S-TIM28

Code(d) **689311**
Code(e) **694308**

Refractive Index n_d	**1.688 93** 1.688 931	Abbe Number ν_d	**31.07**	Dispersion $n_F - n_C$	**0.022 170**
Refractive Index n_e	1.694 167	Abbe Number ν_e	30.83	Dispersion $n_{F'} - n_{C'}$	0.022 516

Refractive Indices		
λ (μm)		
n_{2325}	2.325 42	1.644 63
n_{1970}	1.970 09	1.650 62
n_{1530}	1.529 58	1.657 45
n_{1129}	1.128 64	1.664 38
n_t	1.013 98	1.666 99
n_s	0.852 11	1.671 92
$n_{A'}$	0.768 19	1.675 53
n_r	0.706 52	1.678 96
n_C	0.656 27	1.682 50
$n_{C'}$	0.643 85	1.683 50
$n_{He\text{-}Ne}$	0.632 8	1.684 45
n_D	0.589 29	1.688 74
n_d	0.587 56	1.688 93
n_e	0.546 07	1.694 17
n_F	0.486 13	1.704 67
$n_{F'}$	0.479 99	1.706 02
$n_{He\text{-}Cd}$	0.441 57	1.716 15
n_g	0.435 835	1.717 97
n_h	0.404 656	1.729 81
n_i	0.365 015	

Constants of Dispersion Formula	
A_1	1.542 708 10E+00
A_2	2.171 138 91E-01
A_3	1.819 044 59E+00
B_1	1.139 250 05E-02
B_2	5.792 245 72E-02
B_3	1.676 971 89E+02

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

Mechanical Properties		
Young's Modulus E (GPa)	85.5	
Rigidity Modulus G (GPa)	34.4	
Poisson's Ratio σ	0.242	
Knoop Hardness Hk[Class]	560	6
Abrasion Aa	152	

Partial Dispersions	
$n_C - n_t$	0.015 507
$n_C - n_{A'}$	0.006 966
$n_d - n_C$	0.006 436
$n_e - n_C$	0.011 672
$n_g - n_d$	0.029 044
$n_g - n_F$	0.013 310
$n_h - n_g$	0.011 834
$n_i - n_g$	
$n_{C'} - n_t$	0.016 512
$n_e - n_{C'}$	0.010 667
$n_{F'} - n_e$	0.011 849
$n_i - n_{F'}$	

Relative Partial Dispersions	
$\theta_{C,t}$	0.699 5
$\theta_{C,A'}$	0.314 2
$\theta_{d,C}$	0.290 3
$\theta_{e,C}$	0.526 5
$\theta_{g,d}$	1.310 1
$\theta_{g,F}$	0.600 4
$\theta_{h,g}$	0.533 8
$\theta_{i,g}$	
$\theta'_{C,t}$	0.733 3
$\theta'_{e,C'}$	0.473 8
$\theta'_{F,e}$	0.526 2
$\theta'_{i,F'}$	

Anomalous dispersion	
$\Delta\theta_{C,t}$	0.007 1
$\Delta\theta_{C,A'}$	0.000 7
$\Delta\theta_{g,d}$	0.009 9
$\Delta\theta_{g,F}$	0.009 2
$\Delta\theta_{i,g}$	

Coloring			
λ_{80}	405	λ_5	360
λ_{70}			

Internal transmission			
$\lambda_{0.80}$	391	$\lambda_{0.05}$	362

CCI		
B	G	R
0.00	2.30	2.36

Internal Transmittance	
λ (nm)	τ_i (10 mm)
280	
290	
300	
310	
320	
330	
340	
350	
360	0.01
370	0.23
380	0.58
390	0.79
400	0.88
420	0.951
440	0.970
460	0.978
480	0.983
500	0.987
550	0.994
600	0.995
650	0.994
700	0.995
800	0.998
900	0.998
1 000	0.998
1 200	0.998
1 400	0.996
1 600	0.996
1 800	0.989
2 000	0.983
2 200	0.961
2 400	0.948

Thermal Properties		
Strain Point StP (°C)		560
Annealing Point AP (°C)		588
Transformation Temperature Tg (°C)		615
Yield Point At (°C)		655
Softening Point SP (°C)		701
Expansion Coefficients	(-30 ℃ ~ 70 ℃)	81
α_l (10^{-7} K^{-1})	(100 °C ~ 300 °C)	99
Thermal Conductivity λ (W/(m·K))		1.01

Linear coefficient of thermal expansion	
Temperature range (°C)	α_l (10^{-7} K^{-1})
-100 ~ -90	66
-90 ~ -80	68
-80 ~ -70	69
-70 ~ -60	70
-60 ~ -50	72
-50 ~ -40	73
-40 ~ -30	74
-30 ~ -20	76
-20 ~ -10	77
-10 ~ 0	78
0 ~ 10	79
10 ~ 20	81
20 ~ 30	82
30 ~ 40	83
40 ~ 50	84
50 ~ 60	85
60 ~ 70	86
70 ~ 80	87
80 ~ 90	88
90 ~ 100	89
100 ~ 110	90
110 ~ 120	91
120 ~ 130	92
130 ~ 140	93
140 ~ 150	94
150 ~ 160	95
160 ~ 170	96
170 ~ 180	97
180 ~ 190	98
190 ~ 200	99
200 ~ 210	99
210 ~ 220	100
220 ~ 230	101
230 ~ 240	102
240 ~ 250	102
250 ~ 260	103
260 ~ 270	104
270 ~ 280	104
280 ~ 290	105
290 ~ 300	106

Other Properties	
Photoelastic Constant β nm/(cm·105Pa)	2.77
Specific Gravity *d*	2.98
Remarks	

Temperature Coefficients of Refractive Index												
Range of Temperature (°C)	$\Delta n_{rel}/\Delta T$ (10^{-6} K^{-1})											
	1550	t	r	C	C'	d	e	F	F'	g	h	i
-80 ~ -60	0.5	0.7	1.2	1.4	1.4	1.7	2.0	2.6	2.8	3.7	4.8	-
-60 ~ -40	0.4	0.7	1.1	1.3	1.4	1.7	2.0	2.7	2.9	3.8	4.9	-
-40 ~ -20	0.4	0.6	1.2	1.4	1.5	1.8	2.1	2.8	2.9	4.0	5.2	-
-20 ~ 0	0.5	0.7	1.3	1.5	1.5	1.9	2.3	3.0	3.2	4.2	5.5	-
0 ~ 20	0.6	0.9	1.5	1.7	1.7	2.1	2.4	3.3	3.4	4.5	5.9	-
20 ~ 40	0.7	0.9	1.6	1.9	1.9	2.3	2.7	3.5	3.6	4.8	6.2	-
40 ~ 60	0.9	1.1	1.8	2.0	2.1	2.4	2.8	3.7	3.9	5.1	6.7	-
60 ~ 80	0.9	1.2	1.9	2.1	2.2	2.7	3.1	4.0	4.2	5.4	7.0	-
80 ~ 100	1.0	1.3	2.0	2.3	2.3	2.7	3.2	4.2	4.3	5.7	7.3	-
100 ~ 120	1.1	1.4	2.2	2.4	2.5	2.9	3.4	4.4	4.5	5.9	7.7	-
120 ~ 140	1.2	1.5	2.2	2.5	2.6	3.0	3.5	4.6	4.7	6.2	8.0	-
140 ~ 160	1.2	1.5	2.3	2.6	2.6	3.2	3.7	4.8	4.9	6.4	8.2	-
160 ~ 180	1.2	1.6	2.4	2.7	2.8	3.2	3.7	4.9	5.0	6.6	8.4	-

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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.