L-BAL35

Code(d) **589612**
Code(e) **591609**

Refractive Index	n_d	**1.58913**	Abbe Number	ν_d	**61.15**	Dispersion	n_F-n_C	**0.009634**
		1.589130						
Refractive Index	n_e	1.591428	Abbe Number	ν_e	60.93	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.60031
n_g	0.435835	1.60100
n_h	0.404656	1.60528
n_i	0.365015	1.61256

Constants of Dispersion Formula	
A_1	1.16262630E+00
A_2	3.25661051E-01
A_3	1.35132486E+00
B_1	1.25957437E-02
B_2	-3.26911050E-03
B_3	1.19214596E+02

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

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

Partial Dispersions	
n_C-n_t	0.008230
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		489
Annealing Point AP (℃)		520
Transformation Temperature Tg (℃)		527
Yield Point At (℃)		567
Softening Point SP (℃)		619
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	81
Thermal Conductivity λ W/(m·K)		1.13

Coloring			
λ_{80}	345	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	300

CCI		
B	G	R
0.00	0.23	0.20

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.06
310	0.27
320	0.53
330	0.73
340	0.85
350	0.922
360	0.956
370	0.975
380	0.984
390	0.989
400	0.992
420	0.993
440	0.993
460	0.995
480	0.996
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.997
1200	0.997
1400	0.991
1600	0.994
1800	0.989
2000	0.978
2200	0.934
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.29
Specific Gravity d	2.82
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-BAL35P

Code(d) **592610**
Code(e) **594608**

Refractive Index	n_d	**1.59208** 1.592080	Abbe Number	ν_d	**61.00**	Dispersion	n_F-n_C **0.009707**
Refractive Index	n_e	1.594396	Abbe Number	ν_e	60.77	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	0.6328	1.59002
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
$n_{He\text{-}Cd}$	0.44157	1.60335
n_g	0.435835	1.60404
n_h	0.404656	1.60836
n_i	0.365015	1.61570

Constants of Dispersion Formula	
A_1	8.06742194E-01
A_2	6.90488648E-01
A_3	1.26477947E+00
B_1	1.48836231E-02
B_2	2.51943058E-03
B_3	1.11314570E+02

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

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

Partial Dispersions	
n_C-n_t	0.008288
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		489
Annealing Point AP (℃)		520
Transformation Temperature Tg (℃)		527
Yield Point At (℃)		567
Softening Point SP (℃)		619
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	81
Thermal Conductivity λ W/(m·K)		1.13

Coloring			
λ_{80}	345	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	300

CCI		
B	G	R
0.00	0.23	0.20

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.06
310	0.27
320	0.53
330	0.73
340	0.85
350	0.922
360	0.956
370	0.975
380	0.984
390	0.989
400	0.992
420	0.993
440	0.993
460	0.995
480	0.996
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.997
1200	0.997
1400	0.991
1600	0.994
1800	0.989
2000	0.978
2200	0.934
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.29
Specific Gravity d	2.82
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-BAL42

Code(d) **583594**
Code(e) **585591**

Refractive Index	n_d	**1.58313**	Abbe Number	ν_d	**59.38**	Dispersion	n_F-n_C	**0.009820**
		1.583126						
Refractive Index	n_e	1.585468	Abbe Number	ν_e	59.13	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.59457
n_g	0.435835	1.59528
n_h	0.404656	1.59969
n_i	0.365015	1.60719

Constants of Dispersion Formula	
A_1	1.39528097E+00
A_2	7.25519520E-02
A_3	1.66335848E+00
B_1	1.11862030E-02
B_2	-2.46748575E-02
B_3	1.67717958E+02

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

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

Partial Dispersions	
n_C-n_t	0.008122
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		467
Annealing Point AP (℃)		494
Transformation Temperature Tg (℃)		506
Yield Point At (℃)		538
Softening Point SP (℃)		607
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	72
	(+100~+300℃)	88
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	282

CCI		
B	G	R
0.00	0.17	0.14

Internal Transmittance	
λ(nm)	τ 10mm
280	0.03
290	0.14
300	0.32
310	0.55
320	0.73
330	0.85
340	0.924
350	0.960
360	0.978
370	0.987
380	0.992
390	0.994
400	0.995
420	0.996
440	0.996
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.988
1600	0.993
1800	0.983
2000	0.968
2200	0.901
2400	0.83

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.19
Specific Gravity d	3.05
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-BAL42P

Code(d) **586592**
Code(e) **588590**

Refractive Index	n_d	**1.58593**	Abbe Number	ν_d	**59.24**	Dispersion	n_F-n_C	**0.009890**
		1.585930						
Refractive Index	n_e	1.588288	Abbe Number	ν_e	58.99	Dispersion	$n_{F'}$-$n_{C'}$	0.009972

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.59746
n_g	0.435835	1.59817
n_h	0.404656	1.60262
n_i	0.365015	1.61020

Constants of Dispersion Formula	
A_1	8.81090017E-01
A_2	5.95038859E-01
A_3	1.22582098E+00
B_1	1.48496655E-02
B_2	1.63577371E-03
B_3	1.25113720E+02

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

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

Partial Dispersions	
n_C-n_t	0.008169
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		467
Annealing Point AP (℃)		494
Transformation Temperature Tg (℃)		506
Yield Point At (℃)		538
Softening Point SP (℃)		607
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	72
	(+100~+300℃)	88
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	282

CCI		
B	G	R
0.00	0.17	0.14

Internal Transmittance	
λ(nm)	τ 10mm
280	0.03
290	0.14
300	0.32
310	0.55
320	0.73
330	0.85
340	0.924
350	0.960
360	0.978
370	0.987
380	0.992
390	0.994
400	0.995
420	0.996
440	0.996
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.988
1600	0.993
1800	0.983
2000	0.968
2200	0.901
2400	0.83

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.19
Specific Gravity d	3.05
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-BAL43

Code(d) **586597**
Code(e) **588594**

Refractive Index	n_d	**1.58573**	Abbe Number	ν_d	**59.70**	Dispersion	n_F-n_C	**0.009812**
		1.585730						
Refractive Index	n_e	1.588070	Abbe Number	ν_e	59.45	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.59716
n_g	0.435835	1.59786
n_h	0.404656	1.60227
n_i	0.365015	1.60976

Constants of Dispersion Formula	
A_1	1.04745291E+00
A_2	4.28452873E-01
A_3	1.14111303E+00
B_1	5.63209756E-03
B_2	1.88321416E-02
B_3	1.14197069E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	90.4	
Rigidity Modulus G (GPa)	36.2	
Poisson's Ratio σ	0.250	
Knoop Hardness Hk[Class]	610	6
Abrasion Aa	118	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		451
Annealing Point AP (℃)		482
Transformation Temperature Tg (℃)		493
Yield Point At (℃)		535
Softening Point SP (℃)		596
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	72
	(+100~+300℃)	90
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	340	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	328	$\lambda_{0.05}$	289

CCI		
B	G	R
0.00	0.10	0.10

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.29
310	0.51
320	0.70
330	0.83
340	0.906
350	0.949
360	0.971
370	0.983
380	0.988
390	0.990
400	0.996
420	0.997
440	0.996
460	0.998
480	0.999
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.993
1600	0.997
1800	0.988
2000	0.975
2200	0.914
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.18
Specific Gravity d	3.05
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-BSL 7

Code(d) **516641**
Code(e) **518638**

Refractive Index	n_d	**1.51633** 1.516330	Abbe Number	ν_d	**64.06**	Dispersion	n_F-n_C **0.008060**
Refractive Index	n_e	1.518253	Abbe Number	ν_e	63.87	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.52564
n_g	0.435835	1.52620
n_h	0.404656	1.52975
n_i	0.365015	1.53574

Constants of Dispersion Formula	
A_1	9.17473918E-01
A_2	3.52687665E-01
A_3	1.05579788E+00
B_1	5.27701411E-03
B_2	1.70809497E-02
B_3	1.04302583E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	79.3	
Rigidity Modulus G (GPa)	32.7	
Poisson's Ratio σ	0.214	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	72	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		464
Annealing Point AP (℃)		488
Transformation Temperature Tg (℃)		498
Yield Point At (℃)		549
Softening Point SP (℃)		630
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		1.17

Coloring			
λ_{80}	330	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	299

CCI		
B	G	R
0.00	0.08	0.09

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.08
310	0.40
320	0.71
330	0.87
340	0.942
350	0.973
360	0.986
370	0.992
380	0.994
390	0.996
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.974
1600	0.994
1800	0.988
2000	0.974
2200	0.87
2400	0.80

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.93
Specific Gravity d	2.38
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAH53

Code(d) **806409**
Code(e) **811407**

Refractive Index	n_d	**1.80625** 1.806250	Abbe Number	ν_d	**40.91**	Dispersion	n_F-n_C	**0.019709**
Refractive Index	n_e	1.810931	Abbe Number	ν_e	40.66	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82981
n_g	0.435835	1.83132
n_h	0.404656	1.84090
n_i	0.365015	1.85783

Constants of Dispersion Formula	
A_1	1.87409991E+00
A_2	2.97921402E-01
A_3	1.35064285E+00
B_1	9.93318344E-03
B_2	4.05501825E-02
B_3	1.00502200E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	115.1	
Rigidity Modulus G (GPa)	44.3	
Poisson's Ratio σ	0.298	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	83	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		534
Annealing Point AP (℃)		558
Transformation Temperature Tg (℃)		574
Yield Point At (℃)		607
Softening Point SP (℃)		646
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	59
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		0.862

Coloring			
λ_{80}	400	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	338

CCI		
B	G	R
0.00	0.88	0.94

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.16
350	0.47
360	0.70
370	0.83
380	0.89
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	0.73

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.88
Specific Gravity d	4.49
Remarks	

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L-LAH84

Code(d) **808405**
Code(e) **813403**

Refractive Index	n_d	**1.80835** 1.808350	Abbe Number	ν_d	**40.55**	Dispersion	n_F-n_C	**0.019936**
Refractive Index	n_e	1.813086	Abbe Number	ν_e	40.30	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.83219
n_g	0.435835	1.83372
n_h	0.404656	1.84340
n_i	0.365015	1.86048

Constants of Dispersion Formula	
A_1	1.83606127E+00
A_2	3.41720032E-01
A_3	1.35280173E+00
B_1	9.81969903E-03
B_2	3.85636264E-02
B_3	1.07045530E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	111.6	
Rigidity Modulus G (GPa)	42.8	
Poisson's Ratio σ	0.303	
Knoop Hardness Hk[Class]	610	6
Abrasion Aa	88	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		491
Annealing Point AP (℃)		515
Transformation Temperature Tg (℃)		527
Yield Point At (℃)		568
Softening Point SP (℃)		603
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	64
	(+100~+300℃)	79
Thermal Conductivity λ W/(m·K)		0.875

Coloring			
λ_{80}	400	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	364	$\lambda_{0.05}$	336

CCI		
B	G	R
0.00	0.75	0.77

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.20
350	0.54
360	0.76
370	0.87
380	0.922
390	0.950
400	0.965
420	0.979
440	0.985
460	0.990
480	0.993
500	0.996
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.992
2000	0.975
2200	0.942
2400	0.79

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.35
Specific Gravity d	4.62
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAH85V

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

Refractive Index	n_d	**1.85400** 1.854000	Abbe Number	ν_d	**40.38**	Dispersion	n_F-n_C	**0.021151**
Refractive Index	n_e	1.859025	Abbe Number	ν_e	40.13	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.87929
n_g	0.435835	1.88090
n_h	0.404656	1.89116
n_i	0.365015	1.90923

Constants of Dispersion Formula	
A_1	1.97460503E+00
A_2	3.61903592E-01
A_3	1.38433241E+00
B_1	1.01854258E-02
B_2	3.84829118E-02
B_3	1.03713627E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	111.5	
Rigidity Modulus G (GPa)	42.7	
Poisson's Ratio σ	0.306	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	65	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		613
Yield Point At (℃)		653
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	63
	(+100~+300℃)	77
Thermal Conductivity λ W/(m·K)		0.819

Coloring			
λ_{80}		λ_5	340
λ_{70}	380		

Internal transmission			
$\lambda_{0.80}$	373	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.17	1.20

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.05
350	0.30
360	0.58
370	0.77
380	0.86
390	0.915
400	0.944
420	0.971
440	0.981
460	0.987
480	0.992
500	0.995
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.998
1800	0.992
2000	0.973
2200	0.933
2400	0.77

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.83
Specific Gravity d	5.25
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAH90

Code(d) **832401**
Code(e) **837398**

Refractive Index	n_d	**1.83220**	Abbe Number	ν_d	**40.10**	Dispersion	n_F-n_C	**0.020755**
		1.832200						
Refractive Index	n_e	1.837128	Abbe Number	ν_e	39.84	Dispersion	$n_{F'}$-$n_{C'}$	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

Constants of Dispersion Formula	
A_1	1.97595301E+00
A_2	2.83924985E-01
A_3	1.35176368E+00
B_1	1.04276395E-02
B_2	4.27708222E-02
B_3	1.01453710E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.2
Phosphate Resistance PR	1.2

Mechanical Properties		
Young's Modulus E (GPa)	114.8	
Rigidity Modulus G (GPa)	44.0	
Poisson's Ratio σ	0.304	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	80	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		578
Annealing Point AP (℃)		597
Transformation Temperature Tg (℃)		607
Yield Point At (℃)		644
Softening Point SP (℃)		677
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	63
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.839

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	376	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.32	1.36

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.05
350	0.26
360	0.55
370	0.73
380	0.84
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	0.75

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.93
Specific Gravity d	4.65
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAH91

Code(d) **765491**
Code(e) **768488**

Refractive Index	n_d	**1.76450** 1.764500	Abbe Number	ν_d	**49.09**	Dispersion	n_F-n_C **0.015572**
Refractive Index	n_e	1.768208	Abbe Number	ν_e	48.85	Dispersion	$n_{F'}$-$n_{C'}$ 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

Constants of Dispersion Formula	
A_1	1.26144128E+00
A_2	7.82115273E-01
A_3	1.15823645E+00
B_1	5.72512582E-03
B_2	2.19829752E-02
B_3	8.80482200E+01

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

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

Partial Dispersions	
n_C-n_t	0.012232
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		578
Annealing Point AP (℃)		599
Transformation Temperature Tg (℃)		611
Yield Point At (℃)		644
Softening Point SP (℃)		676
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.841

Coloring			
λ_{80}	365	λ_5	275
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	333	$\lambda_{0.05}$	274

CCI		
B	G	R
0.00	0.30	0.31

Internal Transmittance	
λ(nm)	τ 10mm
280	0.15
290	0.32
300	0.46
310	0.59
320	0.69
330	0.78
340	0.85
350	0.902
360	0.937
370	0.954
380	0.973
390	0.981
400	0.986
420	0.991
440	0.993
460	0.996
480	0.997
500	0.998
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.988
2000	0.963
2200	0.905
2400	0.67

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.71
Specific Gravity d	4.29
Remarks	

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L-LAH94

Code(d) **861371**
Code(e) **867368**

Refractive Index	n_d	**1.86100** 1.861000	Abbe Number	ν_d	**37.10**	Dispersion	n_F-n_C	**0.023209**
Refractive Index	n_e	1.866504	Abbe Number	ν_e	36.85	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	2.00621420E+00
A_2	3.47029888E-01
A_3	1.41688382E+00
B_1	1.05499238E-02
B_2	4.45845013E-02
B_3	1.05995250E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	112.1	
Rigidity Modulus G (GPa)	43.0	
Poisson's Ratio σ	0.305	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	81	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	0.0019
$\Delta\theta_{g,d}$	-0.0038
$\Delta\theta_{g,F}$	-0.0029
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		560
Annealing Point AP (℃)		583
Transformation Temperature Tg (℃)		593
Yield Point At (℃)		628
Softening Point SP (℃)		664
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	62
	(+100~+300℃)	77
Thermal Conductivity λ W/(m·K)		0.817

Coloring			
λ_{80}		λ_5	350
λ_{70}	390		

Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	349

CCI		
B	G	R
0.00	1.80	1.88

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.31
370	0.58
380	0.75
390	0.85
400	0.908
420	0.957
440	0.975
460	0.983
480	0.989
500	0.993
550	0.998
600	0.998
650	0.999
700	0.999
800	0.999
900	0.998
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.989
2000	0.970
2200	0.923
2400	0.74

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.71
Specific Gravity d	4.89
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAL13

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

Refractive Index	n_d	**1.69350** 1.693500	Abbe Number	ν_d	**53.18**	Dispersion	n_F-n_C **0.013040**
Refractive Index	n_e	1.696607	Abbe Number	ν_e	52.93	Dispersion	$n_{F'}$-$n_{C'}$ 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

Constants of Dispersion Formula	
A_1	1.17776146E+00
A_2	6.34591345E-01
A_3	1.20435649E+00
B_1	5.57618243E-03
B_2	2.06821469E-02
B_3	9.96322776E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	107.8	
Rigidity Modulus G (GPa)	41.9	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	620	6
Abrasion Aa	108	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		503
Annealing Point AP (℃)		522
Transformation Temperature Tg (℃)		534
Yield Point At (℃)		575
Softening Point SP (℃)		615
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	76
	(+100~+300℃)	92
Thermal Conductivity λ W/(m·K)		0.887

Coloring			
λ_{80}	360	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	288

CCI		
B	G	R
0.00	0.35	0.32

Internal Transmittance	
λ(nm)	τ 10mm
280	0.01
290	0.06
300	0.15
310	0.28
320	0.45
330	0.61
340	0.74
350	0.84
360	0.913
370	0.949
380	0.969
390	0.979
400	0.984
420	0.989
440	0.991
460	0.993
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.995
1800	0.988
2000	0.969
2200	0.918
2400	0.72

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.91
Specific Gravity d	3.69
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-LAL15

Code(d) **693529**
Code(e) **696527**

Refractive Index	n_d	**1.69304** 1.693040	Abbe Number	ν_d	**52.93**	Dispersion	n_F-n_C	**0.013093**
Refractive Index	n_e	1.696160	Abbe Number	ν_e	52.70	Dispersion	$n_{F'}$-$n_{C'}$	0.013210

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.70837
n_g	0.435835	1.70932
n_h	0.404656	1.71528
n_i	0.365015	1.72550

Constants of Dispersion Formula	
A_1	1.07959634E+00
A_2	7.31872134E-01
A_3	1.17111107E+00
B_1	4.70047543E-03
B_2	1.98615758E-02
B_3	8.70359900E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	110.3	
Rigidity Modulus G (GPa)	42.7	
Poisson's Ratio σ	0.291	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	82	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		494
Annealing Point AP (℃)		515
Transformation Temperature Tg (℃)		525
Yield Point At (℃)		562
Softening Point SP (℃)		596
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	54
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		0.923

Coloring			
λ_{80}	345	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	320	$\lambda_{0.05}$	

CCI		
B	G	R
0.00	0.14	0.14

Internal Transmittance	
λ(nm)	τ 10mm
280	0.39
290	0.53
300	0.64
310	0.73
320	0.80
330	0.87
340	0.916
350	0.948
360	0.968
370	0.980
380	0.987
390	0.991
400	0.993
420	0.995
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.990
1600	0.991
1800	0.979
2000	0.949
2200	0.85
2400	0.59

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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	7.9	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.44
Specific Gravity d	3.66
Remarks	

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L-LAM60

Code(d) **743493**
Code(e) **747490**

Refractive Index	n_d	**1.74320** 1.743198	Abbe Number	ν_d	**49.29**	Dispersion	n_F-n_C **0.015077**
Refractive Index	n_e	1.746788	Abbe Number	ν_e	49.05	Dispersion	$n_{F'}$-$n_{C'}$ 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

Constants of Dispersion Formula	
A_1	1.47574184E+00
A_2	4.96132743E-01
A_3	1.23796236E+00
B_1	7.36950000E-03
B_2	2.51891746E-02
B_3	9.80306651E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	114.7	
Rigidity Modulus G (GPa)	44.5	
Poisson's Ratio σ	0.289	
Knoop Hardness Hk[Class]	620	6
Abrasion Aa	92	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		511
Annealing Point AP (℃)		533
Transformation Temperature Tg (℃)		541
Yield Point At (℃)		581
Softening Point SP (℃)		623
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	74
	(+100~+300℃)	92
Thermal Conductivity λ W/(m·K)		0.876

Coloring			
λ_{80}	370	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	308

CCI		
B	G	R
0.00	0.37	0.38

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.09
320	0.33
330	0.56
340	0.72
350	0.83
360	0.904
370	0.944
380	0.965
390	0.977
400	0.983
420	0.988
440	0.991
460	0.993
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.991
2000	0.974
2200	0.936
2400	0.75

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.83
Specific Gravity d	4.20
Remarks	

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L-LAM69

Code(d) **731405**
Code(e) **735403**

Refractive Index	n_d	**1.73077**	Abbe Number	ν_d	**40.51**	Dispersion	n_F-n_C	**0.018040**
		1.730770						
Refractive Index	n_e	1.735051	Abbe Number	ν_e	40.25	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.75240
n_g	0.435835	1.75379
n_h	0.404656	1.76267
n_i	0.365015	1.77858

Constants of Dispersion Formula	
A_1	1.74038960E+00
A_2	1.76996917E-01
A_3	1.76775413E+00
B_1	1.03398870E-02
B_2	4.84822765E-02
B_3	1.36671996E+02

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

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

Partial Dispersions	
n_C-n_t	0.013567
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		461
Annealing Point AP (℃)		489
Transformation Temperature Tg (℃)		497
Yield Point At (℃)		529
Softening Point SP (℃)		574
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	86
	(+100~+300℃)	105
Thermal Conductivity λ W/(m·K)		1.11

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.88	1.91

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.04
350	0.26
360	0.53
370	0.71
380	0.81
390	0.87
400	0.910
420	0.947
440	0.963
460	0.974
480	0.983
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.997
1600	0.995
1800	0.987
2000	0.971
2200	0.925
2400	0.76

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.03
Specific Gravity d	3.24
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-TIM28

Code(d) **689310**
Code(e) **695308**

Refractive Index	n_d	**1.68948** 1.689480	Abbe Number	ν_d	**31.02**	Dispersion	n_F-n_C **0.022225**
Refractive Index	n_e	1.694731	Abbe Number	ν_e	30.78	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.71674
n_g	0.435835	1.71856
n_h	0.404656	1.73034
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.52780829E+00
A_2	2.32776367E-01
A_3	1.71638781E+00
B_1	1.14135883E-02
B_2	5.59068566E-02
B_3	1.71511800E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.5	
Rigidity Modulus G (GPa)	33.7	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	530	5
Abrasion Aa	217	

Partial Dispersions	
n_C-n_t	0.015462
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	0.011872
n_i-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0035
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0080
$\Delta\theta_{g,F}$	0.0074
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		453
Annealing Point AP (℃)		484
Transformation Temperature Tg (℃)		504
Yield Point At (℃)		539
Softening Point SP (℃)		582
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	101
	(+100~+300℃)	130
Thermal Conductivity λ W/(m·K)		1.02

Coloring			
λ_{80}	400	λ_5	355
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	352

CCI		
B	G	R
0.00	1.29	1.27

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.21
370	0.60
380	0.82
390	0.903
400	0.940
420	0.969
440	0.979
460	0.984
480	0.988
500	0.991
550	0.997
600	0.996
650	0.995
700	0.997
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.995
1800	0.980
2000	0.962
2200	0.927
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.62
Specific Gravity d	2.88
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

L-TIM28P

Code(d) **695307**
Code(e) **700304**

Refractive Index	n_d	**1.69453** 1.694530	Abbe Number	ν_d	**30.66**	Dispersion	n_F-n_C **0.022656**
Refractive Index	n_e	1.699883	Abbe Number	ν_e	30.42	Dispersion	$n_{F'}$-$n_{C'}$ 0.023009

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.72233
n_g	0.435835	1.72419
n_h	0.404656	1.73622
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.53013396E+00
A_2	2.45362280E-01
A_3	1.78233031E+00
B_1	1.14236857E-02
B_2	5.55101852E-02
B_3	1.79074300E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.5	
Rigidity Modulus G (GPa)	33.7	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	530	5
Abrasion Aa	217	

Partial Dispersions	
n_C-n_t	0.015711
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0030
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	0.0080
$\Delta\theta_{g,F}$	0.0073
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		453
Annealing Point AP (℃)		484
Transformation Temperature Tg (℃)		504
Yield Point At (℃)		539
Softening Point SP (℃)		582
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	101
	(+100~+300℃)	130
Thermal Conductivity λ W/(m·K)		1.02

Coloring			
λ_{80}	400	λ_5	355
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	379	$\lambda_{0.05}$	352

CCI		
B	G	R
0.00	1.29	1.27

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.21
370	0.60
380	0.82
390	0.903
400	0.940
420	0.969
440	0.979
460	0.984
480	0.988
500	0.991
550	0.997
600	0.996
650	0.995
700	0.997
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.995
1800	0.980
2000	0.962
2200	0.927
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.62
Specific Gravity d	2.88
Remarks	

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S-BAH10

Code(d) **670473**
Code(e) **673470**

Refractive Index	n_d	**1.67003** 1.670029	Abbe Number	ν_d	**47.23**	Dispersion	n_F-n_C	**0.014186**
Refractive Index	n_e	1.673402	Abbe Number	ν_e	46.94	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.68689
n_g	0.435835	1.68796
n_h	0.404656	1.69473
n_i	0.365015	1.70663

Constants of Dispersion Formula	
A_1	1.59034337E+00
A_2	1.38464579E-01
A_3	1.21988043E+00
B_1	9.32734340E-03
B_2	4.27498654E-02
B_3	1.19251777E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	96.2	
Rigidity Modulus G (GPa)	37.8	
Poisson's Ratio σ	0.273	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	140	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		584
Annealing Point AP (℃)		612
Transformation Temperature Tg (℃)		623
Yield Point At (℃)		669
Softening Point SP (℃)		734
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	68
	(+100~+300℃)	80
Thermal Conductivity λ W/(m·K)		0.902

Coloring			
λ_{80}	390	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	342

CCI		
B	G	R
0.00	1.25	1.25

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.01
350	0.19
360	0.48
370	0.70
380	0.83
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	0.85

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.12
Specific Gravity d	3.48
Remarks	

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S-BAH11

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

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.68309
n_g	0.435835	1.68412
n_h	0.404656	1.69067
n_i	0.365015	1.70213

Constants of Dispersion Formula	
A_1	1.57138860E+00
A_2	1.47869313E-01
A_3	1.28092846E+00
B_1	9.10807936E-03
B_2	4.02401684E-02
B_3	1.30399367E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	92.9	
Rigidity Modulus G (GPa)	36.5	
Poisson's Ratio σ	0.274	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	153	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		593
Annealing Point AP (℃)		617
Transformation Temperature Tg (℃)		629
Yield Point At (℃)		675
Softening Point SP (℃)		738
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	69
	(+100~+300℃)	82
Thermal Conductivity λ W/(m·K)		0.858

Coloring			
λ_{80}	380	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	0.98	0.94

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.04
350	0.27
360	0.56
370	0.75
380	0.86
390	0.922
400	0.952
420	0.975
440	0.982
460	0.987
480	0.991
500	0.994
550	0.997
600	0.995
650	0.995
700	0.996
800	0.997
900	0.997
1000	0.997
1200	0.998
1400	0.994
1600	0.995
1800	0.988
2000	0.976
2200	0.936
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.06
Specific Gravity d	3.59
Remarks	

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S-BAH27

Code(d) **702412**
Code(e) **706410**

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

Constants of Dispersion Formula	
A_1	1.68939052E+00
A_2	1.33081013E-01
A_3	1.41165515E+00
B_1	1.03598193E-02
B_2	5.33982239E-02
B_3	1.26515503E+02

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

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

Partial Dispersions	
n_C-n_t	0.012641
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		611
Annealing Point AP (℃)		636
Transformation Temperature Tg (℃)		647
Yield Point At (℃)		682
Softening Point SP (℃)		749
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	64
	(+100~+300℃)	75
Thermal Conductivity λ W/(m·K)		0.869

Coloring			
λ_{80}	400	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	388	$\lambda_{0.05}$	356

CCI		
B	G	R
0.00	1.99	2.01

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.16
370	0.47
380	0.70
390	0.83
400	0.89
420	0.955
440	0.971
460	0.979
480	0.985
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.993
1600	0.994
1800	0.987
2000	0.974
2200	0.921
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.18
Specific Gravity d	3.67
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BAH28

Code(d) **723380**
Code(e) **728377**

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

Constants of Dispersion Formula	
A_1	1.69493484E+00
A_2	1.92890298E-01
A_3	1.56385948E+00
B_1	1.02723190E-02
B_2	5.21187640E-02
B_3	1.37818035E+02

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

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

Partial Dispersions	
n_C-n_t	0.013857
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0023
$\Delta\theta_{C,A'}$	0.0006
$\Delta\theta_{g,d}$	0.0037
$\Delta\theta_{g,F}$	0.0035
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		599
Annealing Point AP (℃)		626
Transformation Temperature Tg (℃)		643
Yield Point At (℃)		676
Softening Point SP (℃)		739
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	73
Thermal Conductivity λ W/(m·K)		0.889

Coloring			
λ_{80}	415	λ_5	355
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	2.78	2.88

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.06
370	0.32
380	0.58
390	0.75
400	0.85
420	0.934
440	0.963
460	0.975
480	0.982
500	0.987
550	0.994
600	0.995
650	0.995
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.994
1600	0.995
1800	0.990
2000	0.979
2200	0.938
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.31
Specific Gravity d	3.67
Remarks	

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S-BAL 2

Code(d) **571508**
Code(e) **574505**

Refractive Index	n_d	**1.57099** 1.570989	Abbe Number	ν_d	**50.80**	Dispersion	n_F-n_C	**0.011240**
Refractive Index	n_e	1.573663	Abbe Number	ν_e	50.50	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.58430
n_g	0.435835	1.58514
n_h	0.404656	1.59045
n_i	0.365015	1.59972

Constants of Dispersion Formula	
A_1	1.30923813E+00
A_2	1.14137353E-01
A_3	1.17882259E+00
B_1	8.38873953E-03
B_2	3.99436485E-02
B_3	1.40257892E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	72.7	
Rigidity Modulus G (GPa)	29.2	
Poisson's Ratio σ	0.245	
Knoop Hardness Hk[Class]	510	5
Abrasion Aa	174	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		492
Annealing Point AP (℃)		525
Transformation Temperature Tg (℃)		540
Yield Point At (℃)		582
Softening Point SP (℃)		663
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	91
	(+100~+300℃)	109
Thermal Conductivity λ W/(m·K)		0.901

Coloring			
λ_{80}	370	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	363	$\lambda_{0.05}$	339

CCI		
B	G	R
0.00	0.33	0.34

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.10
350	0.47
360	0.76
370	0.89
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	0.89
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-0.7	-0.3	-0.3	-0.2	0.0	0.4	0.7
-20~ 0	-0.7	-0.3	-0.3	-0.1	0.0	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	0.0	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.32
Specific Gravity d	2.89
Remarks	

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S-BAL 3

Code(d) **571530**
Code(e) **574527**

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

Constants of Dispersion Formula	
A_1	1.29366890E+00
A_2	1.32440252E-01
A_3	1.10197293E+00
B_1	8.00367962E-03
B_2	3.54711196E-02
B_3	1.34517431E+02

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

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

Partial Dispersions	
n_C-n_t	0.008456
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		483
Annealing Point AP (℃)		516
Transformation Temperature Tg (℃)		531
Yield Point At (℃)		573
Softening Point SP (℃)		652
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	95
	(+100~+300℃)	111
Thermal Conductivity λ W/(m·K)		0.864

Coloring			
λ_{80}	360	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	332

CCI		
B	G	R
0.00	0.24	0.25

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.01
340	0.26
350	0.63
360	0.84
370	0.928
380	0.963
390	0.979
400	0.988
420	0.994
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.997
1200	0.996
1400	0.991
1600	0.990
1800	0.972
2000	0.945
2200	0.88
2400	0.83

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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	0.0	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.18
Specific Gravity d	2.98
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BAL12

Code(d) **540595**
Code(e) **542592**

Refractive Index	n_d	**1.53996**	Abbe Number	ν_d	**59.46**	Dispersion	n_F-n_C	**0.009081**
		1.539956						
Refractive Index	n_e	1.542121	Abbe Number	ν_e	59.20	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.55056
n_g	0.435835	1.55122
n_h	0.404656	1.55532
n_i	0.365015	1.56232

Constants of Dispersion Formula	
A_1	7.14605258E-01
A_2	6.21993289E-01
A_3	1.22537681E+00
B_1	3.01763913E-03
B_2	1.66505450E-02
B_3	1.43506314E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	71.0	
Rigidity Modulus G (GPa)	30.6	
Poisson's Ratio σ	0.161	
Knoop Hardness Hk[Class]	520	5
Abrasion Aa	112	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		432
Annealing Point AP (℃)		468
Transformation Temperature Tg (℃)		478
Yield Point At (℃)		527
Softening Point SP (℃)		624
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	86
	(+100~+300℃)	102
Thermal Conductivity λ W/(m·K)		0.982

Coloring			
λ_{80}	330	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	330	$\lambda_{0.05}$	301

CCI		
B	G	R
0.00	0.09	0.06

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.02
310	0.23
320	0.57
330	0.80
340	0.914
350	0.959
360	0.979
370	0.989
380	0.992
390	0.995
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.993
1600	0.995
1800	0.983
2000	0.966
2200	0.920
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.60
Specific Gravity d	2.75
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BAL14

Code(d) **569563**
Code(e) **571561**

Refractive Index	n_d	**1.56883**	Abbe Number	ν_d	**56.36**	Dispersion	n_F-n_C	**0.010092**
		1.568832						
Refractive Index	n_e	1.571237	Abbe Number	ν_e	56.09	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.58067
n_g	0.435835	1.58141
n_h	0.404656	1.58604
n_i	0.365015	1.59400

Constants of Dispersion Formula	
A_1	1.27553696E+00
A_2	1.46083393E-01
A_3	1.16754699E+00
B_1	7.49692359E-03
B_2	3.10421530E-02
B_3	1.28947092E+02

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

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

Partial Dispersions	
n_C-n_t	0.008164
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		533
Annealing Point AP (℃)		562
Transformation Temperature Tg (℃)		580
Yield Point At (℃)		622
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	80
	(+100~+300℃)	93
Thermal Conductivity λ W/(m·K)		0.967

Coloring			
λ_{80}	360	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	354	$\lambda_{0.05}$	329

CCI		
B	G	R
0.00	0.26	0.24

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.09
340	0.44
350	0.74
360	0.88
370	0.946
380	0.970
390	0.983
400	0.989
420	0.992
440	0.993
460	0.994
480	0.995
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.997
1200	0.997
1400	0.989
1600	0.993
1800	0.983
2000	0.967
2200	0.914
2400	0.86

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.32
Specific Gravity d	2.89
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BAL35

Code(d) **589612**
Code(e) **591609**

Refractive Index	n_d	**1.58913**	Abbe Number	ν_d	**61.14**	Dispersion	n_F-n_C	**0.009636**
		1.589130						
Refractive Index	n_e	1.591429	Abbe Number	ν_e	60.88	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.60034
n_g	0.435835	1.60103
n_h	0.404656	1.60535
n_i	0.365015	1.61268

Constants of Dispersion Formula	
A_1	9.41357273E-01
A_2	5.46174895E-01
A_3	1.16168917E+00
B_1	1.40333996E-02
B_2	9.06635683E-04
B_3	1.14163758E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2～3
Acid Resistance(Surface) Group SR	4.2
Phosphate Resistance PR	1.0

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

Partial Dispersions	
n_C-n_t	0.008061
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		619
Annealing Point AP (℃)		646
Transformation Temperature Tg (℃)		669
Yield Point At (℃)		709
Softening Point SP (℃)		768
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	67
Thermal Conductivity λ W/(m·K)		0.915

Coloring			
λ_{80}	345	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	339	$\lambda_{0.05}$	303

CCI		
B	G	R
0.00	0.17	0.15

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.01
310	0.16
320	0.43
330	0.67
340	0.82
350	0.904
360	0.949
370	0.972
380	0.983
390	0.989
400	0.993
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.999
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.984
1600	0.994
1800	0.987
2000	0.972
2200	0.89
2400	0.80

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.15
Specific Gravity d	3.31
Remarks	

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S-BAL42

Code(d) **583594**
Code(e) **585591**

Refractive Index	n_d	**1.58313**	Abbe Number	ν_d	**59.38**	Dispersion	n_F-n_C	**0.009821**
		1.583126						
Refractive Index	n_e	1.585468	Abbe Number	ν_e	59.11	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.59459
n_g	0.435835	1.59530
n_h	0.404656	1.59972
n_i	0.365015	1.60724

Constants of Dispersion Formula	
A_1	1.39570615E+00
A_2	7.18505070E-02
A_3	1.27129267E+00
B_1	1.12218843E-02
B_2	-2.52117422E-02
B_3	1.34497860E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.7	
Rigidity Modulus G (GPa)	34.0	
Poisson's Ratio σ	0.246	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	121	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		503
Annealing Point AP (℃)		534
Transformation Temperature Tg (℃)		550
Yield Point At (℃)		588
Softening Point SP (℃)		672
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	76
Thermal Conductivity λ W/(m·K)		0.974

Coloring			
λ_{80}	340	λ_5	290
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	292

CCI		
B	G	R
0.00	0.16	0.14

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.03
300	0.15
310	0.36
320	0.58
330	0.75
340	0.86
350	0.932
360	0.964
370	0.979
380	0.986
390	0.991
400	0.993
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.998
900	0.997
1000	0.997
1200	0.997
1400	0.987
1600	0.994
1800	0.985
2000	0.973
2200	0.917
2400	0.86

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.20
Specific Gravity d	3.19
Remarks	

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S-BAM 4

Code(d) **606437**
Code(e) **609434**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.62222
n_g	0.435835	1.62329
n_h	0.404656	1.63010
n_i	0.365015	1.64228

Constants of Dispersion Formula	
A_1	1.41059317E+00
A_2	1.11201306E-01
A_3	1.34148939E+00
B_1	9.63312192E-03
B_2	4.98778210E-02
B_3	1.52237696E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	76.2	
Rigidity Modulus G (GPa)	30.6	
Poisson's Ratio σ	0.244	
Knoop Hardness Hk[Class]	520	5
Abrasion Aa	159	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		548
Annealing Point AP (℃)		577
Transformation Temperature Tg (℃)		599
Yield Point At (℃)		641
Softening Point SP (℃)		722
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	84
	(+100~+300℃)	97
Thermal Conductivity λ W/(m·K)		0.931

Coloring			
λ_{80}	380	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	350

CCI		
B	G	R
0.00	0.69	0.65

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.41
370	0.72
380	0.87
390	0.938
400	0.965
420	0.986
440	0.991
460	0.991
480	0.993
500	0.995
550	0.998
600	0.997
650	0.996
700	0.997
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.994
1800	0.980
2000	0.962
2200	0.919
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.41
Specific Gravity d	2.91
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BAM12

Code(d) **639449**
Code(e) **643446**

Refractive Index	n_d	**1.63930**	Abbe Number	ν_d	**44.87**	Dispersion	n_F-n_C	**0.014247**
		1.639300						
Refractive Index	n_e	1.642684	Abbe Number	ν_e	44.59	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.65631
n_g	0.435835	1.65740
n_h	0.404656	1.66433
n_i	0.365015	1.67665

Constants of Dispersion Formula	
A_1	1.50161605E+00
A_2	1.26987445E-01
A_3	1.43544052E+00
B_1	9.40761826E-03
B_2	4.72602195E-02
B_3	1.41666499E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	90.4	
Rigidity Modulus G (GPa)	36.1	
Poisson's Ratio σ	0.253	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	154	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		565
Annealing Point AP (℃)		592
Transformation Temperature Tg (℃)		608
Yield Point At (℃)		645
Softening Point SP (℃)		717
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	76
	(+100~+300℃)	91
Thermal Conductivity λ W/(m·K)		0.954

Coloring			
λ_{80}	385	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	348

CCI		
B	G	R
0.00	0.93	0.93

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.13
360	0.49
370	0.75
380	0.87
390	0.928
400	0.955
420	0.977
440	0.983
460	0.987
480	0.990
500	0.993
550	0.997
600	0.996
650	0.996
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.992
1600	0.995
1800	0.987
2000	0.976
2200	0.932
2400	0.86

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.30
Specific Gravity d	3.18
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BSL 7

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

Refractive Index	n_d	**1.51633** 1.516330	Abbe Number	ν_d	**64.14**	Dispersion	n_F-n_C **0.008050**
Refractive Index	n_e	1.518251	Abbe Number	ν_e	63.93	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.52564
n_g	0.435835	1.52621
n_h	0.404656	1.52977
n_i	0.365015	1.53578

Constants of Dispersion Formula	
A_1	1.15150190E+00
A_2	1.18583612E-01
A_3	1.26301359E+00
B_1	1.05984130E-02
B_2	-1.18225190E-02
B_3	1.29617662E+02

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

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

Partial Dispersions	
n_C-n_t	0.006993
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		532
Annealing Point AP (℃)		563
Transformation Temperature Tg (℃)		576
Yield Point At (℃)		625
Softening Point SP (℃)		718
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	72
	(+100~+300℃)	86
Thermal Conductivity λ W/(m·K)		1.13

Coloring			
λ_{80}	320	λ_5	280
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	315	$\lambda_{0.05}$	278

CCI		
B	G	R
0.00	0.06	0.04

Internal Transmittance	
λ(nm)	τ 10mm
280	0.06
290	0.25
300	0.52
310	0.74
320	0.87
330	0.936
340	0.969
350	0.984
360	0.991
370	0.994
380	0.995
390	0.997
400	0.998
420	0.998
440	0.997
460	0.997
480	0.997
500	0.998
550	0.999
600	0.999
650	0.998
700	0.999
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.973
1600	0.989
1800	0.968
2000	0.933
2200	0.82
2400	0.77

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.79
Specific Gravity d	2.52
Remarks	

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S-BSM 2

Code(d) **607568**
Code(e) **610565**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.61992
n_g	0.435835	1.62070
n_h	0.404656	1.62558
n_i	0.365015	1.63394

Constants of Dispersion Formula	
A_1	8.67168676E-01
A_2	6.72848343E-01
A_3	1.18456107E+00
B_1	3.69311003E-03
B_2	1.81652804E-02
B_3	1.32376147E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	78.0	
Rigidity Modulus G (GPa)	30.9	
Poisson's Ratio σ	0.264	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	139	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		612
Annealing Point AP (℃)		643
Transformation Temperature Tg (℃)		654
Yield Point At (℃)		690
Softening Point SP (℃)		778
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	65
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.802

Coloring			
λ_{80}	350	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	343	$\lambda_{0.05}$	310

CCI		
B	G	R
0.00	0.26	0.25

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.04
320	0.27
330	0.57
340	0.77
350	0.88
360	0.941
370	0.967
380	0.981
390	0.987
400	0.991
420	0.991
440	0.990
460	0.991
480	0.993
500	0.995
550	0.997
600	0.997
650	0.996
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.994
1600	0.997
1800	0.992
2000	0.984
2200	0.951
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.26
Specific Gravity d	3.53
Remarks	

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S-BSM10

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

Refractive Index	n_d	**1.62280**	Abbe Number	ν_d	**57.05**	Dispersion	n_F-n_C	**0.010916**
		1.622799						
Refractive Index	n_e	1.625401	Abbe Number	ν_e	56.78	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.63558
n_g	0.435835	1.63637
n_h	0.404656	1.64133
n_i	0.365015	1.64980

Constants of Dispersion Formula	
A_1	9.45443081E-01
A_2	6.43237376E-01
A_3	1.17752968E+00
B_1	1.57263798E-02
B_2	1.61924066E-03
B_3	1.21361748E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	83.5	
Rigidity Modulus G (GPa)	33.0	
Poisson's Ratio σ	0.266	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	134	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		622
Annealing Point AP (℃)		650
Transformation Temperature Tg (℃)		668
Yield Point At (℃)		709
Softening Point SP (℃)		773
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	65
	(+100~+300℃)	76
Thermal Conductivity λ W/(m·K)		0.822

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	345	$\lambda_{0.05}$	309

CCI		
B	G	R
0.00	0.17	0.15

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.08
320	0.31
330	0.57
340	0.75
350	0.86
360	0.929
370	0.962
380	0.977
390	0.986
400	0.991
420	0.994
440	0.995
460	0.996
480	0.997
500	0.998
550	0.998
600	0.998
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.997
1200	0.997
1400	0.990
1600	0.993
1800	0.985
2000	0.971
2200	0.913
2400	0.82

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.88
Specific Gravity d	3.60
Remarks	

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S-BSM14

Code(d) **603607**
Code(e) **605604**

Refractive Index	n_d	**1.60311** 1.603112	Abbe Number	ν_d **60.64**	Dispersion	n_F-n_C **0.009945**
Refractive Index	n_e	1.605484	Abbe Number	ν_e 60.39	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.61470
n_g	0.435835	1.61541
n_h	0.404656	1.61987
n_i	0.365015	1.62745

Constants of Dispersion Formula	
A_1	1.28286270E+00
A_2	2.47647429E-01
A_3	1.10383999E+00
B_1	1.22902399E-02
B_2	-6.13142361E-03
B_3	1.06883378E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.9	
Rigidity Modulus G (GPa)	33.8	
Poisson's Ratio σ	0.257	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	126	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		614
Annealing Point AP (℃)		641
Transformation Temperature Tg (℃)		663
Yield Point At (℃)		698
Softening Point SP (℃)		757
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	62
	(+100~+300℃)	73
Thermal Conductivity λ W/(m·K)		0.891

Coloring			
λ_{80}	350	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	339	$\lambda_{0.05}$	306

CCI		
B	G	R
0.00	0.19	0.20

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.17
320	0.45
330	0.68
340	0.82
350	0.906
360	0.948
370	0.968
380	0.980
390	0.987
400	0.991
420	0.994
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.990
1600	0.995
1800	0.988
2000	0.976
2200	0.919
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.01
Specific Gravity d	3.43
Remarks	

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S-BSM15

Code(d) **623582**
Code(e) **626579**

Refractive Index	n_d	**1.62299** 1.622992	Abbe Number	ν_d	**58.16**	Dispersion	n_F-n_C	**0.010711**
Refractive Index	n_e	1.625545	Abbe Number	ν_e	57.89	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.63552
n_g	0.435835	1.63630
n_h	0.404656	1.64116
n_i	0.365015	1.64948

Constants of Dispersion Formula	
A_1	9.53128328E-01
A_2	6.37613977E-01
A_3	1.65245647E+00
B_1	3.87638985E-03
B_2	1.85094632E-02
B_3	1.59442367E+02

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

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

Partial Dispersions	
n_C-n_t	0.008741
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		615
Annealing Point AP (℃)		639
Transformation Temperature Tg (℃)		658
Yield Point At (℃)		685
Softening Point SP (℃)		746
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	65
	(+100~+300℃)	78
Thermal Conductivity λ W/(m·K)		0.845

Coloring			
λ_{80}	360	λ_5	320
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	327

CCI		
B	G	R
0.00	0.32	0.30

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.13
340	0.44
350	0.70
360	0.85
370	0.926
380	0.959
390	0.976
400	0.985
420	0.991
440	0.992
460	0.994
480	0.995
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.991
1600	0.994
1800	0.987
2000	0.973
2200	0.918
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.80
Specific Gravity d	3.60
Remarks	

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S-BSM16

Code(d) **620603**
Code(e) **623601**

Refractive Index	n_d	**1.62041** 1.620411	Abbe Number	ν_d **60.29**	Dispersion	n_F-n_C **0.010290**
Refractive Index	n_e	1.622865	Abbe Number	ν_e 60.03	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.63241
n_g	0.435835	1.63315
n_h	0.404656	1.63778
n_i	0.365015	1.64567

Constants of Dispersion Formula	
A_1	1.14490383E+00
A_2	4.39563911E-01
A_3	1.27688079E+00
B_1	1.37034916E-02
B_2	-1.86514205E-03
B_3	1.19535585E+02

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

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

Partial Dispersions	
n_C-n_t	0.008531
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		606
Annealing Point AP (℃)		634
Transformation Temperature Tg (℃)		657
Yield Point At (℃)		689
Softening Point SP (℃)		738
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	67
	(+100~+300℃)	76
Thermal Conductivity λ W/(m·K)		0.835

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	346	$\lambda_{0.05}$	312

CCI		
B	G	R
0.00	0.28	0.23

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.01
320	0.18
330	0.49
340	0.72
350	0.85
360	0.924
370	0.959
380	0.976
390	0.984
400	0.989
420	0.992
440	0.993
460	0.994
480	0.996
500	0.997
550	0.999
600	0.998
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.992
1600	0.995
1800	0.987
2000	0.972
2200	0.911
2400	0.79

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.81
Specific Gravity d	3.59
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BSM18

Code(d) **639554**
Code(e) **641551**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.65207
n_g	0.435835	1.65291
n_h	0.404656	1.65818
n_i	0.365015	1.66720

Constants of Dispersion Formula	
A_1	9.27886025E-01
A_2	7.08858526E-01
A_3	1.18610897E+00
B_1	4.17549199E-03
B_2	1.84691838E-02
B_3	1.22210416E+02

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

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

Partial Dispersions	
n_C-n_t	0.009188
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		567
Annealing Point AP (℃)		600
Transformation Temperature Tg (℃)		613
Yield Point At (℃)		655
Softening Point SP (℃)		717
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	70
	(+100~+300℃)	84
Thermal Conductivity λ W/(m·K)		0.815

Coloring			
λ_{80}	350	λ_5	305
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	345	$\lambda_{0.05}$	309

CCI		
B	G	R
0.00	0.21	0.22

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.08
320	0.31
330	0.57
340	0.75
350	0.86
360	0.929
370	0.961
380	0.977
390	0.985
400	0.990
420	0.993
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.997
1200	0.997
1400	0.993
1600	0.994
1800	0.986
2000	0.973
2200	0.924
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.79
Specific Gravity d	3.69
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BSM25

Code(d) **658509**
Code(e) **662506**

Refractive Index	n_d	**1.65844** 1.658441	Abbe Number	ν_d	**50.88**	Dispersion	n_F-n_C **0.012942**
Refractive Index	n_e	1.661522	Abbe Number	ν_e	50.59	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.67373
n_g	0.435835	1.67469
n_h	0.404656	1.68074
n_i	0.365015	1.69121

Constants of Dispersion Formula	
A_1	1.34814257E+00
A_2	3.47530319E-01
A_3	1.38798368E+00
B_1	6.95364366E-03
B_2	2.77863478E-02
B_3	1.42138122E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	95.1	
Rigidity Modulus G (GPa)	37.4	
Poisson's Ratio σ	0.272	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	136	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		605
Annealing Point AP (℃)		630
Transformation Temperature Tg (℃)		638
Yield Point At (℃)		686
Softening Point SP (℃)		760
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	68
	(+100~+300℃)	82
Thermal Conductivity λ W/(m·K)		0.891

Coloring			
λ_{80}	375	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	0.71	0.70

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.03
340	0.19
350	0.48
360	0.71
370	0.84
380	0.910
390	0.945
400	0.964
420	0.980
440	0.984
460	0.988
480	0.991
500	0.994
550	0.996
600	0.995
650	0.995
700	0.996
800	0.997
900	0.997
1000	0.996
1200	0.997
1400	0.995
1600	0.995
1800	0.989
2000	0.980
2200	0.947
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.08
Specific Gravity d	3.50
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BSM28

Code(d) **618498**
Code(e) **621495**

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

Constants of Dispersion Formula	
A_1	1.43822841E+00
A_2	1.28100017E-01
A_3	1.34355530E+00
B_1	8.59779750E-03
B_2	4.08617854E-02
B_3	1.43709890E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	85.3	
Rigidity Modulus G (GPa)	33.9	
Poisson's Ratio σ	0.258	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	176	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		530
Annealing Point AP (℃)		559
Transformation Temperature Tg (℃)		578
Yield Point At (℃)		618
Softening Point SP (℃)		680
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	84
	(+100~+300℃)	96
Thermal Conductivity λ W/(m·K)		0.878

Coloring			
λ_{80}	385	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	375	$\lambda_{0.05}$	341

CCI		
B	G	R
0.00	1.01	1.02

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.02
350	0.24
360	0.54
370	0.74
380	0.85
390	0.918
400	0.950
420	0.975
440	0.982
460	0.987
480	0.990
500	0.993
550	0.997
600	0.996
650	0.996
700	0.997
800	0.997
900	0.997
1000	0.996
1200	0.996
1400	0.994
1600	0.995
1800	0.988
2000	0.978
2200	0.944
2400	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.05
Specific Gravity d	3.23
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-BSM71

Code(d) **649530**
Code(e) **651527**

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

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-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-Cd}	0.44157	1.66293
n_g	0.435835	1.66383
n_h	0.404656	1.66954
n_i	0.365015	1.67943

Constants of Dispersion Formula	
A_1	1.50847885E+00
A_2	1.58099826E-01
A_3	1.36815368E+00
B_1	8.12769076E-03
B_2	3.54200898E-02
B_3	1.36110038E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	86.2	
Rigidity Modulus G (GPa)	33.9	
Poisson's Ratio σ	0.273	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	170	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		607
Annealing Point AP (℃)		635
Transformation Temperature Tg (℃)		651
Yield Point At (℃)		687
Softening Point SP (℃)		737
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	71
	(+100~+300℃)	83
Thermal Conductivity λ W/(m·K)		0.773

Coloring			
λ_{80}	375	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	337

CCI		
B	G	R
0.00	0.59	0.55

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.15
350	0.47
360	0.72
370	0.86
380	0.926
390	0.958
400	0.973
420	0.985
440	0.988
460	0.990
480	0.993
500	0.995
550	0.998
600	0.997
650	0.996
700	0.997
800	0.998
900	0.998
1000	0.997
1200	0.997
1400	0.993
1600	0.993
1800	0.985
2000	0.972
2200	0.925
2400	0.82

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.81
Specific Gravity d	3.74
Remarks	

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S-BSM81

Code(d) **640601**
Code(e) **643599**

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

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

Constants of Dispersion Formula	
A_1	9.96356844E-01
A_2	6.51392837E-01
A_3	1.22432622E+00
B_1	1.44821587E-02
B_2	1.54826389E-03
B_3	8.99818604E+01

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

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

Partial Dispersions	
n_C-n_t	0.009210
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		604
Annealing Point AP (℃)		624
Transformation Temperature Tg (℃)		653
Yield Point At (℃)		679
Softening Point SP (℃)		721
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		1.00

Coloring			
λ_{80}	370	λ_5	305
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	303

CCI		
B	G	R
0.00	0.55	0.49

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.01
300	0.03
310	0.10
320	0.21
330	0.38
340	0.56
350	0.71
360	0.82
370	0.89
380	0.934
390	0.957
400	0.970
420	0.981
440	0.985
460	0.989
480	0.992
500	0.995
550	0.995
600	0.992
650	0.993
700	0.995
800	0.997
900	0.997
1000	0.996
1200	0.996
1400	0.993
1600	0.994
1800	0.985
2000	0.961
2200	0.87
2400	0.61

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.00
Specific Gravity d	3.06
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPL51

Code(d) **497816**
Code(e) **498810**

Refractive Index	n_d	**1.49700**	Abbe Number	ν_d	**81.54**	Dispersion	n_F-n_C	**0.006095**
		1.496999						
Refractive Index	n_e	1.498455	Abbe Number	ν_e	81.14	Dispersion	$n_{F'}$-$n_{C'}$	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

Constants of Dispersion Formula	
A_1	1.17010505E+00
A_2	4.75710783E-02
A_3	7.63832445E-01
B_1	6.16203924E-03
B_2	2.63372876E-02
B_3	1.41882642E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	52.1
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	72.7	
Rigidity Modulus G (GPa)	28.0	
Poisson's Ratio σ	0.299	
Knoop Hardness Hk[Class]	350	4
Abrasion Aa	493	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		458
Yield Point At (℃)		489
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	131
	(+100~+300℃)	155
Thermal Conductivity λ W/(m·K)		0.780

Coloring			
λ_{80}	340	λ_5	290
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	333	$\lambda_{0.05}$	290

CCI		
B	G	R
0.00	0.16	0.13

Internal Transmittance	
λ(nm)	τ 10mm
280	0.01
290	0.05
300	0.17
310	0.37
320	0.60
330	0.77
340	0.88
350	0.947
360	0.975
370	0.988
380	0.994
390	0.996
400	0.995
420	0.994
440	0.994
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.999
1800	0.999
2000	0.999
2200	0.997
2400	0.996

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.74
Specific Gravity d	3.62
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPL53

Code(d) **439950**
Code(e) **440946**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.44410
n_g	0.435835	1.44442
n_h	0.404656	1.44645
n_i	0.365015	1.44986

Constants of Dispersion Formula	
A_1	9.83532327E-01
A_2	6.95688140E-02
A_3	1.11409238E+00
B_1	4.92234955E-03
B_2	1.93581091E-02
B_3	2.64275294E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	69.1	
Rigidity Modulus G (GPa)	26.5	
Poisson's Ratio σ	0.303	
Knoop Hardness Hk[Class]	320	3
Abrasion Aa	480	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		426
Yield Point At (℃)		456
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	145
	(+100~+300℃)	169
Thermal Conductivity λ W/(m·K)		0.857

Coloring			
λ_{80}	330	λ_5	280
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	326	$\lambda_{0.05}$	283

CCI		
B	G	R
0.00	0.13	0.08

Internal Transmittance	
λ(nm)	τ 10mm
280	0.04
290	0.12
300	0.28
310	0.51
320	0.71
330	0.85
340	0.928
350	0.967
360	0.985
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.57
Specific Gravity d	3.62
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPL55

Code(d) **439948**
Code(e) **440942**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.44411
n_g	0.435835	1.44444
n_h	0.404656	1.44647
n_i	0.365015	1.44988

Constants of Dispersion Formula	
A_1	8.39067682E-01
A_2	2.14083503E-01
A_3	1.47914677E+00
B_1	7.95286639E-03
B_2	-2.32581717E-03
B_3	3.40043700E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	69.8	
Rigidity Modulus G (GPa)	26.8	
Poisson's Ratio σ	0.302	
Knoop Hardness Hk[Class]	340	3
Abrasion Aa	470	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		435
Yield Point At (℃)		460
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	136
	(+100~+300℃)	166
Thermal Conductivity λ W/(m·K)		0.876

Coloring			
λ_{80}	335	λ_5	290
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	329	$\lambda_{0.05}$	285

CCI		
B	G	R
0.00	0.13	0.08

Internal Transmittance	
λ(nm)	τ 10mm
280	0.02
290	0.08
300	0.22
310	0.43
320	0.65
330	0.81
340	0.907
350	0.957
360	0.979
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.59
Specific Gravity d	3.59
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPM 2

Code(d) **595677**
Code(e) **597674**

Refractive Index	n_d	**1.59522** 1.595220	Abbe Number	ν_d	**67.74**	Dispersion	n_F-n_C **0.008787**
Refractive Index	n_e	1.597316	Abbe Number	ν_e	67.37	Dispersion	$n_{F'}$-$n_{C'}$ 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	1.59255
$n_{C'}$	0.64385	1.59298
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.60549
n_g	0.435835	1.60612
n_h	0.404656	1.61008
n_i	0.365015	1.61681

Constants of Dispersion Formula	
A_1	7.61242785E-01
A_2	7.47033375E-01
A_3	9.38928947E-01
B_1	3.21174095E-03
B_2	1.40234423E-02
B_3	1.39523530E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.3
Phosphate Resistance PR	4.1

Mechanical Properties		
Young's Modulus E (GPa)	75.7	
Rigidity Modulus G (GPa)	29.4	
Poisson's Ratio σ	0.287	
Knoop Hardness Hk[Class]	390	4
Abrasion Aa	521	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		571
Yield Point At (℃)		596
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	117
	(+100~+300℃)	135
Thermal Conductivity λ W/(m·K)		0.624

Coloring			
λ_{80}	355	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	302

CCI		
B	G	R
0.00	0.32	0.27

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.18
320	0.35
330	0.54
340	0.72
350	0.84
360	0.917
370	0.958
380	0.980
390	0.988
400	0.991
420	0.989
440	0.989
460	0.992
480	0.994
500	0.996
550	0.998
600	0.997
650	0.996
700	0.996
800	0.995
900	0.995
1000	0.996
1200	0.997
1400	0.997
1600	0.997
1800	0.995
2000	0.992
2200	0.989
2400	0.983

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.51
Specific Gravity d	4.17
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPM 3

Code(d) **538747**
Code(e) **539743**

Refractive Index	n_d	**1.53775** 1.537750	Abbe Number	ν_d	**74.70**	Dispersion	n_F-n_C **0.007199**
Refractive Index	n_e	1.539469	Abbe Number	ν_e	74.34	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.54612
n_g	0.435835	1.54664
n_h	0.404656	1.54984
n_i	0.365015	1.55525

Constants of Dispersion Formula	
A_1	8.09407286E-01
A_2	5.27007033E-01
A_3	9.09127704E-01
B_1	3.76072389E-03
B_2	1.35654895E-02
B_3	1.42503612E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	5.1
Phosphate Resistance PR	4.1

Mechanical Properties		
Young's Modulus E (GPa)	80.6	
Rigidity Modulus G (GPa)	31.2	
Poisson's Ratio σ	0.291	
Knoop Hardness Hk[Class]	390	4
Abrasion Aa	418	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		496
Yield Point At (℃)		524
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	115
	(+100~+300℃)	138
Thermal Conductivity λ W/(m·K)		0.805

Coloring			
λ_{80}	345	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	336	$\lambda_{0.05}$	284

CCI		
B	G	R
0.00	0.28	0.23

Internal Transmittance	
λ(nm)	τ 10mm
280	0.03
290	0.08
300	0.19
310	0.36
320	0.55
330	0.72
340	0.85
350	0.924
360	0.962
370	0.981
380	0.990
390	0.992
400	0.992
420	0.989
440	0.990
460	0.992
480	0.995
500	0.996
550	0.998
600	0.997
650	0.996
700	0.996
800	0.994
900	0.995
1000	0.996
1200	0.997
1400	0.997
1600	0.996
1800	0.995
2000	0.993
2200	0.987
2400	0.984

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.85
Specific Gravity d	3.64
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPM 4

Code(d) **528765**
Code(e) **530760**

Refractive Index	n_d	**1.52841** 1.528410	Abbe Number	ν_d	**76.46**	Dispersion	n_F-n_C **0.006911**
Refractive Index	n_e	1.530060	Abbe Number	ν_e	76.07	Dispersion	$n_{F'}$-$n_{C'}$ 0.006968

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.50911
n_{1970}	1.97009	1.51254
n_{1530}	1.52958	1.51625
n_{1129}	1.12864	1.51955
n_t	1.01398	1.52065
n_s	0.85211	1.52258
$n_{A'}$	0.76819	1.52390
n_r	0.70652	1.52510
n_C	0.65627	1.52630
$n_{C'}$	0.64385	1.52664
n_{He-Ne}	0.6328	1.52695
n_D	0.58929	1.52835
n_d	0.58756	1.52841
n_e	0.54607	1.53006
n_F	0.48613	1.53321
$n_{F'}$	0.47999	1.53361
n_{He-Cd}	0.44157	1.53645
n_g	0.435835	1.53694
n_h	0.404656	1.54002
n_i	0.365015	1.54522

Constants of Dispersion Formula	
A_1	6.85585084E-01
A_2	6.23380215E-01
A_3	9.14178386E-01
B_1	2.88172010E-03
B_2	1.24701707E-02
B_3	1.53577200E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	51.3
Phosphate Resistance PR	4.3

Mechanical Properties		
Young's Modulus E (GPa)	74.7	
Rigidity Modulus G (GPa)	28.9	
Poisson's Ratio σ	0.295	
Knoop Hardness Hk[Class]	360	4
Abrasion Aa	506	

Partial Dispersions	
n_C-n_t	0.005650
n_C-$n_{A'}$	0.002406
n_d-n_C	0.002107
n_e-n_C	0.003757
n_g-n_d	0.008533
n_g-n_F	0.003729
n_h-n_g	0.003076
n_i-n_g	0.008275
n_C-n_t	0.005985
n_e-$n_{C'}$	0.003422
n_F-n_e	0.003546
n_i-$n_{F'}$	0.011612

Relative Partial Dispersions	
$\theta_{C,t}$	0.8175
$\theta_{C,A'}$	0.3481
$\theta_{d,C}$	0.3049
$\theta_{e,C}$	0.5436
$\theta_{g,d}$	1.2347
$\theta_{g,F}$	0.5396
$\theta_{h,g}$	0.4451
$\theta_{i,g}$	1.1974
$\theta'_{C',t}$	0.8589
$\theta'_{e,C'}$	0.4911
$\theta'_{F',e}$	0.5089
$\theta'_{i,F'}$	1.6665

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0879
$\Delta\theta_{C,A'}$	-0.0205
$\Delta\theta_{g,d}$	0.0288
$\Delta\theta_{g,F}$	0.0218
$\Delta\theta_{i,g}$	0.1126

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		488
Yield Point At (℃)		520
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	123
	(+100~+300℃)	143
Thermal Conductivity λ W/(m·K)		0.746

Coloring			
λ_{80}	340	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	283

CCI		
B	G	R
0.00	0.14	0.11

Internal Transmittance	
λ(nm)	τ 10mm
280	0.03
290	0.09
300	0.20
310	0.37
320	0.58
330	0.75
340	0.86
350	0.934
360	0.968
370	0.984
380	0.992
390	0.995
400	0.996
420	0.995
440	0.995
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.997
800	0.997
900	0.997
1000	0.997
1200	0.998
1400	0.999
1600	0.998
1800	0.998
2000	0.998
2200	0.996
2400	0.995

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-5.4	-5.2	-5.2	-5.1	-5.0	-4.9	-4.7
-20~ 0	-5.7	-5.5	-5.5	-5.5	-5.4	-5.2	-5.0
0~20	-5.9	-5.8	-5.8	-5.7	-5.6	-5.4	-5.2
20~40	-6.2	-6.0	-6.0	-5.9	-5.8	-5.6	-5.4
40~60	-6.3	-6.1	-6.1	-6.1	-6.0	-5.8	-5.6
60~80	-6.4	-6.2	-6.2	-6.1	-6.1	-5.9	-5.6

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.72
Specific Gravity d	3.76
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FPM 5

Code(d) **552708**
Code(e) **554703**

Refractive Index	n_d	**1.55200** 1.552000	Abbe Number	ν_d	**70.70**	Dispersion	n_F-n_C **0.007808**
Refractive Index	n_e	1.553863	Abbe Number	ν_e	70.33	Dispersion	$n_{F'}$-$n_{C'}$ 0.007875

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.53066
n_{1970}	1.97009	1.53441
n_{1530}	1.52958	1.53845
n_{1129}	1.12864	1.54208
n_t	1.01398	1.54330
n_s	0.85211	1.54545
$n_{A'}$	0.76819	1.54692
n_r	0.70652	1.54828
n_C	0.65627	1.54963
$n_{C'}$	0.64385	1.55000
n_{He-Ne}	0.6328	1.55036
n_D	0.58929	1.55193
n_d	0.58756	1.55200
n_e	0.54607	1.55386
n_F	0.48613	1.55743
$n_{F'}$	0.47999	1.55788
n_{He-Cd}	0.44157	1.56111
n_g	0.435835	1.56167
n_h	0.404656	1.56517
n_i	0.365015	1.57111

Constants of Dispersion Formula	
A_1	8.39899764E-01
A_2	5.37721312E-01
A_3	9.53247759E-01
B_1	3.76448295E-03
B_2	1.48022622E-02
B_3	1.45675550E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	76.9	
Rigidity Modulus G (GPa)	29.7	
Poisson's Ratio σ	0.296	
Knoop Hardness Hk[Class]	410	4
Abrasion Aa	413	

Partial Dispersions	
n_C-n_t	0.006321
n_C-$n_{A'}$	0.002702
n_d-n_C	0.002375
n_e-n_C	0.004238
n_g-n_d	0.009666
n_g-n_F	0.004233
n_h-n_g	0.003502
n_i-n_g	0.009440
n_C-n_t	0.006699
n_e-$n_{C'}$	0.003860
$n_{F'}$-n_e	0.004015
n_i-$n_{F'}$	0.013228

Relative Partial Dispersions	
$\theta_{C,t}$	0.8096
$\theta_{C,A'}$	0.3461
$\theta_{d,C}$	0.3042
$\theta_{e,C}$	0.5428
$\theta_{g,d}$	1.2380
$\theta_{g,F}$	0.5421
$\theta_{h,g}$	0.4485
$\theta_{i,g}$	1.2090
$\theta'_{C',t}$	0.8507
$\theta'_{e,C'}$	0.4902
$\theta'_{F',e}$	0.5098
$\theta'_{i,F'}$	1.6797

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0688
$\Delta\theta_{C,A'}$	-0.0155
$\Delta\theta_{g,d}$	0.0201
$\Delta\theta_{g,F}$	0.0150
$\Delta\theta_{i,g}$	0.0760

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		474
Yield Point At (℃)		503
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	109
	(+100~+300℃)	129
Thermal Conductivity λ W/(m·K)		0.765

Coloring			
λ_{80}	345	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	335	$\lambda_{0.05}$	282

CCI		
B	G	R
0.00	0.14	0.12

Internal Transmittance	
λ(nm)	τ 10mm
280	0.04
290	0.10
300	0.20
310	0.35
320	0.56
330	0.73
340	0.86
350	0.929
360	0.967
370	0.984
380	0.992
390	0.995
400	0.996
420	0.995
440	0.995
460	0.996
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.999
1600	0.998
1800	0.998
2000	0.997
2200	0.994
2400	0.993

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-2.5	-2.3	-2.2	-2.2	-2.1	-1.8	-1.5
-20~ 0	-2.8	-2.5	-2.5	-2.4	-2.3	-2.0	-1.8
0~20	-3.0	-2.7	-2.7	-2.6	-2.5	-2.2	-1.9
20~40	-3.2	-2.9	-2.8	-2.7	-2.6	-2.3	-2.1
40~60	-3.3	-3.0	-2.9	-2.8	-2.7	-2.4	-2.1
60~80	-3.3	-3.0	-3.0	-2.9	-2.7	-2.4	-2.1

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.29
Specific Gravity d	3.74
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FSL 5

Code(d) **487702**
Code(e) **489701**

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

Constants of Dispersion Formula	
A_1	1.17447043E+00
A_2	1.40056154E-02
A_3	1.19272435E+00
B_1	8.41855181E-03
B_2	-5.81790767E-02
B_3	1.29599726E+02

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

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

Partial Dispersions	
n_C-n_t	0.006194
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		457
Annealing Point AP (℃)		491
Transformation Temperature Tg (℃)		500
Yield Point At (℃)		568
Softening Point SP (℃)		679
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	90
	(+100~+300℃)	95
Thermal Conductivity λ W/(m·K)		1.01

Coloring			
λ_{80}	300	λ_5	265
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	304	$\lambda_{0.05}$	277

CCI		
B	G	R
0.00	0.00	0.00

Internal Transmittance	
λ(nm)	τ 10mm
280	0.13
290	0.43
300	0.73
310	0.89
320	0.961
330	0.984
340	0.992
350	0.995
360	0.995
370	0.998
380	0.998
390	0.999
400	0.999
420	0.999
440	0.999
460	0.999
480	0.999
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.998
1200	0.998
1400	0.982
1600	0.992
1800	0.985
2000	0.971
2200	0.88
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-1.3	-1.1	-1.1	-1.0	-0.9	-0.8	-0.6
-20~ 0	-1.2	-1.0	-1.0	-0.9	-0.9	-0.7	-0.5
0~20	-1.1	-0.9	-0.9	-0.9	-0.8	-0.6	-0.4
20~40	-1.1	-0.9	-0.9	-0.8	-0.7	-0.5	-0.3
40~60	-1.0	-0.7	-0.7	-0.6	-0.6	-0.4	-0.2
60~80	-0.8	-0.5	-0.5	-0.4	-0.3	-0.1	0.1

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.87
Specific Gravity d	2.46
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-FTM16

Code(d) **593353**
Code(e) **597350**

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

Constants of Dispersion Formula	
A_1	1.32940907E+00
A_2	1.41512125E-01
A_3	1.44299068E+00
B_1	1.02377287E-02
B_2	5.78081956E-02
B_3	1.50597139E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	65.3	
Rigidity Modulus G (GPa)	26.4	
Poisson's Ratio σ	0.238	
Knoop Hardness Hk[Class]	490	5
Abrasion Aa	181	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		501
Yield Point At (℃)		542
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	90
	(+100~+300℃)	100
Thermal Conductivity λ W/(m·K)		0.947

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	370	$\lambda_{0.05}$	350

CCI		
B	G	R
0.00	0.43	0.42

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.04
360	0.43
370	0.81
380	0.934
390	0.973
400	0.984
420	0.989
440	0.990
460	0.991
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.996
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.994
1800	0.989
2000	0.987
2200	0.959
2400	0.953

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-1.0	-0.5	-0.4	-0.2	0.0	0.7	1.4
-20~ 0	-0.9	-0.4	-0.3	0.0	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	0.0	0.0	0.3	0.6	1.4	2.3
60~80	-0.5	0.1	0.1	0.4	0.7	1.6	2.5

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.33
Specific Gravity d	2.64
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH51

Code(d) **786442**
Code(e) **790439**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.80704
n_g	0.435835	1.80838
n_h	0.404656	1.81687
n_i	0.365015	1.83175

Constants of Dispersion Formula	
A_1	1.82586991E+00
A_2	2.83023349E-01
A_3	1.35964319E+00
B_1	9.35297152E-03
B_2	3.73803057E-02
B_3	1.00655798E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	112.9	
Rigidity Modulus G (GPa)	43.5	
Poisson's Ratio σ	0.297	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	80	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		568
Annealing Point AP (℃)		598
Transformation Temperature Tg (℃)		617
Yield Point At (℃)		641
Softening Point SP (℃)		677
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	59
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		0.826

Coloring			
λ_{80}	390	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	333

CCI		
B	G	R
0.00	0.83	0.82

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.01
340	0.17
350	0.51
360	0.73
370	0.84
380	0.910
390	0.942
400	0.961
420	0.977
440	0.984
460	0.989
480	0.993
500	0.995
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.997
1000	0.996
1200	0.996
1400	0.991
1600	0.989
1800	0.981
2000	0.957
2200	0.89
2400	0.68

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.88
Specific Gravity d	4.40
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH52

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

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82211
n_g	0.435835	1.82355
n_h	0.404656	1.83271
n_i	0.365015	1.84885

Constants of Dispersion Formula	
A_1	1.85390925E+00
A_2	2.97925555E-01
A_3	1.39382086E+00
B_1	9.55320687E-03
B_2	3.93816850E-02
B_3	1.02706848E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	111.9	
Rigidity Modulus G (GPa)	43.1	
Poisson's Ratio σ	0.297	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	85	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		565
Annealing Point AP (℃)		596
Transformation Temperature Tg (℃)		618
Yield Point At (℃)		636
Softening Point SP (℃)		679
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	60
	(+100~+300℃)	73
Thermal Conductivity λ W/(m·K)		0.828

Coloring			
λ_{80}	395	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	1.03	1.10

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.02
340	0.23
350	0.52
360	0.72
370	0.83
380	0.89
390	0.931
400	0.951
420	0.971
440	0.979
460	0.985
480	0.990
500	0.993
550	0.997
600	0.997
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.997
1400	0.994
1600	0.993
1800	0.986
2000	0.965
2200	0.910
2400	0.71

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.92
Specific Gravity d	4.41
Remarks	

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S-LAH52Q

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

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

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

Constants of Dispersion Formula	
A_1	1.91082318E+00
A_2	2.39854589E-01
A_3	1.16159733E+00
B_1	1.03565352E-02
B_2	4.13805081E-02
B_3	9.66037300E+01

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

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

Partial Dispersions	
n_C-n_t	0.014094
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		553
Annealing Point AP (℃)		576
Transformation Temperature Tg (℃)		598
Yield Point At (℃)		622
Softening Point SP (℃)		651
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	60
	(+100~+300℃)	73
Thermal Conductivity λ W/(m·K)		0.852

Coloring			
λ_{80}	390	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	365	$\lambda_{0.05}$	334

CCI		
B	G	R
0.00	0.67	0.68

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.13
350	0.46
360	0.73
370	0.86
380	0.926
390	0.954
400	0.969
420	0.982
440	0.988
460	0.992
480	0.995
500	0.997
550	0.999
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.989
2000	0.967
2200	0.924
2400	0.75

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.31
Specific Gravity d	4.47
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH53

Code(d) **806409**
Code(e) **811407**

Refractive Index	n_d	**1.80610**	Abbe Number	ν_d	**40.92**	Dispersion	n_F-n_C	**0.019697**
		1.806098						
Refractive Index	n_e	1.810775	Abbe Number	ν_e	40.67	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82967
n_g	0.435835	1.83117
n_h	0.404656	1.84078
n_i	0.365015	1.85782

Constants of Dispersion Formula	
A_1	1.91811619E+00
A_2	2.53724399E-01
A_3	1.39473885E+00
B_1	1.02147684E-02
B_2	4.33176011E-02
B_3	1.01938021E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	4.2
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	112.7	
Rigidity Modulus G (GPa)	43.4	
Poisson's Ratio σ	0.299	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	80	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		610
Yield Point At (℃)		637
Softening Point SP (℃)		687
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	59
	(+100~+300℃)	70
Thermal Conductivity λ W/(m·K)		0.860

Coloring			
λ_{80}	405	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	370	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.07	1.13

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.06
350	0.38
360	0.65
370	0.80
380	0.88
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	0.72

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.96
Specific Gravity d	4.43
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH53V

Code(d) **806409**
Code(e) **811407**

Refractive Index	n_d	**1.80610** 1.806100	Abbe Number	ν_d	**40.93**	Dispersion	n_F-n_C **0.019695**
Refractive Index	n_e	1.810776	Abbe Number	ν_e	40.67	Dispersion	$n_{F'}$-$n_{C'}$ 0.019937

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.76201
n_{1970}	1.97009	1.76865
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
$n_{He\text{-}Ne}$	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	1.82111
$n_{He\text{-}Cd}$	0.44157	1.82969
n_g	0.435835	1.83121
n_h	0.404656	1.84084
n_i	0.365015	1.85798

Constants of Dispersion Formula	
A_1	1.96600955E+00
A_2	2.05143305E-01
A_3	1.23200934E+00
B_1	1.07817785E-02
B_2	4.63727869E-02
B_3	9.76940600E+01

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

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

Partial Dispersions	
n_C-n_t	0.014601
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		569
Annealing Point AP (℃)		589
Transformation Temperature Tg (℃)		603
Yield Point At (℃)		638
Softening Point SP (℃)		670
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.859

Coloring			
λ_{80}	400	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	372	$\lambda_{0.05}$	341

CCI		
B	G	R
0.00	0.95	0.98

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.02
350	0.23
360	0.56
370	0.78
380	0.88
390	0.931
400	0.954
420	0.975
440	0.984
460	0.989
480	0.992
500	0.995
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.995
1800	0.987
2000	0.966
2200	0.916
2400	0.73

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.13
Specific Gravity d	4.41
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH55V

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

Refractive Index	n_d	**1.83481**	Abbe Number	ν_d	**42.73**	Dispersion	n_F-n_C	**0.019539**
		1.834807						
Refractive Index	n_e	1.839452	Abbe Number	ν_e	42.47	Dispersion	$n_{F'}$-$n_{C'}$	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	1.82250
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

Constants of Dispersion Formula	
A_1	1.97025325E+00
A_2	3.04894140E-01
A_3	1.39214665E+00
B_1	9.91088134E-03
B_2	3.83202295E-02
B_3	9.77785249E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	117.8	
Rigidity Modulus G (GPa)	47.0	
Poisson's Ratio σ	0.253	
Knoop Hardness Hk[Class]	740	7
Abrasion Aa	63	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		645
Annealing Point AP (℃)		672
Transformation Temperature Tg (℃)		695
Yield Point At (℃)		718
Softening Point SP (℃)		749
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	62
	(+100~+300℃)	77
Thermal Conductivity λ W/(m·K)		0.853

Coloring			
λ_{80}	400	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	363	$\lambda_{0.05}$	327

CCI		
B	G	R
0.00	0.93	0.96

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.14
340	0.42
350	0.64
360	0.78
370	0.86
380	0.910
390	0.939
400	0.956
420	0.974
440	0.982
460	0.987
480	0.992
500	0.995
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.995
1800	0.987
2000	0.966
2200	0.909
2400	0.71

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.30
Specific Gravity d	4.73
Remarks	

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S-LAH55VS

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

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

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.78945
n_{1970}	1.97009	1.79652
n_{1530}	1.52958	1.80427
n_{1129}	1.12864	1.81164
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

Constants of Dispersion Formula	
A_1	1.92591095E+00
A_2	3.48953460E-01
A_3	1.42230744E+00
B_1	9.61152490E-03
B_2	3.65132980E-02
B_3	1.03364090E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	122.3	
Rigidity Modulus G (GPa)	47.2	
Poisson's Ratio σ	0.297	
Knoop Hardness Hk[Class]	740	7
Abrasion Aa	60	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		639
Annealing Point AP (℃)		667
Transformation Temperature Tg (℃)		677
Yield Point At (℃)		709
Softening Point SP (℃)		738
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	63
	(+100~+300℃)	77
Thermal Conductivity λ W/(m·K)		0.864

Coloring			
λ_{80}	395	λ_5	320
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	356	$\lambda_{0.05}$	319

CCI		
B	G	R
0.00	0.65	0.68

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.06
330	0.28
340	0.55
350	0.73
360	0.84
370	0.90
380	0.936
390	0.957
400	0.970
420	0.982
440	0.988
460	0.991
480	0.994
500	0.996
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.988
2000	0.968
2200	0.920
2400	0.74

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.31
Specific Gravity d	4.58
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH58

Code(d) **883408**
Code(e) **888405**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.90885
n_g	0.435835	1.91050
n_h	0.404656	1.92092
n_i	0.365015	1.93917

Constants of Dispersion Formula	
A_1	1.78764964E+00
A_2	6.52635600E-01
A_3	1.79914564E+00
B_1	8.47378536E-03
B_2	3.13126408E-02
B_3	1.32788001E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	1
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	2.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	126.8	
Rigidity Modulus G (GPa)	48.7	
Poisson's Ratio σ	0.301	
Knoop Hardness Hk[Class]	710	7
Abrasion Aa	62	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		666
Annealing Point AP (℃)		714
Transformation Temperature Tg (℃)		738
Yield Point At (℃)		765
Softening Point SP (℃)		803
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	78
Thermal Conductivity λ W/(m·K)		0.827

Coloring			
λ_{80}		λ_5	315
λ_{70}	375		

Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	320

CCI		
B	G	R
0.00	1.69	1.75

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.05
330	0.17
340	0.34
350	0.51
360	0.66
370	0.77
380	0.84
390	0.89
400	0.924
420	0.951
440	0.965
460	0.974
480	0.982
500	0.988
550	0.995
600	0.995
650	0.995
700	0.995
800	0.995
900	0.995
1000	0.995
1200	0.996
1400	0.996
1600	0.996
1800	0.992
2000	0.980
2200	0.956
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.30
Specific Gravity d	5.52
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH59

Code(d) **816466**
Code(e) **820464**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.83670
n_g	0.435835	1.83800
n_h	0.404656	1.84619
n_i	0.365015	1.86034

Constants of Dispersion Formula	
A_1	1.51372967E+00
A_2	7.02462343E-01
A_3	1.33600982E+00
B_1	7.05246901E-03
B_2	2.49488689E-02
B_3	1.00085908E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	125.0	
Rigidity Modulus G (GPa)	48.2	
Poisson's Ratio σ	0.298	
Knoop Hardness Hk[Class]	750	7
Abrasion Aa	50	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		644
Annealing Point AP (℃)		690
Transformation Temperature Tg (℃)		714
Yield Point At (℃)		737
Softening Point SP (℃)		773
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	63
	(+100~+300℃)	76
Thermal Conductivity λ W/(m·K)		0.816

Coloring			
λ_{80}	390	λ_5	290
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	359	$\lambda_{0.05}$	298

CCI		
B	G	R
0.00	0.94	0.93

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.02
300	0.06
310	0.09
320	0.28
330	0.43
340	0.58
350	0.71
360	0.81
370	0.88
380	0.921
390	0.943
400	0.958
420	0.973
440	0.979
460	0.984
480	0.989
500	0.994
550	0.997
600	0.996
650	0.996
700	0.996
800	0.996
900	0.995
1000	0.995
1200	0.995
1400	0.995
1600	0.994
1800	0.989
2000	0.973
2200	0.938
2400	0.76

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.37
Specific Gravity d	5.07
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH60

Code(d) **834372**
Code(e) **839369**

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

Constants of Dispersion Formula	
A_1	1.95243469E+00
A_2	3.07100210E-01
A_3	1.56578094E+00
B_1	1.06442437E-02
B_2	4.56735302E-02
B_3	1.10281410E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	4.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	124.8	
Rigidity Modulus G (GPa)	48.1	
Poisson's Ratio σ	0.296	
Knoop Hardness Hk[Class]	670	7
Abrasion Aa	79	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		612
Yield Point At (℃)		632
Softening Point SP (℃)		676
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	56
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.872

Coloring			
λ_{80}	420	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	377	$\lambda_{0.05}$	341

CCI		
B	G	R
0.00	1.57	1.66

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.03
350	0.27
360	0.54
370	0.72
380	0.83
390	0.88
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	0.72

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.15
Specific Gravity d	4.43
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH60MQ

Code(d) **834372**
Code(e) **839369**

Refractive Index	n_d	**1.83400** 1.834000	Abbe Number	ν_d	**37.17**	Dispersion	n_F-n_C	**0.022437**
Refractive Index	n_e	1.839321	Abbe Number	ν_e	36.92	Dispersion	$n_{F'}$-$n_{C'}$	0.022735

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.78810
n_{1970}	1.97009	1.79430
n_{1530}	1.52958	1.80135
n_{1129}	1.12864	1.80854
n_t	1.01398	1.81125
n_s	0.85211	1.81641
$n_{A'}$	0.76819	1.82017
n_r	0.70652	1.82374
n_C	0.65627	1.82739
$n_{C'}$	0.64385	1.82843
$n_{He\text{-}Ne}$	0.6328	1.82940
n_D	0.58929	1.83380
n_d	0.58756	1.83400
n_e	0.54607	1.83932
n_F	0.48613	1.84983
$n_{F'}$	0.47999	1.85116
$n_{He\text{-}Cd}$	0.44157	1.86106
n_g	0.435835	1.86281
n_h	0.404656	1.87401
n_i	0.365015	1.89407

Constants of Dispersion Formula	
A_1	1.95539063E+00
A_2	3.02550219E-01
A_3	1.34311390E+00
B_1	1.09111365E-02
B_2	4.54666700E-02
B_3	1.13580850E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	1.2

Mechanical Properties		
Young's Modulus E (GPa)	95.3	
Rigidity Modulus G (GPa)	36.6	
Poisson's Ratio σ	0.302	
Knoop Hardness Hk[Class]	520	5
Abrasion Aa	160	

Partial Dispersions	
n_C-n_t	0.016137
n_C-$n_{A'}$	0.007222
n_d-n_C	0.006608
n_e-n_C	0.011929
n_g-n_d	0.028810
n_g-n_F	0.012981
n_h-n_g	0.011196
n_i-n_g	0.031262
n_C-n_t	0.017174
n_e-$n_{C'}$	0.010892
n_F-n_e	0.011843
n_i-$n_{F'}$	0.042908

Relative Partial Dispersions	
$\theta_{C,t}$	0.7192
$\theta_{C,A'}$	0.3219
$\theta_{d,C}$	0.2945
$\theta_{e,C}$	0.5317
$\theta_{g,d}$	1.2840
$\theta_{g,F}$	0.5786
$\theta_{h,g}$	0.4990
$\theta_{i,g}$	1.3933
$\theta'_{C',t}$	0.7554
$\theta'_{e,C'}$	0.4791
$\theta'_{F',e}$	0.5209
$\theta'_{i,F'}$	1.8873

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0019
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	-0.0035
$\Delta\theta_{g,F}$	-0.0027
$\Delta\theta_{i,g}$	-0.0205

Thermal Properties		
Strain Point StP (℃)		609
Annealing Point AP (℃)		635
Transformation Temperature Tg (℃)		655
Yield Point At (℃)		688
Softening Point SP (℃)		721
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	85
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		0.701

Coloring			
λ_{80}	425	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	377	$\lambda_{0.05}$	336

CCI		
B	G	R
0.00	1.58	1.64

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.08
350	0.31
360	0.56
370	0.73
380	0.83
390	0.89
400	0.927
420	0.957
440	0.968
460	0.976
480	0.983
500	0.989
550	0.995
600	0.995
650	0.995
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.998
1600	0.995
1800	0.986
2000	0.968
2200	0.927
2400	0.80

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-1.4	-0.6	-0.6	-0.3	0.0	0.8	1.6
-20~ 0	-1.4	-0.6	-0.5	-0.2	0.1	0.9	1.8
0~20	-1.4	-0.5	-0.5	-0.2	0.2	1.1	2.0
20~40	-1.4	-0.5	-0.4	-0.1	0.2	1.1	2.1
40~60	-1.4	-0.4	-0.4	-0.1	0.3	1.2	2.2
60~80	-1.3	-0.4	-0.3	0.0	0.4	1.4	2.4

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.36
Specific Gravity d	4.71
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH60V

Code(d) **834372**
Code(e) **839370**

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

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	1.82374
n_C	0.65627	1.82740
$n_{C'}$	0.64385	1.82844
$n_{He\text{-}Ne}$	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	1.84981
$n_{F'}$	0.47999	1.85115
$n_{He\text{-}Cd}$	0.44157	1.86107
n_g	0.435835	1.86283
n_h	0.404656	1.87412
n_i	0.365015	1.89456

Constants of Dispersion Formula	
A_1	2.05081962E+00
A_2	2.08475257E-01
A_3	1.31486394E+00
B_1	1.16035991E-02
B_2	5.26489359E-02
B_3	9.93806500E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	111.4	
Rigidity Modulus G (GPa)	44.5	
Poisson's Ratio σ	0.253	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	61	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		570
Annealing Point AP (℃)		588
Transformation Temperature Tg (℃)		603
Yield Point At (℃)		635
Softening Point SP (℃)		669
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	73
Thermal Conductivity λ W/(m·K)		0.880

Coloring			
λ_{80}	430	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	383	$\lambda_{0.05}$	350

CCI		
B	G	R
0.00	1.88	1.93

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.05
360	0.29
370	0.59
380	0.77
390	0.86
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	0.72

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.10
Specific Gravity d	4.43
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH63

Code(d) **804396**
Code(e) **809393**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82877
n_g	0.435835	1.83034
n_h	0.404656	1.84033
n_i	0.365015	1.85815

Constants of Dispersion Formula	
A_1	1.89458276E+00
A_2	2.68702978E-01
A_3	1.45705526E+00
B_1	1.02277048E-02
B_2	4.42801243E-02
B_3	1.04874927E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	4.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	112.1	
Rigidity Modulus G (GPa)	43.3	
Poisson's Ratio σ	0.295	
Knoop Hardness Hk[Class]	640	6
Abrasion Aa	82	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		558
Annealing Point AP (℃)		588
Transformation Temperature Tg (℃)		607
Yield Point At (℃)		630
Softening Point SP (℃)		675
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	70
Thermal Conductivity λ W/(m·K)		0.849

Coloring			
λ_{80}	410	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.31	1.39

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.06
350	0.31
360	0.59
370	0.76
380	0.86
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	0.89
2400	0.70

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.18
Specific Gravity d	4.34
Remarks	

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S-LAH63Q

Code(d) **804396**
Code(e) **809393**

Refractive Index	n_d	**1.80440** 1.804400	Abbe Number	ν_d	**39.58**	Dispersion	n_F-n_C	**0.020323**
Refractive Index	n_e	1.809222	Abbe Number	ν_e	39.31	Dispersion	$n_{F'}$-$n_{C'}$	0.020586

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.76063
n_{1970}	1.97009	1.76695
n_{1530}	1.52958	1.77401
n_{1129}	1.12864	1.78098
n_t	1.01398	1.78355
n_s	0.85211	1.78834
$n_{A'}$	0.76819	1.79180
n_r	0.70652	1.79507
n_C	0.65627	1.79840
$n_{C'}$	0.64385	1.79934
n_{He-Ne}	0.6328	1.80023
n_D	0.58929	1.80422
n_d	0.58756	1.80440
n_e	0.54607	1.80922
n_F	0.48613	1.81872
$n_{F'}$	0.47999	1.81993
n_{He-Cd}	0.44157	1.82885
n_g	0.435835	1.83043
n_h	0.404656	1.84052
n_i	0.365015	1.85862

Constants of Dispersion Formula	
A_1	1.96723017E+00
A_2	1.94953915E-01
A_3	1.25386282E+00
B_1	1.10456086E-02
B_2	4.97137061E-02
B_3	1.04843520E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	102.6	
Rigidity Modulus G (GPa)	39.5	
Poisson's Ratio σ	0.300	
Knoop Hardness Hk[Class]	580	6
Abrasion Aa	121	

Partial Dispersions	
n_C-n_t	0.014851
n_C-$n_{A'}$	0.006597
n_d-n_C	0.006003
n_e-n_C	0.010825
n_g-n_d	0.026030
n_g-n_F	0.011710
n_h-n_g	0.010090
n_i-n_g	0.028188
n_C-n_t	0.015794
n_e-$n_{C'}$	0.009882
n_F-n_e	0.010704
n_i-$n_{F'}$	0.038692

Relative Partial Dispersions	
$\theta_{C,t}$	0.7307
$\theta_{C,A'}$	0.3246
$\theta_{d,C}$	0.2954
$\theta_{e,C}$	0.5326
$\theta_{g,d}$	1.2808
$\theta_{g,F}$	0.5762
$\theta_{h,g}$	0.4965
$\theta_{i,g}$	1.3870
$\theta'_{C',t}$	0.7672
$\theta'_{e,C'}$	0.4800
$\theta'_{F',e}$	0.5200
$\theta'_{i,F'}$	1.8795

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0017
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	-0.0017
$\Delta\theta_{g,F}$	-0.0012
$\Delta\theta_{i,g}$	-0.0066

Thermal Properties		
Strain Point StP (℃)		626
Annealing Point AP (℃)		654
Transformation Temperature Tg (℃)		669
Yield Point At (℃)		701
Softening Point SP (℃)		732
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	79
	(+100~+300℃)	93
Thermal Conductivity λ W/(m·K)		0.738

Coloring			
λ_{80}	415	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	343

CCI		
B	G	R
0.00	1.51	1.56

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.01
350	0.14
360	0.44
370	0.69
380	0.82
390	0.89
400	0.927
420	0.959
440	0.973
460	0.981
480	0.987
500	0.991
550	0.996
600	0.996
650	0.996
700	0.997
800	0.998
900	0.998
1000	0.999
1200	0.999
1400	0.998
1600	0.995
1800	0.987
2000	0.968
2200	0.923
2400	0.77

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	0.4	1.2	1.2	1.5	1.8	2.5	3.3
-20~ 0	0.4	1.1	1.2	1.4	1.7	2.5	3.3
0~20	0.4	1.2	1.2	1.5	1.8	2.6	3.5
20~40	0.4	1.2	1.3	1.5	1.9	2.7	3.6
40~60	0.4	1.3	1.3	1.6	2.0	2.8	3.8
60~80	0.5	1.4	1.5	1.7	2.1	3.0	4.0

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.39
Specific Gravity d	4.45
Remarks	

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S-LAH64

Code(d) **788474**
Code(e) **792471**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.80765
n_g	0.435835	1.80888
n_h	0.404656	1.81666
n_i	0.365015	1.83016

Constants of Dispersion Formula	
A_1	1.83021453E+00
A_2	2.91563590E-01
A_3	1.28544024E+00
B_1	9.04823290E-03
B_2	3.30756689E-02
B_3	8.93675501E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	122.4	
Rigidity Modulus G (GPa)	47.3	
Poisson's Ratio σ	0.294	
Knoop Hardness Hk[Class]	750	7
Abrasion Aa	63	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		644
Annealing Point AP (℃)		660
Transformation Temperature Tg (℃)		685
Yield Point At (℃)		705
Softening Point SP (℃)		732
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	61
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.856

Coloring			
λ_{80}	380	λ_5	315
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	354	$\lambda_{0.05}$	317

CCI		
B	G	R
0.00	0.63	0.65

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.13
330	0.40
340	0.63
350	0.77
360	0.85
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	0.68

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.40
Specific Gravity d	4.30
Remarks	

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S-LAH65V

Code(d) **804466**
Code(e) **808463**

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

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.75986
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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82441
n_g	0.435835	1.82569
n_h	0.404656	1.83380
n_i	0.365015	1.84786

Constants of Dispersion Formula	
A_1	1.81419034E+00
A_2	3.61376301E-01
A_3	1.32729484E+00
B_1	8.74935029E-03
B_2	3.18352836E-02
B_3	9.13406898E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	4.1
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	122.0	
Rigidity Modulus G (GPa)	47.0	
Poisson's Ratio σ	0.298	
Knoop Hardness Hk[Class]	730	7
Abrasion Aa	57	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		639
Annealing Point AP (℃)		664
Transformation Temperature Tg (℃)		691
Yield Point At (℃)		711
Softening Point SP (℃)		740
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	60
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.841

Coloring			
λ_{80}	385	λ_5	315
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	355	$\lambda_{0.05}$	319

CCI		
B	G	R
0.00	0.65	0.67

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.11
330	0.37
340	0.60
350	0.75
360	0.85
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	0.68

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.44
Specific Gravity d	4.72
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH65VS

Code(d) **804465**
Code(e) **808463**

Refractive Index	n_d	**1.80400** 1.804000	Abbe Number	ν_d	**46.53**	Dispersion	n_F-n_C **0.017281**
Refractive Index	n_e	1.808112	Abbe Number	ν_e	46.28	Dispersion	$n_{F'}$-$n_{C'}$ 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	1.79590
n_C	0.65627	1.79882
$n_{C'}$	0.64385	1.79964
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82445
n_g	0.435835	1.82573
n_h	0.404656	1.83385
n_i	0.365015	1.84792

Constants of Dispersion Formula	
A_1	1.76068422E+00
A_2	4.14128906E-01
A_3	1.33415439E+00
B_1	8.53607198E-03
B_2	3.01826383E-02
B_3	9.80942100E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	122.3	
Rigidity Modulus G (GPa)	47.1	
Poisson's Ratio σ	0.300	
Knoop Hardness Hk[Class]	730	7
Abrasion Aa	61	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		648
Annealing Point AP (℃)		677
Transformation Temperature Tg (℃)		691
Yield Point At (℃)		720
Softening Point SP (℃)		745
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	61
	(+100~+300℃)	75
Thermal Conductivity λ W/(m·K)		0.856

Coloring			
λ_{80}	380	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	310

CCI		
B	G	R
0.00	0.40	0.42

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.05
320	0.25
330	0.53
340	0.72
350	0.83
360	0.89
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	0.72

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.27
Specific Gravity d	4.46
Remarks	

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S-LAH66

Code(d) **773496**
Code(e) **776493**

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

Constants of Dispersion Formula	
A_1	1.39280586E+00
A_2	6.79577094E-01
A_3	1.38702069E+00
B_1	6.08475118E-03
B_2	2.33925351E-02
B_3	9.58354094E+01

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

Mechanical Properties		
Young's Modulus E (GPa)	121.9	
Rigidity Modulus G (GPa)	47.2	
Poisson's Ratio σ	0.291	
Knoop Hardness Hk[Class]	700	7
Abrasion Aa	61	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		641
Annealing Point AP (℃)		660
Transformation Temperature Tg (℃)		686
Yield Point At (℃)		706
Softening Point SP (℃)		726
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	62
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.845

Coloring			
λ_{80}	370	λ_5	305
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	349	$\lambda_{0.05}$	308

CCI		
B	G	R
0.00	0.44	0.42

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.10
320	0.33
330	0.55
340	0.71
350	0.81
360	0.88
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	0.88
2400	0.64

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.43
Specific Gravity d	4.23
Remarks	

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S-LAH71

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

Refractive Index	n_d	**1.85026**	Abbe Number	ν_d	**32.27**	Dispersion	n_F-n_C	**0.026349**
		1.850259						
Refractive Index	n_e	1.856493	Abbe Number	ν_e	32.03	Dispersion	$n_{F'}$-$n_{C'}$	0.026744

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	1.86893
$n_{F'}$	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	

Constants of Dispersion Formula	
A_1	1.98280031E+00
A_2	3.16758450E-01
A_3	2.44472646E+00
B_1	1.18987459E-02
B_2	5.27156001E-02
B_3	2.13220697E+02

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

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

Partial Dispersions	
n_C-n_t	0.018292
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0039
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	0.0040
$\Delta\theta_{g,F}$	0.0036
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		656
Annealing Point AP (℃)		685
Transformation Temperature Tg (℃)		707
Yield Point At (℃)		752
Softening Point SP (℃)		802
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	77
	(+100~+300℃)	91
Thermal Conductivity λ W/(m·K)		0.874

Coloring			
λ_{80}		λ_5	370
λ_{70}	425		

Internal transmission			
$\lambda_{0.80}$	417	$\lambda_{0.05}$	364

CCI		
B	G	R
0.00	6.64	6.89

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.11
380	0.29
390	0.49
400	0.65
420	0.83
440	0.913
460	0.945
480	0.963
500	0.976
550	0.992
600	0.995
650	0.995
700	0.997
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.998
1800	0.993
2000	0.989
2200	0.982
2400	0.959

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.52
Specific Gravity d	4.36
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH79

Code(d) **003283**
Code(e) **012281**

Refractive Index	n_d	**2.00330** 2.003300	Abbe Number	ν_d	**28.27**	Dispersion	n_F-n_C	**0.035486**
Refractive Index	n_e	2.011689	Abbe Number	ν_e	28.07	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	2.04682
n_g	0.435835	2.04972
n_h	0.404656	2.06844
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.32557148E+00
A_2	5.07967133E-01
A_3	2.43087198E+00
B_1	1.32895208E-02
B_2	5.28335449E-02
B_3	1.61122408E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	125.5	
Rigidity Modulus G (GPa)	48.4	
Poisson's Ratio σ	0.297	
Knoop Hardness Hk[Class]	700	7
Abrasion Aa	63	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0049
$\Delta\theta_{C,A'}$	0.0015
$\Delta\theta_{g,d}$	0.0020
$\Delta\theta_{g,F}$	0.0023
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		699
Yield Point At (℃)		731
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	60
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.957

Coloring			
λ_{80}		λ_5	370
λ_{70}	460		

Internal transmission			
$\lambda_{0.80}$	435	$\lambda_{0.05}$	371

CCI		
B	G	R
0.00	10.86	11.57

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.03
380	0.16
390	0.33
400	0.50
420	0.72
440	0.83
460	0.88
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	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.89
Specific Gravity d	5.23
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH88

Code(d) **917316**
Code(e) **923314**

Refractive Index	n_d	**1.91650** 1.916500	Abbe Number	ν_d	**31.60**	Dispersion	n_F-n_C	**0.028999**
Refractive Index	n_e	1.923361	Abbe Number	ν_e	31.38	Dispersion	$n_{F'}$-$n_{C'}$	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	1.90803
$n_{C'}$	0.64385	1.90936
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.95185
n_g	0.435835	1.95418
n_h	0.404656	1.96920
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.12844340E+00
A_2	4.05082139E-01
A_3	1.67918461E+00
B_1	1.17309815E-02
B_2	5.08706599E-02
B_3	1.07091456E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	113.5	
Rigidity Modulus G (GPa)	45.7	
Poisson's Ratio σ	0.242	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	69	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0110
$\Delta\theta_{C,A'}$	0.0029
$\Delta\theta_{g,d}$	0.0001
$\Delta\theta_{g,F}$	0.0008
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		581
Annealing Point AP (℃)		601
Transformation Temperature Tg (℃)		616
Yield Point At (℃)		642
Softening Point SP (℃)		677
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.894

Coloring			
λ_{80}		λ_5	355
λ_{70}	400		

Internal transmission			
$\lambda_{0.80}$	389	$\lambda_{0.05}$	353

CCI		
B	G	R
0.00	2.51	2.67

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.16
370	0.45
380	0.68
390	0.81
400	0.87
420	0.936
440	0.961
460	0.973
480	0.981
500	0.987
550	0.994
600	0.996
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.995
1600	0.994
1800	0.985
2000	0.963
2200	0.89
2400	0.71

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.90
Specific Gravity d	4.74
Remarks	

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S-LAH89

Code(d) **852408**
Code(e) **856405**

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

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	1.87807
n_h	0.404656	1.88822
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.95118827E+00
A_2	3.77607223E-01
A_3	1.47757262E+00
B_1	9.76560799E-03
B_2	3.82232043E-02
B_3	1.12236720E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	120.8	
Rigidity Modulus G (GPa)	46.3	
Poisson's Ratio σ	0.303	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	68	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0012
$\Delta\theta_{C,A'}$	0.0020
$\Delta\theta_{g,d}$	-0.0073
$\Delta\theta_{g,F}$	-0.0060
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		634
Annealing Point AP (℃)		660
Transformation Temperature Tg (℃)		669
Yield Point At (℃)		702
Softening Point SP (℃)		743
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	68
	(+100~+300℃)	80
Thermal Conductivity λ W/(m·K)		0.861

Coloring			
λ_{80}		λ_5	340
λ_{70}	380		

Internal transmission			
$\lambda_{0.80}$	376	$\lambda_{0.05}$	339

CCI		
B	G	R
0.00	1.47	1.52

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.07
350	0.31
360	0.57
370	0.74
380	0.84
390	0.89
400	0.930
420	0.962
440	0.975
460	0.983
480	0.989
500	0.993
550	0.998
600	0.999
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.992
2000	0.975
2200	0.938
2400	0.78

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.27
Specific Gravity d	4.70
Remarks	

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S-LAH92

Code(d) **892371**
Code(e) **898369**

Refractive Index	n_d	**1.89190** 1.891900	Abbe Number	ν_d	**37.13**	Dispersion	n_F-n_C **0.024019**
Refractive Index	n_e	1.897597	Abbe Number	ν_e	36.88	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.92085
n_g	0.435835	1.92273
n_h	0.404656	1.93469
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.10440311E+00
A_2	3.58346161E-01
A_3	1.63010064E+00
B_1	1.08531811E-02
B_2	4.43405920E-02
B_3	1.23249800E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	123.0	
Rigidity Modulus G (GPa)	47.1	
Poisson's Ratio σ	0.306	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	63	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0006
$\Delta\theta_{C,A'}$	0.0013
$\Delta\theta_{g,d}$	-0.0042
$\Delta\theta_{g,F}$	-0.0034
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		646
Annealing Point AP (℃)		678
Transformation Temperature Tg (℃)		689
Yield Point At (℃)		730
Softening Point SP (℃)		761
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	75
	(+100~+300℃)	87
Thermal Conductivity λ W/(m·K)		0.873

Coloring			
λ_{80}		λ_5	350
λ_{70}	400		

Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	349

CCI		
B	G	R
0.00	2.55	2.68

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.08
360	0.28
370	0.52
380	0.69
390	0.80
400	0.87
420	0.936
440	0.962
460	0.976
480	0.984
500	0.990
550	0.997
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.992
2000	0.977
2200	0.946
2400	0.82

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.12
Specific Gravity d	4.87
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH93

Code(d) **905350**
Code(e) **911348**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.93658
n_g	0.435835	1.93862
n_h	0.404656	1.95176
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.17884378E+00
A_2	3.25508683E-01
A_3	1.70608646E+00
B_1	1.15760879E-02
B_2	4.95982503E-02
B_3	1.28913580E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	124.7	
Rigidity Modulus G (GPa)	47.8	
Poisson's Ratio σ	0.304	
Knoop Hardness Hk[Class]	680	7
Abrasion Aa	60	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0017
$\Delta\theta_{C,A'}$	0.0006
$\Delta\theta_{g,d}$	-0.0002
$\Delta\theta_{g,F}$	0.0000
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		645
Annealing Point AP (℃)		672
Transformation Temperature Tg (℃)		677
Yield Point At (℃)		716
Softening Point SP (℃)		761
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	70
	(+100~+300℃)	86
Thermal Conductivity λ W/(m·K)		0.892

Coloring			
λ_{80}		λ_5	355
λ_{70}	410		

Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	353

CCI		
B	G	R
0.00	3.75	3.96

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.22
370	0.48
380	0.65
390	0.75
400	0.82
420	0.901
440	0.938
460	0.959
480	0.974
500	0.984
550	0.996
600	0.998
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.998
1800	0.993
2000	0.979
2200	0.952
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.10
Specific Gravity d	4.83
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH95

Code(d) **904313**
Code(e) **910311**

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

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	

Constants of Dispersion Formula	
A_1	2.15636617E+00
A_2	3.29558178E-01
A_3	1.72178935E+00
B_1	1.22880510E-02
B_2	5.55507835E-02
B_3	1.24439340E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	117.7	
Rigidity Modulus G (GPa)	45.2	
Poisson's Ratio σ	0.302	
Knoop Hardness Hk[Class]	630	6
Abrasion Aa	85	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0016
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0059
$\Delta\theta_{g,F}$	0.0055
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		615
Annealing Point AP (℃)		638
Transformation Temperature Tg (℃)		649
Yield Point At (℃)		684
Softening Point SP (℃)		713
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	73
	(+100~+300℃)	87
Thermal Conductivity λ W/(m·K)		0.861

Coloring			
λ_{80}		λ_5	360
λ_{70}	410		

Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	4.11	4.35

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.06
370	0.31
380	0.56
390	0.71
400	0.80
420	0.89
440	0.934
460	0.956
480	0.970
500	0.980
550	0.992
600	0.995
650	0.996
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.997
1600	0.995
1800	0.988
2000	0.972
2200	0.933
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.43
Specific Gravity d	4.64
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH96

Code(d) **764485**
Code(e) **768482**

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

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	1.76057
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

Constants of Dispersion Formula	
A_1	1.85078519E+00
A_2	1.89204854E-01
A_3	1.19763137E+00
B_1	9.40657541E-03
B_2	3.80345187E-02
B_3	1.01426835E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.0
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	118.7	
Rigidity Modulus G (GPa)	45.8	
Poisson's Ratio σ	0.296	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	81	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		629
Yield Point At (℃)		655
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	70
	(+100~+300℃)	84
Thermal Conductivity λ W/(m·K)		0.890

Coloring			
λ_{80}	400	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	342

CCI		
B	G	R
0.00	1.09	1.11

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.02
350	0.19
360	0.48
370	0.71
380	0.83
390	0.905
400	0.941
420	0.972
440	0.982
460	0.988
480	0.992
500	0.994
550	0.996
600	0.996
650	0.996
700	0.997
800	0.997
900	0.996
1000	0.996
1200	0.997
1400	0.995
1600	0.995
1800	0.989
2000	0.972
2200	0.930
2400	0.76

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.12
Specific Gravity d	4.54
Remarks	

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S-LAH97

Code(d) **755523**
Code(e) **758521**

Refractive Index	n_d	**1.75500** 1.755000	Abbe Number	ν_d	**52.32**	Dispersion	n_F-n_C	**0.014431**
Refractive Index	n_e	1.758440	Abbe Number	ν_e	52.08	Dispersion	$n_{F'}$-$n_{C'}$	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

Constants of Dispersion Formula	
A_1	1.02730180E+00
A_2	9.89293564E-01
A_3	1.25781057E+00
B_1	1.83406129E-02
B_2	3.71264195E-03
B_3	8.78510500E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	120.9	
Rigidity Modulus G (GPa)	46.7	
Poisson's Ratio σ	0.295	
Knoop Hardness Hk[Class]	730	7
Abrasion Aa	62	

Partial Dispersions	
n_C-n_t	0.011678
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		644
Annealing Point AP (℃)		670
Transformation Temperature Tg (℃)		692
Yield Point At (℃)		709
Softening Point SP (℃)		721
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	58
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		0.863

Coloring			
λ_{80}	355	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	328	$\lambda_{0.05}$	272

CCI		
B	G	R
0.00	0.21	0.21

Internal Transmittance	
λ(nm)	τ 10mm
280	0.28
290	0.43
300	0.55
310	0.65
320	0.74
330	0.82
340	0.88
350	0.923
360	0.951
370	0.969
380	0.980
390	0.986
400	0.990
420	0.993
440	0.995
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.995
1600	0.994
1800	0.984
2000	0.956
2200	0.87
2400	0.61

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.39
Specific Gravity d	4.17
Remarks	

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S-LAH98

Code(d) **954323**
Code(e) **961321**

Refractive Index	n_d	**1.95375** 1.953750	Abbe Number	ν_d	**32.32**	Dispersion	n_F-n_C **0.029506**
Refractive Index	n_e	1.960733	Abbe Number	ν_e	32.09	Dispersion	$n_{F'}$-$n_{C'}$ 0.029940

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.89737
n_{1970}	1.97009	1.90436
n_{1530}	1.52958	1.91250
n_{1129}	1.12864	1.92115
n_t	1.01398	1.92452
n_s	0.85211	1.93102
$n_{A'}$	0.76819	1.93582
n_r	0.70652	1.94042
n_C	0.65627	1.94514
$n_{C'}$	0.64385	1.94649
n_{He-Ne}	0.6328	1.94775
n_D	0.58929	1.95349
n_d	0.58756	1.95375
n_e	0.54607	1.96073
n_F	0.48613	1.97465
$n_{F'}$	0.47999	1.97643
n_{He-Cd}	0.44157	1.98970
n_g	0.435835	1.99207
n_h	0.404656	2.00732
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.28510629E+00
A_2	3.85532264E-01
A_3	2.06551120E+00
B_1	1.22178962E-02
B_2	5.14752342E-02
B_3	1.45920870E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	129.3	
Rigidity Modulus G (GPa)	49.5	
Poisson's Ratio σ	0.306	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	55	

Partial Dispersions	
n_C-n_t	0.020620
n_C-$n_{A'}$	0.009319
n_d-n_C	0.008609
n_e-n_C	0.015592
n_g-n_d	0.038320
n_g-n_F	0.017423
n_h-n_g	0.015249
n_i-n_g	
n_C-n_t	0.021965
n_e-$n_{C'}$	0.014247
n_F-n_e	0.015693
n_i-$n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6988
$\theta_{C,A'}$	0.3158
$\theta_{d,C}$	0.2918
$\theta_{e,C}$	0.5284
$\theta_{g,d}$	1.2987
$\theta_{g,F}$	0.5905
$\theta_{h,g}$	0.5168
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7336
$\theta'_{e,C'}$	0.4759
$\theta'_{F',e}$	0.5241
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0005
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	0.0011
$\Delta\theta_{g,F}$	0.0013
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		680
Annealing Point AP (℃)		716
Transformation Temperature Tg (℃)		723
Yield Point At (℃)		757
Softening Point SP (℃)		791
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	73
	(+100~+300℃)	87
Thermal Conductivity λ W/(m·K)		0.924

Coloring			
λ_{80}		λ_5	355
λ_{70}	405		

Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	352

CCI		
B	G	R
0.00	2.90	3.06

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.02
360	0.18
370	0.47
380	0.68
390	0.80
400	0.86
420	0.927
440	0.953
460	0.967
480	0.978
500	0.986
550	0.996
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.998
1800	0.993
2000	0.979
2200	0.952
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	2.4	3.5	3.6	4.0	4.5	5.6	6.8
-20~ 0	2.5	3.7	3.8	4.2	4.7	5.9	7.2
0~20	2.6	3.8	3.9	4.3	4.8	6.1	7.5
20~40	2.5	3.8	3.9	4.3	4.9	6.2	7.7
40~60	2.5	3.9	4.0	4.4	5.0	6.4	7.9
60~80	2.7	4.1	4.2	4.7	5.3	6.7	8.3

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.86
Specific Gravity d	4.94
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAH99

Code(d) **001291**
Code(e) **009289**

Refractive Index	n_d	**2.00100** 2.001000	Abbe Number	ν_d	**29.14**	Dispersion	n_F-n_C	**0.034352**
Refractive Index	n_e	2.009118	Abbe Number	ν_e	28.92	Dispersion	$n_{F'}$-$n_{C'}$	0.034895

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.93863
n_{1970}	1.97009	1.94585
n_{1530}	1.52958	1.95440
n_{1129}	1.12864	1.96380
n_t	1.01398	1.96756
n_s	0.85211	1.97488
$n_{A'}$	0.76819	1.98035
n_r	0.70652	1.98561
n_C	0.65627	1.99105
$n_{C'}$	0.64385	1.99260
n_{He-Ne}	0.6328	1.99406
n_D	0.58929	2.00070
n_d	0.58756	2.00100
n_e	0.54607	2.00912
n_F	0.48613	2.02540
$n_{F'}$	0.47999	2.02749
n_{He-Cd}	0.44157	2.04319
n_g	0.435835	2.04600
n_h	0.404656	2.06424
n_i	0.365015	

Constants of Dispersion Formula	
A_1	2.39140662E+00
A_2	4.39219228E-01
A_3	2.38358467E+00
B_1	1.31467500E-02
B_2	5.53226042E-02
B_3	1.61259900E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	131.3	
Rigidity Modulus G (GPa)	50.2	
Poisson's Ratio σ	0.307	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	55	

Partial Dispersions	
n_C-n_t	0.023490
n_C-$n_{A'}$	0.010695
n_d-n_C	0.009952
n_e-n_C	0.018070
n_g-n_d	0.045001
n_g-n_F	0.020601
n_h-n_g	0.018235
n_i-n_g	
n_C-n_t	0.025041
n_e-$n_{C'}$	0.016519
n_F-n_e	0.018376
n_i-$n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6838
$\theta_{C,A'}$	0.3113
$\theta_{d,C}$	0.2897
$\theta_{e,C}$	0.5260
$\theta_{g,d}$	1.3100
$\theta_{g,F}$	0.5997
$\theta_{h,g}$	0.5308
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7176
$\theta'_{e,C'}$	0.4734
$\theta'_{F',e}$	0.5266
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0004
$\Delta\theta_{C,A'}$	0.0001
$\Delta\theta_{g,d}$	0.0058
$\Delta\theta_{g,F}$	0.0054
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		682
Annealing Point AP (℃)		718
Transformation Temperature Tg (℃)		725
Yield Point At (℃)		761
Softening Point SP (℃)		792
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	75
	(+100~+300℃)	88
Thermal Conductivity λ W/(m·K)		0.944

Coloring			
λ_{80}		λ_5	360
λ_{70}	425		

Internal transmission			
$\lambda_{0.80}$	407	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	5.00	5.23

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.25
380	0.49
390	0.66
400	0.76
420	0.87
440	0.924
460	0.951
480	0.968
500	0.980
550	0.995
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.998
1800	0.995
2000	0.983
2200	0.964
2400	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	2.1	3.4	3.5	3.9	4.5	5.8	7.4
-20~ 0	2.1	3.5	3.6	4.1	4.7	6.1	7.8
0~20	2.2	3.6	3.7	4.2	4.8	6.4	8.1
20~40	2.2	3.7	3.8	4.3	4.9	6.6	8.4
40~60	2.3	3.8	3.9	4.5	5.1	6.8	8.7
60~80	2.4	4.1	4.2	4.7	5.4	7.2	9.2

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	0.76
Specific Gravity d	5.02
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL 7Q

Code(d) **652585**
Code(e) **654584**

Refractive Index	n_d	**1.65160** 1.651600	Abbe Number	ν_d	**58.54**	Dispersion	n_F-n_C	**0.011130**
Refractive Index	n_e	1.654255	Abbe Number	ν_e	58.34	Dispersion	$n_{F'}$-$n_{C'}$	0.011215

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.61523
n_{1970}	1.97009	1.62265
n_{1530}	1.52958	1.63034
n_{1129}	1.12864	1.63671
n_t	1.01398	1.63870
n_s	0.85211	1.64204
$n_{A'}$	0.76819	1.64425
n_r	0.70652	1.64624
n_C	0.65627	1.64819
$n_{C'}$	0.64385	1.64874
$n_{He\text{-}Ne}$	0.6328	1.64924
n_D	0.58929	1.65150
n_d	0.58756	1.65160
n_e	0.54607	1.65426
n_F	0.48613	1.65932
$n_{F'}$	0.47999	1.65995
$n_{He\text{-}Cd}$	0.44157	1.66453
n_g	0.435835	1.66532
n_h	0.404656	1.67029
n_i	0.365015	1.67873

Constants of Dispersion Formula	
A_1	9.05277143E-01
A_2	7.77955684E-01
A_3	1.18137286E+00
B_1	1.55606507E-02
B_2	2.84718626E-03
B_3	8.80737900E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	110.8	
Rigidity Modulus G (GPa)	43.3	
Poisson's Ratio σ	0.280	
Knoop Hardness Hk[Class]	680	7
Abrasion Aa	75	

Partial Dispersions	
n_C-n_t	0.009488
n_C-$n_{A'}$	0.003943
n_d-n_C	0.003408
n_e-n_C	0.006063
n_g-n_d	0.013721
n_g-n_F	0.005999
n_h-n_g	0.004966
n_i-n_g	0.013410
n_C-n_t	0.010033
n_e-$n_{C'}$	0.005518
$n_{F'}$-n_e	0.005697
n_i-$n_{F'}$	0.018779

Relative Partial Dispersions	
$\theta_{C,t}$	0.8525
$\theta_{C,A'}$	0.3543
$\theta_{d,C}$	0.3062
$\theta_{e,C}$	0.5447
$\theta_{g,d}$	1.2328
$\theta_{g,F}$	0.5390
$\theta_{h,g}$	0.4462
$\theta_{i,g}$	1.2049
$\theta'_{C',t}$	0.8946
$\theta'_{e,C'}$	0.4920
$\theta'_{F',e}$	0.5080
$\theta'_{i,F'}$	1.6745

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0312
$\Delta\theta_{C,A'}$	0.0075
$\Delta\theta_{g,d}$	-0.0103
$\Delta\theta_{g,F}$	-0.0078
$\Delta\theta_{i,g}$	-0.0299

Thermal Properties		
Strain Point StP (℃)		580
Annealing Point AP (℃)		601
Transformation Temperature Tg (℃)		620
Yield Point At (℃)		646
Softening Point SP (℃)		683
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	55
	(+100~+300℃)	70
Thermal Conductivity λ W/(m·K)		0.989

Coloring			
λ_{80}	365	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	351	$\lambda_{0.05}$	294

CCI		
B	G	R
0.00	0.32	0.29

Internal Transmittance	
λ(nm)	τ 10mm
280	0.01
290	0.03
300	0.08
310	0.19
320	0.34
330	0.51
340	0.67
350	0.79
360	0.88
370	0.930
380	0.960
390	0.974
400	0.983
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.984
1600	0.989
1800	0.977
2000	0.948
2200	0.83
2400	0.59

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	3.8	4.2	4.2	4.3	4.4	4.8	5.0
-20~ 0	3.8	4.2	4.2	4.3	4.5	4.8	5.1
0~20	3.8	4.2	4.2	4.4	4.5	4.8	5.2
20~40	3.8	4.2	4.3	4.4	4.5	4.9	5.2
40~60	3.9	4.3	4.4	4.5	4.6	5.0	5.3
60~80	4.1	4.5	4.5	4.7	4.8	5.2	5.6

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.98
Specific Gravity d	3.24
Remarks	

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S-LAL 8

Code(d) **713539**
Code(e) **716536**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.72848
n_g	0.435835	1.72943
n_h	0.404656	1.73545
n_i	0.365015	1.74575

Constants of Dispersion Formula	
A_1	1.30663291E+00
A_2	5.71377253E-01
A_3	1.24303605E+00
B_1	6.11862448E-03
B_2	2.12721470E-02
B_3	9.06285686E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	114.0	
Rigidity Modulus G (GPa)	44.2	
Poisson's Ratio σ	0.289	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	81	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		590
Annealing Point AP (℃)		617
Transformation Temperature Tg (℃)		643
Yield Point At (℃)		668
Softening Point SP (℃)		698
Expansion Coefficients	(-30~+70℃)	61
α (10^{-7} K^{-1})	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.894

Coloring			
λ_{80}	375	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	356	$\lambda_{0.05}$	295

CCI		
B	G	R
0.00	0.42	0.39

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.03
300	0.07
310	0.15
320	0.28
330	0.44
340	0.60
350	0.74
360	0.84
370	0.905
380	0.944
390	0.965
400	0.977
420	0.988
440	0.991
460	0.994
480	0.996
500	0.997
550	0.998
600	0.996
650	0.997
700	0.997
800	0.998
900	0.997
1000	0.997
1200	0.997
1400	0.991
1600	0.991
1800	0.981
2000	0.955
2200	0.87
2400	0.62

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.75
Specific Gravity d	3.79
Remarks	

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S-LAL 9

Code(d) **691548**
Code(e) **694546**

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

Constants of Dispersion Formula	
A_1	1.16195687E+00
A_2	6.44860099E-01
A_3	1.25062221E+00
B_1	1.59659509E-02
B_2	5.05502467E-04
B_3	9.38284169E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	107.5	
Rigidity Modulus G (GPa)	41.8	
Poisson's Ratio σ	0.287	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	89	

Partial Dispersions	
n_C-n_t	0.010384
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		606
Annealing Point AP (℃)		630
Transformation Temperature Tg (℃)		653
Yield Point At (℃)		679
Softening Point SP (℃)		707
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	61
	(+100~+300℃)	74
Thermal Conductivity λ W/(m·K)		0.895

Coloring			
λ_{80}	375	λ_5	295
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	301

CCI		
B	G	R
0.00	0.51	0.52

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.01
300	0.04
310	0.11
320	0.22
330	0.38
340	0.55
350	0.70
360	0.82
370	0.89
380	0.936
390	0.960
400	0.973
420	0.985
440	0.988
460	0.992
480	0.994
500	0.995
550	0.997
600	0.996
650	0.997
700	0.998
800	0.998
900	0.997
1000	0.996
1200	0.996
1400	0.992
1600	0.992
1800	0.984
2000	0.963
2200	0.89
2400	0.66

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.85
Specific Gravity d	3.63
Remarks	

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S-LAL10

Code(d) **720502**
Code(e) **723500**

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

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

Constants of Dispersion Formula	
A_1	1.52812575E+00
A_2	3.67965267E-01
A_3	1.11751784E+00
B_1	7.76817644E-03
B_2	2.72026548E-02
B_3	8.88697400E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	106.1	
Rigidity Modulus G (GPa)	41.0	
Poisson's Ratio σ	0.294	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	89	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		582
Annealing Point AP (℃)		600
Transformation Temperature Tg (℃)		624
Yield Point At (℃)		657
Softening Point SP (℃)		692
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	61
	(+100~+300℃)	76
Thermal Conductivity λ W/(m·K)		0.850

Coloring			
λ_{80}	380	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	309

CCI		
B	G	R
0.00	0.59	0.60

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.07
320	0.22
330	0.40
340	0.58
350	0.72
360	0.83
370	0.89
380	0.937
390	0.959
400	0.972
420	0.983
440	0.988
460	0.991
480	0.994
500	0.996
550	0.998
600	0.997
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.997
1600	0.996
1800	0.990
2000	0.971
2200	0.922
2400	0.71

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.17
Specific Gravity d	3.86
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL12

Code(d) **678553**
Code(e) **681551**

Refractive Index	n_d	**1.67790** 1.677900	Abbe Number	ν_d	**55.34**	Dispersion	n_F-n_C	**0.012250**
Refractive Index	n_e	1.680820	Abbe Number	ν_e	55.08	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.69225
n_g	0.435835	1.69314
n_h	0.404656	1.69872
n_i	0.365015	1.70826

Constants of Dispersion Formula	
A_1	9.92053895E-01
A_2	7.71377731E-01
A_3	1.18296264E+00
B_1	1.67095063E-02
B_2	2.36750156E-03
B_3	1.05901080E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	5
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.0
Phosphate Resistance PR	4.2

Mechanical Properties		
Young's Modulus E (GPa)	91.0	
Rigidity Modulus G (GPa)	35.4	
Poisson's Ratio σ	0.284	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	166	

Partial Dispersions	
n_C-n_t	0.009855
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		604
Annealing Point AP (℃)		630
Transformation Temperature Tg (℃)		652
Yield Point At (℃)		679
Softening Point SP (℃)		716
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	72
	(+100~+300℃)	86
Thermal Conductivity λ W/(m·K)		0.717

Coloring			
λ_{80}	360	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	337	$\lambda_{0.05}$	279

CCI		
B	G	R
0.00	0.26	0.24

Internal Transmittance	
λ(nm)	τ 10mm
280	0.06
290	0.15
300	0.29
310	0.45
320	0.61
330	0.73
340	0.83
350	0.89
360	0.938
370	0.962
380	0.976
390	0.984
400	0.988
420	0.992
440	0.994
460	0.995
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.997
1000	0.996
1200	0.996
1400	0.991
1600	0.991
1800	0.981
2000	0.963
2200	0.901
2400	0.73

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.61
Specific Gravity d	4.01
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL12Q

Code(d) **678553**
Code(e) **681551**

Refractive Index	n_d	**1.67790** 1.677900	Abbe Number	ν_d	**55.35**	Dispersion	n_F-n_C	**0.012248**
Refractive Index	n_e	1.680821	Abbe Number	ν_e	55.12	Dispersion	$n_{F'}$-$n_{C'}$	0.012351

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.64108
n_{1970}	1.97009	1.64821
n_{1530}	1.52958	1.65566
n_{1129}	1.12864	1.66200
n_t	1.01398	1.66404
n_s	0.85211	1.66754
$n_{A'}$	0.76819	1.66990
n_r	0.70652	1.67204
n_C	0.65627	1.67417
$n_{C'}$	0.64385	1.67476
$n_{He\text{-}Ne}$	0.6328	1.67532
n_D	0.58929	1.67779
n_d	0.58756	1.67790
n_e	0.54607	1.68082
n_F	0.48613	1.68642
$n_{F'}$	0.47999	1.68712
$n_{He\text{-}Cd}$	0.44157	1.69219
n_g	0.435835	1.69307
n_h	0.404656	1.69860
n_i	0.365015	1.70803

Constants of Dispersion Formula	
A_1	1.09887025E+00
A_2	6.65500482E-01
A_3	1.07183658E+00
B_1	5.38103754E-03
B_2	1.86717709E-02
B_3	8.30816500E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	106.8	
Rigidity Modulus G (GPa)	41.4	
Poisson's Ratio σ	0.289	
Knoop Hardness Hk[Class]	700	7
Abrasion Aa	62	

Partial Dispersions	
n_C-n_t	0.010130
n_C-$n_{A'}$	0.004273
n_d-n_C	0.003729
n_e-n_C	0.006650
n_g-n_d	0.015174
n_g-n_F	0.006655
n_h-n_g	0.005527
n_i-n_g	0.014954
n_C-n_t	0.010724
n_e-$n_{C'}$	0.006056
n_F-n_e	0.006295
n_i-$n_{F'}$	0.020912

Relative Partial Dispersions	
$\theta_{C,t}$	0.8271
$\theta_{C,A'}$	0.3489
$\theta_{d,C}$	0.3045
$\theta_{e,C}$	0.5429
$\theta_{g,d}$	1.2389
$\theta_{g,F}$	0.5434
$\theta_{h,g}$	0.4513
$\theta_{i,g}$	1.2209
$\theta'_{C',t}$	0.8683
$\theta'_{e,C'}$	0.4903
$\theta'_{F',e}$	0.5097
$\theta'_{i,F'}$	1.6931

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0207
$\Delta\theta_{C,A'}$	0.0059
$\Delta\theta_{g,d}$	-0.0109
$\Delta\theta_{g,F}$	-0.0085
$\Delta\theta_{i,g}$	-0.0406

Thermal Properties		
Strain Point StP (℃)		637
Annealing Point AP (℃)		670
Transformation Temperature Tg (℃)		689
Yield Point At (℃)		717
Softening Point SP (℃)		750
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	49
	(+100~+300℃)	59
Thermal Conductivity λ W/(m·K)		0.914

Coloring			
λ_{80}	380	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	363	$\lambda_{0.05}$	308

CCI		
B	G	R
0.00	0.53	0.50

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.01
310	0.06
320	0.15
330	0.30
340	0.48
350	0.64
360	0.77
370	0.86
380	0.917
390	0.950
400	0.969
420	0.987
440	0.993
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.998
900	0.996
1000	0.996
1200	0.996
1400	0.981
1600	0.988
1800	0.975
2000	0.944
2200	0.82
2400	0.59

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	5.3	5.7	5.7	5.8	6.0	6.3	6.7
-20~ 0	5.3	5.7	5.8	5.9	6.1	6.4	6.8
0~20	5.3	5.8	5.8	5.9	6.1	6.5	6.9
20~40	5.3	5.8	5.8	6.0	6.1	6.5	6.9
40~60	5.4	5.9	5.9	6.0	6.2	6.6	7.0
60~80	5.6	6.1	6.1	6.2	6.4	6.8	7.3

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.97
Specific Gravity d	3.59
Remarks	

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S-LAL13

Code(d) **694532**
Code(e) **697530**

Refractive Index	n_d	**1.69350** 1.693501	Abbe Number	ν_d	**53.21**	Dispersion	n_F-n_C	**0.013034**
Refractive Index	n_e	1.696607	Abbe Number	ν_e	52.97	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.70877
n_g	0.435835	1.70972
n_h	0.404656	1.71566
n_i	0.365015	1.72585

Constants of Dispersion Formula	
A_1	9.80071267E-01
A_2	8.32904776E-01
A_3	1.28111995E+00
B_1	3.89123698E-03
B_2	1.89164592E-02
B_3	9.89052676E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	107.3	
Rigidity Modulus G (GPa)	41.6	
Poisson's Ratio σ	0.290	
Knoop Hardness Hk[Class]	650	7
Abrasion Aa	84	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		591
Annealing Point AP (℃)		616
Transformation Temperature Tg (℃)		641
Yield Point At (℃)		666
Softening Point SP (℃)		701
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	72
Thermal Conductivity λ W/(m·K)		0.893

Coloring			
λ_{80}	375	λ_5	300
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	360	$\lambda_{0.05}$	304

CCI		
B	G	R
0.00	0.48	0.42

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.01
300	0.03
310	0.08
320	0.19
330	0.34
340	0.52
350	0.68
360	0.80
370	0.88
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	0.88
2400	0.66

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.13
Specific Gravity d	3.60
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL14

Code(d) **697555**
Code(e) **700553**

Refractive Index	n_d	**1.69680**	Abbe Number	ν_d	**55.53**	Dispersion	n_F-n_C	**0.012548**
		1.696797						
Refractive Index	n_e	1.699788	Abbe Number	ν_e	55.31	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.71144
n_g	0.435835	1.71234
n_h	0.404656	1.71800
n_i	0.365015	1.72767

Constants of Dispersion Formula	
A_1	1.23720970E+00
A_2	5.89722623E-01
A_3	1.31921880E+00
B_1	1.53551320E-02
B_2	-3.07896250E-04
B_3	9.37202947E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	111.8	
Rigidity Modulus G (GPa)	43.5	
Poisson's Ratio σ	0.284	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	83	

Partial Dispersions	
n_C-n_t	0.010452
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		650
Yield Point At (℃)		668
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	71
Thermal Conductivity λ W/(m·K)		0.908

Coloring			
λ_{80}	365	λ_5	285
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	349	$\lambda_{0.05}$	285

CCI		
B	G	R
0.00	0.32	0.29

Internal Transmittance	
λ(nm)	τ 10mm
280	0.03
290	0.07
300	0.15
310	0.27
320	0.41
330	0.56
340	0.70
350	0.81
360	0.88
370	0.931
380	0.959
390	0.974
400	0.982
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.998
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.991
1600	0.992
1800	0.982
2000	0.954
2200	0.86
2400	0.59

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.86
Specific Gravity d	3.70
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL18

Code(d) **729547**
Code(e) **732544**

Refractive Index	n_d	**1.72916**	Abbe Number	ν_d	**54.68**	Dispersion	n_F-n_C	**0.013335**
		1.729157						
Refractive Index	n_e	1.732336	Abbe Number	ν_e	54.45	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.74473
n_g	0.435835	1.74570
n_h	0.404656	1.75173
n_i	0.365015	1.76203

Constants of Dispersion Formula	
A_1	1.50276318E+00
A_2	4.30224497E-01
A_3	1.34726060E+00
B_1	1.45462356E-02
B_2	-3.32784153E-03
B_3	9.33508342E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	120.4	
Rigidity Modulus G (GPa)	46.7	
Poisson's Ratio σ	0.289	
Knoop Hardness Hk[Class]	720	7
Abrasion Aa	69	

Partial Dispersions	
n_C-n_t	0.010994
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		632
Annealing Point AP (℃)		655
Transformation Temperature Tg (℃)		685
Yield Point At (℃)		699
Softening Point SP (℃)		731
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	59
	(+100~+300℃)	69
Thermal Conductivity λ W/(m·K)		0.871

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	343	$\lambda_{0.05}$	281

CCI		
B	G	R
0.00	0.30	0.31

Internal Transmittance	
λ(nm)	τ 10mm
280	0.04
290	0.21
300	0.30
310	0.32
320	0.55
330	0.68
340	0.78
350	0.86
360	0.912
370	0.946
380	0.967
390	0.978
400	0.984
420	0.991
440	0.994
460	0.996
480	0.997
500	0.998
550	0.999
600	0.998
650	0.999
700	0.999
800	0.998
900	0.998
1000	0.997
1200	0.996
1400	0.991
1600	0.991
1800	0.982
2000	0.956
2200	0.87
2400	0.60

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	3.3	3.7	3.7	3.8	4.0	4.4	4.7
-20~ 0	3.3	3.7	3.7	3.9	4.0	4.4	4.8
0~20	3.3	3.7	3.8	3.9	4.1	4.5	4.9
20~40	3.3	3.8	3.8	4.0	4.1	4.5	5.0
40~60	3.4	3.8	3.9	4.0	4.2	4.6	5.1
60~80	3.5	4.0	4.0	4.1	4.3	4.8	5.2

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.58
Specific Gravity d	4.18
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL19

Code(d) **729541**
Code(e) **732539**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.74491
n_g	0.435835	1.74588
n_h	0.404656	1.75199
n_i	0.365015	1.76243

Constants of Dispersion Formula	
A_1	9.73997577E-01
A_2	9.58186322E-01
A_3	1.20163359E+00
B_1	3.79332678E-03
B_2	1.77574581E-02
B_3	8.37989600E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	119.8	
Rigidity Modulus G (GPa)	46.3	
Poisson's Ratio σ	0.295	
Knoop Hardness Hk[Class]	720	7
Abrasion Aa	65	

Partial Dispersions	
n_C-n_t	0.011088
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		610
Annealing Point AP (℃)		634
Transformation Temperature Tg (℃)		644
Yield Point At (℃)		672
Softening Point SP (℃)		708
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	54
	(+100~+300℃)	69
Thermal Conductivity λ W/(m·K)		0.895

Coloring			
λ_{80}	355	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	327	$\lambda_{0.05}$	

CCI		
B	G	R
0.00	0.21	0.21

Internal Transmittance	
λ(nm)	τ 10mm
280	0.29
290	0.43
300	0.55
310	0.66
320	0.75
330	0.82
340	0.88
350	0.925
360	0.953
370	0.970
380	0.980
390	0.986
400	0.990
420	0.993
440	0.995
460	0.997
480	0.998
500	0.999
550	0.999
600	0.999
650	0.999
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.993
1600	0.993
1800	0.981
2000	0.951
2200	0.85
2400	0.58

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.61
Specific Gravity d	3.98
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL20

Code(d) **699511**
Code(e) **703508**

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

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.71546
n_g	0.435835	1.71647
n_h	0.404656	1.72283
n_i	0.365015	1.73376

Constants of Dispersion Formula	
A_1	1.06788467E+00
A_2	7.58735350E-01
A_3	1.02804682E+00
B_1	5.18896058E-03
B_2	2.04004357E-02
B_3	1.20826320E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	2
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1
Acid Resistance(Surface) Group SR	53.1
Phosphate Resistance PR	4.2

Mechanical Properties		
Young's Modulus E (GPa)	78.7	
Rigidity Modulus G (GPa)	30.2	
Poisson's Ratio σ	0.302	
Knoop Hardness Hk[Class]	490	5
Abrasion Aa	254	

Partial Dispersions	
n_C-n_t	0.010389
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		593
Annealing Point AP (℃)		621
Transformation Temperature Tg (℃)		628
Yield Point At (℃)		676
Softening Point SP (℃)		717
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	90
	(+100~+300℃)	105
Thermal Conductivity λ W/(m·K)		0.602

Coloring			
λ_{80}	370	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	350	$\lambda_{0.05}$	305

CCI		
B	G	R
0.00	0.40	0.36

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	0.01
310	0.09
320	0.27
330	0.49
340	0.67
350	0.80
360	0.88
370	0.934
380	0.960
390	0.974
400	0.982
420	0.987
440	0.987
460	0.989
480	0.992
500	0.994
550	0.996
600	0.995
650	0.994
700	0.996
800	0.998
900	0.997
1000	0.997
1200	0.998
1400	0.997
1600	0.995
1800	0.985
2000	0.969
2200	0.935
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.23
Specific Gravity d	4.38
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL21

Code(d) **703524**
Code(e) **706521**

Refractive Index	n_d	**1.70300** 1.703000	Abbe Number	ν_d	**52.38**	Dispersion	n_F-n_C	**0.013422**
Refractive Index	n_e	1.706198	Abbe Number	ν_e	52.11	Dispersion	$n_{F'}$-$n_{C'}$	0.013553

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.66940
n_{1970}	1.97009	1.67490
n_{1530}	1.52958	1.68093
n_{1129}	1.12864	1.68652
n_t	1.01398	1.68846
n_s	0.85211	1.69195
$n_{A'}$	0.76819	1.69440
n_r	0.70652	1.69667
n_C	0.65627	1.69895
$n_{C'}$	0.64385	1.69959
$n_{He\text{-}Ne}$	0.6328	1.70019
n_D	0.58929	1.70288
n_d	0.58756	1.70300
n_e	0.54607	1.70620
n_F	0.48613	1.71237
$n_{F'}$	0.47999	1.71315
$n_{He\text{-}Cd}$	0.44157	1.71878
n_g	0.435835	1.71976
n_h	0.404656	1.72593
n_i	0.365015	1.73649

Constants of Dispersion Formula	
A_1	9.35250779E-01
A_2	9.05988706E-01
A_3	1.43351212E+00
B_1	1.80836047E-02
B_2	4.08452643E-03
B_3	1.38683410E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	112.9	
Rigidity Modulus G (GPa)	43.6	
Poisson's Ratio σ	0.293	
Knoop Hardness Hk[Class]	690	7
Abrasion Aa	60	

Partial Dispersions	
n_C-n_t	0.010494
n_C-$n_{A'}$	0.004551
n_d-n_C	0.004048
n_e-n_C	0.007246
n_g-n_d	0.016764
n_g-n_F	0.007390
n_h-n_g	0.006165
n_i-n_g	0.016723
n_C-n_t	0.011135
n_e-$n_{C'}$	0.006605
$n_{F'}$-n_e	0.006948
n_i-$n_{F'}$	0.023341

Relative Partial Dispersions	
$\theta_{C,t}$	0.7819
$\theta_{C,A'}$	0.3391
$\theta_{d,C}$	0.3016
$\theta_{e,C}$	0.5399
$\theta_{g,d}$	1.2490
$\theta_{g,F}$	0.5506
$\theta_{h,g}$	0.4593
$\theta_{i,g}$	1.2459
$\theta'_{C',t}$	0.8216
$\theta'_{e,C'}$	0.4873
$\theta'_{F',e}$	0.5127
$\theta'_{i,F'}$	1.7222

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0105
$\Delta\theta_{C,A'}$	-0.0003
$\Delta\theta_{g,d}$	-0.0069
$\Delta\theta_{g,F}$	-0.0061
$\Delta\theta_{i,g}$	-0.0405

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		767
Yield Point At (℃)		814
Softening Point SP (℃)		879
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	50
	(+100~+300℃)	61
Thermal Conductivity λ W/(m·K)		0.983

Coloring			
λ_{80}	395	λ_5	320
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	320

CCI		
B	G	R
0.00	1.01	0.99

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.01
320	0.05
330	0.15
340	0.30
350	0.48
360	0.65
370	0.77
380	0.85
390	0.909
400	0.942
420	0.975
440	0.986
460	0.991
480	0.994
500	0.996
550	0.998
600	0.997
650	0.997
700	0.996
800	0.995
900	0.992
1000	0.991
1200	0.992
1400	0.989
1600	0.992
1800	0.987
2000	0.979
2200	0.949
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	6.8	7.4	7.4	7.6	7.8	8.2	8.7
-20~ 0	6.9	7.4	7.5	7.6	7.8	8.3	8.8
0~20	6.9	7.5	7.5	7.7	7.9	8.4	8.9
20~40	6.9	7.5	7.6	7.7	7.9	8.4	9.0
40~60	7.0	7.6	7.6	7.8	8.0	8.6	9.1
60~80	7.1	7.8	7.8	8.0	8.2	8.7	9.3

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.64
Specific Gravity d	3.85
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL54Q

Code(d) **651562**
Code(e) **654560**

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

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	1.67939

Constants of Dispersion Formula	
A_1	9.20085087E-01
A_2	7.58646115E-01
A_3	1.07073096E+00
B_1	1.60829667E-02
B_2	2.92059306E-03
B_3	8.51211200E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	3
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	4.0
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	101.9	
Rigidity Modulus G (GPa)	39.6	
Poisson's Ratio σ	0.287	
Knoop Hardness Hk[Class]	680	7
Abrasion Aa	61	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		646
Annealing Point AP (℃)		679
Transformation Temperature Tg (℃)		688
Yield Point At (℃)		718
Softening Point SP (℃)		748
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	43
	(+100~+300℃)	55
Thermal Conductivity λ W/(m·K)		0.921

Coloring			
λ_{80}	385	λ_5	
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	367	$\lambda_{0.05}$	311

CCI		
B	G	R
0.00	0.62	0.63

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	0.04
320	0.11
330	0.24
340	0.41
350	0.58
360	0.73
370	0.83
380	0.90
390	0.938
400	0.962
420	0.984
440	0.991
460	0.995
480	0.997
500	0.997
550	0.998
600	0.997
650	0.998
700	0.997
800	0.997
900	0.995
1000	0.993
1200	0.994
1400	0.976
1600	0.986
1800	0.973
2000	0.942
2200	0.81
2400	0.58

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.17
Specific Gravity d	3.36
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL58

Code(d) **694508**
Code(e) **697505**

Refractive Index	n_d	**1.69350**	Abbe Number	ν_d	**50.81**	Dispersion	n_F-n_C	**0.013649**
		1.693495						
Refractive Index	n_e	1.696745	Abbe Number	ν_e	50.53	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.70960
n_g	0.435835	1.71061
n_h	0.404656	1.71696
n_i	0.365015	1.72788

Constants of Dispersion Formula	
A_1	1.06368789E+00
A_2	7.44939067E-01
A_3	1.59178942E+00
B_1	1.85199640E-02
B_2	1.16295862E-03
B_3	1.56636025E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.2

Mechanical Properties		
Young's Modulus E (GPa)	92.8	
Rigidity Modulus G (GPa)	36.1	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	580	6
Abrasion Aa	158	

Partial Dispersions	
n_C-n_t	0.010565
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		633
Annealing Point AP (℃)		659
Transformation Temperature Tg (℃)		676
Yield Point At (℃)		718
Softening Point SP (℃)		770
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	75
	(+100~+300℃)	86
Thermal Conductivity λ W/(m·K)		0.728

Coloring			
λ_{80}	370	λ_5	320
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	354	$\lambda_{0.05}$	322

CCI		
B	G	R
0.00	0.30	0.28

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.02
330	0.22
340	0.53
350	0.75
360	0.87
370	0.935
380	0.962
390	0.977
400	0.986
420	0.991
440	0.992
460	0.994
480	0.996
500	0.997
550	0.998
600	0.997
650	0.997
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.999
1400	0.997
1600	0.996
1800	0.989
2000	0.977
2200	0.942
2400	0.84

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.70
Specific Gravity d	4.03
Remarks	

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S-LAL59

Code(d) **734515**
Code(e) **737512**

Refractive Index	n_d	**1.73400**	Abbe Number	ν_d	**51.47**	Dispersion	n_F-n_C	**0.014261**
		1.733997						
Refractive Index	n_e	1.737395	Abbe Number	ν_e	51.24	Dispersion	$n_{F'}$-$n_{C'}$	0.014392

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.75072
n_g	0.435835	1.75176
n_h	0.404656	1.75829
n_i	0.365015	1.76950

Constants of Dispersion Formula	
A_1	1.13962742E+00
A_2	8.05227838E-01
A_3	1.29488061E+00
B_1	4.93294862E-03
B_2	2.02479960E-02
B_3	9.34746507E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	113.7	
Rigidity Modulus G (GPa)	44.0	
Poisson's Ratio σ	0.293	
Knoop Hardness Hk[Class]	700	7
Abrasion Aa	69	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		591
Annealing Point AP (℃)		620
Transformation Temperature Tg (℃)		635
Yield Point At (℃)		663
Softening Point SP (℃)		696
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	55
	(+100~+300℃)	68
Thermal Conductivity λ W/(m·K)		0.863

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	347	$\lambda_{0.05}$	283

CCI		
B	G	R
0.00	0.36	0.33

Internal Transmittance	
λ(nm)	τ 10mm
280	0.02
290	0.11
300	0.20
310	0.34
320	0.48
330	0.62
340	0.74
350	0.83
360	0.89
370	0.934
380	0.959
390	0.973
400	0.982
420	0.990
440	0.993
460	0.995
480	0.997
500	0.998
550	0.999
600	0.998
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.997
1200	0.997
1400	0.994
1600	0.994
1800	0.986
2000	0.964
2200	0.905
2400	0.65

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.87
Specific Gravity d	4.04
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAL61

Code(d) **741527**
Code(e) **744524**

Refractive Index	n_d	**1.74100** 1.740999	Abbe Number	ν_d	**52.64**	Dispersion	n_F-n_C **0.014078**
Refractive Index	n_e	1.744354	Abbe Number	ν_e	52.41	Dispersion	$n_{F'}$-$n_{C'}$ 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

Constants of Dispersion Formula	
A_1	1.11073292E+00
A_2	8.59347773E-01
A_3	1.26707433E+00
B_1	4.64181248E-03
B_2	1.92989261E-02
B_3	8.73917698E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	119.0	
Rigidity Modulus G (GPa)	46.1	
Poisson's Ratio σ	0.291	
Knoop Hardness Hk[Class]	720	7
Abrasion Aa	71	

Partial Dispersions	
n_C-n_t	0.011481
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		631
Annealing Point AP (℃)		646
Transformation Temperature Tg (℃)		653
Yield Point At (℃)		688
Softening Point SP (℃)		724
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	70
Thermal Conductivity λ W/(m·K)		0.861

Coloring			
λ_{80}	365	λ_5	280
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	296

CCI		
B	G	R
0.00	0.58	0.59

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	0.02
300	0.07
310	0.15
320	0.27
330	0.43
340	0.59
350	0.72
360	0.82
370	0.89
380	0.935
390	0.958
400	0.971
420	0.982
440	0.988
460	0.991
480	0.994
500	0.996
550	0.997
600	0.997
650	0.997
700	0.998
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.994
1600	0.994
1800	0.985
2000	0.959
2200	0.88
2400	0.62

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.55
Specific Gravity d	4.04
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAM 2

Code(d) **744448**
Code(e) **748445**

Refractive Index	n_d	**1.74400** 1.743997	Abbe Number	ν_d	**44.78**	Dispersion	n_F-n_C **0.016613**
Refractive Index	n_e	1.747946	Abbe Number	ν_e	44.50	Dispersion	$n_{F'}$-$n_{C'}$ 0.016806

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.76380
n_g	0.435835	1.76506
n_h	0.404656	1.77304
n_i	0.365015	1.78708

Constants of Dispersion Formula	
A_1	1.77130000E+00
A_2	1.95814230E-01
A_3	1.19487834E+00
B_1	9.76652444E-03
B_2	4.12718628E-02
B_3	1.10458122E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2～3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	3.0

Mechanical Properties		
Young's Modulus E (GPa)	93.5	
Rigidity Modulus G (GPa)	36.1	
Poisson's Ratio σ	0.295	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	157	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		590
Annealing Point AP (℃)		617
Transformation Temperature Tg (℃)		633
Yield Point At (℃)		670
Softening Point SP (℃)		711
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	74
	(+100~+300℃)	87
Thermal Conductivity λ W/(m·K)		0.698

Coloring			
λ_{80}	395	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	372	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	1.00	1.02

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.04
350	0.29
360	0.59
370	0.78
380	0.87
390	0.925
400	0.950
420	0.973
440	0.983
460	0.987
480	0.992
500	0.995
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.997
1000	0.997
1200	0.999
1400	0.997
1600	0.996
1800	0.988
2000	0.971
2200	0.928
2400	0.79

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.72
Specific Gravity d	4.32
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAM 3

Code(d) **717479**
Code(e) **721476**

Refractive Index	n_d	**1.71700** 1.717004	Abbe Number	ν_d	**47.92**	Dispersion	n_F-n_C	**0.014961**
Refractive Index	n_e	1.720563	Abbe Number	ν_e	47.64	Dispersion	$n_{F'}$-$n_{C'}$	0.015124

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.73475
n_g	0.435835	1.73587
n_h	0.404656	1.74296
n_i	0.365015	1.75531

Constants of Dispersion Formula	
A_1	1.64258713E+00
A_2	2.39634610E-01
A_3	1.22483026E+00
B_1	8.68246020E-03
B_2	3.51226242E-02
B_3	1.16604369E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	53.2
Phosphate Resistance PR	4.2

Mechanical Properties		
Young's Modulus E (GPa)	86.8	
Rigidity Modulus G (GPa)	33.5	
Poisson's Ratio σ	0.294	
Knoop Hardness Hk[Class]	510	5
Abrasion Aa	184	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		588
Annealing Point AP (℃)		614
Transformation Temperature Tg (℃)		630
Yield Point At (℃)		661
Softening Point SP (℃)		701
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	80
	(+100~+300℃)	94
Thermal Conductivity λ W/(m·K)		0.655

Coloring			
λ_{80}	385	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	368	$\lambda_{0.05}$	338

CCI		
B	G	R
0.00	0.65	0.63

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.10
350	0.41
360	0.69
370	0.83
380	0.916
390	0.951
400	0.968
420	0.982
440	0.987
460	0.990
480	0.993
500	0.995
550	0.997
600	0.996
650	0.996
700	0.997
800	0.999
900	0.997
1000	0.997
1200	0.996
1400	0.994
1600	0.992
1800	0.983
2000	0.966
2200	0.920
2400	0.77

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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	0.0	0.4	0.9
0~20	-0.8	-0.4	-0.4	-0.2	0.0	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.51
Specific Gravity d	4.25
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAM 7

Code(d) **750353**
Code(e) **755350**

Refractive Index	n_d	**1.74950** 1.749497	Abbe Number	ν_d	**35.28**	Dispersion	n_F-n_C **0.021243**
Refractive Index	n_e	1.754527	Abbe Number	ν_e	35.02	Dispersion	$n_{F'}$-$n_{C'}$ 0.021544

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	

Constants of Dispersion Formula	
A_1	1.71014712E+00
A_2	2.56943292E-01
A_3	1.63986271E+00
B_1	1.05161080E-02
B_2	5.02809636E-02
B_3	1.46181217E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	97.0	
Rigidity Modulus G (GPa)	38.1	
Poisson's Ratio σ	0.273	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	140	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0018
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0026
$\Delta\theta_{g,F}$	0.0025
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		583
Annealing Point AP (℃)		615
Transformation Temperature Tg (℃)		628
Yield Point At (℃)		673
Softening Point SP (℃)		739
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	67
	(+100~+300℃)	79
Thermal Conductivity λ W/(m·K)		0.871

Coloring			
λ_{80}	420	λ_5	355
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	396	$\lambda_{0.05}$	359

CCI		
B	G	R
0.00	2.84	2.97

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.08
370	0.34
380	0.59
390	0.75
400	0.84
420	0.935
440	0.965
460	0.977
480	0.984
500	0.989
550	0.996
600	0.997
650	0.998
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.996
1800	0.990
2000	0.982
2200	0.950
2400	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.53
Specific Gravity d	3.81
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAM54

Code(d) **757478**
Code(e) **761476**

Refractive Index	n_d	**1.75700**	Abbe Number	ν_d	**47.82**	Dispersion	n_F-n_C	**0.015830**
		1.756998						
Refractive Index	n_e	1.760765	Abbe Number	ν_e	47.57	Dispersion	$n_{F'}$-$n_{C'}$	0.015991

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.77570
n_g	0.435835	1.77687
n_h	0.404656	1.78431
n_i	0.365015	1.79726

Constants of Dispersion Formula	
A_1	1.84213306E+00
A_2	1.75468631E-01
A_3	1.25750878E+00
B_1	9.43993220E-03
B_2	3.95281122E-02
B_3	8.65463013E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	1～2
Acid Resistance(Surface) Group SR	51.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	117.2	
Rigidity Modulus G (GPa)	45.4	
Poisson's Ratio σ	0.292	
Knoop Hardness Hk[Class]	700	7
Abrasion Aa	69	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		614
Annealing Point AP (℃)		637
Transformation Temperature Tg (℃)		664
Yield Point At (℃)		687
Softening Point SP (℃)		721
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	57
	(+100~+300℃)	69
Thermal Conductivity λ W/(m·K)		0.891

Coloring			
λ_{80}	390	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	369	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	0.75	0.80

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.05
350	0.33
360	0.65
370	0.82
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	0.87
2400	0.62

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.70
Specific Gravity d	4.08
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-LAM55

Code(d) **762401**
Code(e) **767398**

Refractive Index	n_d	**1.76200** 1.762001	Abbe Number	ν_d	**40.10**	Dispersion	n_F-n_C **0.019003**
Refractive Index	n_e	1.766509	Abbe Number	ν_e	39.82	Dispersion	$n_{F'}$-$n_{C'}$ 0.019247

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.78487
n_g	0.435835	1.78634
n_h	0.404656	1.79580
n_i	0.365015	1.81280

Constants of Dispersion Formula	
A_1	1.85412979E+00
A_2	1.65450323E-01
A_3	1.27255422E+00
B_1	1.08438152E-02
B_2	5.14050980E-02
B_3	1.09986837E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	51.2
Phosphate Resistance PR	1.0

Mechanical Properties		
Young's Modulus E (GPa)	96.7	
Rigidity Modulus G (GPa)	37.4	
Poisson's Ratio σ	0.292	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	145	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		589
Annealing Point AP (℃)		617
Transformation Temperature Tg (℃)		632
Yield Point At (℃)		662
Softening Point SP (℃)		709
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	71
	(+100~+300℃)	84
Thermal Conductivity λ W/(m·K)		0.741

Coloring			
λ_{80}	405	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	350

CCI		
B	G	R
0.00	1.43	1.46

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.06
360	0.37
370	0.67
380	0.82
390	0.89
400	0.932
420	0.963
440	0.976
460	0.984
480	0.989
500	0.993
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.994
1800	0.986
2000	0.970
2200	0.923
2400	0.78

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.88
Specific Gravity d	4.22
Remarks	

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S-LAM60

Code(d) **743493**
Code(e) **747491**

Refractive Index	n_d	**1.74320**	Abbe Number	ν_d	**49.34**	Dispersion	n_F-n_C	**0.015063**
		1.743198						
Refractive Index	n_e	1.746784	Abbe Number	ν_e	49.10	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.76094
n_g	0.435835	1.76205
n_h	0.404656	1.76904
n_i	0.365015	1.78113

Constants of Dispersion Formula	
A_1	1.60673056E+00
A_2	3.66415640E-01
A_3	1.31761804E+00
B_1	7.75046140E-03
B_2	2.89967611E-02
B_3	9.30720709E+01

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	52.0
Phosphate Resistance PR	2.0

Mechanical Properties		
Young's Modulus E (GPa)	113.2	
Rigidity Modulus G (GPa)	43.8	
Poisson's Ratio σ	0.294	
Knoop Hardness Hk[Class]	730	7
Abrasion Aa	70	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		594
Annealing Point AP (℃)		615
Transformation Temperature Tg (℃)		643
Yield Point At (℃)		658
Softening Point SP (℃)		693
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	54
	(+100~+300℃)	66
Thermal Conductivity λ W/(m·K)		0.845

Coloring			
λ_{80}	375	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	360	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	0.51	0.52

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.03
340	0.29
350	0.60
360	0.79
370	0.89
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	0.87
2400	0.62

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.90
Specific Gravity d	4.06
Remarks	

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S-LAM66

Code(d) **801350**
Code(e) **806347**

Refractive Index	n_d	**1.80100** 1.800999	Abbe Number	ν_d	**34.97**	Dispersion	n_F-n_C	**0.022907**
Refractive Index	n_e	1.806423	Abbe Number	ν_e	34.72	Dispersion	$n_{F'}$-$n_{C'}$	0.023227

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82879
n_g	0.435835	1.83061
n_h	0.404656	1.84236
n_i	0.365015	1.86391

Constants of Dispersion Formula	
A_1	1.92094221E+00
A_2	2.19901208E-01
A_3	1.72705231E+00
B_1	1.15075241E-02
B_2	5.47993543E-02
B_3	1.20133674E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	121.0	
Rigidity Modulus G (GPa)	47.3	
Poisson's Ratio σ	0.280	
Knoop Hardness Hk[Class]	660	7
Abrasion Aa	93	

Partial Dispersions	
n_C-n_t	0.016620
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		514
Annealing Point AP (℃)		544
Transformation Temperature Tg (℃)		554
Yield Point At (℃)		586
Softening Point SP (℃)		629
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	79
	(+100~+300℃)	95
Thermal Conductivity λ W/(m·K)		1.06

Coloring			
λ_{80}	430	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	388	$\lambda_{0.05}$	351

CCI		
B	G	R
0.00	2.58	2.67

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.03
360	0.28
370	0.57
380	0.73
390	0.82
400	0.87
420	0.932
440	0.954
460	0.968
480	0.977
500	0.985
550	0.994
600	0.994
650	0.994
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.998
1600	0.997
1800	0.992
2000	0.976
2200	0.937
2400	0.77

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.92
Specific Gravity d	3.55
Remarks	

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S-LAM73

Code(d) **794371**
Code(e) **799368**

Refractive Index	n_d	**1.79360** 1.793600	Abbe Number	ν_d	**37.09**	Dispersion	n_F-n_C **0.021397**
Refractive Index	n_e	1.798672	Abbe Number	ν_e	36.82	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.81950
n_g	0.435835	1.82119
n_h	0.404656	1.83200
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.86353123E+00
A_2	2.55215617E-01
A_3	1.23399133E+00
B_1	1.07620673E-02
B_2	4.87248679E-02
B_3	1.17125110E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	3
Acid Resistance(Surface) Group SR	52.2
Phosphate Resistance PR	2.2

Mechanical Properties		
Young's Modulus E (GPa)	86.8	
Rigidity Modulus G (GPa)	33.2	
Poisson's Ratio σ	0.306	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	182	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0080
$\Delta\theta_{C,A'}$	-0.0008
$\Delta\theta_{g,d}$	0.0015
$\Delta\theta_{g,F}$	0.0013
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		584
Annealing Point AP (℃)		607
Transformation Temperature Tg (℃)		623
Yield Point At (℃)		658
Softening Point SP (℃)		695
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	89
	(+100~+300℃)	105
Thermal Conductivity λ W/(m·K)		0.648

Coloring			
λ_{80}	415	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	382	$\lambda_{0.05}$	349

CCI		
B	G	R
0.00	1.77	1.79

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.08
360	0.34
370	0.62
380	0.78
390	0.87
400	0.916
420	0.954
440	0.968
460	0.976
480	0.983
500	0.989
550	0.995
600	0.994
650	0.994
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.997
1600	0.995
1800	0.984
2000	0.964
2200	0.925
2400	0.80

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.52
Specific Gravity d	4.45
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH 5

Code(d) **654397**
Code(e) **658395**

Refractive Index	n_d	**1.65412** 1.654115	Abbe Number	ν_d	**39.68**	Dispersion	n_F-n_C **0.016484**
Refractive Index	n_e	1.658026	Abbe Number	ν_e	39.43	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.67389
n_g	0.435835	1.67517
n_h	0.404656	1.68331
n_i	0.365015	1.69791

Constants of Dispersion Formula	
A_1	1.47544521E+00
A_2	1.93060095E-01
A_3	1.50939010E+00
B_1	9.55836740E-03
B_2	4.60430483E-02
B_3	1.26422746E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	90.2	
Rigidity Modulus G (GPa)	36.1	
Poisson's Ratio σ	0.248	
Knoop Hardness Hk[Class]	580	6
Abrasion Aa	123	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		489
Annealing Point AP (℃)		511
Transformation Temperature Tg (℃)		524
Yield Point At (℃)		575
Softening Point SP (℃)		645
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	66
	(+100~+300℃)	84
Thermal Conductivity λ W/(m·K)		0.965

Coloring			
λ_{80}	370	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	357	$\lambda_{0.05}$	328

CCI		
B	G	R
0.00	0.66	0.69

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.12
340	0.47
350	0.71
360	0.83
370	0.902
380	0.936
390	0.957
400	0.969
420	0.980
440	0.985
460	0.988
480	0.991
500	0.994
550	0.997
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.991
1600	0.994
1800	0.989
2000	0.976
2200	0.919
2400	0.80

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.22
Specific Gravity d	3.02
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH 8

Code(d) **720347**
Code(e) **725345**

Refractive Index	n_d	**1.72047** 1.720467	Abbe Number	ν_d	**34.71**	Dispersion	n_F-n_C **0.020758**
Refractive Index	n_e	1.725385	Abbe Number	ν_e	34.47	Dispersion	$n_{F'}$-$n_{C'}$ 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

Constants of Dispersion Formula	
A_1	1.61344136E+00
A_2	2.57295888E-01
A_3	1.98364455E+00
B_1	1.06386752E-02
B_2	4.87071624E-02
B_3	1.59784404E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	101.7	
Rigidity Modulus G (GPa)	40.7	
Poisson's Ratio σ	0.250	
Knoop Hardness Hk[Class]	590	6
Abrasion Aa	153	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		476
Annealing Point AP (℃)		499
Transformation Temperature Tg (℃)		508
Yield Point At (℃)		555
Softening Point SP (℃)		611
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	81
	(+100~+300℃)	100
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	390	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	371	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	1.38	1.48

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.03
340	0.24
350	0.49
360	0.67
370	0.79
380	0.86
390	0.908
400	0.936
420	0.962
440	0.972
460	0.979
480	0.984
500	0.989
550	0.996
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.997
1800	0.992
2000	0.984
2200	0.955
2400	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.90
Specific Gravity d	3.19
Remarks	

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S-NBH51

Code(d) **750353**
Code(e) **755351**

Refractive Index	n_d	**1.74950** 1.749505	Abbe Number	ν_d	**35.33**	Dispersion	n_F-n_C **0.021214**
Refractive Index	n_e	1.754531	Abbe Number	ν_e	35.10	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.77515
n_g	0.435835	1.77681
n_h	0.404656	1.78753
n_i	0.365015	1.80695

Constants of Dispersion Formula	
A_1	1.71203689E+00
A_2	2.55989588E-01
A_3	1.81456998E+00
B_1	1.07724134E-02
B_2	4.88593504E-02
B_3	1.36359013E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	109.7	
Rigidity Modulus G (GPa)	43.8	
Poisson's Ratio σ	0.253	
Knoop Hardness Hk[Class]	610	6
Abrasion Aa	113	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		500
Annealing Point AP (℃)		521
Transformation Temperature Tg (℃)		535
Yield Point At (℃)		578
Softening Point SP (℃)		631
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	73
	(+100~+300℃)	92
Thermal Conductivity λ W/(m·K)		1.12

Coloring			
λ_{80}	400	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	370	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	1.22	1.30

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.02
340	0.22
350	0.49
360	0.68
370	0.80
380	0.87
390	0.918
400	0.943
420	0.967
440	0.976
460	0.982
480	0.987
500	0.991
550	0.997
600	0.997
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.994
1800	0.989
2000	0.980
2200	0.945
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.66
Specific Gravity d	3.29
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH52V

Code(d) **673383**
Code(e) **677380**

Refractive Index	n_d	**1.67300** 1.673000	Abbe Number	ν_d	**38.26**	Dispersion	n_F-n_C **0.017592**
Refractive Index	n_e	1.677172	Abbe Number	ν_e	38.01	Dispersion	$n_{F'}$-$n_{C'}$ 0.017815

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.69415
n_g	0.435835	1.69551
n_h	0.404656	1.70425
n_i	0.365015	1.71994

Constants of Dispersion Formula	
A_1	1.51336868E+00
A_2	2.12341478E-01
A_3	1.54149143E+00
B_1	9.87077827E-03
B_2	4.62843662E-02
B_3	1.26978510E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	96.3	
Rigidity Modulus G (GPa)	38.6	
Poisson's Ratio σ	0.246	
Knoop Hardness Hk[Class]	600	6
Abrasion Aa	139	

Partial Dispersions	
n_C-n_t	0.013160
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		460
Annealing Point AP (℃)		483
Transformation Temperature Tg (℃)		497
Yield Point At (℃)		538
Softening Point SP (℃)		592
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	77
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	360	λ_5	320
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	348	$\lambda_{0.05}$	320

CCI		
B	G	R
0.00	0.25	0.26

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.04
330	0.31
340	0.65
350	0.84
360	0.919
370	0.956
380	0.974
390	0.983
400	0.988
420	0.992
440	0.993
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.992
1600	0.993
1800	0.986
2000	0.973
2200	0.922
2400	0.82

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.11
Specific Gravity d	3.01
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH53V

Code(d) **738323**
Code(e) **743321**

Refractive Index	n_d	**1.73800** 1.738000	Abbe Number	ν_d	**32.33**	Dispersion	n_F-n_C	**0.022830**
Refractive Index	n_e	1.743402	Abbe Number	ν_e	32.10	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.76579
n_g	0.435835	1.76762
n_h	0.404656	1.77943
n_i	0.365015	1.80114

Constants of Dispersion Formula	
A_1	1.65444141E+00
A_2	2.67453927E-01
A_3	2.14530347E+00
B_1	1.12485533E-02
B_2	5.20272740E-02
B_3	1.67366100E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	102.7	
Rigidity Modulus G (GPa)	41.5	
Poisson's Ratio σ	0.237	
Knoop Hardness Hk[Class]	600	6
Abrasion Aa	126	

Partial Dispersions	
n_C-n_t	0.016332
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		501
Annealing Point AP (℃)		523
Transformation Temperature Tg (℃)		538
Yield Point At (℃)		582
Softening Point SP (℃)		640
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	71
	(+100~+300℃)	93
Thermal Conductivity λ W/(m·K)		1.13

Coloring			
λ_{80}	385	λ_5	330
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	361	$\lambda_{0.05}$	331

CCI		
B	G	R
0.00	0.61	0.67

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.03
340	0.28
350	0.61
360	0.79
370	0.88
380	0.927
390	0.952
400	0.968
420	0.982
440	0.988
460	0.991
480	0.993
500	0.995
550	0.997
600	0.998
650	0.998
700	0.999
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.995
1600	0.995
1800	0.990
2000	0.984
2200	0.951
2400	0.928

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.99
Specific Gravity d	3.19
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH55

Code(d) **800299**
Code(e) **806296**

Refractive Index	n_d	**1.80000** 1.800000	Abbe Number	ν_d	**29.84**	Dispersion	n_F-n_C	**0.026806**
Refractive Index	n_e	1.806331	Abbe Number	ν_e	29.61	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.83145156E+00
A_2	2.87818024E-01
A_3	2.15208300E+00
B_1	1.22443139E-02
B_2	5.73877310E-02
B_3	1.86099124E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	105.3	
Rigidity Modulus G (GPa)	41.5	
Poisson's Ratio σ	0.269	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	148	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0007
$\Delta\theta_{C,A'}$	-0.0003
$\Delta\theta_{g,d}$	0.0094
$\Delta\theta_{g,F}$	0.0085
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		613
Yield Point At (℃)		663
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	90
Thermal Conductivity λ W/(m·K)		0.994

Coloring			
λ_{80}	435	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	392	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	2.72	2.91

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.04
370	0.34
380	0.63
390	0.78
400	0.86
420	0.931
440	0.958
460	0.970
480	0.978
500	0.983
550	0.992
600	0.995
650	0.995
700	0.997
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.991
2000	0.985
2200	0.969
2400	0.943

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.50
Specific Gravity d	3.68
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH56

Code(d) **855248**
Code(e) **863246**

Refractive Index	n_d	**1.85478**	Abbe Number	ν_d	**24.80**	Dispersion	n_F-n_C	**0.034469**
		1.854780						
Refractive Index	n_e	1.862904	Abbe Number	ν_e	24.61	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.89755
n_g	0.435835	1.90045
n_h	0.404656	1.91944
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.85191438E+00
A_2	4.31102852E-01
A_3	3.45278284E+00
B_1	1.32732620E-02
B_2	5.85944644E-02
B_3	2.39357089E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	106.7	
Rigidity Modulus G (GPa)	42.7	
Poisson's Ratio σ	0.249	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	138	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0109
$\Delta\theta_{C,A'}$	0.0012
$\Delta\theta_{g,d}$	0.0117
$\Delta\theta_{g,F}$	0.0109
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		578
Yield Point At (℃)		612
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	77
	(+100~+300℃)	94
Thermal Conductivity λ W/(m·K)		1.12

Coloring			
λ_{80}		λ_5	360
λ_{70}	395		

Internal transmission			
$\lambda_{0.80}$	389	$\lambda_{0.05}$	358

CCI		
B	G	R
0.00	2.57	2.76

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.11
370	0.44
380	0.69
390	0.81
400	0.87
420	0.933
440	0.958
460	0.970
480	0.978
500	0.983
550	0.993
600	0.996
650	0.996
700	0.997
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.997
1800	0.993
2000	0.991
2200	0.977
2400	0.966

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.35
Specific Gravity d	3.49
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH57

Code(d) **850300**
Code(e) **857298**

Refractive Index	n_d	**1.85025** 1.850250	Abbe Number	ν_d	**30.05**	Dispersion	n_F-n_C **0.028299**
Refractive Index	n_e	1.856938	Abbe Number	ν_e	29.82	Dispersion	$n_{F'}$-$n_{C'}$ 0.028738

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	

Constants of Dispersion Formula	
A_1	1.92026488E+00
A_2	3.71535240E-01
A_3	2.55205704E+00
B_1	1.18468028E-02
B_2	5.32105472E-02
B_3	2.04549300E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	111.7	
Rigidity Modulus G (GPa)	43.8	
Poisson's Ratio σ	0.275	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	143	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0021
$\Delta\theta_{C,A'}$	0.0004
$\Delta\theta_{g,d}$	0.0053
$\Delta\theta_{g,F}$	0.0051
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		625
Yield Point At (℃)		679
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	77
	(+100~+300℃)	92
Thermal Conductivity λ W/(m·K)		0.988

Coloring			
λ_{80}		λ_5	355
λ_{70}	410		

Internal transmission			
$\lambda_{0.80}$	399	$\lambda_{0.05}$	355

CCI		
B	G	R
0.00	3.97	4.14

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.17
370	0.42
380	0.60
390	0.72
400	0.81
420	0.89
440	0.936
460	0.955
480	0.968
500	0.978
550	0.993
600	0.994
650	0.994
700	0.996
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.992
2000	0.984
2200	0.968
2400	0.921

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.95
Specific Gravity d	4.00
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH58

Code(d) **789284**
Code(e) **795282**

Refractive Index	n_d	**1.78880** 1.788800	Abbe Number	ν_d	**28.43**	Dispersion	n_F-n_C	**0.027747**
Refractive Index	n_e	1.795354	Abbe Number	ν_e	28.22	Dispersion	$n_{F'}$-$n_{C'}$	0.028184

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.73459
n_{1970}	1.97009	1.74170
n_{1530}	1.52958	1.74987
n_{1129}	1.12864	1.75829
n_t	1.01398	1.76149
n_s	0.85211	1.76759
$n_{A'}$	0.76819	1.77207
n_r	0.70652	1.77635
n_C	0.65627	1.78076
$n_{C'}$	0.64385	1.78201
n_{He-Ne}	0.6328	1.78319
n_D	0.58929	1.78856
n_d	0.58756	1.78880
n_e	0.54607	1.79535
n_F	0.48613	1.80850
$n_{F'}$	0.47999	1.81020
n_{He-Cd}	0.44157	1.82290
n_g	0.435835	1.82518
n_h	0.404656	1.83997
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.71408219E+00
A_2	3.62966167E-01
A_3	2.56486266E+00
B_1	1.16812775E-02
B_2	5.40847347E-02
B_3	1.88785700E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	105.1	
Rigidity Modulus G (GPa)	42.3	
Poisson's Ratio σ	0.244	
Knoop Hardness Hk[Class]	590	6
Abrasion Aa	131	

Partial Dispersions	
n_C-n_t	0.019265
n_C-$n_{A'}$	0.008684
n_d-n_C	0.008043
n_e-n_C	0.014597
n_g-n_d	0.036376
n_g-n_F	0.016672
n_h-n_g	0.014799
n_i-n_g	
n_C-n_t	0.020520
n_e-$n_{C'}$	0.013342
n_F-n_e	0.014842
n_i-$n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6943
$\theta_{C,A'}$	0.3130
$\theta_{d,C}$	0.2899
$\theta_{e,C}$	0.5261
$\theta_{g,d}$	1.3110
$\theta_{g,F}$	0.6009
$\theta_{h,g}$	0.5334
$\theta_{i,g}$	
$\theta'_{C',t}$	0.7281
$\theta'_{e,C'}$	0.4734
$\theta'_{F',e}$	0.5266
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0142
$\Delta\theta_{C,A'}$	0.0027
$\Delta\theta_{g,d}$	0.0053
$\Delta\theta_{g,F}$	0.0054
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		515
Annealing Point AP (℃)		540
Transformation Temperature Tg (℃)		560
Yield Point At (℃)		600
Softening Point SP (℃)		652
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	74
	(+100~+300℃)	95
Thermal Conductivity λ W/(m·K)		1.13

Coloring			
λ_{80}	410	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	376	$\lambda_{0.05}$	344

CCI		
B	G	R
0.00	1.27	1.35

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.14
360	0.48
370	0.73
380	0.85
390	0.907
400	0.936
420	0.966
440	0.979
460	0.985
480	0.989
500	0.992
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	0.997
1600	0.996
1800	0.992
2000	0.987
2200	0.965
2400	0.946

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	3.3	4.2	4.3	4.6	5.1	6.1	7.3
-20~ 0	3.2	4.3	4.3	4.7	5.1	6.3	7.6
0~20	3.2	4.3	4.4	4.7	5.2	6.5	7.9
20~40	3.2	4.4	4.4	4.8	5.3	6.6	8.1
40~60	3.2	4.4	4.5	4.9	5.5	6.8	8.3
60~80	3.3	4.6	4.6	5.1	5.6	7.0	8.6

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.15
Specific Gravity d	3.33
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBH59

Code(d) **766358**
Code(e) **771356**

Refractive Index	n_d	**1.76634**	Abbe Number	ν_d	**35.82**	Dispersion	n_F-n_C	**0.021393**
		1.766342						
Refractive Index	n_e	1.771415	Abbe Number	ν_e	35.59	Dispersion	$n_{F'}$-$n_{C'}$	0.021677

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.72069
n_{1970}	1.97009	1.72721
n_{1530}	1.52958	1.73454
n_{1129}	1.12864	1.74182
n_t	1.01398	1.74450
n_s	0.85211	1.74951
$n_{A'}$	0.76819	1.75313
n_r	0.70652	1.75655
n_C	0.65627	1.76004
$n_{C'}$	0.64385	1.76103
n_{He-Ne}	0.6328	1.76196
n_D	0.58929	1.76615
n_d	0.58756	1.76634
n_e	0.54607	1.77141
n_F	0.48613	1.78143
$n_{F'}$	0.47999	1.78270
n_{He-Cd}	0.44157	1.79215
n_g	0.435835	1.79382
n_h	0.404656	1.80453
n_i	0.365015	1.82378

Constants of Dispersion Formula	
A_1	1.73689864E+00
A_2	2.87362541E-01
A_3	1.85126136E+00
B_1	1.07866506E-02
B_2	4.58085077E-02
B_3	1.49646900E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	112.1	
Rigidity Modulus G (GPa)	44.4	
Poisson's Ratio σ	0.261	
Knoop Hardness Hk[Class]	610	6
Abrasion Aa	135	

Partial Dispersions	
n_C-n_t	0.015542
n_C-$n_{A'}$	0.006912
n_d-n_C	0.006303
n_e-n_C	0.011376
n_g-n_d	0.027481
n_g-n_F	0.012391
n_h-n_g	0.010708
n_i-n_g	0.029960
n_C-n_t	0.016531
n_e-$n_{C'}$	0.010387
$n_{F'}$-n_e	0.011290
n_i-$n_{F'}$	0.041078

Relative Partial Dispersions	
$\theta_{C,t}$	0.7265
$\theta_{C,A'}$	0.3231
$\theta_{d,C}$	0.2946
$\theta_{e,C}$	0.5318
$\theta_{g,d}$	1.2846
$\theta_{g,F}$	0.5792
$\theta_{h,g}$	0.5005
$\theta_{i,g}$	1.4005
$\theta'_{C',t}$	0.7626
$\theta'_{e,C'}$	0.4792
$\theta'_{F',e}$	0.5208
$\theta'_{i,F'}$	1.8950

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0118
$\Delta\theta_{C,A'}$	0.0038
$\Delta\theta_{g,d}$	-0.0057
$\Delta\theta_{g,F}$	-0.0043
$\Delta\theta_{i,g}$	-0.0246

Thermal Properties		
Strain Point StP (℃)		493
Annealing Point AP (℃)		516
Transformation Temperature Tg (℃)		526
Yield Point At (℃)		572
Softening Point SP (℃)		623
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	103
Thermal Conductivity λ W/(m·K)		1.10

Coloring			
λ_{80}	395	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	322

CCI		
B	G	R
0.00	1.09	1.08

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.02
330	0.17
340	0.42
350	0.62
360	0.75
370	0.84
380	0.90
390	0.932
400	0.952
420	0.970
440	0.976
460	0.982
480	0.987
500	0.991
550	0.997
600	0.996
650	0.995
700	0.997
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.995
1800	0.987
2000	0.975
2200	0.942
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	2.8	3.6	3.7	3.9	4.3	5.1	5.9
-20~ 0	2.7	3.6	3.7	3.9	4.3	5.2	6.1
0~20	2.7	3.6	3.6	3.9	4.3	5.2	6.2
20~40	2.6	3.5	3.6	3.9	4.3	5.2	6.2
40~60	2.6	3.6	3.6	3.9	4.3	5.3	6.3
60~80	2.7	3.7	3.7	4.1	4.5	5.5	6.6

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.40
Specific Gravity d	3.47
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NBM51

Code(d) **613443**
Code(e) **617440**

Refractive Index	n_d	**1.61340** 1.613397	Abbe Number	ν_d	**44.27**	Dispersion	n_F-n_C	**0.013857**
Refractive Index	n_e	1.616690	Abbe Number	ν_e	44.02	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.62986
n_g	0.435835	1.63091
n_h	0.404656	1.63755
n_i	0.365015	1.64927

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

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

Mechanical Properties		
Young's Modulus E (GPa)	81.7	
Rigidity Modulus G (GPa)	32.9	
Poisson's Ratio σ	0.243	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	125	

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

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

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

Thermal Properties		
Strain Point StP (℃)		509
Annealing Point AP (℃)		531
Transformation Temperature Tg (℃)		554
Yield Point At (℃)		611
Softening Point SP (℃)		693
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	65
	(+100~+300℃)	78
Thermal Conductivity λ W/(m·K)		0.904

Coloring			
λ_{80}	350	λ_5	320
λ_{70}			

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

CCI		
B	G	R
0.00	0.38	0.40

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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	3.0	3.4	3.4	3.6	3.8	4.2	4.7
-20~ 0	3.1	3.6	3.6	3.7	3.9	4.4	4.9
0~20	3.2	3.7	3.7	3.9	4.1	4.6	5.1
20~40	3.2	3.8	3.8	4.0	4.2	4.8	5.3
40~60	3.4	3.9	4.0	4.2	4.4	4.9	5.5
60~80	3.5	4.1	4.1	4.3	4.5	5.1	5.7

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.47
Specific Gravity d	2.93
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 1

Code(d) **808228**
Code(e) **816226**

Refractive Index	n_d	**1.80809** 1.808095	Abbe Number	ν_d	**22.76**	Dispersion	n_F-n_C	**0.035504**
Refractive Index	n_e	1.816434	Abbe Number	ν_e	22.57	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.85279
n_g	0.435835	1.85590
n_h	0.404656	1.87658
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.75156623E+00
A_2	3.64006304E-01
A_3	2.47874141E+00
B_1	1.35004681E-02
B_2	6.68245147E-02
B_3	1.70756006E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	89.3	
Rigidity Modulus G (GPa)	35.7	
Poisson's Ratio σ	0.250	
Knoop Hardness Hk[Class]	460	5
Abrasion Aa	320	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0020
$\Delta\theta_{g,d}$	0.0292
$\Delta\theta_{g,F}$	0.0261
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		516
Annealing Point AP (℃)		547
Transformation Temperature Tg (℃)		552
Yield Point At (℃)		589
Softening Point SP (℃)		645
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	104
Thermal Conductivity λ W/(m·K)		0.882

Coloring			
λ_{80}	445	λ_5	375
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	404	$\lambda_{0.05}$	378

CCI		
B	G	R
0.00	4.24	4.43

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	0.14
390	0.53
400	0.77
420	0.917
440	0.952
460	0.967
480	0.975
500	0.982
550	0.992
600	0.994
650	0.995
700	0.996
800	0.997
900	0.997
1000	0.996
1200	0.997
1400	0.994
1600	0.992
1800	0.984
2000	0.973
2200	0.934
2400	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.23
Specific Gravity d	3.29
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 1W

Code(d) **808228**
Code(e) **816226**

Refractive Index	n_d	**1.80809** 1.808095	Abbe Number	ν_d	**22.76**	Dispersion	n_F-n_C	**0.035504**
Refractive Index	n_e	1.816434	Abbe Number	ν_e	22.57	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.85279
n_g	0.435835	1.85590
n_h	0.404656	1.87658
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.75156623E+00
A_2	3.64006304E-01
A_3	2.47874141E+00
B_1	1.35004681E-02
B_2	6.68245147E-02
B_3	1.70756006E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	89.3	
Rigidity Modulus G (GPa)	35.7	
Poisson's Ratio σ	0.250	
Knoop Hardness Hk[Class]	460	5
Abrasion Aa	320	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	-0.0020
$\Delta\theta_{g,d}$	0.0292
$\Delta\theta_{g,F}$	0.0261
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		516
Annealing Point AP (℃)		547
Transformation Temperature Tg (℃)		552
Yield Point At (℃)		589
Softening Point SP (℃)		645
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	104
Thermal Conductivity λ W/(m·K)		0.882

Coloring			
λ_{80}	420	λ_5	375
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	372

CCI		
B	G	R
0.00	2.65	2.84

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	0.28
390	0.67
400	0.87
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	0.88

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.23
Specific Gravity d	3.29
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 2

Code(d) **923189**
Code(e) **934187**

Refractive Index	n_d	**1.92286** 1.922860	Abbe Number	ν_d	**18.90**	Dispersion	n_F-n_C **0.048838**
Refractive Index	n_e	1.934291	Abbe Number	ν_e	18.74	Dispersion	$n_{F'}$-$n_{C'}$ 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	

Constants of Dispersion Formula	
A_1	2.03869510E+00
A_2	4.37269641E-01
A_3	2.96711461E+00
B_1	1.70796224E-02
B_2	7.49254813E-02
B_3	1.74155354E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	99.1	
Rigidity Modulus G (GPa)	39.7	
Poisson's Ratio σ	0.249	
Knoop Hardness Hk[Class]	450	5
Abrasion Aa	237	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0012
$\Delta\theta_{C,A'}$	-0.0045
$\Delta\theta_{g,d}$	0.0436
$\Delta\theta_{g,F}$	0.0386
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		604
Annealing Point AP (℃)		631
Transformation Temperature Tg (℃)		650
Yield Point At (℃)		676
Softening Point SP (℃)		716
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	67
	(+100~+300℃)	83
Thermal Conductivity λ W/(m·K)		0.969

Coloring			
λ_{80}		λ_5	390
λ_{70}	440		

Internal transmission			
$\lambda_{0.80}$	433	$\lambda_{0.05}$	391

CCI		
B	G	R
0.00	12.87	13.51

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	
390	0.02
400	0.24
420	0.70
440	0.85
460	0.910
480	0.936
500	0.953
550	0.978
600	0.988
650	0.990
700	0.993
800	0.996
900	0.996
1000	0.996
1200	0.997
1400	0.997
1600	0.996
1800	0.992
2000	0.988
2200	0.977
2400	0.961

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.31
Specific Gravity d	3.58
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 3

Code(d) **959175**
Code(e) **972173**

Refractive Index	n_d	**1.95906** 1.959060	Abbe Number	ν_d	**17.47**	Dispersion	n_F-n_C	**0.054895**
Refractive Index	n_e	1.971885	Abbe Number	ν_e	17.33	Dispersion	$n_{F'}$-$n_{C'}$	0.056091

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.87064
n_{1970}	1.97009	1.88002
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	1.94834
n_D	0.58929	1.95860
n_d	0.58756	1.95906
n_e	0.54607	1.97188
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	

Constants of Dispersion Formula	
A_1	2.09834903E+00
A_2	4.89088388E-01
A_3	2.94009268E+00
B_1	1.79123869E-02
B_2	7.76653353E-02
B_3	1.60930428E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	102.2	
Rigidity Modulus G (GPa)	41.1	
Poisson's Ratio σ	0.243	
Knoop Hardness Hk[Class]	450	5
Abrasion Aa	215	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0022
$\Delta\theta_{C,A'}$	-0.0063
$\Delta\theta_{g,d}$	0.0527
$\Delta\theta_{g,F}$	0.0466
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		671
Yield Point At (℃)		704
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	59
	(+100~+300℃)	65
Thermal Conductivity λ W/(m·K)		1.01

Coloring			
λ_{80}		λ_5	395
λ_{70}	440		

Internal transmission			
$\lambda_{0.80}$	430	$\lambda_{0.05}$	398

CCI		
B	G	R
0.00	13.14	13.56

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	
390	
400	0.12
420	0.72
440	0.88
460	0.932
480	0.956
500	0.970
550	0.990
600	0.996
650	0.997
700	0.999
800	0.999
900	0.998
1000	0.998
1200	0.999
1400	0.998
1600	0.995
1800	0.989
2000	0.983
2200	0.968
2400	0.949

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.35
Specific Gravity d	3.59
Remarks	

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S-NPH 4

Code(d) **893204**
Code(e) **903202**

Refractive Index	n_d	**1.89286**	Abbe Number	ν_d	**20.36**	Dispersion	n_F-n_C	**0.043851**
		1.892860						
Refractive Index	n_e	1.903144	Abbe Number	ν_e	20.20	Dispersion	$n_{F'}$-$n_{C'}$	0.044721

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
$n_{He\text{-}Ne}$	0.6328	1.88420
n_D	0.58929	1.89249
n_d	0.58756	1.89286
n_e	0.54607	1.90314
n_F	0.48613	1.92433
$n_{F'}$	0.47999	1.92712
$n_{He\text{-}Cd}$	0.44157	1.94846
n_g	0.435835	1.95237
n_h	0.404656	1.97853
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.93563931E+00
A_2	4.49596478E-01
A_3	2.71828573E+00
B_1	1.52585289E-02
B_2	6.96815778E-02
B_3	1.70327149E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	94.5	
Rigidity Modulus G (GPa)	37.7	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	440	4
Abrasion Aa	268	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0033
$\Delta\theta_{C,A'}$	-0.0032
$\Delta\theta_{g,d}$	0.0347
$\Delta\theta_{g,F}$	0.0308
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		638
Yield Point At (℃)		668
Softening Point SP (℃)		711
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	73
	(+100~+300℃)	88
Thermal Conductivity λ W/(m·K)		0.925

Coloring			
λ_{80}		λ_5	380
λ_{70}	410		

Internal transmission			
$\lambda_{0.80}$	409	$\lambda_{0.05}$	380

CCI		
B	G	R
0.00	4.93	5.17

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	
380	0.06
390	0.39
400	0.71
420	0.915
440	0.951
460	0.966
480	0.975
500	0.982
550	0.993
600	0.997
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.999
1600	0.995
1800	0.984
2000	0.971
2200	0.948
2400	0.915

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.39
Specific Gravity d	3.61
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 5

Code(d) **859227**
Code(e) **868225**

Refractive Index	n_d	**1.85896** 1.858956	Abbe Number	ν_d	**22.73**	Dispersion	n_F-n_C **0.037792**
Refractive Index	n_e	1.867836	Abbe Number	ν_e	22.54	Dispersion	$n_{F'}$-$n_{C'}$ 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	1.83103
$n_{A'}$	0.76819	1.83681
n_r	0.70652	1.84240
n_C	0.65627	1.84821
$n_{C'}$	0.64385	1.84987
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.90645
n_g	0.435835	1.90975
n_h	0.404656	1.93160
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.89108996E+00
A_2	3.95220126E-01
A_3	2.20492127E+00
B_1	1.41164499E-02
B_2	6.62834445E-02
B_3	1.48680700E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	92.9	
Rigidity Modulus G (GPa)	37.0	
Poisson's Ratio σ	0.256	
Knoop Hardness Hk[Class]	470	5
Abrasion Aa	277	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0018
$\Delta\theta_{g,d}$	0.0265
$\Delta\theta_{g,F}$	0.0237
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		573
Annealing Point AP (℃)		599
Transformation Temperature Tg (℃)		609
Yield Point At (℃)		651
Softening Point SP (℃)		704
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	76
	(+100~+300℃)	84
Thermal Conductivity λ W/(m·K)		0.877

Coloring			
λ_{80}		λ_5	370
λ_{70}	400		

Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	364

CCI		
B	G	R
0.00	3.38	3.62

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.03
370	0.08
380	0.41
390	0.72
400	0.84
420	0.924
440	0.949
460	0.962
480	0.971
500	0.979
550	0.991
600	0.994
650	0.995
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.996
1600	0.993
1800	0.984
2000	0.972
2200	0.944
2400	0.915

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.18
Specific Gravity d	3.71
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NPH 7

Code(d) **778239**
Code(e) **786237**

Refractive Index	n_d	**1.77830** 1.778300	Abbe Number	ν_d	**23.91**	Dispersion	n_F-n_C **0.032549**
Refractive Index	n_e	1.785954	Abbe Number	ν_e	23.71	Dispersion	$n_{F'}$-$n_{C'}$ 0.033147

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.72077
n_{1970}	1.97009	1.72750
n_{1530}	1.52958	1.73544
n_{1129}	1.12864	1.74406
n_t	1.01398	1.74749
n_s	0.85211	1.75417
$n_{A'}$	0.76819	1.75917
n_r	0.70652	1.76400
n_C	0.65627	1.76902
$n_{C'}$	0.64385	1.77046
$n_{He\text{-}Ne}$	0.6328	1.77182
n_D	0.58929	1.77802
n_d	0.58756	1.77830
n_e	0.54607	1.78595
n_F	0.48613	1.80157
$n_{F'}$	0.47999	1.80361
$n_{He\text{-}Cd}$	0.44157	1.81909
n_g	0.435835	1.82191
n_h	0.404656	1.84053
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.68236554E+00
A_2	3.39649644E-01
A_3	2.25049208E+00
B_1	1.31431682E-02
B_2	6.45040012E-02
B_3	1.81386300E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	75.3	
Rigidity Modulus G (GPa)	29.6	
Poisson's Ratio σ	0.269	
Knoop Hardness Hk[Class]	350	4
Abrasion Aa	448	

Partial Dispersions	
n_C-n_t	0.021538
n_C-$n_{A'}$	0.009855
n_d-n_C	0.009276
n_e-n_C	0.016930
n_g-n_d	0.043611
n_g-n_F	0.020338
n_h-n_g	0.018622
n_i-n_g	
n_C-n_t	0.022976
n_e-$n_{C'}$	0.015492
n_F-n_e	0.017655
n_i-$n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.6617
$\theta_{C,A'}$	0.3028
$\theta_{d,C}$	0.2850
$\theta_{e,C}$	0.5201
$\theta_{g,d}$	1.3399
$\theta_{g,F}$	0.6248
$\theta_{h,g}$	0.5721
$\theta_{i,g}$	
$\theta'_{C',t}$	0.6932
$\theta'_{e,C'}$	0.4674
$\theta'_{F',e}$	0.5326
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0029
$\Delta\theta_{C,A'}$	-0.0020
$\Delta\theta_{g,d}$	0.0249
$\Delta\theta_{g,F}$	0.0220
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		520
Annealing Point AP (℃)		541
Transformation Temperature Tg (℃)		569
Yield Point At (℃)		598
Softening Point SP (℃)		630
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	109
	(+100~+300℃)	130
Thermal Conductivity λ W/(m·K)		0.826

Coloring			
λ_{80}	420	λ_5	370
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	365

CCI		
B	G	R
0.00	2.61	2.69

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.11
380	0.45
390	0.74
400	0.87
420	0.949
440	0.971
460	0.980
480	0.986
500	0.990
550	0.996
600	0.997
650	0.997
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.999
1600	0.995
1800	0.984
2000	0.970
2200	0.951
2400	0.920

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-5.3	-4.5	-4.4	-4.1	-3.6	-2.3	-0.8
-20~ 0	-5.5	-4.5	-4.5	-4.1	-3.6	-2.2	-0.5
0~20	-5.6	-4.6	-4.5	-4.1	-3.5	-2.1	-0.3
20~40	-5.6	-4.6	-4.5	-4.1	-3.5	-2.0	-0.1
40~60	-5.7	-4.6	-4.5	-4.1	-3.5	-1.8	0.1
60~80	-5.7	-4.6	-4.5	-4.0	-3.4	-1.6	0.4

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.45
Specific Gravity d	3.30
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NSL 3

Code(d) **518590**
Code(e) **520586**

Refractive Index	n_d	**1.51823**	Abbe Number	ν_d	**58.90**	Dispersion	n_F-n_C	**0.008798**
		1.518229						
Refractive Index	n_e	1.520326	Abbe Number	ν_e	58.63	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.52852
n_g	0.435835	1.52915
n_h	0.404656	1.53315
n_i	0.365015	1.53999

Constants of Dispersion Formula	
A_1	8.82514764E-01
A_2	3.89271907E-01
A_3	1.10693448E+00
B_1	4.64504582E-03
B_2	2.00551397E-02
B_3	1.36234339E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	70.0	
Rigidity Modulus G (GPa)	28.8	
Poisson's Ratio σ	0.217	
Knoop Hardness Hk[Class]	510	5
Abrasion Aa	117	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		455
Annealing Point AP (℃)		492
Transformation Temperature Tg (℃)		500
Yield Point At (℃)		553
Softening Point SP (℃)		668
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	90
	(+100~+300℃)	110
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	340	λ_5	310
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	340	$\lambda_{0.05}$	317

CCI		
B	G	R
0.00	0.09	0.06

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.15
330	0.53
340	0.80
350	0.924
360	0.968
370	0.984
380	0.990
390	0.995
400	0.997
420	0.997
440	0.997
460	0.997
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.998
900	0.998
1000	0.997
1200	0.997
1400	0.992
1600	0.991
1800	0.968
2000	0.930
2200	0.86
2400	0.81

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.60
Specific Gravity d	2.48
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-NSL36

Code(d) **517524**
Code(e) **520522**

Refractive Index	n_d	**1.51742**	Abbe Number	ν_d	**52.43**	Dispersion	n_F-n_C	**0.009869**
		1.517417						
Refractive Index	n_e	1.519765	Abbe Number	ν_e	52.14	Dispersion	$n_{F'}$-$n_{C'}$	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

Constants of Dispersion Formula	
A_1	1.09666153E+00
A_2	1.68990073E-01
A_3	1.20580827E+00
B_1	6.67491123E-03
B_2	3.36095450E-02
B_3	1.41668738E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	64.0	
Rigidity Modulus G (GPa)	28.1	
Poisson's Ratio σ	0.139	
Knoop Hardness Hk[Class]	480	5
Abrasion Aa	113	

Partial Dispersions	
n_C-n_t	0.007887
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		429
Annealing Point AP (℃)		465
Transformation Temperature Tg (℃)		464
Yield Point At (℃)		522
Softening Point SP (℃)		655
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	80
	(+100~+300℃)	93
Thermal Conductivity λ W/(m·K)		1.09

Coloring			
λ_{80}	360	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	360	$\lambda_{0.05}$	337

CCI		
B	G	R
0.00	0.22	0.20

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.18
350	0.57
360	0.81
370	0.917
380	0.960
390	0.980
400	0.989
420	0.995
440	0.996
460	0.997
480	0.998
500	0.998
550	0.999
600	0.999
650	0.998
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.996
1600	0.994
1800	0.978
2000	0.950
2200	0.89
2400	0.86

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.82
Specific Gravity d	2.46
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-PHM52

Code(d) **618634**
Code(e) **620630**

Refractive Index	n_d	**1.61800** 1.618000	Abbe Number	ν_d	**63.33**	Dispersion	n_F-n_C	**0.009758**
Refractive Index	n_e	1.620327	Abbe Number	ν_e	63.02	Dispersion	$n_{F'}$-$n_{C'}$	0.009844

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

Constants of Dispersion Formula	
A_1	1.09966550E+00
A_2	4.78125422E-01
A_3	1.13214074E+00
B_1	1.32718559E-02
B_2	-6.01649685E-04
B_3	1.30595472E+02

Chemical Properties	
Water Resistance(Powder) Group RW(P)	1
Acid Resistance(Powder) Group RA(P)	4
Weathering Resistance(Surface) Group W(S)	2
Acid Resistance(Surface) Group SR	5.0
Phosphate Resistance PR	4.0

Mechanical Properties		
Young's Modulus E (GPa)	71.5	
Rigidity Modulus G (GPa)	27.7	
Poisson's Ratio σ	0.292	
Knoop Hardness Hk[Class]	390	4
Abrasion Aa	468	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		587
Yield Point At (℃)		617
Softening Point SP (℃)		-
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	101
	(+100~+300℃)	120
Thermal Conductivity λ W/(m·K)		0.599

Coloring			
λ_{80}	370	λ_5	325
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	330

CCI		
B	G	R
0.00	0.55	0.57

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	0.05
340	0.25
350	0.51
360	0.72
370	0.85
380	0.923
390	0.957
400	0.974
420	0.986
440	0.990
460	0.992
480	0.994
500	0.996
550	0.998
600	0.998
650	0.998
700	0.998
800	0.997
900	0.996
1000	0.996
1200	0.996
1400	0.996
1600	0.991
1800	0.979
2000	0.961
2200	0.926
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.00
Specific Gravity d	3.67
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-PHM52Q

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

Refractive Index	n_d	**1.61800** 1.618000	Abbe Number	ν_d	**63.32**	Dispersion	n_F-n_C	**0.009760**
Refractive Index	n_e	1.620327	Abbe Number	ν_e	63.02	Dispersion	$n_{F'}$-$n_{C'}$	0.009843

Refractive Indices		
λ(μm)		
n_{2325}	2.32542	1.58996
n_{1970}	1.97009	1.59514
n_{1530}	1.52958	1.60064
n_{1129}	1.12864	1.60545
n_t	1.01398	1.60703
n_s	0.85211	1.60977
$n_{A'}$	0.76819	1.61164
n_r	0.70652	1.61334
n_C	0.65627	1.61503
$n_{C'}$	0.64385	1.61550
$n_{He\text{-}Ne}$	0.6328	1.61594
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	1.62534
$n_{He\text{-}Cd}$	0.44157	1.62938
n_g	0.435835	1.63008
n_h	0.404656	1.63448
n_i	0.365015	1.64195

Constants of Dispersion Formula	
A_1	1.26968750E+00
A_2	3.08418136E-01
A_3	1.04078976E+00
B_1	6.21622949E-03
B_2	2.07785265E-02
B_3	1.12051250E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.0	
Rigidity Modulus G (GPa)	32.7	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	420	4
Abrasion Aa	313	

Partial Dispersions	
n_C-n_t	0.007997
n_C-$n_{A'}$	0.003394
n_d-n_C	0.002971
n_e-n_C	0.005298
n_g-n_d	0.012085
n_g-n_F	0.005296
n_h-n_g	0.004390
n_i-n_g	0.011862
n_C-n_t	0.008469
n_e-$n_{C'}$	0.004826
n_F-n_e	0.005017
n_i-$n_{F'}$	0.016603

Relative Partial Dispersions	
$\theta_{C,t}$	0.8194
$\theta_{C,A'}$	0.3477
$\theta_{d,C}$	0.3044
$\theta_{e,C}$	0.5428
$\theta_{g,d}$	1.2382
$\theta_{g,F}$	0.5426
$\theta_{h,g}$	0.4498
$\theta_{i,g}$	1.2154
$\theta'_{C',t}$	0.8604
$\theta'_{e,C'}$	0.4903
$\theta'_{F',e}$	0.5097
$\theta'_{i,F'}$	1.6868

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	-0.0244
$\Delta\theta_{C,A'}$	-0.0049
$\Delta\theta_{g,d}$	0.0050
$\Delta\theta_{g,F}$	0.0036
$\Delta\theta_{i,g}$	0.0206

Thermal Properties		
Strain Point StP (℃)		539
Annealing Point AP (℃)		559
Transformation Temperature Tg (℃)		577
Yield Point At (℃)		614
Softening Point SP (℃)		650
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	88
	(+100~+300℃)	103
Thermal Conductivity λ W/(m·K)		0.738

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

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

CCI		
B	G	R
0.00	0.31	0.29

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	0.02
330	0.17
340	0.44
350	0.69
360	0.85
370	0.924
380	0.961
390	0.978
400	0.986
420	0.991
440	0.992
460	0.994
480	0.996
500	0.997
550	0.998
600	0.998
650	0.997
700	0.997
800	0.998
900	0.998
1000	0.998
1200	0.999
1400	0.995
1600	0.991
1800	0.978
2000	0.960
2200	0.900
2400	0.85

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-0.9	-0.6	-0.6	-0.5	-0.4	-0.1	0.2
-20~ 0	-1.0	-0.7	-0.7	-0.6	-0.4	-0.2	0.1
0~20	-1.1	-0.8	-0.8	-0.6	-0.5	-0.2	0.1
20~40	-1.2	-0.8	-0.8	-0.7	-0.5	-0.2	0.1
40~60	-1.1	-0.8	-0.8	-0.7	-0.5	-0.2	0.1
60~80	-1.1	-0.7	-0.7	-0.6	-0.4	-0.1	0.2

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.41
Specific Gravity d	3.51
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-PHM53

Code(d) **603655**
Code(e) **605651**

Refractive Index	n_d	**1.60300** 1.603001	Abbe Number	ν_d	**65.44**	Dispersion	n_F-n_C	**0.009215**
Refractive Index	n_e	1.605200	Abbe Number	ν_e	65.15	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.61372
n_g	0.435835	1.61438
n_h	0.404656	1.61850
n_i	0.365015	1.62547

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

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

Mechanical Properties		
Young's Modulus E (GPa)	70.8	
Rigidity Modulus G (GPa)	27.5	
Poisson's Ratio σ	0.285	
Knoop Hardness Hk[Class]	390	4
Abrasion Aa	407	

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

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

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

Thermal Properties		
Strain Point StP (℃)		-
Annealing Point AP (℃)		-
Transformation Temperature Tg (℃)		610
Yield Point At (℃)		644
Softening Point SP (℃)		681
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	93
	(+100~+300℃)	109
Thermal Conductivity λ W/(m·K)		0.615

Coloring			
λ_{80}	360	λ_5	300
λ_{70}			

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

CCI		
B	G	R
0.00	0.56	0.52

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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	-3.1	-2.8	-2.8	-2.7	-2.6	-2.4	-2.2
-20~ 0	-3.0	-2.8	-2.8	-2.7	-2.6	-2.4	-2.1
0~20	-3.0	-2.7	-2.7	-2.6	-2.5	-2.3	-2.0
20~40	-2.9	-2.6	-2.6	-2.5	-2.4	-2.1	-1.9
40~60	-2.9	-2.5	-2.5	-2.4	-2.2	-1.9	-1.7
60~80	-2.7	-2.3	-2.3	-2.2	-2.0	-1.7	-1.5

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.21
Specific Gravity d	3.51
Remarks	

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S-TIH 1

Code(d) **717295**
Code(e) **723293**

Refractive Index	n_d	**1.71736**	Abbe Number	ν_d	**29.52**	Dispersion	n_F-n_C	**0.024303**
		1.717362						
Refractive Index	n_e	1.723098	Abbe Number	ν_e	29.28	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.60326759E+00
A_2	2.42980935E-01
A_3	1.81313592E+00
B_1	1.18019139E-02
B_2	5.91363658E-02
B_3	1.61218747E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	88.4	
Rigidity Modulus G (GPa)	35.5	
Poisson's Ratio σ	0.247	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	157	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0060
$\Delta\theta_{C,A'}$	0.0003
$\Delta\theta_{g,d}$	0.0121
$\Delta\theta_{g,F}$	0.0110
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		569
Annealing Point AP (℃)		597
Transformation Temperature Tg (℃)		622
Yield Point At (℃)		653
Softening Point SP (℃)		703
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	96
Thermal Conductivity λ W/(m·K)		1.02

Coloring			
λ_{80}	405	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	392	$\lambda_{0.05}$	366

CCI		
B	G	R
0.00	2.31	2.29

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.19
380	0.56
390	0.78
400	0.88
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-40~-20	1.3	2.1	2.2	2.5	2.9	3.8	5.0
-20~ 0	1.2	2.1	2.2	2.5	2.9	4.0	5.2
0~20	1.2	2.2	2.3	2.6	3.1	4.2	5.4
20~40	1.3	2.3	2.3	2.7	3.2	4.3	5.7
40~60	1.3	2.4	2.5	2.8	3.3	4.5	5.9
60~80	1.5	2.6	2.6	3.0	3.5	4.8	6.3

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.85
Specific Gravity d	3.06
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH 3

Code(d) **740283**
Code(e) **746281**

Refractive Index	n_d	**1.74000** 1.739998	Abbe Number	ν_d	**28.30**	Dispersion	n_F-n_C	**0.026152**
Refractive Index	n_e	1.746167	Abbe Number	ν_e	28.07	Dispersion	$n_{F'}$-$n_{C'}$	0.026584

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	

Constants of Dispersion Formula	
A_1	1.64797648E+00
A_2	2.67261917E-01
A_3	2.19772845E+00
B_1	1.21917693E-02
B_2	5.97893039E-02
B_3	1.92158340E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	90.8	
Rigidity Modulus G (GPa)	36.2	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	173	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0001
$\Delta\theta_{g,d}$	0.0135
$\Delta\theta_{g,F}$	0.0122
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		566
Annealing Point AP (℃)		591
Transformation Temperature Tg (℃)		615
Yield Point At (℃)		644
Softening Point SP (℃)		723
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	85
	(+100~+300℃)	100
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	420	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	395	$\lambda_{0.05}$	367

CCI		
B	G	R
0.00	2.81	2.86

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.16
380	0.51
390	0.74
400	0.85
420	0.940
440	0.964
460	0.975
480	0.981
500	0.986
550	0.994
600	0.994
650	0.993
700	0.995
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.988
2000	0.980
2200	0.955
2400	0.933

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	3.11
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH 4

Code(d) **755275**
Code(e) **762273**

Refractive Index	n_d	**1.75520**	Abbe Number	ν_d	**27.51**	Dispersion	n_F-n_C **0.027450**
		1.755199					
Refractive Index	n_e	1.761671	Abbe Number	ν_e	27.29	Dispersion	$n_{F'}$-$n_{C'}$ 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	

Constants of Dispersion Formula	
A_1	1.66755531E+00
A_2	2.94411865E-01
A_3	2.49422119E+00
B_1	1.22052137E-02
B_2	5.97775329E-02
B_3	2.14869618E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	91.9	
Rigidity Modulus G (GPa)	36.7	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	168	

Partial Dispersions	
n_C-n_t	0.018659
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0040
$\Delta\theta_{C,A'}$	-0.0005
$\Delta\theta_{g,d}$	0.0147
$\Delta\theta_{g,F}$	0.0133
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		565
Annealing Point AP (℃)		591
Transformation Temperature Tg (℃)		613
Yield Point At (℃)		640
Softening Point SP (℃)		694
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	85
	(+100~+300℃)	100
Thermal Conductivity λ W/(m·K)		1.01

Coloring			
λ_{80}	415	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	398	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.28	3.30

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.12
380	0.45
390	0.70
400	0.82
420	0.929
440	0.962
460	0.973
480	0.980
500	0.986
550	0.995
600	0.994
650	0.993
700	0.995
800	0.999
900	0.999
1000	0.999
1200	0.997
1400	0.995
1600	0.994
1800	0.987
2000	0.981
2200	0.961
2400	0.942

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.76
Specific Gravity d	3.15
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH 6

Code(d) **805254**
Code(e) **813252**

Refractive Index	n_d	**1.80518** 1.805181	Abbe Number	ν_d	**25.42**	Dispersion	n_F-n_C **0.031669**
Refractive Index	n_e	1.812641	Abbe Number	ν_e	25.22	Dispersion	$n_{F'}$-$n_{C'}$ 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	

Constants of Dispersion Formula	
A_1	1.77227611E+00
A_2	3.45691250E-01
A_3	2.40788501E+00
B_1	1.31182633E-02
B_2	6.14479619E-02
B_3	2.00753254E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	93.1	
Rigidity Modulus G (GPa)	36.9	
Poisson's Ratio σ	0.261	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	196	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0021
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0176
$\Delta\theta_{g,F}$	0.0158
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		571
Annealing Point AP (℃)		587
Transformation Temperature Tg (℃)		604
Yield Point At (℃)		630
Softening Point SP (℃)		690
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	89
	(+100~+300℃)	107
Thermal Conductivity λ W/(m·K)		1.01

Coloring			
λ_{80}	440	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	398	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.44	3.56

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.12
380	0.48
390	0.70
400	0.82
420	0.919
440	0.955
460	0.970
480	0.978
500	0.984
550	0.993
600	0.995
650	0.994
700	0.996
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.997
1600	0.995
1800	0.986
2000	0.978
2200	0.958
2400	0.928

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	3.37
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH10

Code(d) **728285**
Code(e) **734282**

Refractive Index	n_d	**1.72825**	Abbe Number	ν_d	**28.46**	Dispersion	n_F-n_C	**0.025588**
		1.728250						
Refractive Index	n_e	1.734286	Abbe Number	ν_e	28.23	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.61549392E+00
A_2	2.62433239E-01
A_3	2.09426189E+00
B_1	1.19830897E-02
B_2	5.96510240E-02
B_3	1.81657554E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	102.4	
Rigidity Modulus G (GPa)	41.2	
Poisson's Ratio σ	0.243	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	158	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0064
$\Delta\theta_{C,A'}$	0.0002
$\Delta\theta_{g,d}$	0.0135
$\Delta\theta_{g,F}$	0.0123
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		569
Annealing Point AP (℃)		596
Transformation Temperature Tg (℃)		617
Yield Point At (℃)		642
Softening Point SP (℃)		703
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	80
	(+100~+300℃)	97
Thermal Conductivity λ W/(m·K)		1.04

Coloring			
λ_{80}	410	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	399	$\lambda_{0.05}$	369

CCI		
B	G	R
0.00	3.34	3.37

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.09
380	0.41
390	0.67
400	0.81
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.88
Specific Gravity d	3.06
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH11

Code(d) **785257**
Code(e) **792255**

Refractive Index	n_d	**1.78472** 1.784723	Abbe Number	ν_d	**25.68**	Dispersion	n_F-n_C	**0.030554**
Refractive Index	n_e	1.791920	Abbe Number	ν_e	25.47	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.72677471E+00
A_2	3.24568628E-01
A_3	2.65816809E+00
B_1	1.29369958E-02
B_2	6.18255245E-02
B_3	2.21904637E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	91.2	
Rigidity Modulus G (GPa)	36.3	
Poisson's Ratio σ	0.255	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	180	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0030
$\Delta\theta_{C,A'}$	-0.0011
$\Delta\theta_{g,d}$	0.0181
$\Delta\theta_{g,F}$	0.0162
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		569
Annealing Point AP (℃)		588
Transformation Temperature Tg (℃)		602
Yield Point At (℃)		633
Softening Point SP (℃)		686
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	89
	(+100~+300℃)	103
Thermal Conductivity λ W/(m·K)		1.02

Coloring			
λ_{80}	430	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	369

CCI		
B	G	R
0.00	3.80	3.85

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.08
380	0.40
390	0.66
400	0.80
420	0.915
440	0.948
460	0.964
480	0.973
500	0.980
550	0.992
600	0.992
650	0.990
700	0.992
800	0.998
900	0.998
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.989
2000	0.982
2200	0.964
2400	0.942

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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	0.0	1.0	1.1	1.5	2.1	3.5	5.3
40~60	0.0	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	3.24
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH13

Code(d) **741278**
Code(e) **747276**

Refractive Index	n_d	**1.74077** 1.740769	Abbe Number	ν_d	**27.79**	Dispersion	n_F-n_C	**0.026657**
Refractive Index	n_e	1.747055	Abbe Number	ν_e	27.56	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.62224674E+00
A_2	2.93844589E-01
A_3	1.99225164E+00
B_1	1.18368386E-02
B_2	5.90208025E-02
B_3	1.71959976E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	89.9	
Rigidity Modulus G (GPa)	36.0	
Poisson's Ratio σ	0.249	
Knoop Hardness Hk[Class]	510	5
Abrasion Aa	167	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0051
$\Delta\theta_{C,A'}$	-0.0002
$\Delta\theta_{g,d}$	0.0144
$\Delta\theta_{g,F}$	0.0130
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		573
Annealing Point AP (℃)		595
Transformation Temperature Tg (℃)		616
Yield Point At (℃)		642
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	96
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	415	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.64	3.67

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.08
380	0.38
390	0.64
400	0.80
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.83
Specific Gravity d	3.10
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH14

Code(d) **762265**
Code(e) **769263**

Refractive Index	n_d	**1.76182**	Abbe Number	ν_d	**26.52**	Dispersion	n_F-n_C	**0.028729**
		1.761821						
Refractive Index	n_e	1.768591	Abbe Number	ν_e	26.30	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.79750
n_g	0.435835	1.79992
n_h	0.404656	1.81584
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.68915108E+00
A_2	2.90462024E-01
A_3	2.37971516E+00
B_1	1.28202514E-02
B_2	6.18090841E-02
B_3	2.01094352E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	88.8	
Rigidity Modulus G (GPa)	35.4	
Poisson's Ratio σ	0.254	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	171	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0046
$\Delta\theta_{C,A'}$	-0.0006
$\Delta\theta_{g,d}$	0.0167
$\Delta\theta_{g,F}$	0.0150
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		565
Annealing Point AP (℃)		590
Transformation Temperature Tg (℃)		609
Yield Point At (℃)		634
Softening Point SP (℃)		693
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	87
	(+100~+300℃)	100
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	420	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.11	3.10

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.10
380	0.43
390	0.70
400	0.84
420	0.934
440	0.960
460	0.971
480	0.977
500	0.983
550	0.993
600	0.993
650	0.990
700	0.992
800	0.997
900	0.999
1000	0.999
1200	0.999
1400	0.997
1600	0.996
1800	0.988
2000	0.982
2200	0.961
2400	0.942

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.86
Specific Gravity d	3.17
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH18

Code(d) **722292**
Code(e) **727290**

Refractive Index	n_d	**1.72151** 1.721507	Abbe Number	ν_d	**29.23**	Dispersion	n_F-n_C	**0.024683**
Refractive Index	n_e	1.727331	Abbe Number	ν_e	29.00	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.75195
n_g	0.435835	1.75399
n_h	0.404656	1.76735
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.59921608E+00
A_2	2.59532164E-01
A_3	2.12454543E+00
B_1	1.16469304E-02
B_2	5.84824883E-02
B_3	1.86927779E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	89.1	
Rigidity Modulus G (GPa)	35.7	
Poisson's Ratio σ	0.248	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	160	

Partial Dispersions	
n_C-n_t	0.017028
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0061
$\Delta\theta_{C,A'}$	0.0001
$\Delta\theta_{g,d}$	0.0122
$\Delta\theta_{g,F}$	0.0111
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		570
Annealing Point AP (℃)		596
Transformation Temperature Tg (℃)		616
Yield Point At (℃)		644
Softening Point SP (℃)		703
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	410	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	393	$\lambda_{0.05}$	366

CCI		
B	G	R
0.00	2.43	2.44

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.18
380	0.54
390	0.77
400	0.87
420	0.951
440	0.971
460	0.979
480	0.984
500	0.988
550	0.995
600	0.995
650	0.993
700	0.995
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.996
1600	0.995
1800	0.986
2000	0.978
2200	0.948
2400	0.928

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.87
Specific Gravity d	3.07
Remarks	

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S-TIH23

Code(d) **785263**
Code(e) **792261**

Refractive Index	n_d	**1.78470**	Abbe Number	ν_d	**26.29**	Dispersion	n_F-n_C	**0.029847**
		1.784696						
Refractive Index	n_e	1.791730	Abbe Number	ν_e	26.08	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.82176
n_g	0.435835	1.82428
n_h	0.404656	1.84081
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.73986485E+00
A_2	3.13894918E-01
A_3	2.31093206E+00
B_1	1.29441300E-02
B_2	6.12116868E-02
B_3	1.97420482E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	92.2	
Rigidity Modulus G (GPa)	36.6	
Poisson's Ratio σ	0.260	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	191	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0026
$\Delta\theta_{C,A'}$	-0.0009
$\Delta\theta_{g,d}$	0.0163
$\Delta\theta_{g,F}$	0.0146
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		561
Annealing Point AP (℃)		586
Transformation Temperature Tg (℃)		604
Yield Point At (℃)		635
Softening Point SP (℃)		684
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	88
	(+100~+300℃)	106
Thermal Conductivity λ W/(m·K)		0.992

Coloring			
λ_{80}	435	λ_5	365
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	400	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.88	3.97

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.12
380	0.44
390	0.67
400	0.80
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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	0.0	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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.69
Specific Gravity d	3.30
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIH53

Code(d) **847238**
Code(e) **855236**

Refractive Index	n_d	**1.84666**	Abbe Number	ν_d	**23.78**	Dispersion	n_F-n_C	**0.035608**
		1.846660						
Refractive Index	n_e	1.855041	Abbe Number	ν_e	23.59	Dispersion	$n_{F'}$-$n_{C'}$	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	

Constants of Dispersion Formula	
A_1	1.87904886E+00
A_2	3.69719775E-01
A_3	2.33730863E+00
B_1	1.44121770E-02
B_2	6.38817990E-02
B_3	1.82668180E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	96.0	
Rigidity Modulus G (GPa)	37.9	
Poisson's Ratio σ	0.266	
Knoop Hardness Hk[Class]	520	5
Abrasion Aa	188	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0195
$\Delta\theta_{g,F}$	0.0175
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		576
Annealing Point AP (℃)		596
Transformation Temperature Tg (℃)		624
Yield Point At (℃)		658
Softening Point SP (℃)		692
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	88
	(+100~+300℃)	104
Thermal Conductivity λ W/(m·K)		1.00

Coloring			
λ_{80}		λ_5	370
λ_{70}	420		

Internal transmission			
$\lambda_{0.80}$	408	$\lambda_{0.05}$	370

CCI		
B	G	R
0.00	4.97	5.06

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.06
380	0.35
390	0.61
400	0.75
420	0.87
440	0.927
460	0.948
480	0.961
500	0.971
550	0.987
600	0.989
650	0.985
700	0.989
800	0.997
900	0.998
1000	0.999
1200	0.999
1400	0.998
1600	0.997
1800	0.991
2000	0.986
2200	0.974
2400	0.955

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	3.54
Remarks	

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S-TIH53W

Code(d) **847238**
Code(e) **855236**

Refractive Index	n_d	**1.84666** 1.846660	Abbe Number	ν_d	**23.78**	Dispersion	n_F-n_C **0.035608**
Refractive Index	n_e	1.855041	Abbe Number	ν_e	23.59	Dispersion	$n_{F'}$-$n_{C'}$ 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	

Constants of Dispersion Formula	
A_1	1.87904886E+00
A_2	3.69719775E-01
A_3	2.33730863E+00
B_1	1.44121770E-02
B_2	6.38817990E-02
B_3	1.82668180E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	96.0	
Rigidity Modulus G (GPa)	37.9	
Poisson's Ratio σ	0.266	
Knoop Hardness Hk[Class]	520	5
Abrasion Aa	188	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0032
$\Delta\theta_{C,A'}$	-0.0012
$\Delta\theta_{g,d}$	0.0195
$\Delta\theta_{g,F}$	0.0175
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		576
Annealing Point AP (℃)		596
Transformation Temperature Tg (℃)		624
Yield Point At (℃)		658
Softening Point SP (℃)		692
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	88
	(+100~+300℃)	104
Thermal Conductivity λ W/(m·K)		1.00

Coloring			
λ_{80}		λ_5	368
λ_{70}	404		

Internal transmission			
$\lambda_{0.80}$	398	$\lambda_{0.05}$	368

CCI		
B	G	R
0.00	3.49	3.70

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.11
380	0.45
390	0.71
400	0.83
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	3.54
Remarks	

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S-TIH57

Code(d) **963241**
Code(e) **972239**

Refractive Index	n_d	**1.96300** 1.963000	Abbe Number	ν_d	**24.11**	Dispersion	n_F-n_C **0.039935**
Refractive Index	n_e	1.972398	Abbe Number	ν_e	23.92	Dispersion	$n_{F'}$-$n_{C'}$ 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	

Constants of Dispersion Formula	
A_1	2.21103256E+00
A_2	4.50346986E-01
A_3	2.47746663E+00
B_1	1.42330268E-02
B_2	6.38573392E-02
B_3	1.61937600E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	117.0	
Rigidity Modulus G (GPa)	45.3	
Poisson's Ratio σ	0.292	
Knoop Hardness Hk[Class]	630	6
Abrasion Aa	102	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0011
$\Delta\theta_{C,A'}$	-0.0018
$\Delta\theta_{g,d}$	0.0211
$\Delta\theta_{g,F}$	0.0187
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		634
Annealing Point AP (℃)		661
Transformation Temperature Tg (℃)		672
Yield Point At (℃)		707
Softening Point SP (℃)		732
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	75
	(+100~+300℃)	91
Thermal Conductivity λ W/(m·K)		0.970

Coloring			
λ_{80}		λ_5	375
λ_{70}	450		

Internal transmission			
$\lambda_{0.80}$	433	$\lambda_{0.05}$	373

CCI		
B	G	R
0.00	10.27	10.95

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.02
380	0.13
390	0.33
400	0.51
420	0.73
440	0.84
460	0.90
480	0.929
500	0.950
550	0.979
600	0.988
650	0.991
700	0.994
800	0.997
900	0.997
1000	0.997
1200	0.997
1400	0.997
1600	0.995
1800	0.989
2000	0.977
2200	0.947
2400	0.85

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	1.73
Specific Gravity d	4.20
Remarks	

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S-TIL 1

Code(d) **548458**
Code(e) **551455**

Refractive Index	n_d	**1.54814** 1.548141	Abbe Number	ν_d	**45.79**	Dispersion	n_F-n_C **0.011972**
Refractive Index	n_e	1.550984	Abbe Number	ν_e	45.49	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.56244
n_g	0.435835	1.56335
n_h	0.404656	1.56918
n_i	0.365015	1.57959

Constants of Dispersion Formula	
A_1	1.25088944E+00
A_2	9.97973327E-02
A_3	1.20583504E+00
B_1	8.83921279E-03
B_2	4.82685052E-02
B_3	1.37414953E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	70.5	
Rigidity Modulus G (GPa)	28.8	
Poisson's Ratio σ	0.222	
Knoop Hardness Hk[Class]	490	5
Abrasion Aa	132	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		452
Annealing Point AP (℃)		487
Transformation Temperature Tg (℃)		501
Yield Point At (℃)		542
Softening Point SP (℃)		654
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	86
	(+100~+300℃)	101
Thermal Conductivity λ W/(m·K)		1.04

Coloring			
λ_{80}	370	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	366	$\lambda_{0.05}$	341

CCI		
B	G	R
0.00	0.32	0.33

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.01
350	0.29
360	0.69
370	0.87
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	0.89
2400	0.85

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.68
Specific Gravity d	2.54
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIL 2

Code(d) **541472**
Code(e) **543469**

Refractive Index	n_d	**1.54072** 1.540720	Abbe Number	ν_d	**47.23**	Dispersion	n_F-n_C	**0.011449**
Refractive Index	n_e	1.543440	Abbe Number	ν_e	46.94	Dispersion	$n_{F'}$-$n_{C'}$	0.011577

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.55435
n_g	0.435835	1.55522
n_h	0.404656	1.56074
n_i	0.365015	1.57052

Constants of Dispersion Formula	
A_1	1.23401499E+00
A_2	9.59796833E-02
A_3	1.20503991E+00
B_1	8.69507801E-03
B_2	4.65611429E-02
B_3	1.37953301E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	69.9	
Rigidity Modulus G (GPa)	28.6	
Poisson's Ratio σ	0.220	
Knoop Hardness Hk[Class]	500	5
Abrasion Aa	122	

Partial Dispersions	
n_C-n_t	0.008891
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0083
$\Delta\theta_{C,A'}$	0.0022
$\Delta\theta_{g,d}$	-0.0005
$\Delta\theta_{g,F}$	0.0000
$\Delta\theta_{i,g}$	0.0076

Thermal Properties		
Strain Point StP (℃)		448
Annealing Point AP (℃)		484
Transformation Temperature Tg (℃)		496
Yield Point At (℃)		538
Softening Point SP (℃)		658
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	370	λ_5	340
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	368	$\lambda_{0.05}$	340

CCI		
B	G	R
0.00	0.40	0.38

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.04
350	0.32
360	0.66
370	0.84
380	0.925
390	0.962
400	0.979
420	0.990
440	0.994
460	0.995
480	0.996
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.998
1000	0.997
1200	0.997
1400	0.997
1600	0.995
1800	0.987
2000	0.970
2200	0.942
2400	0.917

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.74
Specific Gravity d	2.52
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIL 6

Code(d) **532489**
Code(e) **534485**

Refractive Index	n_d	**1.53172** 1.531717	Abbe Number	ν_d	**48.84**	Dispersion	n_F-n_C	**0.010887**
Refractive Index	n_e	1.534304	Abbe Number	ν_e	48.55	Dispersion	$n_{F'}$-$n_{C'}$	0.011006

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.54465
n_g	0.435835	1.54547
n_h	0.404656	1.55069
n_i	0.365015	1.55989

Constants of Dispersion Formula	
A_1	1.17701777E+00
A_2	1.27958030E-01
A_3	1.34740124E+00
B_1	7.71087686E-03
B_2	4.11325328E-02
B_3	1.54531692E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	64.8	
Rigidity Modulus G (GPa)	28.3	
Poisson's Ratio σ	0.146	
Knoop Hardness Hk[Class]	490	5
Abrasion Aa	121	

Partial Dispersions	
n_C-n_t	0.008529
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		438
Annealing Point AP (℃)		468
Transformation Temperature Tg (℃)		479
Yield Point At (℃)		528
Softening Point SP (℃)		648
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	96
Thermal Conductivity λ W/(m·K)		1.06

Coloring			
λ_{80}	365	λ_5	335
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	364	$\lambda_{0.05}$	339

CCI		
B	G	R
0.00	0.28	0.24

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	0.07
350	0.44
360	0.74
370	0.88
380	0.948
390	0.973
400	0.985
420	0.990
440	0.989
460	0.990
480	0.991
500	0.993
550	0.994
600	0.994
650	0.992
700	0.996
800	0.998
900	0.997
1000	0.997
1200	0.996
1400	0.995
1600	0.993
1800	0.977
2000	0.947
2200	0.89
2400	0.85

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	2.50
Remarks	

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S-TIL25

Code(d) **581407**
Code(e) **585405**

Refractive Index	n_d	**1.58144**	Abbe Number	ν_d	**40.75**	Dispersion	n_F-n_C	**0.014270**
		1.581439						
Refractive Index	n_e	1.584822	Abbe Number	ν_e	40.47	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.59861
n_g	0.435835	1.59973
n_h	0.404656	1.60687
n_i	0.365015	1.61979

Constants of Dispersion Formula	
A_1	1.32122534E+00
A_2	1.23824976E-01
A_3	1.43685254E+00
B_1	9.52091436E-03
B_2	5.16062665E-02
B_3	1.49064883E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	75.3	
Rigidity Modulus G (GPa)	30.9	
Poisson's Ratio σ	0.220	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	117	

Partial Dispersions	
n_C-n_t	0.010703
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		536
Annealing Point AP (℃)		564
Transformation Temperature Tg (℃)		588
Yield Point At (℃)		630
Softening Point SP (℃)		715
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	74
	(+100~+300℃)	88
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	351

CCI		
B	G	R
0.00	0.73	0.73

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.01
360	0.28
370	0.65
380	0.85
390	0.929
400	0.964
420	0.986
440	0.991
460	0.993
480	0.994
500	0.995
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.999
1000	0.998
1200	0.998
1400	0.994
1600	0.994
1800	0.981
2000	0.963
2200	0.911
2400	0.89

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.84
Specific Gravity d	2.59
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIL26

Code(d) **567428**
Code(e) **570425**

Refractive Index	n_d	**1.56732**	Abbe Number	ν_d	**42.82**	Dispersion	n_F-n_C	**0.013250**
		1.567322						
Refractive Index	n_e	1.570466	Abbe Number	ν_e	42.54	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.58321
n_g	0.435835	1.58423
n_h	0.404656	1.59077
n_i	0.365015	1.60256

Constants of Dispersion Formula	
A_1	1.31066488E+00
A_2	9.41903094E-02
A_3	1.23292644E+00
B_1	9.68897812E-03
B_2	5.27763106E-02
B_3	1.33296422E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	73.9	
Rigidity Modulus G (GPa)	30.2	
Poisson's Ratio σ	0.222	
Knoop Hardness Hk[Class]	500	5
Abrasion Aa	120	

Partial Dispersions	
n_C-n_t	0.010055
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		495
Annealing Point AP (℃)		533
Transformation Temperature Tg (℃)		552
Yield Point At (℃)		599
Softening Point SP (℃)		694
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	79
	(+100~+300℃)	90
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	380	λ_5	345
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	374	$\lambda_{0.05}$	349

CCI		
B	G	R
0.00	0.56	0.54

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.07
360	0.44
370	0.74
380	0.88
390	0.945
400	0.971
420	0.989
440	0.993
460	0.995
480	0.995
500	0.997
550	0.998
600	0.998
650	0.997
700	0.998
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.993
1800	0.977
2000	0.950
2200	0.89
2400	0.86

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.75
Specific Gravity d	2.57
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIL27

Code(d) **575415**
Code(e) **578412**

Refractive Index	n_d	**1.57501** 1.575006	Abbe Number	ν_d	**41.50**	Dispersion	n_F-n_C	**0.013854**
Refractive Index	n_e	1.578291	Abbe Number	ν_e	41.22	Dispersion	$n_{F'}$-$n_{C'}$	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

Constants of Dispersion Formula	
A_1	1.31433154E+00
A_2	1.12300168E-01
A_3	1.41390100E+00
B_1	9.50404477E-03
B_2	5.24112772E-02
B_3	1.48429972E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	74.9	
Rigidity Modulus G (GPa)	30.8	
Poisson's Ratio σ	0.217	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	125	

Partial Dispersions	
n_C-n_t	0.010433
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		511
Annealing Point AP (℃)		547
Transformation Temperature Tg (℃)		562
Yield Point At (℃)		599
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	74
	(+100~+300℃)	89
Thermal Conductivity λ W/(m·K)		1.07

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	371	$\lambda_{0.05}$	350

CCI		
B	G	R
0.00	0.45	0.47

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.05
360	0.44
370	0.78
380	0.913
390	0.961
400	0.979
420	0.990
440	0.993
460	0.994
480	0.995
500	0.996
550	0.998
600	0.998
650	0.998
700	0.998
800	0.999
900	0.999
1000	0.998
1200	0.998
1400	0.994
1600	0.993
1800	0.978
2000	0.955
2200	0.89
2400	0.87

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	2.58
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIM 2

Code(d) **620363**
Code(e) **624360**

Refractive Index	n_d	**1.62004** 1.620041	Abbe Number	ν_d	**36.26**	Dispersion	n_F-n_C **0.017099**
Refractive Index	n_e	1.624088	Abbe Number	ν_e	35.99	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.64081
n_g	0.435835	1.64218
n_h	0.404656	1.65100
n_i	0.365015	1.66728

Constants of Dispersion Formula	
A_1	1.42193846E+00
A_2	1.33827968E-01
A_3	1.45060574E+00
B_1	1.07291511E-02
B_2	5.72587546E-02
B_3	1.45381805E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	77.6	
Rigidity Modulus G (GPa)	31.5	
Poisson's Ratio σ	0.230	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	141	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		551
Annealing Point AP (℃)		576
Transformation Temperature Tg (℃)		598
Yield Point At (℃)		634
Softening Point SP (℃)		703
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	81
	(+100~+300℃)	95
Thermal Conductivity λ W/(m·K)		1.39

Coloring			
λ_{80}	390	λ_5	355
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	359

CCI		
B	G	R
0.00	1.20	1.19

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.08
370	0.44
380	0.73
390	0.87
400	0.942
420	0.978
440	0.987
460	0.990
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.997
800	0.999
900	0.999
1000	0.999
1200	0.999
1400	0.995
1600	0.995
1800	0.984
2000	0.971
2200	0.930
2400	0.914

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.86
Specific Gravity d	2.69
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIM 5

Code(d) **603380**
Code(e) **607378**

Refractive Index	n_d	**1.60342** 1.603420	Abbe Number	ν_d	**38.03**	Dispersion	n_F-n_C **0.015868**
Refractive Index	n_e	1.607179	Abbe Number	ν_e	37.76	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.62262
n_g	0.435835	1.62388
n_h	0.404656	1.63196
n_i	0.365015	1.64676

Constants of Dispersion Formula	
A_1	1.38531342E+00
A_2	1.22372945E-01
A_3	1.40508326E+00
B_1	1.04074567E-02
B_2	5.57440088E-02
B_3	1.44878733E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	76.3	
Rigidity Modulus G (GPa)	30.9	
Poisson's Ratio σ	0.233	
Knoop Hardness Hk[Class]	540	5
Abrasion Aa	131	

Partial Dispersions	
n_C-n_t	0.011667
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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		535
Annealing Point AP (℃)		565
Transformation Temperature Tg (℃)		588
Yield Point At (℃)		624
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	96
Thermal Conductivity λ W/(m·K)		1.04

Coloring			
λ_{80}	385	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	357

CCI		
B	G	R
0.00	0.79	0.81

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.19
370	0.60
380	0.84
390	0.931
400	0.963
420	0.984
440	0.989
460	0.991
480	0.993
500	0.995
550	0.997
600	0.997
650	0.997
700	0.997
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.994
1600	0.994
1800	0.982
2000	0.966
2200	0.923
2400	0.902

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.84
Specific Gravity d	2.63
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIM 8

Code(d) **596392**
Code(e) **599390**

Refractive Index	n_d	**1.59551** 1.595509	Abbe Number	ν_d	**39.24**	Dispersion	n_F-n_C **0.015176**
Refractive Index	n_e	1.599106	Abbe Number	ν_e	38.97	Dispersion	$n_{F'}$-$n_{C'}$ 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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.61382
n_g	0.435835	1.61501
n_h	0.404656	1.62267
n_i	0.365015	1.63661

Constants of Dispersion Formula	
A_1	1.37262713E+00
A_2	1.12636276E-01
A_3	1.39786421E+00
B_1	1.03220068E-02
B_2	5.50195044E-02
B_3	1.47735609E+02

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	1.0

Mechanical Properties		
Young's Modulus E (GPa)	75.0	
Rigidity Modulus G (GPa)	30.5	
Poisson's Ratio σ	0.231	
Knoop Hardness Hk[Class]	530	5
Abrasion Aa	135	

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

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

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	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

Thermal Properties		
Strain Point StP (℃)		529
Annealing Point AP (℃)		560
Transformation Temperature Tg (℃)		585
Yield Point At (℃)		610
Softening Point SP (℃)		695
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	84
	(+100~+300℃)	104
Thermal Conductivity λ W/(m·K)		1.03

Coloring			
λ_{80}	380	λ_5	350
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	378	$\lambda_{0.05}$	351

CCI		
B	G	R
0.00	0.82	0.82

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	0.02
360	0.27
370	0.64
380	0.84
390	0.928
400	0.962
420	0.982
440	0.988
460	0.990
480	0.992
500	0.994
550	0.997
600	0.997
650	0.996
700	0.997
800	0.998
900	0.997
1000	0.996
1200	0.996
1400	0.994
1600	0.993
1800	0.983
2000	0.968
2200	0.935
2400	0.915

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.79
Specific Gravity d	2.63
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIM22

Code(d) **648338**
Code(e) **652335**

Refractive Index	n_d	**1.64769** 1.647689	Abbe Number	ν_d	**33.79**	Dispersion	n_F-n_C	**0.019167**
Refractive Index	n_e	1.652221	Abbe Number	ν_e	33.53	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.67109
n_g	0.435835	1.67265
n_h	0.404656	1.68269
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.44222294E+00
A_2	1.94432665E-01
A_3	1.74092482E+00
B_1	1.04249404E-02
B_2	5.50235257E-02
B_3	1.69710769E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	79.8	
Rigidity Modulus G (GPa)	32.2	
Poisson's Ratio σ	0.238	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	149	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0074
$\Delta\theta_{C,A'}$	0.0010
$\Delta\theta_{g,d}$	0.0075
$\Delta\theta_{g,F}$	0.0070
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		545
Annealing Point AP (℃)		572
Transformation Temperature Tg (℃)		593
Yield Point At (℃)		624
Softening Point SP (℃)		692
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	83
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		1.02

Coloring			
λ_{80}	395	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	386	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	1.48	1.49

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.04
370	0.37
380	0.70
390	0.86
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

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.82
Specific Gravity d	2.79
Remarks	

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※The name of the glass type is the model number assigned based on the main components of the composition: large, medium, small refractive index and serial number.

S-TIM25

Code(d) **673321**
Code(e) **678318**

Refractive Index	n_d	**1.67270** 1.672700	Abbe Number	ν_d	**32.10**	Dispersion	n_F-n_C	**0.020957**
Refractive Index	n_e	1.677651	Abbe Number	ν_e	31.84	Dispersion	$n_{F'}$-$n_{C'}$	0.021280

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.69840
n_g	0.435835	1.70011
n_h	0.404656	1.71126
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.50659233E+00
A_2	2.04786135E-01
A_3	1.92036668E+00
B_1	1.09501562E-02
B_2	5.74980285E-02
B_3	1.78128535E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	84.1	
Rigidity Modulus G (GPa)	34.0	
Poisson's Ratio σ	0.236	
Knoop Hardness Hk[Class]	570	6
Abrasion Aa	146	

Partial Dispersions	
n_C-n_t	0.014766
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0073
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0101
$\Delta\theta_{g,F}$	0.0093
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		556
Annealing Point AP (℃)		585
Transformation Temperature Tg (℃)		608
Yield Point At (℃)		640
Softening Point SP (℃)		700
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	79
	(+100~+300℃)	95
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	400	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	390	$\lambda_{0.05}$	362

CCI		
B	G	R
0.00	2.11	2.17

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.24
380	0.60
390	0.80
400	0.89
420	0.957
440	0.974
460	0.981
480	0.986
500	0.989
550	0.995
600	0.996
650	0.995
700	0.996
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.995
1800	0.987
2000	0.977
2200	0.944
2400	0.930

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.81
Specific Gravity d	2.91
Remarks	

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S-TIM27

Code(d) **640345**
Code(e) **644342**

Refractive Index	n_d	**1.63980**	Abbe Number	ν_d	**34.46**	Dispersion	n_F-n_C	**0.018564**
		1.639799						
Refractive Index	n_e	1.644189	Abbe Number	ν_e	34.20	Dispersion	$n_{F'}$-$n_{C'}$	0.018835

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.66244
n_g	0.435835	1.66393
n_h	0.404656	1.67361
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.41680470E+00
A_2	1.96785057E-01
A_3	1.68001322E+00
B_1	1.00732158E-02
B_2	5.37616908E-02
B_3	1.64672436E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	79.3	
Rigidity Modulus G (GPa)	32.1	
Poisson's Ratio σ	0.236	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	146	

Partial Dispersions	
n_C-n_t	0.013292
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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0076
$\Delta\theta_{C,A'}$	0.0011
$\Delta\theta_{g,d}$	0.0069
$\Delta\theta_{g,F}$	0.0065
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		543
Annealing Point AP (℃)		572
Transformation Temperature Tg (℃)		594
Yield Point At (℃)		629
Softening Point SP (℃)		696
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	80
	(+100~+300℃)	99
Thermal Conductivity λ W/(m·K)		1.04

Coloring			
λ_{80}	390	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	385	$\lambda_{0.05}$	360

CCI		
B	G	R
0.00	1.37	1.38

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.05
370	0.41
380	0.73
390	0.87
400	0.935
420	0.973
440	0.983
460	0.987
480	0.990
500	0.992
550	0.997
600	0.997
650	0.996
700	0.997
800	0.999
900	0.998
1000	0.998
1200	0.998
1400	0.995
1600	0.994
1800	0.984
2000	0.973
2200	0.936
2400	0.919

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.83
Specific Gravity d	2.76
Remarks	

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S-TIM28

Code(d) **689311**
Code(e) **694308**

Refractive Index	n_d	**1.68893** 1.688931	Abbe Number	ν_d	**31.07**	Dispersion	n_F-n_C	**0.022170**
Refractive Index	n_e	1.694167	Abbe Number	ν_e	30.83	Dispersion	$n_{F'}$-$n_{C'}$	0.022516

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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.71615
n_g	0.435835	1.71797
n_h	0.404656	1.72981
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.54270810E+00
A_2	2.17113891E-01
A_3	1.81904459E+00
B_1	1.13925005E-02
B_2	5.79224572E-02
B_3	1.67697189E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	85.5	
Rigidity Modulus G (GPa)	34.4	
Poisson's Ratio σ	0.242	
Knoop Hardness Hk[Class]	550	6
Abrasion Aa	152	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0071
$\Delta\theta_{C,A'}$	0.0007
$\Delta\theta_{g,d}$	0.0099
$\Delta\theta_{g,F}$	0.0092
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		560
Annealing Point AP (℃)		588
Transformation Temperature Tg (℃)		611
Yield Point At (℃)		637
Softening Point SP (℃)		701
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	82
	(+100~+300℃)	98
Thermal Conductivity λ W/(m·K)		1.01

Coloring			
λ_{80}	405	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	391	$\lambda_{0.05}$	362

CCI		
B	G	R
0.00	2.30	2.36

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.23
380	0.58
390	0.79
400	0.88
420	0.951
440	0.970
460	0.978
480	0.983
500	0.987
550	0.994
600	0.995
650	0.994
700	0.995
800	0.998
900	0.998
1000	0.998
1200	0.998
1400	0.996
1600	0.996
1800	0.989
2000	0.983
2200	0.961
2400	0.948

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	2.77
Specific Gravity d	2.98
Remarks	

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S-TIM35

Code(d) **699301**
Code(e) **704299**

Refractive Index	n_d	**1.69895**	Abbe Number	ν_d	**30.13**	Dispersion	n_F-n_C	**0.023199**
		1.698947						
Refractive Index	n_e	1.704424	Abbe Number	ν_e	29.89	Dispersion	$n_{F'}$-$n_{C'}$	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
$n_{He\text{-}Ne}$	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
$n_{He\text{-}Cd}$	0.44157	1.72750
n_g	0.435835	1.72941
n_h	0.404656	1.74189
n_i	0.365015	

Constants of Dispersion Formula	
A_1	1.55849775E+00
A_2	2.30767007E-01
A_3	1.84436099E+00
B_1	1.15367235E-02
B_2	5.86095947E-02
B_3	1.62981888E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	87.5	
Rigidity Modulus G (GPa)	35.3	
Poisson's Ratio σ	0.238	
Knoop Hardness Hk[Class]	500	5
Abrasion Aa	142	

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-$n_{F'}$	

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
$\theta'_{i,F'}$	

Deviation of Relative Dispersions Δθfrom "Normal"	
$\Delta\theta_{C,t}$	0.0086
$\Delta\theta_{C,A'}$	0.0008
$\Delta\theta_{g,d}$	0.0111
$\Delta\theta_{g,F}$	0.0103
$\Delta\theta_{i,g}$	

Thermal Properties		
Strain Point StP (℃)		579
Annealing Point AP (℃)		603
Transformation Temperature Tg (℃)		622
Yield Point At (℃)		648
Softening Point SP (℃)		716
Expansion Coefficients α (10^{-7} K^{-1})	(-30~+70℃)	75
	(+100~+300℃)	89
Thermal Conductivity λ W/(m·K)		1.05

Coloring			
λ_{80}	400	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	397	$\lambda_{0.05}$	367

CCI		
B	G	R
0.00	2.94	2.98

Internal Transmittance	
λ(nm)	τ 10mm
280	
290	
300	
310	
320	
330	
340	
350	
360	
370	0.14
380	0.48
390	0.72
400	0.84
420	0.939
440	0.964
460	0.974
480	0.981
500	0.986
550	0.994
600	0.994
650	0.993
700	0.995
800	0.998
900	0.999
1000	0.999
1200	0.999
1400	0.995
1600	0.995
1800	0.988
2000	0.980
2200	0.942
2400	0.931

Temperature Coefficients of Refractive Index							
Range of Temperature (℃)	Δn/ΔT relative ($10^{-6}K^{-1}$)						
	t	C'	He-Ne	D	e	F'	g
-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

Other Properties	
Photoelastic Constant β nm/(cm·10^5Pa)	3.04
Specific Gravity d	2.96
Remarks	

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