

# S-LAL 9

Code(d) **691548**

Code(e) **694546**

Refractive Index $n_d$	<b>1.69100</b> 1.691002	Abbe Number $\nu_d$	<b>54.82</b>	Dispersion $n_F-n_C$	<b>0.012605</b>
Refractive Index $n_e$	1.694007	Abbe Number $\nu_e$	54.59	Dispersion $n_F-n_C'$	0.012714

Refractive Indices		
$\lambda(\mu\text{m})$		
$n_{2325}$	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
$n_{\text{He-Ne}}$	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
$n_{\text{He-Cd}}$	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 ( $10^9\text{N/m}^2$ )	1075
Rigidity Modulus G ( $10^9\text{N/m}^2$ )	418
Poisson's Ratio $\sigma$	0.287
Knoop Hardness Hk[Class]	660   7
Abrasion Aa	89
Photoelastic Constant $\beta$ nm/(cm · $10^5\text{Pa}$ )	1.85

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

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 $\Delta\theta$ from "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 (°C)	606
Annealing Point AP (°C)	630
Transformation Temperature Tg (°C)	653
Yield Point At (°C)	679
Softening Point SP (°C)	707
Expansion Coefficients (-30~+70°C)	61
$\alpha$ ( $10^{-7}/^\circ\text{C}$ ) (+100~+300°C)	74
Thermal Conductivity $\lambda$ W/(m·K)	0.895

Coloring			
$\lambda_{80}$	375	$\lambda_5$	295
$\lambda_{70}$			

Internal transmission			
$\lambda_{0.80}$	358	$\lambda_{0.05}$	301

CCI		
B	G	R
0.00	0.51	0.52

Internal Transmittance	
$\lambda(\text{nm})$	$\tau$ 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 (°C)	$\Delta n/\Delta T$ relative ( $10^{-6}/^\circ\text{C}$ )						
	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	
Bubble Quality Group B	
Specific Gravity d	3.63
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.