

Optical Glass (N-BK7 and B270 types)



APPLICATIONS: N-BK7 is a Schott™ designation for the most common Borosilicate Crown glass used for a wide variety of visible applications. The basic data here is given for N-BK7. Full optical design data on N-BK7 and other glasses can be found by following the web links at the bottom of this page.

Transmission Range	350nm to 2.5µm
Refractive Index	1.51680 @ 587.5618nm (Yellow Helium Line)
Reflection Loss	8.1% at 587.5618nm (2 surfaces)
Absorption Coefficient	--
Reststrahlen Peak	--
dn/dT	See Schott™ Table
dn/dµ = 0	--

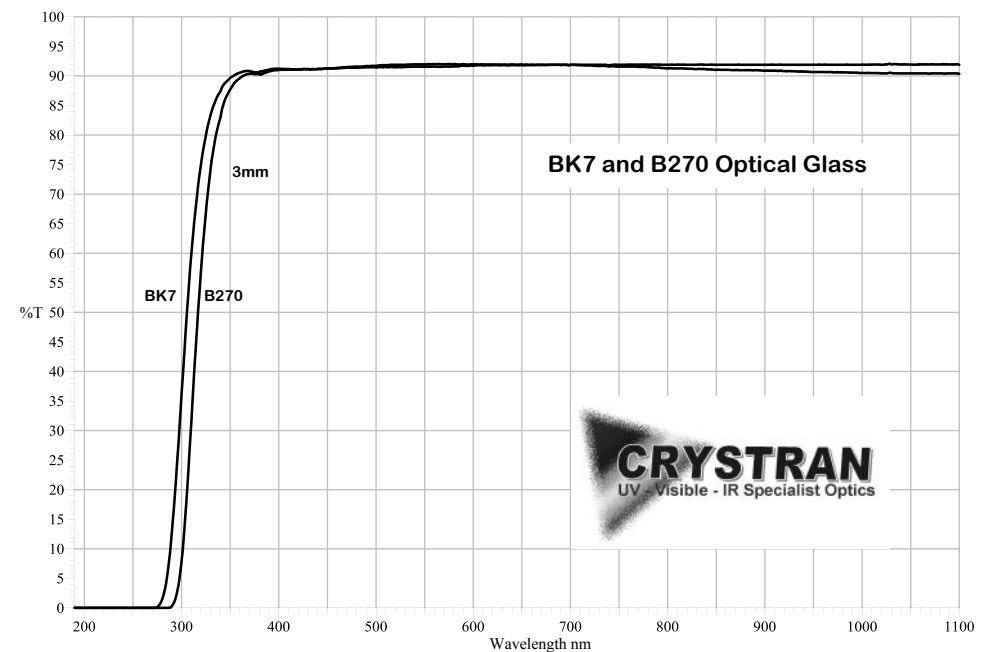
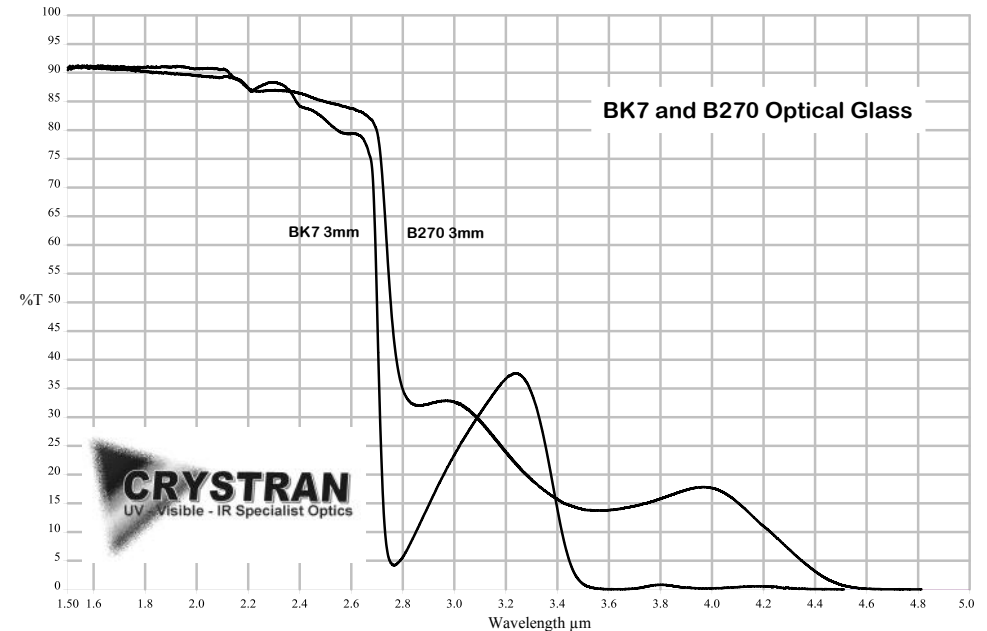
Density	2.51
Melting Point	557°C (Transformation Temperature)
Thermal Conductivity	1.114 W m ⁻¹ K ⁻¹
Thermal Expansion	7.1 x 10 ⁻⁶ K ⁻¹
Hardness	Knoop 610
Specific Heat Capacity	858 J Kg ⁻¹ K ⁻¹
Dielectric Constant	n/a
Youngs Modulus (E)	82 GPa
Shear Modulus (G)	n/a
Bulk Modulus (K)	34 GPa
Elastic Coefficients	n/a
Apparent Elastic Limit	63.5MPa (9206psi)
Poisson Ratio	0.206

Solubility	Insoluble in water
Molecular Weight	n/a
Class/Structure	Amorphous glass

WEBLINKS:

Schott Glass Catalogue - Data on all Schott™ Glass types at:
www.schott.com/advanced_optics/english/download/opticalglasdatasheetsv101007.xls

Optical Glass (N-BK7 and B270 types)



BK7 Glass Types

Glass Code 517642

BK7 is a borosilicate crown optical glass with high homogeneity, low bubble and inclusion content. Good physical and chemical properties mean it is widely used.



EQUIVALENTS			
Schott NBK-7	Hoya BSC7	$n_d =$ 1.51680	$v_d =$ 64.20
Corning BSCB16-64	Hikari E-BK7	$n_e =$ 1.51872	$v_e =$ 64.00
Ohara S-BSL7	Chinese H-K9L	$n_F - n_c =$ 0.008050	$n_{F'} - n_c =$ 0.008105

Refractive Indices		
nm		
n_F	706.5	1.51289
n_c	656.3	1.51432
$n_{c'}$	643.8	1.51472
n_{HeNe}	632.8	1.51509
n_D	589.3	1.51673
n_d	587.6	1.51680
n_e	546.1	1.51872
n_F	486.1	1.52237
$n_{F'}$	480.0	1.52282
n_g	435.8	1.52667
n_h	404.7	1.53022
n_i	365.0	1.53622

Chemical Properties	
RC(S)	1
RA(S)	1
D_w	3
D_A	1

Internal Transmittance		
nm	5mm	10mm
2400	0.860	0.74
2200	0.930	0.86
2000	0.960	0.922
1800	0.985	0.970
1600	0.990	0.980
1400	0.995	0.990
1200	0.998	0.996
1060	0.998	0.996
1000	0.999	0.997
950	0.999	0.997
900	0.999	0.998
850	0.999	0.998
800	0.999	0.999
700	0.999	0.999
650	0.999	0.998
600	0.999	0.999
550	0.999	0.999
500	0.999	0.998
480	0.999	0.998
460	0.999	0.998
440	0.999	0.997
420	0.999	0.998
400	0.999	0.998
390	0.998	0.997
380	0.997	0.993
370	0.997	0.993
360	0.994	0.988
350	0.989	0.977
340	0.977	0.954
330	0.95	0.91
320	0.90	0.81
310	0.80	0.63
300	0.61	0.38
290	0.36	0.13
280	0.14	0.02

Thermal Properties	
T_g (°C)	565
T_s (°C)	630
$T_{10}^{14.5}$ (°C)	511
T_{10}^{13} (°C)	547
$\alpha_{20/120}$ ($10^{-7}/K$)	75
$\alpha_{20/300}$ ($10^{-7}/K$)	82

Constants of Dispersion	
A_0	2.2702566
A_1	$-9.1988101 \times 10^{-3}$
A_2	1.1609706×10^{-2}
A_3	$-7.6123911 \times 10^{-5}$
A_4	2.8558727×10^{-5}
A_5	$-1.2566486 \times 10^{-6}$

Mechanical Properties	
H_K (GPa)	5.95
F_A	1.00
E (GPa)	79.2
G (GPa)	32.7
Poisson Ratio	0.211

Relative Partial Dispersions			
$P_{d,c}$	0.3080	$P'_{d,c}$	0.2569
$P_{e,d}$	0.2387	$P'_{e,d}$	0.2371
$P_{g,F}$	0.5342	$P'_{g,F}$	0.4748

Stress-Optical Coefficient	
B ($10^{-12}/Pa$)	2.7

Deviation of Relative partial Dispersions ΔP from the "Normal Line"	
$\Delta P_{F,e}$	-0.0014
$\Delta P_{g,F}$	-0.0035

Colouration Code	
λ_{80} / λ_5	33 / 29

Other Properties	
Density	2.52

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Data provided is compiled by a survey of scientific literature and commercial publication. While every attempt has been made to verify the source of the information, Crystran Ltd accept no responsibility for the accuracy of data.

B270 Glass Types

Glass Code 523586

B270 is a borosilicate crown optical glass with high homogeneity, low bubble and inclusion content. Widely used as drawn sheet water-white glass.



EQUIVALENTS		$n_d =$	1.52307	$\nu_d =$	58.64	$n_F - n_c =$	0.008920
Schott B270	Hoya C12	$n_e =$	1.52520	$\nu_e =$	58.36	$n_{F'} - n_c =$	0.009000
	Hikari KN1						
Ohara NSL51	Chinese H-K51						

Refractive Indices		
nm		
n_r	706.5	1.51883
n_c	656.3	1.52037
$n_{c'}$	643.8	1.52080
n_{HeNe}	632.8	1.51120
n_D	589.3	1.52299
n_d	587.6	1.52307
n_e	546.1	1.52520
n_F	486.1	1.52929
$n_{F'}$	480.0	1.52980
n_g	435.8	1.53416
n_h	404.7	1.53820
n_i	365.0	1.54510

Chemical Properties	
RC(S)	2
RA(S)	1
D_w	2
D_A	1

Internal Transmittance		
nm	5mm	10mm
2400	0.89	0.80
2200	0.910	0.828
2000	0.960	0.921
1800	0.981	0.962
1600	0.995	0.990
1400	0.996	0.993
1200	0.999	0.998
1060	0.998	0.997
1000	0.998	0.996
950	0.998	0.996
900	0.997	0.995
850	0.997	0.994
800	0.996	0.993
700	0.996	0.992
650	0.996	0.992
600	0.996	0.992
550	0.996	0.992
500	0.995	0.990
480	0.994	0.989
460	0.994	0.988
440	0.993	0.987
420	0.993	0.987
400	0.993	0.987
390	0.992	0.985
380	0.989	0.979
370	0.987	0.974
360	0.979	0.959
350	0.962	0.925
340	0.922	0.850
330	0.83	0.69
320	0.66	0.43
310	0.36	0.13
300	0.09	0.01
290		
280		

Thermal Properties	
T_g (°C)	533
T_s (°C)	595
$T_{10}^{14.5}$ (°C)	467
T_{10}^{13} (°C)	520
$\alpha_{20/120}$ ($10^{-7}/K$)	85
$\alpha_{20/300}$ ($10^{-7}/K$)	96

Constants of Dispersion	
A_0	2.2877828
A_1	$-9.3148723 \times 10^{-3}$
A_2	1.0986443×10^{-2}
A_3	4.8465203×10^{-4}
A_4	$-3.3944738 \times 10^{-5}$
A_5	1.6958554×10^{-6}

Mechanical Properties	
H_K (GPa)	5.37
F_A	
E (GPa)	74.0
G (GPa)	30.26
Poisson Ratio	0.223

Relative Partial Dispersions			
$P_{d,c}$	0.3033	$P'_{d,c}$	0.2529
$P_{e,d}$	0.2384	$P'_{e,d}$	0.2363
$P_{g,F}$	0.5357	$P'_{g,F}$	0.4842

Stress-Optical Coefficient	
B ($10^{-12}/Pa$)	

Deviation of Relative partial Dispersions ΔP from the "Normal Line"	
$\Delta P_{F,e}$	0.0006
$\Delta P_{g,F}$	-0.0001

Colouration Code	
λ_{80} / λ_5	35 / 31

Other Properties	
Density	2.54

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