S-BAH10

670473
673470

Refractive Index	n_d	**1.67003**	Abbe Number	ν_d	**47.23**	Dispersion	$n_F - n_C$	**0.01418**
	n_e	1.670030		ν_e	46.94		$n_{F'} - n_{C'}$	0.014186
		1.673402						0.014345

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.63546
n_{1970}	1.97009	1.64108
n_{1530}	1.52958	1.64722
n_{1129}	1.12864	1.65293
n_t	1.01398	1.65492
n_s	0.85211	1.65852
$n_{A'}$	0.76819	1.66105
n_r	0.70652	1.66341
n_C	0.65627	**1.66579**
$n_{C'}$	0.64385	1.66646
n_{He-Ne}	0.6328	1.66709
n_D	0.58929	1.66990
n_d	0.58756	**1.67003**
n_e	0.54607	1.67340
n_F	0.48613	**1.67997**
$n_{F'}$	0.47999	1.68080
n_{He-Cd}	0.44157	1.68689
n_g	0.435835	**1.68796**
n_h	0.404656	1.69473
n_i	0.365015	1.70663
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	584
Annealing Point (°C)	**AP**	612
Transformation Temperature (°C)	**Tg**	623
Yield Point (°C)	**At**	669
Softening Point (°C)	**SP**	734
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	68
	(+100~+300°C)	80
Thermal Conductivity (W/m·K)	**k**	0.902

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	962
Rigidity Modulus (10^8N/m^2)	**G**	378
Poisson's Ratio	σ	0.273
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	127
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.12

Partial Dispersions

$n_C - n_t$	0.010866
$n_C - n_{A'}$	0.004735
$n_d - n_C$	0.004241
$n_e - n_C$	0.007614
$n_g - n_d$	0.017928
$n_g - n_F$	0.007983
$n_h - n_g$	0.006774
$n_i - n_g$	0.018670
$n_{C'} - n_t$	0.011535
$n_e - n_{C'}$	0.006945
$n_{F'} - n_e$	0.007400
$n_i - n_{F'}$	0.025825

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0023
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	-0.0028
$\Delta\theta_{g,F}$	-0.0024
$\Delta\theta_{i,g}$	-0.0134

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.59034337	
A_2	1.38464579	E-1
A_3	1.21988043	
B_1	9.32734340	E-3
B_2	4.27498654	E-2
B_3	1.19251777	E2
1129 ~ 2325 nm		
A_1	1.59034337	
A_2	1.38464579	E-1
A_3	1.21988043	
B_1	9.32734340	E-3
B_2	4.27498654	E-2
B_3	1.19251777	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7660
$\theta_{C,A'}$	0.3338
$\theta_{d,C}$	0.2990
$\theta_{e,C}$	0.5367
$\theta_{g,d}$	1.2638
$\theta_{g,F}$	0.5627
$\theta_{h,g}$	0.4775
$\theta_{i,g}$	1.3161
$\theta'_{C',t}$	0.8041
$\theta'_{e,C'}$	0.4841
$\theta'_{F',e}$	0.5159
$\theta'_{i,F'}$	1.8003

Internal Transmittance

λ_{80}	378	λ_5	342

CCI

B	G	R
0.00	1.25	1.25

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.010	
350	0.190	
360	0.480	
365		
370	0.700	
380	0.830	
390	0.902	
400	0.939	
420	0.969	
440	0.979	
460	0.984	
480	0.989	
500	0.993	
550	0.997	
600	0.996	
650	0.996	
700	0.997	
800	0.998	
900	0.997	
1000	0.997	
1200	0.998	
1400	0.996	
1600	0.996	
1800	0.991	
2000	0.981	
2200	0.949	
2400	0.850	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	3.48		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.4	3.9	3.9	4.1	4.3	4.8	5.3	
-20 ~ 0	3.5	3.9	4.0	4.1	4.4	4.9	5.5	
0 ~ 20	3.5	4.0	4.1	4.2	4.5	5.0	5.6	
20 ~ 40	3.6	4.1	4.1	4.3	4.6	5.2	5.7	
40 ~ 60	3.6	4.2	4.2	4.4	4.7	5.3	5.9	
60 ~ 80	3.7	4.2	4.3	4.5	4.8	5.4	6.0	

© OHARA GmbH – Hofheim – Germany

S-BAH11

667483
670480

Refractive Index	n_d	**1.66672**	Abbe Number	ν_d	**48.32**	Dispersion	$n_F - n_C$	**0.01380**
	n_e	1.670000		ν_e	48.04		$n_{F'} - n_{C'}$	0.013948
		1.666718						0.013797

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.63328
n_{1970}	1.97009	1.63866
n_{1530}	1.52958	1.64456
n_{1129}	1.12864	1.65008
n_t	1.01398	1.65201
n_s	0.85211	1.65551
$n_{A'}$	0.76819	1.65798
n_r	0.70652	1.66027
n_C	0.65627	**1.66259**
$n_{C'}$	0.64385	1.66324
n_{He-Ne}	0.6328	1.66385
n_D	0.58929	1.66660
n_d	0.58756	**1.66672**
n_e	0.54607	1.67000
n_F	0.48613	**1.67639**
$n_{F'}$	0.47999	1.67719
n_{He-Cd}	0.44157	1.68309
n_g	0.435835	**1.68412**
n_h	0.404656	1.69067
n_i	0.365015	1.70213
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	593
Annealing Point (°C)	**AP**	617
Transformation Temperature (°C)	**Tg**	629
Yield Point (°C)	**At**	675
Softening Point (°C)	**SP**	738
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	69
	(+100~+300°C)	82
Thermal Conductivity (W/m·K)	**k**	0.858

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	929
Rigidity Modulus (10^8N/m^2)	**G**	365
Poisson's Ratio	σ	0.274
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	154
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.06

Partial Dispersions

$n_C - n_t$	0.010576
$n_C - n_{A'}$	0.004611
$n_d - n_C$	0.004129
$n_e - n_C$	0.007411
$n_g - n_d$	0.017407
$n_g - n_F$	0.007739
$n_h - n_g$	0.006549
$n_i - n_g$	0.018002
$n_{C'} - n_t$	0.011228
$n_e - n_{C'}$	0.006759
$n_{F'} - n_e$	0.007189
$n_i - n_{F'}$	0.024938

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0069
$\Delta\theta_{C,A'}$	-0.0002
$\Delta\theta_{g,d}$	-0.0027
$\Delta\theta_{g,F}$	-0.0024
$\Delta\theta_{i,g}$	-0.0156

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.57138860	
A_2	1.47869313	E-1
A_3	1.28092846	
B_1	9.10807936	E-3
B_2	4.02401684	E-2
B_3	1.30399367	E2
1129 ~ 2325 nm		
A_1	1.57138860	
A_2	1.47869313	E-1
A_3	1.28092846	
B_1	9.10807936	E-3
B_2	4.02401684	E-2
B_3	1.30399367	E2

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**	2.0

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	3.59		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.7	3.7	3.9	4.1	4.6	5.1	
-20 ~ 0	3.3	3.8	3.8	4.0	4.2	4.7	5.2	
0 ~ 20	3.3	3.8	3.9	4.1	4.3	4.8	5.4	
20 ~ 40	3.3	3.9	3.9	4.1	4.4	4.9	5.5	
40 ~ 60	3.4	4.0	4.0	4.2	4.5	5.0	5.6	
60 ~ 80	3.4	4.0	4.1	4.3	4.6	5.1	5.8	

Relative Partial Dispersions

$\theta_{C,t}$	0.7665
$\theta_{C,A'}$	0.3342
$\theta_{d,C}$	0.2993
$\theta_{e,C}$	0.5371
$\theta_{g,d}$	1.2617
$\theta_{g,F}$	0.5609
$\theta_{h,g}$	0.4747
$\theta_{i,g}$	1.3048
$\theta'_{C',t}$	0.8050
$\theta'_{e,C'}$	0.4846
$\theta'_{F',e}$	0.5154
$\theta'_{i,F'}$	1.7879

Internal Transmittance

λ_{80}	375	λ_5	340

CCI

B	G	R
0.00	0.98	0.94

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.040	
350	0.270	
360	0.560	
365		
370	0.750	
380	0.860	
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	
1000	0.997	
1200	0.998	
1400	0.994	
1600	0.995	
1800	0.988	
2000	0.976	
2200	0.936	
2400	0.840	

© OHARA GmbH – Hofheim – Germany

S-BAH27

702412
706410

Refractive Index	n_d	**1.70154**	Abbe Number	ν_d	**41.24**	Dispersion	$n_F - n_C$	**0.01701**
	n_e	1.701536		ν_e	40.95		$n_{F'} - n_{C'}$	0.017012
		1.705571						0.017228

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.66253
n_{1970}	1.97009	1.66858
n_{1530}	1.52958	1.67526
n_{1129}	1.12864	1.68160
n_t	1.01398	1.68386
n_s	0.85211	1.68800
$n_{A'}$	0.76819	1.69094
n_r	0.70652	1.69370
n_C	0.65627	**1.69650**
$n_{C'}$	0.64385	1.69729
n_{He-Ne}	0.6328	1.69804
n_D	0.58929	1.70139
n_d	0.58756	**1.70154**
n_e	0.54607	1.70557
n_F	0.48613	**1.71351**
$n_{F'}$	0.47999	1.71452
n_{He-Cd}	0.44157	1.72200
n_g	0.435835	**1.72332**
n_h	0.404656	1.73180
n_i	0.365015	1.74712
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	611
Annealing Point (°C)	**AP**	636
Transformation Temperature (°C)	**Tg**	647
Yield Point (°C)	**At**	682
Softening Point (°C)	**SP**	749
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	64
	(+100~+300°C)	75
Thermal Conductivity (W/m·K)	**k**	0.869

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	936
Rigidity Modulus (10^8N/m^2)	**G**	368
Poisson's Ratio	σ	0.272
Knoop Hardness	**Hk**	580 [6]
Abrasion	**Aa**	129
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.18

Partial Dispersions	
$n_C - n_t$	0.012641
$n_C - n_{A'}$	0.005561
$n_d - n_C$	0.005033
$n_e - n_C$	0.009068
$n_g - n_d$	0.021787
$n_g - n_F$	0.009808
$n_h - n_g$	0.008480
$n_i - n_g$	0.023797
$n_{C'} - n_t$	0.013433
$n_e - n_{C'}$	0.008276
$n_{F'} - n_e$	0.008952
$n_i - n_{F'}$	0.032597

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0029
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	0.0016
$\Delta\theta_{g,F}$	0.0018
$\Delta\theta_{i,g}$	0.0191

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.68939052	
A_2	1.33081013	E-1
A_3	1.41165515	
B_1	1.03598193	E-2
B_2	5.33982239	E-2
B_3	1.26515503	E2
1129 ~ 2325 nm		
A_1	1.68939052	
A_2	1.33081013	E-1
A_3	1.41165515	
B_1	1.03598193	E-2
B_2	5.33982239	E-2
B_3	1.26515503	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7431
$\theta_{C,A'}$	0.3269
$\theta_{d,C}$	0.2958
$\theta_{e,C}$	0.5330
$\theta_{g,d}$	1.2807
$\theta_{g,F}$	0.5765
$\theta_{h,g}$	0.4985
$\theta_{i,g}$	1.3988
$\theta'_{C',t}$	0.7797
$\theta'_{e,C'}$	0.4804
$\theta'_{F',e}$	0.5196
$\theta'_{i,F'}$	1.8921

Internal Transmittance			
λ_{80}	388	λ_5	356

CCI		
B	G	R
0.00	1.99	2.01

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.160	
365		
370	0.470	
380	0.700	
390	0.830	
400	0.890	
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	
1000	0.998	
1200	0.998	
1400	0.993	
1600	0.994	
1800	0.987	
2000	0.974	
2200	0.921	
2400	0.810	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40
Specific Gravity	**d**	3.67		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.2	3.7	3.7	4.0	4.2	4.8	5.5	
-20 ~ 0	3.3	3.8	3.9	4.1	4.4	5.0	5.7	
0 ~ 20	3.4	4.0	4.0	4.2	4.5	5.2	5.9	
20 ~ 40	3.5	4.1	4.1	4.4	4.7	5.4	6.2	
40 ~ 60	3.5	4.2	4.3	4.5	4.8	5.6	6.4	
60 ~ 80	3.7	4.4	4.4	4.6	5.0	5.8	6.6	

© OHARA GmbH – Hofheim – Germany

S-BAH28

723380
728377

Refractive Index	n_d	**1.72342**	Abbe Number	ν_d	**37.95**	Dispersion	$n_F - n_C$	**0.01906**
	n_e	1.723420		ν_e	37.68		$n_{F'} - n_{C'}$	0.019060
		1.727935						0.019320

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68198
n_{1970}	1.97009	1.68808
n_{1530}	1.52958	1.69490
n_{1129}	1.12864	1.70154
n_t	1.01398	1.70396
n_s	0.85211	1.70844
$n_{A'}$	0.76819	1.71167
n_r	0.70652	1.71471
n_C	0.65627	**1.71782**
$n_{C'}$	0.64385	1.71870
n_{He-Ne}	0.6328	1.71952
n_D	0.58929	1.72325
n_d	0.58756	**1.72342**
n_e	0.54607	1.72794
n_F	0.48613	**1.73688**
$n_{F'}$	0.47999	1.73802
n_{He-Cd}	0.44157	1.74649
n_g	0.435835	**1.74800**
n_h	0.404656	1.75769
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	599
Annealing Point (°C)	**AP**	626
Transformation Temperature (°C)	**Tg**	643
Yield Point (°C)	**At**	676
Softening Point (°C)	**SP**	739
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	66
	(+100~+300°C)	73
Thermal Conductivity (W/m·K)	**k**	0.889

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	911
Rigidity Modulus (10^8N/m^2)	**G**	375
Poisson's Ratio	σ	0.213
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	138
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.31

Partial Dispersions

$n_C - n_t$	0.013857
$n_C - n_{A'}$	0.006146
$n_d - n_C$	0.005604
$n_e - n_C$	0.010119
$n_g - n_d$	0.024580
$n_g - n_F$	0.011124
$n_h - n_g$	0.009689
$n_i - n_g$	
$n_{C'} - n_t$	0.014736
$n_e - n_{C'}$	0.009240
$n_{F'} - n_e$	0.010080
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0023
$\Delta\theta_{C,A'}$	0.0006
$\Delta\theta_{g,d}$	0.0037
$\Delta\theta_{g,F}$	0.0035
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.69493484	
A_2	1.92890298	E-1
A_3	1.56385948	
B_1	1.02723190	E-2
B_2	5.21187640	E-2
B_3	1.37818035	E2
1129 ~ 2325 nm		
A_1	1.69493484	
A_2	1.92890298	E-1
A_3	1.56385948	
B_1	1.02723190	E-2
B_2	5.21187640	E-2
B_3	1.37818035	E2

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**	4.0
Phosphate Resistance	**PR**	1.0

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42		
Specific Gravity	**d**	3.67		λ_5	36		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.8	4.5	4.5	4.8	5.1	5.8	6.6	
-20 ~ 0	3.9	4.6	4.7	4.9	5.3	6.0	6.9	
0 ~ 20	4.0	4.8	4.8	5.1	5.4	6.2	7.1	
20 ~ 40	4.1	4.9	5.0	5.2	5.6	6.5	7.4	
40 ~ 60	4.2	5.1	5.1	5.4	5.8	6.7	7.7	
60 ~ 80	4.3	5.2	5.3	5.6	6.0	6.9	7.9	

Relative Partial Dispersions

$\theta_{C,t}$	0.7270
$\theta_{C,A'}$	0.3225
$\theta_{d,C}$	0.2940
$\theta_{e,C}$	0.5309
$\theta_{g,d}$	1.2896
$\theta_{g,F}$	0.5836
$\theta_{h,g}$	0.5083
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7627
$\theta'_{e,C'}$	0.4783
$\theta'_{F',e}$	0.5217
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	395	λ_5	360

CCI

B	G	R
0.00	2.78	2.88

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.060	
365		
370	0.320	
380	0.580	
390	0.750	
400	0.850	
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.995	
1800	0.990	
2000	0.979	
2200	0.938	
2400	0.840	

© OHARA GmbH – Hofheim – Germany

S-BAH32

670393
674390

Refractive Index	n_d	**1.66998**	Abbe Number	ν_d	**39.27**	Dispersion	$n_F - n_C$	**0.01706**
	n_e	1.669979		ν_e	38.99		$n_{F'} - n_{C'}$	0.017061
		1.674022						0.017287

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.63134
n_{1970}	1.97009	1.63728
n_{1530}	1.52958	1.64386
n_{1129}	1.12864	1.65013
n_t	1.01398	1.65237
n_s	0.85211	1.65648
$n_{A'}$	0.76819	1.65941
n_r	0.70652	1.66216
n_C	0.65627	**1.66495**
$n_{C'}$	0.64385	1.66574
n_{He-Ne}	0.6328	1.66648
n_D	0.58929	1.66983
n_d	0.58756	**1.66998**
n_e	0.54607	1.67402
n_F	0.48613	**1.68201**
$n_{F'}$	0.47999	1.68303
n_{He-Cd}	0.44157	1.69059
n_g	0.435835	**1.69193**
n_h	0.404656	1.70056
n_i	0.365015	1.71630
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	546
Annealing Point (°C)	**AP**	563
Transformation Temperature (°C)	**Tg**	608
Yield Point (°C)	**At**	657
Softening Point (°C)	**SP**	726
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	69
	(+100~+300°C)	78
Thermal Conductivity (W/m·K)	**k**	0.921

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	904
Rigidity Modulus (10^8N/m^2)	**G**	359
Poisson's Ratio	σ	0.260
Knoop Hardness	**Hk**	580 [6]
Abrasion	**Aa**	138
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.74

Partial Dispersions	
$n_C - n_t$	0.012577
$n_C - n_{A'}$	0.005542
$n_d - n_C$	0.005030
$n_e - n_C$	0.009073
$n_g - n_d$	0.021950
$n_g - n_F$	0.009919
$n_h - n_g$	0.008632
$n_i - n_g$	0.024370
$n_{C'} - n_t$	0.013368
$n_e - n_{C'}$	0.008282
$n_{F'} - n_e$	0.009005
$n_i - n_{F'}$	0.033272

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0063
$\Delta\theta_{C,A'}$	0.0013
$\Delta\theta_{g,d}$	0.0034
$\Delta\theta_{g,F}$	0.0035
$\Delta\theta_{i,g}$	0.0322

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.58023630	
A_2	1.37504632	E-1
A_3	1.60603298	
B_1	1.03578062	E-2
B_2	5.48393088	E-2
B_3	1.47982885	E2
1129 ~ 2325 nm		
A_1	1.58023630	
A_2	1.37504632	E-1
A_3	1.60603298	
B_1	1.03578062	E-2
B_2	5.48393088	E-2
B_3	1.47982885	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7372
$\theta_{C,A'}$	0.3248
$\theta_{d,C}$	0.2948
$\theta_{e,C}$	0.5318
$\theta_{g,d}$	1.2866
$\theta_{g,F}$	0.5814
$\theta_{h,g}$	0.5059
$\theta_{i,g}$	1.4284
$\theta'_{C',t}$	0.7733
$\theta'_{e,C'}$	0.4791
$\theta'_{F',e}$	0.5209
$\theta'_{i,F'}$	1.9247

Internal Transmittance			
λ_{80}	385	λ_5	357

CCI		
B	G	R
0.00	1.79	1.85

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.160	
365		
370	0.510	
380	0.740	
390	0.850	
400	0.910	
420	0.955	
440	0.971	
460	0.978	
480	0.984	
500	0.988	
550	0.994	
600	0.994	
650	0.994	
700	0.996	
800	0.998	
900	0.997	
1000	0.997	
1200	0.996	
1400	0.992	
1600	0.993	
1800	0.988	
2000	0.980	
2200	0.948	
2400	0.880	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40	
Specific Gravity	**d**	3.26		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.7	4.3	4.3	4.6	4.8	5.4	6.2	
-20 ~ 0	3.7	4.4	4.4	4.7	4.9	5.6	6.4	
0 ~ 20	3.7	4.4	4.5	4.7	5.0	5.7	6.5	
20 ~ 40	3.8	4.5	4.6	4.8	5.1	5.9	6.7	
40 ~ 60	3.8	4.6	4.7	4.9	5.3	6.0	6.9	
60 ~ 80	3.8	4.7	4.8	5.0	5.4	6.2	7.1	

© OHARA GmbH – Hofheim – Germany

S-BAL2

571508
574505

Refractive Index	n_d	**1.57099**	Abbe Number	ν_d	**50.80**	Dispersion	$n_F - n_C$	**0.01124**
	n_e	1.570989		ν_e	50.50		$n_{F'} - n_{C'}$	0.011240
		1.573663						0.011359

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.54240
n_{1970}	1.97009	1.54721
n_{1530}	1.52958	1.55244
n_{1129}	1.12864	1.55722
n_t	1.01398	1.55886
n_s	0.85211	1.56179
$n_{A'}$	0.76819	1.56383
n_r	0.70652	1.56572
n_C	0.65627	**1.56762**
$n_{C'}$	0.64385	1.56815
n_{He-Ne}	0.6328	1.56865
n_D	0.58929	1.57089
n_d	0.58756	**1.57099**
n_e	0.54607	1.57366
n_F	0.48613	**1.57886**
$n_{F'}$	0.47999	1.57951
n_{He-Cd}	0.44157	1.58430
n_g	0.435835	**1.58514**
n_h	0.404656	1.59045
n_i	0.365015	1.59972
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	492
Annealing Point (°C)	**AP**	525
Transformation Temperature (°C)	**Tg**	540
Yield Point (°C)	**At**	582
Softening Point (°C)	**SP**	663
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	91
	(+100~+300°C)	109
Thermal Conductivity (W/m·K)	**k**	0.901

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	727
Rigidity Modulus (10^8N/m^2)	**G**	292
Poisson's Ratio	σ	0.245
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	163
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.32

Partial Dispersions

$n_C - n_t$	0.008753
$n_C - n_{A'}$	0.003787
$n_d - n_C$	0.003373
$n_e - n_C$	0.006047
$n_g - n_d$	0.014148
$n_g - n_F$	0.006281
$n_h - n_g$	0.005308
$n_i - n_g$	0.014580
$n_{C'} - n_t$	0.009286
$n_e - n_{C'}$	0.005514
$n_{F'} - n_e$	0.005845
$n_i - n_{F'}$	0.020209

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0063
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	-0.0005
$\Delta\theta_{g,F}$	-0.0005
$\Delta\theta_{i,g}$	-0.0024

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.30923813	
A_2	1.14137353	E-1
A_3	1.17882259	
B_1	8.38873953	E-3
B_2	3.99436485	E-2
B_3	1.40257892	E2
1129 ~ 2325 nm		
A_1	1.30923813	
A_2	1.14137353	E-1
A_3	1.17882259	
B_1	8.38873953	E-3
B_2	3.99436485	E-2
B_3	1.40257892	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7787
$\theta_{C,A'}$	0.3369
$\theta_{d,C}$	0.3001
$\theta_{e,C}$	0.5380
$\theta_{g,d}$	1.2587
$\theta_{g,F}$	0.5588
$\theta_{h,g}$	0.4722
$\theta_{i,g}$	1.2972
$\theta'_{C',t}$	0.8175
$\theta'_{e,C'}$	0.4854
$\theta'_{F',e}$	0.5146
$\theta'_{i,F'}$	1.7791

Internal Transmittance

λ_{80}	363	λ_5	339

CCI

B	G	R
0.00	0.33	0.34

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.100	
350	0.470	
360	0.760	
365		
370	0.890	
380	0.947	
390	0.971	
400	0.983	
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	0.998	
800	0.998	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.992	
1600	0.992	
1800	0.976	
2000	0.951	
2200	0.890	
2400	0.840	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	2.89		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.7	-0.3	-0.3	-0.2		0.4	0.7	
-20 ~ 0	-0.7	-0.3	-0.3	-0.1		0.4	0.8	
0 ~ 20	-0.6	-0.2	-0.2	-0.1	0.1	0.5	0.9	
20 ~ 40	-0.6	-0.2	-0.2		0.2	0.6	1.1	
40 ~ 60	-0.6	-0.1	-0.1	0.1	0.2	0.7	1.2	
60 ~ 80	-0.5	-0.1	-0.1	0.1	0.3	0.8	1.3	

© OHARA GmbH – Hofheim – Germany

S-BAL3

571530
574527

Refractive Index	n_d	**1.57135**	Abbe Number	ν_d	**52.95**	Dispersion	$n_F - n_C$	**0.01079**
	n_e	1.571351		ν_e	52.65		$n_{F'} - n_{C'}$	0.010790
		1.573920						0.010900

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.54361
n_{1970}	1.97009	1.54831
n_{1530}	1.52958	1.55341
n_{1129}	1.12864	1.55806
n_t	1.01398	1.55965
n_s	0.85211	1.56248
$n_{A'}$	0.76819	1.56445
n_r	0.70652	1.56627
n_C	0.65627	**1.56810**
$n_{C'}$	0.64385	1.56862
n_{He-Ne}	0.6328	1.56910
n_D	0.58929	1.57126
n_d	0.58756	**1.57135**
n_e	0.54607	1.57392
n_F	0.48613	**1.57889**
$n_{F'}$	0.47999	1.57952
n_{He-Cd}	0.44157	1.58409
n_g	0.435835	**1.58489**
n_h	0.404656	1.58993
n_i	0.365015	1.59867
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	483
Annealing Point (°C)	**AP**	516
Transformation Temperature (°C)	**Tg**	531
Yield Point (°C)	**At**	573
Softening Point (°C)	**SP**	652
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	95
	(+100~+300°C)	111
Thermal Conductivity (W/m·K)	**k**	0.864

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	719
Rigidity Modulus (10^8N/m^2)	**G**	288
Poisson's Ratio	σ	0.249
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	172
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.18

Partial Dispersions

$n_C - n_t$	0.008456
$n_C - n_{A'}$	0.003653
$n_d - n_C$	0.003246
$n_e - n_C$	0.005815
$n_g - n_d$	0.013536
$n_g - n_F$	0.005992
$n_h - n_g$	0.005041
$n_i - n_g$	0.013784
$n_{C'} - n_t$	0.008970
$n_e - n_{C'}$	0.005301
$n_{F'} - n_e$	0.005599
$n_i - n_{F'}$	0.019152

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0114
$\Delta\theta_{C,A'}$	-0.0015
$\Delta\theta_{g,d}$	-0.0003
$\Delta\theta_{g,F}$	-0.0005
$\Delta\theta_{i,g}$	-0.0041

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.29366890	
A_2	1.32440252	E-1
A_3	1.10197293	
B_1	8.00367962	E-3
B_2	3.54711196	E-2
B_3	1.34517431	E2
1129 ~ 2325 nm		
A_1	1.29366890	
A_2	1.32440252	E-1
A_3	1.10197293	
B_1	8.00367962	E-3
B_2	3.54711196	E-2
B_3	1.34517431	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7837
$\theta_{C,A'}$	0.3386
$\theta_{d,C}$	0.3008
$\theta_{e,C}$	0.5389
$\theta_{g,d}$	1.2545
$\theta_{g,F}$	0.5553
$\theta_{h,g}$	0.4672
$\theta_{i,g}$	1.2775
$\theta'_{C',t}$	0.8229
$\theta'_{e,C'}$	0.4863
$\theta'_{F',e}$	0.5137
$\theta'_{i,F'}$	1.7571

Internal Transmittance

λ_{80}	358	λ_5	332

CCI

B	G	R
0.00	0.24	0.25

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.010	
340	0.260	
350	0.630	
360	0.840	
365		
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	
1000	0.997	
1200	0.996	
1400	0.991	
1600	0.990	
1800	0.972	
2000	0.945	
2200	0.880	
2400	0.830	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	2.98		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.0	-0.8	-0.7	-0.6	-0.5	-0.1	0.2	
-20 ~ 0	-1.0	-0.7	-0.7	-0.6	-0.4	-0.1	0.3	
0 ~ 20	-1.0	-0.7	-0.7	-0.6	-0.4		0.4	
20 ~ 40	-1.0	-0.7	-0.6	-0.5	-0.3	0.1	0.5	
40 ~ 60	-1.0	-0.7	-0.6	-0.5	-0.3	0.1	0.5	
60 ~ 80	-1.0	-0.6	-0.6	-0.4	-0.2	0.2	0.6	

© OHARA GmbH – Hofheim – Germany

S-BAL12

540595
542592

Refractive Index	n_d	**1.53996**	Abbe Number	ν_d	**59.46**	Dispersion	$n_F - n_C$	**0.00908**
	n_e	1.542121		ν_e	59.20		$n_{F'} - n_{C'}$	0.009081 / 0.009158

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.51358
n_{1970}	1.97009	1.51848
n_{1530}	1.52958	1.52370
n_{1129}	1.12864	1.52825
n_t	1.01398	1.52974
n_s	0.85211	1.53230
$n_{A'}$	0.76819	1.53404
n_r	0.70652	1.53562
n_C	0.65627	**1.53719**
$n_{C'}$	0.64385	1.53763
n_{He-Ne}	0.6328	1.53804
n_D	0.58929	1.53988
n_d	0.58756	**1.53996**
n_e	0.54607	1.54212
n_F	0.48613	**1.54627**
$n_{F'}$	0.47999	1.54679
n_{He-Cd}	0.44157	1.55056
n_g	0.435835	**1.55122**
n_h	0.404656	1.55532
n_i	0.365015	1.56232
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	432
Annealing Point (°C)	**AP**	468
Transformation Temperature (°C)	**Tg**	478
Yield Point (°C)	**At**	527
Softening Point (°C)	**SP**	624
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	86
	(+100~+300°C)	102
Thermal Conductivity (W/m·K)	**k**	0.982

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	710
Rigidity Modulus (10^8N/m^2)	**G**	306
Poisson's Ratio	σ	0.161
Knoop Hardness	**Hk**	520 [5]
Abrasion	**Aa**	105
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.6

Partial Dispersions

$n_C - n_t$	0.007456
$n_C - n_{A'}$	0.003156
$n_d - n_C$	0.002762
$n_e - n_C$	0.004927
$n_g - n_d$	0.011260
$n_g - n_F$	0.004941
$n_h - n_g$	0.004105
$n_i - n_g$	0.011107
$n_{C'} - n_t$	0.007896
$n_e - n_{C'}$	0.004487
$n_{F'} - n_e$	0.004671
$n_i - n_{F'}$	0.015531

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0046
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	-0.0012
$\Delta\theta_{g,F}$	-0.0012
$\Delta\theta_{i,g}$	-0.0040

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	7.14605258	E-1
A_2	6.21993289	E-1
A_3	1.22537681	
B_1	3.01763913	E-3
B_2	1.66505450	E-2
B_3	1.43506314	E2
1129 ~ 2325 nm		
A_1	7.14605258	E-1
A_2	6.21993289	E-1
A_3	1.22537681	
B_1	3.01763913	E-3
B_2	1.66505450	E-2
B_3	1.43506314	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.8211
$\theta_{C,A'}$	0.3475
$\theta_{d,C}$	0.3042
$\theta_{e,C}$	0.5426
$\theta_{g,d}$	1.2400
$\theta_{g,F}$	0.5441
$\theta_{h,g}$	0.4520
$\theta_{i,g}$	1.2231
$\theta'_{C',t}$	0.8622
$\theta'_{e,C'}$	0.4900
$\theta'_{F',e}$	0.5100
$\theta'_{i,F'}$	1.6959

Internal Transmittance

λ_{80}	330	λ_5	301

CCI

B	G	R
0.00	0.09	0.06

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.020	
310	0.230	
320	0.570	
330	0.800	
340	0.914	
350	0.959	
360	0.979	
365		
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	
1000	0.999	
1200	0.999	
1400	0.993	
1600	0.995	
1800	0.983	
2000	0.966	
2200	0.920	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	33
Specific Gravity	**d**	2.75		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.4	1.7	1.8	1.8	2.0	2.3	2.6	
-20 ~ 0	1.4	1.7	1.8	1.9	2.0	2.3	2.6	
0 ~ 20	1.4	1.7	1.8	1.9	2.0	2.3	2.7	
20 ~ 40	1.4	1.7	1.8	1.9	2.0	2.4	2.7	
40 ~ 60	1.4	1.7	1.8	1.9	2.1	2.4	2.8	
60 ~ 80	1.4	1.8	1.8	1.9	2.1	2.4	2.8	

© OHARA GmbH – Hofheim – Germany

S-BAL14

569563
571561

Refractive Index	n_d	**1.56883**	Abbe Number	ν_d	**56.36**	Dispersion	$n_F - n_C$	**0.01010**
	n_e	1.568832		ν_e	56.09		$n_{F'} - n_{C'}$	0.010092
		1.571237						0.010185

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.54050
n_{1970}	1.97009	1.54565
n_{1530}	1.52958	1.55116
n_{1129}	1.12864	1.55601
n_t	1.01398	1.55761
n_s	0.85211	1.56040
$n_{A'}$	0.76819	1.56230
n_r	0.70652	1.56404
n_C	0.65627	**1.56577**
$n_{C'}$	0.64385	1.56626
n_{He-Ne}	0.6328	1.56671
n_D	0.58929	1.56874
n_d	0.58756	**1.56883**
n_e	0.54607	1.57124
n_F	0.48613	**1.57587**
$n_{F'}$	0.47999	1.57645
n_{He-Cd}	0.44157	1.58067
n_g	0.435835	**1.58141**
n_h	0.404656	1.58604
n_i	0.365015	1.59400
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	533
Annealing Point (°C)	**AP**	562
Transformation Temperature (°C)	**Tg**	580
Yield Point (°C)	**At**	622
Softening Point (°C)	**SP**	700
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	80
	(+100~+300°C)	93
Thermal Conductivity (W/m·K)	**k**	0.967

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	811
Rigidity Modulus (10^8N/m^2)	**G**	327
Poisson's Ratio	σ	0.240
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	134
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.32

Partial Dispersions	
$n_C - n_t$	0.008164
$n_C - n_{A'}$	0.003476
$n_d - n_C$	0.003057
$n_e - n_C$	0.005462
$n_g - n_d$	0.012574
$n_g - n_F$	0.005539
$n_h - n_g$	0.004629
$n_i - n_g$	0.012595
$n_{C'} - n_t$	0.008650
$n_e - n_{C'}$	0.004976
$n_{F'} - n_e$	0.005209
$n_i - n_{F'}$	0.017555

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0021
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	-0.0018
$\Delta\theta_{g,F}$	-0.0014
$\Delta\theta_{i,g}$	-0.0051

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.27553696	
A_2	1.46083393	E-1
A_3	1.16754699	
B_1	7.49692359	E-3
B_2	3.10421530	E-2
B_3	1.28947092	E2
1129 ~ 2325 nm		
A_1	1.27553696	
A_2	1.46083393	E-1
A_3	1.16754699	
B_1	7.49692359	E-3
B_2	3.10421530	E-2
B_3	1.28947092	E2

Chemical Properties		
Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8090
$\theta_{C,A'}$	0.3444
$\theta_{d,C}$	0.3029
$\theta_{e,C}$	0.5412
$\theta_{g,d}$	1.2459
$\theta_{g,F}$	0.5489
$\theta_{h,g}$	0.4587
$\theta_{i,g}$	1.2480
$\theta'_{C',t}$	0.8493
$\theta'_{e,C'}$	0.4886
$\theta'_{F',e}$	0.5114
$\theta'_{i,F'}$	1.7236

Internal Transmittance			
λ_{80}	354	λ_5	329

CCI		
B	G	R
0.00	0.26	0.24

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.090	
340	0.440	
350	0.740	
360	0.880	
365		
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	
1000	0.997	
1200	0.997	
1400	0.989	
1600	0.993	
1800	0.983	
2000	0.967	
2200	0.914	
2400	0.860	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	2.89		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.2	1.5	1.5	1.6	1.8	2.1	2.4	
-20 ~ 0	1.2	1.5	1.6	1.7	1.8	2.2	2.5	
0 ~ 20	1.3	1.6	1.6	1.7	1.9	2.2	2.6	
20 ~ 40	1.3	1.7	1.7	1.8	2.0	2.3	2.7	
40 ~ 60	1.4	1.7	1.8	1.8	2.0	2.4	2.8	
60 ~ 80	1.4	1.8	1.8	1.9	2.1	2.5	2.9	

© OHARA GmbH – Hofheim – Germany

S-BAL35

589612
591609

Refractive Index	n_d	**1.58913**	Abbe Number	ν_d	**61.14**	Dispersion	$n_F - n_C$	**0.00963**
	n_e	1.589130		ν_e	60.88		$n_{F'} - n_{C'}$	0.009636
		1.591429						0.009714

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55959
n_{1970}	1.97009	1.56531
n_{1530}	1.52958	1.57134
n_{1129}	1.12864	1.57648
n_t	1.01398	1.57813
n_s	0.85211	1.58093
$n_{A'}$	0.76819	1.58280
n_r	0.70652	1.58450
n_C	0.65627	**1.58619**
$n_{C'}$	0.64385	1.58666
n_{He-Ne}	0.6328	1.58710
n_D	0.58929	1.58904
n_d	0.58756	**1.58913**
n_e	0.54607	1.59143
n_F	0.48613	**1.59582**
$n_{F'}$	0.47999	1.59637
n_{He-Cd}	0.44157	1.60034
n_g	0.435835	**1.60103**
n_h	0.404656	1.60535
n_i	0.365015	1.61268
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	619
Annealing Point (°C)	**AP**	646
Transformation Temperature (°C)	**Tg**	669
Yield Point (°C)	**At**	709
Softening Point (°C)	**SP**	768
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	57
	(+100~+300°C)	67
Thermal Conductivity (W/m·K)	**k**	0.915

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	832
Rigidity Modulus (10^8N/m^2)	**G**	333
Poisson's Ratio	σ	0.250
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	115
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.15

Partial Dispersions

$n_C - n_t$	0.008061
$n_C - n_{A'}$	0.003384
$n_d - n_C$	0.002942
$n_e - n_C$	0.005241
$n_g - n_d$	0.011904
$n_g - n_F$	0.005210
$n_h - n_g$	0.004314
$n_i - n_g$	0.011647
$n_{C'} - n_t$	0.008530
$n_e - n_{C'}$	0.004772
$n_{F'} - n_e$	0.004942
$n_i - n_{F'}$	0.016310

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0030
$\Delta\theta_{C,A'}$	0.0012
$\Delta\theta_{g,d}$	-0.0024
$\Delta\theta_{g,F}$	-0.0018
$\Delta\theta_{i,g}$	-0.0044

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.41357273	E-1
A_2	5.46174895	E-1
A_3	1.16168917	
B_1	1.40333996	E-2
B_2	9.06635683	E-4
B_3	1.14163758	E2
1129 ~ 2325 nm		
A_1	9.41357273	E-1
A_2	5.46174895	E-1
A_3	1.16168917	
B_1	1.40333996	E-2
B_2	9.06635683	E-4
B_3	1.14163758	E2

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**	4.2
Phosphate Resistance	**PR**	1.0

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.31		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	3.1	3.1	3.3	3.4	3.6	3.9	
-20 ~ 0	3.0	3.3	3.3	3.4	3.5	3.8	4.1	
0 ~ 20	3.2	3.5	3.5	3.6	3.7	4.0	4.3	
20 ~ 40	3.3	3.6	3.6	3.8	3.9	4.2	4.5	
40 ~ 60	3.5	3.8	3.8	3.9	4.1	4.4	4.7	
60 ~ 80	3.6	3.9	4.0	4.1	4.2	4.5	4.9	

Relative Partial Dispersions

$\theta_{C,t}$	0.8366
$\theta_{C,A'}$	0.3512
$\theta_{d,C}$	0.3053
$\theta_{e,C}$	0.5439
$\theta_{g,d}$	1.2354
$\theta_{g,F}$	0.5407
$\theta_{h,g}$	0.4477
$\theta_{i,g}$	1.2087
$\theta'_{C',t}$	0.8781
$\theta'_{e,C'}$	0.4912
$\theta'_{F',e}$	0.5088
$\theta'_{i,F'}$	1.6790

Internal Transmittance

λ_{80}	339	λ_5	303

CCI

B	G	R
0.00	0.17	0.15

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.010	
310	0.160	
320	0.430	
330	0.670	
340	0.820	
350	0.904	
360	0.949	
365		
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	
1000	0.998	
1200	0.998	
1400	0.984	
1600	0.994	
1800	0.987	
2000	0.972	
2200	0.890	
2400	0.800	

© OHARA GmbH – Hofheim – Germany

S-BAL41

564607
566604

Refractive Index	n_d	**1.56384**	Abbe Number	ν_d	**60.67**	Dispersion	$n_F - n_C$	**0.00929**
	n_e	1.563839		ν_e	60.42		$n_{F'} - n_{C'}$	0.009294
		1.566056						0.009369

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.53530
n_{1970}	1.97009	1.54083
n_{1530}	1.52958	1.54667
n_{1129}	1.12864	1.55164
n_t	1.01398	1.55322
n_s	0.85211	1.55593
$n_{A'}$	0.76819	1.55774
n_r	0.70652	1.55938
n_C	0.65627	**1.56100**
$n_{C'}$	0.64385	1.56145
n_{He-Ne}	0.6328	1.56188
n_D	0.58929	1.56376
n_d	0.58756	**1.56384**
n_e	0.54607	1.56606
n_F	0.48613	**1.57029**
$n_{F'}$	0.47999	1.57082
n_{He-Cd}	0.44157	1.57465
n_g	0.435835	**1.57532**
n_h	0.404656	1.57947
n_i	0.365015	1.58652
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	486
Annealing Point (°C)	**AP**	521
Transformation Temperature (°C)	**Tg**	541
Yield Point (°C)	**At**	577
Softening Point (°C)	**SP**	644
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	75
	(+100~+300°C)	91
Thermal Conductivity (W/m·K)	**k**	1.043

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	890
Rigidity Modulus (10^8N/m^2)	**G**	358
Poisson's Ratio	σ	0.242
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	122
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.32

Partial Dispersions	
$n_C - n_t$	0.007779
$n_C - n_{A'}$	0.003265
$n_d - n_C$	0.002838
$n_e - n_C$	0.005055
$n_g - n_d$	0.011477
$n_g - n_F$	0.005021
$n_h - n_g$	0.004155
$n_i - n_g$	0.011208
$n_{C'} - n_t$	0.008231
$n_e - n_{C'}$	0.004603
$n_{F'} - n_e$	0.004766
$n_i - n_{F'}$	0.015702

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0057
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	-0.0038
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	-0.0111

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.24344200	
A_2	1.66301104	E-1
A_3	1.10586114	
B_1	1.16396708	E-2
B_2	-8.90464938	E-3
B_3	1.14111220	E2
1129 ~ 2325 nm		
A_1	1.24344200	
A_2	1.66301104	E-1
A_3	1.10586114	
B_1	1.16396708	E-2
B_2	-8.90464938	E-3
B_3	1.14111220	E2

Chemical Properties		
Water Resistance (Powder Group)	**RW(P)**	3
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	2~3
Acid Resistance (Surface Group)	**SR**	51.2
Phosphate Resistance	**PR**	3.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.8370
$\theta_{C,A'}$	0.3513
$\theta_{d,C}$	0.3054
$\theta_{e,C}$	0.5439
$\theta_{g,d}$	1.2349
$\theta_{g,F}$	0.5402
$\theta_{h,g}$	0.4471
$\theta_{i,g}$	1.2059
$\theta'_{C',t}$	0.8785
$\theta'_{e,C'}$	0.4913
$\theta'_{F',e}$	0.5087
$\theta'_{i,F'}$	1.6760

Internal Transmittance			
λ_{80}	336	λ_5	300

CCI		
B	G	R
0.00	0.20	0.14

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.050	
310	0.250	
320	0.510	
330	0.720	
340	0.850	
350	0.925	
360	0.960	
365		
370	0.978	
380	0.985	
390	0.990	
400	0.993	
420	0.994	
440	0.994	
460	0.995	
480	0.997	
500	0.998	
550	0.999	
600	0.998	
650	0.997	
700	0.998	
800	0.998	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.987	
1600	0.993	
1800	0.984	
2000	0.971	
2200	0.908	
2400	0.830	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35	
Specific Gravity	**d**	2.78		λ_5	30	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.1	2.3	2.3	2.4	2.5	2.8	3.0	
-20 ~ 0	2.1	2.3	2.3	2.4	2.6	2.9	3.2	
0 ~ 20	2.1	2.4	2.4	2.5	2.7	3.0	3.3	
20 ~ 40	2.1	2.5	2.5	2.6	2.7	3.1	3.4	
40 ~ 60	2.2	2.5	2.5	2.7	2.8	3.2	3.5	
60 ~ 80	2.2	2.6	2.6	2.7	2.9	3.2	3.6	

© OHARA GmbH – Hofheim – Germany

S-BAL42

583594
585591

Refractive Index	n_d	**1.58313**	Abbe Number	ν_d	**59.38**	Dispersion	$n_F - n_C$	**0.00982**
	n_e	1.583126		ν_e	59.11		$n_{F'} - n_{C'}$	0.009821
		1.585468						0.009905

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55463
n_{1970}	1.97009	1.55992
n_{1530}	1.52958	1.56557
n_{1129}	1.12864	1.57048
n_t	1.01398	1.57208
n_s	0.85211	1.57485
$n_{A'}$	0.76819	1.57673
n_r	0.70652	1.57844
n_C	0.65627	**1.58014**
$n_{C'}$	0.64385	1.58061
n_{He-Ne}	0.6328	1.58106
n_D	0.58929	1.58304
n_d	0.58756	**1.58313**
n_e	0.54607	1.58547
n_F	0.48613	**1.58996**
$n_{F'}$	0.47999	1.59052
n_{He-Cd}	0.44157	1.59459
n_g	0.435835	**1.59530**
n_h	0.404656	1.59972
n_i	0.365015	1.60724
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	503
Annealing Point (°C)	**AP**	534
Transformation Temperature (°C)	**Tg**	550
Yield Point (°C)	**At**	588
Softening Point (°C)	**SP**	672
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	66
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.974

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	847
Rigidity Modulus (10^8N/m^2)	**G**	340
Poisson's Ratio	σ	0.246
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	117
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.2

Partial Dispersions

$n_C - n_t$	0.008056
$n_C - n_{A'}$	0.003413
$n_d - n_C$	0.002987
$n_e - n_C$	0.005329
$n_g - n_d$	0.012171
$n_g - n_F$	0.005337
$n_h - n_g$	0.004424
$n_i - n_g$	0.011946
$n_{C'} - n_t$	0.008531
$n_e - n_{C'}$	0.004854
$n_{F'} - n_e$	0.005051
$n_i - n_{F'}$	0.016724

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0050
$\Delta\theta_{C,A'}$	-0.0004
$\Delta\theta_{g,d}$	-0.0021
$\Delta\theta_{g,F}$	-0.0020
$\Delta\theta_{i,g}$	-0.0114

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.39570615	
A_2	7.18505070	E-2
A_3	1.27129267	
B_1	1.12218843	E-2
B_2	-2.52117422	E-2
B_3	1.34497860	E2
1129 ~ 2325 nm		
A_1	1.39570615	
A_2	7.18505070	E-2
A_3	1.27129267	
B_1	1.12218843	E-2
B_2	-2.52117422	E-2
B_3	1.34497860	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8203
$\theta_{C,A'}$	0.3475
$\theta_{d,C}$	0.3041
$\theta_{e,C}$	0.5426
$\theta_{g,d}$	1.2393
$\theta_{g,F}$	0.5434
$\theta_{h,g}$	0.4505
$\theta_{i,g}$	1.2164
$\theta'_{C',t}$	0.8613
$\theta'_{e,C'}$	0.4901
$\theta'_{F',e}$	0.5099
$\theta'_{i,F'}$	1.6884

Internal Transmittance

λ_{80}	335	λ_5	292

CCI

B	G	R
0.00	0.16	0.14

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.030	
300	0.150	
310	0.360	
320	0.580	
330	0.750	
340	0.860	
350	0.932	
360	0.964	
365		
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	
1000	0.997	
1200	0.997	
1400	0.987	
1600	0.994	
1800	0.985	
2000	0.973	
2200	0.917	
2400	0.860	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.19		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	3.2	3.2	3.3	3.5	3.8	4.0	
-20 ~ 0	2.9	3.3	3.3	3.4	3.5	3.8	4.1	
0 ~ 20	3.0	3.3	3.3	3.4	3.6	3.9	4.2	
20 ~ 40	3.0	3.4	3.4	3.5	3.7	4.0	4.3	
40 ~ 60	3.0	3.4	3.4	3.6	3.7	4.1	4.4	
60 ~ 80	3.1	3.5	3.5	3.7	3.8	4.2	4.5	

© OHARA GmbH – Hofheim – Germany

S-BAM4

606437
609434

Refractive Index	n_d	**1.60562**	Abbe Number	ν_d	**43.70**	Dispersion	$n_F - n_C$	**0.01385**
	n_e	1.608909		ν_e	43.41		$n_{F'} - n_{C'}$	0.014026
		1.605620						0.013857

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57351
n_{1970}	1.97009	1.57850
n_{1530}	1.52958	1.58402
n_{1129}	1.12864	1.58926
n_t	1.01398	1.59113
n_s	0.85211	1.59453
$n_{A'}$	0.76819	1.59695
n_r	0.70652	1.59921
n_C	0.65627	**1.60151**
$n_{C'}$	0.64385	1.60215
n_{He-Ne}	0.6328	1.60276
n_D	0.58929	1.60550
n_d	0.58756	**1.60562**
n_e	0.54607	1.60891
n_F	0.48613	**1.61536**
$n_{F'}$	0.47999	1.61618
n_{He-Cd}	0.44157	1.62222
n_g	0.435835	**1.62329**
n_h	0.404656	1.63010
n_i	0.365015	1.64228
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	548
Annealing Point (°C)	**AP**	577
Transformation Temperature (°C)	**Tg**	599
Yield Point (°C)	**At**	641
Softening Point (°C)	**SP**	722
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	84
	(+100~+300°C)	97
Thermal Conductivity (W/m·K)	**k**	0.931

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	762
Rigidity Modulus (10^8N/m^2)	**G**	306
Poisson's Ratio	σ	0.244
Knoop Hardness	**Hk**	520 [5]
Abrasion	**Aa**	151
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.41

Partial Dispersions

$n_C - n_t$	0.010380
$n_C - n_{A'}$	0.004557
$n_d - n_C$	0.004113
$n_e - n_C$	0.007402
$n_g - n_d$	0.017671
$n_g - n_F$	0.007927
$n_h - n_g$	0.006811
$n_i - n_g$	0.018992
$n_{C'} - n_t$	0.011028
$n_e - n_{C'}$	0.006754
$n_{F'} - n_e$	0.007272
$n_i - n_{F'}$	0.026102

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0026
$\Delta\theta_{C,A'}$	0.0001
$\Delta\theta_{g,d}$	0.0012
$\Delta\theta_{g,F}$	0.0013
$\Delta\theta_{i,g}$	0.0115

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.41059317	
A_2	1.11201306	E-1
A_3	1.34148939	
B_1	9.63312192	E-3
B_2	4.98778210	E-2
B_3	1.52237696	E2
1129 ~ 2325 nm		
A_1	1.41059317	
A_2	1.11201306	E-1
A_3	1.34148939	
B_1	9.63312192	E-3
B_2	4.98778210	E-2
B_3	1.52237696	E2

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7491
$\theta_{C,A'}$	0.3289
$\theta_{d,C}$	0.2968
$\theta_{e,C}$	0.5342
$\theta_{g,d}$	1.2752
$\theta_{g,F}$	0.5721
$\theta_{h,g}$	0.4915
$\theta_{i,g}$	1.3706
$\theta'_{C',t}$	0.7863
$\theta'_{e,C'}$	0.4815
$\theta'_{F',e}$	0.5185
$\theta'_{i,F'}$	1.8610

Internal Transmittance

λ_{80}	375	λ_5	350

CCI

B	G	R
0.00	0.69	0.65

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.060	
360	0.410	
365		
370	0.720	
380	0.870	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.994	
1800	0.980	
2000	0.962	
2200	0.919	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	2.91		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.6	1.0	1.0	1.2	1.4	1.9	2.4	
-20 ~ 0	0.7	1.1	1.1	1.3	1.5	2.0	2.6	
0 ~ 20	0.7	1.1	1.2	1.3	1.6	2.1	2.7	
20 ~ 40	0.8	1.2	1.2	1.4	1.7	2.2	2.9	
40 ~ 60	0.8	1.3	1.3	1.5	1.8	2.4	3.0	
60 ~ 80	0.9	1.4	1.4	1.6	1.9	2.5	3.2	

© OHARA GmbH – Hofheim – Germany

S-BAM12

639449
643446

Refractive Index	n_d	**1.63930**	Abbe Number	ν_d	**44.87**	Dispersion	$n_F - n_C$	**0.01424**
	n_e	1.639300		ν_e	44.59		$n_{F'} - n_{C'}$	0.014247
		1.642684						0.014414

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.60480
n_{1970}	1.97009	1.61040
n_{1530}	1.52958	1.61653
n_{1129}	1.12864	1.62223
n_t	1.01398	1.62422
n_s	0.85211	1.62781
$n_{A'}$	0.76819	1.63033
n_r	0.70652	1.63268
n_C	0.65627	**1.63506**
$n_{C'}$	0.64385	1.63573
n_{He-Ne}	0.6328	1.63635
n_D	0.58929	1.63917
n_d	0.58756	**1.63930**
n_e	0.54607	1.64268
n_F	0.48613	**1.64930**
$n_{F'}$	0.47999	1.65014
n_{He-Cd}	0.44157	1.65631
n_g	0.435835	**1.65740**
n_h	0.404656	1.66433
n_i	0.365015	1.67665
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	565
Annealing Point (°C)	**AP**	592
Transformation Temperature (°C)	**Tg**	608
Yield Point (°C)	**At**	645
Softening Point (°C)	**SP**	717
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	76
	(+100~+300°C)	91
Thermal Conductivity (W/m·K)	**k**	0.954

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	904
Rigidity Modulus (10^8N/m^2)	**G**	361
Poisson's Ratio	σ	0.253
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	144
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.3

Partial Dispersions

$n_C - n_t$	0.010836
$n_C - n_{A'}$	0.004725
$n_d - n_C$	0.004243
$n_e - n_C$	0.007627
$n_g - n_d$	0.018101
$n_g - n_F$	0.008097
$n_h - n_g$	0.006929
$n_i - n_g$	0.019244
$n_{C'} - n_t$	0.011505
$n_e - n_{C'}$	0.006958
$n_{F'} - n_e$	0.007456
$n_i - n_{F'}$	0.026505

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0034
$\Delta\theta_{C,A'}$	0.0014
$\Delta\theta_{g,d}$	-0.0010
$\Delta\theta_{g,F}$	-0.0006
$\Delta\theta_{i,g}$	0.0014

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.50161605	
A_2	1.26987445	E-1
A_3	1.43544052	
B_1	9.40761826	E-3
B_2	4.72602195	E-2
B_3	1.41666499	E2
1129 ~ 2325 nm		
A_1	1.50161605	
A_2	1.26987445	E-1
A_3	1.43544052	
B_1	9.40761826	E-3
B_2	4.72602195	E-2
B_3	1.41666499	E2

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**	3.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7606
$\theta_{C,A'}$	0.3316
$\theta_{d,C}$	0.2978
$\theta_{e,C}$	0.5353
$\theta_{g,d}$	1.2705
$\theta_{g,F}$	0.5683
$\theta_{h,g}$	0.4863
$\theta_{i,g}$	1.3507
$\theta'_{C',t}$	0.7982
$\theta'_{e,C'}$	0.4827
$\theta'_{F',e}$	0.5173
$\theta'_{i,F'}$	1.8388

Internal Transmittance

λ_{80}	374	λ_5	348

CCI

B	G	R
0.00	0.93	0.93

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.130	
360	0.490	
365		
370	0.750	
380	0.870	
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	
1000	0.998	
1200	0.998	
1400	0.992	
1600	0.995	
1800	0.987	
2000	0.976	
2200	0.932	
2400	0.860	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	3.18		λ_5	35		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.3	2.6	2.7	2.8	3.0	3.5	4.1	
-20 ~ 0	2.3	2.7	2.7	2.9	3.1	3.6	4.2	
0 ~ 20	2.3	2.7	2.8	3.0	3.2	3.7	4.3	
20 ~ 40	2.4	2.8	2.8	3.0	3.3	3.8	4.5	
40 ~ 60	2.4	2.8	2.9	3.1	3.3	3.9	4.6	
60 ~ 80	2.4	2.9	2.9	3.1	3.4	4.0	4.7	

© OHARA GmbH – Hofheim – Germany

S-BSL7

516641
518639

Refractive Index	n_d	**1.51633**	Abbe Number	ν_d	**64.14**	Dispersion	$n_F - n_C$	**0.00805**
	n_e	1.516330		ν_e	63.93		$n_{F'} - n_{C'}$	0.008050
		1.518251						0.008107

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.48899
n_{1970}	1.97009	1.49462
n_{1530}	1.52958	1.50050
n_{1129}	1.12864	1.50536
n_t	1.01398	1.50686
n_s	0.85211	1.50935
$n_{A'}$	0.76819	1.51097
n_r	0.70652	1.51243
n_C	0.65627	**1.51386**
$n_{C'}$	0.64385	1.51425
n_{He-Ne}	0.6328	1.51462
n_D	0.58929	1.51626
n_d	0.58756	**1.51633**
n_e	0.54607	1.51825
n_F	0.48613	**1.52191**
$n_{F'}$	0.47999	1.52236
n_{He-Cd}	0.44157	1.52564
n_g	0.435835	**1.52621**
n_h	0.404656	1.52977
n_i	0.365015	1.53578
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	532
Annealing Point (°C)	**AP**	563
Transformation Temperature (°C)	**Tg**	576
Yield Point (°C)	**At**	625
Softening Point (°C)	**SP**	718
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	72
	(+100~+300°C)	86
Thermal Conductivity (W/m·K)	**k**	1.130

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	800
Rigidity Modulus (10^8N/m^2)	**G**	332
Poisson's Ratio	σ	0.205
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	94
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.79

Partial Dispersions	
$n_C - n_t$	0.006993
$n_C - n_{A'}$	0.002882
$n_d - n_C$	0.002475
$n_e - n_C$	0.004396
$n_g - n_d$	0.009884
$n_g - n_F$	0.004309
$n_h - n_g$	0.003554
$n_i - n_g$	0.009571
$n_{C'} - n_t$	0.007389
$n_e - n_{C'}$	0.004000
$n_{F'} - n_e$	0.004107
$n_i - n_{F'}$	0.013427

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0211
$\Delta\theta_{C,A'}$	0.0044
$\Delta\theta_{g,d}$	-0.0037
$\Delta\theta_{g,F}$	-0.0024
$\Delta\theta_{i,g}$	0.0010

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.15150190	
A_2	1.18583612	E-1
A_3	1.26301359	
B_1	1.05984130	E-2
B_2	-1.18225190	E-2
B_3	1.29617662	E2
1129 ~ 2325 nm		
A_1	1.15150190	
A_2	1.18583612	E-1
A_3	1.26301359	
B_1	1.05984130	E-2
B_2	-1.18225190	E-2
B_3	1.29617662	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8687
$\theta_{C,A'}$	0.3580
$\theta_{d,C}$	0.3075
$\theta_{e,C}$	0.5461
$\theta_{g,d}$	1.2278
$\theta_{g,F}$	0.5353
$\theta_{h,g}$	0.4415
$\theta_{i,g}$	1.1889
$\theta'_{C',t}$	0.9114
$\theta'_{e,C'}$	0.4934
$\theta'_{F',e}$	0.5066
$\theta'_{i,F'}$	1.6562

Internal Transmittance			
λ_{80}	323	λ_5	289

CCI		
B	G	R
0.00	0.08	0.07

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.080	
300	0.310	
310	0.580	
320	0.770	
330	0.880	
340	0.940	
350	0.968	
360	0.984	
365		
370	0.991	
380	0.991	
390	0.996	
400	0.997	
420	0.996	
440	0.995	
460	0.995	
480	0.996	
500	0.996	
550	0.998	
600	0.997	
650	0.997	
700	0.998	
800	0.998	
900	0.997	
1000	0.996	
1200	0.995	
1400	0.982	
1600	0.991	
1800	0.980	
2000	0.961	
2200	0.890	
2400	0.850	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	33
Specific Gravity	**d**	2.52		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.1	2.3	2.3	2.4	2.5	2.7	3.0	
-20 ~ 0	2.1	2.4	2.4	2.5	2.6	2.8	3.1	
0 ~ 20	2.2	2.5	2.5	2.6	2.7	3.0	3.2	
20 ~ 40	2.2	2.6	2.6	2.7	2.8	3.1	3.3	
40 ~ 60	2.3	2.6	2.7	2.8	2.9	3.2	3.5	
60 ~ 80	2.4	2.7	2.7	2.9	3.0	3.3	3.6	

© OHARA GmbH – Hofheim – Germany

S-BSM2

607568
610565

Refractive Index	n_d	**1.60738**	Abbe Number	ν_d	**56.81**	Dispersion	$n_F - n_C$	**0.01069**
	n_e	1.609927		ν_e	56.53		$n_{F'} - n_{C'}$	0.010790
		1.607379						0.010691

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57874
n_{1970}	1.97009	1.58374
n_{1530}	1.52958	1.58913
n_{1129}	1.12864	1.59398
n_t	1.01398	1.59561
n_s	0.85211	1.59849
$n_{A'}$	0.76819	1.60048
n_r	0.70652	1.60231
n_C	0.65627	**1.60414**
$n_{C'}$	0.64385	1.60466
n_{He-Ne}	0.6328	1.60514
n_D	0.58929	1.60728
n_d	0.58756	**1.60738**
n_e	0.54607	1.60993
n_F	0.48613	**1.61483**
$n_{F'}$	0.47999	1.61545
n_{He-Cd}	0.44157	1.61992
n_g	0.435835	**1.62070**
n_h	0.404656	1.62558
n_i	0.365015	1.63394
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	612
Annealing Point (°C)	**AP**	643
Transformation Temperature (°C)	**Tg**	654
Yield Point (°C)	**At**	690
Softening Point (°C)	**SP**	778
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	65
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.802

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	780
Rigidity Modulus (10^8N/m^2)	**G**	309
Poisson's Ratio	σ	0.264
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	133
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.26

Partial Dispersions

$n_C - n_t$	0.008534
$n_C - n_{A'}$	0.003662
$n_d - n_C$	0.003235
$n_e - n_C$	0.005783
$n_g - n_d$	0.013318
$n_g - n_F$	0.005862
$n_h - n_g$	0.004885
$n_i - n_g$	0.013244
$n_{C'} - n_t$	0.009048
$n_e - n_{C'}$	0.005269
$n_{F'} - n_e$	0.005521
$n_i - n_{F'}$	0.018493

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0150
$\Delta\theta_{C,A'}$	-0.0022
$\Delta\theta_{g,d}$	-0.0010
$\Delta\theta_{g,F}$	-0.0013
$\Delta\theta_{i,g}$	-0.0105

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	8.67168676	E-1
A_2	6.72848343	E-1
A_3	1.18456107	
B_1	3.69311003	E-3
B_2	1.81652804	E-2
B_3	1.32376147	E2
1129 ~ 2325 nm		
A_1	8.67168676	E-1
A_2	6.72848343	E-1
A_3	1.18456107	
B_1	3.69311003	E-3
B_2	1.81652804	E-2
B_3	1.32376147	E2

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**	5.2
Phosphate Resistance	**PR**	2.2

Relative Partial Dispersions

$\theta_{C,t}$	0.7982
$\theta_{C,A'}$	0.3425
$\theta_{d,C}$	0.3026
$\theta_{e,C}$	0.5409
$\theta_{g,d}$	1.2457
$\theta_{g,F}$	0.5483
$\theta_{h,g}$	0.4569
$\theta_{i,g}$	1.2388
$\theta'_{C',t}$	0.8386
$\theta'_{e,C'}$	0.4883
$\theta'_{F',e}$	0.5117
$\theta'_{i,F'}$	1.7139

Internal Transmittance

λ_{80}	343	λ_5	310

CCI

B	G	R
0.00	0.26	0.25

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.040	
320	0.270	
330	0.570	
340	0.770	
350	0.880	
360	0.941	
365		
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.997	
1800	0.992	
2000	0.984	
2200	0.951	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35	
Specific Gravity	**d**	3.53		λ_5	30	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.1	3.5	3.6	3.7	3.8	4.2	4.5	
-20 ~ 0	3.2	3.6	3.7	3.8	3.9	4.3	4.7	
0 ~ 20	3.3	3.7	3.7	3.9	4.0	4.4	4.8	
20 ~ 40	3.4	3.8	3.8	4.0	4.1	4.5	4.9	
40 ~ 60	3.4	3.9	3.9	4.1	4.3	4.7	5.1	
60 ~ 80	3.5	4.0	4.0	4.2	4.4	4.8	5.2	

© OHARA GmbH – Hofheim – Germany

S-BSM4

613587
615584

Refractive Index	n_d	**1.61272**	Abbe Number	ν_d	**58.72**	Dispersion	$n_F - n_C$	**0.01043**
	n_e	1.612716		ν_e	58.45		$n_{F'} - n_{C'}$	0.010435
		1.615204						0.010526

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.58338
n_{1970}	1.97009	1.58871
n_{1530}	1.52958	1.59440
n_{1129}	1.12864	1.59941
n_t	1.01398	1.60107
n_s	0.85211	1.60396
$n_{A'}$	0.76819	1.60594
n_r	0.70652	1.60775
n_C	0.65627	**1.60955**
$n_{C'}$	0.64385	1.61005
n_{He-Ne}	0.6328	1.61052
n_D	0.58929	1.61262
n_d	0.58756	**1.61272**
n_e	0.54607	1.61520
n_F	0.48613	**1.61998**
$n_{F'}$	0.47999	1.62058
n_{He-Cd}	0.44157	1.62491
n_g	0.435835	**1.62567**
n_h	0.404656	1.63039
n_i	0.365015	1.63845
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	613
Annealing Point (°C)	**AP**	643
Transformation Temperature (°C)	**Tg**	660
Yield Point (°C)	**At**	694
Softening Point (°C)	**SP**	757
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	67
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.836

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	816
Rigidity Modulus (10^8N/m^2)	**G**	322
Poisson's Ratio	σ	0.265
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	142
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.77

Partial Dispersions	
$n_C - n_t$	0.008474
$n_C - n_{A'}$	0.003609
$n_d - n_C$	0.003169
$n_e - n_C$	0.005657
$n_g - n_d$	0.012952
$n_g - n_F$	0.005686
$n_h - n_g$	0.004723
$n_i - n_g$	0.012778
$n_{C'} - n_t$	0.008978
$n_e - n_{C'}$	0.005153
$n_{F'} - n_e$	0.005373
$n_i - n_{F'}$	0.017869

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0101
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	-0.0016
$\Delta\theta_{g,F}$	-0.0016
$\Delta\theta_{i,g}$	-0.0088

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	9.62443080	E-1
A_2	5.95939234	E-1
A_3	1.10558352	
B_1	4.68062141	E-3
B_2	1.78772082	E-2
B_3	1.15896432	E2
1129 ~ 2325 nm		
A_1	9.62443080	E-1
A_2	5.95939234	E-1
A_3	1.10558352	
B_1	4.68062141	E-3
B_2	1.78772082	E-2
B_3	1.15896432	E2

Chemical Properties		
Water Resistance (Powder Group)	**RW(P)**	2
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	1~2
Acid Resistance (Surface Group)	**SR**	51.2
Phosphate Resistance	**PR**	2.2

Relative Partial Dispersions	
$\theta_{C,t}$	0.8121
$\theta_{C,A'}$	0.3459
$\theta_{d,C}$	0.3037
$\theta_{e,C}$	0.5421
$\theta_{g,d}$	1.2412
$\theta_{g,F}$	0.5449
$\theta_{h,g}$	0.4526
$\theta_{i,g}$	1.2245
$\theta'_{C',t}$	0.8529
$\theta'_{e,C'}$	0.4895
$\theta'_{F',e}$	0.5105
$\theta'_{i,F'}$	1.6976

Internal Transmittance			
λ_{80}	346	λ_5	311

CCI		
B	G	R
0.00	0.18	0.18

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.040	
320	0.240	
330	0.520	
340	0.730	
350	0.850	
360	0.924	
365		
370	0.960	
380	0.977	
390	0.985	
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	0.998	
700	0.998	
800	0.998	
900	0.997	
1000	0.997	
1200	0.997	
1400	0.990	
1600	0.994	
1800	0.985	
2000	0.971	
2200	0.911	
2400	0.820	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.57		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.8	2.0	2.0	2.1	2.2	2.5	2.8	
-20 ~ 0	1.9	2.1	2.1	2.2	2.3	2.6	2.9	
0 ~ 20	1.9	2.2	2.2	2.3	2.4	2.8	3.1	
20 ~ 40	2.0	2.3	2.3	2.4	2.6	2.9	3.2	
40 ~ 60	2.0	2.3	2.4	2.5	2.7	3.0	3.3	
60 ~ 80	2.1	2.4	2.5	2.6	2.8	3.1	3.5	

© OHARA GmbH – Hofheim – Germany

S-BSM10

623570
625568

Refractive Index	n_d	**1.62280**	Abbe Number	ν_d	**57.05**	Dispersion	$n_F - n_C$	**0.01092**
	n_e	1.622799		ν_e	56.78		$n_{F'} - n_{C'}$	0.010916
		1.625401						0.011014

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.59271
n_{1970}	1.97009	1.59809
n_{1530}	1.52958	1.60386
n_{1129}	1.12864	1.60898
n_t	1.01398	1.61069
n_s	0.85211	1.61368
$n_{A'}$	0.76819	1.61573
n_r	0.70652	1.61761
n_C	0.65627	**1.61949**
$n_{C'}$	0.64385	1.62001
n_{He-Ne}	0.6328	1.62051
n_D	0.58929	1.62270
n_d	0.58756	**1.62280**
n_e	0.54607	1.62540
n_F	0.48613	**1.63041**
$n_{F'}$	0.47999	1.63103
n_{He-Cd}	0.44157	1.63558
n_g	0.435835	**1.63637**
n_h	0.404656	1.64133
n_i	0.365015	1.64980
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	622
Annealing Point (°C)	**AP**	650
Transformation Temperature (°C)	**Tg**	668
Yield Point (°C)	**At**	709
Softening Point (°C)	**SP**	773
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	65
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.822

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	835
Rigidity Modulus (10^8N/m^2)	**G**	330
Poisson's Ratio	σ	0.266
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	142
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.88

Partial Dispersions

$n_C - n_t$	0.008800
$n_C - n_{A'}$	0.003759
$n_d - n_C$	0.003310
$n_e - n_C$	0.005912
$n_g - n_d$	0.013570
$n_g - n_F$	0.005964
$n_h - n_g$	0.004960
$n_i - n_g$	0.013428
$n_{C'} - n_t$	0.009326
$n_e - n_{C'}$	0.005386
$n_{F'} - n_e$	0.005628
$n_i - n_{F'}$	0.018768

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0082
$\Delta\theta_{C,A'}$	-0.0006
$\Delta\theta_{g,d}$	-0.0031
$\Delta\theta_{g,F}$	-0.0028
$\Delta\theta_{i,g}$	-0.0172

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.45443081	E-1
A_2	6.43237376	E-1
A_3	1.17752968	
B_1	1.57263798	E-2
B_2	1.61924066	E-3
B_3	1.21361748	E2
1129 ~ 2325 nm		
A_1	9.45443081	E-1
A_2	6.43237376	E-1
A_3	1.17752968	
B_1	1.57263798	E-2
B_2	1.61924066	E-3
B_3	1.21361748	E2

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**	51.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8062
$\theta_{C,A'}$	0.3444
$\theta_{d,C}$	0.3032
$\theta_{e,C}$	0.5416
$\theta_{g,d}$	1.2431
$\theta_{g,F}$	0.5464
$\theta_{h,g}$	0.4544
$\theta_{i,g}$	1.2301
$\theta'_{C',t}$	0.8467
$\theta'_{e,C'}$	0.4890
$\theta'_{F',e}$	0.5110
$\theta'_{i,F'}$	1.7040

Internal Transmittance

λ_{80}	345	λ_5	309

CCI

B	G	R
0.00	0.17	0.15

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.080	
320	0.310	
330	0.570	
340	0.750	
350	0.860	
360	0.929	
365		
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	
1000	0.997	
1200	0.997	
1400	0.990	
1600	0.993	
1800	0.985	
2000	0.971	
2200	0.913	
2400	0.820	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.60		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.0	2.4	2.4	2.5	2.6	3.0	3.3	
-20 ~ 0	2.1	2.5	2.5	2.6	2.7	3.1	3.4	
0 ~ 20	2.2	2.6	2.6	2.7	2.8	3.2	3.5	
20 ~ 40	2.2	2.6	2.7	2.8	2.9	3.3	3.6	
40 ~ 60	2.3	2.7	2.8	2.9	3.0	3.4	3.8	
60 ~ 80	2.4	2.8	2.8	3.0	3.1	3.5	3.9	

© OHARA GmbH – Hofheim – Germany

S-BSM14

603607
605604

Refractive Index	n_d	**1.60311**	Abbe Number	ν_d	**60.64**	Dispersion	$n_F - n_C$	**0.00994**
	n_e	1.603112		ν_e	60.39		$n_{F'} - n_{C'}$	0.009945
		1.605484						0.010027

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57300
n_{1970}	1.97009	1.57880
n_{1530}	1.52958	1.58491
n_{1129}	1.12864	1.59013
n_t	1.01398	1.59180
n_s	0.85211	1.59467
$n_{A'}$	0.76819	1.59660
n_r	0.70652	1.59835
n_C	0.65627	**1.60008**
$n_{C'}$	0.64385	1.60056
n_{He-Ne}	0.6328	1.60101
n_D	0.58929	1.60302
n_d	0.58756	**1.60311**
n_e	0.54607	1.60548
n_F	0.48613	**1.61002**
$n_{F'}$	0.47999	1.61059
n_{He-Cd}	0.44157	1.61470
n_g	0.435835	**1.61541**
n_h	0.404656	1.61987
n_i	0.365015	1.62745
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	614
Annealing Point (°C)	**AP**	641
Transformation Temperature (°C)	**Tg**	663
Yield Point (°C)	**At**	698
Softening Point (°C)	**SP**	757
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	62
	(+100~+300°C)	73
Thermal Conductivity (W/m·K)	**k**	0.891

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	849
Rigidity Modulus (10^8N/m^2)	**G**	338
Poisson's Ratio	σ	0.257
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	131
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.01

Partial Dispersions

$n_C - n_t$	0.008275
$n_C - n_{A'}$	0.003482
$n_d - n_C$	0.003033
$n_e - n_C$	0.005405
$n_g - n_d$	0.012297
$n_g - n_F$	0.005385
$n_h - n_g$	0.004461
$n_i - n_g$	0.012043
$n_{C'} - n_t$	0.008758
$n_e - n_{C'}$	0.004922
$n_{F'} - n_e$	0.005105
$n_i - n_{F'}$	0.016863

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0009
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	-0.0023
$\Delta\theta_{g,F}$	-0.0019
$\Delta\theta_{i,g}$	-0.0062

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.28286270	
A_2	2.47647429	E-1
A_3	1.10383999	
B_1	1.22902399	E-2
B_2	-6.13142361	E-3
B_3	1.06883378	E2
1129 ~ 2325 nm		
A_1	1.28286270	
A_2	2.47647429	E-1
A_3	1.10383999	
B_1	1.22902399	E-2
B_2	-6.13142361	E-3
B_3	1.06883378	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
Acid Resistance (Powder Group)	**RA(P)**	5
Weathering Resistance (Surface Group)	**W(S)**	3
Acid Resistance (Surface Group)	**SR**	51.2
Phosphate Resistance	**PR**	2.2

Relative Partial Dispersions

$\theta_{C,t}$	0.8321
$\theta_{C,A'}$	0.3501
$\theta_{d,C}$	0.3050
$\theta_{e,C}$	0.5435
$\theta_{g,d}$	1.2365
$\theta_{g,F}$	0.5415
$\theta_{h,g}$	0.4486
$\theta_{i,g}$	1.2110
$\theta'_{C',t}$	0.8734
$\theta'_{e,C'}$	0.4909
$\theta'_{F',e}$	0.5091
$\theta'_{i,F'}$	1.6818

Internal Transmittance

λ_{80}	339	λ_5	306

CCI

B	G	R
0.00	0.19	0.20

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.170	
320	0.450	
330	0.680	
340	0.820	
350	0.906	
360	0.948	
365		
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	
1000	0.998	
1200	0.998	
1400	0.990	
1600	0.995	
1800	0.988	
2000	0.976	
2200	0.919	
2400	0.810	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.43		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.5	2.7	2.7	2.8	2.9	3.1	3.4	
-20 ~ 0	2.5	2.8	2.8	2.9	3.0	3.3	3.5	
0 ~ 20	2.6	2.9	2.9	3.0	3.1	3.4	3.7	
20 ~ 40	2.6	2.9	3.0	3.1	3.2	3.5	3.8	
40 ~ 60	2.7	3.0	3.1	3.2	3.3	3.6	4.0	
60 ~ 80	2.7	3.1	3.1	3.3	3.4	3.8	4.1	

© OHARA GmbH – Hofheim – Germany

S-BSM15

623582
626579

Refractive Index	n_d	**1.62299**	Abbe Number	ν_d	**58.16**	Dispersion	$n_F - n_C$	**0.01071**
	n_e	1.622992		ν_e	57.89		$n_{F'} - n_{C'}$	0.010711
		1.625545						0.010805

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.59236
n_{1970}	1.97009	1.59797
n_{1530}	1.52958	1.60399
n_{1129}	1.12864	1.60927
n_t	1.01398	1.61100
n_s	0.85211	1.61399
$n_{A'}$	0.76819	1.61603
n_r	0.70652	1.61789
n_C	0.65627	**1.61974**
$n_{C'}$	0.64385	1.62026
n_{He-Ne}	0.6328	1.62074
n_D	0.58929	1.62290
n_d	0.58756	**1.62299**
n_e	0.54607	1.62555
n_F	0.48613	**1.63045**
$n_{F'}$	0.47999	1.63106
n_{He-Cd}	0.44157	1.63552
n_g	0.435835	**1.63630**
n_h	0.404656	1.64116
n_i	0.365015	1.64948
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	615
Annealing Point (°C)	**AP**	639
Transformation Temperature (°C)	**Tg**	658
Yield Point (°C)	**At**	685
Softening Point (°C)	**SP**	746
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	65
	(+100~+300°C)	78
Thermal Conductivity (W/m·K)	**k**	0.845

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	854
Rigidity Modulus (10^8N/m^2)	**G**	338
Poisson's Ratio	σ	0.265
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	133
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.8

Partial Dispersions	
$n_C - n_t$	0.008741
$n_C - n_{A'}$	0.003709
$n_d - n_C$	0.003253
$n_e - n_C$	0.005806
$n_g - n_d$	0.013304
$n_g - n_F$	0.005846
$n_h - n_g$	0.004866
$n_i - n_g$	0.013186
$n_{C'} - n_t$	0.009259
$n_e - n_{C'}$	0.005288
$n_{F'} - n_e$	0.005517
$n_i - n_{F'}$	0.018420

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0035
$\Delta\theta_{C,A'}$	-0.0001
$\Delta\theta_{g,d}$	-0.0018
$\Delta\theta_{g,F}$	-0.0016
$\Delta\theta_{i,g}$	-0.0069

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	9.53128328	E-1
A_2	6.37613977	E-1
A_3	1.65245647	
B_1	3.87638985	E-3
B_2	1.85094632	E-2
B_3	1.59442367	E2
1129 ~ 2325 nm		
A_1	9.53128328	E-1
A_2	6.37613977	E-1
A_3	1.65245647	
B_1	3.87638985	E-3
B_2	1.85094632	E-2
B_3	1.59442367	E2

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**	52.2
Phosphate Resistance	**PR**	3.2

Relative Partial Dispersions	
$\theta_{C,t}$	0.8161
$\theta_{C,A'}$	0.3463
$\theta_{d,C}$	0.3037
$\theta_{e,C}$	0.5421
$\theta_{g,d}$	1.2421
$\theta_{g,F}$	0.5458
$\theta_{h,g}$	0.4543
$\theta_{i,g}$	1.2311
$\theta'_{C',t}$	0.8569
$\theta'_{e,C'}$	0.4894
$\theta'_{F',e}$	0.5106
$\theta'_{i,F'}$	1.7048

Internal Transmittance			
λ_{80}	357	λ_5	327

CCI		
B	G	R
0.00	0.32	0.30

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.130	
340	0.440	
350	0.700	
360	0.850	
365		
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	
1000	0.998	
1200	0.998	
1400	0.991	
1600	0.994	
1800	0.987	
2000	0.973	
2200	0.918	
2400	0.810	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	3.60		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.3	1.6	1.6	1.7	1.8	2.1	2.4	
-20 ~ 0	1.4	1.7	1.7	1.8	1.9	2.2	2.5	
0 ~ 20	1.4	1.8	1.8	1.9	2.0	2.4	2.7	
20 ~ 40	1.5	1.9	1.9	2.0	2.2	2.5	2.8	
40 ~ 60	1.6	2.0	2.0	2.1	2.3	2.6	3.0	
60 ~ 80	1.6	2.1	2.1	2.2	2.4	2.8	3.1	

© OHARA GmbH – Hofheim – Germany

S-BSM16

620603
623601

Refractive Index	n_d	**1.62041**	Abbe Number	ν_d	**60.29**	Dispersion	$n_F - n_C$	**0.01029**
	n_e	1.620411		ν_e	60.03		$n_{F'} - n_{C'}$	0.010290
		1.622865						0.010376

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.58957
n_{1970}	1.97009	1.59545
n_{1530}	1.52958	1.60168
n_{1129}	1.12864	1.60702
n_t	1.01398	1.60874
n_s	0.85211	1.61170
$n_{A'}$	0.76819	1.61368
n_r	0.70652	1.61549
n_C	0.65627	**1.61728**
$n_{C'}$	0.64385	1.61778
n_{He-Ne}	0.6328	1.61824
n_D	0.58929	1.62032
n_d	0.58756	**1.62041**
n_e	0.54607	1.62287
n_F	0.48613	**1.62757**
$n_{F'}$	0.47999	1.62815
n_{He-Cd}	0.44157	1.63241
n_g	0.435835	**1.63315**
n_h	0.404656	1.63778
n_i	0.365015	1.64567
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	606
Annealing Point (°C)	**AP**	634
Transformation Temperature (°C)	**Tg**	657
Yield Point (°C)	**At**	689
Softening Point (°C)	**SP**	738
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	67
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.835

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	878
Rigidity Modulus (10^8N/m^2)	**G**	348
Poisson's Ratio	σ	0.262
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	146
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.81

Partial Dispersions	
$n_C - n_t$	0.008531
$n_C - n_{A'}$	0.003595
$n_d - n_C$	0.003135
$n_e - n_C$	0.005589
$n_g - n_d$	0.012739
$n_g - n_F$	0.005584
$n_h - n_g$	0.004632
$n_i - n_g$	0.012520
$n_{C'} - n_t$	0.009030
$n_e - n_{C'}$	0.005090
$n_{F'} - n_e$	0.005286
$n_i - n_{F'}$	0.017519

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0005
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	-0.0015
$\Delta\theta_{g,F}$	-0.0012
$\Delta\theta_{i,g}$	-0.0035

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.14490383	
A_2	4.39563911	E-1
A_3	1.27688079	
B_1	1.37034916	E-2
B_2	-1.86514205	E-3
B_3	1.19535585	E2
1129 ~ 2325 nm		
A_1	1.14490383	
A_2	4.39563911	E-1
A_3	1.27688079	
B_1	1.37034916	E-2
B_2	-1.86514205	E-3
B_3	1.19535585	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8291
$\theta_{C,A'}$	0.3494
$\theta_{d,C}$	0.3047
$\theta_{e,C}$	0.5431
$\theta_{g,d}$	1.2380
$\theta_{g,F}$	0.5427
$\theta_{h,g}$	0.4501
$\theta_{i,g}$	1.2167
$\theta'_{C',t}$	0.8703
$\theta'_{e,C'}$	0.4906
$\theta'_{F',e}$	0.5094
$\theta'_{i,F'}$	1.6884

Internal Transmittance			
λ_{80}	346	λ_5	312

CCI		
B	G	R
0.00	0.28	0.23

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.010	
320	0.180	
330	0.490	
340	0.720	
350	0.850	
360	0.924	
365		
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	
1000	0.999	
1200	0.999	
1400	0.992	
1600	0.995	
1800	0.987	
2000	0.972	
2200	0.911	
2400	0.790	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.59		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.2	1.4	1.5	1.6	1.7	1.9	2.2	
-20 ~ 0	1.2	1.5	1.6	1.7	1.8	2.1	2.3	
0 ~ 20	1.3	1.6	1.6	1.8	1.9	2.2	2.5	
20 ~ 40	1.4	1.7	1.7	1.9	2.0	2.3	2.6	
40 ~ 60	1.4	1.8	1.8	2.0	2.1	2.4	2.7	
60 ~ 80	1.6	1.9	1.9	2.1	2.2	2.5	2.9	

© OHARA GmbH – Hofheim – Germany

S-BSM18

639554
641551

Refractive Index	n_d	**1.63854**	Abbe Number	ν_d	**55.38**	Dispersion	$n_F - n_C$	**0.01153**
	n_e	1.641287		ν_e	55.10		$n_{F'} - n_{C'}$	0.011638
		1.638539						0.011531

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.60779
n_{1970}	1.97009	1.61314
n_{1530}	1.52958	1.61892
n_{1129}	1.12864	1.62411
n_t	1.01398	1.62586
n_s	0.85211	1.62896
$n_{A'}$	0.76819	1.63111
n_r	0.70652	1.63308
n_C	0.65627	**1.63505**
$n_{C'}$	0.64385	1.63560
n_{He-Ne}	0.6328	1.63612
n_D	0.58929	1.63844
n_d	0.58756	**1.63854**
n_e	0.54607	1.64129
n_F	0.48613	**1.64658**
$n_{F'}$	0.47999	1.64724
n_{He-Cd}	0.44157	1.65207
n_g	0.435835	**1.65291**
n_h	0.404656	1.65818
n_i	0.365015	1.66720
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	567
Annealing Point (°C)	**AP**	600
Transformation Temperature (°C)	**Tg**	613
Yield Point (°C)	**At**	655
Softening Point (°C)	**SP**	717
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	70
	(+100~+300°C)	84
Thermal Conductivity (W/m·K)	**k**	0.815

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	885
Rigidity Modulus (10^8N/m^2)	**G**	349
Poisson's Ratio	σ	0.268
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	159
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.79

Partial Dispersions

$n_C - n_t$	0.009188
$n_C - n_{A'}$	0.003946
$n_d - n_C$	0.003488
$n_e - n_C$	0.006236
$n_g - n_d$	0.014367
$n_g - n_F$	0.006324
$n_h - n_g$	0.005271
$n_i - n_g$	0.014291
$n_{C'} - n_t$	0.009742
$n_e - n_{C'}$	0.005682
$n_{F'} - n_e$	0.005956
$n_i - n_{F'}$	0.019954

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0097
$\Delta\theta_{C,A'}$	-0.0008
$\Delta\theta_{g,d}$	-0.0038
$\Delta\theta_{g,F}$	-0.0035
$\Delta\theta_{i,g}$	-0.0219

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.27886025	E-1
A_2	7.08858526	E-1
A_3	1.18610897	
B_1	4.17549199	E-3
B_2	1.84691838	E-2
B_3	1.22210416	E2
1129 ~ 2325 nm		
A_1	9.27886025	E-1
A_2	7.08858526	E-1
A_3	1.18610897	
B_1	4.17549199	E-3
B_2	1.84691838	E-2
B_3	1.22210416	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7968
$\theta_{C,A'}$	0.3422
$\theta_{d,C}$	0.3025
$\theta_{e,C}$	0.5408
$\theta_{g,d}$	1.2459
$\theta_{g,F}$	0.5484
$\theta_{h,g}$	0.4571
$\theta_{i,g}$	1.2394
$\theta'_{C',t}$	0.8371
$\theta'_{e,C'}$	0.4882
$\theta'_{F',e}$	0.5118
$\theta'_{i,F'}$	1.7146

Internal Transmittance

λ_{80}	345	λ_5	309

CCI

B	G	R
0.00	0.21	0.22

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.080	
320	0.310	
330	0.570	
340	0.750	
350	0.860	
360	0.929	
365		
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	
1000	0.997	
1200	0.997	
1400	0.993	
1600	0.994	
1800	0.986	
2000	0.973	
2200	0.924	
2400	0.840	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.69		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.8	2.2	2.3	2.4	2.5	2.9	3.2	
-20 ~ 0	1.8	2.3	2.3	2.4	2.6	3.0	3.3	
0 ~ 20	1.9	2.4	2.4	2.5	2.7	3.1	3.4	
20 ~ 40	1.9	2.4	2.5	2.6	2.8	3.2	3.5	
40 ~ 60	2.0	2.5	2.5	2.7	2.9	3.3	3.7	
60 ~ 80	2.1	2.6	2.6	2.8	2.9	3.4	3.8	

© OHARA GmbH – Hofheim – Germany

S-BSM22

622532
625529

Refractive Index	n_d	**1.62230**	Abbe Number	ν_d	**53.17**	Dispersion	$n_F - n_C$	**0.01170**
	n_e	1.622296		ν_e	52.88		$n_{F'} - n_{C'}$	0.011704
		1.625083						0.011821

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.59157
n_{1970}	1.97009	1.59687
n_{1530}	1.52958	1.60260
n_{1129}	1.12864	1.60778
n_t	1.01398	1.60953
n_s	0.85211	1.61264
$n_{A'}$	0.76819	1.61479
n_r	0.70652	1.61678
n_C	0.65627	**1.61877**
$n_{C'}$	0.64385	1.61933
n_{He-Ne}	0.6328	1.61985
n_D	0.58929	1.62219
n_d	0.58756	**1.62230**
n_e	0.54607	1.62508
n_F	0.48613	**1.63047**
$n_{F'}$	0.47999	1.63115
n_{He-Cd}	0.44157	1.63610
n_g	0.435835	**1.63696**
n_h	0.404656	1.64241
n_i	0.365015	1.65185
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	637
Annealing Point (°C)	**AP**	663
Transformation Temperature (°C)	**Tg**	685
Yield Point (°C)	**At**	726
Softening Point (°C)	**SP**	822
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	66
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.916

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	874
Rigidity Modulus (10^8N/m^2)	**G**	345
Poisson's Ratio	σ	0.265
Knoop Hardness	**Hk**	580 [6]
Abrasion	**Aa**	120
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.97

Partial Dispersions

$n_C - n_t$	0.009237
$n_C - n_{A'}$	0.003977
$n_d - n_C$	0.003526
$n_e - n_C$	0.006313
$n_g - n_d$	0.014664
$n_g - n_F$	0.006486
$n_h - n_g$	0.005451
$n_i - n_g$	0.014894
$n_{C'} - n_t$	0.009796
$n_e - n_{C'}$	0.005754
$n_{F'} - n_e$	0.006067
$n_i - n_{F'}$	0.020704

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0070
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	-0.0014
$\Delta\theta_{g,F}$	-0.0012
$\Delta\theta_{i,g}$	-0.0072

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.44305741	
A_2	1.40786358	E-1
A_3	1.26093951	
B_1	8.19208910	E-3
B_2	3.56911455	E-2
B_3	1.31959337	E2
1129 ~ 2325 nm		
A_1	1.44305741	
A_2	1.40786358	E-1
A_3	1.26093951	
B_1	8.19208910	E-3
B_2	3.56911455	E-2
B_3	1.31959337	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
Acid Resistance (Powder Group)	**RA(P)**	2
Weathering Resistance (Surface Group)	**W(S)**	2~3
Acid Resistance (Surface Group)	**SR**	3.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7892
$\theta_{C,A'}$	0.3398
$\theta_{d,C}$	0.3013
$\theta_{e,C}$	0.5394
$\theta_{g,d}$	1.2529
$\theta_{g,F}$	0.5542
$\theta_{h,g}$	0.4657
$\theta_{i,g}$	1.2726
$\theta'_{C',t}$	0.8287
$\theta'_{e,C'}$	0.4868
$\theta'_{F',e}$	0.5132
$\theta'_{i,F'}$	1.7515

Internal Transmittance

λ_{80}	369	λ_5	339

CCI

B	G	R
0.00	0.74	0.67

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.080	
350	0.370	
360	0.650	
365		
370	0.810	
380	0.901	
390	0.942	
400	0.964	
420	0.981	
440	0.985	
460	0.988	
480	0.991	
500	0.994	
550	0.997	
600	0.995	
650	0.994	
700	0.996	
800	0.998	
900	0.998	
1000	0.997	
1200	0.998	
1400	0.993	
1600	0.995	
1800	0.990	
2000	0.980	
2200	0.938	
2400	0.870	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	3.24		λ_5	34	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.0	3.4	3.4	3.6	3.7	4.1	4.4	
-20 ~ 0	3.0	3.4	3.4	3.6	3.8	4.1	4.5	
0 ~ 20	3.1	3.5	3.5	3.6	3.8	4.2	4.6	
20 ~ 40	3.1	3.5	3.6	3.7	3.9	4.3	4.8	
40 ~ 60	3.1	3.6	3.6	3.7	4.0	4.4	4.9	
60 ~ 80	3.1	3.7	3.7	3.8	4.0	4.5	5.0	

© OHARA GmbH – Hofheim – Germany

S-BSM25

658509
662506

Refractive Index	n_d	**1.65844**	Abbe Number	ν_d	**50.88**	Dispersion	$n_F - n_C$	**0.01294**
	n_e	1.658441		ν_e	50.59		$n_{F'} - n_{C'}$	0.012942
		1.661522						0.013076

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.62613
n_{1970}	1.97009	1.63145
n_{1530}	1.52958	1.63727
n_{1129}	1.12864	1.64264
n_t	1.01398	1.64450
n_s	0.85211	1.64785
$n_{A'}$	0.76819	1.65019
n_r	0.70652	1.65237
n_C	0.65627	**1.65455**
$n_{C'}$	0.64385	1.65517
n_{He-Ne}	0.6328	1.65574
n_D	0.58929	1.65833
n_d	0.58756	**1.65844**
n_e	0.54607	1.66152
n_F	0.48613	**1.66749**
$n_{F'}$	0.47999	1.66824
n_{He-Cd}	0.44157	1.67373
n_g	0.435835	**1.67469**
n_h	0.404656	1.68074
n_i	0.365015	1.69121
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	605
Annealing Point (°C)	**AP**	630
Transformation Temperature (°C)	**Tg**	638
Yield Point (°C)	**At**	686
Softening Point (°C)	**SP**	760
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	68
	(+100~+300°C)	82
Thermal Conductivity (W/m·K)	**k**	0.891

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	951
Rigidity Modulus (10^8N/m^2)	**G**	374
Poisson's Ratio	σ	0.272
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	123
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.08

Partial Dispersions	
$n_C - n_t$	0.010049
$n_C - n_{A'}$	0.004361
$n_d - n_C$	0.003888
$n_e - n_C$	0.006969
$n_g - n_d$	0.016250
$n_g - n_F$	0.007196
$n_h - n_g$	0.006049
$n_i - n_g$	0.016516
$n_{C'} - n_t$	0.010664
$n_e - n_{C'}$	0.006354
$n_{F'} - n_e$	0.006722
$n_i - n_{F'}$	0.022963

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0089
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	-0.0034
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	-0.0228

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.34814257	
A_2	3.47530319	E-1
A_3	1.38798368	
B_1	6.95364366	E-3
B_2	2.77863478	E-2
B_3	1.42138122	E2
1129 ~ 2325 nm		
A_1	1.34814257	
A_2	3.47530319	E-1
A_3	1.38798368	
B_1	6.95364366	E-3
B_2	2.77863478	E-2
B_3	1.42138122	E2

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**	1.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.7765
$\theta_{C,A'}$	0.3370
$\theta_{d,C}$	0.3004
$\theta_{e,C}$	0.5385
$\theta_{g,d}$	1.2556
$\theta_{g,F}$	0.5560
$\theta_{h,g}$	0.4674
$\theta_{i,g}$	1.2762
$\theta'_{C',t}$	0.8155
$\theta'_{e,C'}$	0.4859
$\theta'_{F',e}$	0.5141
$\theta'_{i,F'}$	1.7561

Internal Transmittance			
λ_{80}	367	λ_5	331

CCI		
B	G	R
0.00	0.71	0.70

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.030	
340	0.190	
350	0.480	
360	0.710	
365		
370	0.840	
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	
1000	0.996	
1200	0.997	
1400	0.995	
1600	0.995	
1800	0.989	
2000	0.980	
2200	0.947	
2400	0.870	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	3.50		λ_5	33	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.4	3.8	3.9	4.0	4.2	4.7	5.1	
-20 ~ 0	3.5	3.9	3.9	4.1	4.3	4.8	5.3	
0 ~ 20	3.6	4.0	4.0	4.2	4.4	4.9	5.4	
20 ~ 40	3.6	4.1	4.1	4.3	4.5	5.0	5.5	
40 ~ 60	3.7	4.2	4.2	4.4	4.6	5.1	5.7	
60 ~ 80	3.8	4.2	4.3	4.5	4.7	5.2	5.8	

© OHARA GmbH – Hofheim – Germany

S-BSM28

618498
621495

Refractive Index	n_d	**1.61772**	Abbe Number	ν_d	**49.81**	Dispersion	$n_F - n_C$	**0.01240**
	n_e	1.617722		ν_e	49.52		$n_{F'} - n_{C'}$	0.012401
		1.620671						0.012534

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.58652
n_{1970}	1.97009	1.59173
n_{1530}	1.52958	1.59740
n_{1129}	1.12864	1.60260
n_t	1.01398	1.60439
n_s	0.85211	1.60760
$n_{A'}$	0.76819	1.60984
n_r	0.70652	1.61192
n_C	0.65627	**1.61401**
$n_{C'}$	0.64385	1.61459
n_{He-Ne}	0.6328	1.61514
n_D	0.58929	1.61761
n_d	0.58756	**1.61772**
n_e	0.54607	1.62067
n_F	0.48613	**1.62641**
$n_{F'}$	0.47999	1.62713
n_{He-Cd}	0.44157	1.63242
n_g	0.435835	**1.63335**
n_h	0.404656	1.63924
n_i	0.365015	1.64953
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	530
Annealing Point (°C)	**AP**	559
Transformation Temperature (°C)	**Tg**	578
Yield Point (°C)	**At**	618
Softening Point (°C)	**SP**	680
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	84
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	0.878

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	853
Rigidity Modulus (10^8N/m^2)	**G**	339
Poisson's Ratio	σ	0.258
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	168
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.05

Partial Dispersions

$n_C - n_t$	0.009612
$n_C - n_{A'}$	0.004166
$n_d - n_C$	0.003717
$n_e - n_C$	0.006666
$n_g - n_d$	0.015632
$n_g - n_F$	0.006948
$n_h - n_g$	0.005882
$n_i - n_g$	0.016179
$n_{C'} - n_t$	0.010200
$n_e - n_{C'}$	0.006078
$n_{F'} - n_e$	0.006456
$n_i - n_{F'}$	0.022406

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0053
$\Delta\theta_{C,A'}$	-0.0003
$\Delta\theta_{g,d}$	-0.0008
$\Delta\theta_{g,F}$	-0.0006
$\Delta\theta_{i,g}$	-0.0032

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.43822841	
A_2	1.28100017	E-1
A_3	1.34355530	
B_1	8.59779750	E-3
B_2	4.08617854	E-2
B_3	1.43709890	E2
1129 ~ 2325 nm		
A_1	1.43822841	
A_2	1.28100017	E-1
A_3	1.34355530	
B_1	8.59779750	E-3
B_2	4.08617854	E-2
B_3	1.43709890	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	3
Acid Resistance (Surface Group)	**SR**	51.2
Phosphate Resistance	**PR**	3.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7751
$\theta_{C,A'}$	0.3359
$\theta_{d,C}$	0.2997
$\theta_{e,C}$	0.5375
$\theta_{g,d}$	1.2605
$\theta_{g,F}$	0.5603
$\theta_{h,g}$	0.4743
$\theta_{i,g}$	1.3047
$\theta'_{C',t}$	0.8138
$\theta'_{e,C'}$	0.4849
$\theta'_{F',e}$	0.5151
$\theta'_{i,F'}$	1.7876

Internal Transmittance

λ_{80}	375	λ_5	341

CCI

B	G	R
0.00	1.01	1.02

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.020	
350	0.240	
360	0.540	
365		
370	0.740	
380	0.850	
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	
1000	0.996	
1200	0.996	
1400	0.994	
1600	0.995	
1800	0.988	
2000	0.978	
2200	0.944	
2400	0.880	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	3.23		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.5	0.9	1.0	1.1	1.3	1.7	2.1	
-20 ~ 0	0.6	1.0	1.0	1.2	1.4	1.8	2.3	
0 ~ 20	0.7	1.1	1.1	1.2	1.5	1.9	2.4	
20 ~ 40	0.7	1.1	1.2	1.3	1.5	2.0	2.5	
40 ~ 60	0.8	1.2	1.2	1.4	1.6	2.1	2.6	
60 ~ 80	0.8	1.3	1.3	1.5	1.7	2.2	2.8	

© OHARA GmbH – Hofheim – Germany

S-BSM71

649530
651527

Refractive Index	n_d	**1.64850**	Abbe Number	ν_d	**53.02**	Dispersion	$n_F - n_C$	**0.01223**
	n_e	1.651410		ν_e	52.73		$n_{F'} - n_{C'}$	0.012353
		1.648498						0.012231

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.61657
n_{1970}	1.97009	1.62205
n_{1530}	1.52958	1.62799
n_{1129}	1.12864	1.63336
n_t	1.01398	1.63518
n_s	0.85211	1.63842
$n_{A'}$	0.76819	1.64067
n_r	0.70652	1.64274
n_C	0.65627	**1.64482**
$n_{C'}$	0.64385	1.64540
$n_{He\text{-}Ne}$	0.6328	1.64595
n_D	0.58929	1.64839
n_d	0.58756	**1.64850**
n_e	0.54607	1.65141
n_F	0.48613	**1.65705**
$n_{F'}$	0.47999	1.65775
$n_{He\text{-}Cd}$	0.44157	1.66293
n_g	0.435835	**1.66383**
n_h	0.404656	1.66954
n_i	0.365015	1.67943
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	607
Annealing Point (°C)	**AP**	635
Transformation Temperature (°C)	**Tg**	651
Yield Point (°C)	**At**	687
Softening Point (°C)	**SP**	737
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	71
	(+100~+300°C)	83
Thermal Conductivity (W/m·K)	**k**	0.773

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	862
Rigidity Modulus (10^8N/m^2)	**G**	339
Poisson's Ratio	σ	0.273
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	173
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.81

Partial Dispersions

$n_C - n_t$	0.009631
$n_C - n_{A'}$	0.004150
$n_d - n_C$	0.003683
$n_e - n_C$	0.006595
$n_g - n_d$	0.015333
$n_g - n_F$	0.006785
$n_h - n_g$	0.005706
$n_i - n_g$	0.015599
$n_{C'} - n_t$	0.010215
$n_e - n_{C'}$	0.006011
$n_{F'} - n_e$	0.006342
$n_i - n_{F'}$	0.021678

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0080
$\Delta\theta_{C,A'}$	-0.0008
$\Delta\theta_{g,d}$	-0.0010
$\Delta\theta_{g,F}$	-0.0010
$\Delta\theta_{i,g}$	-0.0057

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.50847885	
A_2	1.58099826	E-1
A_3	1.36815368	
B_1	8.12769076	E-3
B_2	3.54200898	E-2
B_3	1.36110038	E2
1129 ~ 2325 nm		
A_1	1.50847885	
A_2	1.58099826	E-1
A_3	1.36815368	
B_1	8.12769076	E-3
B_2	3.54200898	E-2
B_3	1.36110038	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
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**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7874
$\theta_{C,A'}$	0.3393
$\theta_{d,C}$	0.3011
$\theta_{e,C}$	0.5392
$\theta_{g,d}$	1.2536
$\theta_{g,F}$	0.5547
$\theta_{h,g}$	0.4665
$\theta_{i,g}$	1.2754
$\theta'_{C',t}$	0.8269
$\theta'_{e,C'}$	0.4866
$\theta'_{F',e}$	0.5134
$\theta'_{i,F'}$	1.7549

Internal Transmittance

λ_{80}	366	λ_5	337

CCI

B	G	R
0.00	0.59	0.55

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.150	
350	0.470	
360	0.720	
365		
370	0.860	
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	
1000	0.997	
1200	0.997	
1400	0.993	
1600	0.993	
1800	0.985	
2000	0.972	
2200	0.925	
2400	0.820	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	3.74		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.3	1.5	1.6	1.7	1.8	2.1	2.6	
-20 ~ 0	1.2	1.6	1.6	1.8	1.9	2.3	2.7	
0 ~ 20	1.3	1.8	1.8	1.9	2.1	2.5	3.0	
20 ~ 40	1.4	2.0	2.0	2.1	2.3	2.8	3.2	
40 ~ 60	1.5	2.2	2.2	2.4	2.6	3.1	3.5	
60 ~ 80	1.6	2.5	2.5	2.7	2.9	3.5	3.9	

© OHARA GmbH – Hofheim – Germany

S-BSM81

640601
643599

Refractive Index	n_d	**1.64000**	Abbe Number	ν_d	**60.08**	Dispersion	$n_F - n_C$	**0.01065**
	n_e	1.642540		ν_e	59.88		$n_{F'} - n_{C'}$	0.010730
		1.639999						0.010653

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.60385
n_{1970}	1.97009	1.61138
n_{1530}	1.52958	1.61917
n_{1129}	1.12864	1.62555
n_t	1.01398	1.62752
n_s	0.85211	1.63078
$n_{A'}$	0.76819	1.63293
n_r	0.70652	1.63484
n_C	0.65627	**1.63673**
$n_{C'}$	0.64385	1.63725
n_{He-Ne}	0.6328	1.63774
n_D	0.58929	1.63990
n_d	0.58756	**1.64000**
n_e	0.54607	1.64254
n_F	0.48613	**1.64738**
$n_{F'}$	0.47999	1.64798
n_{He-Cd}	0.44157	1.65235
n_g	0.435835	**1.65310**
n_h	0.404656	1.65783
n_i	0.365015	1.66586
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	604
Annealing Point (°C)	**AP**	624
Transformation Temperature (°C)	**Tg**	653
Yield Point (°C)	**At**	679
Softening Point (°C)	**SP**	721
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	58
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	1.001

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1057
Rigidity Modulus (10⁸N/m²)	**G**	416
Poisson's Ratio	σ	0.271
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	84
Photoelastic Constant (nm/cm/10⁵ Pa)	β	2

Partial Dispersions

$n_C - n_t$	0.009210
$n_C - n_{A'}$	0.003802
$n_d - n_C$	0.003271
$n_e - n_C$	0.005812
$n_g - n_d$	0.013103
$n_g - n_F$	0.005721
$n_h - n_g$	0.004730
$n_i - n_g$	0.012761
$n_{C'} - n_t$	0.009734
$n_e - n_{C'}$	0.005288
$n_{F'} - n_e$	0.005442
$n_i - n_{F'}$	0.017881

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0359
$\Delta\theta_{C,A'}$	0.0082
$\Delta\theta_{g,d}$	-0.0100
$\Delta\theta_{g,F}$	-0.0073
$\Delta\theta_{i,g}$	-0.0240

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.96356844	E-1
A_2	6.51392837	E-1
A_3	1.22432622	
B_1	1.44821587	E-2
B_2	1.54826389	E-3
B_3	8.99818604	E1
1129 ~ 2325 nm		
A_1	9.96356844	E-1
A_2	6.51392837	E-1
A_3	1.22432622	
B_1	1.44821587	E-2
B_2	1.54826389	E-3
B_3	8.99818604	E1

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	4
Acid Resistance (Powder Group)	**RA(P)**	5
Weathering Resistance (Surface Group)	**W(S)**	3
Acid Resistance (Surface Group)	**SR**	53.0
Phosphate Resistance	**PR**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8645
$\theta_{C,A'}$	0.3569
$\theta_{d,C}$	0.3070
$\theta_{e,C}$	0.5456
$\theta_{g,d}$	1.2300
$\theta_{g,F}$	0.5370
$\theta_{h,g}$	0.4440
$\theta_{i,g}$	1.1979
$\theta'_{C',t}$	0.9072
$\theta'_{e,C'}$	0.4928
$\theta'_{F',e}$	0.5072
$\theta'_{i,F'}$	1.6664

Internal Transmittance

λ_{80}	358	λ_5	303

CCI

B	G	R
0.00	0.55	0.49

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.010	
300	0.030	
310	0.100	
320	0.210	
330	0.380	
340	0.560	
350	0.710	
360	0.820	
365		
370	0.890	
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	
1000	0.996	
1200	0.996	
1400	0.993	
1600	0.994	
1800	0.985	
2000	0.961	
2200	0.870	
2400	0.610	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	3.06		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.8	3.1	3.1	3.3	3.3	3.6	3.8	
-20 ~ 0	2.9	3.2	3.2	3.4	3.5	3.7	4.0	
0 ~ 20	3.0	3.3	3.4	3.5	3.6	3.9	4.2	
20 ~ 40	3.2	3.5	3.5	3.6	3.7	4.0	4.3	
40 ~ 60	3.2	3.6	3.6	3.7	3.9	4.2	4.5	
60 ~ 80	3.2	3.7	3.7	3.8	4.0	4.4	4.7	

© OHARA GmbH – Hofheim – Germany

S-FPL51

497816
498810

Refractive Index	n_d	**1.49700**	Abbe Number	ν_d	**81.54**	Dispersion	$n_F - n_C$	**0.00609**
	n_e	1.498455		ν_e	81.14		$n_{F'} - n_{C'}$	0.006095 / 0.006143

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.47952
n_{1970}	1.97009	1.48269
n_{1530}	1.52958	1.48610
n_{1129}	1.12864	1.48911
n_t	1.01398	1.49010
n_s	0.85211	1.49183
$n_{A'}$	0.76819	1.49300
n_r	0.70652	1.49407
n_C	0.65627	**1.49514**
$n_{C'}$	0.64385	1.49543
n_{He-Ne}	0.6328	1.49571
n_D	0.58929	1.49694
n_d	0.58756	**1.49700**
n_e	0.54607	1.49845
n_F	0.48613	**1.50123**
$n_{F'}$	0.47999	1.50158
n_{He-Cd}	0.44157	1.50407
n_g	0.435835	**1.50451**
n_h	0.404656	1.50720
n_i	0.365015	1.51176
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	458
Yield Point (°C)	**At**	489
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	131
	(+100~+300°C)	155
Thermal Conductivity (W/m·K)	**k**	0.780

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	727
Rigidity Modulus (10^8N/m^2)	**G**	280
Poisson's Ratio	σ	0.299
Knoop Hardness	**Hk**	350 [4]
Abrasion	**Aa**	449
Photoelastic Constant (nm/cm/10^5 Pa)	β	0.74

Partial Dispersions

$n_C - n_t$	0.005033
$n_C - n_{A'}$	0.002134
$n_d - n_C$	0.001863
$n_e - n_C$	0.003319
$n_g - n_d$	0.007508
$n_g - n_F$	0.003276
$n_h - n_g$	0.002698
$n_i - n_g$	0.007253
$n_{C'} - n_t$	0.005330
$n_e - n_{C'}$	0.003022
$n_{F'} - n_e$	0.003121
$n_i - n_{F'}$	0.010184

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.1035
$\Delta\theta_{C,A'}$	-0.0246
$\Delta\theta_{g,d}$	0.0364
$\Delta\theta_{g,F}$	0.0280
$\Delta\theta_{i,g}$	0.1478

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.17010505	
A_2	4.75710783	E-2
A_3	7.63832445	E-1
B_1	6.16203924	E-3
B_2	2.63372876	E-2
B_3	1.41882642	E2
1129 ~ 2325 nm		
A_1	1.17010505	
A_2	4.75710783	E-2
A_3	7.63832445	E-1
B_1	6.16203924	E-3
B_2	2.63372876	E-2
B_3	1.41882642	E2

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**	52.1
Phosphate Resistance	**PR**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8258
$\theta_{C,A'}$	0.3501
$\theta_{d,C}$	0.3057
$\theta_{e,C}$	0.5445
$\theta_{g,d}$	1.2318
$\theta_{g,F}$	0.5375
$\theta_{h,g}$	0.4427
$\theta_{i,g}$	1.1900
$\theta'_{C',t}$	0.8677
$\theta'_{e,C'}$	0.4919
$\theta'_{F',e}$	0.5081
$\theta'_{i,F'}$	1.6578

Internal Transmittance

λ_{80}	333	λ_5	290

CCI

B	G	R
0.00	0.16	0.13

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.010	
290	0.050	
300	0.170	
310	0.370	
320	0.600	
330	0.770	
340	0.880	
350	0.947	
360	0.975	
365		
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.999	
1800	0.999	
2000	0.999	
2200	0.997	
2400	0.996	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.62		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-5.7	-5.5	-5.5	-5.4	-5.4	-5.3	-5.1	
-20 ~ 0	-5.9	-5.8	-5.7	-5.7	-5.6	-5.5	-5.3	
0 ~ 20	-6.2	-6.0	-6.0	-5.9	-5.8	-5.7	-5.5	
20 ~ 40	-6.4	-6.2	-6.2	-6.2	-6.1	-5.9	-5.8	
40 ~ 60	-6.7	-6.5	-6.5	-6.4	-6.3	-6.1	-6.0	
60 ~ 80	-6.9	-6.7	-6.7	-6.7	-6.6	-6.4	-6.2	

© OHARA GmbH – Hofheim – Germany

S-FPL53

439950
440946

Refractive Index	n_d	**1.43875**	Abbe Number	ν_d	**94.93**	Dispersion	$n_F - n_C$	**0.00462**
	n_e	1.439854		ν_e	94.49		$n_{F'} - n_{C'}$	0.004655
		1.438750						0.004622

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.42512
n_{1970}	1.97009	1.42762
n_{1530}	1.52958	1.43032
n_{1129}	1.12864	1.43269
n_t	1.01398	1.43346
n_s	0.85211	1.43480
$n_{A'}$	0.76819	1.43570
n_r	0.70652	1.43652
n_C	0.65627	**1.43733**
$n_{C'}$	0.64385	1.43756
n_{He-Ne}	0.6328	1.43777
n_D	0.58929	1.43871
n_d	0.58756	**1.43875**
n_e	0.54607	1.43985
n_F	0.48613	**1.44195**
$n_{F'}$	0.47999	1.44221
n_{He-Cd}	0.44157	1.44410
n_g	0.435835	**1.44442**
n_h	0.404656	1.44645
n_i	0.365015	1.44986
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	426
Yield Point (°C)	**At**	456
Softening Point (°C)	**SP**	
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	145
	(+100~+300°C)	169
Thermal Conductivity (W/m·K)	**k**	0.857

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	691
Rigidity Modulus (10^8N/m^2)	**G**	265
Poisson's Ratio	σ	0.303
Knoop Hardness	**Hk**	320 [3]
Abrasion	**Aa**	451
Photoelastic Constant (nm/cm/10^5 Pa)	β	0.57

Partial Dispersions

$n_C - n_t$	0.003870
$n_C - n_{A'}$	0.001631
$n_d - n_C$	0.001417
$n_e - n_C$	0.002521
$n_g - n_d$	0.005673
$n_g - n_F$	0.002468
$n_h - n_g$	0.002028
$n_i - n_g$	0.005437
$n_{C'} - n_t$	0.004097
$n_e - n_{C'}$	0.002294
$n_{F'} - n_e$	0.002361
$n_i - n_{F'}$	0.007645

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.1548
$\Delta\theta_{C,A'}$	-0.0381
$\Delta\theta_{g,d}$	0.0598
$\Delta\theta_{g,F}$	0.0461
$\Delta\theta_{i,g}$	0.2462

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.83532327	E-1
A_2	6.95688140	E-2
A_3	1.11409238	
B_1	4.92234955	E-3
B_2	1.93581091	E-2
B_3	2.64275294	E2
1129 ~ 2325 nm		
A_1	9.83532327	E-1
A_2	6.95688140	E-2
A_3	1.11409238	
B_1	4.92234955	E-3
B_2	1.93581091	E-2
B_3	2.64275294	E2

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**	52.3
Phosphate Resistance	**PR**	4.3

Relative Partial Dispersions

$\theta_{C,t}$	0.8373
$\theta_{C,A'}$	0.3529
$\theta_{d,C}$	0.3066
$\theta_{e,C}$	0.5454
$\theta_{g,d}$	1.2274
$\theta_{g,F}$	0.5340
$\theta_{h,g}$	0.4388
$\theta_{i,g}$	1.1763
$\theta'_{C',t}$	0.8801
$\theta'_{e,C'}$	0.4928
$\theta'_{F',e}$	0.5072
$\theta'_{i,F'}$	1.6423

Internal Transmittance

λ_{80}	326	λ_5	283

CCI

B	G	R
0.00	0.13	0.08

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.040	
290	0.120	
300	0.280	
310	0.510	
320	0.710	
330	0.850	
340	0.928	
350	0.967	
360	0.985	
365		
370	0.992	
380	0.996	
390	0.997	
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	0.997	
700	0.998	
800	0.998	
900	0.997	
1000	0.997	
1200	0.998	
1400	0.998	
1600	0.998	
1800	0.998	
2000	0.998	
2200	0.997	
2400	0.998	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	33
Specific Gravity	**d**	3.62		λ_5	28

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-5.9	-5.8	-5.8	-5.7	-5.7	-5.6	-5.5	
-20 ~ 0	-6.2	-6.1	-6.1	-6.1	-6.0	-5.9	-5.8	
0 ~ 20	-6.5	-6.4	-6.4	-6.4	-6.3	-6.2	-6.1	
20 ~ 40	-6.9	-6.8	-6.7	-6.7	-6.6	-6.5	-6.4	
40 ~ 60	-7.2	-7.1	-7.1	-7.0	-7.0	-6.8	-6.7	
60 ~ 80	-7.5	-7.4	-7.4	-7.3	-7.3	-7.2	-7.0	

© OHARA GmbH – Hofheim – Germany

S-FPL55

439948
440942

Refractive Index	n_d	**1.43875**	Abbe Number	ν_d	**94.66**	Dispersion	$n_F - n_C$	**0.00463**
	n_e	1.439857		ν_e	94.23		$n_{F'} - n_{C'}$	0.004668
		1.438750						0.004635

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.42492
n_{1970}	1.97009	1.42747
n_{1530}	1.52958	1.43023
n_{1129}	1.12864	1.43264
n_t	1.01398	1.43343
n_s	0.85211	1.43478
$n_{A'}$	0.76819	1.43569
n_r	0.70652	1.43651
n_C	0.65627	**1.43733**
$n_{C'}$	0.64385	1.43755
n_{He-Ne}	0.6328	1.43777
n_D	0.58929	1.43871
n_d	0.58756	**1.43875**
n_e	0.54607	1.43986
n_F	0.48613	**1.44196**
$n_{F'}$	0.47999	1.44222
n_{He-Cd}	0.44157	1.44411
n_g	0.435835	**1.44444**
n_h	0.404656	1.44647
n_i	0.365015	1.44988
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	435
Yield Point (°C)	**At**	460
Softening Point (°C)	**SP**	
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	136
	(+100~+300°C)	166
Thermal Conductivity (W/m·K)	**k**	0.876

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	698
Rigidity Modulus (10^8N/m^2)	**G**	268
Poisson's Ratio	σ	0.302
Knoop Hardness	**Hk**	340 [3]
Abrasion	**Aa**	387
Photoelastic Constant (nm/cm/10^5 Pa)	β	0.59

Partial Dispersions

$n_C - n_t$	0.003898
$n_C - n_{A'}$	0.001639
$n_d - n_C$	0.001422
$n_e - n_C$	0.002529
$n_g - n_d$	0.005688
$n_g - n_F$	0.002475
$n_h - n_g$	0.002031
$n_i - n_g$	0.005445
$n_{C'} - n_t$	0.004125
$n_e - n_{C'}$	0.002302
$n_{F'} - n_e$	0.002366
$n_i - n_{F'}$	0.007660

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.1498
$\Delta\theta_{C,A'}$	-0.0371
$\Delta\theta_{g,d}$	0.0590
$\Delta\theta_{g,F}$	0.0457
$\Delta\theta_{i,g}$	0.2424

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	8.39067682	E-1
A_2	2.14083503	E-1
A_3	1.47914677	
B_1	7.95286639	E-3
B_2	-2.32581717	E-3
B_3	3.40043700	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	52.1
Phosphate Resistance	**PR**	4.1

Relative Partial Dispersions

$\theta_{C,t}$	0.8410
$\theta_{C,A'}$	0.3536
$\theta_{d,C}$	0.3068
$\theta_{e,C}$	0.5456
$\theta_{g,d}$	1.2272
$\theta_{g,F}$	0.5340
$\theta_{h,g}$	0.4382
$\theta_{i,g}$	1.1748
$\theta'_{C',t}$	0.8837
$\theta'_{e,C'}$	0.4931
$\theta'_{F',e}$	0.5069
$\theta'_{i,F'}$	1.6410

Internal Transmittance

λ_{80}	329	λ_5	285

CCI

B	G	R
0.00	0.13	0.08

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.020	
290	0.080	
300	0.220	
310	0.430	
320	0.650	
330	0.810	
340	0.910	
350	0.960	
360	0.979	
365		
370	0.989	
380	0.995	
390	0.996	
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	0.997	
700	0.997	
800	0.997	
900	0.996	
1000	0.995	
1200	0.996	
1400	0.997	
1600	0.997	
1800	0.997	
2000	0.997	
2200	0.996	
2400	0.997	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	335
Specific Gravity	**d**	3.59		λ_5	290

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-5.4	-5.2	-5.2	-5.2	-5.1	-5.0	-4.9	
-20 ~ 0	-5.8	-5.7	-5.7	-5.6	-5.6	-5.4	-5.3	
0 ~ 20	-6.1	-6.0	-6.0	-6.0	-5.9	-5.8	-5.6	
20 ~ 40	-6.4	-6.3	-6.3	-6.3	-6.2	-6.0	-5.9	
40 ~ 60	-6.7	-6.5	-6.5	-6.5	-6.4	-6.3	-6.1	
60 ~ 80	-6.9	-6.8	-6.8	-6.7	-6.6	-6.5	-6.4	

© OHARA GmbH – Hofheim – Germany

S-FPM2

595677
597674

Refractive Index	n_d	**1.59522**	Abbe Number	ν_d	**67.74**	Dispersion	$n_F - n_C$	**0.00879**
	n_e	1.595220		ν_e	67.37		$n_{F'} - n_{C'}$	0.008787
		1.597316						0.008866

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57252
n_{1970}	1.97009	1.57631
n_{1530}	1.52958	1.58045
n_{1129}	1.12864	1.58426
n_t	1.01398	1.58557
n_s	0.85211	1.58791
$n_{A'}$	0.76819	1.58954
n_r	0.70652	1.59105
n_C	0.65627	**1.59256**
$n_{C'}$	0.64385	1.59298
n_{He-Ne}	0.6328	1.59337
n_D	0.58929	1.59514
n_d	0.58756	**1.59522**
n_e	0.54607	1.59732
n_F	0.48613	**1.60134**
$n_{F'}$	0.47999	1.60184
n_{He-Cd}	0.44157	1.60549
n_g	0.435835	**1.60612**
n_h	0.404656	1.61008
n_i	0.365015	1.61681
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	571
Yield Point (°C)	**At**	596
Softening Point (°C)	**SP**	
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	117
	(+100~+300°C)	135
Thermal Conductivity (W/m·K)	**k**	0.624

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	757
Rigidity Modulus (10⁸N/m²)	**G**	294
Poisson's Ratio	σ	0.287
Knoop Hardness	**Hk**	390 [4]
Abrasion	**Aa**	488
Photoelastic Constant (nm/cm/10⁵ Pa)	β	0.51

Partial Dispersions

$n_C - n_t$	0.006988
$n_C - n_{A'}$	0.003015
$n_d - n_C$	0.002665
$n_e - n_C$	0.004761
$n_g - n_d$	0.010904
$n_g - n_F$	0.004782
$n_h - n_g$	0.003960
$n_i - n_g$	0.010681
$n_{C'} - n_t$	0.007411
$n_e - n_{C'}$	0.004338
$n_{F'} - n_e$	0.004528
$n_i - n_{F'}$	0.014961

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0692
$\Delta\theta_{C,A'}$	-0.0149
$\Delta\theta_{g,d}$	0.0169
$\Delta\theta_{g,F}$	0.0123
$\Delta\theta_{i,g}$	0.0577

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	7.61242785	E-1
A_2	7.47033375	E-1
A_3	9.38928947	E-1
B_1	3.21174095	E-3
B_2	1.40234423	E-2
B_3	1.39523530	E2
1129 ~ 2325 nm		
A_1	7.61242785	E-1
A_2	7.47033375	E-1
A_3	9.38928947	E-1
B_1	3.21174095	E-3
B_2	1.40234423	E-2
B_3	1.39523530	E2

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**	51.3
Phosphate Resistance	**PR**	4.1

Relative Partial Dispersions

$\theta_{C,t}$	0.7953
$\theta_{C,A'}$	0.3431
$\theta_{d,C}$	0.3033
$\theta_{e,C}$	0.5418
$\theta_{g,d}$	1.2409
$\theta_{g,F}$	0.5442
$\theta_{h,g}$	0.4507
$\theta_{i,g}$	1.2155
$\theta'_{C',t}$	0.8359
$\theta'_{e,C'}$	0.4893
$\theta'_{F',e}$	0.5107
$\theta'_{i,F'}$	1.6875

Internal Transmittance

λ_{80}	347	λ_5	302

CCI

B	G	R
0.00	0.32	0.27

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.180	
320	0.350	
330	0.540	
340	0.720	
350	0.840	
360	0.917	
365		
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	
1000	0.996	
1200	0.997	
1400	0.997	
1600	0.997	
1800	0.995	
2000	0.992	
2200	0.989	
2400	0.983	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	355
Specific Gravity	**d**	4.17		λ_5	295

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-5.8	-5.5	-5.5	-5.4	-5.3	-5.1	-4.9	
-20 ~ 0	-6.0	-5.7	-5.7	-5.6	-5.5	-5.3	-5.1	
0 ~ 20	-6.1	-5.9	-5.9	-5.8	-5.7	-5.5	-5.2	
20 ~ 40	-6.3	-6.1	-6.1	-6.0	-5.9	-5.6	-5.4	
40 ~ 60	-6.4	-6.2	-6.1	-6.1	-5.9	-5.7	-5.4	
60 ~ 80	-6.5	-6.2	-6.2	-6.1	-6.0	-5.7	-5.5	

© OHARA GmbH – Hofheim – Germany

S-FPM3

538747
539743

Refractive Index	n_d	**1.53775**	Abbe Number	ν_d	**74.70**	Dispersion	$n_F - n_C$	**0.00720**
	n_e	1.537750		ν_e	74.34		$n_{F'} - n_{C'}$	0.007199
		1.539469						0.007257

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.51738
n_{1970}	1.97009	1.52105
n_{1530}	1.52958	1.52500
n_{1129}	1.12864	1.52849
n_t	1.01398	1.52965
n_s	0.85211	1.53167
$n_{A'}$	0.76819	1.53304
n_r	0.70652	1.53430
n_C	0.65627	**1.53555**
$n_{C'}$	0.64385	1.53590
n_{He-Ne}	0.6328	1.53623
n_D	0.58929	1.53769
n_d	0.58756	**1.53775**
n_e	0.54607	1.53947
n_F	0.48613	**1.54275**
$n_{F'}$	0.47999	1.54316
n_{He-Cd}	0.44157	1.54612
n_g	0.435835	**1.54664**
n_h	0.404656	1.54984
n_i	0.365015	1.55525
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	496
Yield Point (°C)	**At**	524
Softening Point (°C)	**SP**	
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	115
	(+100~+300°C)	138
Thermal Conductivity (W/m·K)	**k**	0.805

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	806
Rigidity Modulus (10⁸N/m²)	**G**	312
Poisson's Ratio	σ	0.291
Knoop Hardness	**Hk**	390 [4]
Abrasion	**Aa**	373
Photoelastic Constant (nm/cm/10⁵ Pa)	β	0.85

Partial Dispersions

$n_C - n_t$	0.005905
$n_C - n_{A'}$	0.002510
$n_d - n_C$	0.002196
$n_e - n_C$	0.003915
$n_g - n_d$	0.008885
$n_g - n_F$	0.003882
$n_h - n_g$	0.003203
$n_i - n_g$	0.008618
$n_{C'} - n_t$	0.006255
$n_e - n_{C'}$	0.003565
$n_{F'} - n_e$	0.003692
$n_i - n_{F'}$	0.012092

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0769
$\Delta\theta_{C,A'}$	-0.0177
$\Delta\theta_{g,d}$	0.0246
$\Delta\theta_{g,F}$	0.0186
$\Delta\theta_{i,g}$	0.0976

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	8.09407286	E-1
A_2	5.27007033	E-1
A_3	9.09127704	E-1
B_1	3.76072389	E-3
B_2	1.35654895	E-2
B_3	1.42503612	E2
1129 ~ 2325 nm		
A_1	8.09407286	E-1
A_2	5.27007033	E-1
A_3	9.09127704	E-1
B_1	3.76072389	E-3
B_2	1.35654895	E-2
B_3	1.42503612	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	4
Acid Resistance (Surface Group)	**SR**	5.1
Phosphate Resistance	**PR**	4.1

Relative Partial Dispersions

$\theta_{C,t}$	0.8203
$\theta_{C,A'}$	0.3487
$\theta_{d,C}$	0.3050
$\theta_{e,C}$	0.5438
$\theta_{g,d}$	1.2342
$\theta_{g,F}$	0.5392
$\theta_{h,g}$	0.4449
$\theta_{i,g}$	1.1971
$\theta'_{C',t}$	0.8619
$\theta'_{e,C'}$	0.4912
$\theta'_{F',e}$	0.5088
$\theta'_{i,F'}$	1.6663

Internal Transmittance

λ_{80}	336	λ_5	284

CCI

B	G	R
0.00	0.28	0.23

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.030	
290	0.080	
300	0.190	
310	0.360	
320	0.550	
330	0.720	
340	0.850	
350	0.924	
360	0.962	
365		
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	
1000	0.996	
1200	0.997	
1400	0.997	
1600	0.996	
1800	0.995	
2000	0.993	
2200	0.987	
2400	0.984	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	345	
Specific Gravity	**d**	3.64		λ_5		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10-6/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-3.9	-3.7	-3.7	-3.6	-3.5	-3.3	-3.2	
-20 ~ 0	-4.2	-4.0	-4.0	-3.9	-3.8	-3.6	-3.4	
0 ~ 20	-4.4	-4.2	-4.2	-4.2	-4.1	-3.8	-3.6	
20 ~ 40	-4.6	-4.4	-4.4	-4.3	-4.2	-4.0	-3.8	
40 ~ 60	-4.7	-4.5	-4.5	-4.4	-4.3	-4.1	-3.9	
60 ~ 80	-4.8	-4.6	-4.6	-4.5	-4.4	-4.2	-4.0	

© OHARA GmbH – Hofheim – Germany

S-FSL5

487702
489701

Refractive Index	n_d	**1.48749**	Abbe Number	ν_d	**70.23**	Dispersion	$n_F - n_C$	**0.00694**
	n_e	1.487490		ν_e	70.04		$n_{F'} - n_{C'}$	0.006941
		1.489147						0.006984

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.46227
n_{1970}	1.97009	1.46765
n_{1530}	1.52958	1.47324
n_{1129}	1.12864	1.47778
n_t	1.01398	1.47915
n_s	0.85211	1.48138
$n_{A'}$	0.76819	1.48282
n_r	0.70652	1.48410
n_C	0.65627	**1.48534**
$n_{C'}$	0.64385	1.48569
n_{He-Ne}	0.6328	1.48601
n_D	0.58929	1.48743
n_d	0.58756	**1.48749**
n_e	0.54607	1.48915
n_F	0.48613	**1.49228**
$n_{F'}$	0.47999	1.49267
n_{He-Cd}	0.44157	1.49548
n_g	0.435835	**1.49596**
n_h	0.404656	1.49898
n_i	0.365015	1.50406
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	457
Annealing Point (°C)	**AP**	491
Transformation Temperature (°C)	**Tg**	500
Yield Point (°C)	**At**	568
Softening Point (°C)	**SP**	679
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	90
	(+100~+300°C)	95
Thermal Conductivity (W/m·K)	**k**	1.007

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	623
Rigidity Modulus (10^8N/m^2)	**G**	254
Poisson's Ratio	σ	0.227
Knoop Hardness	**Hk**	520 [5]
Abrasion	**Aa**	111
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.87

Partial Dispersions

$n_C - n_t$	0.006194
$n_C - n_{A'}$	0.002522
$n_d - n_C$	0.002146
$n_e - n_C$	0.003803
$n_g - n_d$	0.008474
$n_g - n_F$	0.003679
$n_h - n_g$	0.003019
$n_i - n_g$	0.008099
$n_{C'} - n_t$	0.006539
$n_e - n_{C'}$	0.003458
$n_{F'} - n_e$	0.003526
$n_i - n_{F'}$	0.011390

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0162
$\Delta\theta_{C,A'}$	0.0023
$\Delta\theta_{g,d}$	0.0020
$\Delta\theta_{g,F}$	0.0022
$\Delta\theta_{i,g}$	0.0299

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.17447043	
A_2	1.40056154	E-2
A_3	1.19272435	
B_1	8.41855181	E-3
B_2	-5.81790767	E-2
B_3	1.29599726	E2
1129 ~ 2325 nm		
A_1	1.17447043	
A_2	1.40056154	E-2
A_3	1.19272435	
B_1	8.41855181	E-3
B_2	-5.81790767	E-2
B_3	1.29599726	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8924
$\theta_{C,A'}$	0.3633
$\theta_{d,C}$	0.3092
$\theta_{e,C}$	0.5479
$\theta_{g,d}$	1.2209
$\theta_{g,F}$	0.5300
$\theta_{h,g}$	0.4350
$\theta_{i,g}$	1.1668
$\theta'_{C',t}$	0.9363
$\theta'_{e,C'}$	0.4951
$\theta'_{F',e}$	0.5049
$\theta'_{i,F'}$	1.6309

Internal Transmittance

λ_{80}	304	λ_5	277

CCI

B	G	R
0.00	0.00	0.00

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.130	
290	0.430	
300	0.730	
310	0.890	
320	0.961	
330	0.984	
340	0.992	
350	0.995	
360	0.995	
365		
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	
1000	0.998	
1200	0.998	
1400	0.982	
1600	0.992	
1800	0.985	
2000	0.971	
2200	0.880	
2400	0.870	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	30
Specific Gravity	**d**	2.46		λ_5	27

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.3	-1.2	-1.2	-1.1	-1.1	-0.9	-0.7	
-20 ~ 0	-1.3	-1.1	-1.1	-1.0	-1.0	-0.8	-0.6	
0 ~ 20	-1.3	-1.1	-1.0	-0.9	-0.8	-0.6	-0.4	
20 ~ 40	-1.1	-0.8	-0.8	-0.7	-0.6	-0.4	-0.3	
40 ~ 60	-1.0	-0.6	-0.6	-0.5	-0.4	-0.2		
60 ~ 80	-0.9	-0.4	-0.4	-0.3	-0.2	-0.1	0.2	

© OHARA GmbH – Hofheim – Germany

S-FTM16

593353
597350

Refractive Index	n_d	**1.59270**	Abbe Number	ν_d	**35.31**	Dispersion	$n_F - n_C$	**0.01679**
	n_e	1.592701		ν_e	35.03		$n_{F'} - n_{C'}$	0.016785
		1.596670						0.017031

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.55603
n_{1970}	1.97009	1.56154
n_{1530}	1.52958	1.56767
n_{1129}	1.12864	1.57357
n_t	1.01398	1.57569
n_s	0.85211	1.57962
$n_{A'}$	0.76819	1.58243
n_r	0.70652	1.58508
n_C	0.65627	**1.58779**
$n_{C'}$	0.64385	1.58856
n_{He-Ne}	0.6328	1.58929
n_D	0.58929	1.59255
n_d	0.58756	**1.59270**
n_e	0.54607	1.59667
n_F	0.48613	**1.60458**
$n_{F'}$	0.47999	1.60559
n_{He-Cd}	0.44157	1.61318
n_g	0.435835	**1.61454**
n_h	0.404656	1.62334
n_i	0.365015	1.63974
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	501
Yield Point (°C)	**At**	542
Softening Point (°C)	**SP**	
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	90
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	0.947

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	653
Rigidity Modulus (10^8N/m^2)	**G**	264
Poisson's Ratio	σ	0.238
Knoop Hardness	**Hk**	490 [5]
Abrasion	**Aa**	172
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.33

Partial Dispersions	
$n_C - n_t$	0.012104
$n_C - n_{A'}$	0.005365
$n_d - n_C$	0.004906
$n_e - n_C$	0.008875
$n_g - n_d$	0.021838
$n_g - n_F$	0.009959
$n_h - n_g$	0.008800
$n_i - n_g$	0.025202
$n_{C'} - n_t$	0.012872
$n_e - n_{C'}$	0.008107
$n_{F'} - n_e$	0.008924
$n_i - n_{F'}$	0.034147

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0088
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	0.0096
$\Delta\theta_{g,F}$	0.0090
$\Delta\theta_{i,g}$	0.0721

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.32940907	
A_2	1.41512125	E-1
A_3	1.44299068	
B_1	1.02377287	E-2
B_2	5.78081956	E-2
B_3	1.50597139	E2
1129 ~ 2325 nm		
A_1	1.32940907	
A_2	1.41512125	E-1
A_3	1.44299068	
B_1	1.02377287	E-2
B_2	5.78081956	E-2
B_3	1.50597139	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7211
$\theta_{C,A'}$	0.3196
$\theta_{d,C}$	0.2923
$\theta_{e,C}$	0.5287
$\theta_{g,d}$	1.3010
$\theta_{g,F}$	0.5933
$\theta_{h,g}$	0.5243
$\theta_{i,g}$	1.5015
$\theta'_{C',t}$	0.7558
$\theta'_{e,C'}$	0.4760
$\theta'_{F',e}$	0.5240
$\theta'_{i,F'}$	2.0050

Internal Transmittance			
λ_{80}	370	λ_5	350

CCI		
B	G	R
0.00	0.43	0.42

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.040	
360	0.430	
365		
370	0.810	
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	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.994	
1800	0.989	
2000	0.987	
2200	0.959	
2400	0.953	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	2.64		λ_5	35	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.0	-0.5	-0.4	-0.2		0.7	1.4	
-20 ~ 0	-0.9	-0.4	-0.3		0.2	0.8	1.6	
0 ~ 20	-0.8	-0.2	-0.2	0.1	0.3	1.0	1.8	
20 ~ 40	-0.7	-0.1	-0.1	0.2	0.5	1.2	2.1	
40 ~ 60	-0.6			0.3	0.6	1.4	2.3	
60 ~ 80	-0.5	0.1	0.1	0.4	0.7	1.6	2.5	

© OHARA GmbH – Hofheim – Germany

S-LAH51

786442
790439

Refractive Index	n_d	**1.78590**	Abbe Number	ν_d	**44.20**	Dispersion	$n_F - n_C$	**0.01778**
	n_e	1.790123		ν_e	43.95		$n_{F'} - n_{C'}$	0.017979
		1.785896						0.017780

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.74265
n_{1970}	1.97009	1.74972
n_{1530}	1.52958	1.75740
n_{1129}	1.12864	1.76452
n_t	1.01398	1.76700
n_s	0.85211	1.77150
$n_{A'}$	0.76819	1.77466
n_r	0.70652	1.77761
n_C	0.65627	**1.78058**
$n_{C'}$	0.64385	1.78142
n_{He-Ne}	0.6328	1.78221
n_D	0.58929	1.78574
n_d	0.58756	**1.78590**
n_e	0.54607	1.79012
n_F	0.48613	**1.79836**
$n_{F'}$	0.47999	1.79940
n_{He-Cd}	0.44157	1.80704
n_g	0.435835	**1.80838**
n_h	0.404656	1.81687
n_i	0.365015	1.83175
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	568
Annealing Point (°C)	**AP**	598
Transformation Temperature (°C)	**Tg**	617
Yield Point (°C)	**At**	641
Softening Point (°C)	**SP**	677
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	59
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.826

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1129
Rigidity Modulus (10^8N/m^2)	**G**	435
Poisson's Ratio	σ	0.297
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	79
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.88

Partial Dispersions

$n_C - n_t$	0.013580
$n_C - n_{A'}$	0.005923
$n_d - n_C$	0.005312
$n_e - n_C$	0.009539
$n_g - n_d$	0.022480
$n_g - n_F$	0.010012
$n_h - n_g$	0.008492
$n_i - n_g$	0.023375
$n_{C'} - n_t$	0.014419
$n_e - n_{C'}$	0.008700
$n_{F'} - n_e$	0.009279
$n_i - n_{F'}$	0.032349

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0097
$\Delta\theta_{C,A'}$	0.0037
$\Delta\theta_{g,d}$	-0.0086
$\Delta\theta_{g,F}$	-0.0069
$\Delta\theta_{i,g}$	-0.0402

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.82586991	
A_2	2.83023349	E-1
A_3	1.35964319	
B_1	9.35297152	E-3
B_2	3.73803057	E-2
B_3	1.00655798	E2
1129 ~ 2325 nm		
A_1	1.82586991	
A_2	2.83023349	E-1
A_3	1.35964319	
B_1	9.35297152	E-3
B_2	3.73803057	E-2
B_3	1.00655798	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7638
$\theta_{C,A'}$	0.3331
$\theta_{d,C}$	0.2988
$\theta_{e,C}$	0.5365
$\theta_{g,d}$	1.2643
$\theta_{g,F}$	0.5631
$\theta_{h,g}$	0.4776
$\theta_{i,g}$	1.3147
$\theta'_{C',t}$	0.8020
$\theta'_{e,C'}$	0.4839
$\theta'_{F',e}$	0.5161
$\theta'_{i,F'}$	1.7993

Internal Transmittance

λ_{80}	366	λ_5	333

CCI

B	G	R
0.00	0.83	0.82

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.010	
340	0.170	
350	0.510	
360	0.730	
365		
370	0.840	
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	
1000	0.996	
1200	0.996	
1400	0.991	
1600	0.989	
1800	0.981	
2000	0.957	
2200	0.890	
2400	0.680	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	4.40		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		6.0		6.3	6.6	7.3	7.8	
-20 ~ 0		6.0		6.3	6.6	7.3	7.9	
0 ~ 20		6.1		6.4	6.7	7.4	8.1	
20 ~ 40		6.2		6.5	6.8	7.6	8.3	
40 ~ 60		6.4		6.7	7.0	7.8	8.6	
60 ~ 80		6.6		6.9	7.2	8.1	8.9	

© OHARA GmbH – Hofheim – Germany

S-LAH52

800422
804420

Refractive Index	n_d	**1.79952**	Abbe Number	ν_d	**42.22**	Dispersion	$n_F - n_C$	**0.01893**
	n_e	1.804015		ν_e	41.97		$n_{F'} - n_{C'}$	0.019157
		1.799516						0.018935

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75495
n_{1970}	1.97009	1.76202
n_{1530}	1.52958	1.76976
n_{1129}	1.12864	1.77703
n_t	1.01398	1.77961
n_s	0.85211	1.78430
$n_{A'}$	0.76819	1.78762
n_r	0.70652	1.79073
n_C	0.65627	**1.79388**
$n_{C'}$	0.64385	1.79477
n_{He-Ne}	0.6328	1.79560
n_D	0.58929	1.79935
n_d	0.58756	**1.79952**
n_e	0.54607	1.80401
n_F	0.48613	**1.81281**
$n_{F'}$	0.47999	1.81393
n_{He-Cd}	0.44157	1.82211
n_g	0.435835	**1.82355**
n_h	0.404656	1.83271
n_i	0.365015	1.84885
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	565
Annealing Point (°C)	**AP**	596
Transformation Temperature (°C)	**Tg**	618
Yield Point (°C)	**At**	636
Softening Point (°C)	**SP**	679
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	60
	(+100~+300°C)	73
Thermal Conductivity (W/m·K)	**k**	0.828

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1119
Rigidity Modulus (10^8N/m^2)	**G**	431
Poisson's Ratio	σ	0.297
Knoop Hardness	**Hk**	640 [6]
Abrasion	**Aa**	82
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.92

Partial Dispersions

$n_C - n_t$	0.014274
$n_C - n_{A'}$	0.006258
$n_d - n_C$	0.005637
$n_e - n_C$	0.010136
$n_g - n_d$	0.024038
$n_g - n_F$	0.010740
$n_h - n_g$	0.009152
$n_i - n_g$	0.025292
$n_{C'} - n_t$	0.015163
$n_e - n_{C'}$	0.009247
$n_{F'} - n_e$	0.009910
$n_i - n_{F'}$	0.034921

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0090
$\Delta\theta_{C,A'}$	0.0035
$\Delta\theta_{g,d}$	-0.0075
$\Delta\theta_{g,F}$	-0.0060
$\Delta\theta_{i,g}$	-0.0358

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.85390925	
A_2	2.97925555	E-1
A_3	1.39382086	
B_1	9.55320687	E-3
B_2	3.93816850	E-2
B_3	1.02706848	E2
1129 ~ 2325 nm		
A_1	1.85390925	
A_2	2.97925555	E-1
A_3	1.39382086	
B_1	9.55320687	E-3
B_2	3.93816850	E-2
B_3	1.02706848	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7538
$\theta_{C,A'}$	0.3305
$\theta_{d,C}$	0.2977
$\theta_{e,C}$	0.5353
$\theta_{g,d}$	1.2695
$\theta_{g,F}$	0.5672
$\theta_{h,g}$	0.4833
$\theta_{i,g}$	1.3357
$\theta'_{C',t}$	0.7915
$\theta'_{e,C'}$	0.4827
$\theta'_{F',e}$	0.5173
$\theta'_{i,F'}$	1.8229

Internal Transmittance

λ_{80}	367	λ_5	331

CCI

B	G	R
0.00	1.03	1.10

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.020	
340	0.230	
350	0.520	
360	0.720	
365		
370	0.830	
380	0.890	
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	
1000	0.998	
1200	0.997	
1400	0.994	
1600	0.993	
1800	0.986	
2000	0.965	
2200	0.910	
2400	0.710	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40		
Specific Gravity	**d**	4.41		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.1	6.1	6.2	6.4	6.6	7.3	8.0	
-20 ~ 0	5.2	6.1	6.2	6.4	6.6	7.3	8.1	
0 ~ 20	5.2	6.1	6.1	6.4	6.7	7.5	8.3	
20 ~ 40	5.3	6.2	6.2	6.5	6.9	7.7	8.5	
40 ~ 60	5.5	6.4	6.5	6.7	7.1	7.9	8.8	
60 ~ 80	5.8	6.6	6.6	6.9	7.3	8.2	9.1	

© OHARA GmbH – Hofheim – Germany

S-LAH52Q

800422
804420

Refractive Index	n_d	**1.79952**	Abbe Number	ν_d	**42.24**	Dispersion	$n_F - n_C$ 0.018928
	n_e	1.799520		ν_e	41.98		$n_{F'} - n_{C'}$ 0.019154
		1.804018					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75708
n_{1970}	1.97009	1.76345
n_{1530}	1.52958	1.77050
n_{1129}	1.12864	1.77732
n_t	1.01398	1.77980
n_s	0.85211	1.78438
$n_{A'}$	0.76819	1.78767
n_r	0.70652	1.79076
n_C	0.65627	**1.79389**
$n_{C'}$	0.64385	1.79478
n_{He-Ne}	0.6328	1.79561
n_D	0.58929	1.79935
n_d	0.58756	**1.79952**
n_e	0.54607	1.80402
n_F	0.48613	**1.81282**
$n_{F'}$	0.47999	1.81393
n_{He-Cd}	0.44157	1.82212
n_g	0.435835	**1.82356**
n_h	0.404656	1.83271
n_i	0.365015	1.84883
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	553
Annealing Point (°C)	**AP**	576
Transformation Temperature (°C)	**Tg**	598
Yield Point (°C)	**At**	622
Softening Point (°C)	**SP**	651
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	60
	(+100~+300°C)	73
Thermal Conductivity (W/m·K)	**k**	0.852

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1098
Rigidity Modulus (10^8N/m^2)	**G**	418
Poisson's Ratio	σ	0.313
Knoop Hardness	**Hk**	620 [6]
Abrasion	**Aa**	54
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.31

Partial Dispersions

$n_C - n_t$	0.014094
$n_C - n_{A'}$	0.006224
$n_d - n_C$	0.005627
$n_e - n_C$	0.010125
$n_g - n_d$	0.024043
$n_g - n_F$	0.010742
$n_h - n_g$	0.009149
$n_i - n_g$	0.025268
$n_{C'} - n_t$	0.014980
$n_e - n_{C'}$	0.009239
$n_{F'} - n_e$	0.009915
$n_i - n_{F'}$	0.034898

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0003
$\Delta\theta_{C,A'}$	0.0017
$\Delta\theta_{g,d}$	-0.0068
$\Delta\theta_{g,F}$	-0.0056
$\Delta\theta_{i,g}$	-0.0363

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.91082318	
A_2	2.39854589	E-1
A_3	1.16159733	
B_1	1.03565352	E-2
B_2	4.13805081	E-2
B_3	9.66037300	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7446
$\theta_{C,A'}$	0.3288
$\theta_{d,C}$	0.2973
$\theta_{e,C}$	0.5349
$\theta_{g,d}$	1.2702
$\theta_{g,F}$	0.5675
$\theta_{h,g}$	0.4834
$\theta_{i,g}$	1.3350
$\theta'_{C',t}$	0.7821
$\theta'_{e,C'}$	0.4824
$\theta'_{F',e}$	0.5176
$\theta'_{i,F'}$	1.8220

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.130	
350	0.460	
360	0.730	
365		
370	0.860	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.967	
2200	0.924	
2400	0.750	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	390
Specific Gravity	**d**	4.47		λ_5	335

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	8.5	9.5	9.5	9.8	10.2	11.0	11.9	
-20 ~ 0	8.6	9.6	9.6	9.9	10.3	11.2	12.1	
0 ~ 20	8.7	9.7	9.7	10.1	10.5	11.4	12.3	
20 ~ 40	8.7	9.8	9.8	10.2	10.6	11.5	12.5	
40 ~ 60	8.8	9.9	10.0	10.3	10.7	11.7	12.7	
60 ~ 80	9.0	10.1	10.2	10.5	11.0	12.0	13.1	

© OHARA GmbH – Hofheim – Germany

S-LAH53

806409
811407

Refractive Index	n_d	**1.80610**	Abbe Number	ν_d	**40.92**	Dispersion	$n_F - n_C$	**0.01969**
	n_e	1.806098		ν_e	40.67		$n_{F'} - n_{C'}$	0.019697
		1.810775						0.019935

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.76051
n_{1970}	1.97009	1.76764
n_{1530}	1.52958	1.77546
n_{1129}	1.12864	1.78287
n_t	1.01398	1.78551
n_s	0.85211	1.79034
$n_{A'}$	0.76819	1.79377
n_r	0.70652	1.79699
n_C	0.65627	**1.80025**
$n_{C'}$	0.64385	1.80117
n_{He-Ne}	0.6328	1.80203
n_D	0.58929	1.80592
n_d	0.58756	**1.80610**
n_e	0.54607	1.81078
n_F	0.48613	**1.81994**
$n_{F'}$	0.47999	1.82110
n_{He-Cd}	0.44157	1.82967
n_g	0.435835	**1.83117**
n_h	0.404656	1.84078
n_i	0.365015	1.85782
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	610
Yield Point (°C)	**At**	637
Softening Point (°C)	**SP**	687
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	59
	(+100~+300°C)	70
Thermal Conductivity (W/m·K)	**k**	0.860

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1127
Rigidity Modulus (10^8N/m^2)	**G**	434
Poisson's Ratio	σ	0.299
Knoop Hardness	**Hk**	640 [6]
Abrasion	**Aa**	78
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.96

Partial Dispersions	
$n_C - n_t$	0.014740
$n_C - n_{A'}$	0.006479
$n_d - n_C$	0.005850
$n_e - n_C$	0.010527
$n_g - n_d$	0.025076
$n_g - n_F$	0.011229
$n_h - n_g$	0.009607
$n_i - n_g$	0.026650
$n_{C'} - n_t$	0.015661
$n_e - n_{C'}$	0.009606
$n_{F'} - n_e$	0.010329
$n_i - n_{F'}$	0.036720

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0096
$\Delta\theta_{C,A'}$	0.0034
$\Delta\theta_{g,d}$	-0.0066
$\Delta\theta_{g,F}$	-0.0052
$\Delta\theta_{i,g}$	-0.0294

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.91811619	
A_2	2.53724399	E-1
A_3	1.39473885	
B_1	1.02147684	E-2
B_2	4.33176011	E-2
B_3	1.01938021	E2
1129 ~ 2325 nm		
A_1	1.91811619	
A_2	2.53724399	E-1
A_3	1.39473885	
B_1	1.02147684	E-2
B_2	4.33176011	E-2
B_3	1.01938021	E2

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**	4.2
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.7483
$\theta_{C,A'}$	0.3289
$\theta_{d,C}$	0.2970
$\theta_{e,C}$	0.5344
$\theta_{g,d}$	1.2731
$\theta_{g,F}$	0.5701
$\theta_{h,g}$	0.4877
$\theta_{i,g}$	1.3530
$\theta'_{C',t}$	0.7856
$\theta'_{e,C'}$	0.4819
$\theta'_{F',e}$	0.5181
$\theta'_{i,F'}$	1.8420

Internal Transmittance			
λ_{80}	370	λ_5	340

CCI		
B	G	R
0.00	1.07	1.13

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.060	
350	0.380	
360	0.650	
365		
370	0.800	
380	0.880	
390	0.925	
400	0.947	
420	0.969	
440	0.979	
460	0.985	
480	0.989	
500	0.993	
550	0.996	
600	0.996	
650	0.997	
700	0.998	
800	0.998	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.969	
2200	0.915	
2400	0.720	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	4.43		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.1	6.2	6.2	6.5	6.8	7.6	8.3	
-20 ~ 0	5.2	6.3	6.3	6.6	6.9	7.7	8.5	
0 ~ 20	5.3	6.4	6.4	6.7	7.1	7.9	8.7	
20 ~ 40	5.6	6.6	6.7	6.9	7.3	8.1	9.0	
40 ~ 60	5.8	6.8	6.9	7.2	7.6	8.4	9.4	
60 ~ 80	6.2	7.1	7.2	7.5	7.8	8.7	9.8	

© OHARA GmbH – Hofheim – Germany

S-LAH53V

806409
811407

Refractive Index	n_d	**1.80610**	Abbe Number	ν_d	**40.93**	Dispersion	$n_F - n_C$ 0.019695
	n_e	1.810776		ν_e	40.67		$n_{F'} - n_{C'}$ 0.019937

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.76201
n_{1970}	1.97009	1.76866
n_{1530}	1.52958	1.77600
n_{1129}	1.12864	1.78309
n_t	1.01398	1.78566
n_s	0.85211	1.79041
$n_{A'}$	0.76819	1.79381
n_r	0.70652	1.79701
n_C	0.65627	**1.80026**
$n_{C'}$	0.64385	1.80118
n_{He-Ne}	0.6328	1.80204
n_D	0.58929	1.80593
n_d	0.58756	**1.80610**
n_e	0.54607	1.81078
n_F	0.48613	**1.81995**
$n_{F'}$	0.47999	1.82112
n_{He-Cd}	0.44157	1.82969
n_g	0.435835	**1.83121**
n_h	0.404656	1.84085
n_i	0.365015	1.85798
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	569
Annealing Point (°C)	**AP**	589
Transformation Temperature (°C)	**Tg**	603
Yield Point (°C)	**At**	638
Softening Point (°C)	**SP**	670
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	58
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.859

Mechanical Properties		
Young's Modulus (10⁸N/m²)	**E**	1135
Rigidity Modulus (10⁸N/m²)	**G**	434
Poisson's Ratio	σ	0.309
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10⁵ Pa)	β	2.13

Partial Dispersions	
$n_C - n_t$	0.014601
$n_C - n_{A'}$	0.006450
$n_d - n_C$	0.005841
$n_e - n_C$	0.010517
$n_g - n_d$	0.025106
$n_g - n_F$	0.011252
$n_h - n_g$	0.009639
$n_i - n_g$	0.026774
$n_{C'} - n_t$	0.015520
$n_e - n_{C'}$	0.009598
$n_{F'} - n_e$	0.010339
$n_i - n_{F'}$	0.036865

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0027
$\Delta\theta_{C,A'}$	0.0020
$\Delta\theta_{g,d}$	-0.0050
$\Delta\theta_{g,F}$	-0.0039
$\Delta\theta_{i,g}$	-0.0229

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.96600955	
A_2	2.05143305	E-1
A_3	1.23200934	
B_1	1.07817785	E-2
B_2	4.63727869	E-2
B_3	9.76940600	E1
1129 ~ 2325 nm		
A_1	1.96600955	
A_2	2.05143305	E-1
A_3	1.23200934	
B_1	1.07817785	E-2
B_2	4.63727869	E-2
B_3	9.76940600	E1

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7414
$\theta_{C,A'}$	0.3275
$\theta_{d,C}$	0.2966
$\theta_{e,C}$	0.5340
$\theta_{g,d}$	1.2747
$\theta_{g,F}$	0.5713
$\theta_{h,g}$	0.4894
$\theta_{i,g}$	1.3594
$\theta'_{C',t}$	0.7785
$\theta'_{e,C'}$	0.4814
$\theta'_{F',e}$	0.5186
$\theta'_{i,F'}$	1.8491

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.020	
350	0.230	
360	0.560	
365		
370	0.780	
380	0.880	
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	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.995	
1800	0.987	
2000	0.966	
2200	0.916	
2400	0.730	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.41		λ_5	345

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	7.7	8.6	8.7	9.0	9.3	10.1	11.0	
-20 ~ 0	7.8	8.7	8.8	9.1	9.5	10.3	11.3	
0 ~ 20	7.8	8.8	8.9	9.2	9.6	10.5	11.4	
20 ~ 40	7.8	8.8	8.9	9.2	9.6	10.6	11.6	
40 ~ 60	7.9	9.0	9.0	9.4	9.8	10.8	11.8	
60 ~ 80	8.1	9.2	9.3	9.6	10.0	11.0	12.1	

© OHARA GmbH – Hofheim – Germany

S-LAH55V

835427
839425

Refractive Index	n_d	**1.83481**	Abbe Number	ν_d	**42.73**	Dispersion	$n_F - n_C$	**0.01954**
	n_e	1.834807		ν_e	42.47		$n_{F'} - n_{C'}$	0.019539
		1.839452						0.019764

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78870
n_{1970}	1.97009	1.79602
n_{1530}	1.52958	1.80402
n_{1129}	1.12864	1.81154
n_t	1.01398	1.81420
n_s	0.85211	1.81906
$n_{A'}$	0.76819	1.82251
n_r	0.70652	1.82572
n_C	0.65627	**1.82898**
$n_{C'}$	0.64385	1.82990
n_{He-Ne}	0.6328	1.83076
n_D	0.58929	1.83464
n_d	0.58756	**1.83481**
n_e	0.54607	1.83945
n_F	0.48613	**1.84852**
$n_{F'}$	0.47999	1.84966
n_{He-Cd}	0.44157	1.85808
n_g	0.435835	**1.85956**
n_h	0.404656	1.86893
n_i	0.365015	1.88539
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	645
Annealing Point (°C)	**AP**	672
Transformation Temperature (°C)	**Tg**	695
Yield Point (°C)	**At**	718
Softening Point (°C)	**SP**	749
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	62
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.853

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1178
Rigidity Modulus (10^8N/m^2)	**G**	470
Poisson's Ratio	σ	0.253
Knoop Hardness	**Hk**	740 [7]
Abrasion	**Aa**	59
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.3

Partial Dispersions

$n_C - n_t$	0.014778
$n_C - n_{A'}$	0.006476
$n_d - n_C$	0.005826
$n_e - n_C$	0.010471
$n_g - n_d$	0.024749
$n_g - n_F$	0.011036
$n_h - n_g$	0.009373
$n_i - n_g$	0.025830
$n_{C'} - n_t$	0.015697
$n_e - n_{C'}$	0.009552
$n_{F'} - n_e$	0.010212
$n_i - n_{F'}$	0.035722

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0091
$\Delta\theta_{C,A'}$	0.0037
$\Delta\theta_{g,d}$	-0.0094
$\Delta\theta_{g,F}$	-0.0075
$\Delta\theta_{i,g}$	-0.0452

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.97025325	E0
A_2	3.04894140	E-1
A_3	1.39214665	E0
B_1	9.91088134	E-3
B_2	3.83202295	E-2
B_3	9.77785249	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	4.0
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7563
$\theta_{C,A'}$	0.3314
$\theta_{d,C}$	0.2982
$\theta_{e,C}$	0.5359
$\theta_{g,d}$	1.2666
$\theta_{g,F}$	0.5648
$\theta_{h,g}$	0.4797
$\theta_{i,g}$	1.3220
$\theta'_{C',t}$	0.7942
$\theta'_{e,C'}$	0.4833
$\theta'_{F',e}$	0.5167
$\theta'_{i,F'}$	1.8074

Internal Transmittance

λ_{80}	363	λ_5	327

CCI

B	G	R
0.00	0.93	0.96

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.140	
340	0.420	
350	0.640	
360	0.780	
365		
370	0.860	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.995	
1800	0.987	
2000	0.966	
2200	0.909	
2400	0.710	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.73		λ_5	325

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.5	4.2	4.3	4.5	4.8	5.4	6.1	
-20 ~ 0	3.5	4.2	4.3	4.5	4.8	5.5	6.2	
0 ~ 20	3.5	4.2	4.3	4.5	4.8	5.5	6.3	
20 ~ 40	3.5	4.3	4.3	4.5	4.9	5.6	6.4	
40 ~ 60	3.5	4.4	4.4	4.7	5.0	5.8	6.6	
60 ~ 80	3.7	4.5	4.6	4.9	5.2	6.0	6.8	

© OHARA GmbH – Hofheim – Germany

S-LAH55VS

835427
839425

Refractive Index	n_d	**1.83481**	Abbe Number	ν_d	**42.74**	Dispersion	$n_F - n_C$ 0.019531
	n_e	1.834810		ν_e	42.49		$n_{F'} - n_{C'}$ 0.019756
		1.839452					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78946
n_{1970}	1.97009	1.79652
n_{1530}	1.52958	1.80427
n_{1129}	1.12864	1.81165
n_t	1.01398	1.81428
n_s	0.85211	1.81910
$n_{A'}$	0.76819	1.82253
n_r	0.70652	1.82574
n_C	0.65627	**1.82899**
$n_{C'}$	0.64385	1.82991
n_{He-Ne}	0.6328	1.83077
n_D	0.58929	1.83464
n_d	0.58756	**1.83481**
n_e	0.54607	1.83945
n_F	0.48613	**1.84852**
$n_{F'}$	0.47999	1.84966
n_{He-Cd}	0.44157	1.85807
n_g	0.435835	**1.85955**
n_h	0.404656	1.86892
n_i	0.365015	1.88534
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	639
Annealing Point (°C)	**AP**	667
Transformation Temperature (°C)	**Tg**	677
Yield Point (°C)	**At**	709
Softening Point (°C)	**SP**	738
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	63
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.864

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1223
Rigidity Modulus (10^8N/m^2)	**G**	472
Poisson's Ratio	σ	0.297
Knoop Hardness	**Hk**	740 [7]
Abrasion	**Aa**	64
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.31

Partial Dispersions

$n_C - n_t$	0.014712
$n_C - n_{A'}$	0.006462
$n_d - n_C$	0.005822
$n_e - n_C$	0.010464
$n_g - n_d$	0.024741
$n_g - n_F$	0.011032
$n_h - n_g$	0.009365
$n_i - n_g$	0.025786
$n_{C'} - n_t$	0.015630
$n_e - n_{C'}$	0.009546
$n_{F'} - n_e$	0.010210
$n_i - n_{F'}$	0.035675

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	0.0032
$\Delta\theta_{g,d}$	-0.0091
$\Delta\theta_{g,F}$	-0.0075
$\Delta\theta_{i,g}$	-0.0468

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.92591095	
A_2	3.48953460	E-1
A_3	1.42230744	
B_1	9.61152490	E-3
B_2	3.65132980	E-2
B_3	1.03364090	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7533
$\theta_{C,A'}$	0.3309
$\theta_{d,C}$	0.2981
$\theta_{e,C}$	0.5358
$\theta_{g,d}$	1.2668
$\theta_{g,F}$	0.5648
$\theta_{h,g}$	0.4795
$\theta_{i,g}$	1.3203
$\theta'_{C',t}$	0.7912
$\theta'_{e,C'}$	0.4832
$\theta'_{F',e}$	0.5168
$\theta'_{i,F'}$	1.8058

Internal Transmittance

λ_{80}	356	λ_5	319

CCI

B	G	R
0.00	0.65	0.68

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.060	
330	0.280	
340	0.550	
350	0.730	
360	0.840	
365		
370	0.900	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.968	
2200	0.920	
2400	0.740	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	395
Specific Gravity	**d**	4.58		λ_5	320

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.9	4.6	4.6	4.9	5.2	5.8	6.5	
-20 ~ 0	3.8	4.6	4.7	4.9	5.2	5.9	6.6	
0 ~ 20	3.8	4.6	4.7	4.9	5.2	6.0	6.7	
20 ~ 40	3.8	4.6	4.7	5.0	5.3	6.0	6.8	
40 ~ 60	3.9	4.8	4.8	5.1	5.4	6.2	7.0	
60 ~ 80	4.0	4.9	5.0	5.3	5.6	6.4	7.3	

© OHARA GmbH – Hofheim – Germany

S-LAH58

883408
888405

Refractive Index	n_d	**1.88300**	Abbe Number	ν_d	**40.76**	Dispersion	$n_F - n_C$	**0.02166**
	n_e	1.888146		ν_e	40.52		$n_{F'} - n_{C'}$	0.021919
		1.882997						0.021661

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.83590
n_{1970}	1.97009	1.84264
n_{1530}	1.52958	1.85023
n_{1129}	1.12864	1.85776
n_t	1.01398	1.86054
n_s	0.85211	1.86572
$n_{A'}$	0.76819	1.86946
n_r	0.70652	1.87298
n_C	0.65627	**1.87656**
$n_{C'}$	0.64385	1.87757
n_{He-Ne}	0.6328	1.87852
n_D	0.58929	1.88281
n_d	0.58756	**1.88300**
n_e	0.54607	1.88815
n_F	0.48613	**1.89822**
$n_{F'}$	0.47999	1.89949
n_{He-Cd}	0.44157	1.90885
n_g	0.435835	**1.91050**
n_h	0.404656	1.92092
n_i	0.365015	1.93917
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	666
Annealing Point (°C)	**AP**	714
Transformation Temperature (°C)	**Tg**	738
Yield Point (°C)	**At**	765
Softening Point (°C)	**SP**	803
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	66
	(+100~+300°C)	78
Thermal Conductivity (W/m·K)	**k**	0.827

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1268
Rigidity Modulus (10^8N/m^2)	**G**	487
Poisson's Ratio	σ	0.301
Knoop Hardness	**Hk**	710 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.3

Partial Dispersions	
$n_C - n_t$	0.016022
$n_C - n_{A'}$	0.007103
$n_d - n_C$	0.006437
$n_e - n_C$	0.011586
$n_g - n_d$	0.027500
$n_g - n_F$	0.012276
$n_h - n_g$	0.010422
$n_i - n_g$	0.028677
$n_{C'} - n_t$	0.017035
$n_e - n_{C'}$	0.010573
$n_{F'} - n_e$	0.011346
$n_i - n_{F'}$	0.039682

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0018
$\Delta\theta_{C,A'}$	0.0026
$\Delta\theta_{g,d}$	-0.0105
$\Delta\theta_{g,F}$	-0.0088
$\Delta\theta_{i,g}$	-0.0598

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.78764964	
A_2	6.52635600	E-1
A_3	1.79914564	
B_1	8.47378536	E-3
B_2	3.13126408	E-2
B_3	1.32788001	E2
1129 ~ 2325 nm		
A_1	1.78764964	
A_2	6.52635600	E-1
A_3	1.79914564	
B_1	8.47378536	E-3
B_2	3.13126408	E-2
B_3	1.32788001	E2

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**	2.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.7397
$\theta_{C,A'}$	0.3279
$\theta_{d,C}$	0.2972
$\theta_{e,C}$	0.5349
$\theta_{g,d}$	1.2696
$\theta_{g,F}$	0.5667
$\theta_{h,g}$	0.4811
$\theta_{i,g}$	1.3239
$\theta'_{C',t}$	0.7772
$\theta'_{e,C'}$	0.4824
$\theta'_{F',e}$	0.5176
$\theta'_{i,F'}$	1.8104

Internal Transmittance			
λ_{80}	374	λ_5	320

CCI		
B	G	R
0.00	1.69	1.75

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.050	
330	0.170	
340	0.340	
350	0.510	
360	0.660	
365		
370	0.770	
380	0.840	
390	0.890	
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	
1000	0.995	
1200	0.996	
1400	0.996	
1600	0.996	
1800	0.992	
2000	0.980	
2200	0.956	
2400	0.840	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	5.52		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	4.1	4.1	4.4	4.7	5.4	6.2	
-20 ~ 0	3.4	4.2	4.3	4.6	4.9	5.6	6.4	
0 ~ 20	3.6	4.3	4.4	4.7	5.0	5.8	6.6	
20 ~ 40	3.7	4.5	4.5	4.9	5.2	6.0	6.8	
40 ~ 60	3.9	4.6	4.6	5.0	5.3	6.2	7.1	
60 ~ 80	4.0	4.7	4.8	5.2	5.5	6.4	7.3	

© OHARA GmbH – Hofheim – Germany

S-LAH59

816466
820464

Refractive Index	n_d	**1.81600**	Abbe Number	ν_d	**46.62**	Dispersion	$n_F - n_C$	**0.01750**
	n_e	1.820167		ν_e	46.37		$n_{F'} - n_{C'}$	0.017688
		1.816000						0.017503

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.77345
n_{1970}	1.97009	1.78033
n_{1530}	1.52958	1.78784
n_{1129}	1.12864	1.79483
n_t	1.01398	1.79729
n_s	0.85211	1.80174
$n_{A'}$	0.76819	1.80488
n_r	0.70652	1.80780
n_C	0.65627	**1.81075**
$n_{C'}$	0.64385	1.81158
n_{He-Ne}	0.6328	1.81236
n_D	0.58929	1.81585
n_d	0.58756	**1.81600**
n_e	0.54607	1.82017
n_F	0.48613	**1.82825**
$n_{F'}$	0.47999	1.82927
n_{He-Cd}	0.44157	1.83670
n_g	0.435835	**1.83800**
n_h	0.404656	1.84619
n_i	0.365015	1.86034
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	644
Annealing Point (°C)	**AP**	690
Transformation Temperature (°C)	**Tg**	714
Yield Point (°C)	**At**	737
Softening Point (°C)	**SP**	773
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	63
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.816

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1250
Rigidity Modulus (10^8N/m^2)	**G**	482
Poisson's Ratio	σ	0.298
Knoop Hardness	**Hk**	750 [7]
Abrasion	**Aa**	57
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.37

Partial Dispersions	
$n_C - n_t$	0.013459
$n_C - n_{A'}$	0.005870
$n_d - n_C$	0.005251
$n_e - n_C$	0.009418
$n_g - n_d$	0.021997
$n_g - n_F$	0.009745
$n_h - n_g$	0.008188
$n_i - n_g$	0.022341
$n_{C'} - n_t$	0.014289
$n_e - n_{C'}$	0.008588
$n_{F'} - n_e$	0.009100
$n_i - n_{F'}$	0.031071

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0036
$\Delta\theta_{C,A'}$	0.0030
$\Delta\theta_{g,d}$	-0.0111
$\Delta\theta_{g,F}$	-0.0092
$\Delta\theta_{i,g}$	-0.0582

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.51372967	
A_2	7.02462343	E-1
A_3	1.33600982	
B_1	7.05246901	E-3
B_2	2.49488689	E-2
B_3	1.00085908	E2
1129 ~ 2325 nm		
A_1	1.51372967	
A_2	7.02462343	E-1
A_3	1.33600982	
B_1	7.05246901	E-3
B_2	2.49488689	E-2
B_3	1.00085908	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7690
$\theta_{C,A'}$	0.3354
$\theta_{d,C}$	0.3000
$\theta_{e,C}$	0.5381
$\theta_{g,d}$	1.2568
$\theta_{g,F}$	0.5568
$\theta_{h,g}$	0.4678
$\theta_{i,g}$	1.2764
$\theta'_{C',t}$	0.8078
$\theta'_{e,C'}$	0.4855
$\theta'_{F',e}$	0.5145
$\theta'_{i,F'}$	1.7566

Internal Transmittance			
λ_{80}	359	λ_5	298

CCI		
B	G	R
0.00	0.94	0.93

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.020	
300	0.060	
310	0.090	
320	0.280	
330	0.430	
340	0.580	
350	0.710	
360	0.810	
365		
370	0.880	
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	
1000	0.995	
1200	0.995	
1400	0.995	
1600	0.994	
1800	0.989	
2000	0.973	
2200	0.938	
2400	0.760	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39
Specific Gravity	**d**	5.07		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.1	4.6	4.6	4.9	5.1	5.6	6.2	
-20 ~ 0	4.1	4.7	4.7	5.0	5.2	5.8	6.4	
0 ~ 20	4.2	4.8	4.8	5.1	5.3	5.9	6.5	
20 ~ 40	4.3	4.9	4.9	5.2	5.4	6.1	6.7	
40 ~ 60	4.3	5.0	5.0	5.3	5.6	6.2	6.9	
60 ~ 80	4.4	5.1	5.1	5.4	5.7	6.4	7.0	

© OHARA GmbH – Hofheim – Germany

S-LAH60

834372
839369

Refractive Index	n_d	**1.83400**	Abbe Number	ν_d	**37.16**	Dispersion	$n_F - n_C$	**0.02244**
	n_e	1.834000		ν_e	36.92		$n_{F'} - n_{C'}$	0.022443
		1.839323						0.022736

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78473
n_{1970}	1.97009	1.79205
n_{1530}	1.52958	1.80018
n_{1129}	1.12864	1.80807
n_t	1.01398	1.81094
n_s	0.85211	1.81627
$n_{A'}$	0.76819	1.82009
n_r	0.70652	1.82370
n_C	0.65627	**1.82738**
$n_{C'}$	0.64385	1.82842
n_{He-Ne}	0.6328	1.82939
n_D	0.58929	1.83380
n_d	0.58756	**1.83400**
n_e	0.54607	1.83932
n_F	0.48613	**1.84982**
$n_{F'}$	0.47999	1.85115
n_{He-Cd}	0.44157	1.86103
n_g	0.435835	**1.86278**
n_h	0.404656	1.87396
n_i	0.365015	1.89403
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	612
Yield Point (°C)	**At**	632
Softening Point (°C)	**SP**	676
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	56
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.872

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1248
Rigidity Modulus (10^8N/m^2)	**G**	481
Poisson's Ratio	σ	0.296
Knoop Hardness	**Hk**	670 [7]
Abrasion	**Aa**	78
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.15

Partial Dispersions

$n_C - n_t$	0.016437
$n_C - n_{A'}$	0.007283
$n_d - n_C$	0.006624
$n_e - n_C$	0.011947
$n_g - n_d$	0.028781
$n_g - n_F$	0.012962
$n_h - n_g$	0.011183
$n_i - n_g$	0.031249
$n_{C'} - n_t$	0.017477
$n_e - n_{C'}$	0.010907
$n_{F'} - n_e$	0.011829
$n_i - n_{F'}$	0.042878

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0114
$\Delta\theta_{C,A'}$	0.0036
$\Delta\theta_{g,d}$	-0.0051
$\Delta\theta_{g,F}$	-0.0037
$\Delta\theta_{i,g}$	-0.0215

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.95243469	
A_2	3.07100210	E-1
A_3	1.56578094	
B_1	1.06442437	E-2
B_2	4.56735302	E-2
B_3	1.10281410	E2
1129 ~ 2325 nm		
A_1	1.95243469	
A_2	3.07100210	E-1
A_3	1.56578094	
B_1	1.06442437	E-2
B_2	4.56735302	E-2
B_3	1.10281410	E2

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**	4.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7324
$\theta_{C,A'}$	0.3245
$\theta_{d,C}$	0.2951
$\theta_{e,C}$	0.5323
$\theta_{g,d}$	1.2824
$\theta_{g,F}$	0.5776
$\theta_{h,g}$	0.4983
$\theta_{i,g}$	1.3924
$\theta'_{C',t}$	0.7687
$\theta'_{e,C'}$	0.4797
$\theta'_{F',e}$	0.5203
$\theta'_{i,F'}$	1.8859

Internal Transmittance

λ_{80}	377	λ_5	341

CCI

B	G	R
0.00	1.57	1.66

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.030	
350	0.270	
360	0.540	
365		
370	0.720	
380	0.830	
390	0.880	
400	0.924	
420	0.957	
440	0.972	
460	0.980	
480	0.986	
500	0.990	
550	0.996	
600	0.997	
650	0.997	
700	0.998	
800	0.999	
900	0.998	
1000	0.997	
1200	0.996	
1400	0.993	
1600	0.992	
1800	0.984	
2000	0.964	
2200	0.906	
2400	0.720	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42
Specific Gravity	**d**	4.43		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	6.0	6.9	6.9	7.3	7.6	8.4	9.3	
-20 ~ 0	6.3	7.0	7.1	7.4	7.7	8.6	9.6	
0 ~ 20	6.3	7.1	7.2	7.6	7.9	8.8	9.8	
20 ~ 40	6.4	7.3	7.3	7.7	8.1	9.0	10.1	
40 ~ 60	6.6	7.4	7.5	7.9	8.3	9.3	10.3	
60 ~ 80	6.7	7.5	7.6	8.0	8.4	9.5	10.6	

© OHARA GmbH – Hofheim – Germany

S-LAH60V

834372
839370

Refractive Index	n_d	**1.83400**	Abbe Number	ν_d	**37.21**	Dispersion	$n_F - n_C$ 0.022416
	n_e	1.834000		ν_e	36.95		$n_{F'} - n_{C'}$ 0.022716
		1.839313					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78608
n_{1970}	1.97009	1.79301
n_{1530}	1.52958	1.80073
n_{1129}	1.12864	1.80833
n_t	1.01398	1.81114
n_s	0.85211	1.81638
$n_{A'}$	0.76819	1.82016
n_r	0.70652	1.82375
n_C	0.65627	**1.82740**
$n_{C'}$	0.64385	1.82844
n_{He-Ne}	0.6328	1.82941
n_D	0.58929	1.83380
n_d	0.58756	**1.83400**
n_e	0.54607	1.83931
n_F	0.48613	**1.84982**
$n_{F'}$	0.47999	1.85115
n_{He-Cd}	0.44157	1.86107
n_g	0.435835	**1.86283**
n_h	0.404656	1.87412
n_i	0.365015	1.89457
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	570
Annealing Point (°C)	**AP**	588
Transformation Temperature (°C)	**Tg**	603
Yield Point (°C)	**At**	635
Softening Point (°C)	**SP**	669
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	58
	(+100~+300°C)	73
Thermal Conductivity (W/m·K)	**k**	0.880

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1114
Rigidity Modulus (10^8N/m^2)	**G**	445
Poisson's Ratio	σ	0.253
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	57
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.1

Partial Dispersions

$n_C - n_t$	0.016264
$n_C - n_{A'}$	0.007235
$n_d - n_C$	0.006601
$n_e - n_C$	0.011914
$n_g - n_d$	0.028833
$n_g - n_F$	0.013018
$n_h - n_g$	0.011289
$n_i - n_g$	0.031732
$n_{C'} - n_t$	0.017300
$n_e - n_{C'}$	0.010878
$n_{F'} - n_e$	0.011838
$n_i - n_{F'}$	0.043414

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0043
$\Delta\theta_{C,A'}$	0.0018
$\Delta\theta_{g,d}$	-0.0011
$\Delta\theta_{g,F}$	-0.0006
$\Delta\theta_{i,g}$	0.0022

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.05081962	
A_2	2.08475257	E-1
A_3	1.31486394	
B_1	1.16035991	E-2
B_2	5.26489359	E-2
B_3	9.93806500	E1
1129 ~ 2325 nm		
A_1	2.05081962	
A_2	2.08475257	E-1
A_3	1.31486394	
B_1	1.16035991	E-2
B_2	5.26489359	E-2
B_3	9.93806500	E1

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7256
$\theta_{C,A'}$	0.3228
$\theta_{d,C}$	0.2945
$\theta_{e,C}$	0.5315
$\theta_{g,d}$	1.2863
$\theta_{g,F}$	0.5807
$\theta_{h,g}$	0.5036
$\theta_{i,g}$	1.4156
$\theta'_{C',t}$	0.7616
$\theta'_{e,C'}$	0.4789
$\theta'_{F',e}$	0.5211
$\theta'_{i,F'}$	1.9112

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.050	
360	0.290	
365		
370	0.590	
380	0.770	
390	0.860	
400	0.909	
420	0.951	
440	0.968	
460	0.979	
480	0.986	
500	0.991	
550	0.996	
600	0.996	
650	0.996	
700	0.997	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.993	
1800	0.984	
2000	0.961	
2200	0.905	
2400	0.720	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	430
Specific Gravity	**d**	4.43		λ_5	350

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	7.4	8.4	8.5	8.8	9.2	10.1	11.2	
-20 ~ 0	7.5	8.5	8.6	8.9	9.4	10.4	11.5	
0 ~ 20	7.5	8.6	8.7	9.0	9.5	10.5	11.7	
20 ~ 40	7.5	8.7	8.7	9.1	9.5	10.6	11.9	
40 ~ 60	7.7	8.8	8.9	9.2	9.7	10.8	12.1	
60 ~ 80	7.8	9.0	9.1	9.5	10.0	11.2	12.5	

© OHARA GmbH – Hofheim – Germany

S-LAH63

804396
809393

Refractive Index	n_d	**1.80440**	Abbe Number	ν_d	**39.59**	Dispersion	$n_F - n_C$	**0.02032**
	n_e	1.809221		ν_e	39.33		$n_{F'} - n_{C'}$	0.020573
		1.804398						0.020320

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75781
n_{1970}	1.97009	1.76505
n_{1530}	1.52958	1.77300
n_{1129}	1.12864	1.78056
n_t	1.01398	1.78325
n_s	0.85211	1.78820
$n_{A'}$	0.76819	1.79172
n_r	0.70652	1.79502
n_C	0.65627	**1.79838**
$n_{C'}$	0.64385	1.79932
n_{He-Ne}	0.6328	1.80021
n_D	0.58929	1.80422
n_d	0.58756	**1.80440**
n_e	0.54607	1.80922
n_F	0.48613	**1.81870**
$n_{F'}$	0.47999	1.81990
n_{He-Cd}	0.44157	1.82877
n_g	0.435835	**1.83034**
n_h	0.404656	1.84033
n_i	0.365015	1.85815
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	558
Annealing Point (°C)	**AP**	588
Transformation Temperature (°C)	**Tg**	607
Yield Point (°C)	**At**	630
Softening Point (°C)	**SP**	675
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	58
	(+100~+300°C)	70
Thermal Conductivity (W/m·K)	**k**	0.849

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1121
Rigidity Modulus (10^8N/m^2)	**G**	433
Poisson's Ratio	σ	0.295
Knoop Hardness	**Hk**	640 [6]
Abrasion	**Aa**	82
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.18

Partial Dispersions

$n_C - n_t$	0.015124
$n_C - n_{A'}$	0.006658
$n_d - n_C$	0.006022
$n_e - n_C$	0.010845
$n_g - n_d$	0.025940
$n_g - n_F$	0.011642
$n_h - n_g$	0.009994
$n_i - n_g$	0.027810
$n_{C'} - n_t$	0.016071
$n_e - n_{C'}$	0.009898
$n_{F'} - n_e$	0.010675
$n_i - n_{F'}$	0.038252

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0119
$\Delta\theta_{C,A'}$	0.0039
$\Delta\theta_{g,d}$	-0.0059
$\Delta\theta_{g,F}$	-0.0045
$\Delta\theta_{i,g}$	-0.0249

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.89458276	
A_2	2.68702978	E-1
A_3	1.45705526	
B_1	1.02277048	E-2
B_2	4.42801243	E-2
B_3	1.04874927	E2
1129 ~ 2325 nm		
A_1	1.89458276	
A_2	2.68702978	E-1
A_3	1.45705526	
B_1	1.02277048	E-2
B_2	4.42801243	E-2
B_3	1.04874927	E2

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**	4.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7443
$\theta_{C,A'}$	0.3277
$\theta_{d,C}$	0.2964
$\theta_{e,C}$	0.5337
$\theta_{g,d}$	1.2766
$\theta_{g,F}$	0.5729
$\theta_{h,g}$	0.4918
$\theta_{i,g}$	1.3686
$\theta'_{C',t}$	0.7812
$\theta'_{e,C'}$	0.4811
$\theta'_{F',e}$	0.5189
$\theta'_{i,F'}$	1.8593

Internal Transmittance

λ_{80}	374	λ_5	340

CCI

B	G	R
0.00	1.31	1.39

Internal Transmittance

λ (nm)	τ_i 10 mm	τ_i 25 mm
280		
290		
300		
310		
320		
330		
340	0.060	
350	0.310	
360	0.590	
365		
370	0.760	
380	0.860	
390	0.909	
400	0.937	
420	0.965	
440	0.976	
460	0.983	
480	0.988	
500	0.992	
550	0.997	
600	0.998	
650	0.998	
700	0.998	
800	0.999	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.993	
1600	0.992	
1800	0.984	
2000	0.963	
2200	0.890	
2400	0.700	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41		
Specific Gravity	**d**	4.34		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.5	6.6	6.6	6.8	7.3	8.0	8.7	
-20 ~ 0	5.7	6.7	6.7	6.9	7.3	8.1	8.9	
0 ~ 20	5.8	6.8	6.8	7.0	7.5	8.3	9.1	
20 ~ 40	5.9	6.9	6.9	7.2	7.6	8.5	9.4	
40 ~ 60	6.2	7.1	7.2	7.5	7.8	8.8	9.7	
60 ~ 80	6.4	7.3	7.4	7.7	8.1	9.1	10.1	

© OHARA GmbH – Hofheim – Germany

S-LAH64

788474
792471

Refractive Index	n_d	**1.78800**	Abbe Number	ν_d	**47.37**	Dispersion	$n_F - n_C$	**0.01663**
	n_e	1.791961		ν_e	47.12		$n_{F'} - n_{C'}$	0.016806
	1.788001							0.016636

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.74466
n_{1970}	1.97009	1.75220
n_{1530}	1.52958	1.76026
n_{1129}	1.12864	1.76750
n_t	1.01398	1.76996
n_s	0.85211	1.77433
$n_{A'}$	0.76819	1.77737
n_r	0.70652	1.78018
n_C	0.65627	**1.78300**
$n_{C'}$	0.64385	1.78379
n_{He-Ne}	0.6328	1.78453
n_D	0.58929	1.78785
n_d	0.58756	**1.78800**
n_e	0.54607	1.79196
n_F	0.48613	**1.79963**
$n_{F'}$	0.47999	1.80060
n_{He-Cd}	0.44157	1.80765
n_g	0.435835	**1.80888**
n_h	0.404656	1.81666
n_i	0.365015	1.83016
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	644
Annealing Point (°C)	**AP**	660
Transformation Temperature (°C)	**Tg**	685
Yield Point (°C)	**At**	705
Softening Point (°C)	**SP**	732
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	61
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.856

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1224
Rigidity Modulus (10^8N/m^2)	**G**	473
Poisson's Ratio	σ	0.294
Knoop Hardness	**Hk**	750 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.4

Partial Dispersions

$n_C - n_t$	0.013038
$n_C - n_{A'}$	0.005628
$n_d - n_C$	0.005003
$n_e - n_C$	0.008963
$n_g - n_d$	0.020881
$n_g - n_F$	0.009248
$n_h - n_g$	0.007782
$n_i - n_g$	0.021279
$n_{C'} - n_t$	0.013830
$n_e - n_{C'}$	0.008171
$n_{F'} - n_e$	0.008635
$n_i - n_{F'}$	0.029565

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0148
$\Delta\theta_{C,A'}$	0.0050
$\Delta\theta_{g,d}$	-0.0111
$\Delta\theta_{g,F}$	-0.0089
$\Delta\theta_{i,g}$	-0.0493

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.83021453	
A_2	2.91563590	E-1
A_3	1.28544024	
B_1	9.04823290	E-3
B_2	3.30756689	E-2
B_3	8.93675501	E1
1129 ~ 2325 nm		
A_1	1.83021453	
A_2	2.91563590	E-1
A_3	1.28544024	
B_1	9.04823290	E-3
B_2	3.30756689	E-2
B_3	8.93675501	E1

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**	4.0
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7837
$\theta_{C,A'}$	0.3383
$\theta_{d,C}$	0.3007
$\theta_{e,C}$	0.5388
$\theta_{g,d}$	1.2552
$\theta_{g,F}$	0.5559
$\theta_{h,g}$	0.4678
$\theta_{i,g}$	1.2791
$\theta'_{C',t}$	0.8229
$\theta'_{e,C'}$	0.4862
$\theta'_{F',e}$	0.5138
$\theta'_{i,F'}$	1.7592

Internal Transmittance

λ_{80}	354	λ_5	317

CCI

B	G	R
0.00	0.63	0.65

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.130	
330	0.400	
340	0.630	
350	0.770	
360	0.850	
365		
370	0.912	
380	0.943	
390	0.961	
400	0.972	
420	0.981	
440	0.986	
460	0.990	
480	0.993	
500	0.996	
550	0.998	
600	0.998	
650	0.998	
700	0.998	
800	0.999	
900	0.998	
1000	0.997	
1200	0.996	
1400	0.995	
1600	0.993	
1800	0.987	
2000	0.966	
2200	0.915	
2400	0.680	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38		
Specific Gravity	**d**	4.30		λ_5	32		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.5	3.9	3.9	4.1	4.3	4.8	5.3	
-20 ~ 0	3.5	4.0	4.0	4.2	4.4	5.0	5.5	
0 ~ 20	3.6	4.1	4.1	4.3	4.6	5.1	5.7	
20 ~ 40	3.7	4.2	4.2	4.4	4.7	5.3	5.8	
40 ~ 60	3.8	4.3	4.3	4.5	4.8	5.4	6.0	
60 ~ 80	3.9	4.4	4.4	4.6	4.9	5.5	6.2	

© OHARA GmbH – Hofheim – Germany

S-LAH65V

804466
808463

Refractive Index	n_d	**1.80400**	Abbe Number	ν_d	**46.58**	Dispersion	$n_F - n_C$	**0.01726**
	n_e	1.804000		ν_e	46.34		$n_{F'} - n_{C'}$	0.017259
		1.808107						0.017440

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75987
n_{1970}	1.97009	1.76741
n_{1530}	1.52958	1.77552
n_{1129}	1.12864	1.78286
n_t	1.01398	1.78538
n_s	0.85211	1.78987
$n_{A'}$	0.76819	1.79300
n_r	0.70652	1.79590
n_C	0.65627	**1.79882**
$n_{C'}$	0.64385	1.79964
n_{He-Ne}	0.6328	1.80041
n_D	0.58929	1.80385
n_d	0.58756	**1.80400**
n_e	0.54607	1.80811
n_F	0.48613	**1.81608**
$n_{F'}$	0.47999	1.81708
n_{He-Cd}	0.44157	1.82441
n_g	0.435835	**1.82569**
n_h	0.404656	1.83380
n_i	0.365015	1.84786
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	639
Annealing Point (°C)	**AP**	664
Transformation Temperature (°C)	**Tg**	691
Yield Point (°C)	**At**	711
Softening Point (°C)	**SP**	740
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	60
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.841

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1220
Rigidity Modulus (10^8N/m^2)	**G**	470
Poisson's Ratio	σ	0.298
Knoop Hardness	**Hk**	730 [7]
Abrasion	**Aa**	55
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.44

Partial Dispersions

$n_C - n_t$	0.013439
$n_C - n_{A'}$	0.005818
$n_d - n_C$	0.005183
$n_e - n_C$	0.009290
$n_g - n_d$	0.021694
$n_g - n_F$	0.009618
$n_h - n_g$	0.008101
$n_i - n_g$	0.022167
$n_{C'} - n_t$	0.014259
$n_e - n_{C'}$	0.008470
$n_{F'} - n_e$	0.008970
$n_i - n_{F'}$	0.030784

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0135
$\Delta\theta_{C,A'}$	0.0048
$\Delta\theta_{g,d}$	-0.0110
$\Delta\theta_{g,F}$	-0.0088
$\Delta\theta_{i,g}$	-0.0506

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.81419034	E0
A_2	3.61376301	E-1
A_3	1.32729484	E0
B_1	8.74935029	E-3
B_2	3.18352836	E-2
B_3	9.13406898	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	4.1
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7787
$\theta_{C,A'}$	0.3371
$\theta_{d,C}$	0.3003
$\theta_{e,C}$	0.5383
$\theta_{g,d}$	1.2570
$\theta_{g,F}$	0.5573
$\theta_{h,g}$	0.4694
$\theta_{i,g}$	1.2844
$\theta'_{C',t}$	0.8176
$\theta'_{e,C'}$	0.4857
$\theta'_{F',e}$	0.5143
$\theta'_{i,F'}$	1.7651

Internal Transmittance

λ_{80}	355	λ_5	319

CCI

B	G	R
0.00	0.65	0.67

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.110	
330	0.370	
340	0.600	
350	0.750	
360	0.850	
365		
370	0.906	
380	0.939	
390	0.959	
400	0.970	
420	0.981	
440	0.986	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.967	
2200	0.910	
2400	0.680	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	385
Specific Gravity	**d**	4.72		λ_5	315

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.6	4.1	4.2	4.4	4.6	5.2	5.7	
-20 ~ 0	3.7	4.3	4.4	4.6	4.8	5.4	6.0	
0 ~ 20	3.8	4.4	4.5	4.7	4.9	5.5	6.1	
20 ~ 40	3.8	4.5	4.5	4.7	5.0	5.6	6.2	
40 ~ 60	3.8	4.5	4.6	4.8	5.1	5.7	6.4	
60 ~ 80	3.9	4.7	4.7	5.0	5.3	5.9	6.6	

© OHARA GmbH – Hofheim – Germany

S-LAH65VS

804465
808463

Refractive Index	n_d	**1.80400**	Abbe Number	ν_d	**46.53**	Dispersion	$n_F - n_C$ 0.017281
	n_e	1.808112		ν_e	46.28		$n_{F'} - n_{C'}$ 0.017463

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.76127
n_{1970}	1.97009	1.76833
n_{1530}	1.52958	1.77597
n_{1129}	1.12864	1.78303
n_t	1.01398	1.78548
n_s	0.85211	1.78991
$n_{A'}$	0.76819	1.79302
n_r	0.70652	1.79591
n_C	0.65627	**1.79882**
$n_{C'}$	0.64385	1.79964
n_{He-Ne}	0.6328	1.80040
n_D	0.58929	1.80385
n_d	0.58756	**1.80400**
n_e	0.54607	1.80811
n_F	0.48613	**1.81610**
$n_{F'}$	0.47999	1.81710
n_{He-Cd}	0.44157	1.82445
n_g	0.435835	**1.82573**
n_h	0.404656	1.83385
n_i	0.365015	1.84792
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	648
Annealing Point (°C)	**AP**	677
Transformation Temperature (°C)	**Tg**	691
Yield Point (°C)	**At**	720
Softening Point (°C)	**SP**	745
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	61
	(+100~+300°C)	75
Thermal Conductivity (W/m·K)	**k**	0.856

Mechanical Properties		
Young's Modulus (10⁸N/m²)	**E**	1223
Rigidity Modulus (10⁸N/m²)	**G**	471
Poisson's Ratio	σ	0.300
Knoop Hardness	**Hk**	730 [7]
Abrasion	**Aa**	58
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.27

Partial Dispersions	
$n_C - n_t$	0.013334
$n_C - n_{A'}$	0.005801
$n_d - n_C$	0.005184
$n_e - n_C$	0.009296
$n_g - n_d$	0.021734
$n_g - n_F$	0.009637
$n_h - n_g$	0.008114
$n_i - n_g$	0.022188
$n_{C'} - n_t$	0.014154
$n_e - n_{C'}$	0.008476
$n_{F'} - n_e$	0.008987
$n_i - n_{F'}$	0.030823

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0066
$\Delta\theta_{C,A'}$	0.0034
$\Delta\theta_{g,d}$	-0.0104
$\Delta\theta_{g,F}$	-0.0085
$\Delta\theta_{i,g}$	-0.0514

Constants of Dispersion Formula		
326 ~ 1129 nm		
A 1	1.76068422	
A 2	4.14128906	E-1
A 3	1.33415439	
B 1	8.53607198	E-3
B 2	3.01826383	E-2
B 3	9.80942100	E1
1129 ~ 2325 nm		
A 1		
A 2		
A 3		
B 1		
B 2		
B 3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7716
$\theta_{C,A'}$	0.3357
$\theta_{d,C}$	0.3000
$\theta_{e,C}$	0.5379
$\theta_{g,d}$	1.2577
$\theta_{g,F}$	0.5577
$\theta_{h,g}$	0.4695
$\theta_{i,g}$	1.2840
$\theta'_{C',t}$	0.8105
$\theta'_{e,C'}$	0.4854
$\theta'_{F',e}$	0.5146
$\theta'_{i,F'}$	1.7650

Internal Transmittance			
λ_{80}	347	λ_5	310

CCI		
B	G	R
0.00	0.40	0.42

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.050	
320	0.250	
330	0.530	
340	0.720	
350	0.830	
360	0.890	
365		
370	0.934	
380	0.957	
390	0.971	
400	0.979	
420	0.987	
440	0.991	
460	0.993	
480	0.996	
500	0.997	
550	0.999	
600	0.999	
650	0.999	
700	0.999	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.996	
1800	0.989	
2000	0.968	
2200	0.916	
2400	0.720	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	380
Specific Gravity	**d**	4.46		λ_5	310

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.6	4.2	4.3	4.4	4.7	5.2	5.8	
-20 ~ 0	3.5	4.2	4.2	4.4	4.7	5.3	5.9	
0 ~ 20	3.5	4.2	4.2	4.4	4.7	5.3	5.9	
20 ~ 40	3.5	4.2	4.2	4.4	4.7	5.3	6.0	
40 ~ 60	3.5	4.3	4.3	4.5	4.8	5.5	6.1	
60 ~ 80	3.7	4.4	4.5	4.7	5.0	5.7	6.4	

© OHARA GmbH – Hofheim – Germany

S-LAH66

773496
776493

Refractive Index	n_d	**1.77250**	Abbe Number	ν_d	**49.60**	Dispersion	$n_F - n_C$	**0.01557**
	n_e	1.772499		ν_e	49.36		$n_{F'} - n_{C'}$	0.015576
		1.776208						0.015727

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.73031
n_{1970}	1.97009	1.73786
n_{1530}	1.52958	1.74590
n_{1129}	1.12864	1.75303
n_t	1.01398	1.75541
n_s	0.85211	1.75960
$n_{A'}$	0.76819	1.76248
n_r	0.70652	1.76514
n_C	0.65627	**1.76780**
$n_{C'}$	0.64385	1.76854
n_{He-Ne}	0.6328	1.76924
n_D	0.58929	1.77236
n_d	0.58756	**1.77250**
n_e	0.54607	1.77621
n_F	0.48613	**1.78337**
$n_{F'}$	0.47999	1.78427
n_{He-Cd}	0.44157	1.79083
n_g	0.435835	**1.79197**
n_h	0.404656	1.79917
n_i	0.365015	1.81158
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	641
Annealing Point (°C)	**AP**	660
Transformation Temperature (°C)	**Tg**	686
Yield Point (°C)	**At**	706
Softening Point (°C)	**SP**	726
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	62
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.845

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1219
Rigidity Modulus (10⁸N/m²)	**G**	472
Poisson's Ratio	σ	0.291
Knoop Hardness	**Hk**	700 [7]
Abrasion	**Aa**	65
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.43

Partial Dispersions

$n_C - n_t$	0.012391
$n_C - n_{A'}$	0.005314
$n_d - n_C$	0.004701
$n_e - n_C$	0.008410
$n_g - n_d$	0.019473
$n_g - n_F$	0.008598
$n_h - n_g$	0.007202
$n_i - n_g$	0.019610
$n_{C'} - n_t$	0.013137
$n_e - n_{C'}$	0.007664
$n_{F'} - n_e$	0.008063
$n_i - n_{F'}$	0.027311

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0161
$\Delta\theta_{C,A'}$	0.0052
$\Delta\theta_{g,d}$	-0.0115
$\Delta\theta_{g,F}$	-0.0092
$\Delta\theta_{i,g}$	-0.0507

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.39280586	
A_2	6.79577094	E-1
A_3	1.38702069	
B_1	6.08475118	E-3
B_2	2.33925351	E-2
B_3	9.58354094	E1
1129 ~ 2325 nm		
A_1	1.39280586	
A_2	6.79577094	E-1
A_3	1.38702069	
B_1	6.08475118	E-3
B_2	2.33925351	E-2
B_3	9.58354094	E1

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7955
$\theta_{C,A'}$	0.3412
$\theta_{d,C}$	0.3018
$\theta_{e,C}$	0.5399
$\theta_{g,d}$	1.2502
$\theta_{g,F}$	0.5520
$\theta_{h,g}$	0.4624
$\theta_{i,g}$	1.2590
$\theta'_{C',t}$	0.8353
$\theta'_{e,C'}$	0.4873
$\theta'_{F',e}$	0.5127
$\theta'_{i,F'}$	1.7366

Internal Transmittance

λ_{80}	349	λ_5	308

CCI

B	G	R
0.00	0.44	0.42

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.100	
320	0.330	
330	0.550	
340	0.710	
350	0.810	
360	0.880	
365		
370	0.930	
380	0.956	
390	0.971	
400	0.979	
420	0.987	
440	0.991	
460	0.994	
480	0.996	
500	0.997	
550	0.999	
600	0.998	
650	0.998	
700	0.999	
800	0.998	
900	0.998	
1000	0.998	
1200	0.997	
1400	0.993	
1600	0.993	
1800	0.983	
2000	0.958	
2200	0.880	
2400	0.640	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	4.23		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.4	3.8	3.8	4.0	4.2	4.7	5.1	
-20 ~ 0	3.5	3.9	4.0	4.2	4.4	4.8	5.3	
0 ~ 20	3.6	4.1	4.1	4.3	4.5	5.0	5.5	
20 ~ 40	3.7	4.2	4.3	4.5	4.7	5.2	5.7	
40 ~ 60	3.8	4.4	4.4	4.7	4.9	5.4	5.9	
60 ~ 80	3.9	4.5	4.6	4.8	5.0	5.6	6.1	

© OHARA GmbH – Hofheim – Germany

S-LAH71

850323
856320

Refractive Index	n_d	**1.85026**	Abbe Number	ν_d	**32.27**	Dispersion	$n_F - n_C$	**0.02634**
	n_e	1.856493		ν_e	32.00		$n_{F'} - n_{C'}$	0.026744
		1.850259						0.026349

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.80095
n_{1970}	1.97009	1.80685
n_{1530}	1.52958	1.81380
n_{1129}	1.12864	1.82133
n_t	1.01398	1.82429
n_s	0.85211	1.83004
$n_{A'}$	0.76819	1.83430
n_r	0.70652	1.83838
n_C	0.65627	**1.84259**
$n_{C'}$	0.64385	1.84378
n_{He-Ne}	0.6328	1.84491
n_D	0.58929	1.85003
n_d	0.58756	**1.85026**
n_e	0.54607	1.85649
n_F	0.48613	**1.86894**
$n_{F'}$	0.47999	1.87053
n_{He-Cd}	0.44157	1.88243
n_g	0.435835	**1.88456**
n_h	0.404656	1.89827
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	656
Annealing Point (°C)	**AP**	685
Transformation Temperature (°C)	**Tg**	707
Yield Point (°C)	**At**	752
Softening Point (°C)	**SP**	802
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	77
	(+100~+300°C)	91
Thermal Conductivity (W/m·K)	**k**	0.874

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1100
Rigidity Modulus (10^8N/m^2)	**G**	429
Poisson's Ratio	σ	0.281
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	140
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.52

Partial Dispersions

$n_C - n_t$	0.018292
$n_C - n_{A'}$	0.008288
$n_d - n_C$	0.007673
$n_e - n_C$	0.013907
$n_g - n_d$	0.034299
$n_g - n_F$	0.015623
$n_h - n_g$	0.013716
$n_i - n_g$	
$n_{C'} - n_t$	0.019490
$n_e - n_{C'}$	0.012709
$n_{F'} - n_e$	0.014035
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0039
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	0.0040
$\Delta\theta_{g,F}$	0.0036
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.98280031	
A_2	3.16758450	E-1
A_3	2.44472646	
B_1	1.18987459	E-2
B_2	5.27156001	E-2
B_3	2.13220697	E2
1129 ~ 2325 nm		
A_1	1.98280031	
A_2	3.16758450	E-1
A_3	2.44472646	
B_1	1.18987459	E-2
B_2	5.27156001	E-2
B_3	2.13220697	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6942
$\theta_{C,A'}$	0.3145
$\theta_{d,C}$	0.2912
$\theta_{e,C}$	0.5278
$\theta_{g,d}$	1.3017
$\theta_{g,F}$	0.5929
$\theta_{h,g}$	0.5206
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7288
$\theta'_{e,C'}$	0.4752
$\theta'_{F',e}$	0.5248
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	417	λ_5	364

CCI

B	G	R
0.00	6.64	6.89

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.010	
365		
370	0.110	
380	0.290	
390	0.490	
400	0.650	
420	0.830	
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.998	
1800	0.993	
2000	0.989	
2200	0.982	
2400	0.959	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42
Specific Gravity	**d**	4.36		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.9	2.9	2.9	3.3	3.7	4.7	5.8	
-20 ~ 0	2.0	3.0	3.0	3.4	3.8	4.9	6.0	
0 ~ 20	2.0	3.0	3.1	3.5	3.9	5.0	6.3	
20 ~ 40	2.0	3.1	3.2	3.6	4.1	5.2	6.5	
40 ~ 60	2.0	3.2	3.3	3.7	4.2	5.4	6.8	
60 ~ 80	2.1	3.3	3.4	3.8	4.3	5.6	7.0	

© OHARA GmbH – Hofheim – Germany

S-LAH79

2003283
2011281

Refractive Index	n_d	**2.00330**	Abbe Number	ν_d	**28.27**	Dispersion	$n_F - n_C$	**0.03549**
	n_e	2.003300		ν_e	28.07		$n_{F'} - n_{C'}$	0.035486
		2.011689						0.036041

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.93904
n_{1970}	1.97009	1.94642
n_{1530}	1.52958	1.95518
n_{1129}	1.12864	1.96486
n_t	1.01398	1.96873
n_s	0.85211	1.97630
$n_{A'}$	0.76819	1.98195
n_r	0.70652	1.98739
n_C	0.65627	**1.99301**
$n_{C'}$	0.64385	1.99461
n_{He-Ne}	0.6328	1.99613
n_D	0.58929	2.00299
n_d	0.58756	**2.00330**
n_e	0.54607	2.01169
n_F	0.48613	**2.02850**
$n_{F'}$	0.47999	2.03066
n_{He-Cd}	0.44157	2.04682
n_g	0.435835	**2.04972**
n_h	0.404656	2.06844
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	699
Yield Point (°C)	**At**	731
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	60
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.957

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1255
Rigidity Modulus (10⁸N/m²)	**G**	484
Poisson's Ratio	σ	0.297
Knoop Hardness	**Hk**	700 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.89

Partial Dispersions

$n_C - n_t$	0.024281
$n_C - n_{A'}$	0.011059
$n_d - n_C$	0.010289
$n_e - n_C$	0.018678
$n_g - n_d$	0.046416
$n_g - n_F$	0.021219
$n_h - n_g$	0.018725
$n_i - n_g$	
$n_{C'} - n_t$	0.025885
$n_e - n_{C'}$	0.017074
$n_{F'} - n_e$	0.018967
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0049
$\Delta\theta_{C,A'}$	0.0015
$\Delta\theta_{g,d}$	0.0020
$\Delta\theta_{g,F}$	0.0023
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.32557148	
A_2	5.07967133	E-1
A_3	2.43087198	
B_1	1.32895208	E-2
B_2	5.28335449	E-2
B_3	1.61122408	E2
1129 ~ 2325 nm		
A_1	2.32557148	
A_2	5.07967133	E-1
A_3	2.43087198	
B_1	1.32895208	E-2
B_2	5.28335449	E-2
B_3	1.61122408	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6842
$\theta_{C,A'}$	0.3116
$\theta_{d,C}$	0.2899
$\theta_{e,C}$	0.5263
$\theta_{g,d}$	1.3080
$\theta_{g,F}$	0.5980
$\theta_{h,g}$	0.5277
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7182
$\theta'_{e,C'}$	0.4737
$\theta'_{F',e}$	0.5263
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	435	λ_5	371

CCI

B	G	R
0.00	10.86	11.57

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.030	
380	0.160	
390	0.330	
400	0.500	
420	0.720	
440	0.830	
460	0.880	
480	0.921	
500	0.945	
550	0.979	
600	0.988	
650	0.991	
700	0.993	
800	0.996	
900	0.997	
1000	0.997	
1200	0.998	
1400	0.998	
1600	0.997	
1800	0.994	
2000	0.986	
2200	0.966	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	
Specific Gravity	**d**	5.23		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	6.5	8.0	8.1	8.6	9.2	10.7	12.4	
-20 ~ 0	6.7	8.2	8.3	8.9	9.5	11.1	12.9	
0 ~ 20	6.9	8.5	8.6	9.2	9.8	11.5	13.4	
20 ~ 40	7.0	8.7	8.9	9.4	10.1	11.9	13.8	
40 ~ 60	7.2	9.0	9.1	9.7	10.4	12.2	14.3	
60 ~ 80	7.4	9.2	9.4	10.0	10.7	12.6	14.8	

© OHARA GmbH – Hofheim – Germany

S-LAH88

917316
923314

Refractive Index	n_d	**1.91650**	Abbe Number	ν_d	**31.60**	Dispersion	$n_F - n_C$	**0.02900**
	n_e	1.916500		ν_e	31.38		$n_{F'} - n_{C'}$	0.028999
		1.923361						0.029426

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.85814
n_{1970}	1.97009	1.86607
n_{1530}	1.52958	1.87503
n_{1129}	1.12864	1.88413
n_t	1.01398	1.88756
n_s	0.85211	1.89408
$n_{A'}$	0.76819	1.89884
n_r	0.70652	1.90338
n_C	0.65627	**1.90804**
$n_{C'}$	0.64385	1.90936
n_{He-Ne}	0.6328	1.91060
n_D	0.58929	1.91625
n_d	0.58756	**1.91650**
n_e	0.54607	1.92336
n_F	0.48613	**1.93703**
$n_{F'}$	0.47999	1.93878
n_{He-Cd}	0.44157	1.95185
n_g	0.435835	**1.95418**
n_h	0.404656	1.96921
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	581
Annealing Point (°C)	**AP**	601
Transformation Temperature (°C)	**Tg**	616
Yield Point (°C)	**At**	642
Softening Point (°C)	**SP**	677
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	57
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.894

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1135
Rigidity Modulus (10⁸N/m²)	**G**	457
Poisson's Ratio	σ	0.242
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	68
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.9

Partial Dispersions

$n_C - n_t$	0.020471
$n_C - n_{A'}$	0.009192
$n_d - n_C$	0.008465
$n_e - n_C$	0.015326
$n_g - n_d$	0.037676
$n_g - n_F$	0.017142
$n_h - n_g$	0.015029
$n_i - n_g$	
$n_{C'} - n_t$	0.021794
$n_e - n_{C'}$	0.014003
$n_{F'} - n_e$	0.015423
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0110
$\Delta\theta_{C,A'}$	0.0029
$\Delta\theta_{g,d}$	0.0001
$\Delta\theta_{g,F}$	0.0008
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	2.12844340	E0
A 2	4.05082139	E-1
A 3	1.67918461	E0
B 1	1.17309815	E-2
B 2	5.08706599	E-2
B 3	1.07091456	E2
1129 ~ 2325 nm		
A 1		
A 2		
A 3		
B 1		
B 2		
B 3		

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**	3.2
Phosphate Resistance	**PR**	1.1

Relative Partial Dispersions

$\theta_{C,t}$	0.7059
$\theta_{C,A'}$	0.3170
$\theta_{d,C}$	0.2919
$\theta_{e,C}$	0.5285
$\theta_{g,d}$	1.2992
$\theta_{g,F}$	0.5911
$\theta_{h,g}$	0.5183
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7406
$\theta'_{e,C'}$	0.4759
$\theta'_{F',e}$	0.5241
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	389	λ_5	353

CCI

B	G	R
0.00	2.51	2.67

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.010	
360	0.160	
365		
370	0.450	
380	0.680	
390	0.810	
400	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.995	
1600	0.994	
1800	0.985	
2000	0.963	
2200	0.890	
2400	0.710	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.74		λ_5	355

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.3	6.4	6.5	6.8	7.3	8.5	9.7	
-20 ~ 0	5.4	6.6	6.6	7.0	7.5	8.7	10.1	
0 ~ 20	5.4	6.7	6.8	7.2	7.7	9.0	10.4	
20 ~ 40	5.5	6.8	6.9	7.3	7.8	9.1	10.6	
40 ~ 60	5.6	6.9	7.0	7.4	8.0	9.4	10.9	
60 ~ 80	5.8	7.1	7.2	7.7	8.3	9.7	11.3	

© OHARA GmbH – Hofheim – Germany

S-LAH89

852408
856405

Refractive Index	n_d	**1.85150**	Abbe Number	ν_d	**40.78**	Dispersion	$n_F - n_C$	**0.02088**
	n_e	1.856460		ν_e	40.53		$n_{F'} - n_{C'}$	0.021134
		1.851500						0.020880

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.80561
n_{1970}	1.97009	1.81233
n_{1530}	1.52958	1.81983
n_{1129}	1.12864	1.82718
n_t	1.01398	1.82987
n_s	0.85211	1.83487
$n_{A'}$	0.76819	1.83847
n_r	0.70652	1.84186
n_C	0.65627	**1.84530**
$n_{C'}$	0.64385	1.84628
n_{He-Ne}	0.6328	1.84719
n_D	0.58929	1.85132
n_d	0.58756	**1.85150**
n_e	0.54607	1.85646
n_F	0.48613	**1.86618**
$n_{F'}$	0.47999	1.86741
n_{He-Cd}	0.44157	1.87648
n_g	0.435835	**1.87808**
n_h	0.404656	1.88822
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	634
Annealing Point (°C)	**AP**	660
Transformation Temperature (°C)	**Tg**	669
Yield Point (°C)	**At**	702
Softening Point (°C)	**SP**	743
Expansion Coefficient (10^{-7}/°C) α (-30~+70°C)		68
α (+100~+300°C)		80
Thermal Conductivity (W/m·K)	**k**	0.861

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1208
Rigidity Modulus (10^8N/m^2)	**G**	463
Poisson's Ratio	σ	0.303
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	70
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.27

Partial Dispersions

$n_C - n_t$	0.015434
$n_C - n_{A'}$	0.006834
$n_d - n_C$	0.006196
$n_e - n_C$	0.011156
$n_g - n_d$	0.026575
$n_g - n_F$	0.011891
$n_h - n_g$	0.010143
$n_i - n_g$	
$n_{C'} - n_t$	0.016409
$n_e - n_{C'}$	0.010181
$n_{F'} - n_e$	0.010953
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0012
$\Delta\theta_{C,A'}$	0.0020
$\Delta\theta_{g,d}$	-0.0073
$\Delta\theta_{g,F}$	-0.0060
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.95118827	
A_2	3.77607223	E-1
A_3	1.47757262	
B_1	9.76560799	E-3
B_2	3.82232043	E-2
B_3	1.12236720	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7392
$\theta_{C,A'}$	0.3273
$\theta_{d,C}$	0.2967
$\theta_{e,C}$	0.5343
$\theta_{g,d}$	1.2727
$\theta_{g,F}$	0.5695
$\theta_{h,g}$	0.4858
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7764
$\theta'_{e,C'}$	0.4817
$\theta'_{F',e}$	0.5183
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	376	λ_5	339

CCI

B	G	R
0.00	1.47	1.52

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.070	
350	0.310	
360	0.570	
365		
370	0.740	
380	0.840	
390	0.890	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.975	
2200	0.938	
2400	0.780	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	380
Specific Gravity	**d**	4.70		λ_5	340

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.0	4.9	4.9	5.2	5.5	6.3	7.1	
-20 ~ 0	4.0	4.9	5.0	5.2	5.6	6.4	7.2	
0 ~ 20	4.0	4.9	5.0	5.3	5.7	6.5	7.4	
20 ~ 40	4.0	5.0	5.0	5.3	5.7	6.6	7.5	
40 ~ 60	4.1	5.1	5.1	5.4	5.8	6.7	7.6	
60 ~ 80	4.2	5.2	5.3	5.6	6.0	7.0	7.9	

© OHARA GmbH – Hofheim – Germany

S-LAH92

892371
898369

Refractive Index	n_d	**1.89190**	Abbe Number	ν_d	**37.13**	Dispersion	$n_F - n_C$	**0.02402**
	n_e	1.891900		ν_e	36.88		$n_{F'} - n_{C'}$	0.024019
		1.897597						0.024337

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.84259
n_{1970}	1.97009	1.84927
n_{1530}	1.52958	1.85686
n_{1129}	1.12864	1.86460
n_t	1.01398	1.86752
n_s	0.85211	1.87305
$n_{A'}$	0.76819	1.87709
n_r	0.70652	1.88091
n_C	0.65627	**1.88482**
$n_{C'}$	0.64385	1.88593
n_{He-Ne}	0.6328	1.88698
n_D	0.58929	1.89169
n_d	0.58756	**1.89190**
n_e	0.54607	1.89760
n_F	0.48613	**1.90884**
$n_{F'}$	0.47999	1.91027
n_{He-Cd}	0.44157	1.92085
n_g	0.435835	**1.92273**
n_h	0.404656	1.93469
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	646
Annealing Point (°C)	**AP**	678
Transformation Temperature (°C)	**Tg**	689
Yield Point (°C)	**At**	730
Softening Point (°C)	**SP**	761
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	75
	(+100~+300°C)	87
Thermal Conductivity (W/m·K)	**k**	0.873

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1230
Rigidity Modulus (10^8N/m^2)	**G**	471
Poisson's Ratio	σ	0.306
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	51
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.12

Partial Dispersions

$n_C - n_t$	0.017302
$n_C - n_{A'}$	0.007739
$n_d - n_C$	0.007076
$n_e - n_C$	0.012773
$n_g - n_d$	0.030827
$n_g - n_F$	0.013884
$n_h - n_g$	0.011965
$n_i - n_g$	
$n_{C'} - n_t$	0.018412
$n_e - n_{C'}$	0.011663
$n_{F'} - n_e$	0.012674
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0006
$\Delta\theta_{C,A'}$	0.0013
$\Delta\theta_{g,d}$	-0.0042
$\Delta\theta_{g,F}$	-0.0034
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.10440311	
A_2	3.58346161	E-1
A_3	1.63010064	
B_1	1.08531811	E-2
B_2	4.43405920	E-2
B_3	1.23249800	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7203
$\theta_{C,A'}$	0.3222
$\theta_{d,C}$	0.2946
$\theta_{e,C}$	0.5318
$\theta_{g,d}$	1.2834
$\theta_{g,F}$	0.5780
$\theta_{h,g}$	0.4981
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7565
$\theta'_{e,C'}$	0.4792
$\theta'_{F',e}$	0.5208
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	390	λ_5	349

CCI

B	G	R
0.00	2.55	2.68

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.080	
360	0.280	
365		
370	0.520	
380	0.690	
390	0.800	
400	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.977	
2200	0.946	
2400	0.820	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.87		λ_5	350

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.8	4.7	4.8	5.1	5.5	6.4	7.4	
-20 ~ 0	3.7	4.7	4.8	5.1	5.5	6.5	7.5	
0 ~ 20	3.7	4.8	4.8	5.1	5.6	6.6	7.7	
20 ~ 40	3.7	4.8	4.8	5.2	5.6	6.7	7.8	
40 ~ 60	3.7	4.9	4.9	5.3	5.7	6.8	8.0	
60 ~ 80	3.9	5.1	5.2	5.5	6.0	7.1	8.4	

© OHARA GmbH – Hofheim – Germany

S-LAH93

905350
911348

Refractive Index	n_d	**1.90525**	Abbe Number	ν_d	**35.04**	Dispersion	$n_F - n_C$	**0.02583**
	n_e	1.911372		ν_e	34.79		$n_{F'} - n_{C'}$	0.026200
		1.905250						0.025838

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.85401
n_{1970}	1.97009	1.86068
n_{1530}	1.52958	1.86834
n_{1129}	1.12864	1.87630
n_t	1.01398	1.87935
n_s	0.85211	1.88517
$n_{A'}$	0.76819	1.88944
n_r	0.70652	1.89350
n_C	0.65627	**1.89768**
$n_{C'}$	0.64385	1.89886
n_{He-Ne}	0.6328	1.89998
n_D	0.58929	1.90502
n_d	0.58756	**1.90525**
n_e	0.54607	1.91137
n_F	0.48613	**1.92351**
$n_{F'}$	0.47999	1.92506
n_{He-Cd}	0.44157	1.93658
n_g	0.435835	**1.93862**
n_h	0.404656	1.95176
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	645
Annealing Point (°C)	**AP**	672
Transformation Temperature (°C)	**Tg**	677
Yield Point (°C)	**At**	716
Softening Point (°C)	**SP**	761
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	70
	(+100~+300°C)	86
Thermal Conductivity (W/m·K)	**k**	0.892

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1247
Rigidity Modulus (10^8N/m^2)	**G**	478
Poisson's Ratio	σ	0.304
Knoop Hardness	**Hk**	680 [7]
Abrasion	**Aa**	51
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.1

Partial Dispersions

$n_C - n_t$	0.018330
$n_C - n_{A'}$	0.008240
$n_d - n_C$	0.007573
$n_e - n_C$	0.013695
$n_g - n_d$	0.033374
$n_g - n_F$	0.015109
$n_h - n_g$	0.013137
$n_i - n_g$	
$n_{C'} - n_t$	0.019516
$n_e - n_{C'}$	0.012509
$n_{F'} - n_e$	0.013691
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0017
$\Delta\theta_{C,A'}$	0.0006
$\Delta\theta_{g,d}$	-0.0002
$\Delta\theta_{g,F}$	0.0000
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.17884378	E0
A_2	3.25508683	E-1
A_3	1.70608646	E0
B_1	1.15760879	E-2
B_2	4.95982503	E-2
B_3	1.28913580	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	4.0
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7094
$\theta_{C,A'}$	0.3189
$\theta_{d,C}$	0.2931
$\theta_{e,C}$	0.5300
$\theta_{g,d}$	1.2917
$\theta_{g,F}$	0.5848
$\theta_{h,g}$	0.5084
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7449
$\theta'_{e,C'}$	0.4774
$\theta'_{F',e}$	0.5226
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.220	
365		
370	0.480	
380	0.650	
390	0.750	
400	0.820	
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.998	
1800	0.993	
2000	0.979	
2200	0.952	
2400	0.840	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	410
Specific Gravity	**d**	4.83		λ_5	355

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.9	5.0	5.0	5.4	5.8	6.8	7.9	
-20 ~ 0	3.9	5.0	5.1	5.4	5.9	6.9	8.2	
0 ~ 20	3.9	5.1	5.2	5.5	6.0	7.1	8.4	
20 ~ 40	3.9	5.1	5.2	5.5	6.0	7.2	8.5	
40 ~ 60	4.0	5.2	5.3	5.7	6.2	7.4	8.8	
60 ~ 80	4.2	5.5	5.6	6.0	6.5	7.7	9.2	

© OHARA GmbH – Hofheim – Germany

S-LAH95

904313
910311

Refractive Index	n_d	**1.90366**	Abbe Number	ν_d	**31.34**	Dispersion	$n_F - n_C$	**0.02883**
	n_e	1.910476		ν_e	31.10		$n_{F'} - n_{C'}$	0.029272
		1.903660						0.028832

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.84825
n_{1970}	1.97009	1.85530
n_{1530}	1.52958	1.86342
n_{1129}	1.12864	1.87194
n_t	1.01398	1.87523
n_s	0.85211	1.88155
$n_{A'}$	0.76819	1.88622
n_r	0.70652	1.89068
n_C	0.65627	**1.89528**
$n_{C'}$	0.64385	1.89659
n_{He-Ne}	0.6328	1.89782
n_D	0.58929	1.90341
n_d	0.58756	**1.90366**
n_e	0.54607	1.91048
n_F	0.48613	**1.92411**
$n_{F'}$	0.47999	1.92586
n_{He-Cd}	0.44157	1.93896
n_g	0.435835	**1.94130**
n_h	0.404656	1.95648
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	615
Annealing Point (°C)	**AP**	638
Transformation Temperature (°C)	**Tg**	649
Yield Point (°C)	**At**	684
Softening Point (°C)	**SP**	713
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	73
	(+100~+300°C)	87
Thermal Conductivity (W/m·K)	**k**	0.861

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1177
Rigidity Modulus (10⁸N/m²)	**G**	452
Poisson's Ratio	σ	0.302
Knoop Hardness	**Hk**	630 [6]
Abrasion	**Aa**	87
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.43

Partial Dispersions

$n_C - n_t$	0.020047
$n_C - n_{A'}$	0.009057
$n_d - n_C$	0.008383
$n_e - n_C$	0.015199
$n_g - n_d$	0.037641
$n_g - n_F$	0.017192
$n_h - n_g$	0.015178
$n_i - n_g$	
$n_{C'} - n_t$	0.021356
$n_e - n_{C'}$	0.013890
$n_{F'} - n_e$	0.015382
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0016
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0059
$\Delta\theta_{g,F}$	0.0055
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.15636617	E0
A_2	3.29558178	E-1
A_3	1.72178935	E0
B_1	1.22880510	E-2
B_2	5.55507835	E-2
B_3	1.24439340	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6953
$\theta_{C,A'}$	0.3141
$\theta_{d,C}$	0.2908
$\theta_{e,C}$	0.5272
$\theta_{g,d}$	1.3055
$\theta_{g,F}$	0.5963
$\theta_{h,g}$	0.5264
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7296
$\theta'_{e,C'}$	0.4745
$\theta'_{F',e}$	0.5255
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.060	
365		
370	0.310	
380	0.560	
390	0.710	
400	0.800	
420	0.890	
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	
1000	0.998	
1200	0.999	
1400	0.997	
1600	0.995	
1800	0.988	
2000	0.972	
2200	0.933	
2400	0.810	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	410
Specific Gravity	**d**	4.64		λ_5	360

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	4.0	4.0	4.4	4.9	6.1	7.3	
-20 ~ 0	2.9	4.1	4.2	4.6	5.1	6.3	7.7	
0 ~ 20	3.0	4.2	4.3	4.7	5.2	6.5	8.0	
20 ~ 40	3.0	4.3	4.4	4.8	5.3	6.7	8.2	
40 ~ 60	3.1	4.4	4.5	5.0	5.5	7.0	8.6	
60 ~ 80	3.3	4.7	4.8	5.2	5.8	7.3	9.0	

© OHARA GmbH – Hofheim – Germany

S-LAH96

764485
768482

Refractive Index	n_d	**1.76385**	Abbe Number	ν_d	**48.49**	Dispersion	$n_F - n_C$	**0.01575**
	n_e	1.767599		ν_e	48.21		$n_{F'} - n_{C'}$	0.015923
		1.763850						0.015753

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.72543
n_{1970}	1.97009	1.73168
n_{1530}	1.52958	1.73848
n_{1129}	1.12864	1.74481
n_t	1.01398	1.74702
n_s	0.85211	1.75103
$n_{A'}$	0.76819	1.75385
n_r	0.70652	1.75648
n_C	0.65627	**1.75913**
$n_{C'}$	0.64385	1.75988
n_{He-Ne}	0.6328	1.76058
n_D	0.58929	1.76371
n_d	0.58756	**1.76385**
n_e	0.54607	1.76760
n_F	0.48613	**1.77488**
$n_{F'}$	0.47999	1.77580
n_{He-Cd}	0.44157	1.78251
n_g	0.435835	**1.78369**
n_h	0.404656	1.79112
n_i	0.365015	1.80405
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	629
Yield Point (°C)	**At**	655
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	70
	(+100~+300°C)	84
Thermal Conductivity (W/m·K)	**k**	0.890

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1187
Rigidity Modulus (10^8N/m^2)	**G**	458
Poisson's Ratio	σ	0.296
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	73
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.12

Partial Dispersions

$n_C - n_t$	0.012108
$n_C - n_{A'}$	0.005277
$n_d - n_C$	0.004721
$n_e - n_C$	0.008470
$n_g - n_d$	0.019837
$n_g - n_F$	0.008805
$n_h - n_g$	0.007429
$n_i - n_g$	0.020364
$n_{C'} - n_t$	0.012854
$n_e - n_{C'}$	0.007724
$n_{F'} - n_e$	0.008199
$n_i - n_{F'}$	0.028253

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0056
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	-0.0047
$\Delta\theta_{g,F}$	-0.0041
$\Delta\theta_{i,g}$	-0.0263

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.85078519	E0
A_2	1.89204854	E-1
A_3	1.19763137	E0
B_1	9.40657541	E-3
B_2	3.80345187	E-2
B_3	1.01426835	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7686
$\theta_{C,A'}$	0.3350
$\theta_{d,C}$	0.2997
$\theta_{e,C}$	0.5377
$\theta_{g,d}$	1.2593
$\theta_{g,F}$	0.5589
$\theta_{h,g}$	0.4716
$\theta_{i,g}$	1.2927
$\theta'_{C',t}$	0.8073
$\theta'_{e,C'}$	0.4851
$\theta'_{F',e}$	0.5149
$\theta'_{i,F'}$	1.7744

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.020	
350	0.190	
360	0.480	
365		
370	0.710	
380	0.830	
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	
1000	0.996	
1200	0.997	
1400	0.995	
1600	0.995	
1800	0.989	
2000	0.972	
2200	0.930	
2400	0.760	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.54		λ_5	345

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.6	3.2	3.2	3.4	3.7	4.2	4.7	
-20 ~ 0	2.5	3.1	3.2	3.3	3.6	4.1	4.7	
0 ~ 20	2.4	3.1	3.1	3.3	3.5	4.1	4.7	
20 ~ 40	2.4	3.0	3.1	3.3	3.5	4.1	4.7	
40 ~ 60	2.4	3.1	3.1	3.3	3.6	4.2	4.8	
60 ~ 80	2.5	3.2	3.2	3.4	3.7	4.3	5.0	

© OHARA GmbH – Hofheim – Germany

S-LAH97

755523
758521

Refractive Index	n_d	**1.75500**	Abbe Number	ν_d	**52.32**	Dispersion	$n_F - n_C$ 0.014431
	n_e	1.758440		ν_e	52.08		$n_{F'} - n_{C'}$ 0.014562

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.71414
n_{1970}	1.97009	1.72171
n_{1530}	1.52958	1.72970
n_{1129}	1.12864	1.73666
n_t	1.01398	1.73895
n_s	0.85211	1.74293
$n_{A'}$	0.76819	1.74565
n_r	0.70652	1.74814
n_C	0.65627	**1.75063**
$n_{C'}$	0.64385	1.75132
n_{He-Ne}	0.6328	1.75197
n_D	0.58929	1.75487
n_d	0.58756	**1.75500**
n_e	0.54607	1.75844
n_F	0.48613	**1.76506**
$n_{F'}$	0.47999	1.76588
n_{He-Cd}	0.44157	1.77191
n_g	0.435835	**1.77296**
n_h	0.404656	1.77954
n_i	0.365015	1.79082
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	644
Annealing Point (°C)	**AP**	670
Transformation Temperature (°C)	**Tg**	692
Yield Point (°C)	**At**	709
Softening Point (°C)	**SP**	721
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	58
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.863

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1209
Rigidity Modulus (10^8N/m^2)	**G**	467
Poisson's Ratio	σ	0.295
Knoop Hardness	**Hk**	730 [7]
Abrasion	**Aa**	64
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.39

Partial Dispersions	
$n_C - n_t$	0.011678
$n_C - n_{A'}$	0.004974
$n_d - n_C$	0.004373
$n_e - n_C$	0.007813
$n_g - n_d$	0.017958
$n_g - n_F$	0.007900
$n_h - n_g$	0.006585
$n_i - n_g$	0.017860
$n_{C'} - n_t$	0.012373
$n_e - n_{C'}$	0.007118
$n_{F'} - n_e$	0.007444
$n_i - n_{F'}$	0.024934

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0170
$\Delta\theta_{C,A'}$	0.0054
$\Delta\theta_{g,d}$	-0.0117
$\Delta\theta_{g,F}$	-0.0094
$\Delta\theta_{i,g}$	-0.0493

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.02730180	
A_2	9.89293564	E-1
A_3	1.25781057	
B_1	1.83406129	E-2
B_2	3.71264195	E-3
B_3	8.78510500	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8092
$\theta_{C,A'}$	0.3447
$\theta_{d,C}$	0.3030
$\theta_{e,C}$	0.5414
$\theta_{g,d}$	1.2444
$\theta_{g,F}$	0.5474
$\theta_{h,g}$	0.4563
$\theta_{i,g}$	1.2376
$\theta'_{C',t}$	0.8497
$\theta'_{e,C'}$	0.4888
$\theta'_{F',e}$	0.5112
$\theta'_{i,F'}$	1.7123

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280	0.280	
290	0.430	
300	0.550	
310	0.650	
320	0.740	
330	0.820	
340	0.880	
350	0.923	
360	0.951	
365		
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	
1000	0.999	
1200	0.999	
1400	0.995	
1600	0.994	
1800	0.984	
2000	0.956	
2200	0.870	
2400	0.610	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	355
Specific Gravity	**d**	4.17		λ_5	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.4	3.8	3.9	4.0	4.2	4.6	5.0	
-20 ~ 0	3.3	3.8	3.9	4.0	4.2	4.6	5.1	
0 ~ 20	3.3	3.9	3.9	4.1	4.3	4.7	5.2	
20 ~ 40	3.4	3.9	4.0	4.1	4.3	4.8	5.3	
40 ~ 60	3.5	4.0	4.1	4.3	4.5	4.9	5.4	
60 ~ 80	3.6	4.2	4.2	4.4	4.6	5.1	5.6	

© OHARA GmbH – Hofheim – Germany

S-LAL7

652585
654583

Refractive Index	n_d	**1.65160**	Abbe Number	ν_d	**58.55**	Dispersion	$n_F - n_C$	**0.01113**
	n_e	1.651597		ν_e	58.31		$n_{F'} - n_{C'}$	0.011129
		1.654251						0.011221

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.61850
n_{1970}	1.97009	1.62479
n_{1530}	1.52958	1.63144
n_{1129}	1.12864	1.63715
n_t	1.01398	1.63900
n_s	0.85211	1.64218
$n_{A'}$	0.76819	1.64432
n_r	0.70652	1.64627
n_C	0.65627	**1.64821**
$n_{C'}$	0.64385	1.64875
$n_{He\text{-}Ne}$	0.6328	1.64925
n_D	0.58929	1.65150
n_d	0.58756	**1.65160**
n_e	0.54607	1.65425
n_F	0.48613	**1.65934**
$n_{F'}$	0.47999	1.65997
$n_{He\text{-}Cd}$	0.44157	1.66457
n_g	0.435835	**1.66537**
n_h	0.404656	1.67038
n_i	0.365015	1.67892
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	582
Annealing Point (°C)	**AP**	603
Transformation Temperature (°C)	**Tg**	617
Yield Point (°C)	**At**	658
Softening Point (°C)	**SP**	694
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	67
	(+100~+300°C)	81
Thermal Conductivity (W/m·K)	**k**	0.825

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	958
Rigidity Modulus (10^8N/m^2)	**G**	377
Poisson's Ratio	σ	0.271
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	136
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.72

Partial Dispersions

$n_C - n_t$	0.009204
$n_C - n_{A'}$	0.003884
$n_d - n_C$	0.003390
$n_e - n_C$	0.006044
$n_g - n_d$	0.013777
$n_g - n_F$	0.006038
$n_h - n_g$	0.005010
$n_i - n_g$	0.013542
$n_{C'} - n_t$	0.009744
$n_e - n_{C'}$	0.005504
$n_{F'} - n_e$	0.005717
$n_i - n_{F'}$	0.018948

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0056
$\Delta\theta_{C,A'}$	0.0022
$\Delta\theta_{g,d}$	-0.0052
$\Delta\theta_{g,F}$	-0.0042
$\Delta\theta_{i,g}$	-0.0179

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.16121247	E-1
A_2	7.65948319	E-1
A_3	1.27745023	
B_1	3.95889743	E-3
B_2	1.67547425	E-2
B_3	1.10762706	E2
1129 ~ 2325 nm		
A_1	9.16121247	E-1
A_2	7.65948319	E-1
A_3	1.27745023	
B_1	3.95889743	E-3
B_2	1.67547425	E-2
B_3	1.10762706	E2

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**	53.0
Phosphate Resistance	**PR**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8270
$\theta_{C,A'}$	0.3490
$\theta_{d,C}$	0.3046
$\theta_{e,C}$	0.5431
$\theta_{g,d}$	1.2379
$\theta_{g,F}$	0.5425
$\theta_{h,g}$	0.4502
$\theta_{i,g}$	1.2168
$\theta'_{C',t}$	0.8684
$\theta'_{e,C'}$	0.4905
$\theta'_{F',e}$	0.5095
$\theta'_{i,F'}$	1.6886

Internal Transmittance

λ_{80}	330	λ_5	277

CCI

B	G	R
0.00	0.18	0.16

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.090	
290	0.220	
300	0.380	
310	0.550	
320	0.690	
330	0.800	
340	0.880	
350	0.929	
360	0.957	
365		
370	0.974	
380	0.984	
390	0.990	
400	0.992	
420	0.994	
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	0.999	
900	0.998	
1000	0.998	
1200	0.997	
1400	0.991	
1600	0.993	
1800	0.984	
2000	0.968	
2200	0.903	
2400	0.740	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35		
Specific Gravity	**d**	3.73		λ_5	28		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.5	1.8	1.8	1.9	2.0	2.3	2.6	
-20 ~ 0	1.5	1.8	1.9	2.0	2.1	2.4	2.7	
0 ~ 20	1.6	1.9	2.0	2.1	2.2	2.5	2.8	
20 ~ 40	1.8	2.0	2.0	2.2	2.3	2.6	3.0	
40 ~ 60	1.8	2.1	2.1	2.3	2.4	2.8	3.1	
60 ~ 80	1.8	2.2	2.2	2.4	2.5	2.9	3.2	

© OHARA GmbH – Hofheim – Germany

S-LAL8

713539
716536

Refractive Index	n_d	**1.71300**	Abbe Number	ν_d	**53.87**	Dispersion	$n_F - n_C$	**0.01324**
	n_e	1.716150		ν_e	53.64		$n_{F'} - n_{C'}$	0.013352
		1.712995						0.013236

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.67418
n_{1970}	1.97009	1.68155
n_{1530}	1.52958	1.68930
n_{1129}	1.12864	1.69597
n_t	1.01398	1.69813
n_s	0.85211	1.70186
$n_{A'}$	0.76819	1.70438
n_r	0.70652	1.70669
n_C	0.65627	**1.70897**
$n_{C'}$	0.64385	1.70961
n_{He-Ne}	0.6328	1.71021
n_D	0.58929	1.71288
n_d	0.58756	**1.71300**
n_e	0.54607	1.71615
n_F	0.48613	**1.72221**
$n_{F'}$	0.47999	1.72297
n_{He-Cd}	0.44157	1.72848
n_g	0.435835	**1.72943**
n_h	0.404656	1.73545
n_i	0.365015	1.74575
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	590
Annealing Point (°C)	**AP**	617
Transformation Temperature (°C)	**Tg**	643
Yield Point (°C)	**At**	668
Softening Point (°C)	**SP**	698
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	61
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.894

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1140
Rigidity Modulus (10^8N/m^2)	**G**	442
Poisson's Ratio	σ	0.289
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	81
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.75

Partial Dispersions

$n_C - n_t$	0.010846
$n_C - n_{A'}$	0.004591
$n_d - n_C$	0.004021
$n_e - n_C$	0.007176
$n_g - n_d$	0.016440
$n_g - n_F$	0.007225
$n_h - n_g$	0.006016
$n_i - n_g$	0.016311
$n_{C'} - n_t$	0.011486
$n_e - n_{C'}$	0.006536
$n_{F'} - n_e$	0.006816
$n_i - n_{F'}$	0.022780

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0200
$\Delta\theta_{C,A'}$	0.0057
$\Delta\theta_{g,d}$	-0.0107
$\Delta\theta_{g,F}$	-0.0084
$\Delta\theta_{i,g}$	-0.0416

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.30663291	
A_2	5.71377253	E-1
A_3	1.24303605	
B_1	6.11862448	E-3
B_2	2.12721470	E-2
B_3	9.06285686	E1
1129 ~ 2325 nm		
A_1	1.30663291	
A_2	5.71377253	E-1
A_3	1.24303605	
B_1	6.11862448	E-3
B_2	2.12721470	E-2
B_3	9.06285686	E1

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**	3.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8194
$\theta_{C,A'}$	0.3469
$\theta_{d,C}$	0.3038
$\theta_{e,C}$	0.5422
$\theta_{g,d}$	1.2421
$\theta_{g,F}$	0.5459
$\theta_{h,g}$	0.4545
$\theta_{i,g}$	1.2323
$\theta'_{C',t}$	0.8602
$\theta'_{e,C'}$	0.4895
$\theta'_{F',e}$	0.5105
$\theta'_{i,F'}$	1.7061

Internal Transmittance

λ_{80}	356	λ_5	295

CCI

B	G	R
0.00	0.42	0.39

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.030	
300	0.070	
310	0.150	
320	0.280	
330	0.440	
340	0.600	
350	0.740	
360	0.840	
365		
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	
1000	0.997	
1200	0.997	
1400	0.991	
1600	0.991	
1800	0.981	
2000	0.955	
2200	0.870	
2400	0.620	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38		
Specific Gravity	**d**	3.79		λ_5	30		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.6	3.6	3.8	4.0	4.3	4.7	
-20 ~ 0	3.4	3.7	3.8	3.9	4.1	4.5	4.9	
0 ~ 20	3.5	3.9	3.9	4.0	4.2	4.6	5.0	
20 ~ 40	3.6	4.0	4.0	4.1	4.3	4.8	5.2	
40 ~ 60	3.6	4.1	4.1	4.3	4.5	4.9	5.4	
60 ~ 80	3.7	4.2	4.2	4.4	4.6	5.1	5.5	

© OHARA GmbH – Hofheim – Germany

S-LAL9

691548
694546

Refractive Index	n_d	**1.69100**	Abbe Number	ν_d	**54.82**	Dispersion	$n_F - n_C$	**0.01260**
	n_e	1.691002		ν_e	54.59		$n_{F'} - n_{C'}$	0.012605
		1.694007						0.012714

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.65343
n_{1970}	1.97009	1.66064
n_{1530}	1.52958	1.66822
n_{1129}	1.12864	1.67470
n_t	1.01398	1.67678
n_s	0.85211	1.68037
$n_{A'}$	0.76819	1.68279
n_r	0.70652	1.68499
n_C	0.65627	**1.68717**
$n_{C'}$	0.64385	1.68778
n_{He-Ne}	0.6328	1.68835
n_D	0.58929	1.69089
n_d	0.58756	**1.69100**
n_e	0.54607	1.69401
n_F	0.48613	**1.69977**
$n_{F'}$	0.47999	1.70049
n_{He-Cd}	0.44157	1.70573
n_g	0.435835	**1.70664**
n_h	0.404656	1.71236
n_i	0.365015	1.72212
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	606
Annealing Point (°C)	**AP**	630
Transformation Temperature (°C)	**Tg**	653
Yield Point (°C)	**At**	679
Softening Point (°C)	**SP**	707
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	61
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.895

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1075
Rigidity Modulus (10^8N/m^2)	**G**	418
Poisson's Ratio	σ	0.287
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	88
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.85

Partial Dispersions

$n_C - n_t$	0.010384
$n_C - n_{A'}$	0.004384
$n_d - n_C$	0.003833
$n_e - n_C$	0.006838
$n_g - n_d$	0.015640
$n_g - n_F$	0.006868
$n_h - n_g$	0.005714
$n_i - n_g$	0.015476
$n_{C'} - n_t$	0.010994
$n_e - n_{C'}$	0.006228
$n_{F'} - n_e$	0.006486
$n_i - n_{F'}$	0.021625

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0199
$\Delta\theta_{C,A'}$	0.0055
$\Delta\theta_{g,d}$	-0.0101
$\Delta\theta_{g,F}$	-0.0079
$\Delta\theta_{i,g}$	-0.0382

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.16195687	
A_2	6.44860099	E-1
A_3	1.25062221	
B_1	1.59659509	E-2
B_2	5.05502467	E-4
B_3	9.38284169	E1
1129 ~ 2325 nm		
A_1	1.16195687	
A_2	6.44860099	E-1
A_3	1.25062221	
B_1	1.59659509	E-2
B_2	5.05502467	E-4
B_3	9.38284169	E1

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**	52.0
Phosphate Resistance	**PR**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8238
$\theta_{C,A'}$	0.3478
$\theta_{d,C}$	0.3041
$\theta_{e,C}$	0.5425
$\theta_{g,d}$	1.2408
$\theta_{g,F}$	0.5449
$\theta_{h,g}$	0.4533
$\theta_{i,g}$	1.2278
$\theta'_{C',t}$	0.8647
$\theta'_{e,C'}$	0.4899
$\theta'_{F',e}$	0.5101
$\theta'_{i,F'}$	1.7009

Internal Transmittance

λ_{80}	358	λ_5	301

CCI

B	G	R
0.00	0.51	0.52

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.010	
300	0.040	
310	0.110	
320	0.220	
330	0.380	
340	0.550	
350	0.700	
360	0.820	
365		
370	0.890	
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	
1000	0.996	
1200	0.996	
1400	0.992	
1600	0.992	
1800	0.984	
2000	0.963	
2200	0.890	
2400	0.660	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	3.63		λ_5	30	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.4	3.8	3.8	3.9	4.1	4.4	4.8	
-20 ~ 0	3.4	3.8	3.8	4.0	4.1	4.5	4.9	
0 ~ 20	3.5	3.9	3.9	4.0	4.2	4.6	5.0	
20 ~ 40	3.5	3.9	3.9	4.1	4.3	4.7	5.1	
40 ~ 60	3.6	4.0	4.0	4.2	4.3	4.8	5.2	
60 ~ 80	3.7	4.0	4.0	4.2	4.4	4.8	5.3	

© OHARA GmbH – Hofheim – Germany

S-LAL10

720502
723500

Refractive Index	n_d	**1.72000**	Abbe Number	ν_d	**50.23**	Dispersion	$n_F - n_C$	**0.01433**
	n_e	1.723409		ν_e	49.98		$n_{F'} - n_{C'}$	0.014474
	1.719995							0.014334

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68159
n_{1970}	1.97009	1.68841
n_{1530}	1.52958	1.69567
n_{1129}	1.12864	1.70213
n_t	1.01398	1.70430
n_s	0.85211	1.70814
$n_{A'}$	0.76819	1.71079
n_r	0.70652	1.71323
n_C	0.65627	**1.71567**
$n_{C'}$	0.64385	1.71636
$n_{He\text{-}Ne}$	0.6328	1.71700
n_D	0.58929	1.71987
n_d	0.58756	**1.72000**
n_e	0.54607	1.72341
n_F	0.48613	**1.73000**
$n_{F'}$	0.47999	1.73083
$n_{He\text{-}Cd}$	0.44157	1.73686
n_g	0.435835	**1.73792**
n_h	0.404656	1.74455
n_i	0.365015	1.75597
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	582
Annealing Point (°C)	**AP**	600
Transformation Temperature (°C)	**Tg**	624
Yield Point (°C)	**At**	657
Softening Point (°C)	**SP**	692
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	61
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.850

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1061
Rigidity Modulus (10^8N/m^2)	**G**	410
Poisson's Ratio	σ	0.294
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	86
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.17

Partial Dispersions

$n_C - n_t$	0.011368
$n_C - n_{A'}$	0.004885
$n_d - n_C$	0.004325
$n_e - n_C$	0.007739
$n_g - n_d$	0.017923
$n_g - n_F$	0.007914
$n_h - n_g$	0.006628
$n_i - n_g$	0.018051
$n_{C'} - n_t$	0.012054
$n_e - n_{C'}$	0.007053
$n_{F'} - n_e$	0.007421
$n_i - n_{F'}$	0.025139

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0107
$\Delta\theta_{C,A'}$	0.0040
$\Delta\theta_{g,d}$	-0.0100
$\Delta\theta_{g,F}$	-0.0081
$\Delta\theta_{i,g}$	-0.0451

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.52812575	
A_2	3.67965267	E-1
A_3	1.11751784	
B_1	7.76817644	E-3
B_2	2.72026548	E-2
B_3	8.88697400	E1
1129 ~ 2325 nm		
A_1	1.52812575	
A_2	3.67965267	E-1
A_3	1.11751784	
B_1	7.76817644	E-3
B_2	2.72026548	E-2
B_3	8.88697400	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7931
$\theta_{C,A'}$	0.3408
$\theta_{d,C}$	0.3017
$\theta_{e,C}$	0.5399
$\theta_{g,d}$	1.2504
$\theta_{g,F}$	0.5521
$\theta_{h,g}$	0.4624
$\theta_{i,g}$	1.2593
$\theta'_{C',t}$	0.8328
$\theta'_{e,C'}$	0.4873
$\theta'_{F',e}$	0.5127
$\theta'_{i,F'}$	1.7368

Internal Transmittance

λ_{80}	357	λ_5	309

CCI

B	G	R
0.00	0.59	0.60

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.070	
320	0.220	
330	0.400	
340	0.580	
350	0.720	
360	0.830	
365		
370	0.890	
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	
1000	0.998	
1200	0.998	
1400	0.997	
1600	0.996	
1800	0.990	
2000	0.971	
2200	0.922	
2400	0.710	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	3.86		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.4	5.0	5.0	5.1	5.4	5.8	6.3	
-20 ~ 0	4.5	5.0	5.1	5.2	5.5	5.9	6.4	
0 ~ 20	4.5	5.1	5.2	5.3	5.5	6.0	6.5	
20 ~ 40	4.6	5.2	5.2	5.4	5.6	6.1	6.7	
40 ~ 60	4.6	5.2	5.3	5.5	5.7	6.3	6.8	
60 ~ 80	4.6	5.3	5.4	5.5	5.8	6.4	6.9	

© OHARA GmbH – Hofheim – Germany

S-LAL12

678553
681551

Refractive Index	n_d	**1.67790**	Abbe Number	ν_d	**55.34**	Dispersion	$n_F - n_C$	**0.01225**
	n_e	1.677900		ν_e	55.08		$n_{F'} - n_{C'}$	0.012250
		1.680820						0.012361

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.64414
n_{1970}	1.97009	1.65021
n_{1530}	1.52958	1.65669
n_{1129}	1.12864	1.66242
n_t	1.01398	1.66433
n_s	0.85211	1.66768
$n_{A'}$	0.76819	1.66998
n_r	0.70652	1.67208
n_C	0.65627	**1.67419**
$n_{C'}$	0.64385	1.67478
n_{He-Ne}	0.6328	1.67533
n_D	0.58929	1.67779
n_d	0.58756	**1.67790**
n_e	0.54607	1.68082
n_F	0.48613	**1.68644**
$n_{F'}$	0.47999	1.68714
n_{He-Cd}	0.44157	1.69225
n_g	0.435835	**1.69314**
n_h	0.404656	1.69872
n_i	0.365015	1.70826
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	604
Annealing Point (°C)	**AP**	630
Transformation Temperature (°C)	**Tg**	652
Yield Point (°C)	**At**	679
Softening Point (°C)	**SP**	716
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	72
	(+100~+300°C)	86
Thermal Conductivity (W/m·K)	**k**	0.717

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	910
Rigidity Modulus (10^8N/m^2)	**G**	354
Poisson's Ratio	σ	0.284
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	166
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.61

Partial Dispersions

$n_C - n_t$	0.009855
$n_C - n_{A'}$	0.004212
$n_d - n_C$	0.003712
$n_e - n_C$	0.006632
$n_g - n_d$	0.015241
$n_g - n_F$	0.006703
$n_h - n_g$	0.005580
$n_i - n_g$	0.015119
$n_{C'} - n_t$	0.010445
$n_e - n_{C'}$	0.006042
$n_{F'} - n_e$	0.006319
$n_i - n_{F'}$	0.021121

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0018
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	-0.0056
$\Delta\theta_{g,F}$	-0.0047
$\Delta\theta_{i,g}$	-0.0274

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.92053895	E-1
A_2	7.71377731	E-1
A_3	1.18296264	
B_1	1.67095063	E-2
B_2	2.36750156	E-3
B_3	1.05901080	E2
1129 ~ 2325 nm		
A_1	9.92053895	E-1
A_2	7.71377731	E-1
A_3	1.18296264	
B_1	1.67095063	E-2
B_2	2.36750156	E-3
B_3	1.05901080	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.8045
$\theta_{C,A'}$	0.3438
$\theta_{d,C}$	0.3030
$\theta_{e,C}$	0.5414
$\theta_{g,d}$	1.2442
$\theta_{g,F}$	0.5472
$\theta_{h,g}$	0.4555
$\theta_{i,g}$	1.2342
$\theta'_{C',t}$	0.8450
$\theta'_{e,C'}$	0.4888
$\theta'_{F',e}$	0.5112
$\theta'_{i,F'}$	1.7087

Internal Transmittance

λ_{80}	337	λ_5	279

CCI

B	G	R
0.00	0.26	0.24

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.060	
290	0.150	
300	0.290	
310	0.450	
320	0.610	
330	0.730	
340	0.830	
350	0.890	
360	0.938	
365		
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	
1000	0.996	
1200	0.996	
1400	0.991	
1600	0.991	
1800	0.981	
2000	0.963	
2200	0.901	
2400	0.730	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36		
Specific Gravity	**d**	4.01		λ_5	28		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.4	0.6	0.7	0.8	0.9	1.2	1.5	
-20 ~ 0	0.5	0.7	0.7	0.8	1.0	1.3	1.7	
0 ~ 20	0.5	0.8	0.8	0.9	1.1	1.4	1.8	
20 ~ 40	0.5	0.8	0.9	1.0	1.1	1.5	1.9	
40 ~ 60	0.5	0.9	0.9	1.1	1.2	1.6	2.0	
60 ~ 80	0.6	1.0	1.0	1.1	1.3	1.7	2.1	

© OHARA GmbH – Hofheim – Germany

S-LAL13

694532
697530

Refractive Index	n_d	**1.69350**	Abbe Number	ν_d	**53.21**	Dispersion	$n_F - n_C$	**0.01303**
	n_e	1.693501		ν_e	52.97		$n_{F'} - n_{C'}$	0.013034
		1.696607						0.013152

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.65605
n_{1970}	1.97009	1.66304
n_{1530}	1.52958	1.67044
n_{1129}	1.12864	1.67685
n_t	1.01398	1.67894
n_s	0.85211	1.68258
$n_{A'}$	0.76819	1.68504
n_r	0.70652	1.68730
n_C	0.65627	**1.68955**
$n_{C'}$	0.64385	1.69018
n_{He-Ne}	0.6328	1.69076
n_D	0.58929	1.69339
n_d	0.58756	**1.69350**
n_e	0.54607	1.69661
n_F	0.48613	**1.70258**
$n_{F'}$	0.47999	1.70333
n_{He-Cd}	0.44157	1.70877
n_g	0.435835	**1.70972**
n_h	0.404656	1.71566
n_i	0.365015	1.72585
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	591
Annealing Point (°C)	**AP**	616
Transformation Temperature (°C)	**Tg**	641
Yield Point (°C)	**At**	666
Softening Point (°C)	**SP**	701
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	57
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.893

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1073
Rigidity Modulus (10^8N/m^2)	**G**	416
Poisson's Ratio	σ	0.290
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	87
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.13

Partial Dispersions	
$n_C - n_t$	0.010604
$n_C - n_{A'}$	0.004503
$n_d - n_C$	0.003953
$n_e - n_C$	0.007059
$n_g - n_d$	0.016214
$n_g - n_F$	0.007133
$n_h - n_g$	0.005947
$n_i - n_g$	0.016134
$n_{C'} - n_t$	0.011232
$n_e - n_{C'}$	0.006431
$n_{F'} - n_e$	0.006721
$n_i - n_{F'}$	0.022521

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0173
$\Delta\theta_{C,A'}$	0.0051
$\Delta\theta_{g,d}$	-0.0102
$\Delta\theta_{g,F}$	-0.0081
$\Delta\theta_{i,g}$	-0.0417

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	9.80071267	E-1
A_2	8.32904776	E-1
A_3	1.28111995	
B_1	3.89123698	E-3
B_2	1.89164592	E-2
B_3	9.89052676	E1
1129 ~ 2325 nm		
A_1	9.80071267	E-1
A_2	8.32904776	E-1
A_3	1.28111995	
B_1	3.89123698	E-3
B_2	1.89164592	E-2
B_3	9.89052676	E1

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**	52.0
Phosphate Resistance	**PR**	3.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.8136
$\theta_{C,A'}$	0.3455
$\theta_{d,C}$	0.3033
$\theta_{e,C}$	0.5416
$\theta_{g,d}$	1.2440
$\theta_{g,F}$	0.5473
$\theta_{h,g}$	0.4563
$\theta_{i,g}$	1.2378
$\theta'_{C',t}$	0.8540
$\theta'_{e,C'}$	0.4890
$\theta'_{F',e}$	0.5110
$\theta'_{i,F'}$	1.7124

Internal Transmittance			
λ_{80}	360	λ_5	304

CCI		
B	G	R
0.00	0.48	0.42

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.010	
300	0.030	
310	0.080	
320	0.190	
330	0.340	
340	0.520	
350	0.680	
360	0.800	
365		
370	0.880	
380	0.932	
390	0.958	
400	0.972	
420	0.986	
440	0.990	
460	0.993	
480	0.995	
500	0.996	
550	0.997	
600	0.995	
650	0.995	
700	0.996	
800	0.997	
900	0.996	
1000	0.995	
1200	0.995	
1400	0.990	
1600	0.990	
1800	0.981	
2000	0.958	
2200	0.880	
2400	0.660	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	3.60		λ_5	30	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.6	4.8	4.8	4.9	5.1	5.5	5.9	
-20 ~ 0	4.7	4.9	5.0	5.1	5.3	5.7	6.1	
0 ~ 20	4.8	5.1	5.1	5.3	5.5	5.9	6.4	
20 ~ 40	4.9	5.3	5.3	5.5	5.7	6.1	6.6	
40 ~ 60	5.0	5.4	5.5	5.6	5.8	6.3	6.8	
60 ~ 80	5.1	5.6	5.6	5.8	6.0	6.5	7.0	

© OHARA GmbH – Hofheim – Germany

S-LAL14

697555
700553

Refractive Index	n_d	**1.69680**	Abbe Number	ν_d	**55.53**	Dispersion	$n_F - n_C$	**0.01255**
	n_e	1.696797		ν_e	55.31		$n_{F'} - n_{C'}$	0.012548
		1.699788						0.012653

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.65820
n_{1970}	1.97009	1.66578
n_{1530}	1.52958	1.67369
n_{1129}	1.12864	1.68039
n_t	1.01398	1.68252
n_s	0.85211	1.68615
$n_{A'}$	0.76819	1.68858
n_r	0.70652	1.69079
n_C	0.65627	**1.69297**
$n_{C'}$	0.64385	1.69358
n_{He-Ne}	0.6328	1.69415
n_D	0.58929	1.69669
n_d	0.58756	**1.69680**
n_e	0.54607	1.69979
n_F	0.48613	**1.70552**
$n_{F'}$	0.47999	1.70624
n_{He-Cd}	0.44157	1.71144
n_g	0.435835	**1.71234**
n_h	0.404656	1.71800
n_i	0.365015	1.72767
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	650
Yield Point (°C)	**At**	668
Softening Point (°C)	**SP**	700
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	57
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.908

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1118
Rigidity Modulus (10^8N/m^2)	**G**	435
Poisson's Ratio	σ	0.284
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	81
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.86

Partial Dispersions	
$n_C - n_t$	0.010452
$n_C - n_{A'}$	0.004389
$n_d - n_C$	0.003823
$n_e - n_C$	0.006814
$n_g - n_d$	0.015543
$n_g - n_F$	0.006818
$n_h - n_g$	0.005665
$n_i - n_g$	0.015333
$n_{C'} - n_t$	0.011061
$n_e - n_{C'}$	0.006205
$n_{F'} - n_e$	0.006448
$n_i - n_{F'}$	0.021437

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0258
$\Delta\theta_{C,A'}$	0.0066
$\Delta\theta_{g,d}$	-0.0107
$\Delta\theta_{g,F}$	-0.0082
$\Delta\theta_{i,g}$	-0.0381

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.23720970	
A_2	5.89722623	E-1
A_3	1.31921880	
B_1	1.53551320	E-2
B_2	-3.07896250	E-4
B_3	9.37202947	E1
1129 ~ 2325 nm		
A_1	1.23720970	
A_2	5.89722623	E-1
A_3	1.31921880	
B_1	1.53551320	E-2
B_2	-3.07896250	E-4
B_3	9.37202947	E1

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**	52.2
Phosphate Resistance	**PR**	3.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.8330
$\theta_{C,A'}$	0.3498
$\theta_{d,C}$	0.3047
$\theta_{e,C}$	0.5430
$\theta_{g,d}$	1.2387
$\theta_{g,F}$	0.5434
$\theta_{h,g}$	0.4515
$\theta_{i,g}$	1.2219
$\theta'_{C',t}$	0.8742
$\theta'_{e,C'}$	0.4904
$\theta'_{F',e}$	0.5096
$\theta'_{i,F'}$	1.6942

Internal Transmittance			
λ_{80}	349	λ_5	285

CCI		
B	G	R
0.00	0.32	0.29

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280	0.030	
290	0.070	
300	0.150	
310	0.270	
320	0.410	
330	0.560	
340	0.700	
350	0.810	
360	0.880	
365		
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	
1000	0.998	
1200	0.998	
1400	0.991	
1600	0.992	
1800	0.982	
2000	0.954	
2200	0.860	
2400	0.590	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	3.70		λ_5	29	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.5	3.7	3.8	3.9	4.0	4.2	4.7	
-20 ~ 0	3.4	3.7	3.8	3.9	4.0	4.3	4.7	
0 ~ 20	3.4	3.7	3.8	4.0	4.1	4.4	4.8	
20 ~ 40	3.4	3.8	3.9	4.1	4.2	4.6	4.9	
40 ~ 60	3.5	4.0	4.0	4.2	4.3	4.8	5.1	
60 ~ 80	3.7	4.2	4.2	4.4	4.5	5.0	5.4	

© OHARA GmbH – Hofheim – Germany

S-LAL18

729547
732544

Refractive Index	n_d	**1.72916**	Abbe Number	ν_d	**54.68**	Dispersion	$n_F - n_C$	**0.01334**
	n_e	1.729157		ν_e	54.45		$n_{F'} - n_{C'}$	0.013335
		1.732336						0.013449

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68936
n_{1970}	1.97009	1.69701
n_{1530}	1.52958	1.70504
n_{1129}	1.12864	1.71190
n_t	1.01398	1.71411
n_s	0.85211	1.71790
$n_{A'}$	0.76819	1.72046
n_r	0.70652	1.72279
n_C	0.65627	**1.72510**
$n_{C'}$	0.64385	1.72575
n_{He-Ne}	0.6328	1.72635
n_D	0.58929	1.72904
n_d	0.58756	**1.72916**
n_e	0.54607	1.73234
n_F	0.48613	**1.73844**
$n_{F'}$	0.47999	1.73920
n_{He-Cd}	0.44157	1.74473
n_g	0.435835	**1.74570**
n_h	0.404656	1.75173
n_i	0.365015	1.76203
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	632
Annealing Point (°C)	**AP**	655
Transformation Temperature (°C)	**Tg**	685
Yield Point (°C)	**At**	699
Softening Point (°C)	**SP**	731
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	59
	(+100~+300°C)	69
Thermal Conductivity (W/m·K)	**k**	0.871

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1204
Rigidity Modulus (10^8N/m^2)	**G**	467
Poisson's Ratio	σ	0.289
Knoop Hardness	**Hk**	720 [7]
Abrasion	**Aa**	70
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.58

Partial Dispersions

$n_C - n_t$	0.010994
$n_C - n_{A'}$	0.004641
$n_d - n_C$	0.004056
$n_e - n_C$	0.007235
$n_g - n_d$	0.016539
$n_g - n_F$	0.007260
$n_h - n_g$	0.006035
$n_i - n_g$	0.016335
$n_{C'} - n_t$	0.011640
$n_e - n_{C'}$	0.006589
$n_{F'} - n_e$	0.006860
$n_i - n_{F'}$	0.022835

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0212
$\Delta\theta_{C,A'}$	0.0058
$\Delta\theta_{g,d}$	-0.0109
$\Delta\theta_{g,F}$	-0.0086
$\Delta\theta_{i,g}$	-0.0422

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.50276318	
A_2	4.30224497	E-1
A_3	1.34726060	
B_1	1.45462356	E-2
B_2	-3.32784153	E-3
B_3	9.33508342	E1
1129 ~ 2325 nm		
A_1	1.50276318	
A_2	4.30224497	E-1
A_3	1.34726060	
B_1	1.45462356	E-2
B_2	-3.32784153	E-3
B_3	9.33508342	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8244
$\theta_{C,A'}$	0.3480
$\theta_{d,C}$	0.3042
$\theta_{e,C}$	0.5426
$\theta_{g,d}$	1.2403
$\theta_{g,F}$	0.5444
$\theta_{h,g}$	0.4526
$\theta_{i,g}$	1.2250
$\theta'_{C',t}$	0.8655
$\theta'_{e,C'}$	0.4899
$\theta'_{F',e}$	0.5101
$\theta'_{i,F'}$	1.6979

Internal Transmittance

λ_{80}	343	λ_5	281

CCI

B	G	R
0.00	0.30	0.31

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.040	
290	0.210	
300	0.300	
310	0.320	
320	0.550	
330	0.680	
340	0.780	
350	0.860	
360	0.912	
365		
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	
1000	0.997	
1200	0.996	
1400	0.991	
1600	0.991	
1800	0.982	
2000	0.956	
2200	0.870	
2400	0.600	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37		
Specific Gravity	**d**	4.18		λ_5	29		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		3.8		3.9	4.1	4.5	4.8	
-20 ~ 0		3.8		3.9	4.1	4.5	4.9	
0 ~ 20		3.8		4.0	4.2	4.6	4.9	
20 ~ 40		3.9		4.1	4.3	4.7	5.1	
40 ~ 60		4.0		4.2	4.4	4.9	5.3	
60 ~ 80		4.2		4.4	4.6	5.1	5.5	

© OHARA GmbH – Hofheim – Germany

S-LAL19

729541
732539

Refractive Index	n_d	**1.72916**	Abbe Number	ν_d	**54.09**	Dispersion	$n_F - n_C$	**0.01348**
	n_e	1.732373		ν_e	53.87		$n_{F'} - n_{C'}$	0.013596
		1.729160						0.013480

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68912
n_{1970}	1.97009	1.69682
n_{1530}	1.52958	1.70487
n_{1129}	1.12864	1.71175
n_t	1.01398	1.71397
n_s	0.85211	1.71779
$n_{A'}$	0.76819	1.72038
n_r	0.70652	1.72273
n_C	0.65627	**1.72506**
$n_{C'}$	0.64385	1.72571
n_{He-Ne}	0.6328	1.72632
n_D	0.58929	1.72904
n_d	0.58756	**1.72916**
n_e	0.54607	1.73237
n_F	0.48613	**1.73854**
$n_{F'}$	0.47999	1.73931
n_{He-Cd}	0.44157	1.74491
n_g	0.435835	**1.74589**
n_h	0.404656	1.75199
n_i	0.365015	1.76243
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	610
Annealing Point (°C)	**AP**	634
Transformation Temperature (°C)	**Tg**	644
Yield Point (°C)	**At**	672
Softening Point (°C)	**SP**	708
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	54
	(+100~+300°C)	69
Thermal Conductivity (W/m·K)	**k**	0.895

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1198
Rigidity Modulus (10^8N/m^2)	**G**	463
Poisson's Ratio	σ	0.295
Knoop Hardness	**Hk**	720 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.61

Partial Dispersions

$n_C - n_t$	0.011088
$n_C - n_{A'}$	0.004686
$n_d - n_C$	0.004099
$n_e - n_C$	0.007312
$n_g - n_d$	0.016725
$n_g - n_F$	0.007344
$n_h - n_g$	0.006108
$n_i - n_g$	0.016544
$n_{C'} - n_t$	0.011740
$n_e - n_{C'}$	0.006660
$n_{F'} - n_e$	0.006936
$n_i - n_{F'}$	0.023120

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0221
$\Delta\theta_{C,A'}$	0.0062
$\Delta\theta_{g,d}$	-0.0117
$\Delta\theta_{g,F}$	-0.0092
$\Delta\theta_{i,g}$	-0.0448

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.73997577	E-1
A_2	9.58186322	E-1
A_3	1.20163359	E0
B_1	3.79332678	E-3
B_2	1.77574581	E-2
B_3	8.37989600	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
Acid Resistance (Powder Group)	**RA(P)**	5
Weathering Resistance (Surface Group)	**W(S)**	3
Acid Resistance (Surface Group)	**SR**	52.0
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8226
$\theta_{C,A'}$	0.3476
$\theta_{d,C}$	0.3041
$\theta_{e,C}$	0.5424
$\theta_{g,d}$	1.2407
$\theta_{g,F}$	0.5448
$\theta_{h,g}$	0.4531
$\theta_{i,g}$	1.2273
$\theta'_{C',t}$	0.8635
$\theta'_{e,C'}$	0.4898
$\theta'_{F',e}$	0.5102
$\theta'_{i,F'}$	1.7005

Internal Transmittance

λ_{80}	327	λ_5	

CCI

B	G	R
0.00	0.21	0.21

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.290	
290	0.430	
300	0.550	
310	0.660	
320	0.750	
330	0.820	
340	0.880	
350	0.925	
360	0.953	
365		
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	
1000	0.999	
1200	0.999	
1400	0.993	
1600	0.993	
1800	0.981	
2000	0.951	
2200	0.850	
2400	0.580	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	355
Specific Gravity	**d**	3.98		λ_5	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.3	4.7	4.7	4.9	5.0	5.4	5.8	
-20 ~ 0	4.2	4.7	4.7	4.8	5.0	5.4	5.8	
0 ~ 20	4.2	4.7	4.7	4.9	5.0	5.5	5.9	
20 ~ 40	4.2	4.7	4.7	4.9	5.1	5.5	5.9	
40 ~ 60	4.2	4.8	4.8	4.9	5.1	5.6	6.0	
60 ~ 80	4.4	4.9	5.0	5.1	5.3	5.8	6.3	

© OHARA GmbH – Hofheim – Germany

S-LAL20

699511
703508

Refractive Index	n_d	**1.69930**	Abbe Number	ν_d	**51.11**	Dispersion	$n_F - n_C$ 0.013682
	n_e	1.699300		ν_e	50.82		$n_{F'} - n_{C'}$ 0.013825
		1.702559					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.66804
n_{1970}	1.97009	1.67270
n_{1530}	1.52958	1.67791
n_{1129}	1.12864	1.68297
n_t	1.01398	1.68481
n_s	0.85211	1.68820
$n_{A'}$	0.76819	1.69063
n_r	0.70652	1.69290
n_C	0.65627	**1.69520**
$n_{C'}$	0.64385	1.69584
n_{He-Ne}	0.6328	1.69645
n_D	0.58929	1.69918
n_d	0.58756	**1.69930**
n_e	0.54607	1.70256
n_F	0.48613	**1.70888**
$n_{F'}$	0.47999	1.70967
n_{He-Cd}	0.44157	1.71546
n_g	0.435835	**1.71647**
n_h	0.404656	1.72283
n_i	0.365015	1.73376
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	593
Annealing Point (°C)	**AP**	621
Transformation Temperature (°C)	**Tg**	628
Yield Point (°C)	**At**	676
Softening Point (°C)	**SP**	717
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	90
	(+100~+300°C)	105
Thermal Conductivity (W/m·K)	**k**	0.602

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	787
Rigidity Modulus (10^8N/m^2)	**G**	302
Poisson's Ratio	σ	0.302
Knoop Hardness	**Hk**	490 [5]
Abrasion	**Aa**	243
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.23

Partial Dispersions

$n_C - n_t$	0.010389
$n_C - n_{A'}$	0.004570
$n_d - n_C$	0.004104
$n_e - n_C$	0.007363
$n_g - n_d$	0.017174
$n_g - n_F$	0.007596
$n_h - n_g$	0.006359
$n_i - n_g$	0.017290
$n_{C'} - n_t$	0.011038
$n_e - n_{C'}$	0.006714
$n_{F'} - n_e$	0.007111
$n_i - n_{F'}$	0.024094

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0272
$\Delta\theta_{C,A'}$	-0.0038
$\Delta\theta_{g,d}$	-0.0034
$\Delta\theta_{g,F}$	-0.0036
$\Delta\theta_{i,g}$	-0.0333

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.06788467	
A_2	7.58735350	E-1
A_3	1.02804682	
B_1	5.18896058	E-3
B_2	2.04004357	E-2
B_3	1.20826320	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7593
$\theta_{C,A'}$	0.3340
$\theta_{d,C}$	0.3000
$\theta_{e,C}$	0.5382
$\theta_{g,d}$	1.2552
$\theta_{g,F}$	0.5552
$\theta_{h,g}$	0.4648
$\theta_{i,g}$	1.2637
$\theta'_{C',t}$	0.7984
$\theta'_{e,C'}$	0.4856
$\theta'_{F',e}$	0.5144
$\theta'_{i,F'}$	1.7428

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.010	
310	0.090	
320	0.270	
330	0.490	
340	0.670	
350	0.800	
360	0.880	
365		
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	
1000	0.997	
1200	0.998	
1400	0.997	
1600	0.995	
1800	0.985	
2000	0.969	
2200	0.935	
2400	0.840	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	370
Specific Gravity	**d**	4.38		λ_5	310

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.8	-1.3	-1.3	-1.1	-1.0	-0.5	-0.1	
-20 ~ 0	-1.9	-1.4	-1.4	-1.2	-1.0	-0.6	-0.1	
0 ~ 20	-1.9	-1.4	-1.4	-1.2	-1.0	-0.5	-0.1	
20 ~ 40	-2.0	-1.5	-1.4	-1.3	-1.0	-0.6	-0.1	
40 ~ 60	-2.0	-1.4	-1.4	-1.2	-1.0	-0.5	0.0	
60 ~ 80	-1.9	-1.3	-1.3	-1.1	-0.9	-0.4	0.2	

© OHARA GmbH – Hofheim – Germany

S-LAL54

651562
654559

Refractive Index	n_d	**1.65100**	Abbe Number	ν_d	**56.16**	Dispersion	$n_F - n_C$	**0.01159**
	n_e	1.650996		ν_e	55.89		$n_{F'} - n_{C'}$	0.011591
		1.653758						0.011697

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.61893
n_{1970}	1.97009	1.62472
n_{1530}	1.52958	1.63089
n_{1129}	1.12864	1.63634
n_t	1.01398	1.63815
n_s	0.85211	1.64133
$n_{A'}$	0.76819	1.64350
n_r	0.70652	1.64549
n_C	0.65627	**1.64749**
$n_{C'}$	0.64385	1.64804
n_{He-Ne}	0.6328	1.64856
n_D	0.58929	1.65089
n_d	0.58756	**1.65100**
n_e	0.54607	1.65376
n_F	0.48613	**1.65908**
$n_{F'}$	0.47999	1.65974
n_{He-Cd}	0.44157	1.66459
n_g	0.435835	**1.66543**
n_h	0.404656	1.67073
n_i	0.365015	1.67982
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	604
Annealing Point (°C)	**AP**	631
Transformation Temperature (°C)	**Tg**	651
Yield Point (°C)	**At**	675
Softening Point (°C)	**SP**	723
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	71
	(+100~+300°C)	83
Thermal Conductivity (W/m·K)	**k**	0.761

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	877
Rigidity Modulus (10^8N/m^2)	**G**	343
Poisson's Ratio	σ	0.277
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	171
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.66

Partial Dispersions	
$n_C - n_t$	0.009330
$n_C - n_{A'}$	0.003985
$n_d - n_C$	0.003511
$n_e - n_C$	0.006273
$n_g - n_d$	0.014434
$n_g - n_F$	0.006354
$n_h - n_g$	0.005299
$n_i - n_g$	0.014389
$n_{C'} - n_t$	0.009888
$n_e - n_{C'}$	0.005715
$n_{F'} - n_e$	0.005982
$n_i - n_{F'}$	0.020079

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0053
$\Delta\theta_{C,A'}$	-0.0001
$\Delta\theta_{g,d}$	-0.0028
$\Delta\theta_{g,F}$	-0.0024
$\Delta\theta_{i,g}$	-0.0134

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.41910189	
A_2	2.58416881	E-1
A_3	1.07385537	
B_1	7.26647428	E-3
B_2	2.63842499	E-2
B_3	1.02555463	E2
1129 ~ 2325 nm		
A_1	1.41910189	
A_2	2.58416881	E-1
A_3	1.07385537	
B_1	7.26647428	E-3
B_2	2.63842499	E-2
B_3	1.02555463	E2

Chemical Properties		
Water Resistance (Powder Group)	**RW(P)**	3
Acid Resistance (Powder Group)	**RA(P)**	5
Weathering Resistance (Surface Group)	**W(S)**	3
Acid Resistance (Surface Group)	**SR**	53.0
Phosphate Resistance	**PR**	4.2

Relative Partial Dispersions	
$\theta_{C,t}$	0.8049
$\theta_{C,A'}$	0.3438
$\theta_{d,C}$	0.3029
$\theta_{e,C}$	0.5412
$\theta_{g,d}$	1.2453
$\theta_{g,F}$	0.5482
$\theta_{h,g}$	0.4572
$\theta_{i,g}$	1.2414
$\theta'_{C',t}$	0.8453
$\theta'_{e,C'}$	0.4886
$\theta'_{F',e}$	0.5114
$\theta'_{i,F'}$	1.7166

Internal Transmittance			
λ_{80}	356	λ_5	327

CCI		
B	G	R
0.00	0.45	0.43

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.130	
340	0.440	
350	0.710	
360	0.850	
365		
370	0.919	
380	0.953	
390	0.970	
400	0.980	
420	0.988	
440	0.991	
460	0.993	
480	0.995	
500	0.997	
550	0.999	
600	0.998	
650	0.998	
700	0.999	
800	0.999	
900	0.998	
1000	0.998	
1200	0.998	
1400	0.993	
1600	0.993	
1800	0.985	
2000	0.969	
2200	0.913	
2400	0.780	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	3.82		λ_5	33	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.6	0.8	0.8	0.9	1.0	1.4	1.7	
-20 ~ 0	0.7	0.9	0.9	1.0	1.2	1.5	1.8	
0 ~ 20	0.7	1.0	1.0	1.1	1.3	1.6	1.9	
20 ~ 40	0.7	1.1	1.1	1.2	1.4	1.7	2.1	
40 ~ 60	0.8	1.2	1.2	1.3	1.5	1.8	2.2	
60 ~ 80	0.9	1.3	1.3	1.4	1.6	2.0	2.4	

© OHARA GmbH – Hofheim – Germany

S-LAL54Q

651562
654560

Refractive Index	n_d	**1.65100**	Abbe Number	ν_d	**56.24**	Dispersion	$n_F - n_C$ 0.011576
	n_e	1.651000		ν_e	56.02		$n_{F'} - n_{C'}$ 0.011670
		1.653761					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.61532
n_{1970}	1.97009	1.62234
n_{1530}	1.52958	1.62966
n_{1129}	1.12864	1.63584
n_t	1.01398	1.63781
n_s	0.85211	1.64117
$n_{A'}$	0.76819	1.64341
n_r	0.70652	1.64545
n_C	0.65627	**1.64747**
$n_{C'}$	0.64385	1.64803
n_{He-Ne}	0.6328	1.64856
n_D	0.58929	1.65090
n_d	0.58756	**1.65100**
n_e	0.54607	1.65376
n_F	0.48613	**1.65905**
$n_{F'}$	0.47999	1.65970
n_{He-Cd}	0.44157	1.66449
n_g	0.435835	**1.66532**
n_h	0.404656	1.67053
n_i	0.365015	1.67940
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	646
Annealing Point (°C)	**AP**	679
Transformation Temperature (°C)	**Tg**	688
Yield Point (°C)	**At**	718
Softening Point (°C)	**SP**	748
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	43
	(+100~+300°C)	55
Thermal Conductivity (W/m·K)	**k**	0.921

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1019
Rigidity Modulus (10^8N/m^2)	**G**	396
Poisson's Ratio	σ	0.287
Knoop Hardness	**Hk**	680 [7]
Abrasion	**Aa**	53
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.17

Partial Dispersions

$n_C - n_t$	0.009660
$n_C - n_{A'}$	0.004056
$n_d - n_C$	0.003530
$n_e - n_C$	0.006291
$n_g - n_d$	0.014320
$n_g - n_F$	0.006274
$n_h - n_g$	0.005206
$n_i - n_g$	0.014075
$n_{C'} - n_t$	0.010223
$n_e - n_{C'}$	0.005728
$n_{F'} - n_e$	0.005942
$n_i - n_{F'}$	0.019692

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0239
$\Delta\theta_{C,A'}$	0.0064
$\Delta\theta_{g,d}$	-0.0109
$\Delta\theta_{g,F}$	-0.0085
$\Delta\theta_{i,g}$	-0.0382

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.20085087	E-1
A_2	7.58646115	E-1
A_3	1.07073096	
B_1	1.60829667	E-2
B_2	2.92059306	E-3
B_3	8.51211200	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8345
$\theta_{C,A'}$	0.3504
$\theta_{d,C}$	0.3049
$\theta_{e,C}$	0.5435
$\theta_{g,d}$	1.2370
$\theta_{g,F}$	0.5420
$\theta_{h,g}$	0.4497
$\theta_{i,g}$	1.2159
$\theta'_{C',t}$	0.8760
$\theta'_{e,C'}$	0.4908
$\theta'_{F',e}$	0.5092
$\theta'_{i,F'}$	1.6874

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.040	
320	0.110	
330	0.240	
340	0.410	
350	0.580	
360	0.730	
365		
370	0.830	
380	0.900	
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	
1000	0.993	
1200	0.994	
1400	0.976	
1600	0.986	
1800	0.973	
2000	0.942	
2200	0.810	
2400	0.580	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	385
Specific Gravity	**d**	3.36		λ_5	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.9	6.4	6.4	6.5	6.7	7.0	7.3	
-20 ~ 0	5.9	6.3	6.3	6.5	6.6	7.0	7.3	
0 ~ 20	5.9	6.3	6.4	6.5	6.7	7.0	7.4	
20 ~ 40	5.9	6.4	6.4	6.6	6.7	7.1	7.5	
40 ~ 60	6.1	6.5	6.6	6.7	6.9	7.3	7.7	
60 ~ 80	6.3	6.8	6.8	6.9	7.1	7.5	7.9	

© OHARA GmbH – Hofheim – Germany

S-LAL58

694508
697505

Refractive Index	n_d	**1.69350**	Abbe Number	ν_d	**50.81**	Dispersion	$n_F - n_C$	**0.01365**
	n_e	1.693495		ν_e	50.53		$n_{F'} - n_{C'}$	0.013649
		1.696745						0.013789

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.65998
n_{1970}	1.97009	1.66538
n_{1530}	1.52958	1.67133
n_{1129}	1.12864	1.67689
n_t	1.01398	1.67883
n_s	0.85211	1.68233
$n_{A'}$	0.76819	1.68480
n_r	0.70652	1.68709
n_C	0.65627	**1.68939**
$n_{C'}$	0.64385	1.69004
n_{He-Ne}	0.6328	1.69065
n_D	0.58929	1.69337
n_d	0.58756	**1.69350**
n_e	0.54607	1.69675
n_F	0.48613	**1.70304**
$n_{F'}$	0.47999	1.70383
n_{He-Cd}	0.44157	1.70960
n_g	0.435835	**1.71061**
n_h	0.404656	1.71696
n_i	0.365015	1.72788
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	633
Annealing Point (°C)	**AP**	659
Transformation Temperature (°C)	**Tg**	676
Yield Point (°C)	**At**	718
Softening Point (°C)	**SP**	770
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	75
	(+100~+300°C)	86
Thermal Conductivity (W/m·K)	**k**	0.728

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	928
Rigidity Modulus (10^8N/m^2)	**G**	361
Poisson's Ratio	σ	0.285
Knoop Hardness	**Hk**	580 [6]
Abrasion	**Aa**	167
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.7

Partial Dispersions	
$n_C - n_t$	0.010565
$n_C - n_{A'}$	0.004596
$n_d - n_C$	0.004102
$n_e - n_C$	0.007352
$n_g - n_d$	0.017117
$n_g - n_F$	0.007570
$n_h - n_g$	0.006343
$n_i - n_g$	0.017264
$n_{C'} - n_t$	0.011214
$n_e - n_{C'}$	0.006703
$n_{F'} - n_e$	0.007086
$n_i - n_{F'}$	0.024045

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	-0.0111
$\Delta\theta_{C,A'}$	-0.0008
$\Delta\theta_{g,d}$	-0.0051
$\Delta\theta_{g,F}$	-0.0047
$\Delta\theta_{i,g}$	-0.0347

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.06368789	
A_2	7.44939067	E-1
A_3	1.59178942	
B_1	1.85199640	E-2
B_2	1.16295862	E-3
B_3	1.56636025	E2
1129 ~ 2325 nm		
A_1	1.06368789	
A_2	7.44939067	E-1
A_3	1.59178942	
B_1	1.85199640	E-2
B_2	1.16295862	E-3
B_3	1.56636025	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7740
$\theta_{C,A'}$	0.3367
$\theta_{d,C}$	0.3005
$\theta_{e,C}$	0.5386
$\theta_{g,d}$	1.2541
$\theta_{g,F}$	0.5546
$\theta_{h,g}$	0.4647
$\theta_{i,g}$	1.2649
$\theta'_{C',t}$	0.8133
$\theta'_{e,C'}$	0.4861
$\theta'_{F',e}$	0.5139
$\theta'_{i,F'}$	1.7438

Internal Transmittance			
λ_{80}	354	λ_5	322

CCI		
B	G	R
0.00	0.30	0.28

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.020	
330	0.220	
340	0.530	
350	0.750	
360	0.870	
365		
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	
1000	0.998	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.977	
2200	0.942	
2400	0.840	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	4.03		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		2.0	2.1	2.2	2.4	2.9	3.3	
-20 ~ 0		2.1	2.1	2.3	2.4	2.9	3.4	
0 ~ 20		2.1	2.1	2.3	2.5	2.9	3.4	
20 ~ 40		2.1	2.1	2.3	2.5	3.0	3.5	
40 ~ 60		2.1	2.1	2.3	2.5	3.0	3.5	
60 ~ 80		2.1	2.1	2.3	2.6	3.1	3.6	

© OHARA GmbH – Hofheim – Germany

S-LAL59

734515
737512

Refractive Index	n_d	**1.73400**	Abbe Number	ν_d	**51.47**	Dispersion	$n_F - n_C$	**0.01426**
	n_e	1.737395		ν_e	51.24		$n_{F'} - n_{C'}$	0.014392
		1.733997						0.014261

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.69393
n_{1970}	1.97009	1.70130
n_{1530}	1.52958	1.70911
n_{1129}	1.12864	1.71593
n_t	1.01398	1.71817
n_s	0.85211	1.72210
$n_{A'}$	0.76819	1.72477
n_r	0.70652	1.72723
n_C	0.65627	**1.72968**
$n_{C'}$	0.64385	1.73036
n_{He-Ne}	0.6328	1.73101
n_D	0.58929	1.73387
n_d	0.58756	**1.73400**
n_e	0.54607	1.73739
n_F	0.48613	**1.74394**
$n_{F'}$	0.47999	1.74476
n_{He-Cd}	0.44157	1.75072
n_g	0.435835	**1.75176**
n_h	0.404656	1.75829
n_i	0.365015	1.76950
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	591
Annealing Point (°C)	**AP**	620
Transformation Temperature (°C)	**Tg**	635
Yield Point (°C)	**At**	663
Softening Point (°C)	**SP**	696
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	55
	(+100~+300°C)	68
Thermal Conductivity (W/m·K)	**k**	0.863

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1137
Rigidity Modulus (10^8N/m^2)	**G**	440
Poisson's Ratio	σ	0.293
Knoop Hardness	**Hk**	700 [7]
Abrasion	**Aa**	77
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.87

Partial Dispersions

$n_C - n_t$	0.011504
$n_C - n_{A'}$	0.004905
$n_d - n_C$	0.004318
$n_e - n_C$	0.007716
$n_g - n_d$	0.017767
$n_g - n_F$	0.007824
$n_h - n_g$	0.006531
$n_i - n_g$	0.017734
$n_{C'} - n_t$	0.012190
$n_e - n_{C'}$	0.007030
$n_{F'} - n_e$	0.007362
$n_i - n_{F'}$	0.024741

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0185
$\Delta\theta_{C,A'}$	0.0056
$\Delta\theta_{g,d}$	-0.0120
$\Delta\theta_{g,F}$	-0.0096
$\Delta\theta_{i,g}$	-0.0505

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.13962742	
A_2	8.05227838	E-1
A_3	1.29488061	
B_1	4.93294862	E-3
B_2	2.02479960	E-2
B_3	9.34746507	E1
1129 ~ 2325 nm		
A_1	1.13962742	
A_2	8.05227838	E-1
A_3	1.29488061	
B_1	4.93294862	E-3
B_2	2.02479960	E-2
B_3	9.34746507	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8067
$\theta_{C,A'}$	0.3439
$\theta_{d,C}$	0.3028
$\theta_{e,C}$	0.5411
$\theta_{g,d}$	1.2458
$\theta_{g,F}$	0.5486
$\theta_{h,g}$	0.4580
$\theta_{i,g}$	1.2435
$\theta'_{C',t}$	0.8470
$\theta'_{e,C'}$	0.4885
$\theta'_{F',e}$	0.5115
$\theta'_{i,F'}$	1.7191

Internal Transmittance

λ_{80}	347	λ_5	283

CCI

B	G	R
0.00	0.36	0.33

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.020	
290	0.110	
300	0.200	
310	0.340	
320	0.480	
330	0.620	
340	0.740	
350	0.830	
360	0.890	
365		
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	
1000	0.997	
1200	0.997	
1400	0.994	
1600	0.994	
1800	0.986	
2000	0.964	
2200	0.905	
2400	0.650	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	4.04		λ_5	29	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		5.0		5.2	5.4	5.8	6.3	
-20 ~ 0		5.2		5.4	5.6	6.0	6.5	
0 ~ 20		5.5		5.7	5.9	6.3	6.8	
20 ~ 40		5.7		6.0	6.2	6.7	7.2	
40 ~ 60		6.1		6.3	6.5	7.1	7.6	
60 ~ 80		6.4		6.7	6.9	7.5	8.0	

© OHARA GmbH – Hofheim – Germany

S-LAL61

741527
744524

Refractive Index	n_d	**1.74100**	Abbe Number	ν_d	**52.64**	Dispersion	$n_F - n_C$	**0.01407**
	n_e	1.740999		ν_e	52.41		$n_{F'} - n_{C'}$	0.014078
		1.744354						0.014203

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70016
n_{1970}	1.97009	1.70787
n_{1530}	1.52958	1.71598
n_{1129}	1.12864	1.72297
n_t	1.01398	1.72525
n_s	0.85211	1.72918
$n_{A'}$	0.76819	1.73186
n_r	0.70652	1.73430
n_C	0.65627	**1.73673**
$n_{C'}$	0.64385	1.73741
n_{He-Ne}	0.6328	1.73804
n_D	0.58929	1.74087
n_d	0.58756	**1.74100**
n_e	0.54607	1.74435
n_F	0.48613	**1.75080**
$n_{F'}$	0.47999	1.75161
n_{He-Cd}	0.44157	1.75748
n_g	0.435835	**1.75850**
n_h	0.404656	1.76491
n_i	0.365015	1.77589
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	631
Annealing Point (°C)	**AP**	646
Transformation Temperature (°C)	**Tg**	653
Yield Point (°C)	**At**	688
Softening Point (°C)	**SP**	724
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	57
	(+100~+300°C)	70
Thermal Conductivity (W/m·K)	**k**	0.861

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1190
Rigidity Modulus (10^8N/m^2)	**G**	461
Poisson's Ratio	σ	0.291
Knoop Hardness	**Hk**	720 [7]
Abrasion	**Aa**	65
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.55

Partial Dispersions

$n_C - n_t$	0.011481
$n_C - n_{A'}$	0.004871
$n_d - n_C$	0.004272
$n_e - n_C$	0.007627
$n_g - n_d$	0.017502
$n_g - n_F$	0.007696
$n_h - n_g$	0.006413
$n_i - n_g$	0.017393
$n_{C'} - n_t$	0.012160
$n_e - n_{C'}$	0.006948
$n_{F'} - n_e$	0.007255
$n_i - n_{F'}$	0.024285

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0218
$\Delta\theta_{C,A'}$	0.0063
$\Delta\theta_{g,d}$	-0.0122
$\Delta\theta_{g,F}$	-0.0096
$\Delta\theta_{i,g}$	-0.0487

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.11073292	
A_2	8.59347773	E-1
A_3	1.26707433	
B_1	4.64181248	E-3
B_2	1.92989261	E-2
B_3	8.73917698	E1
1129 ~ 2325 nm		
A_1	1.11073292	
A_2	8.59347773	E-1
A_3	1.26707433	
B_1	4.64181248	E-3
B_2	1.92989261	E-2
B_3	8.73917698	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8155
$\theta_{C,A'}$	0.3460
$\theta_{d,C}$	0.3035
$\theta_{e,C}$	0.5418
$\theta_{g,d}$	1.2432
$\theta_{g,F}$	0.5467
$\theta_{h,g}$	0.4555
$\theta_{i,g}$	1.2355
$\theta'_{C',t}$	0.8562
$\theta'_{e,C'}$	0.4892
$\theta'_{F',e}$	0.5108
$\theta'_{i,F'}$	1.7099

Internal Transmittance

λ_{80}	358	λ_5	296

CCI

B	G	R
0.00	0.58	0.59

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.020	
300	0.070	
310	0.150	
320	0.270	
330	0.430	
340	0.590	
350	0.720	
360	0.820	
365		
370	0.890	
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.994	
1800	0.985	
2000	0.959	
2200	0.880	
2400	0.620	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37		
Specific Gravity	**d**	4.04		λ_5	29		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.7	3.7	3.9	4.0	4.4	4.8	
-20 ~ 0	3.4	3.8	3.9	4.0	4.2	4.6	5.0	
0 ~ 20	3.5	3.9	4.0	4.1	4.3	4.7	5.1	
20 ~ 40	3.6	4.1	4.1	4.2	4.4	4.9	5.3	
40 ~ 60	3.7	4.2	4.2	4.4	4.6	5.0	5.5	
60 ~ 80	3.8	4.3	4.3	4.5	4.7	5.2	5.6	

© OHARA GmbH – Hofheim – Germany

S-LAM2

744448
748445

Refractive Index	n_d	**1.74400**	Abbe Number	ν_d	**44.78**	Dispersion	$n_F - n_C$	**0.01661**
	n_e	1.747946		ν_e	44.50		$n_{F'} - n_{C'}$	0.016806
		1.743997						0.016613

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70597
n_{1970}	1.97009	1.71177
n_{1530}	1.52958	1.71820
n_{1129}	1.12864	1.72436
n_t	1.01398	1.72658
n_s	0.85211	1.73065
$n_{A'}$	0.76819	1.73356
n_r	0.70652	1.73629
n_C	0.65627	**1.73905**
$n_{C'}$	0.64385	1.73983
n_{He-Ne}	0.6328	1.74056
n_D	0.58929	1.74385
n_d	0.58756	**1.74400**
n_e	0.54607	1.74795
n_F	0.48613	**1.75566**
$n_{F'}$	0.47999	1.75663
n_{He-Cd}	0.44157	1.76380
n_g	0.435835	**1.76506**
n_h	0.404656	1.77304
n_i	0.365015	1.78708
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	590
Annealing Point (°C)	**AP**	617
Transformation Temperature (°C)	**Tg**	633
Yield Point (°C)	**At**	670
Softening Point (°C)	**SP**	711
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	74
	(+100~+300°C)	87
Thermal Conductivity (W/m·K)	**k**	0.698

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	935
Rigidity Modulus (10^8N/m^2)	**G**	361
Poisson's Ratio	σ	0.295
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	158
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.72

Partial Dispersions

$n_C - n_t$	0.012472
$n_C - n_{A'}$	0.005488
$n_d - n_C$	0.004949
$n_e - n_C$	0.008898
$n_g - n_d$	0.021058
$n_g - n_F$	0.009394
$n_h - n_g$	0.007986
$n_i - n_g$	0.022027
$n_{C'} - n_t$	0.013252
$n_e - n_{C'}$	0.008118
$n_{F'} - n_e$	0.008688
$n_i - n_{F'}$	0.030448

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0061
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	-0.0041
$\Delta\theta_{g,F}$	-0.0035
$\Delta\theta_{i,g}$	-0.0242

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.77130000	
A_2	1.95814230	E-1
A_3	1.19487834	
B_1	9.76652444	E-3
B_2	4.12718628	E-2
B_3	1.10458122	E2
1129 ~ 2325 nm		
A_1	1.77130000	
A_2	1.95814230	E-1
A_3	1.19487834	
B_1	9.76652444	E-3
B_2	4.12718628	E-2
B_3	1.10458122	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7507
$\theta_{C,A'}$	0.3303
$\theta_{d,C}$	0.2979
$\theta_{e,C}$	0.5356
$\theta_{g,d}$	1.2676
$\theta_{g,F}$	0.5655
$\theta_{h,g}$	0.4807
$\theta_{i,g}$	1.3259
$\theta'_{C',t}$	0.7885
$\theta'_{e,C'}$	0.4830
$\theta'_{F',e}$	0.5170
$\theta'_{i,F'}$	1.8117

Internal Transmittance

λ_{80}	372	λ_5	340

CCI

B	G	R
0.00	1.00	1.02

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.040	
350	0.290	
360	0.590	
365		
370	0.780	
380	0.870	
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	
1000	0.997	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.971	
2200	0.928	
2400	0.790	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	4.32		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.9	2.5	2.5	2.7	3.0	3.5	4.1	
-20 ~ 0	2.0	2.6	2.6	2.8	3.1	3.7	4.3	
0 ~ 20	2.0	2.6	2.7	2.9	3.2	3.8	4.5	
20 ~ 40	2.1	2.7	2.8	3.0	3.3	3.9	4.6	
40 ~ 60	2.2	2.8	2.8	3.1	3.4	4.1	4.8	
60 ~ 80	2.2	2.9	2.9	3.2	3.5	4.2	4.9	

© OHARA GmbH – Hofheim – Germany

S-LAM3

717479
721476

Refractive Index	n_d	**1.71700**	Abbe Number	ν_d	**47.92**	Dispersion	$n_F - n_C$	**0.01496**
	n_e	1.720563		ν_e	47.64		$n_{F'} - n_{C'}$	0.015124
		1.717004						0.014961

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68133
n_{1970}	1.97009	1.68699
n_{1530}	1.52958	1.69320
n_{1129}	1.12864	1.69905
n_t	1.01398	1.70111
n_s	0.85211	1.70488
$n_{A'}$	0.76819	1.70754
n_r	0.70652	1.71002
n_C	0.65627	**1.71253**
$n_{C'}$	0.64385	1.71323
n_{He-Ne}	0.6328	1.71390
n_D	0.58929	1.71687
n_d	0.58756	**1.71700**
n_e	0.54607	1.72056
n_F	0.48613	**1.72749**
$n_{F'}$	0.47999	1.72836
n_{He-Cd}	0.44157	1.73475
n_g	0.435835	**1.73587**
n_h	0.404656	1.74296
n_i	0.365015	1.75531
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	588
Annealing Point (°C)	**AP**	614
Transformation Temperature (°C)	**Tg**	630
Yield Point (°C)	**At**	661
Softening Point (°C)	**SP**	701
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	80
	(+100~+300°C)	94
Thermal Conductivity (W/m·K)	**k**	0.655

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	868
Rigidity Modulus (10^8N/m^2)	**G**	335
Poisson's Ratio	σ	0.294
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	202
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.51

Partial Dispersions

$n_C - n_t$	0.011413
$n_C - n_{A'}$	0.004990
$n_d - n_C$	0.004476
$n_e - n_C$	0.008035
$n_g - n_d$	0.018871
$n_g - n_F$	0.008386
$n_h - n_g$	0.007085
$n_i - n_g$	0.019433
$n_{C'} - n_t$	0.012120
$n_e - n_{C'}$	0.007328
$n_{F'} - n_e$	0.007796
$n_i - n_{F'}$	0.026949

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0086
$\Delta\theta_{C,A'}$	-0.0004
$\Delta\theta_{g,d}$	-0.0039
$\Delta\theta_{g,F}$	-0.0034
$\Delta\theta_{i,g}$	-0.0249

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.64258713	
A_2	2.39634610	E-1
A_3	1.22483026	
B_1	8.68246020	E-3
B_2	3.51226242	E-2
B_3	1.16604369	E2
1129 ~ 2325 nm		
A_1	1.64258713	
A_2	2.39634610	E-1
A_3	1.22483026	
B_1	8.68246020	E-3
B_2	3.51226242	E-2
B_3	1.16604369	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7629
$\theta_{C,A'}$	0.3335
$\theta_{d,C}$	0.2992
$\theta_{e,C}$	0.5371
$\theta_{g,d}$	1.2613
$\theta_{g,F}$	0.5605
$\theta_{h,g}$	0.4736
$\theta_{i,g}$	1.2989
$\theta'_{C',t}$	0.8014
$\theta'_{e,C'}$	0.4845
$\theta'_{F',e}$	0.5155
$\theta'_{i,F'}$	1.7819

Internal Transmittance

λ_{80}	368	λ_5	338

CCI

B	G	R
0.00	0.65	0.63

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.100	
350	0.410	
360	0.690	
365		
370	0.830	
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	
1000	0.997	
1200	0.996	
1400	0.994	
1600	0.992	
1800	0.983	
2000	0.966	
2200	0.920	
2400	0.770	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38		
Specific Gravity	**d**	4.25		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.8	-0.5	-0.5	-0.3	-0.1	0.3	0.8	
-20 ~ 0	-0.8	-0.4	-0.4	-0.3		0.4	0.9	
0 ~ 20	-0.8	-0.4	-0.4	-0.2		0.5	1.0	
20 ~ 40	-0.8	-0.4	-0.3	-0.2	0.1	0.6	1.1	
40 ~ 60	-0.8	-0.3	-0.3	-0.1	0.1	0.7	1.2	
60 ~ 80	-0.8	-0.3	-0.3	-0.1	0.2	0.7	1.3	

© OHARA GmbH – Hofheim – Germany

S-LAM7

750353
755350

Refractive Index	n_d	**1.74950**	Abbe Number	ν_d	**35.28**	Dispersion	$n_F - n_C$	**0.02124**
	n_e	1.754527		ν_e	35.02		$n_{F'} - n_{C'}$	0.021544
		1.749497						0.021243

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70583
n_{1970}	1.97009	1.71184
n_{1530}	1.52958	1.71866
n_{1129}	1.12864	1.72553
n_t	1.01398	1.72811
n_s	0.85211	1.73296
$n_{A'}$	0.76819	1.73649
n_r	0.70652	1.73984
n_C	0.65627	**1.74328**
$n_{C'}$	0.64385	1.74425
n_{He-Ne}	0.6328	1.74517
n_D	0.58929	1.74931
n_d	0.58756	**1.74950**
n_e	0.54607	1.75453
n_F	0.48613	**1.76452**
$n_{F'}$	0.47999	1.76579
n_{He-Cd}	0.44157	1.77530
n_g	0.435835	**1.77699**
n_h	0.404656	1.78787
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	583
Annealing Point (°C)	**AP**	615
Transformation Temperature (°C)	**Tg**	628
Yield Point (°C)	**At**	673
Softening Point (°C)	**SP**	739
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	67
	(+100~+300°C)	79
Thermal Conductivity (W/m·K)	**k**	0.871

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	970
Rigidity Modulus (10^8N/m^2)	**G**	381
Poisson's Ratio	σ	0.273
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	147
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.53

Partial Dispersions

$n_C - n_t$	0.015167
$n_C - n_{A'}$	0.006783
$n_d - n_C$	0.006222
$n_e - n_C$	0.011252
$n_g - n_d$	0.027489
$n_g - n_F$	0.012468
$n_h - n_g$	0.010884
$n_i - n_g$	
$n_{C'} - n_t$	0.016141
$n_e - n_{C'}$	0.010278
$n_{F'} - n_e$	0.011266
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0018
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0026
$\Delta\theta_{g,F}$	0.0025
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.71014712	
A_2	2.56943292	E-1
A_3	1.63986271	
B_1	1.05161080	E-2
B_2	5.02809636	E-2
B_3	1.46181217	E2
1129 ~ 2325 nm		
A_1	1.71014712	
A_2	2.56943292	E-1
A_3	1.63986271	
B_1	1.05161080	E-2
B_2	5.02809636	E-2
B_3	1.46181217	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7140
$\theta_{C,A'}$	0.3193
$\theta_{d,C}$	0.2929
$\theta_{e,C}$	0.5297
$\theta_{g,d}$	1.2940
$\theta_{g,F}$	0.5869
$\theta_{h,g}$	0.5124
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7492
$\theta'_{e,C'}$	0.4771
$\theta'_{F',e}$	0.5229
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	396	λ_5	359

CCI

B	G	R
0.00	2.84	2.97

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.080	
365		
370	0.340	
380	0.590	
390	0.750	
400	0.840	
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	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.996	
1800	0.990	
2000	0.982	
2200	0.950	
2400	0.880	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42
Specific Gravity	**d**	3.81		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.2	5.0	5.1	5.3	5.7	6.5	7.5	
-20 ~ 0	4.4	5.2	5.2	5.5	5.9	6.7	7.7	
0 ~ 20	4.4	5.3	5.3	5.6	6.0	6.9	8.0	
20 ~ 40	4.5	5.4	5.5	5.8	6.2	7.1	8.2	
40 ~ 60	4.6	5.5	5.6	6.0	6.3	7.3	8.4	
60 ~ 80	4.6	5.6	5.7	6.2	6.5	7.5	8.7	

© OHARA GmbH – Hofheim – Germany

S-LAM52

720437
724434

Refractive Index	n_d	**1.72000**	Abbe Number	ν_d	**43.69**	Dispersion	$n_F - n_C$	**0.01648**
	n_e	1.723914		ν_e	43.40		$n_{F'} - n_{C'}$	0.016679
		1.720000						0.016480

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68281
n_{1970}	1.97009	1.68840
n_{1530}	1.52958	1.69463
n_{1129}	1.12864	1.70065
n_t	1.01398	1.70282
n_s	0.85211	1.70683
$n_{A'}$	0.76819	1.70969
n_r	0.70652	1.71238
n_C	0.65627	**1.71511**
$n_{C'}$	0.64385	1.71588
n_{He-Ne}	0.6328	1.71660
n_D	0.58929	1.71986
n_d	0.58756	**1.72000**
n_e	0.54607	1.72391
n_F	0.48613	**1.73159**
$n_{F'}$	0.47999	1.73256
n_{He-Cd}	0.44157	1.73972
n_g	0.435835	**1.74098**
n_h	0.404656	1.74901
n_i	0.365015	1.76328
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	604
Annealing Point (°C)	**AP**	632
Transformation Temperature (°C)	**Tg**	644
Yield Point (°C)	**At**	685
Softening Point (°C)	**SP**	743
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	77
	(+100~+300°C)	88
Thermal Conductivity (W/m·K)	**k**	0.801

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	957
Rigidity Modulus (10^8N/m^2)	**G**	374
Poisson's Ratio	σ	0.278
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	160
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.53

Partial Dispersions

$n_C - n_t$	0.012285
$n_C - n_{A'}$	0.005415
$n_d - n_C$	0.004895
$n_e - n_C$	0.008809
$n_g - n_d$	0.020977
$n_g - n_F$	0.009392
$n_h - n_g$	0.008035
$n_i - n_g$	0.022303
$n_{C'} - n_t$	0.013056
$n_e - n_{C'}$	0.008038
$n_{F'} - n_e$	0.008641
$n_i - n_{F'}$	0.030725

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0063
$\Delta\theta_{C,A'}$	-0.0002
$\Delta\theta_{g,d}$	-0.0011
$\Delta\theta_{g,F}$	-0.0009
$\Delta\theta_{i,g}$	-0.0059

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.73442942	
A_2	1.51553910	E-1
A_3	1.46225433	
B_1	1.00690928	E-2
B_2	4.70634701	E-2
B_3	1.40084396	E2
1129 ~ 2325 nm		
A_1	1.73442942	
A_2	1.51553910	E-1
A_3	1.46225433	
B_1	1.00690928	E-2
B_2	4.70634701	E-2
B_3	1.40084396	E2

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**	1.2

Relative Partial Dispersions

$\theta_{C,t}$	0.7454
$\theta_{C,A'}$	0.3286
$\theta_{d,C}$	0.2970
$\theta_{e,C}$	0.5345
$\theta_{g,d}$	1.2729
$\theta_{g,F}$	0.5699
$\theta_{h,g}$	0.4876
$\theta_{i,g}$	1.3533
$\theta'_{C',t}$	0.7828
$\theta'_{e,C'}$	0.4819
$\theta'_{F',e}$	0.5181
$\theta'_{i,F'}$	1.8421

Internal Transmittance

λ_{80}	380	λ_5	348

CCI

B	G	R
0.00	1.40	1.41

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.100	
360	0.390	
365		
370	0.650	
380	0.800	
390	0.880	
400	0.930	
420	0.965	
440	0.977	
460	0.984	
480	0.988	
500	0.992	
550	0.996	
600	0.996	
650	0.995	
700	0.997	
800	0.998	
900	0.997	
1000	0.997	
1200	0.998	
1400	0.997	
1600	0.996	
1800	0.990	
2000	0.979	
2200	0.947	
2400	0.850	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40
Specific Gravity	**d**	3.95		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.1	1.6	1.6	1.8	2.0	2.6	3.2	
-20 ~ 0	1.1	1.6	1.7	1.9	2.1	2.7	3.3	
0 ~ 20	1.1	1.7	1.8	2.0	2.2	2.8	3.5	
20 ~ 40	1.1	1.8	1.8	2.0	2.3	3.0	3.6	
40 ~ 60	1.2	1.9	1.9	2.1	2.4	3.1	3.8	
60 ~ 80	1.2	1.9	2.0	2.2	2.5	3.2	3.9	

© OHARA GmbH – Hofheim – Germany

S-LAM54

757478
761476

Refractive Index	n_d	**1.75700**	Abbe Number	ν_d	**47.82**	Dispersion	$n_F - n_C$	**0.01583**
	n_e	1.760765		ν_e	47.57		$n_{F'} - n_{C'}$	0.015991
		1.756998						0.015830

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.71415
n_{1970}	1.97009	1.72188
n_{1530}	1.52958	1.73007
n_{1129}	1.12864	1.73729
n_t	1.01398	1.73970
n_s	0.85211	1.74394
$n_{A'}$	0.76819	1.74686
n_r	0.70652	1.74954
n_C	0.65627	**1.75223**
$n_{C'}$	0.64385	1.75299
n_{He-Ne}	0.6328	1.75370
n_D	0.58929	1.75686
n_d	0.58756	**1.75700**
n_e	0.54607	1.76076
n_F	0.48613	**1.76806**
$n_{F'}$	0.47999	1.76898
n_{He-Cd}	0.44157	1.77570
n_g	0.435835	**1.77687**
n_h	0.404656	1.78431
n_i	0.365015	1.79726
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	614
Annealing Point (°C)	**AP**	637
Transformation Temperature (°C)	**Tg**	664
Yield Point (°C)	**At**	687
Softening Point (°C)	**SP**	721
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	57
	(+100~+300°C)	69
Thermal Conductivity (W/m·K)	**k**	0.891

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1172
Rigidity Modulus (10^8N/m^2)	**G**	454
Poisson's Ratio	σ	0.292
Knoop Hardness	**Hk**	700 [7]
Abrasion	**Aa**	62
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.7

Partial Dispersions

$n_C - n_t$	0.012530
$n_C - n_{A'}$	0.005376
$n_d - n_C$	0.004764
$n_e - n_C$	0.008531
$n_g - n_d$	0.019876
$n_g - n_F$	0.008810
$n_h - n_g$	0.007433
$n_i - n_g$	0.020388
$n_{C'} - n_t$	0.013285
$n_e - n_{C'}$	0.007776
$n_{F'} - n_e$	0.008215
$n_i - n_{F'}$	0.028282

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0205
$\Delta\theta_{C,A'}$	0.0058
$\Delta\theta_{g,d}$	-0.0098
$\Delta\theta_{g,F}$	-0.0076
$\Delta\theta_{i,g}$	-0.0367

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.84213306	
A_2	1.75468631	E-1
A_3	1.25750878	
B_1	9.43993220	E-3
B_2	3.95281122	E-2
B_3	8.65463013	E1
1129 ~ 2325 nm		
A_1	1.84213306	
A_2	1.75468631	E-1
A_3	1.25750878	
B_1	9.43993220	E-3
B_2	3.95281122	E-2
B_3	8.65463013	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7915
$\theta_{C,A'}$	0.3396
$\theta_{d,C}$	0.3009
$\theta_{e,C}$	0.5389
$\theta_{g,d}$	1.2556
$\theta_{g,F}$	0.5565
$\theta_{h,g}$	0.4696
$\theta_{i,g}$	1.2879
$\theta'_{C',t}$	0.8308
$\theta'_{e,C'}$	0.4863
$\theta'_{F',e}$	0.5137
$\theta'_{i,F'}$	1.7686

Internal Transmittance

λ_{80}	369	λ_5	340

CCI

B	G	R
0.00	0.75	0.80

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.050	
350	0.330	
360	0.650	
365		
370	0.820	
380	0.909	
390	0.945	
400	0.963	
420	0.979	
440	0.985	
460	0.990	
480	0.993	
500	0.995	
550	0.997	
600	0.997	
650	0.998	
700	0.998	
800	0.999	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.991	
1600	0.991	
1800	0.981	
2000	0.954	
2200	0.870	
2400	0.620	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39
Specific Gravity	**d**	4.08		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.8	4.2	4.3	4.4	4.7	5.1	5.6	
-20 ~ 0	4.0	4.4	4.5	4.7	4.9	5.4	5.9	
0 ~ 20	4.2	4.7	4.7	4.9	5.1	5.6	6.2	
20 ~ 40	4.4	4.9	4.9	5.1	5.3	5.9	6.4	
40 ~ 60	4.5	5.1	5.1	5.3	5.6	6.1	6.7	
60 ~ 80	4.7	5.3	5.3	5.5	5.8	6.4	7.0	

© OHARA GmbH – Hofheim – Germany

S-LAM55

762401
767398

Refractive Index	n_d	**1.76200**	Abbe Number	ν_d	**40.10**	Dispersion	$n_F - n_C$	**0.01900**
	n_e	1.766509		ν_e	39.82		$n_{F'} - n_{C'}$	0.019247
		1.762001						0.019003

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.72020
n_{1970}	1.97009	1.72640
n_{1530}	1.52958	1.73328
n_{1129}	1.12864	1.73998
n_t	1.01398	1.74242
n_s	0.85211	1.74695
$n_{A'}$	0.76819	1.75020
n_r	0.70652	1.75327
n_C	0.65627	**1.75639**
$n_{C'}$	0.64385	1.75727
n_{He-Ne}	0.6328	1.75810
n_D	0.58929	1.76183
n_d	0.58756	**1.76200**
n_e	0.54607	1.76651
n_F	0.48613	**1.77539**
$n_{F'}$	0.47999	1.77652
n_{He-Cd}	0.44157	1.78487
n_g	0.435835	**1.78634**
n_h	0.404656	1.79580
n_i	0.365015	1.81280
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	589
Annealing Point (°C)	**AP**	617
Transformation Temperature (°C)	**Tg**	632
Yield Point (°C)	**At**	662
Softening Point (°C)	**SP**	709
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	71
	(+100~+300°C)	84
Thermal Conductivity (W/m·K)	**k**	0.741

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	967
Rigidity Modulus (10^8N/m^2)	**G**	374
Poisson's Ratio	σ	0.292
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	145
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.88

Partial Dispersions

$n_C - n_t$	0.013960
$n_C - n_{A'}$	0.006182
$n_d - n_C$	0.005616
$n_e - n_C$	0.010124
$n_g - n_d$	0.024342
$n_g - n_F$	0.010955
$n_h - n_g$	0.009453
$n_i - n_g$	0.026457
$n_{C'} - n_t$	0.014843
$n_e - n_{C'}$	0.009241
$n_{F'} - n_e$	0.010006
$n_i - n_{F'}$	0.036285

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0002
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	-0.0004
$\Delta\theta_{g,F}$	-0.0001
$\Delta\theta_{i,g}$	0.0031

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.85412979	
A_2	1.65450323	E-1
A_3	1.27255422	
B_1	1.08438152	E-2
B_2	5.14050980	E-2
B_3	1.09986837	E2
1129 ~ 2325 nm		
A_1	1.85412979	
A_2	1.65450323	E-1
A_3	1.27255422	
B_1	1.08438152	E-2
B_2	5.14050980	E-2
B_3	1.09986837	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7346
$\theta_{C,A'}$	0.3253
$\theta_{d,C}$	0.2955
$\theta_{e,C}$	0.5328
$\theta_{g,d}$	1.2810
$\theta_{g,F}$	0.5765
$\theta_{h,g}$	0.4974
$\theta_{i,g}$	1.3923
$\theta'_{C',t}$	0.7712
$\theta'_{e,C'}$	0.4801
$\theta'_{F',e}$	0.5199
$\theta'_{i,F'}$	1.8852

Internal Transmittance

λ_{80}	378	λ_5	350

CCI

B	G	R
0.00	1.43	1.46

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.060	
360	0.370	
365		
370	0.670	
380	0.820	
390	0.890	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.994	
1800	0.986	
2000	0.970	
2200	0.923	
2400	0.780	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40		
Specific Gravity	**d**	4.22		λ_5	35		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.5	3.1	3.1	3.3	3.6	4.3	5.1	
-20 ~ 0	2.6	3.2	3.2	3.5	3.8	4.5	5.3	
0 ~ 20	2.6	3.3	3.3	3.6	3.9	4.7	5.5	
20 ~ 40	2.7	3.4	3.4	3.7	4.0	4.8	5.7	
40 ~ 60	2.8	3.5	3.5	3.8	4.2	5.0	5.9	
60 ~ 80	2.8	3.6	3.6	3.9	4.3	5.2	6.1	

© OHARA GmbH – Hofheim – Germany

S-LAM58

720420
724417

Refractive Index	n_d	**1.72000**	Abbe Number	ν_d	**41.98**	Dispersion	$n_F - n_C$	**0.01715**
	n_e	1.720000		ν_e	41.69		$n_{F'} - n_{C'}$	0.017152
		1.724072						0.017366

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68205
n_{1970}	1.97009	1.68764
n_{1530}	1.52958	1.69390
n_{1129}	1.12864	1.70001
n_t	1.01398	1.70224
n_s	0.85211	1.70636
$n_{A'}$	0.76819	1.70931
n_r	0.70652	1.71209
n_C	0.65627	**1.71492**
$n_{C'}$	0.64385	1.71572
n_{He-Ne}	0.6328	1.71647
n_D	0.58929	1.71985
n_d	0.58756	**1.72000**
n_e	0.54607	1.72407
n_F	0.48613	**1.73207**
$n_{F'}$	0.47999	1.73308
n_{He-Cd}	0.44157	1.74058
n_g	0.435835	**1.74190**
n_h	0.404656	1.75033
n_i	0.365015	1.76538
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	632
Annealing Point (°C)	**AP**	658
Transformation Temperature (°C)	**Tg**	681
Yield Point (°C)	**At**	726
Softening Point (°C)	**SP**	791
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	66
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.771

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	919
Rigidity Modulus (10^8N/m^2)	**G**	359
Poisson's Ratio	σ	0.279
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	151
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.03

Partial Dispersions

$n_C - n_t$	0.012680
$n_C - n_{A'}$	0.005606
$n_d - n_C$	0.005081
$n_e - n_C$	0.009153
$n_g - n_d$	0.021898
$n_g - n_F$	0.009827
$n_h - n_g$	0.008436
$n_i - n_g$	0.023484
$n_{C'} - n_t$	0.013479
$n_e - n_{C'}$	0.008354
$n_{F'} - n_e$	0.009012
$n_i - n_{F'}$	0.032298

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0043
$\Delta\theta_{C,A'}$	0.0001
$\Delta\theta_{g,d}$	-0.0008
$\Delta\theta_{g,F}$	-0.0006
$\Delta\theta_{i,g}$	-0.0043

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.70984856	
A_2	1.73342897	E-1
A_3	1.64833565	
B_1	1.00852127	E-2
B_2	4.70890831	E-2
B_3	1.57468520	E2
1129 ~ 2325 nm		
A_1	1.70984856	
A_2	1.73342897	E-1
A_3	1.64833565	
B_1	1.00852127	E-2
B_2	4.70890831	E-2
B_3	1.57468520	E2

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7393
$\theta_{C,A'}$	0.3268
$\theta_{d,C}$	0.2962
$\theta_{e,C}$	0.5336
$\theta_{g,d}$	1.2767
$\theta_{g,F}$	0.5729
$\theta_{h,g}$	0.4918
$\theta_{i,g}$	1.3692
$\theta'_{C',t}$	0.7762
$\theta'_{e,C'}$	0.4811
$\theta'_{F',e}$	0.5189
$\theta'_{i,F'}$	1.8598

Internal Transmittance

λ_{80}	385	λ_5	350

CCI

B	G	R
0.00	1.68	1.70

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.040	
360	0.270	
365		
370	0.550	
380	0.740	
390	0.850	
400	0.911	
420	0.960	
440	0.976	
460	0.983	
480	0.988	
500	0.991	
550	0.996	
600	0.996	
650	0.995	
700	0.997	
800	0.998	
900	0.998	
1000	0.998	
1200	0.999	
1400	0.997	
1600	0.997	
1800	0.992	
2000	0.984	
2200	0.956	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41		
Specific Gravity	**d**	4.00		λ_5	35		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.9	3.9	4.1	4.4	5.0	5.7	
-20 ~ 0	3.4	4.0	4.0	4.3	4.6	5.2	5.9	
0 ~ 20	3.4	4.1	4.2	4.4	4.7	5.4	6.1	
20 ~ 40	3.6	4.3	4.3	4.6	4.9	5.6	6.3	
40 ~ 60	3.6	4.4	4.5	4.7	5.0	5.7	6.5	
60 ~ 80	3.7	4.5	4.6	4.8	5.2	5.9	6.8	

© OHARA GmbH – Hofheim – Germany

S-LAM59

697485
700482

Refractive Index	n_d	**1.69700**	Abbe Number	ν_d	**48.52**	Dispersion	$n_F - n_C$	**0.01436**
	n_e	1.697002		ν_e	48.24		$n_{F'} - n_{C'}$	0.014366
		1.700421						0.014521

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.66174
n_{1970}	1.97009	1.66748
n_{1530}	1.52958	1.67376
n_{1129}	1.12864	1.67959
n_t	1.01398	1.68163
n_s	0.85211	1.68530
$n_{A'}$	0.76819	1.68788
n_r	0.70652	1.69028
n_C	0.65627	**1.69270**
$n_{C'}$	0.64385	1.69338
n_{He-Ne}	0.6328	1.69401
n_D	0.58929	1.69688
n_d	0.58756	**1.69700**
n_e	0.54607	1.70042
n_F	0.48613	**1.70706**
$n_{F'}$	0.47999	1.70790
n_{He-Cd}	0.44157	1.71402
n_g	0.435835	**1.71509**
n_h	0.404656	1.72187
n_i	0.365015	1.73366
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	594
Annealing Point (°C)	**AP**	623
Transformation Temperature (°C)	**Tg**	634
Yield Point (°C)	**At**	678
Softening Point (°C)	**SP**	735
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	71
	(+100~+300°C)	83
Thermal Conductivity (W/m·K)	**k**	0.847

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1006
Rigidity Modulus (10^8N/m^2)	**G**	394
Poisson's Ratio	σ	0.277
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	142
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.69

Partial Dispersions

$n_C - n_t$	0.011071
$n_C - n_{A'}$	0.004818
$n_d - n_C$	0.004306
$n_e - n_C$	0.007725
$n_g - n_d$	0.018089
$n_g - n_F$	0.008029
$n_h - n_g$	0.006774
$n_i - n_g$	0.018569
$n_{C'} - n_t$	0.011751
$n_e - n_{C'}$	0.007045
$n_{F'} - n_e$	0.007476
$n_i - n_{F'}$	0.025763

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0037
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	-0.0047
$\Delta\theta_{g,F}$	-0.0041
$\Delta\theta_{i,g}$	-0.0261

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.63056133	
A_2	1.86994897	E-1
A_3	1.30014289	
B_1	8.99690705	E-3
B_2	3.68011993	E-2
B_3	1.22239544	E2
1129 ~ 2325 nm		
A_1	1.63056133	
A_2	1.86994897	E-1
A_3	1.30014289	
B_1	8.99690705	E-3
B_2	3.68011993	E-2
B_3	1.22239544	E2

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**	5.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7706
$\theta_{C,A'}$	0.3354
$\theta_{d,C}$	0.2997
$\theta_{e,C}$	0.5377
$\theta_{g,d}$	1.2592
$\theta_{g,F}$	0.5589
$\theta_{h,g}$	0.4715
$\theta_{i,g}$	1.2926
$\theta'_{C',t}$	0.8092
$\theta'_{e,C'}$	0.4852
$\theta'_{F',e}$	0.5148
$\theta'_{i,F'}$	1.7742

Internal Transmittance

λ_{80}	365	λ_5	337

CCI

B	G	R
0.00	0.65	0.60

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.140	
350	0.470	
360	0.730	
365		
370	0.860	
380	0.923	
390	0.954	
400	0.969	
420	0.982	
440	0.986	
460	0.989	
480	0.992	
500	0.995	
550	0.997	
600	0.996	
650	0.995	
700	0.997	
800	0.998	
900	0.998	
1000	0.998	
1200	0.998	
1400	0.996	
1600	0.996	
1800	0.991	
2000	0.982	
2200	0.952	
2400	0.850	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38		
Specific Gravity	**d**	3.77		λ_5	33		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		2.7	2.7	2.9	3.1	3.5	4.0	
-20 ~ 0		2.8	2.8	3.0	3.2	3.7	4.2	
0 ~ 20		2.9	2.9	3.1	3.3	3.8	4.3	
20 ~ 40		3.0	3.0	3.2	3.4	3.9	4.5	
40 ~ 60		3.1	3.1	3.3	3.5	4.1	4.6	
60 ~ 80		3.1	3.2	3.4	3.6	4.2	4.8	

© OHARA GmbH – Hofheim – Germany

S-LAM60

743493
747491

Refractive Index	n_d	**1.74320**	Abbe Number	ν_d	**49.34**	Dispersion	$n_F - n_C$	**0.01507**
	n_e	1.746784		ν_e	49.10		$n_{F'} - n_{C'}$	0.015063 / 0.015210

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70181
n_{1970}	1.97009	1.70932
n_{1530}	1.52958	1.71730
n_{1129}	1.12864	1.72431
n_t	1.01398	1.72663
n_s	0.85211	1.73071
$n_{A'}$	0.76819	1.73351
n_r	0.70652	1.73608
n_C	0.65627	**1.73865**
$n_{C'}$	0.64385	1.73937
n_{He-Ne}	0.6328	1.74005
n_D	0.58929	1.74306
n_d	0.58756	**1.74320**
n_e	0.54607	1.74678
n_F	0.48613	**1.75372**
$n_{F'}$	0.47999	1.75458
n_{He-Cd}	0.44157	1.76094
n_g	0.435835	**1.76205**
n_h	0.404656	1.76904
n_i	0.365015	1.78113
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	594
Annealing Point (°C)	**AP**	615
Transformation Temperature (°C)	**Tg**	643
Yield Point (°C)	**At**	658
Softening Point (°C)	**SP**	693
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	54
	(+100~+300°C)	66
Thermal Conductivity (W/m·K)	**k**	0.845

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1132
Rigidity Modulus (10^8N/m^2)	**G**	438
Poisson's Ratio	σ	0.294
Knoop Hardness	**Hk**	730 [7]
Abrasion	**Aa**	71
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.9

Partial Dispersions

$n_C - n_t$	0.012019
$n_C - n_{A'}$	0.005143
$n_d - n_C$	0.004545
$n_e - n_C$	0.008131
$n_g - n_d$	0.018849
$n_g - n_F$	0.008331
$n_h - n_g$	0.006993
$n_i - n_g$	0.019083
$n_{C'} - n_t$	0.012740
$n_e - n_{C'}$	0.007410
$n_{F'} - n_e$	0.007800
$n_i - n_{F'}$	0.026546

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0197
$\Delta\theta_{C,A'}$	0.0057
$\Delta\theta_{g,d}$	-0.0109
$\Delta\theta_{g,F}$	-0.0085
$\Delta\theta_{i,g}$	-0.0450

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.60673056	
A_2	3.66415640	E-1
A_3	1.31761804	
B_1	7.75046140	E-3
B_2	2.89967611	E-2
B_3	9.30720709	E1
1129 ~ 2325 nm		
A_1	1.60673056	
A_2	3.66415640	E-1
A_3	1.31761804	
B_1	7.75046140	E-3
B_2	2.89967611	E-2
B_3	9.30720709	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7979
$\theta_{C,A'}$	0.3414
$\theta_{d,C}$	0.3017
$\theta_{e,C}$	0.5398
$\theta_{g,d}$	1.2513
$\theta_{g,F}$	0.5531
$\theta_{h,g}$	0.4643
$\theta_{i,g}$	1.2669
$\theta'_{C',t}$	0.8376
$\theta'_{e,C'}$	0.4872
$\theta'_{F',e}$	0.5128
$\theta'_{i,F'}$	1.7453

Internal Transmittance

λ_{80}	360	λ_5	331

CCI

B	G	R
0.00	0.51	0.52

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.030	
340	0.290	
350	0.600	
360	0.790	
365		
370	0.890	
380	0.937	
390	0.961	
400	0.974	
420	0.985	
440	0.990	
460	0.993	
480	0.995	
500	0.997	
550	0.998	
600	0.997	
650	0.998	
700	0.998	
800	0.998	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.991	
1600	0.991	
1800	0.980	
2000	0.953	
2200	0.870	
2400	0.620	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	4.06		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.3	5.7	5.7	5.9	6.1	6.6	7.1	
-20 ~ 0	5.4	5.8	5.9	6.1	6.3	6.8	7.3	
0 ~ 20	5.5	6.0	6.0	6.2	6.4	7.0	7.5	
20 ~ 40	5.6	6.1	6.2	6.4	6.6	7.2	7.7	
40 ~ 60	5.7	6.3	6.3	6.5	6.8	7.4	7.9	
60 ~ 80	5.9	6.5	6.5	6.6	7.0	7.5	8.1	

© OHARA GmbH – Hofheim – Germany

S-LAM61

720460
724457

Refractive Index	n_d	**1.72000**	Abbe Number	ν_d	**46.02**	Dispersion	$n_F - n_C$	**0.01564**
	n_e	1.720002		ν_e	45.75		$n_{F'} - n_{C'}$	0.015644
		1.723721						0.015820

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.68252
n_{1970}	1.97009	1.68854
n_{1530}	1.52958	1.69511
n_{1129}	1.12864	1.70126
n_t	1.01398	1.70342
n_s	0.85211	1.70735
$n_{A'}$	0.76819	1.71012
n_r	0.70652	1.71271
n_C	0.65627	**1.71533**
$n_{C'}$	0.64385	1.71607
n_{He-Ne}	0.6328	1.71676
n_D	0.58929	1.71986
n_d	0.58756	**1.72000**
n_e	0.54607	1.72372
n_F	0.48613	**1.73097**
$n_{F'}$	0.47999	1.73189
n_{He-Cd}	0.44157	1.73861
n_g	0.435835	**1.73979**
n_h	0.404656	1.74727
n_i	0.365015	1.76042
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	585
Annealing Point (°C)	**AP**	602
Transformation Temperature (°C)	**Tg**	629
Yield Point (°C)	**At**	665
Softening Point (°C)	**SP**	713
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	66
	(+100~+300°C)	80
Thermal Conductivity (W/m·K)	**k**	0.732

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	937
Rigidity Modulus (10^8N/m^2)	**G**	363
Poisson's Ratio	σ	0.290
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	144
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.99

Partial Dispersions

$n_C - n_t$	0.011910
$n_C - n_{A'}$	0.005206
$n_d - n_C$	0.004672
$n_e - n_C$	0.008391
$n_g - n_d$	0.019787
$n_g - n_F$	0.008815
$n_h - n_g$	0.007485
$n_i - n_g$	0.020636
$n_{C'} - n_t$	0.012647
$n_e - n_{C'}$	0.007654
$n_{F'} - n_e$	0.008166
$n_i - n_{F'}$	0.028538

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0013
$\Delta\theta_{C,A'}$	0.0012
$\Delta\theta_{g,d}$	-0.0043
$\Delta\theta_{g,F}$	-0.0035
$\Delta\theta_{i,g}$	-0.0206

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.73883330	
A_2	1.50937430	E-1
A_3	1.12118445	
B_1	9.80244105	E-3
B_2	4.33179685	E-2
B_3	1.01214625	E2
1129 ~ 2325 nm		
A_1	1.73883330	
A_2	1.50937430	E-1
A_3	1.12118445	
B_1	9.80244105	E-3
B_2	4.33179685	E-2
B_3	1.01214625	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
Acid Resistance (Powder Group)	**RA(P)**	5
Weathering Resistance (Surface Group)	**W(S)**	2
Acid Resistance (Surface Group)	**SR**	52.2
Phosphate Resistance	**PR**	2.2

Relative Partial Dispersions

$\theta_{C,t}$	0.7613
$\theta_{C,A'}$	0.3328
$\theta_{d,C}$	0.2986
$\theta_{e,C}$	0.5364
$\theta_{g,d}$	1.2648
$\theta_{g,F}$	0.5635
$\theta_{h,g}$	0.4785
$\theta_{i,g}$	1.3191
$\theta'_{C',t}$	0.7994
$\theta'_{e,C'}$	0.4838
$\theta'_{F',e}$	0.5162
$\theta'_{i,F'}$	1.8039

Internal Transmittance

λ_{80}	375	λ_5	341

CCI

B	G	R
0.00	1.17	1.20

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.030	
350	0.260	
360	0.560	
365		
370	0.750	
380	0.860	
390	0.914	
400	0.943	
420	0.969	
440	0.979	
460	0.985	
480	0.989	
500	0.993	
550	0.997	
600	0.996	
650	0.997	
700	0.997	
800	0.998	
900	0.999	
1000	0.998	
1200	0.999	
1400	0.997	
1600	0.997	
1800	0.991	
2000	0.978	
2200	0.942	
2400	0.800	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	4.10		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	3.5	3.5	3.7	3.9	4.5	5.1	
-20 ~ 0	3.0	3.6	3.7	3.9	4.1	4.7	5.3	
0 ~ 20	3.2	3.8	3.8	4.0	4.3	4.8	5.5	
20 ~ 40	3.2	3.9	3.9	4.1	4.4	5.0	5.7	
40 ~ 60	3.3	4.0	4.1	4.3	4.6	5.2	5.9	
60 ~ 80	3.4	4.2	4.2	4.4	4.7	5.4	6.1	

© OHARA GmbH – Hofheim – Germany

S-LAM66

801350
806347

Refractive Index	n_d	**1.80100**	Abbe Number	ν_d	**34.97**	Dispersion	$n_F - n_C$	**0.02291**
	n_e	1.806423		ν_e	34.72		$n_{F'} - n_{C'}$	0.023227
		1.800999						0.022907

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75094
n_{1970}	1.97009	1.75842
n_{1530}	1.52958	1.76672
n_{1129}	1.12864	1.77475
n_t	1.01398	1.77766
n_s	0.85211	1.78304
$n_{A'}$	0.76819	1.78691
n_r	0.70652	1.79055
n_C	0.65627	**1.79427**
$n_{C'}$	0.64385	1.79533
n_{He-Ne}	0.6328	1.79632
n_D	0.58929	1.80080
n_d	0.58756	**1.80100**
n_e	0.54607	1.80642
n_F	0.48613	**1.81718**
$n_{F'}$	0.47999	1.81856
n_{He-Cd}	0.44157	1.82879
n_g	0.435835	**1.83061**
n_h	0.404656	1.84236
n_i	0.365015	1.86391
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	514
Annealing Point (°C)	**AP**	544
Transformation Temperature (°C)	**Tg**	554
Yield Point (°C)	**At**	586
Softening Point (°C)	**SP**	629
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	79
	(+100~+300°C)	95
Thermal Conductivity (W/m·K)	**k**	1.062

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1210
Rigidity Modulus (10^8N/m^2)	**G**	473
Poisson's Ratio	σ	0.280
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	92
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.92

Partial Dispersions

$n_C - n_t$	0.016620
$n_C - n_{A'}$	0.007369
$n_d - n_C$	0.006724
$n_e - n_C$	0.012148
$n_g - n_d$	0.029615
$n_g - n_F$	0.013432
$n_h - n_g$	0.011747
$n_i - n_g$	0.033294
$n_{C'} - n_t$	0.017674
$n_e - n_{C'}$	0.011094
$n_{F'} - n_e$	0.012133
$n_i - n_{F'}$	0.045352

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0148
$\Delta\theta_{C,A'}$	0.0035
$\Delta\theta_{g,d}$	0.0007
$\Delta\theta_{g,F}$	0.0015
$\Delta\theta_{i,g}$	0.0212

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.92094221	
A_2	2.19901208	E-1
A_3	1.72705231	
B_1	1.15075241	E-2
B_2	5.47993543	E-2
B_3	1.20133674	E2
1129 ~ 2325 nm		
A_1	1.92094221	
A_2	2.19901208	E-1
A_3	1.72705231	
B_1	1.15075241	E-2
B_2	5.47993543	E-2
B_3	1.20133674	E2

Chemical Properties

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7255
$\theta_{C,A'}$	0.3217
$\theta_{d,C}$	0.2935
$\theta_{e,C}$	0.5303
$\theta_{g,d}$	1.2928
$\theta_{g,F}$	0.5864
$\theta_{h,g}$	0.5128
$\theta_{i,g}$	1.4534
$\theta'_{C',t}$	0.7609
$\theta'_{e,C'}$	0.4776
$\theta'_{F',e}$	0.5224
$\theta'_{i,F'}$	1.9526

Internal Transmittance

λ_{80}	388	λ_5	351

CCI

B	G	R
0.00	2.58	2.67

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.030	
360	0.280	
365		
370	0.570	
380	0.730	
390	0.820	
400	0.870	
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	
1000	0.998	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.976	
2200	0.937	
2400	0.770	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	43
Specific Gravity	**d**	3.55		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.2	3.0	3.1	3.3	3.7	4.5	5.5	
-20 ~ 0	2.2	3.1	3.1	3.4	3.8	4.7	5.7	
0 ~ 20	2.2	3.2	3.2	3.5	3.9	4.9	5.9	
20 ~ 40	2.3	3.2	3.3	3.6	4.0	5.0	6.1	
40 ~ 60	2.3	3.3	3.4	3.7	4.1	5.2	6.4	
60 ~ 80	2.4	3.4	3.5	3.8	4.3	5.4	6.6	

© OHARA GmbH – Hofheim – Germany

S-LAM73

794371
799368

Refractive Index	n_d	**1.79360**	Abbe Number	ν_d	**37.09**	Dispersion	$n_F - n_C$ 0.021397
	n_e	1.793600		ν_e	36.82		$n_{F'} - n_{C'}$ 0.021692

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.75073
n_{1970}	1.97009	1.75638
n_{1530}	1.52958	1.76285
n_{1129}	1.12864	1.76952
n_t	1.01398	1.77207
n_s	0.85211	1.77692
$n_{A'}$	0.76819	1.78047
n_r	0.70652	1.78385
n_C	0.65627	**1.78732**
$n_{C'}$	0.64385	1.78830
n_{He-Ne}	0.6328	1.78923
n_D	0.58929	1.79341
n_d	0.58756	**1.79360**
n_e	0.54607	1.79867
n_F	0.48613	**1.80872**
$n_{F'}$	0.47999	1.81000
n_{He-Cd}	0.44157	1.81950
n_g	0.435835	**1.82119**
n_h	0.404656	1.83200
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	584
Annealing Point (°C)	**AP**	607
Transformation Temperature (°C)	**Tg**	623
Yield Point (°C)	**At**	658
Softening Point (°C)	**SP**	695
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	89
	(+100~+300°C)	105
Thermal Conductivity (W/m·K)	**k**	0.648

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	868
Rigidity Modulus (10^8N/m^2)	**G**	332
Poisson's Ratio	σ	0.306
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	182
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.52

Partial Dispersions

$n_C - n_t$	0.015250
$n_C - n_{A'}$	0.006846
$n_d - n_C$	0.006281
$n_e - n_C$	0.011353
$n_g - n_d$	0.027586
$n_g - n_F$	0.012470
$n_h - n_g$	0.010815
$n_i - n_g$	
$n_{C'} - n_t$	0.016234
$n_e - n_{C'}$	0.010369
$n_{F'} - n_e$	0.011323
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0080
$\Delta\theta_{C,A'}$	-0.0008
$\Delta\theta_{g,d}$	0.0015
$\Delta\theta_{g,F}$	0.0013
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.86353123	
A_2	2.55215617	E-1
A_3	1.23399133	
B_1	1.07620673	E-2
B_2	4.87248679	E-2
B_3	1.17125110	E2
1129 ~ 2325 nm		
A_1	1.86353123	
A_2	2.55215617	E-1
A_3	1.23399133	
B_1	1.07620673	E-2
B_2	4.87248679	E-2
B_3	1.17125110	E2

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

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	415
Specific Gravity	**d**	4.45		λ_5	350

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.9	-1.1	-1.1	-0.8	-0.5	0.3	1.1	
-20 ~ 0	-2.0	-1.2	-1.1	-0.9	-0.5	0.3	1.2	
0 ~ 20	-2.0	-1.2	-1.1	-0.9	-0.5	0.4	1.3	
20 ~ 40	-2.1	-1.2	-1.1	-0.9	-0.5	0.4	1.4	
40 ~ 60	-2.1	-1.2	-1.1	-0.8	-0.4	0.5	1.6	
60 ~ 80	-2.0	-1.0	-1.0	-0.7	-0.3	0.7	1.8	

Relative Partial Dispersions

$\theta_{C,t}$	0.7127
$\theta_{C,A'}$	0.3200
$\theta_{d,C}$	0.2935
$\theta_{e,C}$	0.5306
$\theta_{g,d}$	1.2892
$\theta_{g,F}$	0.5828
$\theta_{h,g}$	0.5054
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7484
$\theta'_{e,C'}$	0.4780
$\theta'_{F',e}$	0.5220
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.080	
360	0.340	
365		
370	0.620	
380	0.780	
390	0.870	
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	
1000	0.998	
1200	0.998	
1400	0.997	
1600	0.995	
1800	0.984	
2000	0.964	
2200	0.925	
2400	0.800	

© OHARA GmbH – Hofheim – Germany

S-NBH5

654397
658395

Refractive Index	n_d	**1.65412**	Abbe Number	ν_d	**39.68**	Dispersion	$n_F - n_C$	**0.01648**
	n_e	1.654115		ν_e	39.43		$n_{F'} - n_{C'}$	0.016484
		1.658026						0.016687

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.61410
n_{1970}	1.97009	1.62070
n_{1530}	1.52958	1.62787
n_{1129}	1.12864	1.63448
n_t	1.01398	1.63677
n_s	0.85211	1.64090
$n_{A'}$	0.76819	1.64379
n_r	0.70652	1.64649
n_C	0.65627	**1.64923**
$n_{C'}$	0.64385	1.65000
n_{He-Ne}	0.6328	1.65072
n_D	0.58929	1.65397
n_d	0.58756	**1.65412**
n_e	0.54607	1.65803
n_F	0.48613	**1.66571**
$n_{F'}$	0.47999	1.66668
n_{He-Cd}	0.44157	1.67389
n_g	0.435835	**1.67517**
n_h	0.404656	1.68331
n_i	0.365015	1.69791
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	489
Annealing Point (°C)	**AP**	511
Transformation Temperature (°C)	**Tg**	524
Yield Point (°C)	**At**	575
Softening Point (°C)	**SP**	645
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	66
	(+100~+300°C)	84
Thermal Conductivity (W/m·K)	**k**	0.965

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	902
Rigidity Modulus (10^8N/m^2)	**G**	361
Poisson's Ratio	σ	0.248
Knoop Hardness	**Hk**	580 [6]
Abrasion	**Aa**	130
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.22

Partial Dispersions	
$n_C - n_t$	0.012452
$n_C - n_{A'}$	0.005432
$n_d - n_C$	0.004890
$n_e - n_C$	0.008801
$n_g - n_d$	0.021051
$n_g - n_F$	0.009457
$n_h - n_g$	0.008144
$n_i - n_g$	0.022741
$n_{C'} - n_t$	0.013223
$n_e - n_{C'}$	0.008030
$n_{F'} - n_e$	0.008657
$n_i - n_{F'}$	0.031224

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0226
$\Delta\theta_{C,A'}$	0.0056
$\Delta\theta_{g,d}$	-0.0052
$\Delta\theta_{g,F}$	-0.0036
$\Delta\theta_{i,g}$	-0.0132

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.47544521	
A_2	1.93060095	E-1
A_3	1.50939010	
B_1	9.55836740	E-3
B_2	4.60430483	E-2
B_3	1.26422746	E2
1129 ~ 2325 nm		
A_1	1.47544521	
A_2	1.93060095	E-1
A_3	1.50939010	
B_1	9.55836740	E-3
B_2	4.60430483	E-2
B_3	1.26422746	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7554
$\theta_{C,A'}$	0.3295
$\theta_{d,C}$	0.2967
$\theta_{e,C}$	0.5339
$\theta_{g,d}$	1.2771
$\theta_{g,F}$	0.5737
$\theta_{h,g}$	0.4941
$\theta_{i,g}$	1.3796
$\theta'_{C',t}$	0.7924
$\theta'_{e,C'}$	0.4812
$\theta'_{F',e}$	0.5188
$\theta'_{i,F'}$	1.8712

Internal Transmittance			
λ_{80}	357	λ_5	328

CCI		
B	G	R
0.00	0.66	0.69

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.120	
340	0.470	
350	0.710	
360	0.830	
365		
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	
1000	0.999	
1200	0.999	
1400	0.991	
1600	0.994	
1800	0.989	
2000	0.976	
2200	0.919	
2400	0.800	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	3.02		λ_5	33	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.5	4.1	4.1	4.3	4.6	5.1	5.8	
-20 ~ 0	3.6	4.2	4.2	4.5	4.7	5.3	6.0	
0 ~ 20	3.7	4.3	4.4	4.6	4.9	5.5	6.2	
20 ~ 40	3.8	4.4	4.5	4.8	5.0	5.7	6.4	
40 ~ 60	3.9	4.6	4.6	4.9	5.1	5.8	6.6	
60 ~ 80	3.9	4.7	4.7	5.0	5.3	6.0	6.8	

© OHARA GmbH – Hofheim – Germany

S-NBH8

720347

725345

Refractive Index	n_d	**1.72047**	Abbe Number	ν_d	**34.71**	Dispersion	$n_F - n_C$	**0.02075**
	n_e	1.720467		ν_e	34.47		$n_{F'} - n_{C'}$	0.020758
		1.725385						0.021042

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.67534
n_{1970}	1.97009	1.68198
n_{1530}	1.52958	1.68941
n_{1129}	1.12864	1.69665
n_t	1.01398	1.69928
n_s	0.85211	1.70416
$n_{A'}$	0.76819	1.70767
n_r	0.70652	1.71099
n_C	0.65627	**1.71437**
$n_{C'}$	0.64385	1.71532
n_{He-Ne}	0.6328	1.71622
n_D	0.58929	1.72029
n_d	0.58756	**1.72047**
n_e	0.54607	1.72538
n_F	0.48613	**1.73512**
$n_{F'}$	0.47999	1.73636
n_{He-Cd}	0.44157	1.74559
n_g	0.435835	**1.74723**
n_h	0.404656	1.75777
n_i	0.365015	1.77689
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	476
Annealing Point (°C)	**AP**	499
Transformation Temperature (°C)	**Tg**	508
Yield Point (°C)	**At**	555
Softening Point (°C)	**SP**	611
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	81
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	1.052

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1017
Rigidity Modulus (10^8N/m^2)	**G**	407
Poisson's Ratio	σ	0.250
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	155
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.9

Partial Dispersions	
$n_C - n_t$	0.015084
$n_C - n_{A'}$	0.006690
$n_d - n_C$	0.006102
$n_e - n_C$	0.011020
$n_g - n_d$	0.026767
$n_g - n_F$	0.012111
$n_h - n_g$	0.010534
$n_i - n_g$	0.029660
$n_{C'} - n_t$	0.016041
$n_e - n_{C'}$	0.010063
$n_{F'} - n_e$	0.010979
$n_i - n_{F'}$	0.040530

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0172
$\Delta\theta_{C,A'}$	0.0044
$\Delta\theta_{g,d}$	-0.0031
$\Delta\theta_{g,F}$	-0.0019
$\Delta\theta_{i,g}$	-0.0056

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.61344136	
A_2	2.57295888	E-1
A_3	1.98364455	
B_1	1.06386752	E-2
B_2	4.87071624	E-2
B_3	1.59784404	E2
1129 ~ 2325 nm		
A_1	1.61344136	
A_2	2.57295888	E-1
A_3	1.98364455	
B_1	1.06386752	E-2
B_2	4.87071624	E-2
B_3	1.59784404	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7267
$\theta_{C,A'}$	0.3223
$\theta_{d,C}$	0.2940
$\theta_{e,C}$	0.5309
$\theta_{g,d}$	1.2895
$\theta_{g,F}$	0.5834
$\theta_{h,g}$	0.5075
$\theta_{i,g}$	1.4288
$\theta'_{C',t}$	0.7623
$\theta'_{e,C'}$	0.4782
$\theta'_{F',e}$	0.5218
$\theta'_{i,F'}$	1.9261

Internal Transmittance			
λ_{80}	371	λ_5	331

CCI		
B	G	R
0.00	1.38	1.48

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.030	
340	0.240	
350	0.490	
360	0.670	
365		
370	0.790	
380	0.860	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.997	
1800	0.992	
2000	0.984	
2200	0.955	
2400	0.880	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40	
Specific Gravity	**d**	3.19		λ_5	33	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.2	3.0	3.0	3.3	3.6	4.3	5.2	
-20 ~ 0	2.2	3.0	3.1	3.4	3.7	4.5	5.4	
0 ~ 20	2.2	3.1	3.1	3.4	3.8	4.6	5.5	
20 ~ 40	2.2	3.1	3.2	3.5	3.9	4.7	5.7	
40 ~ 60	2.3	3.2	3.3	3.6	3.9	4.9	5.9	
60 ~ 80	2.4	3.3	3.3	3.6	4.0	5.0	6.1	

© OHARA GmbH – Hofheim – Germany

S-NBH51

750353
755351

Refractive Index	n_d	**1.74950**	Abbe Number	ν_d	**35.33**	Dispersion	$n_F - n_C$	**0.02121**
	n_e	1.749505		ν_e	35.10		$n_{F'} - n_{C'}$	0.021214
		1.754531						0.021498

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70260
n_{1970}	1.97009	1.70965
n_{1530}	1.52958	1.71748
n_{1129}	1.12864	1.72503
n_t	1.01398	1.72776
n_s	0.85211	1.73279
$n_{A'}$	0.76819	1.73640
n_r	0.70652	1.73980
n_C	0.65627	**1.74326**
$n_{C'}$	0.64385	1.74424
n_{He-Ne}	0.6328	1.74516
n_D	0.58929	1.74932
n_d	0.58756	**1.74950**
n_e	0.54607	1.75453
n_F	0.48613	**1.76447**
$n_{F'}$	0.47999	1.76574
n_{He-Cd}	0.44157	1.77515
n_g	0.435835	**1.77681**
n_h	0.404656	1.78753
n_i	0.365015	1.80695
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	500
Annealing Point (°C)	**AP**	521
Transformation Temperature (°C)	**Tg**	535
Yield Point (°C)	**At**	578
Softening Point (°C)	**SP**	631
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	73
	(+100~+300°C)	92
Thermal Conductivity (W/m·K)	**k**	1.124

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1097
Rigidity Modulus (10^8N/m^2)	**G**	438
Poisson's Ratio	σ	0.253
Knoop Hardness	**Hk**	610 [6]
Abrasion	**Aa**	115
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.66

Partial Dispersions

$n_C - n_t$	0.015503
$n_C - n_{A'}$	0.006860
$n_d - n_C$	0.006246
$n_e - n_C$	0.011272
$n_g - n_d$	0.027310
$n_g - n_F$	0.012342
$n_h - n_g$	0.010718
$n_i - n_g$	0.030139
$n_{C'} - n_t$	0.016484
$n_e - n_{C'}$	0.010291
$n_{F'} - n_e$	0.011207
$n_i - n_{F'}$	0.041216

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0184
$\Delta\theta_{C,A'}$	0.0047
$\Delta\theta_{g,d}$	-0.0039
$\Delta\theta_{g,F}$	-0.0025
$\Delta\theta_{i,g}$	-0.0085

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.71203689	
A_2	2.55989588	E-1
A_3	1.81456998	
B_1	1.07724134	E-2
B_2	4.88593504	E-2
B_3	1.36359013	E2
1129 ~ 2325 nm		
A_1	1.71203689	
A_2	2.55989588	E-1
A_3	1.81456998	
B_1	1.07724134	E-2
B_2	4.88593504	E-2
B_3	1.36359013	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7308
$\theta_{C,A'}$	0.3234
$\theta_{d,C}$	0.2944
$\theta_{e,C}$	0.5313
$\theta_{g,d}$	1.2874
$\theta_{g,F}$	0.5818
$\theta_{h,g}$	0.5052
$\theta_{i,g}$	1.4207
$\theta'_{C',t}$	0.7668
$\theta'_{e,C'}$	0.4787
$\theta'_{F',e}$	0.5213
$\theta'_{i,F'}$	1.9172

Internal Transmittance

λ_{80}	370	λ_5	331

CCI

B	G	R
0.00	1.22	1.30

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.020	
340	0.220	
350	0.490	
360	0.680	
365		
370	0.800	
380	0.870	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.994	
1800	0.989	
2000	0.980	
2200	0.945	
2400	0.870	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40
Specific Gravity	**d**	3.29		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.1	4.9	4.9	5.2	5.5	6.3	7.1	
-20 ~ 0	4.1	4.9	5.0	5.2	5.6	6.4	7.3	
0 ~ 20	4.1	4.9	5.0	5.3	5.6	6.5	7.5	
20 ~ 40	4.1	5.0	5.0	5.3	5.7	6.6	7.6	
40 ~ 60	4.1	5.0	5.1	5.4	5.8	6.7	7.8	
60 ~ 80	4.1	5.1	5.1	5.4	5.9	6.9	8.0	

© OHARA GmbH – Hofheim – Germany

S-NBH52

673382
677379

Refractive Index	n_d	**1.67300**	Abbe Number	ν_d	**38.15**	Dispersion	$n_F - n_C$	**0.01764**
	n_e	1.673000		ν_e	37.90		$n_{F'} - n_{C'}$	0.017642
		1.677185						0.017866

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.63291
n_{1970}	1.97009	1.63904
n_{1530}	1.52958	1.64585
n_{1129}	1.12864	1.65237
n_t	1.01398	1.65470
n_s	0.85211	1.65897
$n_{A'}$	0.76819	1.66202
n_r	0.70652	1.66488
n_C	0.65627	**1.66778**
$n_{C'}$	0.64385	1.66860
n_{He-Ne}	0.6328	1.66937
n_D	0.58929	1.67285
n_d	0.58756	**1.67300**
n_e	0.54607	1.67719
n_F	0.48613	**1.68542**
$n_{F'}$	0.47999	1.68647
n_{He-Cd}	0.44157	1.69420
n_g	0.435835	**1.69557**
n_h	0.404656	1.70432
n_i	0.365015	1.71997
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	486
Annealing Point (°C)	**AP**	510
Transformation Temperature (°C)	**Tg**	520
Yield Point (°C)	**At**	556
Softening Point (°C)	**SP**	646
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	86
	(+100~+300°C)	109
Thermal Conductivity (W/m·K)	**k**	1.115

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	979
Rigidity Modulus (10^8N/m^2)	**G**	396
Poisson's Ratio	σ	0.236
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	123
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.013084
$n_C - n_{A'}$	0.005763
$n_d - n_C$	0.005220
$n_e - n_C$	0.009405
$n_g - n_d$	0.022573
$n_g - n_F$	0.010151
$n_h - n_g$	0.008743
$n_i - n_g$	0.024400
$n_{C'} - n_t$	0.013905
$n_e - n_{C'}$	0.008584
$n_{F'} - n_e$	0.009282
$n_i - n_{F'}$	0.033506

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0159
$\Delta\theta_{C,A'}$	0.0046
$\Delta\theta_{g,d}$	-0.0060
$\Delta\theta_{g,F}$	-0.0043
$\Delta\theta_{i,g}$	-0.0225

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.50305799	
A_2	2.21715926	E-1
A_3	1.84496391	
B_1	9.99021738	E-3
B_2	4.50327698	E-2
B_3	1.63722302	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

Chemical Properties

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7416
$\theta_{C,A'}$	0.3267
$\theta_{d,C}$	0.2959
$\theta_{e,C}$	0.5331
$\theta_{g,d}$	1.2795
$\theta_{g,F}$	0.5754
$\theta_{h,g}$	0.4956
$\theta_{i,g}$	1.3831
$\theta'_{C',t}$	0.7783
$\theta'_{e,C'}$	0.4805
$\theta'_{F',e}$	0.5195
$\theta'_{i,F'}$	1.8754

Internal Transmittance

λ_{80}	347	λ_5	320

CCI

B	G	R
0.00	0.25	0.23

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.040	
330	0.370	
340	0.690	
350	0.850	
360	0.923	
365		
370	0.958	
380	0.976	
390	0.985	
400	0.990	
420	0.993	
440	0.994	
460	0.995	
480	0.996	
500	0.997	
550	0.999	
600	0.999	
650	0.998	
700	0.999	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.995	
1800	0.983	
2000	0.971	
2200	0.932	
2400	0.912	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	3.09		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.1	3.7	3.8	4.0	4.3	4.9	5.6	
-20 ~ 0	3.0	3.7	3.7	3.9	4.2	4.9	5.6	
0 ~ 20	2.9	3.7	3.7	3.9	4.2	4.9	5.7	
20 ~ 40	2.8	3.6	3.7	3.8	4.2	5.0	5.8	
40 ~ 60	2.8	3.6	3.6	3.8	4.2	5.0	5.8	
60 ~ 80	2.7	3.5	3.6	3.8	4.2	5.0	5.9	

© OHARA GmbH – Hofheim – Germany

S-NBH52V

673383
677380

Refractive Index	n_d	**1.67300**	Abbe Number	ν_d	**38.26**	Dispersion	$n_F - n_C$ 0.017592
	n_e	1.673000		ν_e	38.01		$n_{F'} - n_{C'}$ 0.017815
		1.677172					

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.63149
n_{1970}	1.97009	1.63815
n_{1530}	1.52958	1.64544
n_{1129}	1.12864	1.65225
n_t	1.01398	1.65463
n_s	0.85211	1.65896
$n_{A'}$	0.76819	1.66203
n_r	0.70652	1.66489
n_C	0.65627	**1.66779**
$n_{C'}$	0.64385	1.66861
n_{He-Ne}	0.6328	1.66938
n_D	0.58929	1.67285
n_d	0.58756	**1.67300**
n_e	0.54607	1.67717
n_F	0.48613	**1.68538**
$n_{F'}$	0.47999	1.68643
n_{He-Cd}	0.44157	1.69415
n_g	0.435835	**1.69551**
n_h	0.404656	1.70425
n_i	0.365015	1.71995
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	460
Annealing Point (°C)	**AP**	483
Transformation Temperature (°C)	**Tg**	497
Yield Point (°C)	**At**	538
Softening Point (°C)	**SP**	592
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	77
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	1.032

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	963
Rigidity Modulus (10^8N/m^2)	**G**	386
Poisson's Ratio	σ	0.246
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	124
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.11

Partial Dispersions	
$n_C - n_t$	0.013160
$n_C - n_{A'}$	0.005766
$n_d - n_C$	0.005208
$n_e - n_C$	0.009380
$n_g - n_d$	0.022512
$n_g - n_F$	0.010128
$n_h - n_g$	0.008738
$n_i - n_g$	0.024433
$n_{C'} - n_t$	0.013979
$n_e - n_{C'}$	0.008561
$n_{F'} - n_e$	0.009254
$n_i - n_{F'}$	0.033519

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0219
$\Delta\theta_{C,A'}$	0.0056
$\Delta\theta_{g,d}$	-0.0055
$\Delta\theta_{g,F}$	-0.0039
$\Delta\theta_{i,g}$	-0.0158

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.51336868	
A_2	2.12341478	E-1
A_3	1.54149143	
B_1	9.87077827	E-3
B_2	4.62843662	E-2
B_3	1.26978510	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	360	
Specific Gravity	**d**	3.01		λ_5	320	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	3.6	3.6	3.8	4.1	4.7	5.4	
-20 ~ 0	2.9	3.6	3.6	3.8	4.1	4.8	5.5	
0 ~ 20	2.8	3.5	3.6	3.8	4.1	4.8	5.6	
20 ~ 40	2.8	3.5	3.5	3.8	4.1	4.8	5.6	
40 ~ 60	2.8	3.5	3.6	3.8	4.2	4.9	5.7	
60 ~ 80	2.8	3.6	3.6	3.9	4.3	5.1	5.9	

Relative Partial Dispersions	
$\theta_{C,t}$	0.7481
$\theta_{C,A'}$	0.3278
$\theta_{d,C}$	0.2960
$\theta_{e,C}$	0.5332
$\theta_{g,d}$	1.2797
$\theta_{g,F}$	0.5757
$\theta_{h,g}$	0.4967
$\theta_{i,g}$	1.3889
$\theta'_{C',t}$	0.7847
$\theta'_{e,C'}$	0.4806
$\theta'_{F',e}$	0.5194
$\theta'_{i,F'}$	1.8815

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ_i 10 mm	τ_i 25 mm
280		
290		
300		
310		
320	0.040	
330	0.310	
340	0.650	
350	0.840	
360	0.919	
365		
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	
1000	0.999	
1200	0.999	
1400	0.992	
1600	0.993	
1800	0.986	
2000	0.973	
2200	0.922	
2400	0.820	

© OHARA GmbH – Hofheim – Germany

S-NBH53

738323
743320

Refractive Index	n_d	**1.73800**	Abbe Number	ν_d	**32.26**	Dispersion	$n_F - n_C$	**0.02287**
	n_e	1.738000		ν_e	32.03		$n_{F'} - n_{C'}$	0.022876
		1.743413						0.023207

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.69016
n_{1970}	1.97009	1.69693
n_{1530}	1.52958	1.70457
n_{1129}	1.12864	1.71215
n_t	1.01398	1.71496
n_s	0.85211	1.72021
$n_{A'}$	0.76819	1.72401
n_r	0.70652	1.72762
n_C	0.65627	**1.73131**
$n_{C'}$	0.64385	1.73236
n_{He-Ne}	0.6328	1.73334
n_D	0.58929	1.73780
n_d	0.58756	**1.73800**
n_e	0.54607	1.74341
n_F	0.48613	**1.75419**
$n_{F'}$	0.47999	1.75556
n_{He-Cd}	0.44157	1.76585
n_g	0.435835	**1.76768**
n_h	0.404656	1.77951
n_i	0.365015	1.80125
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	527
Annealing Point (°C)	**AP**	547
Transformation Temperature (°C)	**Tg**	578
Yield Point (°C)	**At**	620
Softening Point (°C)	**SP**	688
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	69
	(+100~+300°C)	89
Thermal Conductivity (W/m·K)	**k**	1.117

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1031
Rigidity Modulus (10^8N/m^2)	**G**	417
Poisson's Ratio	σ	0.236
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	114
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.016351
$n_C - n_{A'}$	0.007295
$n_d - n_C$	0.006691
$n_e - n_C$	0.012104
$n_g - n_d$	0.029679
$n_g - n_F$	0.013494
$n_h - n_g$	0.011832
$n_i - n_g$	0.033567
$n_{C'} - n_t$	0.017398
$n_e - n_{C'}$	0.011057
$n_{F'} - n_e$	0.012150
$n_i - n_{F'}$	0.045683

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0168
$\Delta\theta_{C,A'}$	0.0040
$\Delta\theta_{g,d}$	-0.0003
$\Delta\theta_{g,F}$	0.0006
$\Delta\theta_{i,g}$	0.0124

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.65828340	
A_2	2.63275666	E-1
A_3	2.10142759	
B_1	1.13872516	E-2
B_2	5.22108137	E-2
B_3	1.65523649	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7148
$\theta_{C,A'}$	0.3189
$\theta_{d,C}$	0.2925
$\theta_{e,C}$	0.5291
$\theta_{g,d}$	1.2974
$\theta_{g,F}$	0.5899
$\theta_{h,g}$	0.5172
$\theta_{i,g}$	1.4673
$\theta'_{C',t}$	0.7497
$\theta'_{e,C'}$	0.4765
$\theta'_{F',e}$	0.5235
$\theta'_{i,F'}$	1.9685

Internal Transmittance

λ_{80}	365	λ_5	331

CCI

B	G	R
0.00	0.70	0.74

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.030	
340	0.170	
350	0.520	
360	0.740	
365		
370	0.850	
380	0.915	
390	0.947	
400	0.965	
420	0.981	
440	0.986	
460	0.988	
480	0.991	
500	0.993	
550	0.997	
600	0.997	
650	0.997	
700	0.998	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.996	
1800	0.990	
2000	0.985	
2200	0.952	
2400	0.949	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39
Specific Gravity	**d**	3.28		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.1	4.9	5.0	5.3	5.6	6.4	7.4	
-20 ~ 0	4.1	5.0	5.0	5.3	5.7	6.6	7.6	
0 ~ 20	4.1	5.0	5.1	5.4	5.8	6.7	7.8	
20 ~ 40	4.1	5.1	5.2	5.5	5.9	6.9	8.0	
40 ~ 60	4.2	5.2	5.2	5.5	6.0	7.0	8.2	
60 ~ 80	4.2	5.2	5.3	5.6	6.1	7.2	8.4	

© OHARA GmbH – Hofheim – Germany

S-NBH53V

738323
743321

Refractive Index	n_d	**1.73800**	Abbe Number	ν_d	**32.33**	Dispersion	$n_F - n_C$ 0.022830
	n_e	1.743402		ν_e	32.10		$n_{F'} - n_{C'}$ 0.023159

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.69006
n_{1970}	1.97009	1.69688
n_{1530}	1.52958	1.70457
n_{1129}	1.12864	1.71218
n_t	1.01398	1.71499
n_s	0.85211	1.72024
$n_{A'}$	0.76819	1.72404
n_r	0.70652	1.72764
n_C	0.65627	**1.73132**
$n_{C'}$	0.64385	1.73237
n_{He-Ne}	0.6328	1.73335
n_D	0.58929	1.73780
n_d	0.58756	**1.73800**
n_e	0.54607	1.74340
n_F	0.48613	**1.75415**
$n_{F'}$	0.47999	1.75553
n_{He-Cd}	0.44157	1.76579
n_g	0.435835	**1.76762**
n_h	0.404656	1.77943
n_i	0.365015	1.80114
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	501
Annealing Point (°C)	**AP**	523
Transformation Temperature (°C)	**Tg**	538
Yield Point (°C)	**At**	582
Softening Point (°C)	**SP**	640
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	71
	(+100~+300°C)	93
Thermal Conductivity (W/m·K)	**k**	1.127

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1027
Rigidity Modulus (10^8N/m^2)	**G**	415
Poisson's Ratio	σ	0.237
Knoop Hardness	**Hk**	600 [6]
Abrasion	**Aa**	110
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.99

Partial Dispersions	
$n_C - n_t$	0.016332
$n_C - n_{A'}$	0.007282
$n_d - n_C$	0.006678
$n_e - n_C$	0.012080
$n_g - n_d$	0.029621
$n_g - n_F$	0.013469
$n_h - n_g$	0.011812
$n_i - n_g$	0.033515
$n_{C'} - n_t$	0.017378
$n_e - n_{C'}$	0.011034
$n_{F'} - n_e$	0.012125
$n_i - n_{F'}$	0.045609

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0170
$\Delta\theta_{C,A'}$	0.0040
$\Delta\theta_{g,d}$	-0.0001
$\Delta\theta_{g,F}$	0.0008
$\Delta\theta_{i,g}$	0.0137

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.65444141	
A_2	2.67453927	E-1
A_3	2.14530347	
B_1	1.12485533	E-2
B_2	5.20272740	E-2
B_3	1.67366100	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7154
$\theta_{C,A'}$	0.3190
$\theta_{d,C}$	0.2925
$\theta_{e,C}$	0.5291
$\theta_{g,d}$	1.2975
$\theta_{g,F}$	0.5900
$\theta_{h,g}$	0.5174
$\theta_{i,g}$	1.4680
$\theta'_{C',t}$	0.7504
$\theta'_{e,C'}$	0.4764
$\theta'_{F',e}$	0.5236
$\theta'_{i,F'}$	1.9694

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.030	
340	0.280	
350	0.610	
360	0.790	
365		
370	0.880	
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	
1000	0.999	
1200	0.999	
1400	0.995	
1600	0.995	
1800	0.990	
2000	0.984	
2200	0.951	
2400	0.928	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	385	
Specific Gravity	**d**	3.19		λ_5	330	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.0	4.8	4.8	5.1	5.5	6.3	7.3	
-20 ~ 0	3.9	4.7	4.8	5.1	5.5	6.4	7.5	
0 ~ 20	3.8	4.7	4.8	5.1	5.5	6.5	7.6	
20 ~ 40	3.8	4.7	4.8	5.1	5.5	6.6	7.7	
40 ~ 60	3.8	4.8	4.9	5.2	5.6	6.7	7.8	
60 ~ 80	3.8	4.9	4.9	5.3	5.8	6.9	8.1	

© OHARA GmbH – Hofheim – Germany

S-NBH55

800299
806296

Refractive Index	n_d	**1.80000**	Abbe Number	ν_d	**29.84**	Dispersion	$n_F - n_C$	**0.02680**
	n_e	1.800000		ν_e	29.61		$n_{F'} - n_{C'}$	0.026806
		1.806331						0.027232

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.74989
n_{1970}	1.97009	1.75600
n_{1530}	1.52958	1.76316
n_{1129}	1.12864	1.77082
n_t	1.01398	1.77381
n_s	0.85211	1.77959
$n_{A'}$	0.76819	1.78388
n_r	0.70652	1.78799
n_C	0.65627	**1.79224**
$n_{C'}$	0.64385	1.79345
n_{He-Ne}	0.6328	1.79459
n_D	0.58929	1.79977
n_d	0.58756	**1.80000**
n_e	0.54607	1.80633
n_F	0.48613	**1.81904**
$n_{F'}$	0.47999	1.82068
n_{He-Cd}	0.44157	1.83297
n_g	0.435835	**1.83517**
n_h	0.404656	1.84951
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	613
Yield Point (°C)	**At**	663
Softening Point (°C)	**SP**	
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	82
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	0.994

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1053
Rigidity Modulus (10^8N/m^2)	**G**	415
Poisson's Ratio	σ	0.269
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	143
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.5

Partial Dispersions	
$n_C - n_t$	0.018427
$n_C - n_{A'}$	0.008355
$n_d - n_C$	0.007763
$n_e - n_C$	0.014094
$n_g - n_d$	0.035172
$n_g - n_F$	0.016129
$n_h - n_g$	0.014338
$n_i - n_g$	
$n_{C'} - n_t$	0.019637
$n_e - n_{C'}$	0.012884
$n_{F'} - n_e$	0.014348
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0007
$\Delta\theta_{C,A'}$	-0.0003
$\Delta\theta_{g,d}$	0.0094
$\Delta\theta_{g,F}$	0.0085
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.83145156	
A_2	2.87818024	E-1
A_3	2.15208300	
B_1	1.22443139	E-2
B_2	5.73877310	E-2
B_3	1.86099124	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.6874
$\theta_{C,A'}$	0.3117
$\theta_{d,C}$	0.2896
$\theta_{e,C}$	0.5258
$\theta_{g,d}$	1.3121
$\theta_{g,F}$	0.6017
$\theta_{h,g}$	0.5349
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7211
$\theta'_{e,C'}$	0.4731
$\theta'_{F',e}$	0.5269
$\theta'_{i,F'}$	

Internal Transmittance			
λ_{80}	392	λ_5	360

CCI		
B	G	R
0.00	2.72	2.91

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.040	
365		
370	0.340	
380	0.630	
390	0.780	
400	0.860	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.991	
2000	0.985	
2200	0.969	
2400	0.943	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	44	
Specific Gravity	**d**	3.68		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.9	3.8	3.9	4.2	4.7	5.7	7.0	
-20 ~ 0	2.8	3.9	3.9	4.3	4.8	5.9	7.2	
0 ~ 20	2.8	3.9	4.0	4.3	4.8	6.1	7.4	
20 ~ 40	2.8	3.9	4.0	4.4	4.9	6.2	7.6	
40 ~ 60	2.8	4.0	4.0	4.4	5.0	6.3	7.8	
60 ~ 80	2.9	4.1	4.2	4.6	5.2	6.6	8.2	

© OHARA GmbH – Hofheim – Germany

S-NBH56

855248
863246

Refractive Index	n_d	**1.85478**	Abbe Number	ν_d	**24.80**	Dispersion	$n_F - n_C$	**0.03447**
	n_e	1.854780		ν_e	24.61		$n_{F'} - n_{C'}$	0.034469
		1.862904						0.035057

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.79234
n_{1970}	1.97009	1.79974
n_{1530}	1.52958	1.80847
n_{1129}	1.12864	1.81792
n_t	1.01398	1.82165
n_s	0.85211	1.82889
$n_{A'}$	0.76819	1.83429
n_r	0.70652	1.83949
n_C	0.65627	**1.84488**
$n_{C'}$	0.64385	1.84642
n_{He-Ne}	0.6328	1.84787
n_D	0.58929	1.85448
n_d	0.58756	**1.85478**
n_e	0.54607	1.86290
n_F	0.48613	**1.87935**
$n_{F'}$	0.47999	1.88147
n_{He-Cd}	0.44157	1.89755
n_g	0.435835	**1.90045**
n_h	0.404656	1.91944
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	578
Yield Point (°C)	**At**	612
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	77
	(+100~+300°C)	94
Thermal Conductivity (W/m·K)	**k**	1.120

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1067
Rigidity Modulus (10^8N/m^2)	**G**	427
Poisson's Ratio	σ	0.249
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	127
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.35

Partial Dispersions

$n_C - n_t$	0.023230
$n_C - n_{A'}$	0.010586
$n_d - n_C$	0.009904
$n_e - n_C$	0.018028
$n_g - n_d$	0.045668
$n_g - n_F$	0.021103
$n_h - n_g$	0.018989
$n_i - n_g$	
$n_{C'} - n_t$	0.024770
$n_e - n_{C'}$	0.016488
$n_{F'} - n_e$	0.018569
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0109
$\Delta\theta_{C,A'}$	0.0012
$\Delta\theta_{g,d}$	0.0117
$\Delta\theta_{g,F}$	0.0109
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.85191438	
A_2	4.31102852	E-1
A_3	3.45278284	
B_1	1.32732620	E-2
B_2	5.85944644	E-2
B_3	2.39357089	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6739
$\theta_{C,A'}$	0.3071
$\theta_{d,C}$	0.2873
$\theta_{e,C}$	0.5230
$\theta_{g,d}$	1.3249
$\theta_{g,F}$	0.6122
$\theta_{h,g}$	0.5509
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7066
$\theta'_{e,C'}$	0.4703
$\theta'_{F',e}$	0.5297
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	389	λ_5	358

CCI

B	G	R
0.00	2.57	2.76

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.110	
365		
370	0.440	
380	0.690	
390	0.810	
400	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.997	
1800	0.993	
2000	0.991	
2200	0.977	
2400	0.966	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	395
Specific Gravity	**d**	3.49		λ_5	360

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.4	3.5	3.6	4.0	4.6	6.0	7.7	
-20 ~ 0	2.3	3.6	3.7	4.1	4.7	6.3	8.1	
0 ~ 20	2.3	3.6	3.7	4.2	4.8	6.5	8.5	
20 ~ 40	2.3	3.7	3.8	4.3	4.9	6.7	8.7	
40 ~ 60	2.3	3.8	3.9	4.4	5.1	6.8	9.0	
60 ~ 80	2.4	3.9	4.0	4.5	5.2	7.1	9.4	

© OHARA GmbH – Hofheim – Germany

S-NBH57

850300
857298

Refractive Index	n_d	**1.85025**	Abbe Number	ν_d	**30.05**	Dispersion	$n_F - n_C$	**0.02830**
	n_e	1.856938		ν_e	29.82		$n_{F'} - n_{C'}$	0.028738
		1.850250						0.028299

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.79733
n_{1970}	1.97009	1.80374
n_{1530}	1.52958	1.81127
n_{1129}	1.12864	1.81935
n_t	1.01398	1.82252
n_s	0.85211	1.82864
$n_{A'}$	0.76819	1.83319
n_r	0.70652	1.83754
n_C	0.65627	**1.84204**
$n_{C'}$	0.64385	1.84332
n_{He-Ne}	0.6328	1.84453
n_D	0.58929	1.85000
n_d	0.58756	**1.85025**
n_e	0.54607	1.85694
n_F	0.48613	**1.87034**
$n_{F'}$	0.47999	1.87206
n_{He-Cd}	0.44157	1.88495
n_g	0.435835	**1.88726**
n_h	0.404656	1.90220
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	625
Yield Point (°C)	**At**	679
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	77
	(+100~+300°C)	92
Thermal Conductivity (W/m·K)	**k**	0.988

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1117
Rigidity Modulus (10⁸N/m²)	**G**	438
Poisson's Ratio	σ	0.275
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	140
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.95

Partial Dispersions

$n_C - n_t$	0.019520
$n_C - n_{A'}$	0.008849
$n_d - n_C$	0.008213
$n_e - n_C$	0.014901
$n_g - n_d$	0.037005
$n_g - n_F$	0.016919
$n_h - n_g$	0.014947
$n_i - n_g$	
$n_{C'} - n_t$	0.020801
$n_e - n_{C'}$	0.013620
$n_{F'} - n_e$	0.015118
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0021
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	0.0053
$\Delta\theta_{g,F}$	0.0051
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.92026488	
A_2	3.71535240	E-1
A_3	2.55205704	
B_1	1.18468028	E-2
B_2	5.32105472	E-2
B_3	2.04549300	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6898
$\theta_{C,A'}$	0.3127
$\theta_{d,C}$	0.2902
$\theta_{e,C}$	0.5266
$\theta_{g,d}$	1.3076
$\theta_{g,F}$	0.5979
$\theta_{h,g}$	0.5282
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7238
$\theta'_{e,C'}$	0.4739
$\theta'_{F',e}$	0.5261
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	399	λ_5	355

CCI

B	G	R
0.00	3.97	4.14

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.170	
365		
370	0.420	
380	0.600	
390	0.720	
400	0.810	
420	0.890	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.984	
2200	0.968	
2400	0.921	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	410
Specific Gravity	**d**	4.00		λ_5	355

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.5	2.5	2.5	2.8	3.3	4.3	5.6	
-20 ~ 0	1.5	2.5	2.6	2.9	3.4	4.5	5.9	
0 ~ 20	1.4	2.5	2.6	3.0	3.4	4.7	6.1	
20 ~ 40	1.4	2.6	2.6	3.0	3.5	4.8	6.3	
40 ~ 60	1.5	2.7	2.7	3.1	3.7	5.0	6.6	
60 ~ 80	1.6	2.8	2.9	3.3	3.9	5.3	6.9	

© OHARA GmbH – Hofheim – Germany

S-NBM51

613443
617440

Refractive Index	n_d	**1.61340**	Abbe Number	ν_d	**44.27**	Dispersion	$n_F - n_C$	**0.01386**
	n_e	1.613397		ν_e	44.02		$n_{F'} - n_{C'}$	0.013857
		1.616690						0.014008

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57660
n_{1970}	1.97009	1.58313
n_{1530}	1.52958	1.59012
n_{1129}	1.12864	1.59633
n_t	1.01398	1.59841
n_s	0.85211	1.60206
$n_{A'}$	0.76819	1.60459
n_r	0.70652	1.60691
n_C	0.65627	**1.60925**
$n_{C'}$	0.64385	1.60990
n_{He-Ne}	0.6328	1.61052
n_D	0.58929	1.61328
n_d	0.58756	**1.61340**
n_e	0.54607	1.61669
n_F	0.48613	**1.62311**
$n_{F'}$	0.47999	1.62391
n_{He-Cd}	0.44157	1.62986
n_g	0.435835	**1.63091**
n_h	0.404656	1.63755
n_i	0.365015	1.64927
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	509
Annealing Point (°C)	**AP**	531
Transformation Temperature (°C)	**Tg**	554
Yield Point (°C)	**At**	611
Softening Point (°C)	**SP**	693
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	65
	(+100~+300°C)	78
Thermal Conductivity (W/m·K)	**k**	0.904

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	817
Rigidity Modulus (10^8N/m^2)	**G**	329
Poisson's Ratio	σ	0.243
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	121
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.47

Partial Dispersions

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

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0281
$\Delta\theta_{C,A'}$	0.0070
$\Delta\theta_{g,d}$	-0.0089
$\Delta\theta_{g,F}$	-0.0065
$\Delta\theta_{i,g}$	-0.0294

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.37023101	
A_2	1.77665568	E-1
A_3	1.30515471	
B_1	8.71920342	E-3
B_2	4.05725552	E-2
B_3	1.12703058	E2
1129 ~ 2325 nm		
A_1	1.37023101	
A_2	1.77665568	E-1
A_3	1.30515471	
B_1	8.71920342	E-3
B_2	4.05725552	E-2
B_3	1.12703058	E2

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

Relative Partial Dispersions

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

Internal Transmittance

λ_{80}	344	λ_5	319

CCI

B	G	R
0.00	0.38	0.40

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.080	
330	0.480	
340	0.750	
350	0.870	
360	0.925	
365		
370	0.953	
380	0.968	
390	0.978	
400	0.984	
420	0.989	
440	0.992	
460	0.993	
480	0.995	
500	0.997	
550	0.999	
600	0.999	
650	0.999	
700	0.999	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.994	
1800	0.987	
2000	0.972	
2200	0.890	
2400	0.760	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	2.93		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.0	3.4	3.4	3.6	3.8	4.2	4.7	
-20 ~ 0	3.1	3.6	3.6	3.7	3.9	4.4	4.9	
0 ~ 20	3.2	3.7	3.7	3.9	4.1	4.6	5.1	
20 ~ 40	3.2	3.8	3.8	4.0	4.2	4.8	5.3	
40 ~ 60	3.4	3.9	4.0	4.2	4.4	4.9	5.5	
60 ~ 80	3.5	4.1	4.1	4.3	4.5	5.1	5.7	

© OHARA GmbH – Hofheim – Germany

S-NPH1

808228
816226

Refractive Index	n_d	**1.80809**	Abbe Number	ν_d	**22.76**	Dispersion	$n_F - n_C$	**0.03550**
	n_e	1.808095		ν_e	22.57		$n_{F'} - n_{C'}$	0.035504
		1.816434						0.036174

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.74455
n_{1970}	1.97009	1.75226
n_{1530}	1.52958	1.76125
n_{1129}	1.12864	1.77084
n_t	1.01398	1.77459
n_s	0.85211	1.78187
$n_{A'}$	0.76819	1.78731
n_r	0.70652	1.79256
n_C	0.65627	**1.79801**
$n_{C'}$	0.64385	1.79957
n_{He-Ne}	0.6328	1.80105
n_D	0.58929	1.80779
n_d	0.58756	**1.80809**
n_e	0.54607	1.81643
n_F	0.48613	**1.83351**
$n_{F'}$	0.47999	1.83575
n_{He-Cd}	0.44157	1.85279
n_g	0.435835	**1.85590**
n_h	0.404656	1.87658
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	516
Annealing Point (°C)	**AP**	547
Transformation Temperature (°C)	**Tg**	552
Yield Point (°C)	**At**	589
Softening Point (°C)	**SP**	645
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	83
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	0.882

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	893
Rigidity Modulus (10^8N/m^2)	**G**	357
Poisson's Ratio	σ	0.250
Knoop Hardness	**Hk**	460 [5]
Abrasion	**Aa**	291
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.23

Partial Dispersions

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

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0020
$\Delta\theta_{g,d}$	0.0292
$\Delta\theta_{g,F}$	0.0261
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.75156623	
A_2	3.64006304	E-1
A_3	2.47874141	
B_1	1.35004681	E-2
B_2	6.68245147	E-2
B_3	1.70756006	E2
1129 ~ 2325 nm		
A_1	1.75156623	
A_2	3.64006304	E-1
A_3	2.47874141	
B_1	1.35004681	E-2
B_2	6.68245147	E-2
B_3	1.70756006	E2

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

Relative Partial Dispersions

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

Internal Transmittance

λ_{80}	404	λ_5	378

CCI

B	G	R
0.00	4.24	4.43

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370		
380	0.140	
390	0.530	
400	0.770	
420	0.917	
440	0.952	
460	0.967	
480	0.975	
500	0.982	
550	0.992	
600	0.994	
650	0.995	
700	0.996	
800	0.997	
900	0.997	
1000	0.996	
1200	0.997	
1400	0.994	
1600	0.992	
1800	0.984	
2000	0.973	
2200	0.934	
2400	0.880	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	44
Specific Gravity	**d**	3.29		λ_5	38

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.9	-1.2	-1.1	-0.7	-0.2	1.2	3.0	
-20 ~ 0	-1.9	-1.1	-1.0	-0.6		1.5	3.4	
0 ~ 20	-1.8	-0.9	-0.8	-0.4	0.2	1.8	3.8	
20 ~ 40	-1.8	-0.8	-0.7	-0.3	0.4	2.1	4.3	
40 ~ 60	-1.8	-0.7	-0.6	-0.1	0.6	2.4	4.7	
60 ~ 80	-1.7	-0.5	-0.4	0.1	0.8	2.7	5.1	

© OHARA GmbH – Hofheim – Germany

S-NPH1W

808228
816226

Refractive Index	n_d	**1.80809**	Abbe Number	ν_d	**22.76**	Dispersion	$n_F - n_C$	**0.03550**
	n_e	1.808095		ν_e	22.57		$n_{F'} - n_{C'}$	0.035504
		1.816434						0.036174

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.74455
n_{1970}	1.97009	1.75226
n_{1530}	1.52958	1.76125
n_{1129}	1.12864	1.77084
n_t	1.01398	1.77459
n_s	0.85211	1.78187
$n_{A'}$	0.76819	1.78731
n_r	0.70652	1.79256
n_C	0.65627	**1.79801**
$n_{C'}$	0.64385	1.79957
n_{He-Ne}	0.6328	1.80105
n_D	0.58929	1.80779
n_d	0.58756	**1.80809**
n_e	0.54607	1.81643
n_F	0.48613	**1.83351**
$n_{F'}$	0.47999	1.83575
n_{He-Cd}	0.44157	1.85279
n_g	0.435835	**1.85590**
n_h	0.404656	1.87658
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	516
Annealing Point (°C)	**AP**	547
Transformation Temperature (°C)	**Tg**	552
Yield Point (°C)	**At**	589
Softening Point (°C)	**SP**	645
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	83
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	0.882

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	893
Rigidity Modulus (10^8N/m^2)	**G**	357
Poisson's Ratio	σ	0.250
Knoop Hardness	**Hk**	460 [5]
Abrasion	**Aa**	291
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.23

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

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

Constants of Dispersion Formula		
326 ~ 1129 nm		
A 1	1.75156623	
A 2	3.64006304	E-1
A 3	2.47874141	
B 1	1.35004681	E-2
B 2	6.68245147	E-2
B 3	1.70756006	E2
1129 ~ 2325 nm		
A 1	1.75156623	
A 2	3.64006304	E-1
A 3	2.47874141	
B 1	1.35004681	E-2
B 2	6.68245147	E-2
B 3	1.70756006	E2

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

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

Internal Transmittance			
λ_{80}	395	λ_5	372

CCI		
B	G	R
0.00	2.65	2.84

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370		
380	0.280	
390	0.670	
400	0.870	
420	0.956	
440	0.972	
460	0.978	
480	0.983	
500	0.986	
550	0.993	
600	0.996	
650	0.997	
700	0.998	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.994	
1800	0.986	
2000	0.973	
2200	0.932	
2400	0.880	

Other Properties						
Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	420	
Specific Gravity	**d**	3.29		λ_5	375	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.9	-1.2	-1.1	-0.7	-0.2	1.2	3.0	
-20 ~ 0	-1.9	-1.1	-1.0	-0.6	0.0	1.5	3.4	
0 ~ 20	-1.8	-0.9	-0.8	-0.4	0.2	1.8	3.8	
20 ~ 40	-1.8	-0.8	-0.7	-0.3	0.4	2.1	4.3	
40 ~ 60	-1.8	-0.7	-0.6	-0.1	0.6	2.4	4.7	
60 ~ 80	-1.7	-0.5	-0.4	0.1	0.8	2.7	5.1	

© OHARA GmbH – Hofheim – Germany

S-NPH2

923189
934187

Refractive Index	n_d	**1.92286**	Abbe Number	ν_d	**18.90**	Dispersion	$n_F - n_C$	**0.04884**
	n_e	1.922860		ν_e	18.74		$n_{F'} - n_{C'}$	0.048838
		1.934291						0.049853

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.84214
n_{1970}	1.97009	1.85093
n_{1530}	1.52958	1.86146
n_{1129}	1.12864	1.87327
n_t	1.01398	1.87807
n_s	0.85211	1.88758
$n_{A'}$	0.76819	1.89479
n_r	0.70652	1.90181
n_C	0.65627	**1.90916**
$n_{C'}$	0.64385	1.91127
n_{He-Ne}	0.6328	1.91327
n_D	0.58929	1.92245
n_d	0.58756	**1.92286**
n_e	0.54607	1.93429
n_F	0.48613	**1.95800**
$n_{F'}$	0.47999	1.96112
n_{He-Cd}	0.44157	1.98526
n_g	0.435835	**1.98972**
n_h	0.404656	2.01976
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	604
Annealing Point (°C)	**AP**	631
Transformation Temperature (°C)	**Tg**	650
Yield Point (°C)	**At**	676
Softening Point (°C)	**SP**	716
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	67
	(+100~+300°C)	83
Thermal Conductivity (W/m·K)	**k**	0.969

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	991
Rigidity Modulus (10^8N/m^2)	**G**	397
Poisson's Ratio	σ	0.249
Knoop Hardness	**Hk**	450 [5]
Abrasion	**Aa**	224
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.31

Partial Dispersions

$n_C - n_t$	0.031086
$n_C - n_{A'}$	0.014367
$n_d - n_C$	0.013702
$n_e - n_C$	0.025133
$n_g - n_d$	0.066857
$n_g - n_F$	0.031721
$n_h - n_g$	0.030046
$n_i - n_g$	
$n_{C'} - n_t$	0.033200
$n_e - n_{C'}$	0.023019
$n_{F'} - n_e$	0.026834
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0012
$\Delta\theta_{C,A'}$	-0.0045
$\Delta\theta_{g,d}$	0.0436
$\Delta\theta_{g,F}$	0.0386
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.03869510	
A_2	4.37269641	E-1
A_3	2.96711461	
B_1	1.70796224	E-2
B_2	7.49254813	E-2
B_3	1.74155354	E2
1129 ~ 2325 nm		
A_1	2.03869510	
A_2	4.37269641	E-1
A_3	2.96711461	
B_1	1.70796224	E-2
B_2	7.49254813	E-2
B_3	1.74155354	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6365
$\theta_{C,A'}$	0.2942
$\theta_{d,C}$	0.2806
$\theta_{e,C}$	0.5146
$\theta_{g,d}$	1.3690
$\theta_{g,F}$	0.6495
$\theta_{h,g}$	0.6152
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6660
$\theta'_{e,C'}$	0.4617
$\theta'_{F',e}$	0.5383
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	433	λ_5	391

CCI

B	G	R
0.00	12.87	13.51

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370		
380		
390	0.020	
400	0.240	
420	0.700	
440	0.850	
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	
1000	0.996	
1200	0.997	
1400	0.997	
1600	0.996	
1800	0.992	
2000	0.988	
2200	0.977	
2400	0.961	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	
Specific Gravity	**d**	3.58		λ_5	39

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.6	0.4	0.5	1.2	1.8	3.8	6.6	
-20 ~ 0	-0.6	0.6	0.7	1.4	2.1	4.3	7.4	
0 ~ 20	-0.4	0.9	1.0	1.8	2.5	4.8	8.1	
20 ~ 40	-0.2	1.1	1.3	2.1	2.8	5.4	8.8	
40 ~ 60	0.0	1.4	1.5	2.3	3.2	5.9	9.6	
60 ~ 80	0.2	1.6	1.8	2.7	3.6	6.4	10.3	

© OHARA GmbH – Hofheim – Germany

S-NPH3

959175
972173

Refractive Index	n_d	**1.95906**	Abbe Number	ν_d	**17.47**	Dispersion	$n_F - n_C$	**0.05490**
	n_e	1.959060		ν_e	17.33		$n_{F'} - n_{C'}$	0.054895
		1.971885						0.056091

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.87064
n_{1970}	1.97009	1.88003
n_{1530}	1.52958	1.89131
n_{1129}	1.12864	1.90412
n_t	1.01398	1.90937
n_s	0.85211	1.91984
$n_{A'}$	0.76819	1.92780
n_r	0.70652	1.93559
n_C	0.65627	**1.94376**
$n_{C'}$	0.64385	1.94612
n_{He-Ne}	0.6328	1.94835
n_D	0.58929	1.95860
n_d	0.58756	**1.95906**
n_e	0.54607	1.97189
n_F	0.48613	**1.99866**
$n_{F'}$	0.47999	2.00221
n_{He-Cd}	0.44157	2.02976
n_g	0.435835	**2.03488**
n_h	0.404656	2.06965
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	671
Yield Point (°C)	**At**	704
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	59
	(+100~+300°C)	65
Thermal Conductivity (W/m·K)	**k**	1.007

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1022
Rigidity Modulus (10⁸N/m²)	**G**	411
Poisson's Ratio	σ	0.243
Knoop Hardness	**Hk**	450 [5]
Abrasion	**Aa**	194
Photoelastic Constant (nm/cm/10⁵ Pa)	β	3.35

Partial Dispersions

$n_C - n_t$	0.034388
$n_C - n_{A'}$	0.015956
$n_d - n_C$	0.015300
$n_e - n_C$	0.028125
$n_g - n_d$	0.075817
$n_g - n_F$	0.036222
$n_h - n_g$	0.034773
$n_i - n_g$	
$n_{C'} - n_t$	0.036744
$n_e - n_{C'}$	0.025769
$n_{F'} - n_e$	0.030322
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0022
$\Delta\theta_{C,A'}$	-0.0063
$\Delta\theta_{g,d}$	0.0527
$\Delta\theta_{g,F}$	0.0466
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	2.09834903	
A_2	4.89088388	E-1
A_3	2.94009268	
B_1	1.79123869	E-2
B_2	7.76653353	E-2
B_3	1.60930428	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6264
$\theta_{C,A'}$	0.2907
$\theta_{d,C}$	0.2787
$\theta_{e,C}$	0.5123
$\theta_{g,d}$	1.3811
$\theta_{g,F}$	0.6598
$\theta_{h,g}$	0.6334
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6551
$\theta'_{e,C'}$	0.4594
$\theta'_{F',e}$	0.5406
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	430	λ_5	398

CCI

B	G	R
0.00	13.14	13.56

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370		
380		
390	0.040	
400	0.120	
420	0.720	
440	0.880	
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	
1000	0.998	
1200	0.999	
1400	0.998	
1600	0.995	
1800	0.989	
2000	0.983	
2200	0.968	
2400	0.949	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$		44
Specific Gravity	**d**	3.59		λ_5	40	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.6	2.1	2.2	2.8	3.7	6.2	9.6	
-20 ~ 0	0.8	2.4	2.6	3.2	4.2	6.9	10.6	
0 ~ 20	1.1	2.8	2.9	3.6	4.6	7.6	11.6	
20 ~ 40	1.2	3.1	3.2	3.9	5.0	8.2	12.4	
40 ~ 60	1.4	3.4	3.5	4.3	5.5	8.8	13.3	
60 ~ 80	1.7	3.8	3.9	4.8	6.0	9.5	14.3	

© OHARA GmbH – Hofheim – Germany

S-NPH4

893204
903202

Refractive Index	n_d	**1.89286**	Abbe Number	ν_d	**20.36**	Dispersion	$n_F - n_C$	**0.04385**
	n_e	1.903144		ν_e	20.20		$n_{F'} - n_{C'}$	0.044721
		1.892860						0.043851

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.81864
n_{1970}	1.97009	1.82694
n_{1530}	1.52958	1.83681
n_{1129}	1.12864	1.84777
n_t	1.01398	1.85218
n_s	0.85211	1.86088
$n_{A'}$	0.76819	1.86745
n_r	0.70652	1.87383
n_C	0.65627	**1.88048**
$n_{C'}$	0.64385	1.88240
n_{He-Ne}	0.6328	1.88421
n_D	0.58929	1.89249
n_d	0.58756	**1.89286**
n_e	0.54607	1.90314
n_F	0.48613	**1.92434**
$n_{F'}$	0.47999	1.92712
n_{He-Cd}	0.44157	1.94846
n_g	0.435835	**1.95237**
n_h	0.404656	1.97853
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	638
Yield Point (°C)	**At**	668
Softening Point (°C)	**SP**	711
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	73
	(+100~+300°C)	88
Thermal Conductivity (W/m·K)	**k**	0.925

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	945
Rigidity Modulus (10^8N/m^2)	**G**	377
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	440 [4]
Abrasion	**Aa**	213
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.39

Partial Dispersions

$n_C - n_t$	0.028304
$n_C - n_{A'}$	0.013036
$n_d - n_C$	0.012376
$n_e - n_C$	0.022660
$n_g - n_d$	0.059511
$n_g - n_F$	0.028036
$n_h - n_g$	0.026158
$n_i - n_g$	
$n_{C'} - n_t$	0.030217
$n_e - n_{C'}$	0.020747
$n_{F'} - n_e$	0.023974
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0033
$\Delta\theta_{C,A'}$	-0.0032
$\Delta\theta_{g,d}$	0.0347
$\Delta\theta_{g,F}$	0.0308
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.93563931	
A_2	4.49596478	E-1
A_3	2.71828573	
B_1	1.52585289	E-2
B_2	6.96815778	E-2
B_3	1.70327149	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6455
$\theta_{C,A'}$	0.2973
$\theta_{d,C}$	0.2822
$\theta_{e,C}$	0.5167
$\theta_{g,d}$	1.3571
$\theta_{g,F}$	0.6393
$\theta_{h,g}$	0.5965
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6757
$\theta'_{e,C'}$	0.4639
$\theta'_{F',e}$	0.5361
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	409	λ_5	380

CCI

B	G	R
0.00	4.93	5.17

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370		
380	0.060	
390	0.390	
400	0.710	
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.995	
1800	0.984	
2000	0.971	
2200	0.948	
2400	0.915	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	410
Specific Gravity	**d**	3.61		λ_5	380

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.1	0.1	0.2	0.6	1.3	3.0	5.3	
-20 ~ 0	-1.1	0.2	0.3	0.7	1.5	3.4	5.8	
0 ~ 20	-1.0	0.3	0.4	0.9	1.7	3.7	6.3	
20 ~ 40	-1.0	0.4	0.5	1.1	1.9	4.1	6.8	
40 ~ 60	-0.9	0.6	0.7	1.3	2.1	4.4	7.4	
60 ~ 80	-0.7	0.8	0.9	1.6	2.4	4.9	8.0	

© OHARA GmbH – Hofheim – Germany

S-NPH5

859227
868225

Refractive Index	n_d	**1.85896**	Abbe Number	ν_d	**22.73**	Dispersion	$n_F - n_C$	**0.03779**
	n_e	1.858956		ν_e	22.54		$n_{F'} - n_{C'}$	0.037792
		1.867836						0.038499

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.79247
n_{1970}	1.97009	1.80027
n_{1530}	1.52958	1.80944
n_{1129}	1.12864	1.81938
n_t	1.01398	1.82333
n_s	0.85211	1.83104
$n_{A'}$	0.76819	1.83681
n_r	0.70652	1.84240
n_C	0.65627	**1.84821**
$n_{C'}$	0.64385	1.84987
n_{He-Ne}	0.6328	1.85145
n_D	0.58929	1.85863
n_d	0.58756	**1.85896**
n_e	0.54607	1.86784
n_F	0.48613	**1.88600**
$n_{F'}$	0.47999	1.88837
n_{He-Cd}	0.44157	1.90645
n_g	0.435835	**1.90975**
n_h	0.404656	1.93160
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	573
Annealing Point (°C)	**AP**	599
Transformation Temperature (°C)	**Tg**	609
Yield Point (°C)	**At**	651
Softening Point (°C)	**SP**	704
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	76
	(+100~+300°C)	84
Thermal Conductivity (W/m·K)	**k**	0.877

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	929
Rigidity Modulus (10^8N/m^2)	**G**	370
Poisson's Ratio	σ	0.256
Knoop Hardness	**Hk**	470 [5]
Abrasion	**Aa**	224
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.18

Partial Dispersions

$n_C - n_t$	0.024883
$n_C - n_{A'}$	0.011397
$n_d - n_C$	0.010747
$n_e - n_C$	0.019627
$n_g - n_d$	0.050792
$n_g - n_F$	0.023747
$n_h - n_g$	0.021851
$n_i - n_g$	
$n_{C'} - n_t$	0.026548
$n_e - n_{C'}$	0.017962
$n_{F'} - n_e$	0.020537
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0018
$\Delta\theta_{g,d}$	0.0265
$\Delta\theta_{g,F}$	0.0237
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.89108996	
A_2	3.95220126	E-1
A_3	2.20492127	
B_1	1.41164499	E-2
B_2	6.62834445	E-2
B_3	1.48680700	E2
1129 ~ 2325 nm		
A_1	1.89108996	
A_2	3.95220126	E-1
A_3	2.20492127	
B_1	1.41164499	E-2
B_2	6.62834445	E-2
B_3	1.48680700	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6584
$\theta_{C,A'}$	0.3016
$\theta_{d,C}$	0.2844
$\theta_{e,C}$	0.5193
$\theta_{g,d}$	1.3440
$\theta_{g,F}$	0.6284
$\theta_{h,g}$	0.5782
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6896
$\theta'_{e,C'}$	0.4666
$\theta'_{F',e}$	0.5334
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	397	λ_5	364

CCI

B	G	R
0.00	3.38	3.62

Internal Transmittance

λ (nm)	τ_i 10 mm	τ_i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.030	
365		
370	0.080	
380	0.410	
390	0.720	
400	0.840	
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	
1000	0.998	
1200	0.999	
1400	0.996	
1600	0.993	
1800	0.984	
2000	0.972	
2200	0.944	
2400	0.915	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	3.71		λ_5	370

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.0	1.0	1.1	1.5	2.0	3.5	5.3	
-20 ~ 0	0.0	1.1	1.2	1.6	2.2	3.8	5.8	
0 ~ 20	0.0	1.2	1.3	1.7	2.4	4.1	6.2	
20 ~ 40	0.1	1.3	1.4	1.9	2.6	4.4	6.6	
40 ~ 60	0.2	1.5	1.6	2.1	2.8	4.7	7.0	
60 ~ 80	0.3	1.7	1.8	2.3	3.1	5.1	7.6	

© OHARA GmbH – Hofheim – Germany

S-NPH53

847239
855237

Refractive Index	n_d	**1.84666**	Abbe Number	ν_d	**23.88**	Dispersion	$n_F - n_C$	**0.03545**
	n_e	1.846660		ν_e	23.69		$n_{F'} - n_{C'}$	0.035449
		1.855001						0.036088

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78347
n_{1970}	1.97009	1.79094
n_{1530}	1.52958	1.79971
n_{1129}	1.12864	1.80921
n_t	1.01398	1.81297
n_s	0.85211	1.82029
$n_{A'}$	0.76819	1.82577
n_r	0.70652	1.83105
n_C	0.65627	**1.83654**
$n_{C'}$	0.64385	1.83811
n_{He-Ne}	0.6328	1.83959
n_D	0.58929	1.84636
n_d	0.58756	**1.84666**
n_e	0.54607	1.85500
n_F	0.48613	**1.87199**
$n_{F'}$	0.47999	1.87420
n_{He-Cd}	0.44157	1.89098
n_g	0.435835	**1.89403**
n_h	0.404656	1.91412
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	569
Annealing Point (°C)	**AP**	590
Transformation Temperature (°C)	**Tg**	621
Yield Point (°C)	**At**	663
Softening Point (°C)	**SP**	715
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	74
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	0.830

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	886
Rigidity Modulus (10^8N/m^2)	**G**	352
Poisson's Ratio	σ	0.258
Knoop Hardness	**Hk**	420 [4]
Abrasion	**Aa**	286
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.18

Partial Dispersions

$n_C - n_t$	0.023568
$n_C - n_{A'}$	0.010771
$n_d - n_C$	0.010123
$n_e - n_C$	0.018464
$n_g - n_d$	0.047367
$n_g - n_F$	0.022041
$n_h - n_g$	0.020094
$n_i - n_g$	
$n_{C'} - n_t$	0.025139
$n_e - n_{C'}$	0.016893
$n_{F'} - n_e$	0.019195
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0010
$\Delta\theta_{g,d}$	0.0211
$\Delta\theta_{g,F}$	0.0190
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.85484904	
A_2	3.96194484	E-1
A_3	2.43512461	
B_1	1.34621486	E-2
B_2	6.31945361	E-2
B_3	1.70864886	E2
1129 ~ 2325 nm		
A_1	1.85484904	
A_2	3.96194484	E-1
A_3	2.43512461	
B_1	1.34621486	E-2
B_2	6.31945361	E-2
B_3	1.70864886	E-2

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**	2.3
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.6648
$\theta_{C,A'}$	0.3038
$\theta_{d,C}$	0.2856
$\theta_{e,C}$	0.5209
$\theta_{g,d}$	1.3362
$\theta_{g,F}$	0.6218
$\theta_{h,g}$	0.5668
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6966
$\theta'_{e,C'}$	0.4681
$\theta'_{F',e}$	0.5319
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	394	λ_5	360

CCI

B	G	R
0.00	3.24	3.66

Internal Transmittance

λ (nm)	τ_i 10 mm	τ_i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.050	
365		
370	0.340	
380	0.630	
390	0.770	
400	0.850	
420	0.914	
440	0.940	
460	0.953	
480	0.962	
500	0.971	
550	0.988	
600	0.994	
650	0.996	
700	0.997	
800	0.998	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.995	
1800	0.986	
2000	0.976	
2200	0.952	
2400	0.927	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40		
Specific Gravity	**d**	3.78		λ_5	36		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.9	0.1	0.2	0.5	1.1	2.4	4.0	
-20 ~ 0	-0.8	0.2	0.3	0.7	1.2	2.6	4.4	
0 ~ 20	-0.8	0.3	0.4	0.8	1.4	2.9	4.8	
20 ~ 40	-0.8	0.4	0.5	1.0	1.6	3.2	5.2	
40 ~ 60	-0.7	0.6	0.7	1.1	1.8	3.5	5.6	
60 ~ 80	-0.7	0.7	0.8	1.3	2.0	3.7	6.0	

© OHARA GmbH – Hofheim – Germany

S-NSL3

518590
520586

Refractive Index	n_d	**1.51823**	Abbe Number	ν_d	**58.90**	Dispersion	$n_F - n_C$	**0.00879**
	n_e	1.520326		ν_e	58.63		$n_{F'} - n_{C'}$	0.008798 / 0.008875

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.49273
n_{1970}	1.97009	1.49747
n_{1530}	1.52958	1.50252
n_{1129}	1.12864	1.50692
n_t	1.01398	1.50835
n_s	0.85211	1.51083
$n_{A'}$	0.76819	1.51250
n_r	0.70652	1.51403
n_C	0.65627	**1.51556**
$n_{C'}$	0.64385	1.51598
n_{He-Ne}	0.6328	1.51638
n_D	0.58929	1.51815
n_d	0.58756	**1.51823**
n_e	0.54607	1.52033
n_F	0.48613	**1.52435**
$n_{F'}$	0.47999	1.52486
n_{He-Cd}	0.44157	1.52852
n_g	0.435835	**1.52915**
n_h	0.404656	1.53315
n_i	0.365015	1.53999
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	455
Annealing Point (°C)	**AP**	492
Transformation Temperature (°C)	**Tg**	500
Yield Point (°C)	**At**	553
Softening Point (°C)	**SP**	668
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	90
	(+100~+300°C)	110
Thermal Conductivity (W/m·K)	**k**	1.026

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	700
Rigidity Modulus (10^8N/m^2)	**G**	288
Poisson's Ratio	σ	0.217
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	111
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.6

Partial Dispersions

$n_C - n_t$	0.007206
$n_C - n_{A'}$	0.003052
$n_d - n_C$	0.002673
$n_e - n_C$	0.004770
$n_g - n_d$	0.010926
$n_g - n_F$	0.004801
$n_h - n_g$	0.003996
$n_i - n_g$	0.010832
$n_{C'} - n_t$	0.007631
$n_e - n_{C'}$	0.004345
$n_{F'} - n_e$	0.004530
$n_i - n_{F'}$	0.015131

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0040
$\Delta\theta_{C,A'}$	-0.0004
$\Delta\theta_{g,d}$	-0.0005
$\Delta\theta_{g,F}$	-0.0005
$\Delta\theta_{i,g}$	-0.0006

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	8.82514764	E-1
A_2	3.89271907	E-1
A_3	1.10693448	
B_1	4.64504582	E-3
B_2	2.00551397	E-2
B_3	1.36234339	E2
1129 ~ 2325 nm		
A_1	8.82514764	E-1
A_2	3.89271907	E-1
A_3	1.10693448	
B_1	4.64504582	E-3
B_2	2.00551397	E-2
B_3	1.36234339	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.8190
$\theta_{C,A'}$	0.3469
$\theta_{d,C}$	0.3038
$\theta_{e,C}$	0.5422
$\theta_{g,d}$	1.2419
$\theta_{g,F}$	0.5457
$\theta_{h,g}$	0.4542
$\theta_{i,g}$	1.2312
$\theta'_{C',t}$	0.8598
$\theta'_{e,C'}$	0.4896
$\theta'_{F',e}$	0.5104
$\theta'_{i,F'}$	1.7049

Internal Transmittance

λ_{80}	340	λ_5	317

CCI

B	G	R
0.00	0.09	0.06

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.150	
330	0.530	
340	0.800	
350	0.924	
360	0.968	
365		
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	
1000	0.997	
1200	0.997	
1400	0.992	
1600	0.991	
1800	0.968	
2000	0.930	
2200	0.860	
2400	0.810	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	2.48		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.3	0.6	0.6	0.7	0.8	1.1	1.4	
-20 ~ 0	0.3	0.6	0.6	0.7	0.8	1.1	1.4	
0 ~ 20	0.3	0.6	0.6	0.7	0.9	1.2	1.5	
20 ~ 40	0.3	0.6	0.6	0.7	0.9	1.2	1.6	
40 ~ 60	0.3	0.6	0.7	0.8	0.9	1.3	1.6	
60 ~ 80	0.3	0.6	0.7	0.8	1.0	1.3	1.7	

© OHARA GmbH – Hofheim – Germany

S-NSL5

522598
525596

Refractive Index	n_d	**1.52249**	Abbe Number	ν_d	**59.84**	Dispersion	$n_F - n_C$	**0.00874**
	n_e	1.524576		ν_e	59.58		$n_{F'} - n_{C'}$	0.008805
		1.522494						0.008732

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.49592
n_{1970}	1.97009	1.50104
n_{1530}	1.52958	1.50646
n_{1129}	1.12864	1.51108
n_t	1.01398	1.51256
n_s	0.85211	1.51509
$n_{A'}$	0.76819	1.51678
n_r	0.70652	1.51831
n_C	0.65627	**1.51983**
$n_{C'}$	0.64385	1.52026
n_{He-Ne}	0.6328	1.52065
n_D	0.58929	1.52242
n_d	0.58756	**1.52249**
n_e	0.54607	1.52458
n_F	0.48613	**1.52857**
$n_{F'}$	0.47999	1.52906
n_{He-Cd}	0.44157	1.53269
n_g	0.435835	**1.53332**
n_h	0.404656	1.53727
n_i	0.365015	1.54403
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	502
Annealing Point (°C)	**AP**	536
Transformation Temperature (°C)	**Tg**	548
Yield Point (°C)	**At**	596
Softening Point (°C)	**SP**	700
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	82
	(+100~+300°C)	95
Thermal Conductivity (W/m·K)	**k**	1.058

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	691
Rigidity Modulus (10^8N/m^2)	**G**	303
Poisson's Ratio	σ	0.140
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	114
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.67

Partial Dispersions

$n_C - n_t$	0.007270
$n_C - n_{A'}$	0.003054
$n_d - n_C$	0.002660
$n_e - n_C$	0.004742
$n_g - n_d$	0.010822
$n_g - n_F$	0.004750
$n_h - n_g$	0.003952
$n_i - n_g$	0.010715
$n_{C'} - n_t$	0.007694
$n_e - n_{C'}$	0.004318
$n_{F'} - n_e$	0.004487
$n_i - n_{F'}$	0.014968

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0052
$\Delta\theta_{C,A'}$	0.0013
$\Delta\theta_{g,d}$	-0.0011
$\Delta\theta_{g,F}$	-0.0007
$\Delta\theta_{i,g}$	0.0032

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.04574577	
A_2	2.39613026	E-1
A_3	1.15906850	
B_1	5.85232280	E-3
B_2	2.36858752	E-2
B_3	1.31329061	E2
1129 ~ 2325 nm		
A_1	1.04574577	
A_2	2.39613026	E-1
A_3	1.15906850	
B_1	5.85232280	E-3
B_2	2.36858752	E-2
B_3	1.31329061	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.8326
$\theta_{C,A'}$	0.3497
$\theta_{d,C}$	0.3046
$\theta_{e,C}$	0.5431
$\theta_{g,d}$	1.2393
$\theta_{g,F}$	0.5440
$\theta_{h,g}$	0.4526
$\theta_{i,g}$	1.2271
$\theta'_{C',t}$	0.8738
$\theta'_{e,C'}$	0.4904
$\theta'_{F',e}$	0.5096
$\theta'_{i,F'}$	1.6999

Internal Transmittance

λ_{80}	347	λ_5	320

CCI

B	G	R
0.00	0.11	0.08

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.040	
330	0.320	
340	0.670	
350	0.860	
360	0.941	
365		
370	0.972	
380	0.984	
390	0.992	
400	0.995	
420	0.996	
440	0.996	
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	
1000	0.998	
1200	0.997	
1400	0.988	
1600	0.992	
1800	0.972	
2000	0.939	
2200	0.860	
2400	0.810	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35		
Specific Gravity	**d**	2.49		λ_5	32		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.0	1.1	1.2	1.2	1.4	1.6	1.9	
-20 ~ 0	1.0	1.2	1.2	1.3	1.4	1.7	2.0	
0 ~ 20	1.0	1.2	1.3	1.4	1.5	1.8	2.1	
20 ~ 40	1.0	1.3	1.3	1.4	1.6	1.9	2.2	
40 ~ 60	1.0	1.4	1.4	1.5	1.6	2.0	2.3	
60 ~ 80	1.1	1.4	1.4	1.5	1.7	2.0	2.4	

© OHARA GmbH – Hofheim – Germany

S-NSL36

517524
520522

Refractive Index	n_d	**1.51742**	Abbe Number	ν_d	**52.43**	Dispersion	$n_F - n_C$	**0.00987**
	n_e	1.517417		ν_e	52.14		$n_{F'} - n_{C'}$	0.009869
		1.519765						0.009968

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.49004
n_{1970}	1.97009	1.49501
n_{1530}	1.52958	1.50033
n_{1129}	1.12864	1.50501
n_t	1.01398	1.50656
n_s	0.85211	1.50924
$n_{A'}$	0.76819	1.51108
n_r	0.70652	1.51276
n_C	0.65627	**1.51444**
$n_{C'}$	0.64385	1.51492
n_{He-Ne}	0.6328	1.51536
n_D	0.58929	1.51733
n_d	0.58756	**1.51742**
n_e	0.54607	1.51976
n_F	0.48613	**1.52431**
$n_{F'}$	0.47999	1.52488
n_{He-Cd}	0.44157	1.52907
n_g	0.435835	**1.52980**
n_h	0.404656	1.53444
n_i	0.365015	1.54252
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	429
Annealing Point (°C)	**AP**	465
Transformation Temperature (°C)	**Tg**	464
Yield Point (°C)	**At**	522
Softening Point (°C)	**SP**	655
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	80
	(+100~+300°C)	93
Thermal Conductivity (W/m·K)	**k**	1.089

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	640
Rigidity Modulus (10^8N/m^2)	**G**	281
Poisson's Ratio	σ	0.139
Knoop Hardness	**Hk**	480 [5]
Abrasion	**Aa**	103
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.82

Partial Dispersions	
$n_C - n_t$	0.007887
$n_C - n_{A'}$	0.003365
$n_d - n_C$	0.002973
$n_e - n_C$	0.005321
$n_g - n_d$	0.012387
$n_g - n_F$	0.005491
$n_h - n_g$	0.004635
$n_i - n_g$	0.012715
$n_{C'} - n_t$	0.008359
$n_e - n_{C'}$	0.004849
$n_{F'} - n_e$	0.005119
$n_i - n_{F'}$	0.017635

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0065
$\Delta\theta_{C,A'}$	0.0016
$\Delta\theta_{g,d}$	-0.0007
$\Delta\theta_{g,F}$	-0.0002
$\Delta\theta_{i,g}$	0.0024

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.09666153	
A_2	1.68990073	E-1
A_3	1.20580827	
B_1	6.67491123	E-3
B_2	3.36095450	E-2
B_3	1.41668738	E2
1129 ~ 2325 nm		
A_1	1.09666153	
A_2	1.68990073	E-1
A_3	1.20580827	
B_1	6.67491123	E-3
B_2	3.36095450	E-2
B_3	1.41668738	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7992
$\theta_{C,A'}$	0.3410
$\theta_{d,C}$	0.3012
$\theta_{e,C}$	0.5392
$\theta_{g,d}$	1.2551
$\theta_{g,F}$	0.5564
$\theta_{h,g}$	0.4697
$\theta_{i,g}$	1.2884
$\theta'_{C',t}$	0.8386
$\theta'_{e,C'}$	0.4865
$\theta'_{F',e}$	0.5135
$\theta'_{i,F'}$	1.7692

Internal Transmittance			
λ_{80}	360	λ_5	337

CCI		
B	G	R
0.00	0.22	0.20

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.180	
350	0.570	
360	0.810	
365		
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	
1000	0.998	
1200	0.998	
1400	0.996	
1600	0.994	
1800	0.978	
2000	0.950	
2200	0.890	
2400	0.860	

Other Properties					
Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	2.46		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.8	2.2	2.2	2.3	2.5	2.8	3.2	
-20 ~ 0	1.8	2.2	2.2	2.3	2.5	2.9	3.3	
0 ~ 20	1.8	2.2	2.3	2.4	2.6	2.9	3.3	
20 ~ 40	1.9	2.3	2.3	2.4	2.6	3.0	3.4	
40 ~ 60	1.9	2.3	2.3	2.5	2.7	3.1	3.5	
60 ~ 80	1.9	2.3	2.3	2.5	2.7	3.1	3.6	

© OHARA GmbH – Hofheim – Germany

S-PHM52

618634
620630

Refractive Index	n_d	**1.61800**	Abbe Number	ν_d	**63.33**	Dispersion	$n_F - n_C$	**0.00975**
	n_e	1.620327		ν_e	63.02		$n_{F'} - n_{C'}$	0.009844
		1.618000						0.009758

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.59108
n_{1970}	1.97009	1.59587
n_{1530}	1.52958	1.60103
n_{1129}	1.12864	1.60561
n_t	1.01398	1.60714
n_s	0.85211	1.60983
$n_{A'}$	0.76819	1.61167
n_r	0.70652	1.61335
n_C	0.65627	**1.61504**
$n_{C'}$	0.64385	1.61551
n_{He-Ne}	0.6328	1.61595
n_D	0.58929	1.61791
n_d	0.58756	**1.61800**
n_e	0.54607	1.62033
n_F	0.48613	**1.62479**
$n_{F'}$	0.47999	1.62535
n_{He-Cd}	0.44157	1.62940
n_g	0.435835	**1.63010**
n_h	0.404656	1.63451
n_i	0.365015	1.64199
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	587
Yield Point (°C)	**At**	617
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	101
	(+100~+300°C)	120
Thermal Conductivity (W/m·K)	**k**	0.599

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	715
Rigidity Modulus (10^8N/m^2)	**G**	277
Poisson's Ratio	σ	0.292
Knoop Hardness	**Hk**	390 [4]
Abrasion	**Aa**	434
Photoelastic Constant (nm/cm/10^5 Pa)	β	1

Partial Dispersions

$n_C - n_t$	0.007893
$n_C - n_{A'}$	0.003370
$n_d - n_C$	0.002964
$n_e - n_C$	0.005291
$n_g - n_d$	0.012103
$n_g - n_F$	0.005309
$n_h - n_g$	0.004403
$n_i - n_g$	0.011891
$n_{C'} - n_t$	0.008364
$n_e - n_{C'}$	0.004820
$n_{F'} - n_e$	0.005024
$n_i - n_{F'}$	0.016643

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0349
$\Delta\theta_{C,A'}$	-0.0072
$\Delta\theta_{g,d}$	0.0071
$\Delta\theta_{g,F}$	0.0051
$\Delta\theta_{i,g}$	0.0239

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.09966550	
A_2	4.78125422	E-1
A_3	1.13214074	
B_1	1.32718559	E-2
B_2	-6.01649685	E-4
B_3	1.30595472	E2
1129 ~ 2325 nm		
A_1	1.09966550	
A_2	4.78125422	E-1
A_3	1.13214074	
B_1	1.32718559	E-2
B_2	-6.01649685	E-4
B_3	1.30595472	E2

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**	5.0
Phosphate Resistance	**PR**	4.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8089
$\theta_{C,A'}$	0.3454
$\theta_{d,C}$	0.3038
$\theta_{e,C}$	0.5422
$\theta_{g,d}$	1.2403
$\theta_{g,F}$	0.5441
$\theta_{h,g}$	0.4512
$\theta_{i,g}$	1.2186
$\theta'_{C',t}$	0.8497
$\theta'_{e,C'}$	0.4896
$\theta'_{F',e}$	0.5104
$\theta'_{i,F'}$	1.6907

Internal Transmittance

λ_{80}	366	λ_5	330

CCI

B	G	R
0.00	0.55	0.57

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330	0.050	
340	0.250	
350	0.510	
360	0.720	
365		
370	0.850	
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	
1000	0.996	
1200	0.996	
1400	0.996	
1600	0.991	
1800	0.979	
2000	0.961	
2200	0.926	
2400	0.890	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	3.67		λ_5	33

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-3.7	-3.6	-3.6	-3.6	-3.4	-3.2	-3.0	
-20 ~ 0	-3.8	-3.7	-3.7	-3.6	-3.5	-3.2	-3.0	
0 ~ 20	-4.0	-3.7	-3.7	-3.6	-3.5	-3.2	-3.0	
20 ~ 40	-4.1	-3.7	-3.7	-3.6	-3.5	-3.2	-3.0	
40 ~ 60	-4.2	-3.8	-3.8	-3.6	-3.5	-3.2	-3.0	
60 ~ 80	-4.2	-3.8	-3.8	-3.7	-3.6	-3.3	-3.0	

© OHARA GmbH – Hofheim – Germany

S-PHM53

603655
605651

Refractive Index	n_d	**1.60300**	Abbe Number	ν_d	**65.44**	Dispersion	$n_F - n_C$	**0.00921**
	n_e	1.603001		ν_e	65.15		$n_{F'} - n_{C'}$	0.009215
		1.605200						0.009289

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.57583
n_{1970}	1.97009	1.58092
n_{1530}	1.52958	1.58634
n_{1129}	1.12864	1.59103
n_t	1.01398	1.59256
n_s	0.85211	1.59519
$n_{A'}$	0.76819	1.59697
n_r	0.70652	1.59858
n_C	0.65627	**1.60019**
$n_{C'}$	0.64385	1.60064
n_{He-Ne}	0.6328	1.60106
n_D	0.58929	1.60292
n_d	0.58756	**1.60300**
n_e	0.54607	1.60520
n_F	0.48613	**1.60940**
$n_{F'}$	0.47999	1.60993
n_{He-Cd}	0.44157	1.61372
n_g	0.435835	**1.61438**
n_h	0.404656	1.61850
n_i	0.365015	1.62547
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	610
Yield Point (°C)	**At**	644
Softening Point (°C)	**SP**	681
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	93
	(+100~+300°C)	109
Thermal Conductivity (W/m·K)	**k**	0.615

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	708
Rigidity Modulus (10^8N/m^2)	**G**	275
Poisson's Ratio	σ	0.285
Knoop Hardness	**Hk**	390 [4]
Abrasion	**Aa**	378
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.21

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

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

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.09775423	
A_2	4.34816432	E-1
A_3	1.13894976	
B_1	1.23369400	E-2
B_2	-3.72522903	E-4
B_3	1.24276984	E2
1129 ~ 2325 nm		
A_1	1.09775423	
A_2	4.34816432	E-1
A_3	1.13894976	
B_1	1.23369400	E-2
B_2	-3.72522903	E-4
B_3	1.24276984	E2

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

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

Internal Transmittance			
λ_{80}	362	λ_5	313

CCI		
B	G	R
0.00	0.56	0.52

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.030	
320	0.100	
330	0.250	
340	0.450	
350	0.640	
360	0.780	
365		
370	0.880	
380	0.935	
390	0.963	
400	0.977	
420	0.986	
440	0.987	
460	0.989	
480	0.992	
500	0.994	
550	0.998	
600	0.997	
650	0.996	
700	0.996	
800	0.997	
900	0.997	
1000	0.996	
1200	0.997	
1400	0.993	
1600	0.987	
1800	0.967	
2000	0.941	
2200	0.870	
2400	0.830	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	3.51		λ_5	31	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-3.1	-2.8	-2.8	-2.7	-2.6	-2.4	-2.2	
-20 ~ 0	-3.0	-2.8	-2.8	-2.7	-2.6	-2.4	-2.1	
0 ~ 20	-3.0	-2.7	-2.7	-2.6	-2.5	-2.3	-2.0	
20 ~ 40	-2.9	-2.6	-2.6	-2.5	-2.4	-2.1	-1.9	
40 ~ 60	-2.9	-2.5	-2.5	-2.4	-2.2	-1.9	-1.7	
60 ~ 80	-2.7	-2.3	-2.3	-2.2	-2.0	-1.7	-1.5	

© OHARA GmbH – Hofheim – Germany

S-TIH1

717295
723293

Refractive Index	n_d	**1.71736**	Abbe Number	ν_d	**29.52**	Dispersion	$n_F - n_C$	**0.02430**
	n_e	1.717362		ν_e	29.28		$n_{F'} - n_{C'}$	0.024303
		1.723098						0.024694

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.67018
n_{1970}	1.97009	1.67636
n_{1530}	1.52958	1.68344
n_{1129}	1.12864	1.69075
n_t	1.01398	1.69353
n_s	0.85211	1.69885
$n_{A'}$	0.76819	1.70275
n_r	0.70652	1.70649
n_C	0.65627	**1.71033**
$n_{C'}$	0.64385	1.71143
n_{He-Ne}	0.6328	1.71246
n_D	0.58929	1.71715
n_d	0.58756	**1.71736**
n_e	0.54607	1.72310
n_F	0.48613	**1.73463**
$n_{F'}$	0.47999	1.73612
n_{He-Cd}	0.44157	1.74732
n_g	0.435835	**1.74933**
n_h	0.404656	1.76247
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	569
Annealing Point (°C)	**AP**	597
Transformation Temperature (°C)	**Tg**	622
Yield Point (°C)	**At**	653
Softening Point (°C)	**SP**	703
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	82
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	1.018

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	884
Rigidity Modulus (10^8N/m^2)	**G**	355
Poisson's Ratio	σ	0.247
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	161
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.85

Partial Dispersions

$n_C - n_t$	0.016798
$n_C - n_{A'}$	0.007579
$n_d - n_C$	0.007030
$n_e - n_C$	0.012766
$n_g - n_d$	0.031970
$n_g - n_F$	0.014697
$n_h - n_g$	0.013136
$n_i - n_g$	
$n_{C'} - n_t$	0.017894
$n_e - n_{C'}$	0.011670
$n_{F'} - n_e$	0.013024
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0060
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0121
$\Delta\theta_{g,F}$	0.0110
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.60326759	
A_2	2.42980935	E-1
A_3	1.81313592	
B_1	1.18019139	E-2
B_2	5.91363658	E-2
B_3	1.61218747	E2
1129 ~ 2325 nm		
A_1	1.60326759	
A_2	2.42980935	E-1
A_3	1.81313592	
B_1	1.18019139	E-2
B_2	5.91363658	E-2
B_3	1.61218747	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6912
$\theta_{C,A'}$	0.3119
$\theta_{d,C}$	0.2893
$\theta_{e,C}$	0.5253
$\theta_{g,d}$	1.3155
$\theta_{g,F}$	0.6047
$\theta_{h,g}$	0.5405
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7246
$\theta'_{e,C'}$	0.4726
$\theta'_{F',e}$	0.5274
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	392	λ_5	366

CCI

B	G	R
0.00	2.31	2.29

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.190	
380	0.560	
390	0.780	
400	0.880	
420	0.952	
440	0.971	
460	0.978	
480	0.982	
500	0.987	
550	0.994	
600	0.994	
650	0.991	
700	0.993	
800	0.998	
900	0.999	
1000	0.998	
1200	0.998	
1400	0.996	
1600	0.995	
1800	0.988	
2000	0.981	
2200	0.957	
2400	0.941	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	3.06		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		3.2	3.3	3.6	4.0	5.1	6.2	
-20 ~ 0		3.4	3.5	3.8	4.3	5.4	6.7	
0 ~ 20		3.7	3.7	4.1	4.6	5.7	7.1	
20 ~ 40		3.9	4.0	4.3	4.8	6.0	7.5	
40 ~ 60		4.1	4.2	4.6	5.1	6.4	7.9	
60 ~ 80		4.3	4.4	4.8	5.3	6.7	8.3	

© OHARA GmbH – Hofheim – Germany

S-TIH3

740283
746281

Refractive Index	n_d	**1.74000**	Abbe Number	ν_d	**28.30**	Dispersion	$n_F - n_C$	**0.02616**
	n_e	1.746167		ν_e	28.07		$n_{F'} - n_{C'}$	0.026584
		1.739998						0.026152

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.69065
n_{1970}	1.97009	1.69685
n_{1530}	1.52958	1.70405
n_{1129}	1.12864	1.71162
n_t	1.01398	1.71455
n_s	0.85211	1.72018
$n_{A'}$	0.76819	1.72434
n_r	0.70652	1.72833
n_C	0.65627	**1.73245**
$n_{C'}$	0.64385	1.73363
n_{He-Ne}	0.6328	1.73474
n_D	0.58929	1.73977
n_d	0.58756	**1.74000**
n_e	0.54607	1.74617
n_F	0.48613	**1.75861**
$n_{F'}$	0.47999	1.76021
n_{He-Cd}	0.44157	1.77232
n_g	0.435835	**1.77450**
n_h	0.404656	1.78876
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	566
Annealing Point (°C)	**AP**	591
Transformation Temperature (°C)	**Tg**	615
Yield Point (°C)	**At**	644
Softening Point (°C)	**SP**	723
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	85
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	1.027

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	908
Rigidity Modulus (10^8N/m^2)	**G**	362
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	165
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.017900
$n_C - n_{A'}$	0.008108
$n_d - n_C$	0.007545
$n_e - n_C$	0.013714
$n_g - n_d$	0.034504
$n_g - n_F$	0.015897
$n_h - n_g$	0.014254
$n_i - n_g$	
$n_{C'} - n_t$	0.019075
$n_e - n_{C'}$	0.012539
$n_{F'} - n_e$	0.014045
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0001
$\Delta\theta_{g,d}$	0.0135
$\Delta\theta_{g,F}$	0.0122
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.64797648	
A_2	2.67261917	E-1
A_3	2.19772845	
B_1	1.21917693	E-2
B_2	5.97893039	E-2
B_3	1.92158340	E2
1129 ~ 2325 nm		
A_1	1.64797648	
A_2	2.67261917	E-1
A_3	2.19772845	
B_1	1.21917693	E-2
B_2	5.97893039	E-2
B_3	1.92158340	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6845
$\theta_{C,A'}$	0.3100
$\theta_{d,C}$	0.2885
$\theta_{e,C}$	0.5244
$\theta_{g,d}$	1.3194
$\theta_{g,F}$	0.6079
$\theta_{h,g}$	0.5450
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7175
$\theta'_{e,C'}$	0.4717
$\theta'_{F',e}$	0.5283
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	395	λ_5	367

CCI

B	G	R
0.00	2.81	2.86

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.160	
380	0.510	
390	0.740	
400	0.850	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.980	
2200	0.955	
2400	0.933	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42	
Specific Gravity	**d**	3.11		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.6	1.5	1.6	1.9	2.3	3.4	4.6	
-20 ~ 0	0.9	1.7	1.7	2.1	2.5	3.6	4.9	
0 ~ 20	0.9	1.8	1.9	2.2	2.7	3.8	5.2	
20 ~ 40	0.9	1.9	2.0	2.4	2.8	4.1	5.5	
40 ~ 60	1.0	2.0	2.1	2.5	3.0	4.3	5.9	
60 ~ 80	1.2	2.2	2.2	2.7	3.2	4.5	6.2	

© OHARA GmbH – Hofheim – Germany

S-TIH4

755275
762273

Refractive Index	n_d	**1.75520**	Abbe Number	ν_d	**27.51**	Dispersion	$n_F - n_C$	**0.02745**
	n_e	1.755199		ν_e	27.29		$n_{F'} - n_{C'}$	0.027450
		1.761671						0.027911

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70430
n_{1970}	1.97009	1.71054
n_{1530}	1.52958	1.71784
n_{1129}	1.12864	1.72561
n_t	1.01398	1.72864
n_s	0.85211	1.73448
$n_{A'}$	0.76819	1.73882
n_r	0.70652	1.74299
n_C	0.65627	**1.74730**
$n_{C'}$	0.64385	1.74853
n_{He-Ne}	0.6328	1.74968
n_D	0.58929	1.75496
n_d	0.58756	**1.75520**
n_e	0.54607	1.76167
n_F	0.48613	**1.77475**
$n_{F'}$	0.47999	1.77644
n_{He-Cd}	0.44157	1.78920
n_g	0.435835	**1.79150**
n_h	0.404656	1.80656
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	565
Annealing Point (°C)	**AP**	591
Transformation Temperature (°C)	**Tg**	613
Yield Point (°C)	**At**	640
Softening Point (°C)	**SP**	694
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	85
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	1.010

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	919
Rigidity Modulus (10^8N/m^2)	**G**	367
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	168
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.76

Partial Dispersions

$n_C - n_t$	0.018659
$n_C - n_{A'}$	0.008473
$n_d - n_C$	0.007904
$n_e - n_C$	0.014376
$n_g - n_d$	0.036298
$n_g - n_F$	0.016752
$n_h - n_g$	0.015059
$n_i - n_g$	
$n_{C'} - n_t$	0.019889
$n_e - n_{C'}$	0.013146
$n_{F'} - n_e$	0.014765
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0040
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	0.0147
$\Delta\theta_{g,F}$	0.0133
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.66755531	
A_2	2.94411865	E-1
A_3	2.49422119	
B_1	1.22052137	E-2
B_2	5.97775329	E-2
B_3	2.14869618	E2
1129 ~ 2325 nm		
A_1	1.66755531	
A_2	2.94411865	E-1
A_3	2.49422119	
B_1	1.22052137	E-2
B_2	5.97775329	E-2
B_3	2.14869618	E2

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.6797
$\theta_{C,A'}$	0.3087
$\theta_{d,C}$	0.2879
$\theta_{e,C}$	0.5237
$\theta_{g,d}$	1.3223
$\theta_{g,F}$	0.6103
$\theta_{h,g}$	0.5486
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7126
$\theta'_{e,C'}$	0.4710
$\theta'_{F',e}$	0.5290
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	398	λ_5	368

CCI

B	G	R
0.00	3.28	3.30

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.120	
380	0.450	
390	0.700	
400	0.820	
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	
1000	0.999	
1200	0.997	
1400	0.995	
1600	0.994	
1800	0.987	
2000	0.981	
2200	0.961	
2400	0.942	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42
Specific Gravity	**d**	3.15		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.5	1.2	1.2	1.6	2.0	3.1	4.4	
-20 ~ 0	0.6	1.3	1.4	1.8	2.2	3.3	4.7	
0 ~ 20	0.6	1.4	1.5	1.9	2.4	3.6	5.1	
20 ~ 40	0.7	1.6	1.7	2.1	2.6	3.9	5.4	
40 ~ 60	0.7	1.7	1.8	2.3	2.7	4.1	5.8	
60 ~ 80	0.7	1.8	1.9	2.4	2.9	4.4	6.1	

© OHARA GmbH – Hofheim – Germany

S-TIH6

805254
813252

Refractive Index	n_d	**1.80518**	Abbe Number	ν_d	**25.42**	Dispersion	$n_F - n_C$	**0.03166**
	n_e	1.805181		ν_e	25.22		$n_{F'} - n_{C'}$	0.031669
		1.812641						0.032223

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.74917
n_{1970}	1.97009	1.75558
n_{1530}	1.52958	1.76321
n_{1129}	1.12864	1.77160
n_t	1.01398	1.77495
n_s	0.85211	1.78151
$n_{A'}$	0.76819	1.78643
n_r	0.70652	1.79118
n_C	0.65627	**1.79611**
$n_{C'}$	0.64385	1.79752
n_{He-Ne}	0.6328	1.79885
n_D	0.58929	1.80491
n_d	0.58756	**1.80518**
n_e	0.54607	1.81264
n_F	0.48613	**1.82777**
$n_{F'}$	0.47999	1.82974
n_{He-Cd}	0.44157	1.84460
n_g	0.435835	**1.84729**
n_h	0.404656	1.86494
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	571
Annealing Point (°C)	**AP**	587
Transformation Temperature (°C)	**Tg**	604
Yield Point (°C)	**At**	630
Softening Point (°C)	**SP**	690
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	89
	(+100~+300°C)	107
Thermal Conductivity (W/m·K)	**k**	1.011

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	931
Rigidity Modulus (10^8N/m^2)	**G**	369
Poisson's Ratio	σ	0.261
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	191
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.021155
$n_C - n_{A'}$	0.009673
$n_d - n_C$	0.009075
$n_e - n_C$	0.016535
$n_g - n_d$	0.042105
$n_g - n_F$	0.019511
$n_h - n_g$	0.017653
$n_i - n_g$	
$n_{C'} - n_t$	0.022564
$n_e - n_{C'}$	0.015126
$n_{F'} - n_e$	0.017097
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0021
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0176
$\Delta\theta_{g,F}$	0.0158
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.77227611	
A_2	3.45691250	E-1
A_3	2.40788501	
B_1	1.31182633	E-2
B_2	6.14479619	E-2
B_3	2.00753254	E2
1129 ~ 2325 nm		
A_1	1.77227611	
A_2	3.45691250	E-1
A_3	2.40788501	
B_1	1.31182633	E-2
B_2	6.14479619	E-2
B_3	2.00753254	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6680
$\theta_{C,A'}$	0.3054
$\theta_{d,C}$	0.2866
$\theta_{e,C}$	0.5221
$\theta_{g,d}$	1.3295
$\theta_{g,F}$	0.6161
$\theta_{h,g}$	0.5574
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7002
$\theta'_{e,C'}$	0.4694
$\theta'_{F',e}$	0.5306
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	398	λ_5	368

CCI

B	G	R
0.00	3.44	3.56

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.120	
380	0.480	
390	0.700	
400	0.820	
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	
1000	0.998	
1200	0.998	
1400	0.997	
1600	0.995	
1800	0.986	
2000	0.978	
2200	0.958	
2400	0.928	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	44	
Specific Gravity	**d**	3.37		λ_5	37	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.6	0.3	0.4	0.7	1.3	2.6	4.1	
-20 ~ 0	-0.6	0.4	0.5	0.9	1.5	2.8	4.4	
0 ~ 20	-0.5	0.5	0.6	1.0	1.6	3.0	4.8	
20 ~ 40	-0.4	0.7	0.8	1.2	1.8	3.3	5.1	
40 ~ 60	-0.4	0.8	0.9	1.3	2.0	3.5	5.5	
60 ~ 80	-0.3	0.9	1.0	1.5	2.1	3.8	5.8	

© OHARA GmbH – Hofheim – Germany

S-TIH10

728285
734282

Refractive Index	n_d	**1.72825**	Abbe Number	ν_d	**28.46**	Dispersion	$n_F - n_C$	**0.02559**
	n_e	1.728250		ν_e	28.23		$n_{F'} - n_{C'}$	0.025588
		1.734286						0.026009

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.67934
n_{1970}	1.97009	1.68562
n_{1530}	1.52958	1.69286
n_{1129}	1.12864	1.70040
n_t	1.01398	1.70330
n_s	0.85211	1.70884
$n_{A'}$	0.76819	1.71292
n_r	0.70652	1.71683
n_C	0.65627	**1.72086**
$n_{C'}$	0.64385	1.72202
n_{He-Ne}	0.6328	1.72310
n_D	0.58929	1.72803
n_d	0.58756	**1.72825**
n_e	0.54607	1.73429
n_F	0.48613	**1.74645**
$n_{F'}$	0.47999	1.74802
n_{He-Cd}	0.44157	1.75987
n_g	0.435835	**1.76200**
n_h	0.404656	1.77595
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	569
Annealing Point (°C)	**AP**	596
Transformation Temperature (°C)	**Tg**	617
Yield Point (°C)	**At**	642
Softening Point (°C)	**SP**	703
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	80
	(+100~+300°C)	97
Thermal Conductivity (W/m·K)	**k**	1.043

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1024
Rigidity Modulus (10^8N/m^2)	**G**	412
Poisson's Ratio	σ	0.243
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	133
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.88

Partial Dispersions

$n_C - n_t$	0.017568
$n_C - n_{A'}$	0.007944
$n_d - n_C$	0.007385
$n_e - n_C$	0.013421
$n_g - n_d$	0.033752
$n_g - n_F$	0.015549
$n_h - n_g$	0.013943
$n_i - n_g$	
$n_{C'} - n_t$	0.018718
$n_e - n_{C'}$	0.012271
$n_{F'} - n_e$	0.013738
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0064
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	0.0135
$\Delta\theta_{g,F}$	0.0123
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.61549392	
A_2	2.62433239	E-1
A_3	2.09426189	
B_1	1.19830897	E-2
B_2	5.96510240	E-2
B_3	1.81657554	E2
1129 ~ 2325 nm		
A_1	1.61549392	
A_2	2.62433239	E-1
A_3	2.09426189	
B_1	1.19830897	E-2
B_2	5.96510240	E-2
B_3	1.81657554	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6866
$\theta_{C,A'}$	0.3105
$\theta_{d,C}$	0.2886
$\theta_{e,C}$	0.5245
$\theta_{g,d}$	1.3191
$\theta_{g,F}$	0.6077
$\theta_{h,g}$	0.5449
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7197
$\theta'_{e,C'}$	0.4718
$\theta'_{F',e}$	0.5282
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	399	λ_5	369

CCI

B	G	R
0.00	3.34	3.37

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.090	
380	0.410	
390	0.670	
400	0.810	
420	0.931	
440	0.963	
460	0.975	
480	0.982	
500	0.987	
550	0.994	
600	0.995	
650	0.993	
700	0.994	
800	0.998	
900	0.998	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.993	
1800	0.985	
2000	0.977	
2200	0.947	
2400	0.929	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	3.06		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.1	2.0	2.1	2.3	2.8	3.8	5.0	
-20 ~ 0	1.3	2.1	2.2	2.5	3.0	4.0	5.3	
0 ~ 20	1.4	2.3	2.3	2.7	3.1	4.3	5.7	
20 ~ 40	1.5	2.4	2.5	2.8	3.3	4.5	6.0	
40 ~ 60	1.5	2.5	2.6	3.0	3.5	4.8	6.3	
60 ~ 80	1.5	2.6	2.7	3.1	3.7	5.0	6.6	

© OHARA GmbH – Hofheim – Germany

S-TIH11

785257
792255

Refractive Index	n_d	**1.78472**	Abbe Number	ν_d	**25.68**	Dispersion	$n_F - n_C$	**0.03056**
	n_e	1.784723		ν_e	25.47		$n_{F'} - n_{C'}$	0.030554
		1.791920						0.031088

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.72998
n_{1970}	1.97009	1.73639
n_{1530}	1.52958	1.74397
n_{1129}	1.12864	1.75222
n_t	1.01398	1.75549
n_s	0.85211	1.76186
$n_{A'}$	0.76819	1.76662
n_r	0.70652	1.77121
n_C	0.65627	**1.77596**
$n_{C'}$	0.64385	1.77733
n_{He-Ne}	0.6328	1.77861
n_D	0.58929	1.78446
n_d	0.58756	**1.78472**
n_e	0.54607	1.79192
n_F	0.48613	**1.80652**
$n_{F'}$	0.47999	1.80841
n_{He-Cd}	0.44157	1.82275
n_g	0.435835	**1.82534**
n_h	0.404656	1.84239
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	569
Annealing Point (°C)	**AP**	588
Transformation Temperature (°C)	**Tg**	602
Yield Point (°C)	**At**	633
Softening Point (°C)	**SP**	686
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	89
	(+100~+300°C)	103
Thermal Conductivity (W/m·K)	**k**	1.017

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	912
Rigidity Modulus (10^8N/m^2)	**G**	363
Poisson's Ratio	σ	0.255
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	171
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.020476
$n_C - n_{A'}$	0.009346
$n_d - n_C$	0.008758
$n_e - n_C$	0.015955
$n_g - n_d$	0.040621
$n_g - n_F$	0.018825
$n_h - n_g$	0.017044
$n_i - n_g$	
$n_{C'} - n_t$	0.021836
$n_e - n_{C'}$	0.014595
$n_{F'} - n_e$	0.016493
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0030
$\Delta\theta_{C,A'}$	-0.0011
$\Delta\theta_{g,d}$	0.0181
$\Delta\theta_{g,F}$	0.0162
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.72677471	
A_2	3.24568628	E-1
A_3	2.65816809	
B_1	1.29369958	E-2
B_2	6.18255245	E-2
B_3	2.21904637	E2
1129 ~ 2325 nm		
A_1	1.72677471	
A_2	3.24568628	E-1
A_3	2.65816809	
B_1	1.29369958	E-2
B_2	6.18255245	E-2
B_3	2.21904637	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6702
$\theta_{C,A'}$	0.3059
$\theta_{d,C}$	0.2866
$\theta_{e,C}$	0.5222
$\theta_{g,d}$	1.3295
$\theta_{g,F}$	0.6161
$\theta_{h,g}$	0.5578
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7024
$\theta'_{e,C'}$	0.4695
$\theta'_{F',e}$	0.5305
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	400	λ_5	369

CCI

B	G	R
0.00	3.80	3.85

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.080	
380	0.400	
390	0.660	
400	0.800	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.982	
2200	0.964	
2400	0.942	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	43		
Specific Gravity	**d**	3.24		λ_5	37		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.3	0.5	0.6	0.9	1.4	2.6	4.1	
-20 ~ 0	-0.2	0.7	0.7	1.1	1.6	2.9	4.5	
0 ~ 20	-0.1	0.8	0.9	1.3	1.9	3.2	4.9	
20 ~ 40		1.0	1.1	1.5	2.1	3.5	5.3	
40 ~ 60		1.1	1.2	1.7	2.3	3.8	5.7	
60 ~ 80	0.1	1.3	1.4	1.9	2.5	4.1	6.1	

© OHARA GmbH – Hofheim – Germany

S-TIH13

741278
747276

Refractive Index	n_d	**1.74077**	Abbe Number	ν_d	**27.79**	Dispersion	$n_F - n_C$	**0.02666**
	n_e	1.740769		ν_e	27.56		$n_{F'} - n_{C'}$	0.026657
		1.747055						0.027102

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.69062
n_{1970}	1.97009	1.69693
n_{1530}	1.52958	1.70425
n_{1129}	1.12864	1.71193
n_t	1.01398	1.71490
n_s	0.85211	1.72062
$n_{A'}$	0.76819	1.72485
n_r	0.70652	1.72890
n_C	0.65627	**1.73309**
$n_{C'}$	0.64385	1.73428
n_{He-Ne}	0.6328	1.73541
n_D	0.58929	1.74054
n_d	0.58756	**1.74077**
n_e	0.54607	1.74705
n_F	0.48613	**1.75975**
$n_{F'}$	0.47999	1.76139
n_{He-Cd}	0.44157	1.77376
n_g	0.435835	**1.77599**
n_h	0.404656	1.79059
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	573
Annealing Point (°C)	**AP**	595
Transformation Temperature (°C)	**Tg**	616
Yield Point (°C)	**At**	642
Softening Point (°C)	**SP**	700
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	83
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	1.034

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	899
Rigidity Modulus (10^8N/m^2)	**G**	360
Poisson's Ratio	σ	0.249
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	148
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.83

Partial Dispersions

$n_C - n_t$	0.018185
$n_C - n_{A'}$	0.008244
$n_d - n_C$	0.007680
$n_e - n_C$	0.013966
$n_g - n_d$	0.035225
$n_g - n_F$	0.016248
$n_h - n_g$	0.014593
$n_i - n_g$	
$n_{C'} - n_t$	0.019380
$n_e - n_{C'}$	0.012771
$n_{F'} - n_e$	0.014331
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0002
$\Delta\theta_{g,d}$	0.0144
$\Delta\theta_{g,F}$	0.0130
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.62224674	
A_2	2.93844589	E-1
A_3	1.99225164	
B_1	1.18368386	E-2
B_2	5.90208025	E-2
B_3	1.71959976	E2
1129 ~ 2325 nm		
A_1	1.62224674	
A_2	2.93844589	E-1
A_3	1.99225164	
B_1	1.18368386	E-2
B_2	5.90208025	E-2
B_3	1.71959976	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6822
$\theta_{C,A'}$	0.3093
$\theta_{d,C}$	0.2881
$\theta_{e,C}$	0.5239
$\theta_{g,d}$	1.3214
$\theta_{g,F}$	0.6095
$\theta_{h,g}$	0.5474
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7151
$\theta'_{e,C'}$	0.4712
$\theta'_{F',e}$	0.5288
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	400	λ_5	368

CCI

B	G	R
0.00	3.64	3.67

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.080	
380	0.380	
390	0.640	
400	0.800	
420	0.921	
440	0.957	
460	0.970	
480	0.978	
500	0.984	
550	0.993	
600	0.993	
650	0.991	
700	0.994	
800	0.997	
900	0.998	
1000	0.997	
1200	0.998	
1400	0.994	
1600	0.993	
1800	0.983	
2000	0.974	
2200	0.944	
2400	0.920	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42		
Specific Gravity	**d**	3.10		λ_5	37		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.0	1.8	1.8	2.1	2.6	3.6	4.9	
-20 ~ 0	1.0	1.9	1.9	2.3	2.7	3.9	5.2	
0 ~ 20	1.1	2.0	2.1	2.4	2.9	4.1	5.5	
20 ~ 40	1.1	2.1	2.2	2.5	3.0	4.3	5.8	
40 ~ 60	1.2	2.2	2.3	2.7	3.2	4.5	6.1	
60 ~ 80	1.3	2.3	2.4	2.8	3.4	4.7	6.4	

© OHARA GmbH – Hofheim – Germany

S-TIH14

762265
769263

Refractive Index	n_d	**1.76182**	Abbe Number	ν_d	**26.52**	Dispersion	$n_F - n_C$	**0.02873**
	n_e	1.761821		ν_e	26.30		$n_{F'} - n_{C'}$	0.028729
		1.768591						0.029221

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70916
n_{1970}	1.97009	1.71554
n_{1530}	1.52958	1.72302
n_{1129}	1.12864	1.73102
n_t	1.01398	1.73415
n_s	0.85211	1.74022
$n_{A'}$	0.76819	1.74474
n_r	0.70652	1.74908
n_C	0.65627	**1.75357**
$n_{C'}$	0.64385	1.75485
n_{He-Ne}	0.6328	1.75606
n_D	0.58929	1.76157
n_d	0.58756	**1.76182**
n_e	0.54607	1.76859
n_F	0.48613	**1.78230**
$n_{F'}$	0.47999	1.78407
n_{He-Cd}	0.44157	1.79750
n_g	0.435835	**1.79992**
n_h	0.404656	1.81584
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	565
Annealing Point (°C)	**AP**	590
Transformation Temperature (°C)	**Tg**	609
Yield Point (°C)	**At**	634
Softening Point (°C)	**SP**	693
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	87
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	1.027

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	888
Rigidity Modulus (10^8N/m^2)	**G**	354
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	163
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.86

Partial Dispersions

$n_C - n_t$	0.019413
$n_C - n_{A'}$	0.008831
$n_d - n_C$	0.008254
$n_e - n_C$	0.015024
$n_g - n_d$	0.038102
$n_g - n_F$	0.017627
$n_h - n_g$	0.015917
$n_i - n_g$	
$n_{C'} - n_t$	0.020697
$n_e - n_{C'}$	0.013740
$n_{F'} - n_e$	0.015481
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0046
$\Delta\theta_{C,A'}$	-0.0006
$\Delta\theta_{g,d}$	0.0167
$\Delta\theta_{g,F}$	0.0150
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.68915108	
A_2	2.90462024	E-1
A_3	2.37971516	
B_1	1.28202514	E-2
B_2	6.18090841	E-2
B_3	2.01094352	E2
1129 ~ 2325 nm		
A_1	1.68915108	
A_2	2.90462024	E-1
A_3	2.37971516	
B_1	1.28202514	E-2
B_2	6.18090841	E-2
B_3	2.01094352	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6757
$\theta_{C,A'}$	0.3074
$\theta_{d,C}$	0.2873
$\theta_{e,C}$	0.5230
$\theta_{g,d}$	1.3263
$\theta_{g,F}$	0.6136
$\theta_{h,g}$	0.5540
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7083
$\theta'_{e,C'}$	0.4702
$\theta'_{F',e}$	0.5298
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	397	λ_5	368

CCI

B	G	R
0.00	3.11	3.10

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.100	
380	0.430	
390	0.700	
400	0.840	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.982	
2200	0.961	
2400	0.942	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	42		
Specific Gravity	**d**	3.17		λ_5	37		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.2	0.9	1.0	1.4	1.8	2.9	4.3	
-20 ~ 0	0.3	1.1	1.2	1.6	2.0	3.2	4.7	
0 ~ 20	0.4	1.2	1.3	1.7	2.2	3.5	5.1	
20 ~ 40	0.5	1.4	1.5	2.0	2.4	3.8	5.5	
40 ~ 60	0.6	1.6	1.7	2.2	2.7	4.1	5.9	
60 ~ 80	0.7	1.7	1.8	2.4	2.9	4.4	6.2	

© OHARA GmbH – Hofheim – Germany

S-TIH18

722292
727290

Refractive Index	n_d	**1.72151**	Abbe Number	ν_d	**29.23**	Dispersion	$n_F - n_C$	**0.02468**
	n_e	1.721507		ν_e	29.00		$n_{F'} - n_{C'}$	0.024683
		1.727331						0.025081

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.67384
n_{1970}	1.97009	1.68002
n_{1530}	1.52958	1.68715
n_{1129}	1.12864	1.69453
n_t	1.01398	1.69734
n_s	0.85211	1.70272
$n_{A'}$	0.76819	1.70668
n_r	0.70652	1.71047
n_C	0.65627	**1.71437**
$n_{C'}$	0.64385	1.71548
n_{He-Ne}	0.6328	1.71653
n_D	0.58929	1.72129
n_d	0.58756	**1.72151**
n_e	0.54607	1.72733
n_F	0.48613	**1.73905**
$n_{F'}$	0.47999	1.74057
n_{He-Cd}	0.44157	1.75195
n_g	0.435835	**1.75399**
n_h	0.404656	1.76735
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	570
Annealing Point (°C)	**AP**	596
Transformation Temperature (°C)	**Tg**	616
Yield Point (°C)	**At**	644
Softening Point (°C)	**SP**	703
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	83
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	1.029

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	891
Rigidity Modulus (10^8N/m^2)	**G**	357
Poisson's Ratio	σ	0.248
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	154
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.87

Partial Dispersions	
$n_C - n_t$	0.017028
$n_C - n_{A'}$	0.007687
$n_d - n_C$	0.007136
$n_e - n_C$	0.012960
$n_g - n_d$	0.032488
$n_g - n_F$	0.014941
$n_h - n_g$	0.013358
$n_i - n_g$	
$n_{C'} - n_t$	0.018141
$n_e - n_{C'}$	0.011847
$n_{F'} - n_e$	0.013234
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	0.0001
$\Delta\theta_{g,d}$	0.0122
$\Delta\theta_{g,F}$	0.0111
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.59921608	
A_2	2.59532164	E-1
A_3	2.12454543	
B_1	1.16469304	E-2
B_2	5.84824883	E-2
B_3	1.86927779	E2
1129 ~ 2325 nm		
A_1	1.59921608	
A_2	2.59532164	E-1
A_3	2.12454543	
B_1	1.16469304	E-2
B_2	5.84824883	E-2
B_3	1.86927779	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.6899
$\theta_{C,A'}$	0.3114
$\theta_{d,C}$	0.2891
$\theta_{e,C}$	0.5251
$\theta_{g,d}$	1.3162
$\theta_{g,F}$	0.6053
$\theta_{h,g}$	0.5412
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7233
$\theta'_{e,C'}$	0.4723
$\theta'_{F',e}$	0.5277
$\theta'_{i,F'}$	

Internal Transmittance			
λ_{80}	393	λ_5	366

CCI		
B	G	R
0.00	2.43	2.44

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.180	
380	0.540	
390	0.770	
400	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.995	
1800	0.986	
2000	0.978	
2200	0.948	
2400	0.928	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	3.07		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.1	1.8	1.8	2.2	2.5	3.5	4.7	
-20 ~ 0	1.2	1.9	2.0	2.3	2.7	3.8	5.0	
0 ~ 20	1.3	2.0	2.2	2.5	2.9	4.0	5.3	
20 ~ 40	1.4	2.2	2.3	2.7	3.1	4.3	5.7	
40 ~ 60	1.5	2.3	2.5	2.8	3.3	4.5	6.0	
60 ~ 80	1.6	2.4	2.6	3.0	3.5	4.8	6.3	

© OHARA GmbH – Hofheim – Germany

S-TIH23

785263
792261

Refractive Index	n_d	**1.78470**	Abbe Number	ν_d	**26.29**	Dispersion	$n_F - n_C$	**0.02984**
	n_e	1.784696		ν_e	26.08		$n_{F'} - n_{C'}$	0.029847
		1.791730						0.030359

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.73102
n_{1970}	1.97009	1.73732
n_{1530}	1.52958	1.74475
n_{1129}	1.12864	1.75284
n_t	1.01398	1.75605
n_s	0.85211	1.76230
$n_{A'}$	0.76819	1.76697
n_r	0.70652	1.77147
n_C	0.65627	**1.77613**
$n_{C'}$	0.64385	1.77746
n_{He-Ne}	0.6328	1.77871
n_D	0.58929	1.78444
n_d	0.58756	**1.78470**
n_e	0.54607	1.79173
n_F	0.48613	**1.80597**
$n_{F'}$	0.47999	1.80782
n_{He-Cd}	0.44157	1.82176
n_g	0.435835	**1.82428**
n_h	0.404656	1.84081
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	561
Annealing Point (°C)	**AP**	586
Transformation Temperature (°C)	**Tg**	604
Yield Point (°C)	**At**	635
Softening Point (°C)	**SP**	684
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	88
	(+100~+300°C)	106
Thermal Conductivity (W/m·K)	**k**	0.992

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	922
Rigidity Modulus (10^8N/m^2)	**G**	366
Poisson's Ratio	σ	0.260
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	180
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.69

Partial Dispersions

$n_C - n_t$	0.020074
$n_C - n_{A'}$	0.009156
$n_d - n_C$	0.008571
$n_e - n_C$	0.015605
$n_g - n_d$	0.039588
$n_g - n_F$	0.018312
$n_h - n_g$	0.016524
$n_i - n_g$	
$n_{C'} - n_t$	0.021407
$n_e - n_{C'}$	0.014272
$n_{F'} - n_e$	0.016087
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0026
$\Delta\theta_{C,A'}$	-0.0009
$\Delta\theta_{g,d}$	0.0163
$\Delta\theta_{g,F}$	0.0146
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.73986485	
A_2	3.13894918	E-1
A_3	2.31093206	
B_1	1.29441300	E-2
B_2	6.12116868	E-2
B_3	1.97420482	E2
1129 ~ 2325 nm		
A_1	1.73986485	
A_2	3.13894918	E-1
A_3	2.31093206	
B_1	1.29441300	E-2
B_2	6.12116868	E-2
B_3	1.97420482	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6726
$\theta_{C,A'}$	0.3068
$\theta_{d,C}$	0.2872
$\theta_{e,C}$	0.5228
$\theta_{g,d}$	1.3264
$\theta_{g,F}$	0.6135
$\theta_{h,g}$	0.5536
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7051
$\theta'_{e,C'}$	0.4701
$\theta'_{F',e}$	0.5299
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	400	λ_5	368

CCI

B	G	R
0.00	3.88	3.97

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.120	
380	0.440	
390	0.670	
400	0.800	
420	0.906	
440	0.947	
460	0.962	
480	0.972	
500	0.979	
550	0.992	
600	0.992	
650	0.991	
700	0.993	
800	0.998	
900	0.998	
1000	0.998	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.981	
2200	0.962	
2400	0.937	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	43
Specific Gravity	**d**	3.30		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.3	0.5	0.6	1.0	1.4	2.6	4.1	
-20 ~ 0	-0.2	0.7	0.7	1.1	1.6	2.9	4.4	
0 ~ 20	-0.1	0.8	0.9	1.3	1.8	3.1	4.8	
20 ~ 40	-0.1	0.9	1.0	1.4	2.0	3.4	5.1	
40 ~ 60		1.0	1.1	1.5	2.2	3.7	5.5	
60 ~ 80	0.1	1.2	1.2	1.7	2.3	3.9	5.8	

© OHARA GmbH – Hofheim – Germany

S-TIH53

847238
855236

Refractive Index	n_d	**1.84666**	Abbe Number	ν_d	**23.78**	Dispersion	$n_F - n_C$	**0.03561**
	n_e	1.846660		ν_e	23.59		$n_{F'} - n_{C'}$	0.035608
		1.855041						0.036247

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78519
n_{1970}	1.97009	1.79199
n_{1530}	1.52958	1.80013
n_{1129}	1.12864	1.80925
n_t	1.01398	1.81294
n_s	0.85211	1.82021
$n_{A'}$	0.76819	1.82568
n_r	0.70652	1.83098
n_C	0.65627	**1.83649**
$n_{C'}$	0.64385	1.83807
n_{He-Ne}	0.6328	1.83956
n_D	0.58929	1.84635
n_d	0.58756	**1.84666**
n_e	0.54607	1.85504
n_F	0.48613	**1.87210**
$n_{F'}$	0.47999	1.87431
n_{He-Cd}	0.44157	1.89114
n_g	0.435835	**1.89419**
n_h	0.404656	1.91429
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	576
Annealing Point (°C)	**AP**	596
Transformation Temperature (°C)	**Tg**	624
Yield Point (°C)	**At**	658
Softening Point (°C)	**SP**	692
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	88
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	1.000

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	960
Rigidity Modulus (10^8N/m^2)	**G**	379
Poisson's Ratio	σ	0.266
Knoop Hardness	**Hk**	520 [5]
Abrasion	**Aa**	170
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.023550
$n_C - n_{A'}$	0.010806
$n_d - n_C$	0.010172
$n_e - n_C$	0.018553
$n_g - n_d$	0.047529
$n_g - n_F$	0.022093
$n_h - n_g$	0.020105
$n_i - n_g$	
$n_{C'} - n_t$	0.025128
$n_e - n_{C'}$	0.016975
$n_{F'} - n_e$	0.019272
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0195
$\Delta\theta_{g,F}$	0.0175
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.87904886	
A_2	3.69719775	E-1
A_3	2.33730863	
B_1	1.44121770	E-2
B_2	6.38817990	E-2
B_3	1.82668180	E2
1129 ~ 2325 nm		
A_1	1.87904886	
A_2	3.69719775	E-1
A_3	2.33730863	
B_1	1.44121770	E-2
B_2	6.38817990	E-2
B_3	1.82668180	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6614
$\theta_{C,A'}$	0.3035
$\theta_{d,C}$	0.2857
$\theta_{e,C}$	0.5210
$\theta_{g,d}$	1.3348
$\theta_{g,F}$	0.6205
$\theta_{h,g}$	0.5646
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6932
$\theta'_{e,C'}$	0.4683
$\theta'_{F',e}$	0.5317
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	408	λ_5	370

CCI

B	G	R
0.00	4.97	5.06

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.060	
380	0.350	
390	0.610	
400	0.750	
420	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.991	
2000	0.986	
2200	0.974	
2400	0.955	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	42
Specific Gravity	**d**	3.54		λ_5	37

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.8	0.4	0.4	0.9	1.4	2.8	4.5	
-20 ~ 0	-0.8	0.5	0.6	1.0	1.6	3.1	5.0	
0 ~ 20	-0.7	0.6	0.7	1.2	1.8	3.4	5.4	
20 ~ 40	-0.7	0.7	0.8	1.3	2.0	3.7	5.8	
40 ~ 60	-0.6	0.9	1.0	1.5	2.2	4.0	6.2	
60 ~ 80	-0.6	1.0	1.1	1.6	2.4	4.3	6.6	

© OHARA GmbH – Hofheim – Germany

S-TIH53W

847238
855236

Refractive Index	n_d	**1.84666**	Abbe Number	ν_d	**23.78**	Dispersion	$n_F - n_C$	**0.03561**
	n_e	1.846660		ν_e	23.59		$n_{F'} - n_{C'}$	0.035608
		1.855041						0.036247

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.78519
n_{1970}	1.97009	1.79199
n_{1530}	1.52958	1.80013
n_{1129}	1.12864	1.80925
n_t	1.01398	1.81294
n_s	0.85211	1.82021
$n_{A'}$	0.76819	1.82568
n_r	0.70652	1.83098
n_C	0.65627	**1.83649**
$n_{C'}$	0.64385	1.83807
n_{He-Ne}	0.6328	1.83956
n_D	0.58929	1.84635
n_d	0.58756	**1.84666**
n_e	0.54607	1.85504
n_F	0.48613	**1.87210**
$n_{F'}$	0.47999	1.87431
n_{He-Cd}	0.44157	1.89114
n_g	0.435835	**1.89419**
n_h	0.404656	1.91429
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	576
Annealing Point (°C)	**AP**	596
Transformation Temperature (°C)	**Tg**	624
Yield Point (°C)	**At**	658
Softening Point (°C)	**SP**	692
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	88
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	1.000

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	960
Rigidity Modulus (10^8N/m^2)	**G**	379
Poisson's Ratio	σ	0.266
Knoop Hardness	**Hk**	520 [5]
Abrasion	**Aa**	170
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.023550
$n_C - n_{A'}$	0.010806
$n_d - n_C$	0.010172
$n_e - n_C$	0.018553
$n_g - n_d$	0.047529
$n_g - n_F$	0.022093
$n_h - n_g$	0.020105
$n_i - n_g$	
$n_{C'} - n_t$	0.025128
$n_e - n_{C'}$	0.016975
$n_{F'} - n_e$	0.019272
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0195
$\Delta\theta_{g,F}$	0.0175
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.87904886	
A_2	3.69719775	E-1
A_3	2.33730863	
B_1	1.44121770	E-2
B_2	6.38817990	E-2
B_3	1.82668180	E2
1129 ~ 2325 nm		
A_1	1.87904886	
A_2	3.69719775	E-1
A_3	2.33730863	
B_1	1.44121770	E-2
B_2	6.38817990	E-2
B_3	1.82668180	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6614
$\theta_{C,A'}$	0.3035
$\theta_{d,C}$	0.2857
$\theta_{e,C}$	0.5210
$\theta_{g,d}$	1.3348
$\theta_{g,F}$	0.6205
$\theta_{h,g}$	0.5646
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6932
$\theta'_{e,C'}$	0.4683
$\theta'_{F',e}$	0.5317
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	398	λ_5	368

CCI

B	G	R
0.00	3.49	3.70

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.110	
380	0.450	
390	0.710	
400	0.830	
420	0.918	
440	0.954	
460	0.971	
480	0.980	
500	0.986	
550	0.995	
600	0.999	
650	0.999	
700	0.999	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.999	
1800	0.994	
2000	0.985	
2200	0.961	
2400	0.925	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	404
Specific Gravity	**d**	3.54		λ_5	368

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-0.8	0.4	0.4	0.9	1.4	2.8	4.5	
-20 ~ 0	-0.8	0.5	0.6	1.0	1.6	3.1	5.0	
0 ~ 20	-0.7	0.6	0.7	1.2	1.8	3.4	5.4	
20 ~ 40	-0.7	0.7	0.8	1.3	2.0	3.7	5.8	
40 ~ 60	-0.6	0.9	1.0	1.5	2.2	4.0	6.2	
60 ~ 80	-0.6	1.0	1.1	1.6	2.4	4.3	6.6	

© OHARA GmbH – Hofheim – Germany

S-TIH57

963241
972239

Refractive Index	n_d	**1.96300**	Abbe Number	ν_d	**24.11**	Dispersion	$n_F - n_C$ 0.039935
	n_e	1.963000		ν_e	23.92		$n_{F'} - n_{C'}$ 0.040656

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.89394
n_{1970}	1.97009	1.90163
n_{1530}	1.52958	1.91082
n_{1129}	1.12864	1.92106
n_t	1.01398	1.92520
n_s	0.85211	1.93335
$n_{A'}$	0.76819	1.93949
n_r	0.70652	1.94542
n_C	0.65627	**1.95160**
$n_{C'}$	0.64385	1.95337
n_{He-Ne}	0.6328	1.95504
n_D	0.58929	1.96266
n_d	0.58756	**1.96300**
n_e	0.54607	1.97240
n_F	0.48613	**1.99153**
$n_{F'}$	0.47999	1.99402
n_{He-Cd}	0.44157	2.01291
n_g	0.435835	**2.01634**
n_h	0.404656	2.03893
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	634
Annealing Point (°C)	**AP**	661
Transformation Temperature (°C)	**Tg**	672
Yield Point (°C)	**At**	707
Softening Point (°C)	**SP**	732
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	75
	(+100~+300°C)	91
Thermal Conductivity (W/m·K)	**k**	0.970

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1170
Rigidity Modulus (10^8N/m^2)	**G**	453
Poisson's Ratio	σ	0.292
Knoop Hardness	**Hk**	630 [6]
Abrasion	**Aa**	97
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.73

Partial Dispersions	
$n_C - n_t$	0.026394
$n_C - n_{A'}$	0.012111
$n_d - n_C$	0.011402
$n_e - n_C$	0.020800
$n_g - n_d$	0.053340
$n_g - n_F$	0.024807
$n_h - n_g$	0.022594
$n_i - n_g$	
$n_{C'} - n_t$	0.028162
$n_e - n_{C'}$	0.019032
$n_{F'} - n_e$	0.021624
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0011
$\Delta\theta_{C,A'}$	-0.0018
$\Delta\theta_{g,d}$	0.0211
$\Delta\theta_{g,F}$	0.0187
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	2.21103256	E0
A_2	4.50346986	E-1
A_3	2.47746663	E0
B_1	1.42330268	E-2
B_2	6.38573392	E-2
B_3	1.61937600	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.6609
$\theta_{C,A'}$	0.3033
$\theta_{d,C}$	0.2855
$\theta_{e,C}$	0.5208
$\theta_{g,d}$	1.3357
$\theta_{g,F}$	0.6212
$\theta_{h,g}$	0.5658
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6927
$\theta'_{e,C'}$	0.4681
$\theta'_{F',e}$	0.5319
$\theta'_{i,F'}$	

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.020	
380	0.130	
390	0.330	
400	0.510	
420	0.730	
440	0.840	
460	0.900	
480	0.929	
500	0.950	
550	0.979	
600	0.988	
650	0.991	
700	0.994	
800	0.997	
900	0.997	
1000	0.997	
1200	0.997	
1400	0.997	
1600	0.995	
1800	0.989	
2000	0.977	
2200	0.947	
2400	0.850	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	450
Specific Gravity	**d**	4.20		λ_5	375

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.5	1.8	1.9	2.4	3.0	4.6	6.6	
-20 ~ 0	0.5	1.9	2.0	2.5	3.2	5.0	7.1	
0 ~ 20	0.6	2.1	2.2	2.8	3.5	5.4	7.6	
20 ~ 40	0.7	2.3	2.4	3.0	3.8	5.8	8.1	
40 ~ 60	0.9	2.6	2.7	3.3	4.1	6.2	8.7	
60 ~ 80	1.1	2.8	2.9	3.6	4.4	6.6	9.3	

© OHARA GmbH – Hofheim – Germany

S-TIL1

548458
551455

Refractive Index	n_d	**1.54814**	Abbe Number	ν_d	**45.79**	Dispersion	$n_F - n_C$	**0.01197**
	n_e	1.548141		ν_e	45.49		$n_{F'} - n_{C'}$	0.011972
		1.550984						0.012112

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.51797
n_{1970}	1.97009	1.52307
n_{1530}	1.52958	1.52861
n_{1129}	1.12864	1.53365
n_t	1.01398	1.53537
n_s	0.85211	1.53844
$n_{A'}$	0.76819	1.54058
n_r	0.70652	1.54257
n_C	0.65627	**1.54457**
$n_{C'}$	0.64385	1.54514
n_{He-Ne}	0.6328	1.54566
n_D	0.58929	1.54804
n_d	0.58756	**1.54814**
n_e	0.54607	1.55098
n_F	0.48613	**1.55654**
$n_{F'}$	0.47999	1.55725
n_{He-Cd}	0.44157	1.56244
n_g	0.435835	**1.56335**
n_h	0.404656	1.56918
n_i	0.365015	1.57959
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	452
Annealing Point (°C)	**AP**	487
Transformation Temperature (°C)	**Tg**	501
Yield Point (°C)	**At**	542
Softening Point (°C)	**SP**	654
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	86
	(+100~+300°C)	101
Thermal Conductivity (W/m·K)	**k**	1.039

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	705
Rigidity Modulus (10^8N/m^2)	**G**	288
Poisson's Ratio	σ	0.222
Knoop Hardness	**Hk**	490 [5]
Abrasion	**Aa**	128
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.68

Partial Dispersions

$n_C - n_t$	0.009202
$n_C - n_{A'}$	0.003988
$n_d - n_C$	0.003569
$n_e - n_C$	0.006412
$n_g - n_d$	0.015210
$n_g - n_F$	0.006807
$n_h - n_g$	0.005833
$n_i - n_g$	0.016236
$n_{C'} - n_t$	0.009765
$n_e - n_{C'}$	0.005849
$n_{F'} - n_e$	0.006263
$n_i - n_{F'}$	0.022340

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0071
$\Delta\theta_{C,A'}$	0.0017
$\Delta\theta_{g,d}$	0.0009
$\Delta\theta_{g,F}$	0.0012
$\Delta\theta_{i,g}$	0.0146

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.25088944	
A_2	9.97973327	E-2
A_3	1.20583504	
B_1	8.83921279	E-3
B_2	4.82685052	E-2
B_3	1.37414953	E2
1129 ~ 2325 nm		
A_1	1.25088944	
A_2	9.97973327	E-2
A_3	1.20583504	
B_1	8.83921279	E-3
B_2	4.82685052	E-2
B_3	1.37414953	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7686
$\theta_{C,A'}$	0.3331
$\theta_{d,C}$	0.2981
$\theta_{e,C}$	0.5356
$\theta_{g,d}$	1.2705
$\theta_{g,F}$	0.5686
$\theta_{h,g}$	0.4872
$\theta_{i,g}$	1.3562
$\theta'_{C',t}$	0.8062
$\theta'_{e,C'}$	0.4829
$\theta'_{F',e}$	0.5171
$\theta'_{i,F'}$	1.8445

Internal Transmittance

λ_{80}	366	λ_5	341

CCI

B	G	R
0.00	0.32	0.33

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.010	
350	0.290	
360	0.690	
365		
370	0.870	
380	0.944	
390	0.972	
400	0.984	
420	0.992	
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	
1000	0.997	
1200	0.997	
1400	0.996	
1600	0.993	
1800	0.977	
2000	0.948	
2200	0.890	
2400	0.850	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	2.54		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.1	1.5	1.5	1.7	1.9	2.3	2.8	
-20 ~ 0	1.1	1.5	1.6	1.7	1.9	2.4	2.9	
0 ~ 20	1.1	1.5	1.6	1.7	2.0	2.4	3.0	
20 ~ 40	1.1	1.6	1.6	1.8	2.0	2.5	3.1	
40 ~ 60	1.1	1.6	1.6	1.8	2.0	2.6	3.1	
60 ~ 80	1.1	1.6	1.6	1.8	2.1	2.6	3.2	

© OHARA GmbH – Hofheim – Germany

S-TIL2

541472
543469

Refractive Index	n_d	**1.54072**	Abbe Number	ν_d	**47.23**	Dispersion	$n_F - n_C$	**0.01145**
	n_e	1.543440		ν_e	46.94		$n_{F'} - n_{C'}$	0.011577
		1.540720						0.011449

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.51118
n_{1970}	1.97009	1.51626
n_{1530}	1.52958	1.52176
n_{1129}	1.12864	1.52672
n_t	1.01398	1.52841
n_s	0.85211	1.53139
$n_{A'}$	0.76819	1.53346
n_r	0.70652	1.53537
n_C	0.65627	**1.53730**
$n_{C'}$	0.64385	1.53784
n_{He-Ne}	0.6328	1.53835
n_D	0.58929	1.54062
n_d	0.58756	**1.54072**
n_e	0.54607	1.54344
n_F	0.48613	**1.54875**
$n_{F'}$	0.47999	1.54942
n_{He-Cd}	0.44157	1.55435
n_g	0.435835	**1.55522**
n_h	0.404656	1.56074
n_i	0.365015	1.57052
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	448
Annealing Point (°C)	**AP**	484
Transformation Temperature (°C)	**Tg**	496
Yield Point (°C)	**At**	538
Softening Point (°C)	**SP**	658
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	82
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	1.051

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	699
Rigidity Modulus (10^8N/m^2)	**G**	286
Poisson's Ratio	σ	0.220
Knoop Hardness	**Hk**	500 [5]
Abrasion	**Aa**	121
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.74

Partial Dispersions

$n_C - n_t$	0.008891
$n_C - n_{A'}$	0.003839
$n_d - n_C$	0.003423
$n_e - n_C$	0.006143
$n_g - n_d$	0.014496
$n_g - n_F$	0.006470
$n_h - n_g$	0.005521
$n_i - n_g$	0.015308
$n_{C'} - n_t$	0.009432
$n_e - n_{C'}$	0.005602
$n_{F'} - n_e$	0.005975
$n_i - n_{F'}$	0.021109

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0083
$\Delta\theta_{C,A'}$	0.0022
$\Delta\theta_{g,d}$	-0.0005
$\Delta\theta_{g,F}$	
$\Delta\theta_{i,g}$	0.0076

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.23401499	
A_2	9.59796833	E-2
A_3	1.20503991	
B_1	8.69507801	E-3
B_2	4.65611429	E-2
B_3	1.37953301	E2
1129 ~ 2325 nm		
A_1	1.23401499	
A_2	9.59796833	E-2
A_3	1.20503991	
B_1	8.69507801	E-3
B_2	4.65611429	E-2
B_3	1.37953301	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7766
$\theta_{C,A'}$	0.3353
$\theta_{d,C}$	0.2990
$\theta_{e,C}$	0.5366
$\theta_{g,d}$	1.2661
$\theta_{g,F}$	0.5651
$\theta_{h,g}$	0.4822
$\theta_{i,g}$	1.3371
$\theta'_{C',t}$	0.8147
$\theta'_{e,C'}$	0.4839
$\theta'_{F',e}$	0.5161
$\theta'_{i,F'}$	1.8234

Internal Transmittance

λ_{80}	368	λ_5	340

CCI

B	G	R
0.00	0.40	0.38

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.040	
350	0.320	
360	0.660	
365		
370	0.840	
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	
1000	0.997	
1200	0.997	
1400	0.997	
1600	0.995	
1800	0.987	
2000	0.970	
2200	0.942	
2400	0.917	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	2.52		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.3	1.7	1.7	1.9	2.0	2.5	2.9	
-20 ~ 0	1.3	1.7	1.8	1.9	2.1	2.6	3.0	
0 ~ 20	1.4	1.8	1.8	2.0	2.2	2.6	3.1	
20 ~ 40	1.5	1.9	1.9	2.1	2.3	2.7	3.3	
40 ~ 60	1.5	1.9	1.9	2.1	2.3	2.8	3.4	
60 ~ 80	1.5	2.0	2.0	2.2	2.4	2.9	3.5	

© OHARA GmbH – Hofheim – Germany

S-TIL6

532489
534485

Refractive Index	n_d	**1.53172**	Abbe Number	ν_d	**48.84**	Dispersion	$n_F - n_C$	**0.01088**
	n_e	1.534304		ν_e	48.55		$n_{F'} - n_{C'}$	0.011006
		1.531717						0.010887

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.50292
n_{1970}	1.97009	1.50797
n_{1530}	1.52958	1.51342
n_{1129}	1.12864	1.51829
n_t	1.01398	1.51993
n_s	0.85211	1.52280
$n_{A'}$	0.76819	1.52479
n_r	0.70652	1.52662
n_C	0.65627	**1.52846**
$n_{C'}$	0.64385	1.52897
n_{He-Ne}	0.6328	1.52946
n_D	0.58929	1.53162
n_d	0.58756	**1.53172**
n_e	0.54607	1.53430
n_F	0.48613	**1.53934**
$n_{F'}$	0.47999	1.53998
n_{He-Cd}	0.44157	1.54465
n_g	0.435835	**1.54547**
n_h	0.404656	1.55069
n_i	0.365015	1.55989
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	438
Annealing Point (°C)	**AP**	468
Transformation Temperature (°C)	**Tg**	479
Yield Point (°C)	**At**	528
Softening Point (°C)	**SP**	648
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	82
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	1.059

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	648
Rigidity Modulus (10^8N/m^2)	**G**	283
Poisson's Ratio	σ	0.146
Knoop Hardness	**Hk**	490 [5]
Abrasion	**Aa**	114
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.008529
$n_C - n_{A'}$	0.003667
$n_d - n_C$	0.003261
$n_e - n_C$	0.005848
$n_g - n_d$	0.013756
$n_g - n_F$	0.006130
$n_h - n_g$	0.005216
$n_i - n_g$	0.014418
$n_{C'} - n_t$	0.009045
$n_e - n_{C'}$	0.005332
$n_{F'} - n_e$	0.005674
$n_i - n_{F'}$	0.019913

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0076
$\Delta\theta_{C,A'}$	0.0017
$\Delta\theta_{g,d}$	0.0002
$\Delta\theta_{g,F}$	0.0007
$\Delta\theta_{i,g}$	0.0082

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.17701777	
A_2	1.27958030	E-1
A_3	1.34740124	
B_1	7.71087686	E-3
B_2	4.11325328	E-2
B_3	1.54531692	E2
1129 ~ 2325 nm		
A_1	1.17701777	
A_2	1.27958030	E-1
A_3	1.34740124	
B_1	7.71087686	E-3
B_2	4.11325328	E-2
B_3	1.54531692	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7834
$\theta_{C,A'}$	0.3368
$\theta_{d,C}$	0.2995
$\theta_{e,C}$	0.5372
$\theta_{g,d}$	1.2635
$\theta_{g,F}$	0.5631
$\theta_{h,g}$	0.4791
$\theta_{i,g}$	1.3243
$\theta'_{C',t}$	0.8218
$\theta'_{e,C'}$	0.4845
$\theta'_{F',e}$	0.5155
$\theta'_{i,F'}$	1.8093

Internal Transmittance

λ_{80}	364	λ_5	339

CCI

B	G	R
0.00	0.28	0.24

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.070	
350	0.440	
360	0.740	
365		
370	0.880	
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	
1000	0.997	
1200	0.996	
1400	0.995	
1600	0.993	
1800	0.977	
2000	0.947	
2200	0.890	
2400	0.850	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	37
Specific Gravity	**d**	2.50		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.4	1.8	1.8	1.9	2.2	2.5	3.0	
-20 ~ 0	1.4	1.8	1.8	1.9	2.2	2.6	3.0	
0 ~ 20	1.4	1.8	1.8	1.9	2.2	2.6	3.1	
20 ~ 40	1.4	1.8	1.8	1.9	2.2	2.7	3.1	
40 ~ 60	1.4	1.8	1.9	1.9	2.2	2.7	3.2	
60 ~ 80	1.4	1.8	1.9	1.9	2.2	2.7	3.3	

© OHARA GmbH – Hofheim – Germany

S-TIL25

581407
585405

Refractive Index	n_d	**1.58144**	Abbe Number	ν_d	**40.75**	Dispersion	$n_F - n_C$	**0.01427**
	n_e	1.581439		ν_e	40.47		$n_{F'} - n_{C'}$	0.014270
		1.584822						0.014451

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.54741
n_{1970}	1.97009	1.55292
n_{1530}	1.52958	1.55895
n_{1129}	1.12864	1.56456
n_t	1.01398	1.56651
n_s	0.85211	1.57005
$n_{A'}$	0.76819	1.57254
n_r	0.70652	1.57486
n_C	0.65627	**1.57722**
$n_{C'}$	0.64385	1.57788
n_{He-Ne}	0.6328	1.57850
n_D	0.58929	1.58131
n_d	0.58756	**1.58144**
n_e	0.54607	1.58482
n_F	0.48613	**1.59149**
$n_{F'}$	0.47999	1.59233
n_{He-Cd}	0.44157	1.59861
n_g	0.435835	**1.59973**
n_h	0.404656	1.60687
n_i	0.365015	1.61979
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	536
Annealing Point (°C)	**AP**	564
Transformation Temperature (°C)	**Tg**	588
Yield Point (°C)	**At**	630
Softening Point (°C)	**SP**	715
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	74
	(+100~+300°C)	88
Thermal Conductivity (W/m·K)	**k**	1.054

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	753
Rigidity Modulus (10^8N/m^2)	**G**	309
Poisson's Ratio	σ	0.220
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	117
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.84

Partial Dispersions

$n_C - n_t$	0.010703
$n_C - n_{A'}$	0.004679
$n_d - n_C$	0.004223
$n_e - n_C$	0.007606
$n_g - n_d$	0.018287
$n_g - n_F$	0.008240
$n_h - n_g$	0.007140
$n_i - n_g$	0.020066
$n_{C'} - n_t$	0.011368
$n_e - n_{C'}$	0.006941
$n_{F'} - n_e$	0.007510
$n_i - n_{F'}$	0.027460

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0121
$\Delta\theta_{C,A'}$	0.0027
$\Delta\theta_{g,d}$	0.0014
$\Delta\theta_{g,F}$	0.0019
$\Delta\theta_{i,g}$	0.0224

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.32122534	
A_2	1.23824976	E-1
A_3	1.43685254	
B_1	9.52091436	E-3
B_2	5.16062665	E-2
B_3	1.49064883	E2
1129 ~ 2325 nm		
A_1	1.32122534	
A_2	1.23824976	E-1
A_3	1.43685254	
B_1	9.52091436	E-3
B_2	5.16062665	E-2
B_3	1.49064883	E2

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7500
$\theta_{C,A'}$	0.3279
$\theta_{d,C}$	0.2959
$\theta_{e,C}$	0.5330
$\theta_{g,d}$	1.2815
$\theta_{g,F}$	0.5774
$\theta_{h,g}$	0.5004
$\theta_{i,g}$	1.4062
$\theta'_{C',t}$	0.7867
$\theta'_{e,C'}$	0.4803
$\theta'_{F',e}$	0.5197
$\theta'_{i,F'}$	1.9002

Internal Transmittance

λ_{80}	378	λ_5	351

CCI

B	G	R
0.00	0.73	0.73

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.010	
360	0.280	
365		
370	0.650	
380	0.850	
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.994	
1800	0.981	
2000	0.963	
2200	0.911	
2400	0.890	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	2.59		λ_5	35	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.4	3.0	3.0	3.2	3.4	4.0	4.6	
-20 ~ 0	2.5	3.0	3.1	3.3	3.5	4.1	4.7	
0 ~ 20	2.6	3.1	3.2	3.4	3.6	4.2	4.9	
20 ~ 40	2.7	3.2	3.3	3.5	3.7	4.4	5.1	
40 ~ 60	2.7	3.3	3.3	3.5	3.8	4.5	5.2	
60 ~ 80	2.8	3.4	3.4	3.6	3.9	4.6	5.4	

© OHARA GmbH – Hofheim – Germany

S-TIL26

567428
570425

Refractive Index	n_d	**1.56732**	Abbe Number	ν_d	**42.82**	Dispersion	$n_F - n_C$	**0.01325**
	n_e	1.567322		ν_e	42.54		$n_{F'} - n_{C'}$	0.013250
		1.570466						0.013411

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.53493
n_{1970}	1.97009	1.54028
n_{1530}	1.52958	1.54611
n_{1129}	1.12864	1.55148
n_t	1.01398	1.55333
n_s	0.85211	1.55667
$n_{A'}$	0.76819	1.55901
n_r	0.70652	1.56119
n_C	0.65627	**1.56339**
$n_{C'}$	0.64385	1.56401
n_{He-Ne}	0.6328	1.56459
n_D	0.58929	1.56721
n_d	0.58756	**1.56732**
n_e	0.54607	1.57047
n_F	0.48613	**1.57664**
$n_{F'}$	0.47999	1.57742
n_{He-Cd}	0.44157	1.58321
n_g	0.435835	**1.58423**
n_h	0.404656	1.59077
n_i	0.365015	1.60256
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	495
Annealing Point (°C)	**AP**	533
Transformation Temperature (°C)	**Tg**	552
Yield Point (°C)	**At**	599
Softening Point (°C)	**SP**	694
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	79
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	1.054

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	739
Rigidity Modulus (10^8N/m^2)	**G**	302
Poisson's Ratio	σ	0.222
Knoop Hardness	**Hk**	500 [5]
Abrasion	**Aa**	123
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.75

Partial Dispersions

$n_C - n_t$	0.010055
$n_C - n_{A'}$	0.004379
$n_d - n_C$	0.003936
$n_e - n_C$	0.007080
$n_g - n_d$	0.016907
$n_g - n_F$	0.007593
$n_h - n_g$	0.006546
$n_i - n_g$	0.018329
$n_{C'} - n_t$	0.010676
$n_e - n_{C'}$	0.006459
$n_{F'} - n_e$	0.006952
$n_i - n_{F'}$	0.025140

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0113
$\Delta\theta_{C,A'}$	0.0027
$\Delta\theta_{g,d}$	0.0002
$\Delta\theta_{g,F}$	0.0009
$\Delta\theta_{i,g}$	0.0168

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.31066488	
A_2	9.41903094	E-2
A_3	1.23292644	
B_1	9.68897812	E-3
B_2	5.27763106	E-2
B_3	1.33296422	E2
1129 ~ 2325 nm		
A_1	1.31066488	
A_2	9.41903094	E-2
A_3	1.23292644	
B_1	9.68897812	E-3
B_2	5.27763106	E-2
B_3	1.33296422	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7589
$\theta_{C,A'}$	0.3305
$\theta_{d,C}$	0.2971
$\theta_{e,C}$	0.5343
$\theta_{g,d}$	1.2760
$\theta_{g,F}$	0.5731
$\theta_{h,g}$	0.4940
$\theta_{i,g}$	1.3833
$\theta'_{C',t}$	0.7961
$\theta'_{e,C'}$	0.4816
$\theta'_{F',e}$	0.5184
$\theta'_{i,F'}$	1.8746

Internal Transmittance

λ_{80}	374	λ_5	349

CCI

B	G	R
0.00	0.56	0.54

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.070	
360	0.440	
365		
370	0.740	
380	0.880	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.993	
1800	0.977	
2000	0.950	
2200	0.890	
2400	0.860	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	2.57		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.0	2.4	2.4	2.6	2.8	3.3	3.9	
-20 ~ 0	2.0	2.5	2.5	2.7	2.9	3.4	4.0	
0 ~ 20	2.0	2.6	2.6	2.8	3.0	3.5	4.2	
20 ~ 40	2.0	2.6	2.7	2.8	3.1	3.6	4.3	
40 ~ 60	2.1	2.7	2.7	2.9	3.2	3.7	4.4	
60 ~ 80	2.2	2.8	2.8	3.0	3.3	3.8	4.6	

© OHARA GmbH – Hofheim – Germany

S-TIL27

575415
578412

Refractive Index	n_d	**1.57501**	Abbe Number	ν_d	**41.50**	Dispersion	$n_F - n_C$	**0.01386**
	n_e	1.575006		ν_e	41.22		$n_{F'} - n_{C'}$	0.013854
		1.578291						0.014028

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.54162
n_{1970}	1.97009	1.54707
n_{1530}	1.52958	1.55304
n_{1129}	1.12864	1.55855
n_t	1.01398	1.56047
n_s	0.85211	1.56392
$n_{A'}$	0.76819	1.56635
n_r	0.70652	1.56861
n_C	0.65627	**1.57090**
$n_{C'}$	0.64385	1.57155
n_{He-Ne}	0.6328	1.57216
n_D	0.58929	1.57488
n_d	0.58756	**1.57501**
n_e	0.54607	1.57829
n_F	0.48613	**1.58476**
$n_{F'}$	0.47999	1.58558
n_{He-Cd}	0.44157	1.59167
n_g	0.435835	**1.59275**
n_h	0.404656	1.59966
n_i	0.365015	1.61218
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	511
Annealing Point (°C)	**AP**	547
Transformation Temperature (°C)	**Tg**	562
Yield Point (°C)	**At**	599
Softening Point (°C)	**SP**	700
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	74
	(+100~+300°C)	89
Thermal Conductivity (W/m·K)	**k**	1.070

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	749
Rigidity Modulus (10^8N/m^2)	**G**	308
Poisson's Ratio	σ	0.217
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	120
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions	
$n_C - n_t$	0.010433
$n_C - n_{A'}$	0.004553
$n_d - n_C$	0.004104
$n_e - n_C$	0.007389
$n_g - n_d$	0.017739
$n_g - n_F$	0.007989
$n_h - n_g$	0.006918
$n_i - n_g$	0.019440
$n_{C'} - n_t$	0.011080
$n_e - n_{C'}$	0.006742
$n_{F'} - n_e$	0.007286
$n_i - n_{F'}$	0.026608

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0117
$\Delta\theta_{C,A'}$	0.0024
$\Delta\theta_{g,d}$	0.0019
$\Delta\theta_{g,F}$	0.0024
$\Delta\theta_{i,g}$	0.0257

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.31433154	
A_2	1.12300168	E-1
A_3	1.41390100	
B_1	9.50404477	E-3
B_2	5.24112772	E-2
B_3	1.48429972	E2
1129 ~ 2325 nm		
A_1	1.31433154	
A_2	1.12300168	E-1
A_3	1.41390100	
B_1	9.50404477	E-3
B_2	5.24112772	E-2
B_3	1.48429972	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7531
$\theta_{C,A'}$	0.3286
$\theta_{d,C}$	0.2962
$\theta_{e,C}$	0.5333
$\theta_{g,d}$	1.2804
$\theta_{g,F}$	0.5767
$\theta_{h,g}$	0.4994
$\theta_{i,g}$	1.4032
$\theta'_{C',t}$	0.7898
$\theta'_{e,C'}$	0.4806
$\theta'_{F',e}$	0.5194
$\theta'_{i,F'}$	1.8968

Internal Transmittance			
λ_{80}	371	λ_5	350

CCI		
B	G	R
0.00	0.45	0.47

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.050	
360	0.440	
365		
370	0.780	
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.993	
1800	0.978	
2000	0.955	
2200	0.890	
2400	0.870	

Other Properties						
Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	38	
Specific Gravity	**d**	2.58		λ_5	35	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.4	2.9	3.0	3.1	3.3	3.9	4.5	
-20 ~ 0	2.4	2.9	3.0	3.2	3.4	4.0	4.6	
0 ~ 20	2.5	3.0	3.0	3.2	3.5	4.0	4.7	
20 ~ 40	2.5	3.0	3.1	3.3	3.5	4.1	4.8	
40 ~ 60	2.5	3.0	3.1	3.3	3.6	4.2	4.9	
60 ~ 80	2.5	3.1	3.1	3.3	3.6	4.3	5.0	

© OHARA GmbH – Hofheim – Germany

S-TIM1

626357
630354

Refractive Index	n_d	**1.62588**	Abbe Number	ν_d	**35.70**	Dispersion	$n_F - n_C$	**0.01754**
	n_e	1.625882		ν_e	35.43		$n_{F'} - n_{C'}$	0.017532
		1.630031						0.017780

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.58769
n_{1970}	1.97009	1.59337
n_{1530}	1.52958	1.59970
n_{1129}	1.12864	1.60583
n_t	1.01398	1.60805
n_s	0.85211	1.61216
$n_{A'}$	0.76819	1.61511
n_r	0.70652	1.61790
n_C	0.65627	**1.62074**
$n_{C'}$	0.64385	1.62155
n_{He-Ne}	0.6328	1.62231
n_D	0.58929	1.62573
n_d	0.58756	**1.62588**
n_e	0.54607	1.63003
n_F	0.48613	**1.63828**
$n_{F'}$	0.47999	1.63933
n_{He-Cd}	0.44157	1.64720
n_g	0.435835	**1.64861**
n_h	0.404656	1.65769
n_i	0.365015	1.67454
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	544
Annealing Point (°C)	**AP**	571
Transformation Temperature (°C)	**Tg**	602
Yield Point (°C)	**At**	630
Softening Point (°C)	**SP**	699
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	81
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	1.043

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	786
Rigidity Modulus (10^8N/m^2)	**G**	319
Poisson's Ratio	σ	0.234
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	136
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.82

Partial Dispersions	
$n_C - n_t$	0.012693
$n_C - n_{A'}$	0.005628
$n_d - n_C$	0.005139
$n_e - n_C$	0.009288
$n_g - n_d$	0.022725
$n_g - n_F$	0.010332
$n_h - n_g$	0.009086
$n_i - n_g$	0.025932
$n_{C'} - n_t$	0.013499
$n_e - n_{C'}$	0.008482
$n_{F'} - n_e$	0.009298
$n_i - n_{F'}$	0.035210

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0098
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	0.0056
$\Delta\theta_{g,F}$	0.0056
$\Delta\theta_{i,g}$	0.0530

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.44963830	
A_2	1.22986408	E-1
A_3	1.38066723	
B_1	1.12094282	E-2
B_2	5.96265770	E-2
B_3	1.38178326	E2
1129 ~ 2325 nm		
A_1	1.44963830	
A_2	1.22986408	E-1
A_3	1.38066723	
B_1	1.12094282	E-2
B_2	5.96265770	E-2
B_3	1.38178326	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7240
$\theta_{C,A'}$	0.3210
$\theta_{d,C}$	0.2931
$\theta_{e,C}$	0.5298
$\theta_{g,d}$	1.2962
$\theta_{g,F}$	0.5893
$\theta_{h,g}$	0.5183
$\theta_{i,g}$	1.4791
$\theta'_{C',t}$	0.7592
$\theta'_{e,C'}$	0.4771
$\theta'_{F',e}$	0.5229
$\theta'_{i,F'}$	1.9803

Internal Transmittance			
λ_{80}	383	λ_5	359

CCI		
B	G	R
0.00	1.20	1.21

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.090	
365		
370	0.470	
380	0.760	
390	0.890	
400	0.945	
420	0.977	
440	0.984	
460	0.987	
480	0.990	
500	0.992	
550	0.997	
600	0.997	
650	0.996	
700	0.997	
800	0.998	
900	0.998	
1000	0.998	
1200	0.998	
1400	0.993	
1600	0.993	
1800	0.980	
2000	0.965	
2200	0.917	
2400	0.890	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39
Specific Gravity	**d**	2.71		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.4	2.1	2.1	2.3	2.6	3.3	4.1	
-20 ~ 0	1.5	2.2	2.2	2.4	2.7	3.5	4.3	
0 ~ 20	1.6	2.3	2.3	2.6	2.9	3.6	4.5	
20 ~ 40	1.7	2.4	2.4	2.7	3.0	3.8	4.7	
40 ~ 60	1.8	2.5	2.5	2.8	3.1	3.9	4.9	
60 ~ 80	1.9	2.6	2.6	2.9	3.2	4.1	5.1	

© OHARA GmbH – Hofheim – Germany

S-TIM2

620363
624360

Refractive Index	n_d	**1.62004**	Abbe Number	ν_d	**36.26**	Dispersion	$n_F - n_C$	**0.01710**
	n_e	1.620041		ν_e	35.99		$n_{F'} - n_{C'}$	0.017099
		1.624088						0.017339

Refractive Indices		
	λ (µm)	
n_{2325}	2.32542	1.58240
n_{1970}	1.97009	1.58806
n_{1530}	1.52958	1.59435
n_{1129}	1.12864	1.60041
n_t	1.01398	1.60260
n_s	0.85211	1.60663
$n_{A'}$	0.76819	1.60952
n_r	0.70652	1.61225
n_C	0.65627	**1.61502**
$n_{C'}$	0.64385	1.61581
n_{He-Ne}	0.6328	1.61655
n_D	0.58929	1.61989
n_d	0.58756	**1.62004**
n_e	0.54607	1.62409
n_F	0.48613	**1.63212**
$n_{F'}$	0.47999	1.63315
n_{He-Cd}	0.44157	1.64081
n_g	0.435835	**1.64218**
n_h	0.404656	1.65100
n_i	0.365015	1.66728
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	551
Annealing Point (°C)	**AP**	576
Transformation Temperature (°C)	**Tg**	598
Yield Point (°C)	**At**	634
Softening Point (°C)	**SP**	703
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	81
	(+100~+300°C)	95
Thermal Conductivity (W/m·K)	**k**	1.394

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	776
Rigidity Modulus (10^8N/m^2)	**G**	315
Poisson's Ratio	σ	0.230
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	150
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.86

Partial Dispersions	
$n_C - n_t$	0.012426
$n_C - n_{A'}$	0.005500
$n_d - n_C$	0.005017
$n_e - n_C$	0.009064
$n_g - n_d$	0.022135
$n_g - n_F$	0.010053
$n_h - n_g$	0.008822
$n_i - n_g$	0.025105
$n_{C'} - n_t$	0.013213
$n_e - n_{C'}$	0.008277
$n_{F'} - n_e$	0.009062
$n_i - n_{F'}$	0.034131

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0099
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	0.0051
$\Delta\theta_{g,F}$	0.0051
$\Delta\theta_{i,g}$	0.0468

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.42193846	
A_2	1.33827968	E-1
A_3	1.45060574	
B_1	1.07291511	E-2
B_2	5.72587546	E-2
B_3	1.45381805	E2
1129 ~ 2325 nm		
A_1	1.42193846	
A_2	1.33827968	E-1
A_3	1.45060574	
B_1	1.07291511	E-2
B_2	5.72587546	E-2
B_3	1.45381805	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7267
$\theta_{C,A'}$	0.3217
$\theta_{d,C}$	0.2934
$\theta_{e,C}$	0.5301
$\theta_{g,d}$	1.2945
$\theta_{g,F}$	0.5879
$\theta_{h,g}$	0.5159
$\theta_{i,g}$	1.4682
$\theta'_{C',t}$	0.7620
$\theta'_{e,C'}$	0.4774
$\theta'_{F',e}$	0.5226
$\theta'_{i,F'}$	1.9685

Internal Transmittance			
λ_{80}	385	λ_5	359

CCI		
B	G	R
0.00	1.20	1.19

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.080	
365		
370	0.440	
380	0.730	
390	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.995	
1600	0.995	
1800	0.984	
2000	0.971	
2200	0.930	
2400	0.914	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39
Specific Gravity	**d**	2.69		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.7	2.3	2.3	2.5	2.8	3.4	4.2	
-20 ~ 0	1.8	2.3	2.4	2.6	2.9	3.6	4.4	
0 ~ 20	1.8	2.4	2.5	2.7	3.0	3.7	4.6	
20 ~ 40	1.9	2.5	2.6	2.8	3.1	3.9	4.8	
40 ~ 60	1.9	2.6	2.6	2.9	3.2	4.1	5.0	
60 ~ 80	2.0	2.7	2.7	3.0	3.4	4.2	5.2	

© OHARA GmbH – Hofheim – Germany

S-TIM3

613370
617367

Refractive Index	n_d	**1.61293**	Abbe Number	ν_d	**37.00**	Dispersion	$n_F - n_C$	**0.01657**
	n_e	1.612929		ν_e	36.73		$n_{F'} - n_{C'}$	0.016564
		1.616851						0.016792

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.57589
n_{1970}	1.97009	1.58154
n_{1530}	1.52958	1.58781
n_{1129}	1.12864	1.59381
n_t	1.01398	1.59595
n_s	0.85211	1.59990
$n_{A'}$	0.76819	1.60272
n_r	0.70652	1.60537
n_C	0.65627	**1.60806**
$n_{C'}$	0.64385	1.60883
n_{He-Ne}	0.6328	1.60954
n_D	0.58929	1.61278
n_d	0.58756	**1.61293**
n_e	0.54607	1.61685
n_F	0.48613	**1.62463**
$n_{F'}$	0.47999	1.62562
n_{He-Cd}	0.44157	1.63302
n_g	0.435835	**1.63434**
n_h	0.404656	1.64284
n_i	0.365015	1.65850
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	548
Annealing Point (°C)	**AP**	577
Transformation Temperature (°C)	**Tg**	597
Yield Point (°C)	**At**	633
Softening Point (°C)	**SP**	708
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	77
	(+100~+300°C)	91
Thermal Conductivity (W/m·K)	**k**	1.044

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	779
Rigidity Modulus (10^8N/m^2)	**G**	317
Poisson's Ratio	σ	0.229
Knoop Hardness	**Hk**	510 [5]
Abrasion	**Aa**	129
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.91

Partial Dispersions	
$n_C - n_t$	0.012109
$n_C - n_{A'}$	0.005347
$n_d - n_C$	0.004867
$n_e - n_C$	0.008789
$n_g - n_d$	0.021407
$n_g - n_F$	0.009710
$n_h - n_g$	0.008506
$n_i - n_g$	0.024167
$n_{C'} - n_t$	0.012873
$n_e - n_{C'}$	0.008025
$n_{F'} - n_e$	0.008767
$n_i - n_{F'}$	0.032885

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0107
$\Delta\theta_{C,A'}$	0.0021
$\Delta\theta_{g,d}$	0.0045
$\Delta\theta_{g,F}$	0.0046
$\Delta\theta_{i,g}$	0.0438

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.40691144	
A_2	1.28369745	E-1
A_3	1.51826191	
B_1	1.05633641	E-2
B_2	5.68483105	E-2
B_3	1.52107924	E2
1129 ~ 2325 nm		
A_1	1.40691144	
A_2	1.28369745	E-1
A_3	1.51826191	
B_1	1.05633641	E-2
B_2	5.68483105	E-2
B_3	1.52107924	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7310
$\theta_{C,A'}$	0.3228
$\theta_{d,C}$	0.2938
$\theta_{e,C}$	0.5306
$\theta_{g,d}$	1.2924
$\theta_{g,F}$	0.5862
$\theta_{h,g}$	0.5135
$\theta_{i,g}$	1.4590
$\theta'_{C',t}$	0.7666
$\theta'_{e,C'}$	0.4779
$\theta'_{F',e}$	0.5221
$\theta'_{i,F'}$	1.9584

Internal Transmittance			
λ_{80}	381	λ_5	358

CCI		
B	G	R
0.00	1.09	1.10

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.130	
365		
370	0.530	
380	0.790	
390	0.907	
400	0.950	
420	0.976	
440	0.984	
460	0.986	
480	0.989	
500	0.992	
550	0.996	
600	0.996	
650	0.995	
700	0.997	
800	0.999	
900	0.998	
1000	0.996	
1200	0.996	
1400	0.994	
1600	0.994	
1800	0.983	
2000	0.971	
2200	0.929	
2400	0.913	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39	
Specific Gravity	**d**	2.67		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.8	2.4	2.5	2.7	3.0	3.6	4.3	
-20 ~ 0	1.8	2.5	2.6	2.8	3.1	3.8	4.5	
0 ~ 20	2.0	2.6	2.7	3.0	3.2	3.9	4.7	
20 ~ 40	2.1	2.8	2.8	3.1	3.4	4.1	5.0	
40 ~ 60	2.2	2.9	2.9	3.2	3.5	4.3	5.2	
60 ~ 80	2.3	3.0	3.0	3.3	3.6	4.4	5.4	

© OHARA GmbH – Hofheim – Germany

S-TIM5

603380
607378

Refractive Index	n_d	**1.60342**	Abbe Number	ν_d	**38.03**	Dispersion	$n_F - n_C$	**0.01587**
	n_e	1.607179		ν_e	37.76		$n_{F'} - n_{C'}$	0.016082

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.56753
n_{1970}	1.97009	1.57306
n_{1530}	1.52958	1.57918
n_{1129}	1.12864	1.58500
n_t	1.01398	1.58708
n_s	0.85211	1.59089
$n_{A'}$	0.76819	1.59360
n_r	0.70652	1.59615
n_C	0.65627	**1.59875**
$n_{C'}$	0.64385	1.59948
n_{He-Ne}	0.6328	1.60017
n_D	0.58929	1.60328
n_d	0.58756	**1.60342**
n_e	0.54607	1.60718
n_F	0.48613	**1.61462**
$n_{F'}$	0.47999	1.61556
n_{He-Cd}	0.44157	1.62262
n_g	0.435835	**1.62388**
n_h	0.404656	1.63196
n_i	0.365015	1.64676
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	535
Annealing Point (°C)	**AP**	565
Transformation Temperature (°C)	**Tg**	588
Yield Point (°C)	**At**	624
Softening Point (°C)	**SP**	700
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	83
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	1.040

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	763
Rigidity Modulus (10^8N/m^2)	**G**	309
Poisson's Ratio	σ	0.233
Knoop Hardness	**Hk**	540 [5]
Abrasion	**Aa**	128
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.84

Partial Dispersions

$n_C - n_t$	0.011667
$n_C - n_{A'}$	0.005143
$n_d - n_C$	0.004672
$n_e - n_C$	0.008431
$n_g - n_d$	0.020455
$n_g - n_F$	0.009259
$n_h - n_g$	0.008081
$n_i - n_g$	0.022880
$n_{C'} - n_t$	0.012401
$n_e - n_{C'}$	0.007697
$n_{F'} - n_e$	0.008385
$n_i - n_{F'}$	0.031191

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0102
$\Delta\theta_{C,A'}$	0.0022
$\Delta\theta_{g,d}$	0.0034
$\Delta\theta_{g,F}$	0.0036
$\Delta\theta_{i,g}$	0.0353

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.38531342	
A_2	1.22372945	E-1
A_3	1.40508326	
B_1	1.04074567	E-2
B_2	5.57440088	E-2
B_3	1.44878733	E2
1129 ~ 2325 nm		
A_1	1.38531342	
A_2	1.22372945	E-1
A_3	1.40508326	
B_1	1.04074567	E-2
B_2	5.57440088	E-2
B_3	1.44878733	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7353
$\theta_{C,A'}$	0.3241
$\theta_{d,C}$	0.2944
$\theta_{e,C}$	0.5313
$\theta_{g,d}$	1.2891
$\theta_{g,F}$	0.5835
$\theta_{h,g}$	0.5093
$\theta_{i,g}$	1.4419
$\theta'_{C',t}$	0.7711
$\theta'_{e,C'}$	0.4786
$\theta'_{F',e}$	0.5214
$\theta'_{i,F'}$	1.9395

Internal Transmittance

λ_{80}	378	λ_5	357

CCI

B	G	R
0.00	0.79	0.81

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.190	
365		
370	0.600	
380	0.840	
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	
1000	0.998	
1200	0.998	
1400	0.994	
1600	0.994	
1800	0.982	
2000	0.966	
2200	0.923	
2400	0.902	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	2.63		λ_5	35		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.4	1.9	1.9	2.1	2.4	3.0	3.7	
-20 ~ 0	1.4	2.0	2.1	2.3	2.5	3.2	3.9	
0 ~ 20	1.4	2.1	2.2	2.4	2.7	3.4	4.1	
20 ~ 40	1.6	2.3	2.3	2.5	2.8	3.6	4.4	
40 ~ 60	1.7	2.4	2.4	2.7	3.0	3.7	4.6	
60 ~ 80	1.7	2.5	2.6	2.8	3.1	3.9	4.8	

© OHARA GmbH – Hofheim – Germany

S-TIM8

596392
599390

Refractive Index	n_d	**1.59551**	Abbe Number	ν_d	**39.24**	Dispersion	$n_F - n_C$	**0.01518**
	n_e	1.595509		ν_e	38.97		$n_{F'} - n_{C'}$	0.015176
		1.599106						0.015375

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.56075
n_{1970}	1.97009	1.56615
n_{1530}	1.52958	1.57212
n_{1129}	1.12864	1.57778
n_t	1.01398	1.57980
n_s	0.85211	1.58347
$n_{A'}$	0.76819	1.58609
n_r	0.70652	1.58854
n_C	0.65627	**1.59103**
$n_{C'}$	0.64385	1.59173
n_{He-Ne}	0.6328	1.59240
n_D	0.58929	1.59538
n_d	0.58756	**1.59551**
n_e	0.54607	1.59911
n_F	0.48613	**1.60621**
$n_{F'}$	0.47999	1.60711
n_{He-Cd}	0.44157	1.61382
n_g	0.435835	**1.61501**
n_h	0.404656	1.62267
n_i	0.365015	1.63661
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	529
Annealing Point (°C)	**AP**	560
Transformation Temperature (°C)	**Tg**	585
Yield Point (°C)	**At**	610
Softening Point (°C)	**SP**	695
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	84
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	1.034

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	750
Rigidity Modulus (10^8N/m^2)	**G**	305
Poisson's Ratio	σ	0.231
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	133
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.79

Partial Dispersions	
$n_C - n_t$	0.011234
$n_C - n_{A'}$	0.004942
$n_d - n_C$	0.004479
$n_e - n_C$	0.008076
$n_g - n_d$	0.019504
$n_g - n_F$	0.008807
$n_h - n_g$	0.007657
$n_i - n_g$	0.021600
$n_{C'} - n_t$	0.011938
$n_e - n_{C'}$	0.007372
$n_{F'} - n_e$	0.008003
$n_i - n_{F'}$	0.029504

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0094
$\Delta\theta_{C,A'}$	0.0022
$\Delta\theta_{g,d}$	0.0020
$\Delta\theta_{g,F}$	0.0023
$\Delta\theta_{i,g}$	0.0269

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.37262713	
A_2	1.12636276	E-1
A_3	1.39786421	
B_1	1.03220068	E-2
B_2	5.50195044	E-2
B_3	1.47735609	E2
1129 ~ 2325 nm		
A_1	1.37262713	
A_2	1.12636276	E-1
A_3	1.39786421	
B_1	1.03220068	E-2
B_2	5.50195044	E-2
B_3	1.47735609	E2

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**	1.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.7402
$\theta_{C,A'}$	0.3256
$\theta_{d,C}$	0.2951
$\theta_{e,C}$	0.5322
$\theta_{g,d}$	1.2852
$\theta_{g,F}$	0.5803
$\theta_{h,g}$	0.5045
$\theta_{i,g}$	1.4233
$\theta'_{C',t}$	0.7765
$\theta'_{e,C'}$	0.4795
$\theta'_{F',e}$	0.5205
$\theta'_{i,F'}$	1.9190

Internal Transmittance			
λ_{80}	378	λ_5	351

CCI		
B	G	R
0.00	0.82	0.82

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.020	
360	0.270	
365		
370	0.640	
380	0.840	
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	
1000	0.996	
1200	0.996	
1400	0.994	
1600	0.993	
1800	0.983	
2000	0.968	
2200	0.935	
2400	0.915	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	38
Specific Gravity	**d**	2.63		λ_5	35

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.3	1.7	1.7	1.9	2.2	2.8	3.4	
-20 ~ 0	1.3	1.8	1.8	2.0	2.3	2.9	3.5	
0 ~ 20	1.3	1.8	1.9	2.1	2.3	3.0	3.7	
20 ~ 40	1.4	1.9	1.9	2.1	2.4	3.1	3.8	
40 ~ 60	1.4	1.9	2.0	2.2	2.5	3.2	4.0	
60 ~ 80	1.5	2.0	2.0	2.3	2.6	3.3	4.1	

© OHARA GmbH – Hofheim – Germany

S-TIM22

648338
652335

Refractive Index	n_d	**1.64769**	Abbe Number	ν_d	**33.79**	Dispersion	$n_F - n_C$	**0.01916**
	n_e	1.647689		ν_e	33.53		$n_{F'} - n_{C'}$	0.019167
		1.652221						0.019451

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.60753
n_{1970}	1.97009	1.61325
n_{1530}	1.52958	1.61971
n_{1129}	1.12864	1.62609
n_t	1.01398	1.62844
n_s	0.85211	1.63283
$n_{A'}$	0.76819	1.63600
n_r	0.70652	1.63901
n_C	0.65627	**1.64210**
$n_{C'}$	0.64385	1.64297
n_{He-Ne}	0.6328	1.64379
n_D	0.58929	1.64752
n_d	0.58756	**1.64769**
n_e	0.54607	1.65222
n_F	0.48613	**1.66126**
$n_{F'}$	0.47999	1.66242
n_{He-Cd}	0.44157	1.67109
n_g	0.435835	**1.67265**
n_h	0.404656	1.68269
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	545
Annealing Point (°C)	**AP**	572
Transformation Temperature (°C)	**Tg**	593
Yield Point (°C)	**At**	624
Softening Point (°C)	**SP**	692
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	83
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	1.024

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	798
Rigidity Modulus (10^8N/m^2)	**G**	322
Poisson's Ratio	σ	0.238
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	149
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.82

Partial Dispersions	
$n_C - n_t$	0.013658
$n_C - n_{A'}$	0.006092
$n_d - n_C$	0.005593
$n_e - n_C$	0.010125
$n_g - n_d$	0.024956
$n_g - n_F$	0.011382
$n_h - n_g$	0.010042
$n_i - n_g$	
$n_{C'} - n_t$	0.014533
$n_e - n_{C'}$	0.009250
$n_{F'} - n_e$	0.010201
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0074
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	0.0075
$\Delta\theta_{g,F}$	0.0070
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.44222294	
A_2	1.94432265	E-1
A_3	1.74092482	
B_1	1.04249404	E-2
B_2	5.50235257	E-2
B_3	1.69710769	E2
1129 ~ 2325 nm		
A_1	1.44222294	
A_2	1.94432265	E-1
A_3	1.74092482	
B_1	1.04249404	E-2
B_2	5.50235257	E-2
B_3	1.69710769	E2

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**	1.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.7126
$\theta_{C,A'}$	0.3178
$\theta_{d,C}$	0.2918
$\theta_{e,C}$	0.5283
$\theta_{g,d}$	1.3020
$\theta_{g,F}$	0.5938
$\theta_{h,g}$	0.5239
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7472
$\theta'_{e,C'}$	0.4756
$\theta'_{F',e}$	0.5244
$\theta'_{i,F'}$	

Internal Transmittance			
λ_{80}	386	λ_5	360

CCI		
B	G	R
0.00	1.48	1.49

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.040	
365		
370	0.370	
380	0.700	
390	0.860	
400	0.928	
420	0.970	
440	0.981	
460	0.986	
480	0.989	
500	0.991	
550	0.996	
600	0.996	
650	0.995	
700	0.996	
800	0.998	
900	0.997	
1000	0.997	
1200	0.996	
1400	0.993	
1600	0.991	
1800	0.981	
2000	0.970	
2200	0.934	
2400	0.916	

Other Properties						
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40	
Specific Gravity	**d**	2.79		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.8	1.5	1.6	1.8	2.1	2.9	3.7	
-20 ~ 0	1.0	1.7	1.7	1.9	2.3	3.1	4.0	
0 ~ 20	1.1	1.8	1.8	2.1	2.4	3.3	4.3	
20 ~ 40	1.1	1.9	2.0	2.3	2.6	3.5	4.5	
40 ~ 60	1.3	2.1	2.1	2.4	2.8	3.7	4.8	
60 ~ 80	1.4	2.2	2.3	2.6	2.9	3.9	5.0	

© OHARA GmbH – Hofheim – Germany

S-TIM25

673321
678318

Refractive Index	n_d	**1.67270**	Abbe Number	ν_d	**32.10**	Dispersion	$n_F - n_C$	**0.02095**
	n_e	1.677651		ν_e	31.84		$n_{F'} - n_{C'}$	0.021280
		1.672700						0.020957

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.62988
n_{1970}	1.97009	1.63583
n_{1530}	1.52958	1.64258
n_{1129}	1.12864	1.64933
n_t	1.01398	1.65184
n_s	0.85211	1.65656
$n_{A'}$	0.76819	1.66000
n_r	0.70652	1.66326
n_C	0.65627	**1.66661**
$n_{C'}$	0.64385	1.66756
n_{He-Ne}	0.6328	1.66846
n_D	0.58929	1.67252
n_d	0.58756	**1.67270**
n_e	0.54607	1.67765
n_F	0.48613	**1.68756**
$n_{F'}$	0.47999	1.68884
n_{He-Cd}	0.44157	1.69840
n_g	0.435835	**1.70011**
n_h	0.404656	1.71126
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	556
Annealing Point (°C)	**AP**	585
Transformation Temperature (°C)	**Tg**	608
Yield Point (°C)	**At**	640
Softening Point (°C)	**SP**	700
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	79
	(+100~+300°C)	95
Thermal Conductivity (W/m·K)	**k**	1.046

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	841
Rigidity Modulus (10^8N/m^2)	**G**	340
Poisson's Ratio	σ	0.236
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	140
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.81

Partial Dispersions

$n_C - n_t$	0.014766
$n_C - n_{A'}$	0.006611
$n_d - n_C$	0.006093
$n_e - n_C$	0.011044
$n_g - n_d$	0.027414
$n_g - n_F$	0.012550
$n_h - n_g$	0.011144
$n_i - n_g$	
$n_{C'} - n_t$	0.015718
$n_e - n_{C'}$	0.010092
$n_{F'} - n_e$	0.011188
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0073
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0101
$\Delta\theta_{g,F}$	0.0093
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.50659233	
A_2	2.04786135	E-1
A_3	1.92036668	
B_1	1.09501562	E-2
B_2	5.74980285	E-2
B_3	1.78128535	E2
1129 ~ 2325 nm		
A_1	1.50659233	
A_2	2.04786135	E-1
A_3	1.92036668	
B_1	1.09501562	E-2
B_2	5.74980285	E-2
B_3	1.78128535	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7046
$\theta_{C,A'}$	0.3155
$\theta_{d,C}$	0.2907
$\theta_{e,C}$	0.5270
$\theta_{g,d}$	1.3081
$\theta_{g,F}$	0.5988
$\theta_{h,g}$	0.5318
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7386
$\theta'_{e,C'}$	0.4742
$\theta'_{F',e}$	0.5258
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	390	λ_5	362

CCI

B	G	R
0.00	2.11	2.17

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.010	
365		
370	0.240	
380	0.600	
390	0.800	
400	0.890	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.995	
1800	0.987	
2000	0.977	
2200	0.944	
2400	0.930	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40
Specific Gravity	**d**	2.91		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.5	2.2	2.3	2.6	2.9	3.7	4.7	
-20 ~ 0	1.7	2.4	2.4	2.7	3.0	3.9	5.0	
0 ~ 20	1.7	2.5	2.5	2.8	3.2	4.1	5.2	
20 ~ 40	1.7	2.6	2.7	2.9	3.4	4.4	5.5	
40 ~ 60	1.8	2.7	2.8	3.1	3.6	4.6	5.8	
60 ~ 80	1.9	2.8	2.9	3.3	3.7	4.8	6.1	

© OHARA GmbH – Hofheim – Germany

S-TIM27

640345
644342

Refractive Index	n_d	**1.63980**	Abbe Number	ν_d	**34.46**	Dispersion	$n_F - n_C$	**0.01856**
	n_e	1.644189		ν_e	34.20		$n_{F'} - n_{C'}$	0.018835
		1.639799						0.018564

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.60036
n_{1970}	1.97009	1.60608
n_{1530}	1.52958	1.61249
n_{1129}	1.12864	1.61878
n_t	1.01398	1.62108
n_s	0.85211	1.62537
$n_{A'}$	0.76819	1.62846
n_r	0.70652	1.63138
n_C	0.65627	**1.63438**
$n_{C'}$	0.64385	1.63522
n_{He-Ne}	0.6328	1.63602
n_D	0.58929	1.63964
n_d	0.58756	**1.63980**
n_e	0.54607	1.64419
n_F	0.48613	**1.65294**
$n_{F'}$	0.47999	1.65406
n_{He-Cd}	0.44157	1.66244
n_g	0.435835	**1.66393**
n_h	0.404656	1.67361
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	543
Annealing Point (°C)	**AP**	572
Transformation Temperature (°C)	**Tg**	594
Yield Point (°C)	**At**	629
Softening Point (°C)	**SP**	696
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	80
	(+100~+300°C)	99
Thermal Conductivity (W/m·K)	**k**	1.035

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	793
Rigidity Modulus (10^8N/m^2)	**G**	321
Poisson's Ratio	σ	0.236
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	141
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.83

Partial Dispersions

$n_C - n_t$	0.013292
$n_C - n_{A'}$	0.005916
$n_d - n_C$	0.005424
$n_e - n_C$	0.009814
$n_g - n_d$	0.024134
$n_g - n_F$	0.010994
$n_h - n_g$	0.009680
$n_i - n_g$	
$n_{C'} - n_t$	0.014141
$n_e - n_{C'}$	0.008965
$n_{F'} - n_e$	0.009870
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0076
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	0.0069
$\Delta\theta_{g,F}$	0.0065
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	1.41680470	
A 2	1.96785057	E-1
A 3	1.68001322	
B 1	1.00732158	E-2
B 2	5.37616908	E-2
B 3	1.64672436	E2
1129 ~ 2325 nm		
A 1	1.41680470	
A 2	1.96785057	E-1
A 3	1.68001322	
B 1	1.00732158	E-2
B 2	5.37616908	E-2
B 3	1.64672436	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7160
$\theta_{C,A'}$	0.3187
$\theta_{d,C}$	0.2922
$\theta_{e,C}$	0.5287
$\theta_{g,d}$	1.3000
$\theta_{g,F}$	0.5922
$\theta_{h,g}$	0.5214
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7508
$\theta'_{e,C'}$	0.4760
$\theta'_{F',e}$	0.5240
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	385	λ_5	360

CCI

B	G	R
0.00	1.37	1.38

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.050	
365		
370	0.410	
380	0.730	
390	0.870	
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	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.994	
1800	0.984	
2000	0.973	
2200	0.936	
2400	0.919	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	39		
Specific Gravity	**d**	2.76		λ_5	36		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.2	1.9	1.9	2.2	2.5	3.2	4.0	
-20 ~ 0	1.3	2.0	2.0	2.3	2.6	3.3	4.2	
0 ~ 20	1.3	2.1	2.1	2.4	2.7	3.5	4.4	
20 ~ 40	1.4	2.1	2.2	2.5	2.8	3.7	4.6	
40 ~ 60	1.4	2.2	2.3	2.6	2.9	3.8	4.8	
60 ~ 80	1.5	2.3	2.4	2.7	3.0	4.0	5.1	

© OHARA GmbH – Hofheim – Germany

S-TIM28

689311
694308

Refractive Index	n_d	**1.68893**	Abbe Number	ν_d	**31.07**	Dispersion	$n_F - n_C$	**0.02217**
	n_e	1.694167		ν_e	30.83		$n_{F'} - n_{C'}$	0.022516
		1.688931						0.022170

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.64463
n_{1970}	1.97009	1.65062
n_{1530}	1.52958	1.65745
n_{1129}	1.12864	1.66438
n_t	1.01398	1.66699
n_s	0.85211	1.67192
$n_{A'}$	0.76819	1.67553
n_r	0.70652	1.67896
n_C	0.65627	**1.68250**
$n_{C'}$	0.64385	1.68350
n_{He-Ne}	0.6328	1.68445
n_D	0.58929	1.68874
n_d	0.58756	**1.68893**
n_e	0.54607	1.69417
n_F	0.48613	**1.70467**
$n_{F'}$	0.47999	1.70602
n_{He-Cd}	0.44157	1.71615
n_g	0.435835	**1.71797**
n_h	0.404656	1.72981
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	560
Annealing Point (°C)	**AP**	588
Transformation Temperature (°C)	**Tg**	611
Yield Point (°C)	**At**	637
Softening Point (°C)	**SP**	701
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	82
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	1.006

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	855
Rigidity Modulus (10^8N/m^2)	**G**	344
Poisson's Ratio	σ	0.242
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	155
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.77

Partial Dispersions

$n_C - n_t$	0.015507
$n_C - n_{A'}$	0.006966
$n_d - n_C$	0.006436
$n_e - n_C$	0.011672
$n_g - n_d$	0.029044
$n_g - n_F$	0.013310
$n_h - n_g$	0.011834
$n_i - n_g$	
$n_{C'} - n_t$	0.016512
$n_e - n_{C'}$	0.010667
$n_{F'} - n_e$	0.011849
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0071
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0099
$\Delta\theta_{g,F}$	0.0092
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.54270810	
A_2	2.17113891	E-1
A_3	1.81904459	
B_1	1.13925005	E-2
B_2	5.79224572	E-2
B_3	1.67697189	E2
1129 ~ 2325 nm		
A_1	1.54270810	
A_2	2.17113891	E-1
A_3	1.81904459	
B_1	1.13925005	E-2
B_2	5.79224572	E-2
B_3	1.67697189	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.6995
$\theta_{C,A'}$	0.3142
$\theta_{d,C}$	0.2903
$\theta_{e,C}$	0.5265
$\theta_{g,d}$	1.3101
$\theta_{g,F}$	0.6004
$\theta_{h,g}$	0.5338
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7333
$\theta'_{e,C'}$	0.4738
$\theta'_{F',e}$	0.5262
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	391	λ_5	362

CCI

B	G	R
0.00	2.30	2.36

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.010	
365		
370	0.230	
380	0.580	
390	0.790	
400	0.880	
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	
1000	0.998	
1200	0.998	
1400	0.996	
1600	0.996	
1800	0.989	
2000	0.983	
2200	0.961	
2400	0.948	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41	
Specific Gravity	**d**	2.98		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.3	1.9	2.0	2.2	2.6	3.4	4.5	
-20 ~ 0	1.3	2.0	2.1	2.3	2.7	3.6	4.7	
0 ~ 20	1.3	2.1	2.2	2.5	2.9	3.8	5.0	
20 ~ 40	1.4	2.2	2.3	2.6	3.0	4.0	5.2	
40 ~ 60	1.4	2.3	2.4	2.7	3.1	4.2	5.5	
60 ~ 80	1.4	2.4	2.5	2.8	3.3	4.4	5.7	

© OHARA GmbH – Hofheim – Germany

S-TIM35

699301
704299

Refractive Index	n_d	**1.69895**	Abbe Number	ν_d	**30.13**	Dispersion	$n_F - n_C$	**0.02320**
	n_e	1.698947		ν_e	29.89		$n_{F'} - n_{C'}$	0.023199
		1.704424						0.023567

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.65283
n_{1970}	1.97009	1.65905
n_{1530}	1.52958	1.66615
n_{1129}	1.12864	1.67335
n_t	1.01398	1.67606
n_s	0.85211	1.68120
$n_{A'}$	0.76819	1.68496
n_r	0.70652	1.68854
n_C	0.65627	**1.69222**
$n_{C'}$	0.64385	1.69327
n_{He-Ne}	0.6328	1.69426
n_D	0.58929	1.69875
n_d	0.58756	**1.69895**
n_e	0.54607	1.70442
n_F	0.48613	**1.71542**
$n_{F'}$	0.47999	1.71684
n_{He-Cd}	0.44157	1.72750
n_g	0.435835	**1.72941**
n_h	0.404656	1.74189
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	579
Annealing Point (°C)	**AP**	603
Transformation Temperature (°C)	**Tg**	622
Yield Point (°C)	**At**	648
Softening Point (°C)	**SP**	716
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	75
	(+100~+300°C)	89
Thermal Conductivity (W/m·K)	**k**	1.049

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	875
Rigidity Modulus (10^8N/m^2)	**G**	353
Poisson's Ratio	σ	0.238
Knoop Hardness	**Hk**	500 [5]
Abrasion	**Aa**	136
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.04

Partial Dispersions

$n_C - n_t$	0.016161
$n_C - n_{A'}$	0.007266
$n_d - n_C$	0.006722
$n_e - n_C$	0.012199
$n_g - n_d$	0.030465
$n_g - n_F$	0.013988
$n_h - n_g$	0.012478
$n_i - n_g$	
$n_{C'} - n_t$	0.017210
$n_e - n_{C'}$	0.011150
$n_{F'} - n_e$	0.012417
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0086
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	0.0111
$\Delta\theta_{g,F}$	0.0103
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.55849775	
A_2	2.30767007	E-1
A_3	1.84436099	
B_1	1.15367235	E-2
B_2	5.86095947	E-2
B_3	1.62981888	E2
1129 ~ 2325 nm		
A_1	1.55849775	
A_2	2.30767007	E-1
A_3	1.84436099	
B_1	1.15367235	E-2
B_2	5.86095947	E-2
B_3	1.62981888	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6966
$\theta_{C,A'}$	0.3132
$\theta_{d,C}$	0.2898
$\theta_{e,C}$	0.5258
$\theta_{g,d}$	1.3132
$\theta_{g,F}$	0.6030
$\theta_{h,g}$	0.5379
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7303
$\theta'_{e,C'}$	0.4731
$\theta'_{F',e}$	0.5269
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	397	λ_5	367

CCI

B	G	R
0.00	2.94	2.98

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360		
365		
370	0.140	
380	0.480	
390	0.720	
400	0.840	
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	
1000	0.999	
1200	0.999	
1400	0.995	
1600	0.995	
1800	0.988	
2000	0.980	
2200	0.942	
2400	0.931	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40	
Specific Gravity	**d**	2.96		λ_5	37	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.0	2.8	2.8	3.1	3.5	4.4	5.5	
-20 ~ 0	2.1	2.9	3.0	3.3	3.7	4.6	5.8	
0 ~ 20	2.1	3.0	3.1	3.4	3.8	4.9	6.1	
20 ~ 40	2.3	3.2	3.2	3.6	4.0	5.1	6.4	
40 ~ 60	2.4	3.3	3.4	3.7	4.2	5.3	6.7	
60 ~ 80	2.4	3.4	3.5	3.9	4.4	5.6	7.0	

© OHARA GmbH – Hofheim – Germany

S-TIM39

667330
672328

Refractive Index	n_d	**1.66680**	Abbe Number	ν_d	**33.05**	Dispersion	$n_F - n_C$	**0.02018**
	n_e	1.671568		ν_e	32.80		$n_{F'} - n_{C'}$	0.020173 / 0.020477

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.62567
n_{1970}	1.97009	1.63132
n_{1530}	1.52958	1.63776
n_{1129}	1.12864	1.64425
n_t	1.01398	1.64667
n_s	0.85211	1.65123
$n_{A'}$	0.76819	1.65454
n_r	0.70652	1.65769
n_C	0.65627	**1.66092**
$n_{C'}$	0.64385	1.66184
n_{He-Ne}	0.6328	1.66271
n_D	0.58929	1.66662
n_d	0.58756	**1.66680**
n_e	0.54607	1.67157
n_F	0.48613	**1.68110**
$n_{F'}$	0.47999	1.68232
n_{He-Cd}	0.44157	1.69148
n_g	0.435835	**1.69311**
n_h	0.404656	1.70373
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	544
Annealing Point (°C)	**AP**	569
Transformation Temperature (°C)	**Tg**	591
Yield Point (°C)	**At**	621
Softening Point (°C)	**SP**	682
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	87
	(+100~+300°C)	104
Thermal Conductivity (W/m·K)	**k**	0.988

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	817
Rigidity Modulus (10^8N/m^2)	**G**	328
Poisson's Ratio	σ	0.246
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	160
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.64

Partial Dispersions	
$n_C - n_t$	0.014252
$n_C - n_{A'}$	0.006381
$n_d - n_C$	0.005875
$n_e - n_C$	0.010643
$n_g - n_d$	0.026315
$n_g - n_F$	0.012017
$n_h - n_g$	0.010616
$n_i - n_g$	
$n_{C'} - n_t$	0.015170
$n_e - n_{C'}$	0.009725
$n_{F'} - n_e$	0.010752
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0048
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	0.0084
$\Delta\theta_{g,F}$	0.0077
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.47008105	
A_2	2.24752746	E-1
A_3	2.44968592	
B_1	1.02900432	E-2
B_2	5.41276904	E-2
B_3	2.37434940	E2
1129 ~ 2325 nm		
A_1	1.47008105	
A_2	2.24752746	E-1
A_3	2.44968592	
B_1	1.02900432	E-2
B_2	5.41276904	E-2
B_3	2.37434940	E2

Chemical Properties		
Water Resistance (Powder Group)	**RW(P)**	3
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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7065
$\theta_{C,A'}$	0.3163
$\theta_{d,C}$	0.2912
$\theta_{e,C}$	0.5276
$\theta_{g,d}$	1.3045
$\theta_{g,F}$	0.5957
$\theta_{h,g}$	0.5262
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7408
$\theta'_{e,C'}$	0.4749
$\theta'_{F',e}$	0.5251
$\theta'_{i,F'}$	

Internal Transmittance			
λ_{80}	389	λ_5	361

CCI		
B	G	R
0.00	1.86	1.92

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.030	
365		
370	0.330	
380	0.660	
390	0.820	
400	0.906	
420	0.962	
440	0.973	
460	0.980	
480	0.985	
500	0.989	
550	0.994	
600	0.995	
650	0.994	
700	0.995	
800	0.998	
900	0.999	
1000	0.998	
1200	0.998	
1400	0.995	
1600	0.994	
1800	0.983	
2000	0.971	
2200	0.937	
2400	0.913	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40
Specific Gravity	**d**	2.92		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.4	1.1	1.2	1.3	1.7	2.5	3.4	
-20 ~ 0	0.5	1.3	1.3	1.4	1.8	2.7	3.6	
0 ~ 20	0.7	1.4	1.4	1.5	2.0	2.8	3.9	
20 ~ 40	0.7	1.5	1.5	1.7	2.1	3.0	4.1	
40 ~ 60	0.8	1.5	1.5	1.8	2.2	3.2	4.3	
60 ~ 80	0.8	1.6	1.6	1.9	2.3	3.3	4.5	

© OHARA GmbH – Hofheim – Germany

S-YGH51

755523
758521

Refractive Index	n_d	**1.75500**	Abbe Number	ν_d	**52.32**	Dispersion	$n_F - n_C$	**0.01443**
	n_e	1.754999		ν_e	52.08		$n_{F'} - n_{C'}$	0.014431
		1.758437						0.014562

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.71387
n_{1970}	1.97009	1.72153
n_{1530}	1.52958	1.72961
n_{1129}	1.12864	1.73662
n_t	1.01398	1.73893
n_s	0.85211	1.74292
$n_{A'}$	0.76819	1.74565
n_r	0.70652	1.74814
n_C	0.65627	**1.75062**
$n_{C'}$	0.64385	1.75132
n_{He-Ne}	0.6328	1.75197
n_D	0.58929	1.75487
n_d	0.58756	**1.75500**
n_e	0.54607	1.75844
n_F	0.48613	**1.76505**
$n_{F'}$	0.47999	1.76588
n_{He-Cd}	0.44157	1.77191
n_g	0.435835	**1.77296**
n_h	0.404656	1.77954
n_i	0.365015	1.79083
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	651
Annealing Point (°C)	**AP**	670
Transformation Temperature (°C)	**Tg**	700
Yield Point (°C)	**At**	712
Softening Point (°C)	**SP**	738
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	58
	(+100~+300°C)	70
Thermal Conductivity (W/m·K)	**k**	0.842

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1222
Rigidity Modulus (10^8N/m^2)	**G**	473
Poisson's Ratio	σ	0.291
Knoop Hardness	**Hk**	720 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.48

Partial Dispersions

$n_C - n_t$	0.011699
$n_C - n_{A'}$	0.004976
$n_d - n_C$	0.004375
$n_e - n_C$	0.007813
$n_g - n_d$	0.017957
$n_g - n_F$	0.007901
$n_h - n_g$	0.006588
$n_i - n_g$	0.017871
$n_{C'} - n_t$	0.012394
$n_e - n_{C'}$	0.007118
$n_{F'} - n_e$	0.007444
$n_i - n_{F'}$	0.024946

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0185
$\Delta\theta_{C,A'}$	0.0055
$\Delta\theta_{g,d}$	-0.0118
$\Delta\theta_{g,F}$	-0.0093
$\Delta\theta_{i,g}$	-0.0485

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.08280170	
A_2	9.33988681	E-1
A_3	1.32367286	
B_1	1.81156360	E-2
B_2	3.04157575	E-3
B_3	9.10353195	E1
1129 ~ 2325 nm		
A_1	1.08280170	
A_2	9.33988681	E-1
A_3	1.32367286	
B_1	1.81156360	E-2
B_2	3.04157575	E-3
B_3	9.10353195	E1

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**	51.0
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8107
$\theta_{C,A'}$	0.3448
$\theta_{d,C}$	0.3032
$\theta_{e,C}$	0.5414
$\theta_{g,d}$	1.2443
$\theta_{g,F}$	0.5475
$\theta_{h,g}$	0.4565
$\theta_{i,g}$	1.2384
$\theta'_{C',t}$	0.8511
$\theta'_{e,C'}$	0.4888
$\theta'_{F',e}$	0.5112
$\theta'_{i,F'}$	1.7131

Internal Transmittance

λ_{80}	347	λ_5	282

CCI

B	G	R
0.00	0.39	0.40

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.030	
290	0.120	
300	0.210	
310	0.240	
320	0.470	
330	0.610	
340	0.730	
350	0.820	
360	0.880	
365		
370	0.930	
380	0.956	
390	0.972	
400	0.980	
420	0.988	
440	0.991	
460	0.994	
480	0.996	
500	0.997	
550	0.998	
600	0.998	
650	0.998	
700	0.998	
800	0.998	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.993	
1600	0.993	
1800	0.984	
2000	0.958	
2200	0.880	
2400	0.620	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	4.40		λ_5	28	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		4.5		4.6	4.8	5.3	5.6	
-20 ~ 0		4.5		4.7	4.9	5.3	5.7	
0 ~ 20		4.6		4.8	5.0	5.4	5.9	
20 ~ 40		4.7		4.9	5.1	5.6	6.1	
40 ~ 60		4.9		5.1	5.4	5.8	6.3	
60 ~ 80		5.1		5.4	5.6	6.0	6.6	

© OHARA GmbH – Hofheim – Germany

BAL15Y

557587
559585

Refractive Index	n_d	**1.55671**	Abbe Number	ν_d	**58.68**	Dispersion	$n_F - n_C$	**0.00948**
	n_e	1.556711		ν_e	58.41		$n_{F'} - n_{C'}$	0.009488
		1.558973						0.009569

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.52907
n_{1970}	1.97009	1.53423
n_{1530}	1.52958	1.53972
n_{1129}	1.12864	1.54449
n_t	1.01398	1.54604
n_s	0.85211	1.54872
$n_{A'}$	0.76819	1.55053
n_r	0.70652	1.55218
n_C	0.65627	**1.55383**
$n_{C'}$	0.64385	1.55429
n_{He-Ne}	0.6328	1.55471
n_D	0.58929	1.55663
n_d	0.58756	**1.55671**
n_e	0.54607	1.55897
n_F	0.48613	**1.56331**
$n_{F'}$	0.47999	1.56385
n_{He-Cd}	0.44157	1.56779
n_g	0.435835	**1.56848**
n_h	0.404656	1.57277
n_i	0.365015	1.58012
n_{334}	0.334148	1.58807
n_{326}	0.326106	1.59060

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	507
Yield Point (°C)	**At**	547
Softening Point (°C)	**SP**	642
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	76
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	1.000

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	783
Rigidity Modulus (10^8N/m^2)	**G**	317
Poisson's Ratio	σ	0.236
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	113
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.007785
$n_C - n_{A'}$	0.003296
$n_d - n_C$	0.002885
$n_e - n_C$	0.005147
$n_g - n_d$	0.011768
$n_g - n_F$	0.005165
$n_h - n_g$	0.004295
$n_i - n_g$	0.011636
$n_{C'} - n_t$	0.008244
$n_e - n_{C'}$	0.004688
$n_{F'} - n_e$	0.004881
$n_i - n_{F'}$	0.016261

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0015
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	-0.0026
$\Delta\theta_{g,F}$	-0.0021
$\Delta\theta_{i,g}$	-0.0073

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.28348331	
A_2	1.02800765	E-1
A_3	4.04609885	E-1
B_1	7.90900515	E-3
B_2	3.05971274	E-2
B_3	4.65268356	E1
1129 ~ 2325 nm		
A_1	1.18261390	
A_2	2.03921973	E-1
A_3	1.11763340	E-1
B_1	6.85280751	E-3
B_2	2.50893634	E-2
B_3	1.24101415	E2

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**	1.2
Phosphate Resistance	**PR**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8205
$\theta_{C,A'}$	0.3474
$\theta_{d,C}$	0.3041
$\theta_{e,C}$	0.5425
$\theta_{g,d}$	1.2403
$\theta_{g,F}$	0.5444
$\theta_{h,g}$	0.4527
$\theta_{i,g}$	1.2264
$\theta'_{C',t}$	0.8615
$\theta'_{e,C'}$	0.4899
$\theta'_{F',e}$	0.5101
$\theta'_{i,F'}$	1.6993

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.170	0.010
310	0.590	0.270
320	0.840	0.650
330	0.937	0.850
340	0.971	0.929
350	0.985	0.963
360	0.992	0.979
365	0.994	0.984
370	0.995	0.988
380	0.996	0.990
390	0.997	0.993
400	0.998	0.994
420	0.998	0.995
440	0.998	0.995
460	0.998	0.996
480	0.998	0.996
500	0.999	0.997
550	0.999	0.997
600	0.999	0.997
650	0.998	0.996
700	0.999	0.997
800	0.999	0.997
900	0.998	0.995
1000	0.996	0.990
1200	0.995	0.988
1400	0.989	0.972
1600	0.992	0.980
1800	0.984	0.961
2000	0.972	0.932
2200	0.927	0.820
2400	0.890	0.750

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	2.90		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.2	2.5	2.5	2.6	2.8	3.0	3.3	4.2
-20 ~ 0	2.2	2.5	2.6	2.7	2.8	3.1	3.5	4.3
0 ~ 20	2.3	2.6	2.6	2.8	2.9	3.2	3.6	4.5
20 ~ 40	2.4	2.7	2.7	2.8	3.0	3.3	3.7	4.6
40 ~ 60	2.4	2.8	2.8	2.9	3.1	3.4	3.8	4.8
60 ~ 80	2.4	2.8	2.9	3.0	3.1	3.5	3.9	4.9

© OHARA GmbH – Hofheim – Germany

BAL35Y

589612
591610

Refractive Index	n_d	**1.58913**	Abbe Number	ν_d	**61.23**	Dispersion	$n_F - n_C$	**0.00962**
	n_e	1.589130		ν_e	60.99		$n_{F'} - n_{C'}$	0.009621
		1.591426						0.009697

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55937
n_{1970}	1.97009	1.56517
n_{1530}	1.52958	1.57128
n_{1129}	1.12864	1.57646
n_t	1.01398	1.57811
n_s	0.85211	1.58093
$n_{A'}$	0.76819	1.58280
n_r	0.70652	1.58451
n_C	0.65627	**1.58619**
$n_{C'}$	0.64385	1.58666
n_{He-Ne}	0.6328	1.58710
n_D	0.58929	1.58904
n_d	0.58756	**1.58913**
n_e	0.54607	1.59143
n_F	0.48613	**1.59581**
$n_{F'}$	0.47999	1.59636
n_{He-Cd}	0.44157	1.60032
n_g	0.435835	**1.60100**
n_h	0.404656	1.60530
n_i	0.365015	1.61261
n_{334}	0.334148	1.62045
n_{326}	0.326106	1.62293

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	590
Yield Point (°C)	**At**	628
Softening Point (°C)	**SP**	697
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	57
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.991

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	881
Rigidity Modulus (10^8N/m^2)	**G**	354
Poisson's Ratio	σ	0.244
Knoop Hardness	**Hk**	550 [6]
Abrasion	**Aa**	118
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.008076
$n_C - n_{A'}$	0.003385
$n_d - n_C$	0.002940
$n_e - n_C$	0.005236
$n_g - n_d$	0.011874
$n_g - n_F$	0.005193
$n_h - n_g$	0.004298
$n_i - n_g$	0.011602
$n_{C'} - n_t$	0.008545
$n_e - n_{C'}$	0.004767
$n_{F'} - n_e$	0.004930
$n_i - n_{F'}$	0.016250

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0054
$\Delta\theta_{C,A'}$	0.0017
$\Delta\theta_{g,d}$	-0.0034
$\Delta\theta_{g,F}$	-0.0026
$\Delta\theta_{i,g}$	-0.0064

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.26231429	
A_2	2.25154210	E-1
A_3	6.39119345	E-1
B_1	6.95586355	E-3
B_2	2.21310699	E-2
B_3	6.31662736	E1
1129 ~ 2325 nm		
A_1	1.09972335	
A_2	3.87872537	E-1
A_3	1.11247378	E-1
B_1	5.82303457	E-3
B_2	1.88745144	E-2
B_3	1.08214962	E2

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

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	3.23		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.2	3.4	3.4	3.5	3.7	3.9	4.2	4.9
-20 ~ 0	3.2	3.5	3.5	3.6	3.8	4.0	4.3	5.0
0 ~ 20	3.3	3.6	3.6	3.7	3.9	4.2	4.4	5.2
20 ~ 40	3.3	3.7	3.7	3.9	4.0	4.3	4.6	5.4
40 ~ 60	3.4	3.8	3.8	4.0	4.1	4.4	4.7	5.6
60 ~ 80	3.5	3.9	3.9	4.1	4.2	4.5	4.9	5.7

Relative Partial Dispersions

$\theta_{C,t}$	0.8394
$\theta_{C,A'}$	0.3518
$\theta_{d,C}$	0.3056
$\theta_{e,C}$	0.5442
$\theta_{g,d}$	1.2342
$\theta_{g,F}$	0.5398
$\theta_{h,g}$	0.4467
$\theta_{i,g}$	1.2059
$\theta'_{C',t}$	0.8812
$\theta'_{e,C'}$	0.4916
$\theta'_{F',e}$	0.5084
$\theta'_{i,F'}$	1.6758

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.110	
300	0.500	0.170
310	0.790	0.560
320	0.920	0.810
330	0.966	0.918
340	0.984	0.960
350	0.991	0.978
360	0.994	0.986
365	0.996	0.990
370	0.996	0.991
380	0.997	0.993
390	0.998	0.995
400	0.998	0.996
420	0.999	0.997
440	0.999	0.997
460	0.999	0.997
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.998
800	0.999	0.998
900	0.999	0.997
1000	0.997	0.993
1200	0.997	0.993
1400	0.985	0.963
1600	0.993	0.982
1800	0.986	0.966
2000	0.973	0.934
2200	0.904	0.770
2400	0.820	0.610

© OHARA GmbH – Hofheim – Germany

BSL7Y

516643
518641

Refractive Index	n_d	**1.51633**	Abbe Number	ν_d	**64.24**	Dispersion	$n_F - n_C$	**0.00803**
	n_e	1.516330		ν_e	64.04		$n_{F'} - n_{C'}$	0.008037
		1.518248						0.008092

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.48829
n_{1970}	1.97009	1.49417
n_{1530}	1.52958	1.50028
n_{1129}	1.12864	1.50528
n_t	1.01398	1.50681
n_s	0.85211	1.50933
$n_{A'}$	0.76819	1.51096
n_r	0.70652	1.51242
n_C	0.65627	**1.51386**
$n_{C'}$	0.64385	1.51425
n_{He-Ne}	0.6328	1.51462
n_D	0.58929	1.51626
n_d	0.58756	**1.51633**
n_e	0.54607	1.51825
n_F	0.48613	**1.52189**
$n_{F'}$	0.47999	1.52234
n_{He-Cd}	0.44157	1.52562
n_g	0.435835	**1.52619**
n_h	0.404656	1.52973
n_i	0.365015	1.53574
n_{334}	0.334148	1.54218
n_{326}	0.326106	1.54422

Thermal Properties		
Strain Point. (°C)	**StP**	527
Annealing Point (°C)	**AP**	559
Transformation Temperature (°C)	**Tg**	577
Yield Point (°C)	**At**	616
Softening Point (°C)	**SP**	714
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	68
	(+100~+300°C)	81
Thermal Conductivity (W/m·K)	**k**	1.182

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	811
Rigidity Modulus (10^8N/m^2)	**G**	336
Poisson's Ratio	σ	0.207
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	87
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions	
$n_C - n_t$	0.007046
$n_C - n_{A'}$	0.002891
$n_d - n_C$	0.002475
$n_e - n_C$	0.004393
$n_g - n_d$	0.009857
$n_g - n_F$	0.004295
$n_h - n_g$	0.003543
$n_i - n_g$	0.009552
$n_{C'} - n_t$	0.007443
$n_e - n_{C'}$	0.003996
$n_{F'} - n_e$	0.004096
$n_i - n_{F'}$	0.013395

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0286
$\Delta\theta_{C,A'}$	0.0059
$\Delta\theta_{g,d}$	-0.0048
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	0.0014

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.13329383	
A_2	1.36897201	E-1
A_3	7.03456004	E-1
B_1	6.69407868	E-3
B_2	2.37391760	E-2
B_3	7.07030316	E1
1129 ~ 2325 nm		
A_1	1.01218580	
A_2	2.58122629	E-1
A_3	1.13916089	
B_1	5.66358122	E-3
B_2	1.96285352	E-2
B_3	1.12904303	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8767
$\theta_{C,A'}$	0.3597
$\theta_{d,C}$	0.3080
$\theta_{e,C}$	0.5466
$\theta_{g,d}$	1.2265
$\theta_{g,F}$	0.5344
$\theta_{h,g}$	0.4408
$\theta_{i,g}$	1.1885
$\theta'_{C',t}$	0.9198
$\theta'_{e,C'}$	0.4938
$\theta'_{F',e}$	0.5062
$\theta'_{i,F'}$	1.6553

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.060	
300	0.430	0.120
310	0.780	0.540
320	0.932	0.830
330	0.978	0.945
340	0.991	0.978
350	0.996	0.990
360	0.997	0.992
365	0.998	0.995
370	0.998	0.996
380	0.998	0.996
390	0.999	0.997
400	0.999	0.998
420	0.999	0.998
440	0.999	0.998
460	0.999	0.998
480	0.999	0.998
500	0.999	0.999
550	0.999	0.999
600	0.999	0.998
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.997
1000	0.997	0.993
1200	0.997	0.993
1400	0.969	0.924
1600	0.990	0.975
1800	0.981	0.952
2000	0.962	0.908
2200	0.860	0.680
2400	0.800	0.580

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	2.50		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.3	2.6	2.6	2.7	2.8	3.0	3.2	3.8
-20 ~ 0	2.4	2.7	2.7	2.8	2.9	3.2	3.4	4.0
0 ~ 20	2.5	2.8	2.9	3.0	3.1	3.3	3.6	4.2
20 ~ 40	2.6	3.0	3.0	3.1	3.2	3.5	3.7	4.4
40 ~ 60	2.8	3.1	3.1	3.2	3.3	3.6	3.9	4.6
60 ~ 80	2.9	3.2	3.2	3.3	3.4	3.7	4.0	4.8

© OHARA GmbH – Hofheim – Germany

BSM51Y

603606
605604

Refractive Index	n_d	**1.60311**	Abbe Number	ν_d	**60.65**	Dispersion	$n_F - n_C$	**0.00995**
	n_e	1.603109		ν_e	60.40		$n_{F'} - n_{C'}$	0.009944
		1.605481						0.010024

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.57281
n_{1970}	1.97009	1.57865
n_{1530}	1.52958	1.58482
n_{1129}	1.12864	1.59008
n_t	1.01398	1.59177
n_s	0.85211	1.59465
$n_{A'}$	0.76819	1.59658
n_r	0.70652	1.59834
n_C	0.65627	**1.60007**
$n_{C'}$	0.64385	1.60056
n_{He-Ne}	0.6328	1.60101
n_D	0.58929	1.60302
n_d	0.58756	**1.60311**
n_e	0.54607	1.60548
n_F	0.48613	**1.61002**
$n_{F'}$	0.47999	1.61058
n_{He-Cd}	0.44157	1.61468
n_g	0.435835	**1.61539**
n_h	0.404656	1.61985
n_i	0.365015	1.62743
n_{334}	0.334148	1.63557
n_{326}	0.326106	1.63815

Thermal Properties

Strain Point. (°C)	**StP**	538
Annealing Point (°C)	**AP**	568
Transformation Temperature (°C)	**Tg**	585
Yield Point (°C)	**At**	617
Softening Point (°C)	**SP**	684
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	63
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.961

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	901
Rigidity Modulus (10^8N/m^2)	**G**	359
Poisson's Ratio	σ	0.256
Knoop Hardness	**Hk**	570 [6]
Abrasion	**Aa**	117
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.008303
$n_C - n_{A'}$	0.003489
$n_d - n_C$	0.003035
$n_e - n_C$	0.005407
$n_g - n_d$	0.012286
$n_g - n_F$	0.005377
$n_h - n_g$	0.004454
$n_i - n_g$	0.012031
$n_{C'} - n_t$	0.008787
$n_e - n_{C'}$	0.004923
$n_{F'} - n_e$	0.005101
$n_i - n_{F'}$	0.168440

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0037
$\Delta\theta_{C,A'}$	0.0015
$\Delta\theta_{g,d}$	-0.0033
$\Delta\theta_{g,F}$	-0.0026
$\Delta\theta_{i,g}$	-0.0073

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.22393171	
A_2	3.06482383	E-1
A_3	8.23950901	E-1
B_1	6.49521083	E-3
B_2	2.08194161	E-2
B_3	7.95168951	E1
1129 ~ 2325 nm		
A_1	1.12268320	
A_2	4.07804849	E-1
A_3	1.16161178	E-1
B_1	5.79521544	E-3
B_2	1.91303182	E-2
B_3	1.11113962	E2

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**	51.2
Phosphate Resistance	**PR**	2.2

Relative Partial Dispersions

$\theta_{C,t}$	0.8350
$\theta_{C,A'}$	0.3509
$\theta_{d,C}$	0.3052
$\theta_{e,C}$	0.5437
$\theta_{g,d}$	1.2355
$\theta_{g,F}$	0.5407
$\theta_{h,g}$	0.4479
$\theta_{i,g}$	1.2099
$\theta'_{C',t}$	0.8766
$\theta'_{e,C'}$	0.4911
$\theta'_{F',e}$	0.5089
$\theta'_{i,F'}$	1.6804

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.030	
300	0.330	0.060
310	0.690	0.400
320	0.880	0.720
330	0.950	0.870
340	0.977	0.944
350	0.988	0.970
360	0.993	0.983
365	0.995	0.987
370	0.996	0.990
380	0.997	0.993
390	0.998	0.995
400	0.998	0.996
420	0.998	0.996
440	0.998	0.996
460	0.999	0.997
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.998
800	0.999	0.998
900	0.999	0.997
1000	0.997	0.993
1200	0.997	0.993
1400	0.985	0.963
1600	0.992	0.980
1800	0.983	0.959
2000	0.967	0.920
2200	0.890	0.740
2400	0.780	0.540

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	3.36		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.5	2.8	2.8	2.9	3.1	3.3	3.6	4.3
-20 ~ 0	2.6	2.9	2.9	3.0	3.1	3.4	3.7	4.4
0 ~ 20	2.6	2.9	2.9	3.1	3.2	3.5	3.8	4.6
20 ~ 40	2.6	3.0	3.0	3.1	3.3	3.6	3.9	4.7
40 ~ 60	2.7	3.0	3.0	3.2	3.3	3.6	4.0	4.8
60 ~ 80	2.7	3.1	3.1	3.3	3.4	3.7	4.1	4.9

© OHARA GmbH – Hofheim – Germany

L-BAL35

589612
591609

Refractive Index	n_d	**1.58913**	Abbe Number	ν_d	**61.15**	Dispersion	$n_F - n_C$	**0.00963**
	n_e	1.589130		ν_e	60.93		$n_{F'} - n_{C'}$	0.009634
		1.591430						0.009706

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55775
n_{1970}	1.97009	1.56407
n_{1530}	1.52958	1.57069
n_{1129}	1.12864	1.57622
n_t	1.01398	1.57795
n_s	0.85211	1.58085
$n_{A'}$	0.76819	1.58276
n_r	0.70652	1.58448
n_C	0.65627	**1.58618**
$n_{C'}$	0.64385	1.58665
n_{He-Ne}	0.6328	1.58709
n_D	0.58929	1.58904
n_d	0.58756	**1.58913**
n_e	0.54607	1.59143
n_F	0.48613	**1.59581**
$n_{F'}$	0.47999	1.59636
n_{He-Cd}	0.44157	1.60031
n_g	0.435835	**1.60100**
n_h	0.404656	1.60528
n_i	0.365015	1.61256
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	489
Annealing Point (°C)	**AP**	520
Transformation Temperature (°C)	**Tg**	527
Yield Point (°C)	**At**	567
Softening Point (°C)	**SP**	619
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	66
	(+100~+300°C)	81
Thermal Conductivity (W/m·K)	**k**	1.126

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1008
Rigidity Modulus (10^8N/m^2)	**G**	403
Poisson's Ratio	σ	0.252
Knoop Hardness	**Hk**	630 [6]
Abrasion	**Aa**	100
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.29

Partial Dispersions

$n_C - n_t$	0.008230
$n_C - n_{A'}$	0.003418
$n_d - n_C$	0.002952
$n_e - n_C$	0.005250
$n_g - n_d$	0.011867
$n_g - n_F$	0.005185
$n_h - n_g$	0.004288
$n_i - n_g$	0.011567
$n_{C'} - n_t$	0.008702
$n_e - n_{C'}$	0.004778
$n_{F'} - n_e$	0.004928
$n_i - n_{F'}$	0.016208

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0207
$\Delta\theta_{C,A'}$	0.0048
$\Delta\theta_{g,d}$	-0.0059
$\Delta\theta_{g,F}$	-0.0043
$\Delta\theta_{i,g}$	-0.0124

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.16262630	
A_2	3.25661051	E-1
A_3	1.35132486	
B_1	1.25957437	E-2
B_2	-3.26911050	E-3
B_3	1.19214596	E2
1129 ~ 2325 nm		
A_1	1.16262630	
A_2	3.25661051	E-1
A_3	1.35132486	
B_1	1.25957437	E-2
B_2	-3.26911050	E-3
B_3	1.19214596	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8543
$\theta_{C,A'}$	0.3548
$\theta_{d,C}$	0.3064
$\theta_{e,C}$	0.5449
$\theta_{g,d}$	1.2318
$\theta_{g,F}$	0.5382
$\theta_{h,g}$	0.4451
$\theta_{i,g}$	1.2006
$\theta'_{C',t}$	0.8966
$\theta'_{e,C'}$	0.4923
$\theta'_{F',e}$	0.5077
$\theta'_{i,F'}$	1.6699

Internal Transmittance

λ_{80}	336	λ_5	300

CCI

B	G	R
0.00	0.23	0.20

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.060	
310	0.270	
320	0.530	
330	0.730	
340	0.850	
350	0.922	
360	0.956	
365		
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	
1000	0.997	
1200	0.997	
1400	0.991	
1600	0.994	
1800	0.989	
2000	0.978	
2200	0.934	
2400	0.810	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35	
Specific Gravity	**d**	2.82		λ_5	30	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.9	4.3	4.3	4.4	4.5	4.8	5.1	
-20 ~ 0	3.9	4.3	4.3	4.5	4.6	4.9	5.2	
0 ~ 20	4.0	4.4	4.4	4.5	4.7	5.0	5.3	
20 ~ 40	4.0	4.4	4.5	4.6	4.7	5.1	5.4	
40 ~ 60	4.1	4.5	4.5	4.7	4.8	5.2	5.5	
60 ~ 80	4.1	4.5	4.6	4.8	4.9	5.2	5.6	

© OHARA GmbH – Hofheim – Germany

L-BAL35P

592610
594608

Refractive Index	n_d	**1.59208**	Abbe Number	ν_d	**61.00**	Dispersion	$n_F - n_C$ 0.009707
	n_e	1.592080		ν_e	60.77		$n_{F'} - n_{C'}$ 0.009781

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.56051
n_{1970}	1.97009	1.56687
n_{1530}	1.52958	1.57353
n_{1129}	1.12864	1.57908
n_t	1.01398	1.58082
n_s	0.85211	1.58373
$n_{A'}$	0.76819	1.58566
n_r	0.70652	1.58740
n_C	0.65627	**1.58911**
$n_{C'}$	0.64385	1.58958
n_{He-Ne}	0.6328	1.59003
n_D	0.58929	1.59199
n_d	0.58756	**1.59208**
n_e	0.54607	1.59440
n_F	0.48613	**1.59881**
$n_{F'}$	0.47999	1.59936
n_{He-Cd}	0.44157	1.60335
n_g	0.435835	**1.60404**
n_h	0.404656	1.60836
n_i	0.365015	1.61570
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	489
Annealing Point (°C)	**AP**	520
Transformation Temperature (°C)	**Tg**	427
Yield Point (°C)	**At**	567
Softening Point (°C)	**SP**	619
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	66
	(+100~+300°C)	81
Thermal Conductivity (W/m·K)	**k**	1.130

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1008
Rigidity Modulus (10^8N/m^2)	**G**	403
Poisson's Ratio	σ	0.252
Knoop Hardness	**Hk**	630 [6]
Abrasion	**Aa**	100
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.29

Partial Dispersions	
$n_C - n_t$	0.008288
$n_C - n_{A'}$	0.003444
$n_d - n_C$	0.002974
$n_e - n_C$	0.005290
$n_g - n_d$	0.011957
$n_g - n_F$	0.005224
$n_h - n_g$	0.004322
$n_i - n_g$	0.011660
$n_{C'} - n_t$	0.008763
$n_e - n_{C'}$	0.004815
$n_{F'} - n_e$	0.004966
$n_i - n_{F'}$	0.016335

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0209
$\Delta\theta_{C,A'}$	0.0050
$\Delta\theta_{g,d}$	-0.0062
$\Delta\theta_{g,F}$	-0.0046
$\Delta\theta_{i,g}$	-0.0130

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	8.06742194	E-1
A_2	6.90488648	E-1
A_3	1.26477947	
B_1	1.48836231	E-2
B_2	2.51943058	E-3
B_3	1.11314570	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8538
$\theta_{C,A'}$	0.3548
$\theta_{d,C}$	0.3064
$\theta_{e,C}$	0.5450
$\theta_{g,d}$	1.2318
$\theta_{g,F}$	0.5382
$\theta_{h,g}$	0.4452
$\theta_{i,g}$	1.2012
$\theta'_{C',t}$	0.8959
$\theta'_{e,C'}$	0.4923
$\theta'_{F',e}$	0.5077
$\theta'_{i,F'}$	1.6701

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.060	
310	0.270	
320	0.530	
330	0.730	
340	0.850	
350	0.922	
360	0.956	
365		
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	
1000	0.997	
1200	0.997	
1400	0.991	
1600	0.994	
1800	0.989	
2000	0.978	
2200	0.934	
2400	0.810	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	345
Specific Gravity	**d**	2.82		λ_5	295

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.9	4.3	4.3	4.4	4.5	4.8	4.8	5.1
-20 ~ 0	3.9	4.3	4.3	4.5	4.6	4.9	4.9	5.2
0 ~ 20	4.0	4.4	4.4	4.5	4.7	4.7	5.0	5.3
20 ~ 40	4.0	4.4	4.5	4.6	4.7	4.7	5.1	5.4
40 ~ 60	4.1	4.5	4.5	4.7	4.8	4.8	5.2	5.5
60 ~ 80	4.1	4.5	4.6	4.8	4.9	4.9	5.2	5.6

© OHARA GmbH – Hofheim – Germany

L-BAL42

583594
585591

Refractive Index	n_d	**1.58313**	Abbe Number	ν_d	**59.38**	Dispersion	$n_F - n_C$	**0.00982**
	n_e	1.583130		ν_e	59.13		$n_{F'} - n_{C'}$	0.009820
		1.585470						0.009901

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55402
n_{1970}	1.97009	1.55949
n_{1530}	1.52958	1.56533
n_{1129}	1.12864	1.57038
n_t	1.01398	1.57201
n_s	0.85211	1.57482
$n_{A'}$	0.76819	1.57671
n_r	0.70652	1.57843
n_C	0.65627	**1.58013**
$n_{C'}$	0.64385	1.58061
n_{He-Ne}	0.6328	1.58106
n_D	0.58929	1.58304
n_d	0.58756	**1.58313**
n_e	0.54607	1.58547
n_F	0.48613	**1.58995**
$n_{F'}$	0.47999	1.59051
n_{He-Cd}	0.44157	1.59457
n_g	0.435835	**1.59528**
n_h	0.404656	1.59969
n_i	0.365015	1.60719
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	467
Annealing Point (°C)	**AP**	494
Transformation Temperature (°C)	**Tg**	506
Yield Point (°C)	**At**	538
Softening Point (°C)	**SP**	607
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	72
	(+100~+300°C)	88
Thermal Conductivity (W/m·K)	**k**	1.028

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	891
Rigidity Modulus (10^8N/m^2)	**G**	357
Poisson's Ratio	σ	0.247
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	113
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.008122
$n_C - n_{A'}$	0.003426
$n_d - n_C$	0.002992
$n_e - n_C$	0.005334
$n_g - n_d$	0.012153
$n_g - n_F$	0.005325
$n_h - n_g$	0.004412
$n_i - n_g$	0.011910
$n_{C'} - n_t$	0.008599
$n_e - n_{C'}$	0.004857
$n_{F'} - n_e$	0.005044
$n_i - n_{F'}$	0.016677

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0018
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	-0.0038
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	-0.0150

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	1.39528097	
A 2	7.25519520	E-2
A 3	1.66335848	
B 1	1.11862030	E-2
B 2	-2.46748575	E-2
B 3	1.67717958	E2
1129 ~ 2325 nm		
A 1	1.39528097	
A 2	7.25519520	E-2
A 3	1.66335848	
B 1	1.11862030	E-2
B 2	-2.46748575	E-2
B 3	1.67717958	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	1~2
Acid Resistance (Surface Group)	**SR**	5.2
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.8271
$\theta_{C,A'}$	0.3489
$\theta_{d,C}$	0.3047
$\theta_{e,C}$	0.5432
$\theta_{g,d}$	1.2376
$\theta_{g,F}$	0.5423
$\theta_{h,g}$	0.4493
$\theta_{i,g}$	1.2128
$\theta'_{C',t}$	0.8685
$\theta'_{e,C'}$	0.4906
$\theta'_{F',e}$	0.5094
$\theta'_{i,F'}$	1.6844

Internal Transmittance

λ_{80}	326	λ_5	282

CCI

B	G	R
0.00	0.17	0.14

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290	0.050	
300	0.190	
310	0.410	
320	0.630	
330	0.790	
340	0.890	
350	0.940	
360	0.968	
365		
370	0.981	
380	0.987	
390	0.992	
400	0.994	
420	0.994	
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	0.999	
900	0.998	
1000	0.998	
1200	0.998	
1400	0.993	
1600	0.997	
1800	0.988	
2000	0.975	
2200	0.914	
2400	0.840	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	34	
Specific Gravity	**d**	3.05		λ_5	29	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20		3.2	3.2	3.3	3.4	3.8	4.1	
-20 ~ 0		3.2	3.2	3.3	3.5	3.8	4.1	
0 ~ 20		3.2	3.2	3.3	3.5	3.8	4.2	
20 ~ 40		3.2	3.2	3.3	3.5	3.8	4.2	
40 ~ 60		3.2	3.2	3.3	3.5	3.9	4.2	
60 ~ 80		3.2	3.2	3.3	3.5	3.9	4.3	

© OHARA GmbH – Hofheim – Germany

L-BAL42P

586592
588590

Refractive Index	n_d	**1.58593**	Abbe Number	ν_d	**59.24**	Dispersion	$n_F - n_C$ 0.009890
	n_e	1.585930		ν_e	58.99		$n_{F'} - n_{C'}$ 0.009972
		1.588288					

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.55671
n_{1970}	1.97009	1.56222
n_{1530}	1.52958	1.56806
n_{1129}	1.12864	1.57311
n_t	1.01398	1.57475
n_s	0.85211	1.57757
$n_{A'}$	0.76819	1.57947
n_r	0.70652	1.58120
n_C	0.65627	**1.58292**
$n_{C'}$	0.64385	1.58340
n_{He-Ne}	0.6328	1.58385
n_D	0.58929	1.58584
n_d	0.58756	**1.58593**
n_e	0.54607	1.58829
n_F	0.48613	**1.59281**
$n_{F'}$	0.47999	1.59337
n_{He-Cd}	0.44157	1.59746
n_g	0.435835	**1.59817**
n_h	0.404656	1.60262
n_i	0.365015	1.61020
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	467
Annealing Point (°C)	**AP**	494
Transformation Temperature (°C)	**Tg**	506
Yield Point (°C)	**At**	538
Softening Point (°C)	**SP**	607
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	72
	(+100~+300°C)	88
Thermal Conductivity (W/m·K)	**k**	1.030

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	891
Rigidity Modulus (10^8N/m^2)	**G**	357
Poisson's Ratio	σ	0.247
Knoop Hardness	**Hk**	590 [6]
Abrasion	**Aa**	113
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.19

Partial Dispersions	
$n_C - n_t$	0.008169
$n_C - n_{A'}$	0.003449
$n_d - n_C$	0.003013
$n_e - n_C$	0.005371
$n_g - n_d$	0.012242
$n_g - n_F$	0.005365
$n_h - n_g$	0.004451
$n_i - n_g$	0.012026
$n_{C'} - n_t$	0.008649
$n_e - n_{C'}$	0.004891
$n_{F'} - n_e$	0.005081
$n_i - n_{F'}$	0.016829

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0014
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	-0.0039
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	-0.0130

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	8.81090017	E-1
A_2	5.95038859	E-1
A_3	1.22582098	
B_1	1.48496655	E-2
B_2	1.63577371	E-3
B_3	1.25113720	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	5.2
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions	
$\theta_{C,t}$	0.8260
$\theta_{C,A'}$	0.3487
$\theta_{d,C}$	0.3047
$\theta_{e,C}$	0.5431
$\theta_{g,d}$	1.2378
$\theta_{g,F}$	0.5425
$\theta_{h,g}$	0.4501
$\theta_{i,g}$	1.2160
$\theta'_{C',t}$	0.8673
$\theta'_{e,C'}$	0.4905
$\theta'_{F',e}$	0.5095
$\theta'_{i,F'}$	1.6876

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280	0.030	
290	0.140	
300	0.320	
310	0.550	
320	0.730	
330	0.850	
340	0.924	
350	0.960	
360	0.978	
365		
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	
1000	0.999	
1200	0.999	
1400	0.988	
1600	0.993	
1800	0.983	
2000	0.968	
2200	0.901	
2400	0.830	

Other Properties						
Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	340	
Specific Gravity	**d**	3.05		λ_5	285	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.7	3.7	3.8	4.0	4.3	4.6	
-20 ~ 0	3.2	3.6	3.6	3.8	3.9	4.3	4.6	
0 ~ 20	3.1	3.6	3.6	3.7	3.9	4.2	4.6	
20 ~ 40	3.1	3.5	3.6	3.7	3.9	4.2	4.6	
40 ~ 60	3.1	3.6	3.6	3.7	3.9	4.3	4.6	
60 ~ 80	3.2	3.7	3.7	3.8	4.0	4.4	4.8	

© OHARA GmbH – Hofheim – Germany

L-BAL43

586597
588594

Refractive Index	n_d	**1.58573**	Abbe Number	ν_d	**59.70**	Dispersion	$n_F - n_C$	**0.00981**
	n_e	1.585730		ν_e	59.45		$n_{F'} - n_{C'}$	0.009812
		1.588070						0.009892

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.55621
n_{1970}	1.97009	1.56185
n_{1530}	1.52958	1.56781
n_{1129}	1.12864	1.57293
n_t	1.01398	1.57458
n_s	0.85211	1.57740
$n_{A'}$	0.76819	1.57930
n_r	0.70652	1.58103
n_C	0.65627	**1.58274**
$n_{C'}$	0.64385	1.58321
n_{He-Ne}	0.6328	1.58366
n_D	0.58929	1.58564
n_d	0.58756	**1.58573**
n_e	0.54607	1.58807
n_F	0.48613	**1.59255**
$n_{F'}$	0.47999	1.59311
n_{He-Cd}	0.44157	1.59716
n_g	0.435835	**1.59786**
n_h	0.404656	1.60227
n_i	0.365015	1.60976
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	451
Annealing Point (°C)	**AP**	482
Transformation Temperature (°C)	**Tg**	493
Yield Point (°C)	**At**	535
Softening Point (°C)	**SP**	596
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	72
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	1.028

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	904
Rigidity Modulus (10^8N/m^2)	**G**	362
Poisson's Ratio	σ	0.250
Knoop Hardness	**Hk**	610 [6]
Abrasion	**Aa**	115
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.18

Partial Dispersions

$n_C - n_t$	0.008157
$n_C - n_{A'}$	0.003435
$n_d - n_C$	0.002993
$n_e - n_C$	0.005333
$n_g - n_d$	0.012132
$n_g - n_F$	0.005313
$n_h - n_g$	0.004404
$n_i - n_g$	0.011900
$n_{C'} - n_t$	0.008634
$n_e - n_{C'}$	0.004856
$n_{F'} - n_e$	0.005036
$n_i - n_{F'}$	0.016656

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0045
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	-0.0043
$\Delta\theta_{g,F}$	-0.0034
$\Delta\theta_{i,g}$	-0.0123

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.04745291	E0
A_2	4.28452873	E-1
A_3	1.14111303	E0
B_1	5.63209756	E-3
B_2	1.88321416	E-2
B_3	1.14197069	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	51.4
Phosphate Resistance	**PR**	2.0

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	340
Specific Gravity	**d**	3.05		λ_5	285

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.2	3.5	3.6	3.7	3.8	4.1	4.5	
-20 ~ 0	3.1	3.5	3.6	3.7	3.8	4.2	4.5	
0 ~ 20	3.1	3.5	3.6	3.7	3.8	4.2	4.5	
20 ~ 40	3.0	3.5	3.5	3.6	3.8	4.1	4.5	
40 ~ 60	3.0	3.5	3.5	3.6	3.8	4.2	4.6	
60 ~ 80	3.2	3.6	3.7	3.8	4.0	4.4	4.7	

Relative Partial Dispersions

$\theta_{C,t}$	0.8313
$\theta_{C,A'}$	0.3501
$\theta_{d,C}$	0.3050
$\theta_{e,C}$	0.5435
$\theta_{g,d}$	1.2364
$\theta_{g,F}$	0.5415
$\theta_{h,g}$	0.4488
$\theta_{i,g}$	1.2128
$\theta'_{C',t}$	0.8728
$\theta'_{e,C'}$	0.4909
$\theta'_{F',e}$	0.5091
$\theta'_{i,F'}$	1.6838

Internal Transmittance

λ_{80}	328	λ_5	289

CCI

B	G	R
0.00	0.10	0.10

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.290	
310	0.510	
320	0.700	
330	0.830	
340	0.906	
350	0.949	
360	0.971	
365		
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	
1000	0.999	
1200	0.999	
1400	0.993	
1600	0.997	
1800	0.988	
2000	0.975	
2200	0.914	
2400	0.840	

© OHARA GmbH – Hofheim – Germany

L-BSL7

516641
518638

Refractive Index	n_d	**1.51633**	Abbe Number	ν_d	**64.06**	Dispersion	$n_F - n_C$	**0.00806**
	n_e	1.516330		ν_e	63.87		$n_{F'} - n_{C'}$	0.008060
		1.518250						0.008114

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.48810
n_{1970}	1.97009	1.49404
n_{1530}	1.52958	1.50020
n_{1129}	1.12864	1.50523
n_t	1.01398	1.50677
n_s	0.85211	1.50930
$n_{A'}$	0.76819	1.51094
n_r	0.70652	1.51241
n_C	0.65627	**1.51385**
$n_{C'}$	0.64385	1.51424
n_{He-Ne}	0.6328	1.51462
n_D	0.58929	1.51626
n_d	0.58756	**1.51633**
n_e	0.54607	1.51825
n_F	0.48613	**1.52191**
$n_{F'}$	0.47999	1.52236
n_{He-Cd}	0.44157	1.52564
n_g	0.435835	**1.52620**
n_h	0.404656	1.52975
n_i	0.365015	1.53574
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	464
Annealing Point (°C)	**AP**	488
Transformation Temperature (°C)	**Tg**	498
Yield Point (°C)	**At**	549
Softening Point (°C)	**SP**	630
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	58
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	1.169

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	793
Rigidity Modulus (10^8N/m^2)	**G**	327
Poisson's Ratio	σ	0.214
Knoop Hardness	**Hk**	560 [6]
Abrasion	**Aa**	69
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.93

Partial Dispersions	
$n_C - n_t$	0.007081
$n_C - n_{A'}$	0.002904
$n_d - n_C$	0.002484
$n_e - n_C$	0.004407
$n_g - n_d$	0.009874
$n_g - n_F$	0.004298
$n_h - n_g$	0.003544
$n_i - n_g$	0.009541
$n_{C'} - n_t$	0.007479
$n_e - n_{C'}$	0.004009
$n_{F'} - n_e$	0.004105
$n_i - n_{F'}$	0.013387

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0312
$\Delta\theta_{C,A'}$	0.0068
$\Delta\theta_{g,d}$	-0.0066
$\Delta\theta_{g,F}$	-0.0045
$\Delta\theta_{i,g}$	-0.0049

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	9.17473918	E-1
A_2	3.52687665	E-1
A_3	1.05579788	
B_1	5.27701411	E-3
B_2	1.70809497	E-2
B_3	1.04302583	E2
1129 ~ 2325 nm		
A_1	9.17473918	E-1
A_2	3.52687665	E-1
A_3	1.05579788	
B_1	5.27701411	E-3
B_2	1.70809497	E-2
B_3	1.04302583	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8785
$\theta_{C,A'}$	0.3603
$\theta_{d,C}$	0.3082
$\theta_{e,C}$	0.5468
$\theta_{g,d}$	1.2251
$\theta_{g,F}$	0.5333
$\theta_{h,g}$	0.4397
$\theta_{i,g}$	1.1837
$\theta'_{C',t}$	0.9217
$\theta'_{e,C'}$	0.4941
$\theta'_{F',e}$	0.5059
$\theta'_{i,F'}$	1.6499

Internal Transmittance			
λ_{80}	326	λ_5	299

CCI		
B	G	R
0.00	0.08	0.09

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300	0.080	
310	0.400	
320	0.710	
330	0.870	
340	0.942	
350	0.973	
360	0.986	
365		
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	
1000	0.999	
1200	0.999	
1400	0.974	
1600	0.994	
1800	0.988	
2000	0.974	
2200	0.870	
2400	0.800	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	33
Specific Gravity	**d**	2.38		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.0	4.3	4.3	4.4	4.5	4.7	4.9	
-20 ~ 0	4.1	4.4	4.4	4.5	4.6	4.8	5.1	
0 ~ 20	4.1	4.5	4.5	4.6	4.7	4.9	5.2	
20 ~ 40	4.2	4.6	4.6	4.7	4.8	5.1	5.3	
40 ~ 60	4.3	4.7	4.7	4.8	4.9	5.2	5.5	
60 ~ 80	4.4	4.7	4.8	4.9	5.0	5.3	5.6	

© OHARA GmbH – Hofheim – Germany

L-LAH53

806409
811406

Refractive Index	n_d	**1.80625**	Abbe Number	ν_d	**40.91**	Dispersion	$n_F - n_C$	**0.01971**
	n_e	1.806250		ν_e	40.66		$n_{F'} - n_{C'}$	0.019709
		1.810931						0.019946

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.76094
n_{1970}	1.97009	1.76797
n_{1530}	1.52958	1.77569
n_{1129}	1.12864	1.78303
n_t	1.01398	1.78566
n_s	0.85211	1.79048
$n_{A'}$	0.76819	1.79391
n_r	0.70652	1.79713
n_C	0.65627	**1.80039**
$n_{C'}$	0.64385	1.80132
n_{He-Ne}	0.6328	1.80218
n_D	0.58929	1.80608
n_d	0.58756	**1.80625**
n_e	0.54607	1.81093
n_F	0.48613	**1.82010**
$n_{F'}$	0.47999	1.82126
n_{He-Cd}	0.44157	1.82981
n_g	0.435835	**1.83132**
n_h	0.404656	1.84090
n_i	0.365015	1.85783
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	534
Annealing Point (°C)	**AP**	558
Transformation Temperature (°C)	**Tg**	574
Yield Point (°C)	**At**	607
Softening Point (°C)	**SP**	646
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	59
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.862

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1151
Rigidity Modulus (10^8N/m^2)	**G**	443
Poisson's Ratio	σ	0.298
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	76
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.88

Partial Dispersions	
$n_C - n_t$	0.014736
$n_C - n_{A'}$	0.006484
$n_d - n_C$	0.005856
$n_e - n_C$	0.010537
$n_g - n_d$	0.025070
$n_g - n_F$	0.011217
$n_h - n_g$	0.009578
$n_i - n_g$	0.026514
$n_{C'} - n_t$	0.015658
$n_e - n_{C'}$	0.009615
$n_{F'} - n_e$	0.010331
$n_i - n_{F'}$	0.036572

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0091
$\Delta\theta_{C,A'}$	0.0036
$\Delta\theta_{g,d}$	-0.0077
$\Delta\theta_{g,F}$	-0.0062
$\Delta\theta_{i,g}$	-0.0372

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.87409991	
A_2	2.97921402	E-1
A_3	1.35064285	
B_1	9.93318344	E-3
B_2	4.05501825	E-2
B_3	1.00502200	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Other Properties							
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	40		
Specific Gravity	**d**	4.49		λ_5	34		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	6.5	7.4	7.4	7.7	8.0	8.8	9.6	
-20 ~ 0	6.6	7.4	7.5	7.7	8.1	8.9	9.7	
0 ~ 20	6.6	7.5	7.5	7.8	8.2	9.0	9.9	
20 ~ 40	6.5	7.5	7.5	7.8	8.2	9.1	10.0	
40 ~ 60	6.6	7.6	7.7	8.0	8.3	9.2	10.2	
60 ~ 80	6.8	7.8	7.9	8.2	8.6	9.5	10.5	

Relative Partial Dispersions	
$\theta_{C,t}$	0.7477
$\theta_{C,A'}$	0.3290
$\theta_{d,C}$	0.2971
$\theta_{e,C}$	0.5346
$\theta_{g,d}$	1.2720
$\theta_{g,F}$	0.5691
$\theta_{h,g}$	0.4860
$\theta_{i,g}$	1.3453
$\theta'_{C',t}$	0.7850
$\theta'_{e,C'}$	0.4821
$\theta'_{F',e}$	0.5179
$\theta'_{i,F'}$	1.8336

Internal Transmittance			
λ_{80}		λ_5	

CCI		
B	G	R
0.00	0.88	0.94

Internal Transmittance		
λ (nm)	τ_i 10 mm	τ_i 25 mm
280		
290		
300		
310		
320		
330		
340	0.160	
350	0.470	
360	0.700	
365		
370	0.830	
380	0.890	
390	0.929	
400	0.950	
420	0.970	
440	0.979	
460	0.985	
480	0.989	
500	0.993	
550	0.997	
600	0.997	
650	0.998	
700	0.998	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.969	
2200	0.919	
2400	0.730	

© OHARA GmbH – Hofheim – Germany

L-LAH84

808405
813403

Refractive Index	n_d	**1.80835**	Abbe Number	ν_d	**40.55**	Dispersion	$n_F - n_C$	**0.01994**
	n_e	1.808350		ν_e	40.30		$n_{F'} - n_{C'}$	0.019936
		1.813086						0.020178

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.76397
n_{1970}	1.97009	1.77059
n_{1530}	1.52958	1.77793
n_{1129}	1.12864	1.78505
n_t	1.01398	1.78765
n_s	0.85211	1.79245
$n_{A'}$	0.76819	1.79590
n_r	0.70652	1.79914
n_C	0.65627	**1.80243**
$n_{C'}$	0.64385	1.80336
n_{He-Ne}	0.6328	1.80424
n_D	0.58929	1.80818
n_d	0.58756	**1.80835**
n_e	0.54607	1.81309
n_F	0.48613	**1.82237**
$n_{F'}$	0.47999	1.82354
n_{He-Cd}	0.44157	1.83219
n_g	0.435835	**1.83372**
n_h	0.404656	1.84340
n_i	0.365015	1.86048
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	491
Annealing Point (°C)	**AP**	515
Transformation Temperature (°C)	**Tg**	527
Yield Point (°C)	**At**	568
Softening Point (°C)	**SP**	603
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	64
	(+100~+300°C)	79
Thermal Conductivity (W/m·K)	**k**	0.875

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1116
Rigidity Modulus (10^8N/m^2)	**G**	428
Poisson's Ratio	σ	0.303
Knoop Hardness	**Hk**	610 [6]
Abrasion	**Aa**	78
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.35

Partial Dispersions

$n_C - n_t$	0.014785
$n_C - n_{A'}$	0.006535
$n_d - n_C$	0.005918
$n_e - n_C$	0.010654
$n_g - n_d$	0.025366
$n_g - n_F$	0.011348
$n_h - n_g$	0.009680
$n_i - n_g$	0.026762
$n_{C'} - n_t$	0.015716
$n_e - n_{C'}$	0.009723
$n_{F'} - n_e$	0.010455
$n_i - n_{F'}$	0.036937

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0047
$\Delta\theta_{C,A'}$	0.0028
$\Delta\theta_{g,d}$	-0.0081
$\Delta\theta_{g,F}$	-0.0067
$\Delta\theta_{i,g}$	-0.0431

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.83606127	
A_2	3.41720032	E-1
A_3	1.35280173	
B_1	9.81969903	E-3
B_2	3.85696264	E-2
B_3	1.07045530	E2
1129 ~ 2325 nm		
A_1	1.86267109	
A_2	3.15564131	E-1
A_3	1.30716934	
B_1	1.01627115	E-2
B_2	3.94096655	E-2
B_3	1.03774464	E2

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7416
$\theta_{C,A'}$	0.3278
$\theta_{d,C}$	0.2968
$\theta_{e,C}$	0.5344
$\theta_{g,d}$	1.2724
$\theta_{g,F}$	0.5692
$\theta_{h,g}$	0.4856
$\theta_{i,g}$	1.3424
$\theta'_{C',t}$	0.7789
$\theta'_{e,C'}$	0.4819
$\theta'_{F',e}$	0.5181
$\theta'_{i,F'}$	1.8306

Internal Transmittance

λ_{80}	364	λ_5	336

CCI

B	G	R
0.00	0.75	0.77

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.200	
350	0.540	
360	0.760	
365		
370	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.975	
2200	0.942	
2400	0.790	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.62		λ_5	335

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	7.2	8.1	8.1	8.4	8.7	9.6	10.4	
-20 ~ 0	7.1	8.1	8.1	8.4	8.8	9.7	10.6	
0 ~ 20	7.1	8.1	8.2	8.5	8.7	9.8	10.7	
20 ~ 40	7.1	8.1	8.2	8.5	8.9	9.8	10.8	
40 ~ 60	7.2	8.2	8.3	8.6	9.0	10.0	11.0	
60 ~ 80	7.3	8.4	8.5	8.8	9.3	10.3	11.3	

© OHARA GmbH – Hofheim – Germany

L-LAH84P

812403
817401

Refractive Index	n_d	**1.81225**	Abbe Number	ν_d	**40.29**	Dispersion	$n_F - n_C$ 0.020159
	n_e	1.812250		ν_e	40.04		$n_{F'} - n_{C'}$ 0.020405
		1.817039					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.76778
n_{1970}	1.97009	1.77433
n_{1530}	1.52958	1.78163
n_{1129}	1.12864	1.78876
n_t	1.01398	1.79136
n_s	0.85211	1.79620
$n_{A'}$	0.76819	1.79967
n_r	0.70652	1.80294
n_C	0.65627	**1.80627**
$n_{C'}$	0.64385	1.80721
n_{He-Ne}	0.6328	1.80809
n_D	0.58929	1.81207
n_d	0.58756	**1.81225**
n_e	0.54607	1.81704
n_F	0.48613	**1.82643**
$n_{F'}$	0.47999	1.82761
n_{He-Cd}	0.44157	1.83637
n_g	0.435835	**1.83791**
n_h	0.404656	1.84771
n_i	0.365015	1.86501
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	491
Annealing Point (°C)	**AP**	515
Transformation Temperature (°C)	**Tg**	527
Yield Point (°C)	**At**	568
Softening Point (°C)	**SP**	603
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	64
	(+100~+300°C)	79
Thermal Conductivity (W/m·K)	**k**	0.875

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1116
Rigidity Modulus (10^8N/m^2)	**G**	428
Poisson's Ratio	σ	0.303
Knoop Hardness	**Hk**	610 [6]
Abrasion	**Aa**	78
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.35

Partial Dispersions

$n_C - n_t$	0.014909
$n_C - n_{A'}$	0.006599
$n_d - n_C$	0.005981
$n_e - n_C$	0.010770
$n_g - n_d$	0.025662
$n_g - n_F$	0.011484
$n_h - n_g$	0.009800
$n_i - n_g$	0.027101
$n_{C'} - n_t$	0.015850
$n_e - n_{C'}$	0.009829
$n_{F'} - n_e$	0.010576
$n_i - n_{F'}$	0.037398

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0039
$\Delta\theta_{C,A'}$	0.0026
$\Delta\theta_{g,d}$	-0.0080
$\Delta\theta_{g,F}$	-0.0066
$\Delta\theta_{i,g}$	-0.0433

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	1.83485816	
A 2	3.55717498	E-1
A 3	1.37757002	
B 1	9.78848200	E-3
B 2	3.83708700	E-2
B 3	1.09716920	E2
1129 ~ 2325 nm		
A 1		
A 2		
A 3		
B 1		
B 2		
B 3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7396
$\theta_{C,A'}$	0.3273
$\theta_{d,C}$	0.2967
$\theta_{e,C}$	0.5343
$\theta_{g,d}$	1.2730
$\theta_{g,F}$	0.5697
$\theta_{h,g}$	0.4861
$\theta_{i,g}$	1.3444
$\theta'_{C',t}$	0.7768
$\theta'_{e,C'}$	0.4817
$\theta'_{F',e}$	0.5183
$\theta'_{i,F'}$	1.8328

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.200	
350	0.540	
360	0.760	
365		
370	0.870	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.992	
2000	0.975	
2200	0.942	
2400	0.790	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	4.62		λ_5	335

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	7.2	8.1	8.1	8.4	8.7	9.6	10.4	
-20 ~ 0	7.1	8.1	8.1	8.4	8.8	9.7	10.6	
0 ~ 20	7.1	8.1	8.2	8.5	8.7	9.8	10.7	
20 ~ 40	7.1	8.1	8.2	8.5	8.9	9.8	10.8	
40 ~ 60	7.2	8.2	8.3	8.6	9.0	10.0	11.0	
60 ~ 80	7.3	8.4	8.5	8.8	9.3	10.3	11.3	

© OHARA GmbH – Hofheim – Germany

L-LAH85V

854404
859401

Refractive Index	n_d	**1.85400**	Abbe Number	ν_d	**40.38**	Dispersion	$n_F - n_C$	**0.02115**
	n_e	1.859025		ν_e	40.13		$n_{F'} - n_{C'}$	0.021407

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.80740
n_{1970}	1.97009	1.81425
n_{1530}	1.52958	1.82188
n_{1129}	1.12864	1.82934
n_t	1.01398	1.83207
n_s	0.85211	1.83714
$n_{A'}$	0.76819	1.84079
n_r	0.70652	1.84423
n_C	0.65627	**1.84772**
$n_{C'}$	0.64385	1.84871
n_{He-Ne}	0.6328	1.84964
n_D	0.58929	1.85381
n_d	0.58756	**1.85400**
n_e	0.54607	1.85903
n_F	0.48613	**1.86887**
$n_{F'}$	0.47999	1.87012
n_{He-Cd}	0.44157	1.87929
n_g	0.435835	**1.88090**
n_h	0.404656	1.89116
n_i	0.365015	1.90923
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	613
Yield Point (°C)	**At**	653
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	63
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.819

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	
Rigidity Modulus (10⁸N/m²)	**G**	
Poisson's Ratio	σ	
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	61
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.83

Partial Dispersions

$n_C - n_t$	0.015652
$n_C - n_{A'}$	0.006929
$n_d - n_C$	0.006279
$n_e - n_C$	0.011304
$n_g - n_d$	0.026903
$n_g - n_F$	0.012031
$n_h - n_g$	0.010254
$n_i - n_g$	0.028327
$n_{C'} - n_t$	0.016640
$n_e - n_{C'}$	0.010316
$n_{F'} - n_e$	0.011091
$n_i - n_{F'}$	0.039114

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0039
$\Delta\theta_{C,A'}$	0.0028
$\Delta\theta_{g,d}$	-0.0089
$\Delta\theta_{g,F}$	-0.0073
$\Delta\theta_{i,g}$	-0.0476

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.97460503	
A_2	3.61903592	E-1
A_3	1.38433241	
B_1	1.01854258	E-2
B_2	3.84829118	E-2
B_3	1.03713627	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.7400
$\theta_{C,A'}$	0.3276
$\theta_{d,C}$	0.2969
$\theta_{e,C}$	0.5344
$\theta_{g,d}$	1.2719
$\theta_{g,F}$	0.5688
$\theta_{h,g}$	0.4848
$\theta_{i,g}$	1.3393
$\theta'_{C',t}$	0.7773
$\theta'_{e,C'}$	0.4819
$\theta'_{F',e}$	0.5181
$\theta'_{i,F'}$	1.8272

Internal Transmittance

λ_{80}	373	λ_5	340

CCI

B	G	R
0.00	1.17	1.20

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.050	
350	0.300	
360	0.580	
365		
370	0.770	
380	0.860	
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	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.998	
1800	0.992	
2000	0.973	
2200	0.933	
2400	0.770	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	380
Specific Gravity	**d**	5.25		λ_5	340

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.9	6.7	6.8	7.1	7.4	8.2	9.0	
-20 ~ 0	5.8	6.7	6.8	7.1	7.4	8.3	9.2	
0 ~ 20	5.8	6.8	6.9	7.1	7.5	8.4	9.3	
20 ~ 40	5.9	6.9	6.9	7.2	7.6	8.5	9.5	
40 ~ 60	6.0	7.0	7.0	7.4	7.8	8.7	9.7	
60 ~ 80	6.1	7.1	7.2	7.5	7.9	8.9	9.9	

© OHARA GmbH – Hofheim – Germany

L-LAH86

903310
910308

Refractive Index	n_d	**1.90270**	Abbe Number	ν_d	**31.00**	Dispersion	$n_F - n_C$	**0.02912**
	n_e	1.909580		ν_e	30.78		$n_{F'} - n_{C'}$	0.029553
		1.902700						0.029115

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.84527
n_{1970}	1.97009	1.85288
n_{1530}	1.52958	1.86154
n_{1129}	1.12864	1.87044
n_t	1.01398	1.87383
n_s	0.85211	1.88029
$n_{A'}$	0.76819	1.88504
n_r	0.70652	1.88957
n_C	0.65627	**1.89422**
$n_{C'}$	0.64385	1.89555
n_{He-Ne}	0.6328	1.89679
n_D	0.58929	1.90245
n_d	0.58756	**1.90270**
n_e	0.54607	1.90958
n_F	0.48613	**1.92334**
$n_{F'}$	0.47999	1.92510
n_{He-Cd}	0.44157	1.93828
n_g	0.435835	**1.94064**
n_h	0.404656	1.95587
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	578
Yield Point (°C)	**At**	610
Softening Point (°C)	**SP**	
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	61
	(+100~+300°C)	76
Thermal Conductivity (W/m·K)	**k**	0.838

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1088
Rigidity Modulus (10⁸N/m²)	**G**	418
Poisson's Ratio	σ	0.302
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	97
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.83

Partial Dispersions

$n_C - n_t$	0.020392
$n_C - n_{A'}$	0.009182
$n_d - n_C$	0.008479
$n_e - n_C$	0.015364
$n_g - n_d$	0.037938
$n_g - n_F$	0.017302
$n_h - n_g$	0.015233
$n_i - n_g$	
$n_{C'} - n_t$	0.021717
$n_e - n_{C'}$	0.014039
$n_{F'} - n_e$	0.015514
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0083
$\Delta\theta_{C,A'}$	0.0020
$\Delta\theta_{g,d}$	0.0027
$\Delta\theta_{g,F}$	0.0030
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	2.11102709	
A 2	3.70368094	E-1
A 3	1.62687484	
B 1	1.20714135	E-2
B 2	5.32464416	E-2
B 3	1.09166396	E2
1129 ~ 2325 nm		
A 1	2.11102709	
A 2	3.70368094	E-1
A 3	1.62687484	
B 1	1.20714135	E-2
B 2	5.32464416	E-2
B 3	1.09166396	E2

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**	4.2
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7004
$\theta_{C,A'}$	0.3154
$\theta_{d,C}$	0.2912
$\theta_{e,C}$	0.5277
$\theta_{g,d}$	1.3030
$\theta_{g,F}$	0.5943
$\theta_{h,g}$	0.5232
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7348
$\theta'_{e,C'}$	0.4750
$\theta'_{F',e}$	0.5250
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}	398	λ_5	360

CCI

B	G	R
0.00	3.61	3.84

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350		
360	0.050	
365		
370	0.280	
380	0.550	
390	0.720	
400	0.820	
420	0.909	
440	0.945	
460	0.963	
480	0.975	
500	0.982	
550	0.993	
600	0.996	
650	0.997	
700	0.999	
800	0.999	
900	0.999	
1000	0.999	
1200	0.999	
1400	0.999	
1600	0.998	
1800	0.992	
2000	0.974	
2200	0.920	
2400	0.741	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	4.90		λ_5	36

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	4.0	5.1	5.1	5.5	6.0	7.1	8.4	
-20 ~ 0	4.0	5.1	5.2	5.6	6.1	7.3	8.7	
0 ~ 20	4.0	5.2	5.3	5.7	6.3	7.5	9.0	
20 ~ 40	4.1	5.4	5.4	5.8	6.4	7.8	9.3	
40 ~ 60	4.2	5.5	5.6	6.0	6.6	8.0	9.6	
60 ~ 80	4.4	5.7	5.8	6.3	6.9	8.4	10.0	

© OHARA GmbH – Hofheim – Germany

L-LAH90

832401
837398

Refractive Index	n_d	**1.83220**	Abbe Number	ν_d	**40.10**	Dispersion	$n_F - n_C$	**0.02075**
	n_e	1.832200		ν_e	39.84		$n_{F'} - n_{C'}$	0.020755
		1.837128						0.021011

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.78602
n_{1970}	1.97009	1.79293
n_{1530}	1.52958	1.80058
n_{1129}	1.12864	1.80800
n_t	1.01398	1.81069
n_s	0.85211	1.81568
$n_{A'}$	0.76819	1.81926
n_r	0.70652	1.82262
n_C	0.65627	**1.82605**
$n_{C'}$	0.64385	1.82701
n_{He-Ne}	0.6328	1.82792
n_D	0.58929	1.83202
n_d	0.58756	**1.83220**
n_e	0.54607	1.83713
n_F	0.48613	**1.84680**
$n_{F'}$	0.47999	1.84803
n_{He-Cd}	0.44157	1.85707
n_g	0.435835	**1.85866**
n_h	0.404656	1.86881
n_i	0.365015	1.88683
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	578
Annealing Point (°C)	**AP**	597
Transformation Temperature (°C)	**Tg**	607
Yield Point (°C)	**At**	644
Softening Point (°C)	**SP**	677
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	63
	(+100~+300°C)	74
Thermal Conductivity (W/m·K)	**k**	0.839

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1148
Rigidity Modulus (10^8N/m^2)	**G**	440
Poisson's Ratio	σ	0.304
Knoop Hardness	**Hk**	640 [6]
Abrasion	**Aa**	73
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.93

Partial Dispersions	
$n_C - n_t$	0.015354
$n_C - n_{A'}$	0.006789
$n_d - n_C$	0.006153
$n_e - n_C$	0.011081
$n_g - n_d$	0.026462
$n_g - n_F$	0.011860
$n_h - n_g$	0.010152
$n_i - n_g$	0.028165
$n_{C'} - n_t$	0.016322
$n_e - n_{C'}$	0.010113
$n_{F'} - n_e$	0.010898
$n_i - n_{F'}$	0.038801

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0050
$\Delta\theta_{C,A'}$	0.0026
$\Delta\theta_{g,d}$	-0.0064
$\Delta\theta_{g,F}$	-0.0052
$\Delta\theta_{i,g}$	-0.0322

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.97595301	
A_2	2.83924985	E-1
A_3	1.35176368	
B_1	1.04276395	E-2
B_2	4.27708222	E-2
B_3	1.01453710	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	5.2
Phosphate Resistance	**PR**	1.2

Relative Partial Dispersions	
$\theta_{C,t}$	0.7398
$\theta_{C,A'}$	0.3271
$\theta_{d,C}$	0.2965
$\theta_{e,C}$	0.5339
$\theta_{g,d}$	1.2750
$\theta_{g,F}$	0.5714
$\theta_{h,g}$	0.4891
$\theta_{i,g}$	1.3570
$\theta'_{C',t}$	0.7768
$\theta'_{e,C'}$	0.4813
$\theta'_{F',e}$	0.5187
$\theta'_{i,F'}$	1.8467

Internal Transmittance			
λ_{80}	376	λ_5	340

CCI		
B	G	R
0.00	1.32	1.36

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.050	
350	0.260	
360	0.550	
365		
370	0.730	
380	0.840	
390	0.903	
400	0.936	
420	0.966	
440	0.978	
460	0.985	
480	0.990	
500	0.994	
550	0.998	
600	0.998	
650	0.998	
700	0.999	
800	0.999	
900	0.998	
1000	0.997	
1200	0.997	
1400	0.996	
1600	0.994	
1800	0.988	
2000	0.969	
2200	0.925	
2400	0.750	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	415
Specific Gravity	**d**	4.65		λ_5	340

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.4	6.4	6.4	6.7	7.1	7.9	8.7	
-20 ~ 0	5.4	6.4	6.5	6.7	7.1	7.9	8.8	
0 ~ 20	5.5	6.5	6.5	6.8	7.2	8.0	8.9	
20 ~ 40	5.5	6.5	6.5	6.8	7.2	8.1	9.0	
40 ~ 60	5.6	6.6	6.7	7.0	7.4	8.3	9.3	
60 ~ 80	5.8	6.8	6.9	7.2	7.6	8.6	9.6	

© OHARA GmbH – Hofheim – Germany

L-LAH91

765491
768488

Refractive Index	n_d	**1.76450**	Abbe Number	ν_d	**49.09**	Dispersion	$n_F - n_C$	**0.01557**
	n_e	1.764500		ν_e	48.85		$n_{F'} - n_{C'}$	0.015572
		1.768208						0.015726

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.72404
n_{1970}	1.97009	1.73103
n_{1530}	1.52958	1.73852
n_{1129}	1.12864	1.74527
n_t	1.01398	1.74758
n_s	0.85211	1.75168
$n_{A'}$	0.76819	1.75453
n_r	0.70652	1.75716
n_C	0.65627	**1.75981**
$n_{C'}$	0.64385	1.76055
n_{He-Ne}	0.6328	1.76125
n_D	0.58929	1.76436
n_d	0.58756	**1.76450**
n_e	0.54607	1.76821
n_F	0.48613	**1.77538**
$n_{F'}$	0.47999	1.77628
n_{He-Cd}	0.44157	1.78284
n_g	0.435835	**1.78399**
n_h	0.404656	1.79120
n_i	0.365015	1.80360
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	578
Annealing Point (°C)	**AP**	599
Transformation Temperature (°C)	**Tg**	611
Yield Point (°C)	**At**	644
Softening Point (°C)	**SP**	676
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	57
	(+100~+300°C)	71
Thermal Conductivity (W/m·K)	**k**	0.841

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1144
Rigidity Modulus (10^8N/m^2)	**G**	439
Poisson's Ratio	σ	0.301
Knoop Hardness	**Hk**	680 [7]
Abrasion	**Aa**	50
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.71

Partial Dispersions

$n_C - n_t$	0.012232
$n_C - n_{A'}$	0.005282
$n_d - n_C$	0.004692
$n_e - n_C$	0.008400
$n_g - n_d$	0.019488
$n_g - n_F$	0.008608
$n_h - n_g$	0.007208
$n_i - n_g$	0.019614
$n_{C'} - n_t$	0.012975
$n_e - n_{C'}$	0.007657
$n_{F'} - n_e$	0.008069
$n_i - n_{F'}$	0.027325

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0085
$\Delta\theta_{C,A'}$	0.0038
$\Delta\theta_{g,d}$	-0.0113
$\Delta\theta_{g,F}$	-0.0092
$\Delta\theta_{i,g}$	-0.0544

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.26144128	
A_2	7.82115273	E-1
A_3	1.15823645	
B_1	5.72512582	E-3
B_2	2.19829752	E-2
B_3	8.80482200	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	365
Specific Gravity	**d**	4.29		λ_5	275

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	6.5	7.2	7.2	7.4	7.7	8.3	8.8	
-20 ~ 0	6.5	7.1	7.2	7.4	7.7	8.3	8.9	
0 ~ 20	6.4	7.1	7.2	7.4	7.7	8.3	8.9	
20 ~ 40	6.3	7.1	7.1	7.4	7.7	8.3	8.9	
40 ~ 60	6.5	7.2	7.3	7.5	7.8	8.5	9.1	
60 ~ 80	6.7	7.5	7.5	7.8	8.1	8.8	9.4	

Relative Partial Dispersions

$\theta_{C,t}$	0.7855
$\theta_{C,A'}$	0.3392
$\theta_{d,C}$	0.3013
$\theta_{e,C}$	0.5394
$\theta_{g,d}$	1.2515
$\theta_{g,F}$	0.5528
$\theta_{h,g}$	0.4629
$\theta_{i,g}$	1.2596
$\theta'_{C',t}$	0.8251
$\theta'_{e,C'}$	0.4869
$\theta'_{F',e}$	0.5131
$\theta'_{i,F'}$	1.7376

Internal Transmittance

λ_{80}	333	λ_5	274

CCI

B	G	R
0.00	0.30	0.31

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.150	
290	0.320	
300	0.460	
310	0.590	
320	0.690	
330	0.780	
340	0.850	
350	0.900	
360	0.937	
365		
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.988	
2000	0.963	
2200	0.905	
2400	0.670	

© OHARA GmbH – Hofheim – Germany

L-LAH94

861371
867368

Refractive Index	n_d	**1.86100**	Abbe Number	ν_d	**37.10**	Dispersion	$n_F - n_C$ **0.02321**
	n_e	1.866500		ν_e	36.85		$n_{F'} - n_{C'}$ 0.023517

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.81215
n_{1970}	1.97009	1.81904
n_{1530}	1.52958	1.82677
n_{1129}	1.12864	1.83449
n_t	1.01398	1.83736
n_s	0.85211	1.84276
$n_{A'}$	0.76819	1.84667
n_r	0.70652	1.85038
n_C	0.65627	**1.85416**
$n_{C'}$	0.64385	1.85523
n_{He-Ne}	0.6328	1.85624
n_D	0.58929	1.86080
n_d	0.58756	**1.86100**
n_e	0.54607	1.86650
n_F	0.48613	**1.87737**
$n_{F'}$	0.47999	1.87875
n_{He-Cd}	0.44157	1.88899
n_g	0.435835	**1.89080**
n_h	0.404656	1.90238
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	560
Annealing Point (°C)	**AP**	583
Transformation Temperature (°C)	**Tg**	593
Yield Point (°C)	**At**	628
Softening Point (°C)	**SP**	664
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	62
	(+100~+300°C)	77
Thermal Conductivity (W/m·K)	**k**	0.817

Mechanical Properties

Young's Modulus (10⁸N/m²)	**E**	1121
Rigidity Modulus (10⁸N/m²)	**G**	430
Poisson's Ratio	σ	0.305
Knoop Hardness	**Hk**	660 [7]
Abrasion	**Aa**	77
Photoelastic Constant (nm/cm/10⁵ Pa)	β	1.71

Partial Dispersions

$n_C - n_t$	0.016800
$n_C - n_{A'}$	0.007490
$n_d - n_C$	0.006839
$n_e - n_C$	0.012343
$n_g - n_d$	0.029797
$n_g - n_F$	0.013427
$n_h - n_g$	0.011584
$n_i - n_g$	
$n_{C'} - n_t$	0.017873
$n_e - n_{C'}$	0.011270
$n_{F'} - n_e$	0.012247
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	-0.0038
$\Delta\theta_{g,F}$	-0.0029
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	2.00621420	
A 2	3.47029888	E-1
A 3	1.41688382	
B 1	1.05499238	E-2
B 2	4.45845013	E-2
B 3	1.05995250	E2
1129 ~ 2325 nm		
A 1		
A 2		
A 3		
B 1		
B 2		
B 3		

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**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7239
$\theta_{C,A'}$	0.3227
$\theta_{d,C}$	0.2947
$\theta_{e,C}$	0.5318
$\theta_{g,d}$	1.2839
$\theta_{g,F}$	0.5785
$\theta_{h,g}$	0.4991
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7600
$\theta'_{e,C'}$	0.4792
$\theta'_{F',e}$	0.5208
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R
0.00	1.80	1.88

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.060	
360	0.310	
365		
370	0.580	
380	0.750	
390	0.850	
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	
1000	0.999	
1200	0.999	
1400	0.997	
1600	0.996	
1800	0.989	
2000	0.970	
2200	0.923	
2400	0.740	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	390
Specific Gravity	**d**	4.89		λ_5	350

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10⁻⁶/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	5.4	6.4	6.4	6.7	7.1	8.0	9.0	
-20 ~ 0	5.4	6.4	6.5	6.8	7.2	8.2	9.2	
0 ~ 20	5.4	6.5	6.5	6.9	7.3	8.3	9.4	
20 ~ 40	5.4	6.5	6.6	6.9	7.4	8.4	9.6	
40 ~ 60	5.5	6.7	6.7	7.1	7.6	8.7	9.9	
60 ~ 80	5.7	6.9	6.9	7.3	7.8	8.9	10.2	

© OHARA GmbH – Hofheim – Germany

L-LAL13

694532
697529

Refractive Index	n_d	**1.69350**	Abbe Number	ν_d	**53.18**	Dispersion	$n_F - n_C$	**0.01304**
	n_e	1.693500		ν_e	52.93		$n_{F'} - n_{C'}$	0.013040
		1.696610						0.013160

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.65737
n_{1970}	1.97009	1.66392
n_{1530}	1.52958	1.67089
n_{1129}	1.12864	1.67702
n_t	1.01398	1.67906
n_s	0.85211	1.68263
$n_{A'}$	0.76819	1.68507
n_r	0.70652	1.68731
n_C	0.65627	**1.68955**
$n_{C'}$	0.64385	1.69018
n_{He-Ne}	0.6328	1.69076
n_D	0.58929	1.69338
n_d	0.58756	**1.69350**
n_e	0.54607	1.69661
n_F	0.48613	**1.70259**
$n_{F'}$	0.47999	1.70334
n_{He-Cd}	0.44157	1.70879
n_g	0.435835	**1.70974**
n_h	0.404656	1.71570
n_i	0.365015	1.72592
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	503
Annealing Point (°C)	**AP**	522
Transformation Temperature (°C)	**Tg**	534
Yield Point (°C)	**At**	575
Softening Point (°C)	**SP**	615
Expansion Coefficient (α) (10-7 /°C)	(-30~+70°C)	76
	(+100~+300°C)	92
Thermal Conductivity (W/m·K)	**k**	0.887

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1078
Rigidity Modulus (10^8N/m^2)	**G**	419
Poisson's Ratio	σ	0.285
Knoop Hardness	**Hk**	620 [6]
Abrasion	**Aa**	115
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.010490
$n_C - n_{A'}$	0.004481
$n_d - n_C$	0.003949
$n_e - n_C$	0.007056
$n_g - n_d$	0.016239
$n_g - n_F$	0.007148
$n_h - n_g$	0.005962
$n_i - n_g$	0.016179
$n_{C'} - n_t$	0.011117
$n_e - n_{C'}$	0.006429
$n_{F'} - n_e$	0.006731
$n_i - n_{F'}$	0.022580

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0082
$\Delta\theta_{C,A'}$	0.0033
$\Delta\theta_{g,d}$	-0.0090
$\Delta\theta_{g,F}$	-0.0072
$\Delta\theta_{i,g}$	-0.0390

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.17776146	
A_2	6.34591345	E-1
A_3	1.20435649	
B_1	5.57618243	E-3
B_2	2.06821469	E-2
B_3	9.96322776	E1
1129 ~ 2325 nm		
A_1	1.17776146	
A_2	6.34591345	E-1
A_3	1.20435649	
B_1	5.57618243	E-3
B_2	2.06821469	E-2
B_3	9.96322776	E1

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8044
$\theta_{C,A'}$	0.3436
$\theta_{d,C}$	0.3028
$\theta_{e,C}$	0.5411
$\theta_{g,d}$	1.2453
$\theta_{g,F}$	0.5482
$\theta_{h,g}$	0.4572
$\theta_{i,g}$	1.2407
$\theta'_{C',t}$	0.8448
$\theta'_{e,C'}$	0.4885
$\theta'_{F',e}$	0.5115
$\theta'_{i,F'}$	1.7158

Internal Transmittance

λ_{80}	346	λ_5	288

CCI

B	G	R
0.00	0.35	0.32

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.010	
290	0.060	
300	0.150	
310	0.280	
320	0.450	
330	0.610	
340	0.740	
350	0.840	
360	0.913	
365		
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	
1000	0.999	
1200	0.999	
1400	0.996	
1600	0.995	
1800	0.988	
2000	0.969	
2200	0.918	
2400	0.720	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	36
Specific Gravity	**d**	3.69		λ_5	29

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.5	3.0	3.0	3.1	3.3	3.8	4.2	
-20 ~ 0	2.5	3.0	3.0	3.2	3.4	3.8	4.3	
0 ~ 20	2.5	3.0	3.1	3.2	3.4	3.9	4.3	
20 ~ 40	2.5	3.1	3.1	3.3	3.5	4.0	4.4	
40 ~ 60	2.5	3.1	3.1	3.3	3.5	4.0	4.5	
60 ~ 80	2.5	3.1	3.2	3.3	3.6	4.1	4.6	

© OHARA GmbH – Hofheim – Germany

L-LAL15

693529
696527

Refractive Index	n_d	**1.69304**	Abbe Number	ν_d	**52.93**	Dispersion	$n_F - n_C$ 0.013093
	n_e	1.693040		ν_e	52.70		$n_{F'} - n_{C'}$ 0.013210
		1.696160					

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.65455
n_{1970}	1.97009	1.66189
n_{1530}	1.52958	1.66960
n_{1129}	1.12864	1.67621
n_t	1.01398	1.67835
n_s	0.85211	1.68203
$n_{A'}$	0.76819	1.68453
n_r	0.70652	1.68680
n_C	0.65627	**1.68906**
$n_{C'}$	0.64385	1.68970
n_{He-Ne}	0.6328	1.69029
n_D	0.58929	1.69292
n_d	0.58756	**1.69304**
n_e	0.54607	1.69616
n_F	0.48613	**1.70216**
$n_{F'}$	0.47999	1.70291
n_{He-Cd}	0.44157	1.70837
n_g	0.435835	**1.70932**
n_h	0.404656	1.71528
n_i	0.365015	1.72550
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	494
Annealing Point (°C)	**AP**	515
Transformation Temperature (°C)	**Tg**	525
Yield Point (°C)	**At**	562
Softening Point (°C)	**SP**	596
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	54
	(+100~+300°C)	72
Thermal Conductivity (W/m·K)	**k**	0.923

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1103
Rigidity Modulus (10^8N/m^2)	**G**	427
Poisson's Ratio	σ	0.291
Knoop Hardness	**Hk**	650 [7]
Abrasion	**Aa**	79
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.44

Partial Dispersions	
$n_C - n_t$	0.010719
$n_C - n_{A'}$	0.004537
$n_d - n_C$	0.003975
$n_e - n_C$	0.007095
$n_g - n_d$	0.016276
$n_g - n_F$	0.007158
$n_h - n_g$	0.005966
$n_i - n_g$	0.016189
$n_{C'} - n_t$	0.011351
$n_e - n_{C'}$	0.006463
$n_{F'} - n_e$	0.006747
$n_i - n_{F'}$	0.022598

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0237
$\Delta\theta_{C,A'}$	0.0065
$\Delta\theta_{g,d}$	-0.0117
$\Delta\theta_{g,F}$	-0.0091
$\Delta\theta_{i,g}$	-0.0453

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.07959634	
A_2	7.31872134	E-1
A_3	1.17111107	
B_1	4.70047543	E-3
B_2	1.98615758	E-2
B_3	8.70359900	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.8187
$\theta_{C,A'}$	0.3465
$\theta_{d,C}$	0.3036
$\theta_{e,C}$	0.5419
$\theta_{g,d}$	1.2431
$\theta_{g,F}$	0.5467
$\theta_{h,g}$	0.4557
$\theta_{i,g}$	1.2365
$\theta'_{C',t}$	0.8593
$\theta'_{e,C'}$	0.4893
$\theta'_{F',e}$	0.5107
$\theta'_{i,F'}$	1.7107

Internal Transmittance			
λ_{80}	320	λ_5	

CCI		
B	G	R
0.00	0.14	0.14

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280	0.390	
290	0.530	
300	0.640	
310	0.730	
320	0.800	
330	0.870	
340	0.916	
350	0.948	
360	0.968	
365		
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	
1000	0.999	
1200	0.999	
1400	0.990	
1600	0.991	
1800	0.979	
2000	0.949	
2200	0.850	
2400	0.590	

Other Properties					
Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	345
Specific Gravity	**d**	3.66		λ_5	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	6.6	7.1	7.2	7.3	7.5	8.0	8.5	
-20 ~ 0	6.7	7.3	7.3	7.5	7.7	8.2	8.7	
0 ~ 20	6.8	7.4	7.4	7.6	7.8	8.3	8.8	
20 ~ 40	6.8	7.4	7.5	7.7	7.8	8.4	9.0	
40 ~ 60	6.9	7.6	7.6	7.8	8.0	8.6	9.1	
60 ~ 80	7.0	7.7	7.7	7.9	8.2	8.7	9.3	

© OHARA GmbH – Hofheim – Germany

L-LAM60

743493
747490

Refractive Index	n_d	**1.74320**	Abbe Number	ν_d	**49.29**	Dispersion	$n_F - n_C$	**0.01507**
	n_e	1.743200		ν_e	49.05		$n_{F'} - n_{C'}$	0.015077
		1.746790						0.015226

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.70409
n_{1970}	1.97009	1.71082
n_{1530}	1.52958	1.71804
n_{1129}	1.12864	1.72458
n_t	1.01398	1.72681
n_s	0.85211	1.73078
$n_{A'}$	0.76819	1.73354
n_r	0.70652	1.73609
n_C	0.65627	**1.73866**
$n_{C'}$	0.64385	1.73937
n_{He-Ne}	0.6328	1.74005
n_D	0.58929	1.74306
n_d	0.58756	**1.74320**
n_e	0.54607	1.74679
n_F	0.48613	**1.75373**
$n_{F'}$	0.47999	1.75460
n_{He-Cd}	0.44157	1.76096
n_g	0.435835	**1.76207**
n_h	0.404656	1.76905
n_i	0.365015	1.78108
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	511
Annealing Point (°C)	**AP**	533
Transformation Temperature (°C)	**Tg**	541
Yield Point (°C)	**At**	581
Softening Point (°C)	**SP**	623
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	74
	(+100~+300°C)	92
Thermal Conductivity (W/m·K)	**k**	0.876

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	1147
Rigidity Modulus (10^8N/m^2)	**G**	445
Poisson's Ratio	σ	0.289
Knoop Hardness	**Hk**	620 [6]
Abrasion	**Aa**	90
Photoelastic Constant (nm/cm/10^5 Pa)	β	1.83

Partial Dispersions

$n_C - n_t$	0.011847
$n_C - n_{A'}$	0.005115
$n_d - n_C$	0.004543
$n_e - n_C$	0.008133
$n_g - n_d$	0.018870
$n_g - n_F$	0.008336
$n_h - n_g$	0.006984
$n_i - n_g$	0.019016
$n_{C'} - n_t$	0.012567
$n_e - n_{C'}$	0.007413
$n_{F'} - n_e$	0.007813
$n_i - n_{F'}$	0.026483

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0079
$\Delta\theta_{C,A'}$	0.0037
$\Delta\theta_{g,d}$	-0.0108
$\Delta\theta_{g,F}$	-0.0088
$\Delta\theta_{i,g}$	-0.0510

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.47574184	
A_2	4.96132743	E-1
A_3	1.23796236	
B_1	7.36950000	E-3
B_2	2.51891746	E-2
B_3	9.80306651	E1
1129 ~ 2325 nm		
A_1	1.47574184	
A_2	4.96132743	E-1
A_3	1.23796236	
B_1	7.36950000	E-3
B_2	2.51891746	E-2
B_3	9.80306651	E1

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	1
Acid Resistance (Powder Group)	**RA(P)**	4
Weathering Resistance (Surface Group)	**W(S)**	
Acid Resistance (Surface Group)	**SR**	51.2
Phosphate Resistance	**PR**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7858
$\theta_{C,A'}$	0.3393
$\theta_{d,C}$	0.3013
$\theta_{e,C}$	0.5394
$\theta_{g,d}$	1.2516
$\theta_{g,F}$	0.5529
$\theta_{h,g}$	0.4632
$\theta_{i,g}$	1.2613
$\theta'_{C',t}$	0.8254
$\theta'_{e,C'}$	0.4869
$\theta'_{F',e}$	0.5131
$\theta'_{i,F'}$	1.7393

Internal Transmittance

λ_{80}	347	λ_5	308

CCI

B	G	R
0.00	0.37	0.38

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.090	
320	0.330	
330	0.560	
340	0.720	
350	0.830	
360	0.904	
365		
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.997	
1800	0.991	
2000	0.974	
2200	0.936	
2400	0.750	

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	37	
Specific Gravity	**d**	4.20		λ_5	31	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	3.3	3.9	3.9	4.1	4.3	4.8	5.3	
-20 ~ 0	3.3	3.9	3.9	4.1	4.3	4.9	5.4	
0 ~ 20	3.3	3.9	3.9	4.1	4.4	4.9	5.5	
20 ~ 40	3.2	3.9	4.0	4.2	4.4	5.0	5.6	
40 ~ 60	3.2	4.0	4.0	4.2	4.5	5.1	5.7	
60 ~ 80	3.2	4.0	4.0	4.2	4.5	5.1	5.7	

© OHARA GmbH – Hofheim – Germany

L-LAM69

731405
735403

Refractive Index	n_d	**1.73077**	Abbe Number	ν_d	**40.51**	Dispersion	$n_F - n_C$	**0.01804**
	n_e	1.730770		ν_e	40.25		$n_{F'} - n_{C'}$	0.018040
		1.735050						0.018262

Refractive Indices		
	λ (μm)	
n_{2325}	2.32542	1.68805
n_{1970}	1.97009	1.69488
n_{1530}	1.52958	1.70237
n_{1129}	1.12864	1.70939
n_t	1.01398	1.71185
n_s	0.85211	1.71632
$n_{A'}$	0.76819	1.71948
n_r	0.70652	1.72243
n_C	0.65627	**1.72542**
$n_{C'}$	0.64385	1.72626
n_{He-Ne}	0.6328	1.72705
n_D	0.58929	1.73061
n_d	0.58756	**1.73077**
n_e	0.54607	1.73505
n_F	0.48613	**1.74346**
$n_{F'}$	0.47999	1.74452
n_{He-Cd}	0.44157	1.75240
n_g	0.435835	**1.75379**
n_h	0.404656	1.76267
n_i	0.365015	1.77858
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties		
Strain Point. (°C)	**StP**	461
Annealing Point (°C)	**AP**	489
Transformation Temperature (°C)	**Tg**	497
Yield Point (°C)	**At**	529
Softening Point (°C)	**SP**	574
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	86
	(+100~+300°C)	105
Thermal Conductivity (W/m·K)	**k**	1.114

Mechanical Properties		
Young's Modulus (10^8N/m^2)	**E**	1133
Rigidity Modulus (10^8N/m^2)	**G**	445
Poisson's Ratio	σ	0.273
Knoop Hardness	**Hk**	630 [6]
Abrasion	**Aa**	118
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.03

Partial Dispersions	
$n_C - n_t$	0.013567
$n_C - n_{A'}$	0.005939
$n_d - n_C$	0.005354
$n_e - n_C$	0.009635
$n_g - n_d$	0.023019
$n_g - n_F$	0.010333
$n_h - n_g$	0.008885
$n_i - n_g$	0.024789
$n_{C'} - n_t$	0.014410
$n_e - n_{C'}$	0.008792
$n_{F'} - n_e$	0.009470
$n_i - n_{F'}$	0.034057

Deviation of Relative Partial Dispersions	
$\Delta\theta_{C,t}$	0.0154
$\Delta\theta_{C,A'}$	0.0042
$\Delta\theta_{g,d}$	-0.0046
$\Delta\theta_{g,F}$	-0.0031
$\Delta\theta_{i,g}$	-0.0117

Constants of Dispersion Formula		
326 ~ 1129 nm		
A_1	1.74038960	
A_2	1.76996917	E-1
A_3	1.76775413	
B_1	1.03398870	E-2
B_2	4.84822765	E-2
B_3	1.36671996	E2
1129 ~ 2325 nm		
A_1	1.74038960	
A_2	1.76996917	E-1
A_3	1.76775413	
B_1	1.03398870	E-2
B_2	4.84822765	E-2
B_3	1.36671996	E2

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

Relative Partial Dispersions	
$\theta_{C,t}$	0.7521
$\theta_{C,A'}$	0.3292
$\theta_{d,C}$	0.2968
$\theta_{e,C}$	0.5341
$\theta_{g,d}$	1.2760
$\theta_{g,F}$	0.5728
$\theta_{h,g}$	0.4925
$\theta_{i,g}$	1.3741
$\theta'_{C',t}$	0.7891
$\theta'_{e,C'}$	0.4814
$\theta'_{F',e}$	0.5186
$\theta'_{i,F'}$	1.8649

Internal Transmittance			
λ_{80}	379	λ_5	340

CCI		
B	G	R
0.00	1.88	1.91

Internal Transmittance		
λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340	0.020	
350	0.220	
360	0.500	
365		
370	0.700	
380	0.810	
390	0.870	
400	0.912	
420	0.950	
440	0.964	
460	0.974	
480	0.982	
500	0.989	
550	0.996	
600	0.994	
650	0.995	
700	0.998	
800	0.998	
900	0.998	
1000		
1200		
1400		
1600		
1800		
2000		
2200		
2400		

Other Properties					
Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	41
Specific Gravity	**d**	3.24		λ_5	34

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.1	2.8	2.8	3.0	3.3	4.0	4.7	
-20 ~ 0	2.1	2.8	2.8	3.1	3.4	4.0	4.8	
0 ~ 20	2.1	2.8	2.8	3.1	3.4	4.1	4.9	
20 ~ 40	2.0	2.8	2.9	3.1	3.4	4.2	5.0	
40 ~ 60	2.0	2.8	2.9	3.1	3.5	4.3	5.1	
60 ~ 80	2.0	2.8	2.9	3.1	3.5	4.3	5.3	

© OHARA GmbH – Hofheim – Germany

L-TIM28

689311
694308

Refractive Index	n_d	**1.68948**	Abbe Number	ν_d	**31.02**	Dispersion	$n_F - n_C$	**0.02223**
	n_e	1.689480		ν_e	30.78		$n_{F'} - n_{C'}$	0.022225
		1.694731						0.022569

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.64632
n_{1970}	1.97009	1.65189
n_{1530}	1.52958	1.65832
n_{1129}	1.12864	1.66500
n_t	1.01398	1.66756
n_s	0.85211	1.67245
$n_{A'}$	0.76819	1.67605
n_r	0.70652	1.67949
n_C	0.65627	**1.68303**
$n_{C'}$	0.64385	1.68403
n_{He-Ne}	0.6328	1.68498
n_D	0.58929	1.68929
n_d	0.58756	**1.68948**
n_e	0.54607	1.69473
n_F	0.48613	**1.70525**
$n_{F'}$	0.47999	1.70660
n_{He-Cd}	0.44157	1.71674
n_g	0.435835	**1.71856**
n_h	0.404656	1.73034
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	453
Annealing Point (°C)	**AP**	484
Transformation Temperature (°C)	**Tg**	504
Yield Point (°C)	**At**	539
Softening Point (°C)	**SP**	582
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	101
	(+100~+300°C)	130
Thermal Conductivity (W/m·K)	**k**	1.020

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	845
Rigidity Modulus (10^8N/m^2)	**G**	337
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	197
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.62

Partial Dispersions

$n_C - n_t$	0.015462
$n_C - n_{A'}$	0.006973
$n_d - n_C$	0.006454
$n_e - n_C$	0.011705
$n_g - n_d$	0.029076
$n_g - n_F$	0.013305
$n_h - n_g$	0.011789
$n_i - n_g$	
$n_{C'} - n_t$	0.016470
$n_e - n_{C'}$	0.010697
$n_{F'} - n_e$	0.011837
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0035
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0080
$\Delta\theta_{g,F}$	0.0074
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.52780829	
A_2	2.32776367	E-1
A_3	1.71638781	
B_1	1.14135883	E-2
B_2	5.59068566	E-2
B_3	1.71511800	E2
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	1.0

Relative Partial Dispersions

$\theta_{C,t}$	0.6957
$\theta_{C,A'}$	0.3137
$\theta_{d,C}$	0.2904
$\theta_{e,C}$	0.5267
$\theta_{g,d}$	1.3083
$\theta_{g,F}$	0.5987
$\theta_{h,g}$	0.5304
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7298
$\theta'_{e,C'}$	0.4740
$\theta'_{F',e}$	0.5260
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R
0.00	1.29	1.27

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.010	
360	0.210	
365		
370	0.600	
380	0.820	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.995	
1800	0.980	
2000	0.962	
2200	0.927	
2400	0.890	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	40	
Specific Gravity	**d**	2.88		λ_5	36	

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.1	-0.2	-0.2	0.1	0.5	1.4	2.4	
-20 ~ 0	-1.1	-0.3	-0.2	0.1	0.5	1.4	2.5	
0 ~ 20	-1.2	-0.3	-0.2	0.1	0.5	1.5	2.7	
20 ~ 40	-1.3	-0.4	-0.3	0.0	0.5	1.5	2.7	
40 ~ 60	-1.4	-0.4	-0.3	0.0	0.5	1.6	2.9	
60 ~ 80	-1.4	-0.4	-0.3	0.1	0.5	1.7	3.0	

© OHARA GmbH – Hofheim – Germany

L-TIM28P

695307
700304

Refractive Index	n_d	**1.69453**	Abbe Number	ν_d	**30.66**	Dispersion	$n_F - n_C$ 0.022656
	n_e	1.694530		ν_e	30.42		$n_{F'} - n_{C'}$ 0.023009
		1.699883					

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.65099
n_{1970}	1.97009	1.65653
n_{1530}	1.52958	1.66294
n_{1129}	1.12864	1.66966
n_t	1.01398	1.67224
n_s	0.85211	1.67720
$n_{A'}$	0.76819	1.68086
n_r	0.70652	1.68435
n_C	0.65627	**1.68796**
$n_{C'}$	0.64385	1.68898
n_{He-Ne}	0.6328	1.68995
n_D	0.58929	1.69433
n_d	0.58756	**1.69453**
n_e	0.54607	1.69988
n_F	0.48613	**1.71061**
$n_{F'}$	0.47999	1.71199
n_{He-Cd}	0.44157	1.72233
n_g	0.435835	**1.72419**
n_h	0.404656	1.73622
n_i	0.365015	
n_{334}	0.334148	
n_{326}	0.326106	

Thermal Properties

Strain Point. (°C)	**StP**	453
Annealing Point (°C)	**AP**	484
Transformation Temperature (°C)	**Tg**	504
Yield Point (°C)	**At**	539
Softening Point (°C)	**SP**	582
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	101
	(+100~+300°C)	130
Thermal Conductivity (W/m·K)	**k**	1.020

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	845
Rigidity Modulus (10^8N/m^2)	**G**	337
Poisson's Ratio	σ	0.254
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	197
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.62

Partial Dispersions

$n_C - n_t$	0.015711
$n_C - n_{A'}$	0.007096
$n_d - n_C$	0.006575
$n_e - n_C$	0.011928
$n_g - n_d$	0.029657
$n_g - n_F$	0.013576
$n_h - n_g$	0.012032
$n_i - n_g$	
$n_{C'} - n_t$	0.016737
$n_e - n_{C'}$	0.010902
$n_{F'} - n_e$	0.012107
$n_i - n_{F'}$	

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0030
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	0.0080
$\Delta\theta_{g,F}$	0.0073
$\Delta\theta_{i,g}$	

Constants of Dispersion Formula

326 ~ 1129 nm		
A 1	1.53013396	
A 2	2.45362280	E-1
A 3	1.78233031	
B 1	1.14236857	E-2
B 2	5.55101852	E-2
B 3	1.79074300	E2
1129 ~ 2325 nm		
A 1		
A 2		
A 3		
B 1		
B 2		
B 3		

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

Relative Partial Dispersions

$\theta_{C,t}$	0.6935
$\theta_{C,A'}$	0.3132
$\theta_{d,C}$	0.2902
$\theta_{e,C}$	0.5265
$\theta_{g,d}$	1.3090
$\theta_{g,F}$	0.5992
$\theta_{h,g}$	0.5311
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7274
$\theta'_{e,C'}$	0.4738
$\theta'_{F',e}$	0.5262
$\theta'_{i,F'}$	

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320		
330		
340		
350	0.010	
360	0.210	
365		
370	0.600	
380	0.820	
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	
1000	0.999	
1200	0.999	
1400	0.998	
1600	0.995	
1800	0.980	
2000	0.962	
2200	0.927	
2400	0.890	

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	400
Specific Gravity	**d**	2.88		λ_5	355

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.1	-0.2	-0.2	0.1	0.5	1.4	2.4	
-20 ~ 0	-1.1	-0.3	-0.2	0.1	0.5	1.4	2.5	
0 ~ 20	-1.2	-0.3	-0.2	0.1	0.5	1.5	2.7	
20 ~ 40	-1.3	-0.4	-0.3	0.0	0.5	1.5	2.7	
40 ~ 60	-1.4	-0.4	-0.3	0.0	0.5	1.6	2.9	
60 ~ 80	-1.4	-0.4	-0.3	0.1	0.5	1.7	3.0	

© OHARA GmbH – Hofheim – Germany

PBL1Y

548457
551455

Refractive Index	n_d	**1.54814**	Abbe Number	ν_d	**45.73**	Dispersion	$n_F - n_C$	**0.01199**
	n_e	1.548141		ν_e	45.45		$n_{F'} - n_{C'}$	0.011986
		1.550989						0.012123

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.51892
n_{1970}	1.97009	1.52371
n_{1530}	1.52958	1.52892
n_{1129}	1.12864	1.53374
n_t	1.01398	1.53542
n_s	0.85211	1.53845
$n_{A'}$	0.76819	1.54058
n_r	0.70652	1.54256
n_C	0.65627	**1.54456**
$n_{C'}$	0.64385	1.54513
n_{He-Ne}	0.6328	1.54566
n_D	0.58929	1.54804
n_d	0.58756	**1.54814**
n_e	0.54607	1.55099
n_F	0.48613	**1.55655**
$n_{F'}$	0.47999	1.55725
n_{He-Cd}	0.44157	1.56242
n_g	0.435835	**1.56333**
n_h	0.404656	1.56911
n_i	0.365015	1.57931
n_{334}	0.334148	1.59092
n_{326}	0.326106	1.59476

Thermal Properties

Strain Point. (°C)	**StP**	361
Annealing Point (°C)	**AP**	396
Transformation Temperature (°C)	**Tg**	406
Yield Point (°C)	**At**	453
Softening Point (°C)	**SP**	567
Expansion Coefficient (10-7 /°C) α	(-30~+70°C)	93
	(+100~+300°C)	106
Thermal Conductivity (W/m·K)	**k**	0.951

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	613
Rigidity Modulus (10^8N/m^2)	**G**	252
Poisson's Ratio	σ	0.217
Knoop Hardness	**Hk**	420 [4]
Abrasion	**Aa**	124
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.94

Partial Dispersions

$n_C - n_t$	0.009141
$n_C - n_{A'}$	0.003985
$n_d - n_C$	0.003576
$n_e - n_C$	0.006424
$n_g - n_d$	0.015189
$n_g - n_F$	0.006779
$n_h - n_g$	0.005775
$n_i - n_g$	0.015976
$n_{C'} - n_t$	0.009705
$n_e - n_{C'}$	0.005860
$n_{F'} - n_e$	0.006263
$n_i - n_{F'}$	0.022054

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0014
$\Delta\theta_{C,A'}$	0.0012
$\Delta\theta_{g,d}$	-0.0025
$\Delta\theta_{g,F}$	-0.0019
$\Delta\theta_{i,g}$	-0.0092

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.24772961	
A_2	1.01954909	E-1
A_3	3.50479619	E-1
B_1	9.26606623	E-3
B_2	4.51754311	E-2
B_3	4.50186705	E1
1129 ~ 2325 nm		
A_1	1.23587282	
A_2	1.14028206	E-1
A_3	9.21822183	E-1
B_1	8.98302029	E-3
B_2	4.39009973	E-2
B_3	1.14338154	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
Acid Resistance (Powder Group)	**RA(P)**	1
Weathering Resistance (Surface Group)	**W(S)**	2~2
Acid Resistance (Surface Group)	**SR**	1.0
Phosphate Resistance	**PR**	1.1

Relative Partial Dispersions

$\theta_{C,t}$	0.7626
$\theta_{C,A'}$	0.3325
$\theta_{d,C}$	0.2983
$\theta_{e,C}$	0.5360
$\theta_{g,d}$	1.2672
$\theta_{g,F}$	0.5656
$\theta_{h,g}$	0.4818
$\theta_{i,g}$	1.3329
$\theta'_{C',t}$	0.8005
$\theta'_{e,C'}$	0.4834
$\theta'_{F',e}$	0.5166
$\theta'_{i,F'}$	1.8192

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.290	0.040
320	0.800	0.570
330	0.954	0.880
340	0.988	0.970
350	0.995	0.988
360	0.997	0.993
365	0.997	0.994
370	0.998	0.995
380	0.998	0.996
390	0.999	0.997
400	0.999	0.998
420	0.999	0.998
440	0.999	0.998
460	0.999	0.998
480	0.999	0.998
500	0.999	0.999
550	0.999	0.999
600	0.999	0.999
650	0.999	0.999
700	0.999	0.999
800	0.999	0.999
900	0.999	0.999
1000	0.999	0.999
1200	0.999	0.999
1400	0.998	0.996
1600	0.996	0.991
1800	0.983	0.958
2000	0.960	0.903
2200	0.919	0.810
2400	0.880	0.730

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	2.95		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.2	1.6	1.7	1.8	2.0	2.5	3.0	4.5
-20 ~ 0	1.2	1.7	1.7	1.9	2.1	2.6	3.1	4.7
0 ~ 20	1.2	1.7	1.8	1.9	2.2	2.7	3.2	4.9
20 ~ 40	1.3	1.8	1.8	2.0	2.2	2.8	3.3	5.0
40 ~ 60	1.3	1.8	1.9	2.1	2.3	2.9	3.4	5.2
60 ~ 80	1.3	1.9	1.9	2.1	2.4	2.9	3.5	5.4

© OHARA GmbH – Hofheim – Germany

PBL6Y

532490
534487

Refractive Index	n_d	**1.53172**	Abbe Number	ν_d	**48.95**	Dispersion	$n_F - n_C$	**0.01086**
	n_e	1.534301		ν_e	48.67		$n_{F'} - n_{C'}$	0.010977
		1.531717						0.010862

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.50343
n_{1970}	1.97009	1.50833
n_{1530}	1.52958	1.51361
n_{1129}	1.12864	1.51837
n_t	1.01398	1.51998
n_s	0.85211	1.52282
$n_{A'}$	0.76819	1.52480
n_r	0.70652	1.52663
n_C	0.65627	**1.52846**
$n_{C'}$	0.64385	1.52897
n_{He-Ne}	0.6328	1.52946
n_D	0.58929	1.53162
n_d	0.58756	**1.53172**
n_e	0.54607	1.53430
n_F	0.48613	**1.53932**
$n_{F'}$	0.47999	1.53995
n_{He-Cd}	0.44157	1.54459
n_g	0.435835	**1.54540**
n_h	0.404656	1.55056
n_i	0.365015	1.55959
n_{334}	0.334148	1.56978
n_{326}	0.326106	1.57312

Thermal Properties

Strain Point. (°C)	**StP**	398
Annealing Point (°C)	**AP**	436
Transformation Temperature (°C)	**Tg**	453
Yield Point (°C)	**At**	501
Softening Point (°C)	**SP**	637
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	83
	(+100~+300°C)	90
Thermal Conductivity (W/m·K)	**k**	1.016

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	605
Rigidity Modulus (10^8N/m^2)	**G**	251
Poisson's Ratio	σ	0.205
Knoop Hardness	**Hk**	450 [5]
Abrasion	**Aa**	113
Photoelastic Constant (nm/cm/10^5 Pa)	β	3.07

Partial Dispersions

$n_C - n_t$	0.008482
$n_C - n_{A'}$	0.003660
$n_d - n_C$	0.003258
$n_e - n_C$	0.005842
$n_g - n_d$	0.136860
$n_g - n_F$	0.006082
$n_h - n_g$	0.005153
$n_i - n_g$	0.014190
$n_{C'} - n_t$	0.008998
$n_e - n_{C'}$	0.005326
$n_{F'} - n_e$	0.005651
$n_i - n_{F'}$	0.019641

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0046
$\Delta\theta_{C,A'}$	0.0018
$\Delta\theta_{g,d}$	-0.0031
$\Delta\theta_{g,F}$	-0.0024
$\Delta\theta_{i,g}$	-0.0087

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.22310794	
A_2	8.11217929	E-2
A_3	3.21400939	E-1
B_1	8.97805333	E-3
B_2	4.45756957	E-2
B_3	4.05962247	E1
1129 ~ 2325 nm		
A_1	1.20208094	
A_2	1.02467101	E-1
A_3	1.01797415	E-1
B_1	8.49251346	E-3
B_2	4.19306973	E-2
B_3	1.22687120	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7809
$\theta_{C,A'}$	0.3370
$\theta_{d,C}$	0.2999
$\theta_{e,C}$	0.5378
$\theta_{g,d}$	1.2600
$\theta_{g,F}$	0.5599
$\theta_{h,g}$	0.4744
$\theta_{i,g}$	1.3064
$\theta'_{C',t}$	0.8197
$\theta'_{e,C'}$	0.4852
$\theta'_{F',e}$	0.5148
$\theta'_{i,F'}$	1.7893

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.330	0.060
320	0.790	0.550
330	0.947	0.870
340	0.985	0.963
350	0.994	0.986
360	0.997	0.993
365	0.998	0.994
370	0.998	0.995
380	0.998	0.996
390	0.998	0.997
400	0.999	0.998
420	0.999	0.998
440	0.999	0.998
460	0.999	0.998
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.999
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.998
1000	0.998	0.996
1200	0.997	0.993
1400	0.996	0.990
1600	0.993	0.983
1800	0.973	0.934
2000	0.933	0.840
2200	0.860	0.690
2400	0.810	0.590

Other Properties

Bubble Quality Group	**B**	B	Coloring	$\lambda_{80}/\lambda_{70}$	32
Specific Gravity	**d**	2.79		λ_5	30

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.9	2.3	2.3	2.4	2.6	3.0	3.4	4.7
-20 ~ 0	1.9	2.4	2.4	2.5	2.7	3.1	3.6	4.9
0 ~ 20	2.0	2.5	2.5	2.6	2.8	3.3	3.7	5.1
20 ~ 40	2.1	2.6	2.6	2.7	2.9	3.4	3.9	5.3
40 ~ 60	2.1	2.7	2.7	2.9	3.1	3.5	4.0	5.6
60 ~ 80	2.2	2.8	2.8	3.0	3.2	3.7	4.2	5.8

© OHARA GmbH – Hofheim – Germany

PBL25Y

581408
585405

Refractive Index	n_d	**1.58144**	Abbe Number	ν_d	**40.77**	Dispersion	$n_F - n_C$	**0.01426**
	n_e	1.581439		ν_e	40.49		$n_{F'} - n_{C'}$	0.014263
		1.584824						0.014442

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.54936
n_{1970}	1.97009	1.55423
n_{1530}	1.52958	1.55961
n_{1129}	1.12864	1.56480
n_t	1.01398	1.56667
n_s	0.85211	1.57011
$n_{A'}$	0.76819	1.57256
n_r	0.70652	1.57487
n_C	0.65627	**1.57722**
$n_{C'}$	0.64385	1.57788
n_{He-Ne}	0.6328	1.57850
n_D	0.58929	1.58131
n_d	0.58756	**1.58144**
n_e	0.54607	1.58482
n_F	0.48613	**1.59148**
$n_{F'}$	0.47999	1.59232
n_{He-Cd}	0.44157	1.59856
n_g	0.435835	**1.59967**
n_h	0.404656	1.60670
n_i	0.365015	1.61928
n_{334}	0.334148	1.63387
n_{326}	0.326106	1.63876

Thermal Properties

Strain Point. (°C)	**StP**	381
Annealing Point (°C)	**AP**	420
Transformation Temperature (°C)	**Tg**	440
Yield Point (°C)	**At**	468
Softening Point (°C)	**SP**	590
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	87
	(+100~+300°C)	98
Thermal Conductivity (W/m·K)	**k**	0.899

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	585
Rigidity Modulus (10^8N/m^2)	**G**	240
Poisson's Ratio	σ	0.219
Knoop Hardness	**Hk**	460 [5]
Abrasion	**Aa**	130
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.99

Partial Dispersions

$n_C - n_t$	0.010546
$n_C - n_{A'}$	0.004656
$n_d - n_C$	0.004222
$n_e - n_C$	0.007607
$n_g - n_d$	0.018226
$n_g - n_F$	0.008185
$n_h - n_g$	0.007038
$n_i - n_g$	0.019619
$n_{C'} - n_t$	0.011210
$n_e - n_{C'}$	0.006943
$n_{F'} - n_e$	0.007499
$n_i - n_{F'}$	0.026961

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0014
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	-0.0021
$\Delta\theta_{g,F}$	-0.0016
$\Delta\theta_{i,g}$	-0.0081

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.31960626	
A_2	1.23752633	E-1
A_3	2.10055351	E-1
B_1	1.01863415	E-2
B_2	4.83593508	E-2
B_3	2.73272029	E1
1129 ~ 2325 nm		
A_1	1.29915001	
A_2	1.44676555	E-1
A_3	1.00019303	E-1
B_1	9.67218844	E-3
B_2	4.65408008	E-2
B_3	1.20780522	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7394
$\theta_{C,A'}$	0.3264
$\theta_{d,C}$	0.2960
$\theta_{e,C}$	0.5333
$\theta_{g,d}$	1.2779
$\theta_{g,F}$	0.5739
$\theta_{h,g}$	0.4934
$\theta_{i,g}$	1.3755
$\theta'_{C',t}$	0.7762
$\theta'_{e,C'}$	0.4808
$\theta'_{F',e}$	0.5192
$\theta'_{i,F'}$	1.8668

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.010	
320	0.350	0.070
330	0.780	0.540
340	0.940	0.850
350	0.981	0.954
360	0.993	0.982
365	0.995	0.986
370	0.996	0.990
380	0.997	0.993
390	0.998	0.995
400	0.998	0.996
420	0.998	0.996
440	0.998	0.996
460	0.999	0.997
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.998
1000	0.998	0.996
1200	0.998	0.995
1400	0.996	0.990
1600	0.994	0.984
1800	0.979	0.948
2000	0.953	0.880
2200	0.905	0.780
2400	0.870	0.700

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.23		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.8	2.4	2.5	2.7	2.9	3.5	4.2	6.3
-20 ~ 0	1.9	2.5	2.6	2.8	3.1	3.7	4.4	6.5
0 ~ 20	1.9	2.6	2.7	2.9	3.2	3.8	4.5	6.8
20 ~ 40	2.0	2.7	2.8	3.0	3.3	4.0	4.7	7.0
40 ~ 60	2.1	2.8	2.9	3.1	3.4	4.1	4.9	7.3
60 ~ 80	2.1	2.9	3.0	3.2	3.5	4.3	5.1	7.5

© OHARA GmbH – Hofheim – Germany

PBL26Y

567428
570426

Refractive Index	n_d	**1.56732**	Abbe Number	ν_d	**42.86**	Dispersion	$n_F - n_C$	**0.01324**
	n_e	1.567322		ν_e	42.58		$n_{F'} - n_{C'}$	0.013238
		1.570466						0.013399

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.53658
n_{1970}	1.97009	1.54138
n_{1530}	1.52958	1.54668
n_{1129}	1.12864	1.55170
n_t	1.01398	1.55348
n_s	0.85211	1.55673
$n_{A'}$	0.76819	1.55904
n_r	0.70652	1.56120
n_C	0.65627	**1.56339**
$n_{C'}$	0.64385	1.56401
n_{He-Ne}	0.6328	1.56459
n_D	0.58929	1.56721
n_d	0.58756	**1.56732**
n_e	0.54607	1.57047
n_F	0.48613	**1.57663**
$n_{F'}$	0.47999	1.57741
n_{He-Cd}	0.44157	1.58317
n_g	0.435835	**1.58418**
n_h	0.404656	1.59065
n_i	0.365015	1.60217
n_{334}	0.334148	1.61543
n_{326}	0.326106	1.61986

Thermal Properties

Strain Point. (°C)	**StP**	380
Annealing Point (°C)	**AP**	418
Transformation Temperature (°C)	**Tg**	432
Yield Point (°C)	**At**	471
Softening Point (°C)	**SP**	591
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	89
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	0.912

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	589
Rigidity Modulus (10^8N/m^2)	**G**	242
Poisson's Ratio	σ	0.220
Knoop Hardness	**Hk**	420 [4]
Abrasion	**Aa**	136
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.009910
$n_C - n_{A'}$	0.004353
$n_d - n_C$	0.003931
$n_e - n_C$	0.007075
$n_g - n_d$	0.168610
$n_g - n_F$	0.007554
$n_h - n_g$	0.006471
$n_i - n_g$	0.017986
$n_{C'} - n_t$	0.010529
$n_e - n_{C'}$	0.006456
$n_{F'} - n_e$	0.006943
$n_i - n_{F'}$	0.024760

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0008
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	-0.0020
$\Delta\theta_{g,F}$	-0.0015
$\Delta\theta_{i,g}$	-0.0074

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.29471773	
A_2	1.08880981	E-1
A_3	2.20322964	E-1
B_1	9.86579479	E-3
B_2	4.77568828	E-2
B_3	2.88509863	E1
1129 ~ 2325 nm		
A_1	1.27520167	
A_2	1.28823528	E-1
A_3	1.01138010	E-1
B_1	9.37656096	E-3
B_2	4.58001584	E-2
B_3	1.23589724	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7486
$\theta_{C,A'}$	0.3288
$\theta_{d,C}$	0.2969
$\theta_{e,C}$	0.5344
$\theta_{g,d}$	1.2737
$\theta_{g,F}$	0.5706
$\theta_{h,g}$	0.4888
$\theta_{i,g}$	1.3587
$\theta'_{C',t}$	0.7858
$\theta'_{e,C'}$	0.4818
$\theta'_{F',e}$	0.5182
$\theta'_{i,F'}$	1.8479

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310	0.040	
320	0.470	0.150
330	0.840	0.650
340	0.957	0.890
350	0.985	0.963
360	0.994	0.986
365	0.996	0.989
370	0.997	0.992
380	0.998	0.995
390	0.998	0.996
400	0.998	0.996
420	0.999	0.997
440	0.999	0.997
460	0.999	0.998
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.997
1000	0.998	0.994
1200	0.997	0.993
1400	0.996	0.990
1600	0.994	0.984
1800	0.979	0.948
2000	0.950	0.870
2200	0.890	0.760
2400	0.850	0.670

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	33
Specific Gravity	**d**	3.10		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	0.9	1.5	1.5	1.7	2.0	2.5	3.0	4.9
-20 ~ 0	1.0	1.6	1.7	1.8	2.1	2.6	3.2	5.1
0 ~ 20	1.1	1.7	1.8	2.0	2.2	2.8	3.4	5.4
20 ~ 40	1.2	1.9	1.9	2.1	2.4	3.0	3.6	5.7
40 ~ 60	1.3	2.0	2.0	2.2	2.5	3.1	3.8	5.9
60 ~ 80	1.4	2.1	2.1	2.4	2.6	3.3	4.0	6.2

© OHARA GmbH – Hofheim – Germany

PBL35Y

582409
585406

Refractive Index	n_d	**1.58159**	Abbe Number	ν_d	**40.86**	Dispersion	$n_F - n_C$	**0.01423**
	n_e	1.581591		ν_e	40.58		$n_{F'} - n_{C'}$	0.014235
		1.584970						0.014415

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.54982
n_{1970}	1.97009	1.55460
n_{1530}	1.52958	1.55990
n_{1129}	1.12864	1.56502
n_t	1.01398	1.56687
n_s	0.85211	1.57029
$n_{A'}$	0.76819	1.57273
n_r	0.70652	1.57504
n_C	0.65627	**1.57738**
$n_{C'}$	0.64385	1.57804
n_{He-Ne}	0.6328	1.57866
n_D	0.58929	1.58147
n_d	0.58756	**1.58159**
n_e	0.54607	1.58497
n_F	0.48613	**1.59161**
$n_{F'}$	0.47999	1.59246
n_{He-Cd}	0.44157	1.59868
n_g	0.435835	**1.59979**
n_h	0.404656	1.60681
n_i	0.365015	1.61937
n_{334}	0.334148	1.63392
n_{326}	0.326106	1.63880

Thermal Properties

Strain Point. (°C)	**StP**	345
Annealing Point (°C)	**AP**	379
Transformation Temperature (°C)	**Tg**	404
Yield Point (°C)	**At**	454
Softening Point (°C)	**SP**	550
Expansion Coefficient (10^{-7}/°C) α	(-30~+70°C)	91
	(+100~+300°C)	107
Thermal Conductivity (W/m·K)	**k**	0.885

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	596
Rigidity Modulus (10^8N/m^2)	**G**	245
Poisson's Ratio	σ	0.217
Knoop Hardness	**Hk**	450 [5]
Abrasion	**Aa**	145
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.88

Partial Dispersions

$n_C - n_t$	0.010505
$n_C - n_{A'}$	0.004644
$n_d - n_C$	0.004213
$n_e - n_C$	0.007591
$n_g - n_d$	0.018194
$n_g - n_F$	0.008172
$n_h - n_g$	0.007026
$n_i - n_g$	0.019583
$n_{C'} - n_t$	0.011167
$n_e - n_{C'}$	0.006929
$n_{F'} - n_e$	0.007486
$n_i - n_{F'}$	0.026913

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.0004
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	-0.0018
$\Delta\theta_{g,F}$	-0.0013
$\Delta\theta_{i,g}$	-0.0072

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.31884698	
A_2	1.25014653	E-1
A_3	2.15794324	E-1
B_1	1.01474939	E-2
B_2	4.81636043	E-2
B_3	2.85517448	E1
1129 ~ 2325 nm		
A_1		
A_2		
A_3		
B_1		
B_2		
B_3		

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**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7380
$\theta_{C,A'}$	0.3262
$\theta_{d,C}$	0.2960
$\theta_{e,C}$	0.5333
$\theta_{g,d}$	1.2781
$\theta_{g,F}$	0.5741
$\theta_{h,g}$	0.4936
$\theta_{i,g}$	1.3757
$\theta'_{C',t}$	0.7747
$\theta'_{e,C'}$	0.4807
$\theta'_{F',e}$	0.5193
$\theta'_{i,F'}$	1.8670

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.470	0.420
330	0.850	0.730
340	0.963	0.916
350	0.989	0.975
360	0.996	0.990
365	0.997	0.993
370	0.998	0.995
380	0.999	0.997
390	0.999	0.998
400	0.999	0.998
420	0.999	0.999
440	0.999	0.999
460	0.999	0.999
480	0.999	0.999
500	0.999	0.999
550	0.999	0.999
600	0.999	0.999
650	0.999	0.999
700	0.999	0.999
800	0.999	0.999
900	0.999	0.999
1000	0.999	0.999
1200	0.999	0.999
1400	0.998	0.996
1600	0.996	0.990
1800	0.980	0.952
2000	0.955	0.890
2200	0.911	0.790
2400	0.880	0.720

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	335
Specific Gravity	**d**	3.27		λ_5	310

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.0	1.7	1.7	1.9	2.2	2.8	3.4	5.5
-20 ~ 0	1.0	1.7	1.7	1.9	2.2	2.8	3.5	5.7
0 ~ 20	1.1	1.8	1.8	2.0	2.3	3.0	3.7	5.9
20 ~ 40	1.1	1.9	1.9	2.1	2.4	3.1	3.8	6.1
40 ~ 60	1.2	2.0	2.0	2.2	2.5	3.2	4.0	6.3
60 ~ 80	1.4	2.1	2.2	2.4	2.7	3.4	4.2	6.6

© OHARA GmbH – Hofheim – Germany

PBM2Y

620363
624360

Refractive Index	n_d	**1.62004**	Abbe Number	ν_d	**36.27**	Dispersion	$n_F - n_C$	**0.01709**
	n_e	1.620041		ν_e	36.01		$n_{F'} - n_{C'}$	0.017095
		1.624093						0.017330

Refractive Indices

	λ (µm)	
n_{2325}	2.32542	1.58471
n_{1970}	1.97009	1.58959
n_{1530}	1.52958	1.59510
n_{1129}	1.12864	1.60067
n_t	1.01398	1.60275
n_s	0.85211	1.60668
$n_{A'}$	0.76819	1.60953
n_r	0.70652	1.61225
n_C	0.65627	**1.61502**
$n_{C'}$	0.64385	1.61581
n_{He-Ne}	0.6328	1.61655
n_D	0.58929	1.61989
n_d	0.58756	**1.62004**
n_e	0.54607	1.62409
n_F	0.48613	**1.63211**
$n_{F'}$	0.47999	1.63314
n_{He-Cd}	0.44157	1.64072
n_g	0.435835	**1.64207**
n_h	0.404656	1.65071
n_i	0.365015	1.66635
n_{334}	0.334148	1.68482
n_{326}	0.326106	1.69111

Thermal Properties

Strain Point. (°C)	**StP**	385
Annealing Point (°C)	**AP**	418
Transformation Temperature (°C)	**Tg**	436
Yield Point (°C)	**At**	470
Softening Point (°C)	**SP**	580
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	86
	(+100~+300°C)	97
Thermal Conductivity (W/m·K)	**k**	0.814

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	571
Rigidity Modulus (10^8N/m^2)	**G**	234
Poisson's Ratio	σ	0.223
Knoop Hardness	**Hk**	420 [4]
Abrasion	**Aa**	140
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.012265
$n_C - n_{A'}$	0.005485
$n_d - n_C$	0.005022
$n_e - n_C$	0.009074
$n_g - n_d$	0.022030
$n_g - n_F$	0.009957
$n_h - n_g$	0.008640
$n_i - n_g$	0.024279
$n_{C'} - n_t$	0.013052
$n_e - n_{C'}$	0.008287
$n_{F'} - n_e$	0.009043
$n_i - n_{F'}$	0.033214

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0007
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	-0.0007
$\Delta\theta_{g,F}$	-0.0003
$\Delta\theta_{i,g}$	-0.0011

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.39446503	
A_2	1.59230985	E-1
A_3	2.45470216	E-1
B_1	1.10571872	E-2
B_2	5.07194882	E-2
B_3	3.14440142	E1
1129 ~ 2325 nm		
A_1	1.37920265	
A_2	1.74908080	E-1
A_3	9.72480533	E-1
B_1	1.06616552	E-2
B_2	4.96089256	E-2
B_3	1.16926659	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7175
$\theta_{C,A'}$	0.3209
$\theta_{d,C}$	0.2938
$\theta_{e,C}$	0.5308
$\theta_{g,d}$	1.2887
$\theta_{g,F}$	0.5825
$\theta_{h,g}$	0.5054
$\theta_{i,g}$	1.4202
$\theta'_{C',t}$	0.7531
$\theta'_{e,C'}$	0.4782
$\theta'_{F',e}$	0.5218
$\theta'_{i,F'}$	1.9166

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.040	
330	0.440	0.120
340	0.810	0.590
350	0.944	0.860
360	0.980	0.951
365	0.986	0.965
370	0.991	0.978
380	0.995	0.987
390	0.996	0.991
400	0.997	0.993
420	0.998	0.995
440	0.998	0.995
460	0.998	0.996
480	0.998	0.996
500	0.999	0.997
550	0.999	0.998
600	0.999	0.998
650	0.999	0.997
700	0.999	0.998
800	0.999	0.998
900	0.999	0.998
1000	0.998	0.995
1200	0.998	0.995
1400	0.996	0.990
1600	0.994	0.985
1800	0.980	0.951
2000	0.962	0.908
2200	0.921	0.810
2400	0.890	0.750

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	35
Specific Gravity	**d**	3.61		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.1	2.9	3.0	3.3	3.6	4.4	5.3	8.2
-20 ~ 0	2.3	3.1	3.1	3.5	3.8	4.6	5.5	8.6
0 ~ 20	2.5	3.3	3.3	3.6	4.0	4.8	5.8	8.9
20 ~ 40	2.5	3.4	3.5	3.8	4.2	5.1	6.0	9.3
40 ~ 60	2.7	3.6	3.7	4.0	4.4	5.3	6.3	9.6
60 ~ 80	2.9	3.8	3.8	4.2	4.6	5.5	6.6	10.0

© OHARA GmbH – Hofheim – Germany

PBM8Y

596393
599390

Refractive Index	n_d	**1.59551**	Abbe Number	ν_d	**39.26**	Dispersion	$n_F - n_C$	**0.01517**
	n_e	1.599108		ν_e	38.99		$n_{F'} - n_{C'}$	0.015365
		1.595509						0.015169

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.56224
n_{1970}	1.97009	1.56716
n_{1530}	1.52958	1.57263
n_{1129}	1.12864	1.57797
n_t	1.01398	1.57992
n_s	0.85211	1.58352
$n_{A'}$	0.76819	1.58611
n_r	0.70652	1.58855
n_C	0.65627	**1.59103**
$n_{C'}$	0.64385	1.59173
n_{He-Ne}	0.6328	1.59239
n_D	0.58929	1.59538
n_d	0.58756	**1.59551**
n_e	0.54607	1.59911
n_F	0.48613	**1.60620**
$n_{F'}$	0.47999	1.60710
n_{He-Cd}	0.44157	1.61377
n_g	0.435835	**1.61495**
n_h	0.404656	1.62249
n_i	0.365015	1.63604
n_{334}	0.334148	1.65185
n_{326}	0.326106	1.65718

Thermal Properties

Strain Point. (°C)	**StP**	390
Annealing Point (°C)	**AP**	426
Transformation Temperature (°C)	**Tg**	445
Yield Point (°C)	**At**	485
Softening Point (°C)	**SP**	590
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	85
	(+100~+300°C)	96
Thermal Conductivity (W/m·K)	**k**	0.878

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	588
Rigidity Modulus (10^8N/m^2)	**G**	241
Poisson's Ratio	σ	0.222
Knoop Hardness	**Hk**	400 [4]
Abrasion	**Aa**	151
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.87

Partial Dispersions

$n_C - n_t$	0.111090
$n_C - n_{A'}$	0.004923
$n_d - n_C$	0.004479
$n_e - n_C$	0.008078
$n_g - n_d$	0.019438
$n_g - n_F$	0.008748
$n_h - n_g$	0.007545
$n_i - n_g$	0.021090
$n_{C'} - n_t$	0.011813
$n_e - n_{C'}$	0.007374
$n_{F'} - n_e$	0.007991
$n_i - n_{F'}$	0.289380

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0014
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	-0.0018
$\Delta\theta_{g,F}$	-0.0012
$\Delta\theta_{i,g}$	-0.0060

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.35351322	
A_2	1.30212912	E-1
A_3	1.58337266	E-1
B_1	1.05624626	E-2
B_2	4.96606652	E-2
B_3	2.07965806	E1
1129 ~ 2325 nm		
A_1	1.33265695	
A_2	1.51642865	E-1
A_3	1.00238959	E-1
B_1	1.00208464	E-2
B_2	4.78779669	E-2
B_3	1.19439670	E2

Chemical Properties

Water Resistance (Powder Group)	**RW(P)**	2
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

Relative Partial Dispersions

$\theta_{C,t}$	0.7323
$\theta_{C,A'}$	0.3245
$\theta_{d,C}$	0.2953
$\theta_{e,C}$	0.5325
$\theta_{g,d}$	1.2814
$\theta_{g,F}$	0.5767
$\theta_{h,g}$	0.4974
$\theta_{i,g}$	1.3903
$\theta'_{C',t}$	0.7688
$\theta'_{e,C'}$	0.4799
$\theta'_{F',e}$	0.5201
$\theta'_{i,F'}$	1.8834

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.170	0.010
330	0.650	0.340
340	0.890	0.750
350	0.996	0.918
360	0.987	0.968
365	0.991	0.977
370	0.993	0.983
380	0.996	0.990
390	0.997	0.993
400	0.998	0.995
420	0.998	0.996
440	0.998	0.996
460	0.998	0.996
480	0.999	0.997
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.998
800	0.999	0.998
900	0.999	0.998
1000	0.998	0.995
1200	0.998	0.995
1400	0.995	0.988
1600	0.994	0.986
1800	0.981	0.953
2000	0.960	0.903
2200	0.916	0.800
2400	0.880	0.740

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.36		λ_5	32

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	1.9	2.6	2.7	2.9	3.2	3.8	4.6	6.8
-20 ~ 0	2.0	2.7	2.8	3.0	3.3	4.0	4.8	7.1
0 ~ 20	2.1	2.9	2.9	3.2	3.5	4.2	5.0	7.4
20 ~ 40	2.2	3.0	3.0	3.3	3.6	4.4	5.2	7.7
40 ~ 60	2.3	3.1	3.2	3.4	3.8	4.5	5.4	8.0
60 ~ 80	2.5	3.3	3.3	3.5	3.9	4.7	5.6	8.3

© OHARA GmbH – Hofheim – Germany

PBM18Y

596387
599385

Refractive Index	n_d	**1.59551**	Abbe Number	ν_d	**38.77**	Dispersion	$n_F - n_C$	**0.01537**
	n_e	1.595509		ν_e	38.50		$n_{F'} - n_{C'}$	0.015361
		1.599153						0.015561

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.56207
n_{1970}	1.97009	1.56696
n_{1530}	1.52958	1.57243
n_{1129}	1.12864	1.57779
n_t	1.01398	1.57975
n_s	0.85211	1.58338
$n_{A'}$	0.76819	1.58599
n_r	0.70652	1.58846
n_C	0.65627	**1.59097**
$n_{C'}$	0.64385	1.59169
n_{He-Ne}	0.6328	1.59236
n_D	0.58929	1.59537
n_d	0.58756	**1.59551**
n_e	0.54607	1.59915
n_F	0.48613	**1.60634**
$n_{F'}$	0.47999	1.60725
n_{He-Cd}	0.44157	1.61400
n_g	0.435835	**1.61520**
n_h	0.404656	1.62284
n_i	0.365015	1.63656
n_{334}	0.334148	1.65255
n_{326}	0.326106	1.65795

Thermal Properties

Strain Point. (°C)	**StP**	377
Annealing Point (°C)	**AP**	419
Transformation Temperature (°C)	**Tg**	441
Yield Point (°C)	**At**	478
Softening Point (°C)	**SP**	565
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	88
	(+100~+300°C)	100
Thermal Conductivity (W/m·K)	**k**	0.865

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	598
Rigidity Modulus (10^8N/m^2)	**G**	244
Poisson's Ratio	σ	0.223
Knoop Hardness	**Hk**	410 [4]
Abrasion	**Aa**	132
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.79

Partial Dispersions

$n_C - n_t$	0.011228
$n_C - n_{A'}$	0.004982
$n_d - n_C$	0.004534
$n_e - n_C$	0.008178
$n_g - n_d$	0.019689
$n_g - n_F$	0.008862
$n_h - n_g$	0.007643
$n_i - n_g$	0.021360
$n_{C'} - n_t$	0.011940
$n_e - n_{C'}$	0.007466
$n_{F'} - n_e$	0.008095
$n_i - n_{F'}$	0.029310

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0023
$\Delta\theta_{C,A'}$	0.0015
$\Delta\theta_{g,d}$	-0.0024
$\Delta\theta_{g,F}$	-0.0018
$\Delta\theta_{i,g}$	-0.0099

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.34660215	
A_2	1.36322343	E-1
A_3	1.83371587	E-1
B_1	1.06313733	E-2
B_2	4.91403013	E-2
B_3	2.39154655	E1
1129 ~ 2325 nm		
A_1	1.32558993	
A_2	1.57859674	E-1
A_3	1.03396744	E-1
B_1	1.01008566	E-2
B_2	4.74276657	E-2
B_3	1.23686168	E2

Chemical Properties

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**	2.0

Relative Partial Dispersions

$\theta_{C,t}$	0.7309
$\theta_{C,A'}$	0.3243
$\theta_{d,C}$	0.2952
$\theta_{e,C}$	0.5324
$\theta_{g,d}$	1.2818
$\theta_{g,F}$	0.5769
$\theta_{h,g}$	0.4976
$\theta_{i,g}$	1.3905
$\theta'_{C',t}$	0.7673
$\theta'_{e,C'}$	0.4798
$\theta'_{F',e}$	0.5202
$\theta'_{i,F'}$	1.8836

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280		
290		
300		
310		
320	0.220	0.020
330	0.680	0.390
340	0.912	0.790
350	0.975	0.939
360	0.990	0.976
365	0.993	0.983
370	0.995	0.988
380	0.997	0.992
390	0.998	0.994
400	0.998	0.995
420	0.998	0.996
440	0.999	0.997
460	0.999	0.997
480	0.999	0.998
500	0.999	0.998
550	0.999	0.998
600	0.999	0.998
650	0.999	0.998
700	0.999	0.998
800	0.999	0.998
900	0.999	0.998
1000	0.998	0.996
1200	0.998	0.996
1400	0.996	0.990
1600	0.994	0.986
1800	0.979	0.948
2000	0.956	0.890
2200	0.907	0.780
2400	0.870	0.710

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	34
Specific Gravity	**d**	3.37		λ_5	31

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	2.5	3.1	3.2	3.4	3.7	4.4	5.2	7.6
-20 ~ 0	2.5	3.3	3.3	3.5	3.9	4.6	5.4	7.9
0 ~ 20	2.6	3.4	3.4	3.7	4.0	4.7	5.5	8.1
20 ~ 40	2.7	3.5	3.5	3.8	4.1	4.9	5.7	8.4
40 ~ 60	2.8	3.6	3.6	3.9	4.2	5.0	5.9	8.7
60 ~ 80	2.8	3.7	3.7	4.0	4.3	5.2	6.1	8.9

© OHARA GmbH – Hofheim – Germany

S-FPL51Y

497811
498808

Refractive Index	n_d	**1.49700**	Abbe Number	ν_d	**81.14**	Dispersion	$n_F - n_C$	**0.00613**
	n_e	1.498466		ν_e	80.74		$n_{F'} - n_{C'}$	0.006174
		1.497003						0.006125

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.47980
n_{1970}	1.97009	1.48286
n_{1530}	1.52958	1.48617
n_{1129}	1.12864	1.48913
n_t	1.01398	1.49011
n_s	0.85211	1.49182
$n_{A'}$	0.76819	1.49299
n_r	0.70652	1.49407
n_C	0.65627	**1.49513**
$n_{C'}$	0.64385	1.49543
n_{He-Ne}	0.6328	1.49571
n_D	0.58929	1.49695
n_d	0.58756	**1.49700**
n_e	0.54607	1.49847
n_F	0.48613	**1.50126**
$n_{F'}$	0.47999	1.50160
n_{He-Cd}	0.44157	1.50412
n_g	0.435835	**1.50455**
n_h	0.404656	1.50727
n_i	0.365015	1.51185
n_{334}	0.334148	1.51673
n_{326}	0.326106	1.51826

Thermal Properties

Strain Point. (°C)	**StP**	
Annealing Point (°C)	**AP**	
Transformation Temperature (°C)	**Tg**	448
Yield Point (°C)	**At**	471
Softening Point (°C)	**SP**	
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	136
	(+100~+300°C)	161
Thermal Conductivity (W/m·K)	**k**	0.780

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	716
Rigidity Modulus (10^8N/m^2)	**G**	275
Poisson's Ratio	σ	0.302
Knoop Hardness	**Hk**	380 [4]
Abrasion	**Aa**	476
Photoelastic Constant (nm/cm/10^5 Pa)	β	

Partial Dispersions

$n_C - n_t$	0.005027
$n_C - n_{A'}$	0.002139
$n_d - n_C$	0.001870
$n_e - n_C$	0.003333
$n_g - n_d$	0.007551
$n_g - n_F$	0.003296
$n_h - n_g$	0.002716
$n_i - n_g$	0.007300
$n_{C'} - n_t$	0.005325
$n_e - n_{C'}$	0.003035
$n_{F'} - n_e$	0.003139
$n_i - n_{F'}$	0.010249

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	-0.1067
$\Delta\theta_{C,A'}$	-0.0251
$\Delta\theta_{g,d}$	0.0366
$\Delta\theta_{g,F}$	0.0279
$\Delta\theta_{i,g}$	0.1462

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	1.14031443	
A_2	7.71496272	E-2
A_3	1.43721957	
B_1	5.95466872	E-3
B_2	2.23953953	E-2
B_3	2.74290057	E2
1129 ~ 2325 nm		
A_1	7.65663766	E-1
A_2	4.51879777	E-1
A_3	1.13199134	
B_1	3.48152533	E-3
B_2	1.28720516	E-2
B_3	2.14351131	E2

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**	51.0
Phosphate Resistance	**PR**	4.2

Relative Partial Dispersions

$\theta_{C,t}$	0.8207
$\theta_{C,A'}$	0.3492
$\theta_{d,C}$	0.3053
$\theta_{e,C}$	0.5442
$\theta_{g,d}$	1.2328
$\theta_{g,F}$	0.5381
$\theta_{h,g}$	0.4434
$\theta_{i,g}$	1.1918
$\theta'_{C',t}$	0.8625
$\theta'_{e,C'}$	0.4916
$\theta'_{F',e}$	0.5084
$\theta'_{i,F'}$	1.6600

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.510	0.190
290	0.670	0.370
300	0.800	0.580
310	0.890	0.750
320	0.943	0.860
330	0.971	0.930
340	0.986	0.966
350	0.994	0.985
360	0.996	0.991
365	0.997	0.993
370	0.998	0.995
380	0.999	0.997
390	0.999	0.998
400	0.999	0.998
420	0.999	0.998
440	0.999	0.998
460	0.999	0.998
480	0.999	0.998
500	0.999	0.999
550	0.999	0.999
600	0.999	0.999
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.998
1000	0.998	0.996
1200	0.998	0.996
1400	0.999	0.998
1600	0.999	0.997
1800	0.998	0.995
2000	0.998	0.995
2200	0.996	0.991
2400	0.995	0.987

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	31	
Specific Gravity	**d**	3.66		λ_5		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-6.4	-6.3	-6.3	-6.3	-6.2	-6.0	-5.9	-5.5
-20 ~ 0	-6.7	-6.6	-6.6	-6.5	-6.4	-6.3	-6.1	-5.7
0 ~ 20	-6.9	-6.8	-6.8	-6.7	-6.7	-6.5	-6.4	-5.9
20 ~ 40	-7.2	-7.0	-7.0	-7.0	-6.9	-6.7	-6.6	-6.1
40 ~ 60	-7.4	-7.3	-7.3	-7.2	-7.1	-7.0	-6.8	-6.3
60 ~ 80	-7.7	-7.5	-7.5	-7.4	-7.4	-7.2	-7.0	-6.6

© OHARA GmbH – Hofheim – Germany

S-FSL5Y

487703
489702

Refractive Index	n_d	**1.48749**	Abbe Number	ν_d	**70.36**	Dispersion	$n_F - n_C$	**0.00693**
	n_e	1.487490		ν_e	70.17		$n_{F'} - n_{C'}$	0.006929
		1.489145						0.006971

Refractive Indices

	λ (μm)	
n_{2325}	2.32542	1.46218
n_{1970}	1.97009	1.46761
n_{1530}	1.52958	1.47323
n_{1129}	1.12864	1.47778
n_t	1.01398	1.47915
n_s	0.85211	1.48138
$n_{A'}$	0.76819	1.48282
n_r	0.70652	1.48410
n_C	0.65627	**1.48535**
$n_{C'}$	0.64385	1.48569
n_{He-Ne}	0.6328	1.48601
n_D	0.58929	1.48743
n_d	0.58756	**1.48749**
n_e	0.54607	1.48915
n_F	0.48613	**1.49228**
$n_{F'}$	0.47999	1.49266
n_{He-Cd}	0.44157	1.49546
n_g	0.435835	**1.49594**
n_h	0.404656	1.49896
n_i	0.365015	1.50404
n_{334}	0.334148	1.50946
n_{326}	0.326106	1.51116

Thermal Properties

Strain Point. (°C)	**StP**	465
Annealing Point (°C)	**AP**	502
Transformation Temperature (°C)	**Tg**	500
Yield Point (°C)	**At**	567
Softening Point (°C)	**SP**	676
Expansion Coefficient (10^{-7} /°C) α	(-30~+70°C)	89
	(+100~+300°C)	97
Thermal Conductivity (W/m·K)	**k**	1.002

Mechanical Properties

Young's Modulus (10^8N/m^2)	**E**	622
Rigidity Modulus (10^8N/m^2)	**G**	253
Poisson's Ratio	σ	0.229
Knoop Hardness	**Hk**	530 [5]
Abrasion	**Aa**	113
Photoelastic Constant (nm/cm/10^5 Pa)	β	2.87

Partial Dispersions

$n_C - n_t$	0.006201
$n_C - n_{A'}$	0.002523
$n_d - n_C$	0.002144
$n_e - n_C$	0.003799
$n_g - n_d$	0.008455
$n_g - n_F$	0.003670
$n_h - n_g$	0.003015
$n_i - n_g$	0.008099
$n_{C'} - n_t$	0.006546
$n_e - n_{C'}$	0.003454
$n_{F'} - n_e$	0.003517
$n_i - n_{F'}$	0.011382

Deviation of Relative Partial Dispersions

$\Delta\theta_{C,t}$	0.0181
$\Delta\theta_{C,A'}$	0.0029
$\Delta\theta_{g,d}$	0.0016
$\Delta\theta_{g,F}$	0.0021
$\Delta\theta_{i,g}$	0.0331

Constants of Dispersion Formula

326 ~ 1129 nm		
A_1	9.77409944	E-1
A_2	2.10950834	E-1
A_3	1.37142848	
B_1	5.57649364	E-3
B_2	1.77000313	E-2
B_3	1.49211443	E2
1129 ~ 2325 nm		
A_1	8.79731455	E-1
A_2	3.08634219	E-1
A_3	1.02136885	
B_1	4.90947559	E-3
B_2	1.57419667	E-2
B_3	1.11412218	E2

Chemical Properties

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

Relative Partial Dispersions

$\theta_{C,t}$	0.8949
$\theta_{C,A'}$	0.3641
$\theta_{d,C}$	0.3094
$\theta_{e,C}$	0.5483
$\theta_{g,d}$	1.2202
$\theta_{g,F}$	0.5297
$\theta_{h,g}$	0.4351
$\theta_{i,g}$	1.1689
$\theta'_{C',t}$	0.9390
$\theta'_{e,C'}$	0.4955
$\theta'_{F',e}$	0.5045
$\theta'_{i,F'}$	1.6328

Internal Transmittance

λ_{80}		λ_5	

CCI

B	G	R

Internal Transmittance

λ (nm)	τ i 10 mm	τ i 25 mm
280	0.190	0.010
290	0.610	0.290
300	0.860	0.680
310	0.954	0.890
320	0.984	0.961
330	0.993	0.983
340	0.997	0.993
350	0.998	0.995
360	0.998	0.996
365	0.999	0.997
370	0.999	0.998
380	0.999	0.998
390	0.999	0.998
400	0.999	0.999
420	0.999	0.999
440	0.999	0.999
460	0.999	0.999
480	0.999	0.999
500	0.999	0.999
550	0.999	0.999
600	0.999	0.999
650	0.999	0.998
700	0.999	0.999
800	0.999	0.999
900	0.999	0.997
1000	0.998	0.994
1200	0.997	0.992
1400	0.981	0.952
1600	0.991	0.977
1800	0.983	0.958
2000	0.968	0.921
2200	0.860	0.700
2400	0.850	0.670

Other Properties

Bubble Quality Group	**B**		Coloring	$\lambda_{80}/\lambda_{70}$	30		
Specific Gravity	**d**	2.46		λ_5	27		

Temperature Coefficients of Refractive Index

Range of Temperature (°C)	dn / dT relative (10^{-6}/°C)							
	t	C'	He-Ne	D	e	F'	g	i
-40 ~ -20	-1.2	-1.2	-1.2	-1.1	-1.1	-0.9	-0.7	-0.3
-20 ~ 0	-1.2	-1.1	-1.1	-1.0	-1.0	-0.8	-0.6	-0.2
0 ~ 20	-1.2	-1.0	-1.0	-0.9	-0.8	-0.7	-0.5	
20 ~ 40	-1.1	-0.9	-0.9	-0.8	-0.7	-0.6	-0.4	0.1
40 ~ 60	-1.0	-0.8	-0.8	-0.7	-0.6	-0.5	-0.3	0.3
60 ~ 80	-1.0	-0.7	-0.7	-0.6	-0.5	-0.3	-0.1	0.4

© OHARA GmbH – Hofheim – Germany