

Glass Engineer System(GE-SYSTEM)

this software to help the glass engineer to fast and accuracy to predict the glass properties and optimization design the components of glass.

Here are the example of property calculate:

For help and the demo of software ,please visit:

<http://www.glassengineersystem.com/>

10.2009.4.18-597150039

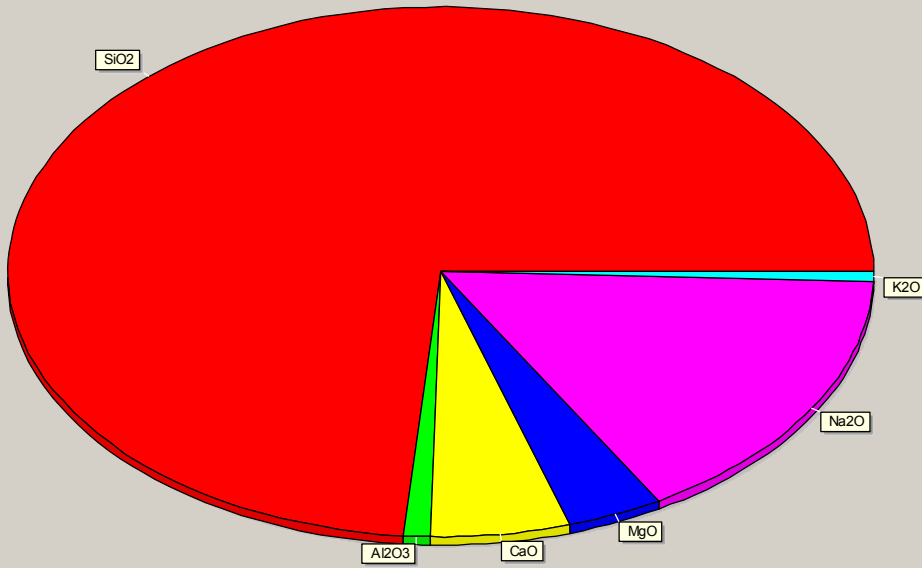
Properties	Corning0080	Unit	Coeff
ALL Total: 90			
Refractive index at 20 oC(nD)	1.51187		
Mean Dispersion at 20 oC(nF-nC)	856.4831		1E-5
Temperature coefficient of Refractive index at ,20-100 oC	37.03942	/oC	1E-7
Thermal optical coefficient ,20-100 oC	83.67475	/oC	1E-7
Molar refraction	8.844047	cm3/mol	
Stress Optical Coefficient -C1	0.1182572	cm2/Kg	1E-6
Stress Optical Coefficient -C2	0.3710286	cm2/Kg	1E-6
Nonlinear refractive index	17.97976	esu	1E-14
Thermo Optical Constant	10.13274	/oC	1E-6
Birefringence	1.317564	/oC	1E-6
Abbe's Number	59.76415		
Reflectance	4.152645	%	
Transmission	95.84736	%	
Total Reflectance	7.974151	%	
Total Transmission	92.02585	%	
X-Ray mass absorption coefficient(0.06nm)	2.59168	cm2/g	
(D)Refractive index at 20 oC(nD)	1.49724		
(D)Mean Dispersion at 20 oC(nF-nC)	849.4812		1E-5
(D)Abbe's Number	58.53459		
(D)Reflectance	3.964716	%	
(D)Transmission	96.03528	%	
(D)Total Reflectance	7.627041	%	
(D)Total Transmission	92.37296	%	
Young's modulus(E) 20 oC	6.990312	Kg/cm2	100000
Shear modulus(G),20 oC	2.839494	Kg/cm2	100000
Molar volume	24.25187	cm3/mol	
Density at 20 oC	2.452467	g/cm3	
Poisson's ratio(μ)	0.230908		
Molecular Weight	59.47692		
Bulk modulus(K) ,20 oC	4.329568	Kg/cm2	100000
Mohs hardness	6.4482	kg/mm2	
Tensile strength	8.076	MPa	
Compressive strength	104.878	MPa	
Shear modulus of glass 20oC (Fluegel)	28.42024	GPa	
Density at room temperature(Fluegel)	2.463412	g/cm3	
Vickers Hardness	16.036	Kg/mm2	

(D)Density at 20 oC	2.411966	g/cm3	
Dielectric Constant at 20oC 4.5E+8Hz	7.26		
High temperature electrical resistivity 1000(log10)	1.012877	1/Ohm.cm	
High temperature electrical resistivity 1200(log10)	0.6850331	1/Ohm.cm	
High temperature electrical resistivity 1400(log10)	0.4640467	1/Ohm.cm	
Expansion Coefficient at 20-400 oC	95.38888	/oC	1E-7
Thermal Conductivity	24.62289	cal/cm.oC.s	0.0001
Linear Thermal Expansion Coefficient 210oC	9.680381	ppm/oC	
Thermal conductivity of glass at room temperature	1.03248	W/(m.K)	

Properties	Corning0080	Unit	Coeff
Melt temperature	1468		
Refine temperature	1492		
Surface tension 900	329.22	mN/m	
Surface tension 1200	311.856	mN/m	
Surface tension 1300	310.439	mN/m	
Surface tension 1400	308.732	mN/m	
Surface tension 1400 oC (Kucuk)	301.2165	mN/m	
Liquidus Temperature	936		
Water solubility silicate glass melts 1200oC, 1 atm H2O	1058.832	ppm	
Density of silicate glass melts 1000	2.342383	g/cm3	
Density of silicate glass melts 1200	2.328342	g/cm3	
Density of silicate glass melts 1400	2.298303	g/cm3	
Volume	47.89328	ppm/oC	
Linear	15.96443	ppm/oC	
Working Range Index (WRI in oC)	182		
Relative Machine Speed (RMS)	0.969		
Devitrification Index (DI in oC)	22		
Gob Temperature (G in oC)	1182		
A	1.657463		
B	4635.731		
T0	206.7079		
(F)Working Range Index (WRI in oC)	182		
(F)Relative Machine Speed (RMS)	0.969		
(F)Devitrification Index (DI in oC)	22		
(F)Gob Temperature (G in oC)	1182		
A(F)	1.730033		
B(F)	4682.173		
T0(F)	204.9228		
Acid Resistance	66.19		
Hydrolytic durability Water Durability log(0.01M HCl)	-0.02352156	ml	
Extracted Na2O equivalent	293.5571	µg	
Hydrolytic class	4		
Refractive index(nD)			
$\Delta\lambda$		nm	
$\Delta\lambda_{eff}$		nm	
σ		cm2	1E-20
τ		us	
σ		cm2	1E-20
τ		us	
τ		us	
$\Delta\lambda_{eff}$		nm	
Density		g/cm3	
Refractive index (nd)			
Abbe's Number			
Nonlinear refractive index (n2)		esu	1E-13

Glass: Corning0080 (wt%)

SiO2	73.6
Al2O3	1
CaO	5.2
MgO	3.6
Na2O	16
K2O	0.6



Convert

Components	wt%	100%	mol%
SiO2	73.6	73.600	72.856
Al2O3	1	1.000	0.583
CaO	5.2	5.200	5.515
MgO	3.6	3.600	5.312
Na2O	16	16.000	15.354
K2O	0.6	0.600	0.379

Gan's

Properties	Corning0080
Refractive index at 20 oC(nD)	1.51187
Mean Dispersion at 20 oC(nF-nC) [1.0E-05]	856.483052
Temperature coefficient of Refractive index at ,20-100 oC (/oC) [1.0E-07]	37.03942
Thermal optical coefficient ,20-100 oC (/oC) [1.0E-07]	83.674749
Molar refraction (cm3/mol)	8.844047
Stress Optical Coefficient -C1 (cm2/Kg) [1.0E-06]	0.118257
Stress Optical Coefficient -C2 (cm2/Kg) [1.0E-06]	0.371029
Nonlinear refractive index (esu) [1.0E-14]	17.979761
Thermo Optical Constant (/oC) [1.0E-06]	10.132744
Birefringence (/oC) [1.0E-06]	1.317564
Abbe's Number	59.764149
Reflectance (%)	4.152645
Transmission (%)	95.847355
Total Reflectance (%)	7.974151
Total Transmission (%)	92.025849

Demkina

Properties	Corning0080
(D)Refractive index at 20 oC(nD)	1.49724
(D)Mean Dispersion at 20 oC(nF-nC) [1.0E-05]	849.481191
(D)Abbe's Number	58.534592

(D)Reflectance (%)	3.964716
(D)Transmission (%)	96.035284
(D)Total Reflectance (%)	7.627041
(D)Total Transmission (%)	92.372959

Standard Visc. to Temp.

Viscosity lg(n)	(H):Corning0080	(F):Corning0080
1	1951	1919
1.5	1674	1654
1.7	1587	1569
2	1474	1460
2.5	1321	1311
3	1202	1194
4	1026	1022
5	903	900
6	812	810
7	742	741
7.477	714	713
7.6	707	706
8.176	678	677
9	641	641
10	604	604
11	572	572
12	546	545
12.5	534	533
13	522	522
13.3	516	516
14	502	502
14.5	493	493
14.6	491	491

Standard Temp. to Visc.

Temperature	(H):Corning0080	(F):Corning0080
100		
200		
300	48.033	47.516
400	22.326	22.272
500	14.148	14.138
600	10.130	10.121
700	7.740	7.727
800	6.156	6.138
900	5.029	5.006
1000	4.186	4.159
1100	3.532	3.501
1150	3.257	3.224
1200	3.010	2.975
1250	2.786	2.750
1300	2.583	2.546
1350	2.397	2.359
1400	2.227	2.188
1450	2.071	2.031
1500	1.927	1.885
1550	1.794	1.751
1600	1.670	1.626
1650	1.554	1.510
1700	1.447	1.402
1750	1.346	1.300
1800	1.252	1.205
1900	1.080	1.032
2000	0.928	0.878
2200	0.668	0.617
2500	0.364	0.310

Temperature Range		
Range	(H):Corning0080	(F):Corning0080
Refine Range(1.7~2)	1474~1587	1460~1569
Melting Temperature(2)	1474	1460
Melting Temperature Range(1.5~2.5)	1321~1674	1311~1654
Temperature Range of	812~1026	810~1022
Crystallization(4~6)		
Working Range(3~7)	742~1202	741~1194
Annealing Rages (A)(12.5~14)	502~534	502~533
Annealing Range (B)(13~14.6)	491~522	491~522
Transition Temperature (A)(13)	522	522
Transition Temperature (B)(13.3)	516	516
Transformation Range(12~14)	502~546	502~545
Softening Point(7.6)	707	706
Softening Range(7.477~8.176)	678~714	677~713
Working Point(4)	1026	1022
Working Range(4~8)	686~1026	686~1022
Long Short Range(4~8.602)	658~1026	658~1022
Strain Point(14.5~14.6)	491~493	491~493

Misc		
Properties	(H):Corning0080	(F):Corning0080
Working Range Index (WRI in oC)	182	182
Relative Machine Speed (RMS)	0.969	0.969
Devitrification Index (DI in oC)	22	22
Gob Temperature (G in oC)	1182	1182

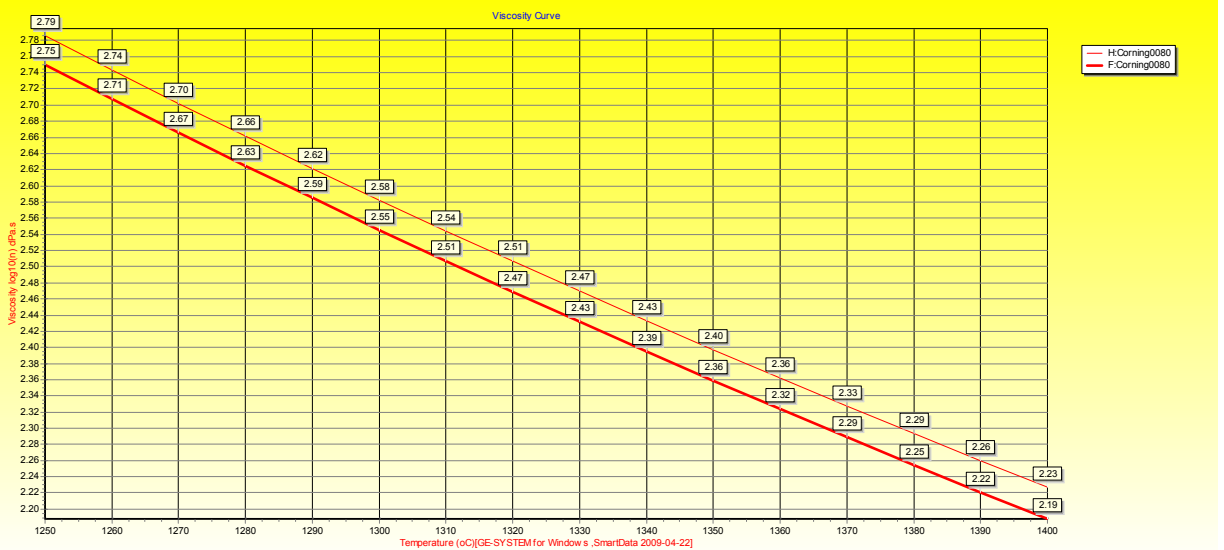
Const	Corning0080
A	1.6575
B	4635.7314
T0	206.7079

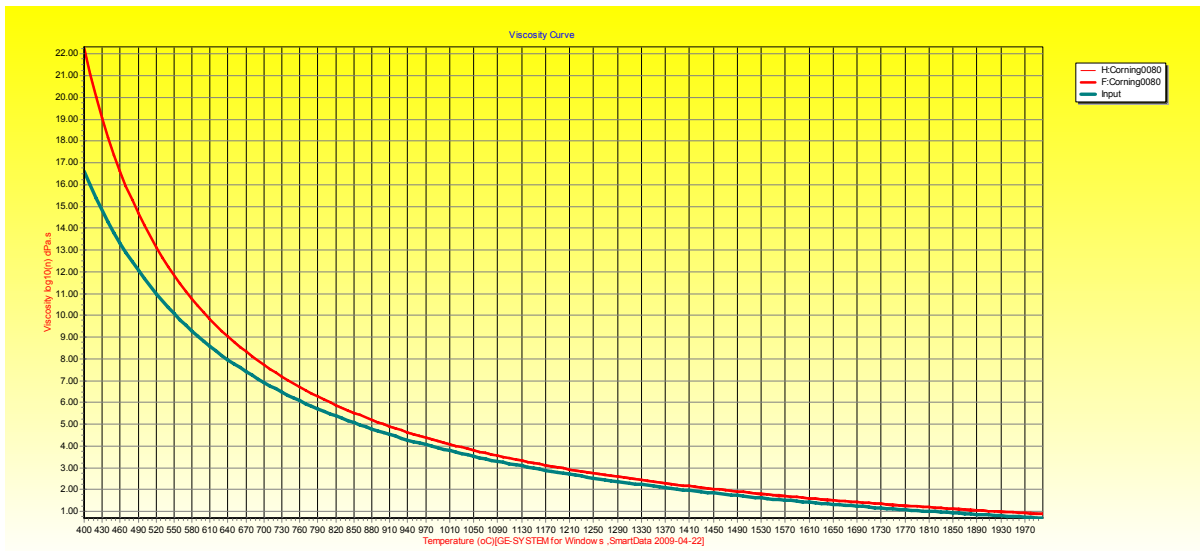
Const	Corning0080
A	1.7300
B	4682.1733
T0	204.9228

Equation	Corning0080
Herbert	$\log_{10}(\text{visc.}/(\text{Poise})) = -1.6575 + 4635.7314 / (T \text{ in } \text{oC} - 206.7079)$
Fluegel	$\log_{10}(\text{visc.}/(\text{Poise})) = -1.7300 + 4682.1733 / (T \text{ in } \text{oC} - 204.9228)$

Melt and refine Temperature	
Properties	Corning0080
Melt temperature	1468
Refine temperature	1492
Liquidus Temperature	936
Surface tension	
Properties	Corning0080
Surface tension 900	329.22
Surface tension 1200	311.856
Surface tension 1300	310.439
Surface tension 1400	308.732
Surface tension 1400 oC (Kucuk)	301.216474607537

Water solubility	
Properties	Corning0080
Water solubility	1058.8315061239





Density of glass melts

Properties

1000

1200

1400

Corning0080

2.34238305097556

2.32834236779192

2.2983026697882

Thermal expansion of glass melts

Properties

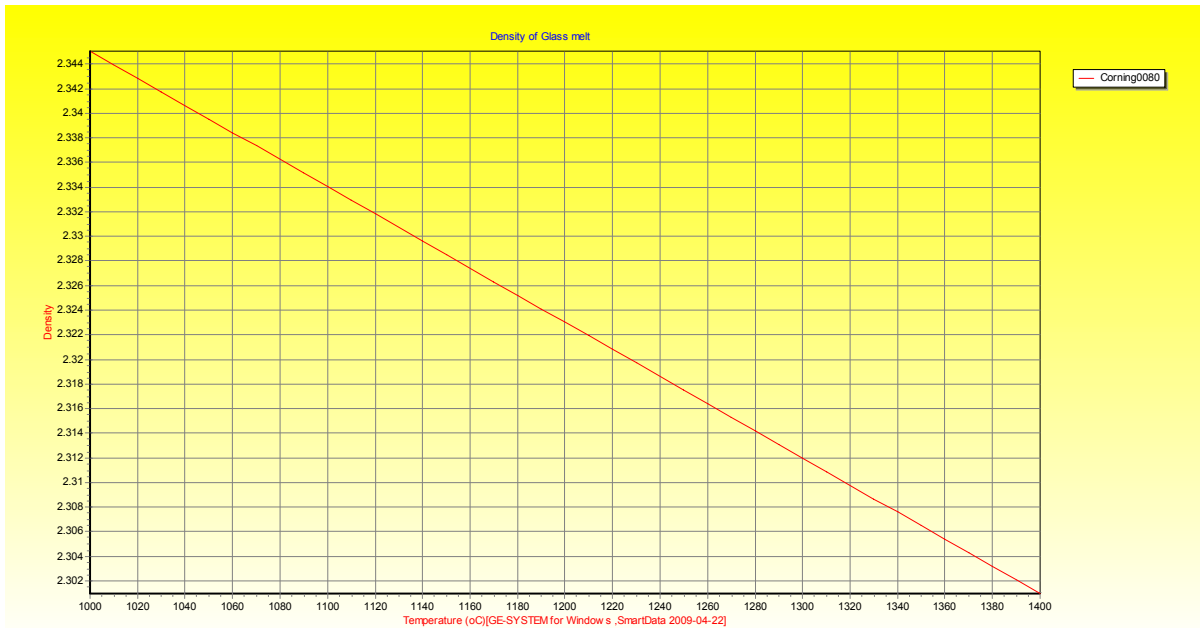
Volume

Linear

Corning0080

47.8932765797323

15.9644255265774



High temperature electrical resistivity

Properties

1000

1200

1400

Corning0080

1.01287707037239

0.685033106590099

0.46404670750201

VFT constants

Properties

A

B

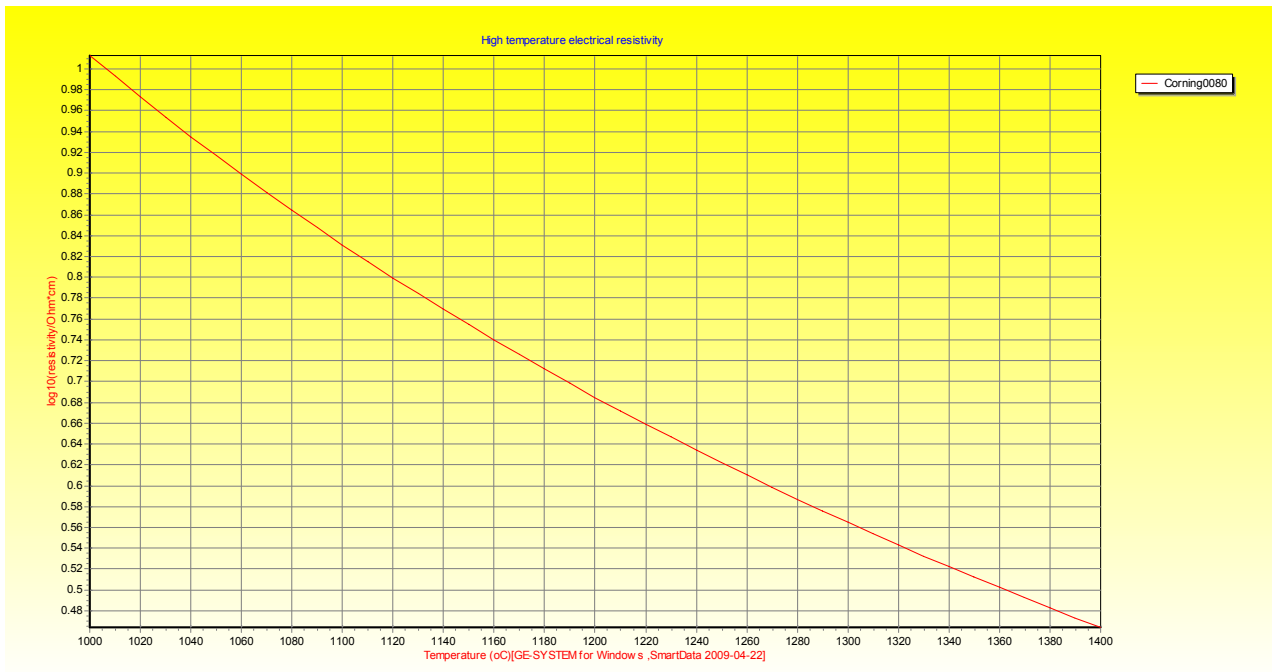
T0

Corning0080

-0.670959933796798

1392.9012036443

172.781450820081



Elastic Properties	Corning0080
Young's modulus(E) 20 oC : Kg/cm2 [1.0E+05]	6.99031229834349
Shear modulus(G),20 oC: Kg/cm2 [1.0E+05]	2.83949418888402
Poisson's ratio(μ)	0.23090801272089
Bulk modulus(K) ,20 oC: Kg/cm2 [1.0E+05]	4.32956797229154
Tensile strength: MPa	8.076
Compressive strength: MPa	104.878
Shear modulus of glass 20oC (Fluegel): GPa	28.4202369078251

Hardness Properties	Corning0080
Mohs hardness	6.4482
Vickers Hardness	16.036

Electrical Properties	Corning0080
Dielectric Constant at 20oC 4.5E+8Hz	7.26

Chemical Durability Properties	Corning0080
Acid Resistance	66.19
Hydrolytic durability Water Durability log(0.01M HCl) : ml	-0.02352155558264
Extracted Na2O equivalent: μ g	293.55708405155
Hydrolytic class	4

Thermal Properties	Corning0080
Expansion Coefficient at 20-400 oC: /oC [1.0E-07]	95.3888762028065
Thermal Conductivity: cal/cm.oC.s [1.0E-04]	24.6228851511467
Linear Thermal Expansion Coefficient 210oC: ppm/oC	9.68038070973535
Thermal conductivity of glass at room temperature: W/(m.K)	1.03248

Silicate Laser Glass Properties	Corning0080
σ : cm2 [1.0E-20]	0
τ r: us	0
τ : us	0
$\Delta \lambda$ eff: nm	0
Density : g/cm3	0

Refractive index (nd): 0
 Abbe's Number: 0
 Nonlinear refractive index (n2): esu [1.0E-13] 0

Fluorin-Phosphorus Laser Glass

Properties Corning0080
 Refractive index(nD): 0
 $\Delta \lambda$: nm 0
 $\Delta \lambda$ eff: nm 0
 σ : cm² [1.0E-20] 0
 τ : us 0

Miscellaneous

Properties Corning0080
 Density at 20 oC: g/cm³ 2.4524672166385
 Density at room temperature(Fluegel): g/cm³ 2.46341239395622
 Molar volume: cm³/mol 24.2518718858332
 Molecular Weight 59.4769207421228
 X-Ray mass absorption coefficient(0.06nm) 2.59168

There is a example of the optimization of components,:

10.2009.4.18-0

Components	Min(%)	Max(%)	:D			:C		
			mol%	100%	wt%	mol%	100%	wt%
SiO2	70	73	70.375	71.239	71.517	70.375	71.034	71.309
CaO	7	12	12.000	12.147	11.382	12.000	12.112	11.348
MgO	1	4.5	2.313	2.341	1.576	2.422	2.445	1.646
Na2O	13	15	13.000	13.160	13.628	13.125	13.248	13.719
Al2O3	1	1.8	1.100	1.114	1.897	1.150	1.161	1.977
Count:	5		Optimize components: 135. Cost time:32 ms					

Designer: _____


Signature: _____

Property	Relatio	Design	Error	:D	:C
Refractive index at 20 oC(nD)		1.523		1.523026	1.523267
Mean Dispersion at 20 oC(nF-nC)				876.037625	876.988571
Temperature coefficient of Refractive index at ,20-100 oC				41.524013	41.265878
Thermal optical coefficient ,20-100 oC				86.904791	86.870368
Molar refraction				8.876864	8.883769
Stress Optical Coefficient -C1				0.10212	0.102199
Stress Optical Coefficient -C2				0.346742	0.346851
Nonlinear refractive index				18.143696	18.191752
Thermo Optical Constant				9.478758	9.490647
Birefringence				1.249847	1.256117
Abbe's Number				59.703649	59.666343
X-Ray mass absorption coefficient(0.06nm)				2.976823	2.973611
(D)Refractive index at 20 oC(nD)				1.509227	1.50936
(D)Mean Dispersion at 20 oC(nF-nC)				875.228029	876.043824
(D)Abbe's Number				58.182218	58.14326
Young's modulus(E) 20 oC				7.325523	7.323891
Shear modulus(G),20 oC				2.970041	2.968223
Molar volume				23.925819	23.915349
Density at 20 oC				2.501489	2.502683
Poisson's ratio(μ)				0.233236	0.233716
Bulk modulus(K) ,20 oC				4.576779	4.584015
Mohs hardness				6.091722	6.066153
Tensile strength				9.096047	9.077235
Compressive strength				100.960149	100.902075
Shear modulus of glass 20oC (Fluegel)				30.012756	30.020109
Density at room temperature(Fluegel)				2.514157	2.515324
Vickers Hardness				15.706413	15.666705
(D)Density at 20 oC				2.453776	2.45476
Dielectric Constant at 20oC 4.5E+8Hz				7.513803	7.534293
High temperature electrical resistivity 1000(log10)				1.340295	1.331654
High temperature electrical resistivity 1200(log10)				0.894146	0.887528
High temperature electrical resistivity 1400(log10)				0.600743	0.595339
Expansion Coefficient at 20-400 oC				91.653894	92.103361
Thermal Conductivity				24.890638	24.850853
Linear Thermal Expansion Coefficient 210oC				9.299532	9.335389
Thermal conductivity of glass at room temperature				1.07509	1.073561
Melt temperature				1458	1456
Refine temperature				1497	1495
Surface tension 900				340.397701	340.626929
Surface tension 1200				326.175772	326.335712
Surface tension 1300				325.065356	325.208611
Surface tension 1400				324.091217	324.218697
Surface tension 1400 oC (Kucuk)				320.223915	320.474706

Property	Relatio	Design	Error	:D	:C
Liquidus Temperature				1064	
A				1.611951	1.6
B				4194.17330	4194.
T0				278.263837	277.
A(F)				1.5553	1.5
B(F)				4130.90225	4119.
T0(F)				281.40615	281.5
Acid Resistance				68.142404	67.
Hydrolytic durability Water Durability log(0.01M HCl)				-0.240381	-0.
Extracted Na2O equivalent				178.169299	179.
Hydrolytic class				3	
Refractive index(nD)				0	
$\Delta\lambda$				0	
$\Delta\lambda_{eff}$				0	
σ				0	
τ				0	
σ				0	
τ				0	
τ				0	
$\Delta\lambda_{eff}$				0	
Density				0	
Refractive index (nd)				0	
Abbe's Number				0	
Nonlinear refractive index (n2)				0	

Our customer:

<p>Shanghai Institute of Optics and Fine Mechanics (SIOM), Chinese Academy of Sciences (CAS) http://www.siom.ac.cn/</p> 	<p>Wuhan University of Technology http://www.whut.edu.cn/</p> 
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<p>http://www.yihecheng.net/</p> 	<p>Anhui Gold Coronet Glass Co.,Ltd. http://www.hbjgbl.com.cn/</p>
<p>China Luoyang Float Glass Group Co.,LTD. http://www.clfg.com/</p>	<p>BlueStar Glass</p>

	
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