 ~ 100	0.8	1.1	1.7	1.9	1.9	2.3	2.6	3.4	3.6	4.7	5.9	-
100 ~ 120	0.9	1.2	1.8	2.0	2.0	2.4	2.8	3.6	3.7	4.9	6.2	-
120 ~ 140	0.9	1.2	1.8	2.0	2.1	2.5	2.9	3.7	3.9	5.1	6.4	-
140 ~ 160	0.8	1.2	1.8	2.0	2.1	2.5	2.9	3.9	3.9	5.3	6.7	-
160 ~ 180	0.9	1.2	1.9	2.1	2.2	2.6	3.0	4.0	4.1	5.4	6.9	-

Refractive Index n_d	1.688 93 1.688 931	Abbe Number v_d	31.07	Dispersion $n_F - n_C$	0.022 170
Refractive Index n_e	1.694 167	Abbe Number v_e	30.83	Dispersion $n_{F'} - n_{C'}$	0.022 516

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.644 63
n_{1970}	1.970 09	1.650 62
n_{1530}	1.529 58	1.657 45
n_{1129}	1.128 64	1.664 38
n_t	1.013 98	1.666 99
n_s	0.852 11	1.671 92
$n_{A'}$	0.768 19	1.675 53
n_r	0.706 52	1.678 96
n_C	0.656 27	1.682 50
$n_{C'}$	0.643 85	1.683 50
n_{He-Ne}	0.632 8	1.684 45
n_D	0.589 29	1.688 74
n_d	0.587 56	1.688 93
n_e	0.546 07	1.694 17
n_F	0.486 13	1.704 67
$n_{F'}$	0.479 99	1.706 02
n_{He-Cd}	0.441 57	1.716 15
n_g	0.435 835	1.717 97
n_h	0.404 656	1.729 81
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.542 708 10E+00
A_2	2.171 138 91E-01
A_3	1.819 044 59E+00
B_1	1.139 250 05E-02
B_2	5.792 245 72E-02
B_3	1.676 971 89E+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 (GPa)	85.5
Rigidity Modulus G (GPa)	34.4
Poisson's Ratio σ	0.242
Knoop Hardness Hk[Class]	560 6
Abrasion Aa	152

Partial Dispersions	
$n_C - n_t$	0.015 507
$n_C - n_{A'}$	0.006 966
$n_d - n_C$	0.006 436
$n_e - n_C$	0.011 672
$n_g - n_d$	0.029 044
$n_g - n_F$	0.013 310
$n_h - n_g$	0.011 834
$n_i - n_g$	
$n_{C'} - n_t$	0.016 512
$n_e - n_{C'}$	0.010 667
$n_{F'} - n_e$	0.011 849
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.699 5
$\theta_{C,A'}$	0.314 2
$\theta_{d,C}$	0.290 3
$\theta_{e,C}$	0.526 5
$\theta_{g,d}$	1.310 1
$\theta_{g,F}$	0.600 4
$\theta_{h,g}$	0.533 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.733 3
$\theta'_{e,C'}$	0.473 8
$\theta'_{F,e}$	0.526 2
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 1
$\Delta\theta_{C,A'}$	0.000 7
$\Delta\theta_{g,d}$	0.009 9
$\Delta\theta_{g,F}$	0.009 2
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	405	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	391	$\lambda_{0.05}$	362
CCI			
B	G	R	
0.00	2.30	2.36	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.23
380	0.58
390	0.79
400	0.88
420	0.951
440	0.970
460	0.978
480	0.983
500	0.987
550	0.994
600	0.995
650	0.994
700	0.995
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.996
1 600	0.996
1 800	0.989
2 000	0.983
2 200	0.961
2 400	0.948

Thermal Properties	
Strain Point StP (°C)	560
Annealing Point AP (°C)	588
Transformation Temperature Tg (°C)	615
Yield Point At (°C)	655
Softening Point SP (°C)	701
Expansion Coefficients (-30 °C ~ 70 °C)	81
α_l (10 ⁻⁷ K ⁻¹) (100 °C ~ 300 °C)	99
Thermal Conductivity λ (W/(mK))	1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10 ⁻⁷ K ⁻¹)
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	69
-70 ~ -60	70
-60 ~ -50	72
-50 ~ -40	73
-40 ~ -30	74
-30 ~ -20	76
-20 ~ -10	77
-10 ~ 0	78
0 ~ 10	79
10 ~ 20	81
20 ~ 30	82
30 ~ 40	83
40 ~ 50	84
50 ~ 60	85
60 ~ 70	86
70 ~ 80	87
80 ~ 90	88
90 ~ 100	89
100 ~ 110	90
110 ~ 120	91
120 ~ 130	92
130 ~ 140	93
140 ~ 150	94
150 ~ 160	95
160 ~ 170	96
170 ~ 180	97
180 ~ 190	98
190 ~ 200	99
200 ~ 210	99
210 ~ 220	100
220 ~ 230	101
230 ~ 240	102
240 ~ 250	102
250 ~ 260	103
260 ~ 270	104
270 ~ 280	104
280 ~ 290	105
290 ~ 300	106

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	0.5	0.7	1.2	1.4	1.4	1.7	2.0	2.6	2.8	3.7	4.8	-
-60 ~ -40	0.4	0.7	1.1	1.3	1.4	1.7	2.0	2.7	2.9	3.8	4.9	-
-40 ~ -20	0.4	0.6	1.2	1.4	1.5	1.8	2.1	2.8	2.9	4.0	5.2	-
-20 ~ 0	0.5	0.7	1.3	1.5	1.5	1.9	2.3	3.0	3.2	4.2	5.5	-
0 ~ 20	0.6	0.9	1.5	1.7	1.7	2.1	2.4	3.3	3.4	4.5	5.9	-
20 ~ 40	0.7	0.9	1.6	1.9	1.9	2.3	2.7	3.5	3.6	4.8	6.2	-
40 ~ 60	0.9	1.1	1.8	2.0	2.1	2.4	2.8	3.7	3.9	5.1	6.7	-
60 ~ 80	0.9	1.2	1.9	2.1	2.2	2.7	3.1	4.0	4.2	5.4	7.0	-
80 ~ 100	1.0	1.3	2.0	2.3	2.3	2.7	3.2	4.2	4.3	5.7	7.3	-
100 ~ 120	1.1	1.4	2.2	2.4	2.5	2.9	3.4	4.4	4.5	5.9	7.7	-
120 ~ 140	1.2	1.5	2.2	2.5	2.6	3.0	3.5	4.6	4.7	6.2	8.0	-
140 ~ 160	1.2	1.5	2.3	2.6	2.6	3.2	3.7	4.8	4.9	6.4	8.2	-
160 ~ 180	1.2	1.6	2.4	2.7	2.8	3.2	3.7	4.9	5.0	6.6	8.4	-

Other Properties	
Photoelastic Constant β nm/(cm ¹⁰⁵ Pa)	2.77
Specific Gravity d	2.98
Remarks	

S-TIM35

Code(d) **699301**
Code(e) **704299**

Refractive Index n_d	1.698 95	Abbe Number v_d	30.13	Dispersion $n_F - n_C$	0.023 199
	1.698 947				
Refractive Index n_e	1.704 424	Abbe Number v_e	29.89	Dispersion $n_{F'} - n_{C'}$	0.023 567

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.652 83
n_{1970}	1.970 09	1.659 05
n_{1530}	1.529 58	1.666 15
n_{1129}	1.128 64	1.673 35
n_t	1.013 98	1.676 06
n_s	0.852 11	1.681 20
$n_{A'}$	0.768 19	1.684 96
n_r	0.706 52	1.688 54
n_C	0.656 27	1.692 22
$n_{C'}$	0.643 85	1.693 27
$n_{\text{He-Ne}}$	0.632 8	1.694 26
n_D	0.589 29	1.698 75
n_d	0.587 56	1.698 95
n_e	0.546 07	1.704 42
n_F	0.486 13	1.715 42
$n_{F'}$	0.479 99	1.716 84
$n_{\text{He-Cd}}$	0.441 57	1.727 50
n_g	0.435 835	1.729 41
n_h	0.404 656	1.741 89
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.558 497 75E+00
A_2	2.307 670 07E-01
A_3	1.844 360 99E+00
B_1	1.153 672 35E-02
B_2	5.860 959 47E-02
B_3	1.629 818 88E+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 (GPa)	87.5
Rigidity Modulus G (GPa)	35.3
Poisson's Ratio σ	0.238
Knoop Hardness Hk[Class]	550 6
Abrasion Aa	142

Partial Dispersions	
$n_C - n_t$	0.016 161
$n_C - n_{A'}$	0.007 266
$n_d - n_C$	0.006 722
$n_e - n_C$	0.012 199
$n_g - n_d$	0.030 465
$n_g - n_F$	0.013 988
$n_h - n_g$	0.012 478
$n_i - n_g$	
$n_C - n_t$	0.017 210
$n_e - n_{C'}$	0.011 150
$n_{F'} - n_e$	0.012 417
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.696 6
$\theta_{C,A'}$	0.313 2
$\theta_{d,C}$	0.289 8
$\theta_{e,C}$	0.525 8
$\theta_{g,d}$	1.313 2
$\theta_{g,F}$	0.603 0
$\theta_{h,g}$	0.537 9
$\theta_{i,g}$	
$\theta'_{C,t}$	0.730 3
$\theta'_{e,C'}$	0.473 1
$\theta'_{F,e}$	0.526 9
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.008 6
$\Delta\theta_{C,A'}$	0.000 8
$\Delta\theta_{g,d}$	0.011 1
$\Delta\theta_{g,F}$	0.010 3
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	400	λ_5	360
λ_{70}			
Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	367
CCI			
B	G	R	
0.00	2.94	2.98	

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.14
380	0.48
390	0.72
400	0.84
420	0.939
440	0.964
460	0.974
480	0.981
500	0.986
550	0.994
600	0.994
650	0.993
700	0.995
800	0.998
900	0.999
1 000	0.999
1 200	0.999
1 400	0.995
1 600	0.995
1 800	0.988
2 000	0.980
2 200	0.942
2 400	0.931

Thermal Properties	
Strain Point StP (°C)	579
Annealing Point AP (°C)	603
Transformation Temperature Tg (°C)	625
Yield Point At (°C)	665
Softening Point SP (°C)	716
Expansion Coefficients (-30 °C ~ 70 °C)	77
α_l (10^{-7}K^{-1}) (100 °C ~ 300 °C)	94
Thermal Conductivity λ (W/(m·K))	1.05

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7}K^{-1})
-100 ~ -90	63
-90 ~ -80	64
-80 ~ -70	65
-70 ~ -60	67
-60 ~ -50	68
-50 ~ -40	69
-40 ~ -30	71
-30 ~ -20	72
-20 ~ -10	73
-10 ~ 0	74
0 ~ 10	75
10 ~ 20	77
20 ~ 30	78
30 ~ 40	79
40 ~ 50	80
50 ~ 60	81
60 ~ 70	82
70 ~ 80	83
80 ~ 90	84
90 ~ 100	85
100 ~ 110	86
110 ~ 120	87
120 ~ 130	88
130 ~ 140	89
140 ~ 150	90
150 ~ 160	91
160 ~ 170	92
170 ~ 180	92
180 ~ 190	93
190 ~ 200	94
200 ~ 210	95
210 ~ 220	95
220 ~ 230	96
230 ~ 240	97
240 ~ 250	97
250 ~ 260	98
260 ~ 270	99
270 ~ 280	99
280 ~ 290	100
290 ~ 300	100

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	1.1	1.3	1.8	2.0	2.0	2.3	2.6	3.3	3.4	4.4	5.6	-
-60 ~ -40	1.0	1.3	1.7	1.9	2.0	2.2	2.7	3.4	3.5	4.5	5.8	-
-40 ~ -20	1.0	1.3	1.8	2.0	2.1	2.4	2.7	3.5	3.7	4.7	6.0	-
-20 ~ 0	1.1	1.4	2.0	2.2	2.2	2.6	2.9	3.7	3.8	4.9	6.4	-
0 ~ 20	1.2	1.5	2.1	2.3	2.4	2.7	3.1	3.9	4.0	5.3	6.7	-
20 ~ 40	1.3	1.6	2.3	2.5	2.6	2.9	3.3	4.2	4.3	5.6	7.0	-
40 ~ 60	1.5	1.8	2.4	2.7	2.7	3.1	3.5	4.4	4.6	5.8	7.5	-
60 ~ 80	1.6	1.9	2.5	2.8	2.8	3.3	3.8	4.7	4.9	6.2	7.8	-
80 ~ 100	1.7	2.0	2.7	2.9	3.0	3.4	3.9	5.0	5.1	6.5	8.2	-
100 ~ 120	1.8	2.1	2.8	3.1	3.1	3.6	4.0	5.1	5.2	6.8	8.5	-
120 ~ 140	1.8	2.1	2.9	3.2	3.2	3.7	4.2	5.2	5.5	7.0	8.8	-
140 ~ 160	1.8	2.2	3.0	3.3	3.4	3.9	4.3	5.5	5.6	7.2	9.1	-
160 ~ 180	1.9	2.2	3.0	3.3	3.4	3.9	4.4	5.5	5.7	7.3	9.3	-

Other Properties	
Photoelastic Constant β nm/(cm ³ ·105Pa)	3.04
Specific Gravity d	2.96
Remarks	

OHARA 25-04