

## European Standards relating to safety eyewear

The European Standards covering Eye & Face Protection are some of the most comprehensive of all those dealing with any item of PPE.

We endeavour to explain what is encompassed within the five most commonly occurring of these i.e. EN166, 169, 170, 171 & 172.

With the following example, we show the way in which the specifications are usually presented.

**Example:** INFIELD Windor - 9070 105 Safety Glasses, Clear Lens.

The full specification for this spectacle is shown as EN166 1F, EN170 2C-1.2

The meaning of the various markings is as follows:

1F refers to EN166, the Technical Performance Standard where: '1' denotes 'optical class 1', the highest optical class and 'F' denotes 'low energy impact resistance'

2C-1.2 refers to EN170, the Ultraviolet Standard where: 2C the Code Number denotes a UV filter with good colour recognition and '1.2' denotes the Shade Number; in this case it indicates virtually total light transmission



In this example, further optional information is shown.

GA is the manufacturer's (INFIELD) identification mark

K denotes a hard coated lens i.e. 'resistance to abrasion' by fine particles

CE indicates that the product conforms with relevant EU directives

11/11 is the production date. In this example November 2011

### **Basic Standards:**

EN166 - Technical performance standard - The core technical standard

EN167 - Methods for optical tests

EN168 - Methods for tests other than optical

### **Product Type Standards:**

EN169 - Filters for welding and related techniques - Transmittance requirements and recommended utilisation

EN170 - Ultraviolet filters - Transmittance requirements and recommended utilisation

EN171 - Infrared filters - Transmittance requirements and recommended use

EN172 - Solar radiation filters – Sun glare filters for industrial use

### **Field of Use Standards:**

Welding -

EN175 - Equipment for eye and face protection during welding and allied processes

EN379 - Specification for welding filters with switchable and dual luminous transmittance

Laser -

EN207 - Filters and eye protection against laser radiation

EN208 - Eye protection for adjustment work on lasers and laser systems

Mechanical / Heat Protection -

EN1731 - Mesh type eye and face protectors for industrial and non-industrial use against mechanical hazards and /or heat

### **Optical Class - The first digit seen after EN166 notation**

Class 1 (high optical quality and the optical quality for all INFIELD spectacles & goggles

Suitable for occasional wear. Refractive power of  $\pm 0.06$  dioptres

Class 2 (medium optical quality)

Suitable for occasional wear. Refractive power of  $\pm 0.12$  dioptres

Class 3 (low optical quality)

Only suitable for exceptional wear. Refractive power of  $\pm 0.25$  dioptres

### **Mechanical Strength**

S = Increased Robustness (12m/s). Typically, applicable to safety glasses with reinforced mineral lenses

F = Low Energy Impact (45m/s). Typically, applicable to Visors, Goggles and Safety Glasses

B = Medium Energy Impact (120m/s). Typically, applicable to Visors and Goggles

A = High Energy Impact (190m/s). Typically, Polycarbonate Visors

*(High Energy Impact is rarely required in industrial use and can adversely affect the optical class)*

T = Retains mechanical strength at extremes of temperature  $-5^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ . Used in conjunction with symbols F, B or A

### **Fields of Use**

3 = Liquids (droplets or splashes). Typically, applicable to Goggles (indirect vent & unvented) & Visors.

4 = Large Dust Particles (particles size  $>5\mu\text{m}$ ). Typically, applicable to Goggles (indirect vent & unvented)

5 = Gas & Fine Dust Particles (smoke/dust with particle size  $<5\mu\text{m}$ ). Typically, applicable to Goggles (unvented)

8 = Resistance to Short Circuit Electric Arc. Typically, applicable to Visors with a minimum thickness 1.4mm and 99.9% UV filtration

9 = Molten Metal and Hot Solids. Typically, applicable to Goggles & Visors

K = Hard Coat - resistance to damage by fine particles (Optional)

N = Non-Mist - resistance to misting (optional)

R = Enhanced reflectance (optional). Typically, applicable to Gold Mirror coated Visors

G = Radiant Heat - mesh type protection only

H = Eye protector designed to fit a small head (Optional)

### **EN169, 170, 171 & 172**

These deal with the shade and filtering characteristics of the eye protection.

They indicate the levels of protection afforded against Ultraviolet light, Infrared light, Sunlight and the high intensity light produced during Welding processes.

The numbers used to describe these characteristics appear only on the lenses of the eyewear and below we illustrate how these numbers relate to specific European Standards.

The 1st digit after the EN ref is the 'Code' indicating the type of filter, except for EN169 where only a shade number appears

The 2nd & 3rd digits after the EN ref are the 'Shade Numbers' and indicate the shade of the lens.

2 & 3 = UV Filters to EN170

4 = IR Filter to EN171

5 & 6 = Solar Filters (sun protection) to EN172

1.2 to 16 = Welding Filters for spectacles & goggles to EN169. Please note that shades greater than 7 require a face shield.

	Nature of Protection	1st digit (filter type)	2nd & 3rd (shade number)	Typical Applications	Typical Lens Shades
EN169	Welding Filters	The Welding standard only requires a Shade Number	1.2 to 16 1.2 - More than 74.4% light transmission, but less than 100% 1.7 - More than 43.2% light transmission, but less than 58.1% 2.5 - More than 17.8% light transmission, but less than 29.1% 3.1 - More than 8.0% light transmission, but less than 17.8%	1.7 -Welders Mate 3 to 5 -Brazing 5 to 7 - Oxy-cutting 7 Upwards - Arc welding (face shield)	Green IR Shades: 1.7, 3.5 Welding Glass
EN170	Ultraviolet (UV) Filters	2 - Effects colour recognition 2C - Good colour recognition	1.2 to 5	Welding - short circuit Electric Arc Sunlight	Clear Amber Blue Yellow
EN171	Infrared (IR) Filters	4	1.2 to 10	Arc welding Glass manufacturing Foundry work	Green Cobalt Blue IR Shades: 1.7, 3.5
EN172	Solar Filters	5 – No IR protection 6 – With IR protection	1.1 to 4.1	High intensity solar glare Outdoor work	Gold Mirror (Indoor/Outdoor) Grey Blue Mirror Silver Mirror

Further information about our lens markings can be found on Page 79 of our Plano Eyewear Catalogue.