

Glass designation :

PHOTOGRAY EXTRA™

Code **8111**

Color : **Clear to medium gray**

Glass type : **Photochromic crown glass.**

Application : **Ophthalmic lenses : Single vision, G&P progressive addition.**

PHYSICAL PROPERTIES

Density :	2.41	g/cm ³
Linear Exp. Coef. :	63.5	10 ⁻⁷ /°C
Viscosity :	Soft. Pt	665 °C
	Ann. Pt	495 °C
	Strain Pt	465 °C

REFRACTIVE INDEX

Line		λ (nm)	Value
F'	Cadmium	480.0	1.52989
F	Hydrogen	486.1	1.52938
e	Mercury	546.1	1.52518
d	Helium	587.6	1.52300
C'	Cadmium	643.8	1.52063
C	Hydrogen	656.3	1.52021
Abbe Number		ve	56.7
		vd	57.0

TRANSMISSION PROPERTIES (2 mm)

VISIBLE 380 - 780 nm	Heat Faded Darkened	
Luminous transmission factor	91.0%	30.0%

ULTRAVIOLET

t(max) 280 - 315 nm	<0.1	<0.1
t(avg) 280 - 315 nm	<0.1	<0.1
Solar UV-B transmission factor	<0.1	<0.1

t(max) 315 - 350 nm	7.0%	2.5%
t(moy) 315 - 380 nm	11.0%	3.5%
Solar UV-A transmission factor	7.5%	2.5%

BLUE LIGHT 380 - 500 nm

Blue light transmission factor	86.0%	29.0%
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TRAFFIC SIGNAL RECOGNITION

ISO 14889	Pass
ANSI Z80-3	Pass
AS 1067.1	Pass

COATING & TEMPERING

(See also notes below)

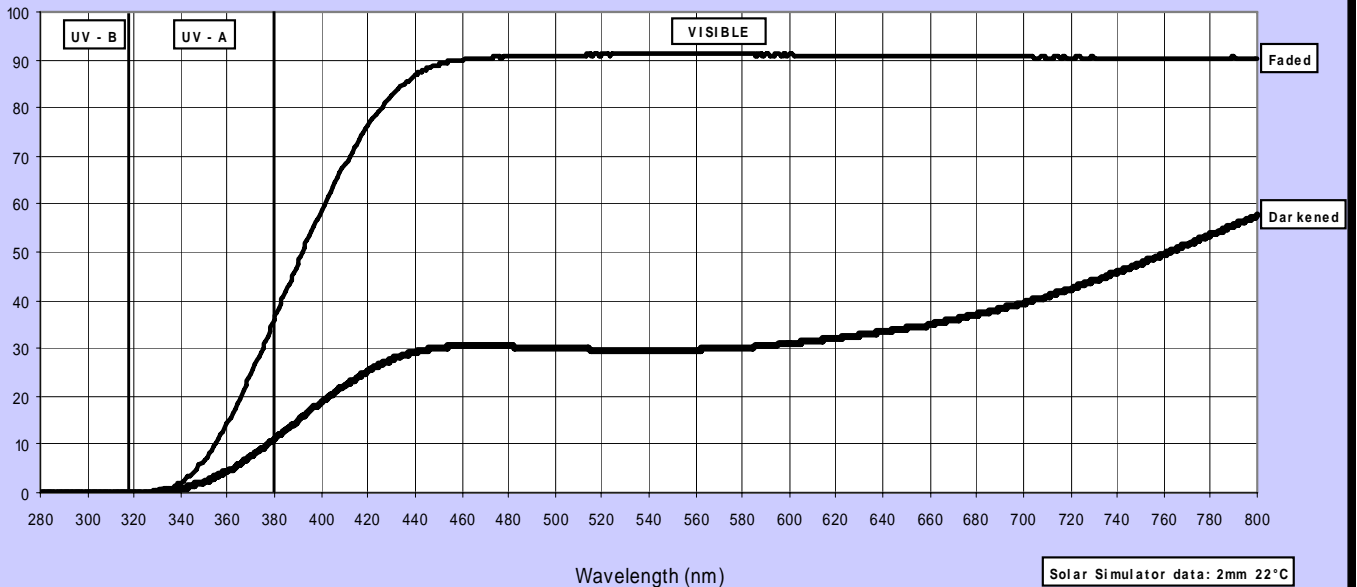
Vacuum coating	YES
Chemical tempering	YES
Air tempering	YES

CHEMICAL DURABILITY (class)

To water	NF ISO 719	HGB3
To acid	DIN 12-116	3
To alkalis	ISO 695	A2

t(%)

Transmission Curve: Photogray Extra™ Code 8111



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Note :
 Heat treatments as indicated below, or vacuum coatings, may cause changes in transmission and color properties.

Chemtempering :		Recommended bath and cycle	
Bath :	Potassium Nitrate	59.5%	Time : 16 Hr
	Sodium Nitrate	40.0%	θ °C : 400 °C
	Silicic acid	0.5%	

Air tempering :
 Use standard schedule for photochromic crown glass.

Compatible Bariums :
 This glass has not been designed for fused multifocal production nor heat formed aspheric or progressive lenses.

Heat forming :
 For purpose of manufacturing the above type of lenses, select
Code 8112 FUS. PHOTOGRAY EXTRA™

Transmittance properties according to ISO 8980-3

Photochromic response :

Temperature			2 mm thickness
22 °C	Heat faded	Tv (0)	91.0%
	15 mn darkened	Tv (15)	30.0%
	5 mn faded		65.0%
	Night driving conditions ⁽¹⁾		85.0%
5 °C	15 mn darkened	Tv (15)	22.0%
35 °C	15 mn darkened	Tv (15)	45.0%

⁽¹⁾ Reference : ISO 8980-3 Chapter 6.5

Transmission categories :

	2 mm
Faded state	Category 0
Darkened state	Category 2
Night driving ⁽²⁾	Yes

⁽²⁾ Reference : ISO 14889 Chapter 4.5

Properties according to ISO 14889

ISO 14889 Chapter 4.3.1 **Physiological compatibility**

The above glass products are not known to be physiologically incompatible, nor known to create a significant number of allergic reactions, when the lenses made out of these materials are used as intended by the manufacturer

ISO 14889 Chapter 4.3.2 **Flammability**

The above glass products are not flammable, and when tested as described in chapter 5.1 of ISO 14889, there is no continued combustion after withdrawal of the test rod.