



The Human Eye

- **The cornea**, in direct contact with external environment, plays an essential part in the transmission of light rays. It is the structure of the human body which has the highest tactile sensibility.
- **The pupil** (light controller), situated in the middle of the iris, works like the diaphragm of a camera. Its diameter changes in accordance with the luminosity.
- **The lens** allows focusing (near vision, far vision) thanks to a control muscle. With age this muscle loses power and impacts near vision (presbyopia). The lens can lose its transparency due to exposure to IR (infrared) light and UV (ultraviolet) light, resulting in loss of vision (cataract).
- **The retina**, where all light beams converge, transmits all information through the optic nerve to the brain in order to create your vision. Burned retina cells are lost forever, which causes irreversible loss of vision.

Industrial hazards for the eyes:

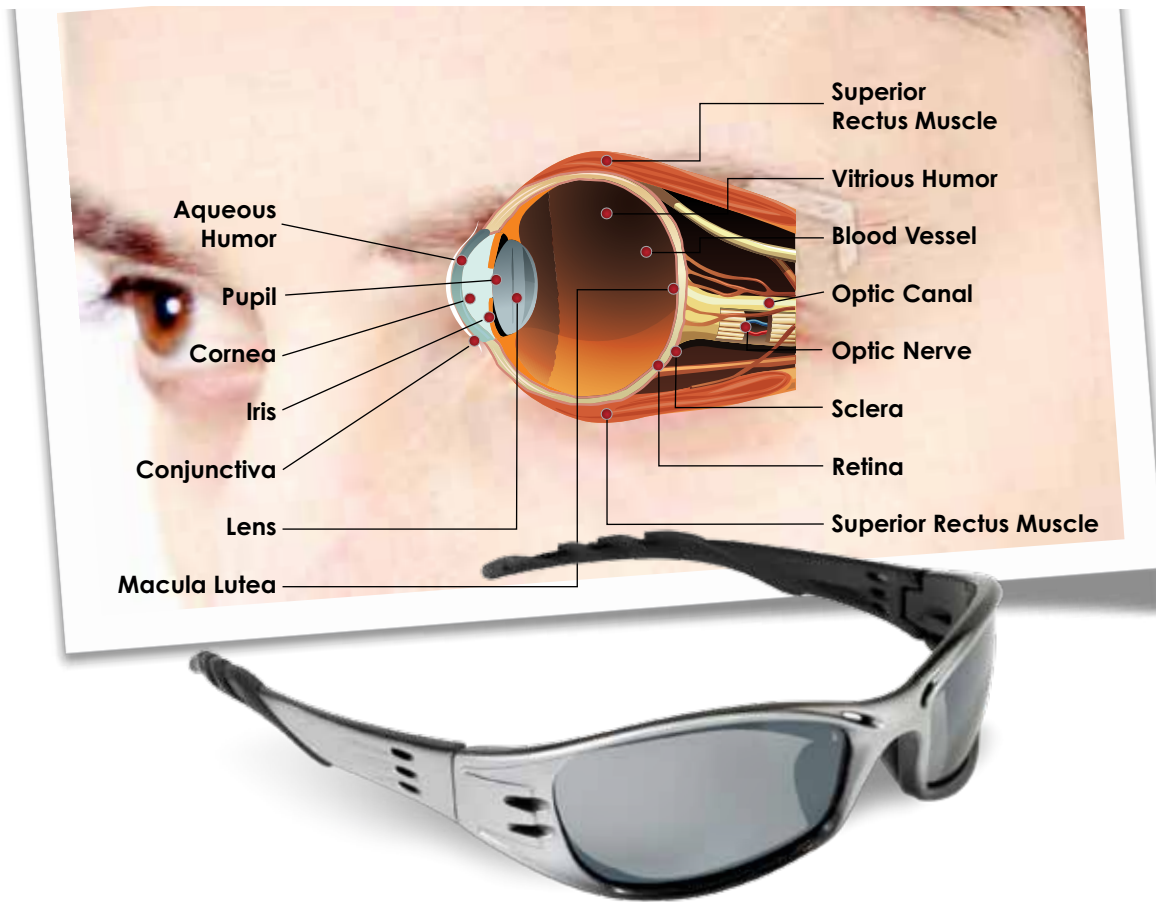
- Mechanical hazards: dust, shock, solid particles.
- Thermal hazards: hot liquid, molten splash, flames.
- Chemical hazards: splashes of acids, solvents.
- Radiation hazards: ultraviolet, infrared, visible, light, laser.
- Electrical hazards: direct contact, short-circuit electric arc.

Facts on eye damage:

Every day more than 600 workers worldwide suffer from eye injury simply because they do not wear protective eyewear.*

* Source: Bureau of Labor Statistics

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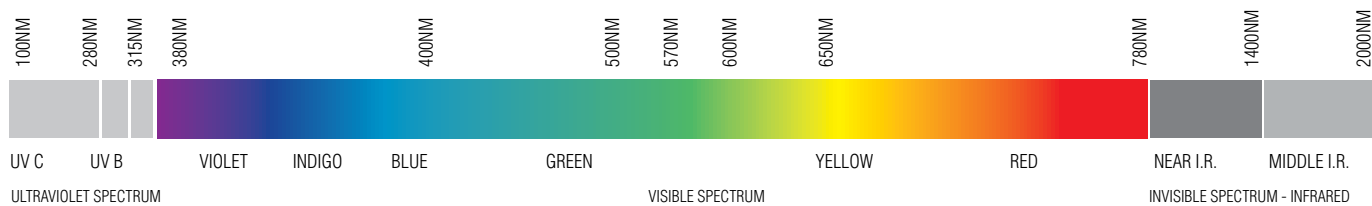
Polycarbonate Lens Selection Guide

This Polycarbonate Lens Selection Guide will help you understand the need for different colored lenses and lens types for industrial applications. It will also help you determine what type of lens is best for your application and environment. There are many lens options other than clear, gray and mirror. When choosing a lens, the basic "rule of thumb" is to consider color opposites. Examples of these opposites are shown in the chart below in columns one and two.

Lens Color/Type	Color of Light Reduced or Blocked*	Lens Properties/Use	Percent of Visible Light Passing Through the Lens (approx.)	Suggested Applications/Environments
Clear	None	Maximum amount of light reaches the eye for good vision and acuity.	85%+	General everyday eye protection.
Gray, Brown, Bronze	All	Reduces brightness and glare from the sun.	10%-25%	Mainly for outdoor daytime use, as in typical sunglass use.
Mirror & Colored Mirror	All	Reduces brightness and glare from the sun.	50%	Mainly for outdoor daytime use, as in typical sunglass use.
Indoor/Outdoor	All	Reduces brightness and glare when working both indoors and outdoors.	50%	For tasks requiring frequent movement indoor to/from outdoor. Loading docks, forklift drivers, construction or similar jobs.
Photochromic	All	Reduces brightness and glare from the sun and indoor lighting.	Varies from 20% to 80%	Lens darkens when outside and lightens when inside. Do not use for frequent indoor to/from outdoor movement.
Polarized	All	Reduces brightness and glare from the sun.	15%	Exceptional for reducing reflective glare. Mainly for outdoor use.
Yellow/Amber	Purple and Blue	Increases contrast, reduces haze from blue lighting, excellent UV protection.	85%-92%	Good for inspection tasks and hazy, overcast or foggy days. Never use for night driving.
Pink/Vermilion	Green	Increases contrast, low-level indoor lighting glare reduction.	50%	Good for inspection tasks. Some workers prefer pink/vermillion over yellow/amber.
Blue	Yellow	Reduces brightness and glare from indoor lighting.	35%-65%	Very useful to reduce glare, eye stress and fatigue in yellow light environments.
Filter Shades, Green & Gray	Red	Reduces ultraviolet, visible and infrared radiation.	Depends upon shade number	Predominately used for gas welding, cutting, brazing and soldering, metal making, furnace work and open flames.
MinimizeR™	All	Reduces ultraviolet, visible and infrared radiation.	50%	Provides good visual sight and acuity while absorbing UV and some IR. Excellent for wearing with welding helmet.

* All polycarbonate safety lenses absorb 99.9% ultraviolet (UV) light.

All 3M™ Protective Eyewear that meet the requirements of ANSI Z87.1-2003 provide 99.9% UV protection (UVA & UVB).



	UV C 100 To 280nm	UV B 280 To 315nm	UV A 315 To 380nm	Blue Light 380 To 480nm	Visible Light 380 To 780nm	Near IR 780 To 1400nm	Middle IR 1400 To 2000nm
Cornea	Conjunctivitis Partial Blindness	Conjunctivitis Partial Blindness	Conjunctivitis Partial Blindness				
Lens		Cataract Premature Aging	Cataract Premature Aging			Cataract	Cataract Partial Blindness
Cornea				Partial Blindness Photoretinitis	Vision Problems Discontinuous Vision	Retinitis Pigmentosa Blindness	



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