

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 <sup>3</sup>
Linear Exp. Coef. :	63.5	10 <sup>-7</sup> / °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(ave) 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)

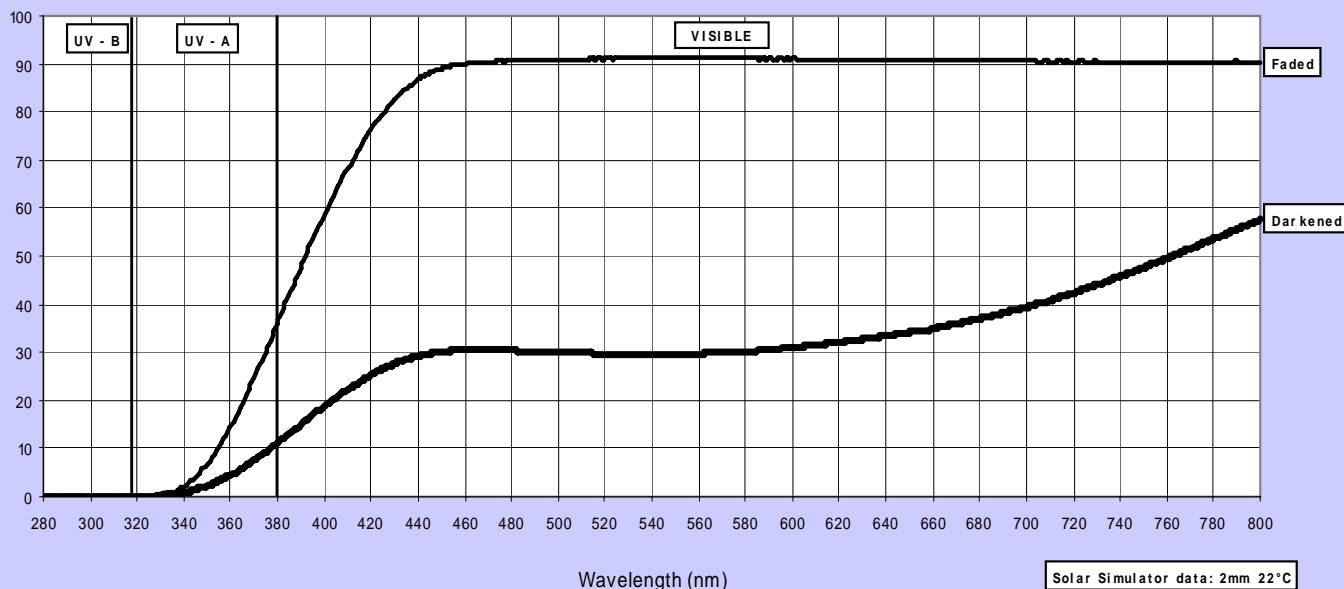
Vacuum coating	YES
Chemical tempering	YES
Air tempering	YES

### 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%**  
Sodium Nitrate **40.0%**  
Silicic acid **0.5%**

Time : **16 Hr**  
 $\theta$  °C : **400 °C**

**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
<b>22 °C</b>	Heat faded	Tv (0)	<b>91.0%</b>
	15 mn darkened	Tv (15)	<b>30.0%</b>
	5 mn faded		<b>65.0%</b>
	Night driving conditions <sup>(1)</sup>		<b>85.0%</b>
<b>5 °C</b>	15 mn darkened	Tv (15)	<b>22.0%</b>
<b>35 °C</b>	15 mn darkened	Tv (15)	<b>45.0%</b>

<sup>(1)</sup> Reference : ISO 8980-3 Chapter 6.5

**Transmission categories :**

	2 mm
Faded state	<b>Category 0</b>
Darkened state	<b>Category 2</b>
Night driving <sup>(2)</sup>	<b>Yes</b>

<sup>(2)</sup> 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.