



## TRAINING **BOOKLET**

Eye protection and standards

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## **THE HUMAN EYE IS A FRAGILE AND VULNERABLE ORGAN.**

*There are many types of eye injury with severity ranging from simple irritation to total blindness. This is why it is so important to be aware of all potential risks in the workplace.*

*The following training booklet will therefore explain in detail all of these risks and the standards and types of protection associated with them, thus enabling you to respond effectively to users' requests.*

*First and foremost, it is vital to emphasise that the selection of eye protection is the sole responsibility of the employer and in no way that of the manufacturer, supplier or the employee.*

*The duty of the employer is to clearly assess the nature and extent of the risk in order to provide the right equipment. This analysis must be entrusted to a qualified person with suitable training.*

*The duty of the manufacturer or the supplier is then to offer the employer suitable personal protection to eliminate or reduce the identified risk.*

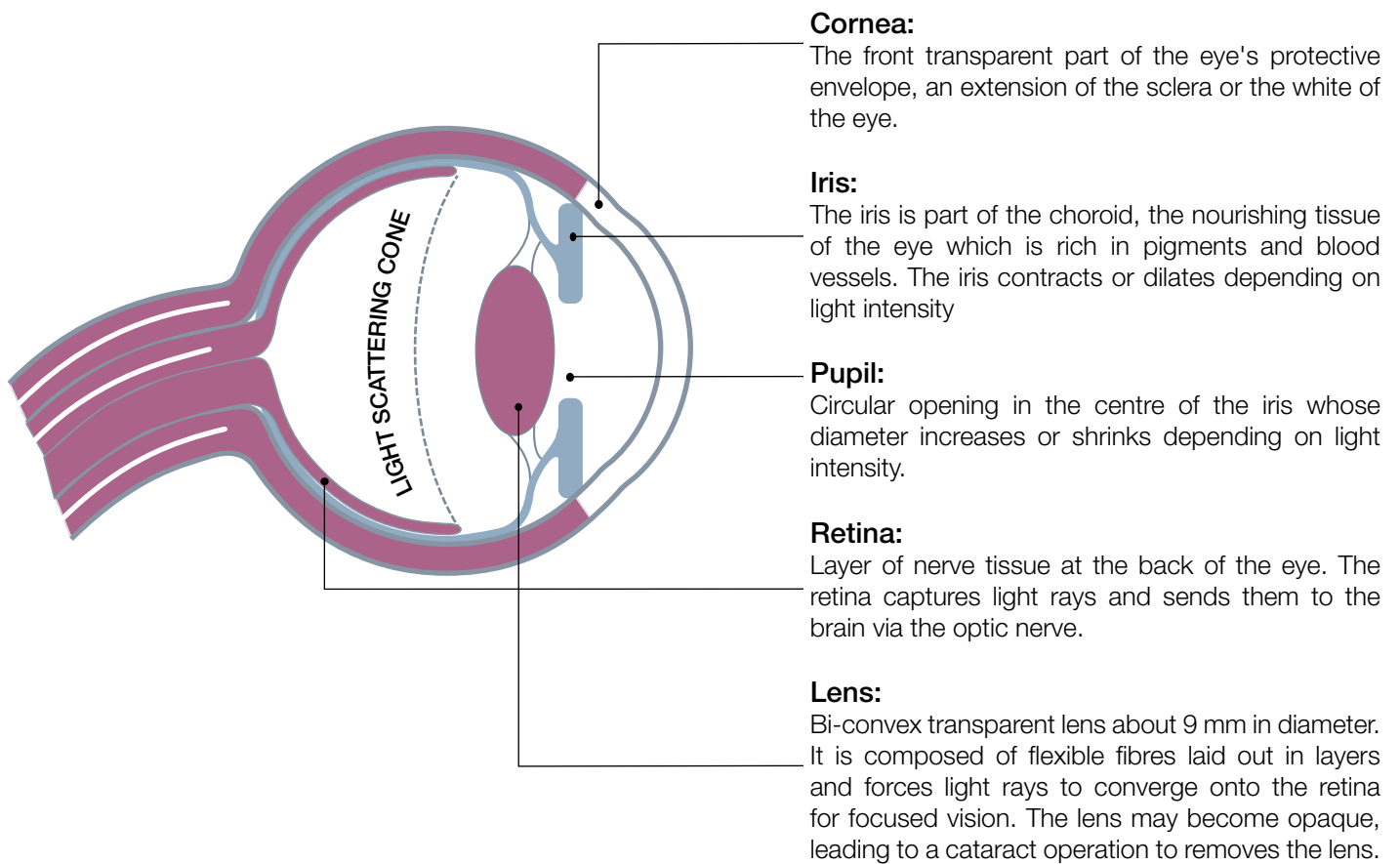
# THE EYE

//01

VISION  
KEY FIGURES  
PPE REGULATION

# VISION

## ANATOMY OF THE EYE



# KEY FIGURES

## ACCIDENTS AT WORK / EYES

### THE EXAMPLE OF FRANCE

# 11,485

periods of sick leave recorded in 2013  
including **70** permanent stoppages

# 63%

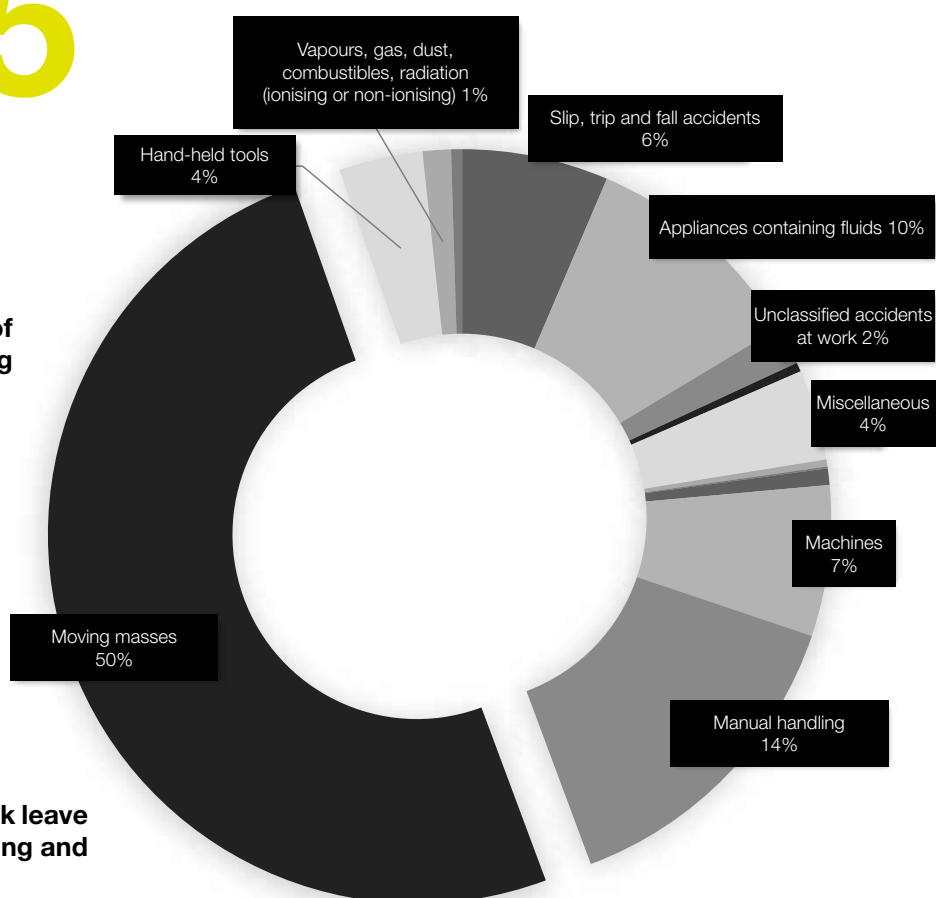
An encouraging figure: the number of accidents at work in France concerning the eyes fell between 1990 and 2013!

# 113,797

days off work which could have been avoided

# €31,000

This is the average cost of a period of sick leave lasting longer than 150 days in the building and public works sector in 2013



# BUT 90%

of eye injuries can be avoided by using suitable glasses and shields!

# PPE REGULATIONS

## BECAUSE EYE PROTECTION IS COMPULSORY



### Eye protection?

European directive 89/656 makes the wearing of eye or facial protection compulsory for:

- Welding, sanding and cutting work
- Drilling and chiselling
- Stonework
- Handling nail guns
- Using machines which remove shavings when processing materials, producing short chips
- Stamping work
- Removal and fragmentation of shards
- Working with jets of abrasive granules
- Handling acid and alkaline products, disinfectants and corrosive detergents
- Handling liquid spray equipment
- Handling molten metal and working in proximity to it
- Activities in environments with radiant heat
- Laser work

### What are the obligations for companies?

- › Identify all the risks in the workplace and assess the level of risk
- › Remove the risk, set up collective protective measures and if this is not possible or is insufficient, provide personal protective equipment
- › Consult the company health and safety commission
- › Select PPE adapted to the risks to be covered and check the validity of this choice
- › Inform employees of the risk, the conditions for use of the PPE and the instructions
- › Train employees in the use of PPE
- › **Provide employees with their own PPE free of charge**
- › **Ensure the PPE is actually used and is used properly**
- › Ensure the condition of the PPE remains compliant
- › Check some PPE regularly

### What are the obligations for employees?

- › The obligations of employees stem directly from the company's internal regulations, approved by the Labour Inspectorate and deemed to be the practical and appropriate application of the Labour Code .



*Compulsory PPE for the eyes and face*

# STANDARDS

//02

EYE PROTECTION  
RADIATION  
WELDING

# STANDARDS

## FOR EYE PROTECTION

# EN166

### The reference standard

Directive 89/686/CEE makes **CE** marking and the logo of the company on all personal protective equipment compulsory.

### EN166: the guarantee of adequate marking and the quality of the equipment

The EN166 standard applies to all eye protection and guarantees adequate marking and the quality of the equipment. Its purpose is to guarantee protection against:

- ▶ impacts characterised by varying degrees of severity;
- ▶ optical radiation;
- ▶ molten metal and hot solids;
- ▶ droplets and splashes;
- ▶ dust;
- ▶ gases;
- ▶ short-circuit electric arcs;
- ▶ or any combination of these risks.



Standard EN166 also defines the basic characteristics to which all eye protection must conform with regard to two criteria: the optical quality and the minimum strength.

While all eye protection must be EN166 certified, all filters and equipment are also covered by specific standards which must be understood in order to ensure protective equipment is adapted to the activity of its wearer.

# EN166



Standards for protection  
against **artificial and  
natural radiation**

- ▶ EN170
- ▶ EN171
- ▶ EN172



Standards relative to  
**welding work** for equipment  
and against radiation

- ▶ EN169
- ▶ EN175
- ▶ EN379



Standards relative to  
**laser work**

- ▶ EN207
- ▶ EN208

# STANDARDS

## FOR PROTECTION AGAINST RADIATION

### EN170

#### ULTRAVIOLET RADIATION

European standard EN170 specifies the scale numbers and requirements relative to the transmission factor of filters protecting against **ultraviolet radiation/sources of artificial light**.

The protection filters specified in this standard are not suitable for looking directly at bright light sources such as high-pressure xenon arc lamps or looking directly or indirectly at electric welding arcs. In this case a welding filter must be used as specified in standard EN169 with a scale number suitable for the light source.

### EN171

#### INFRARED RADIATION

This European standard specifies the scale numbers and requirements relative to the transmission factor of **filters protecting against infrared radiation**.

### EN172

#### SOLAR FILTERS FOR USE IN THE WORKPLACE

EN172 defines the scales and requirements of the corresponding transmission factor for **solar filters for industrial use/natural light sources**.



# STANDARDS

## RELATIVE TO WELDING

### EN169 WELDING FILTERS

Specifies the scale numbers and requirements relative to the transmission factor of filters designed to **protect operators carrying out work involving welding, hard soldering, arc gouging using compressed air and plasma stream cutting**. It also includes requirements relative to dual scale number welding filters.

### EN379 VARIABLE OR DUAL SCALE WELDING PROTECTION FILTERS

EN379 specifies the requirements relating to welding filters which **automatically switch their transmission factor in the clear zone** to a lower value when a welding arc is struck (known as welding filters with switchable scale numbers).

The specifications of the standard apply if such a filter is to be used for the **continuous observation of the welding process** and if it is only used during the period where the arc is ignited.

The standard also specifies the requirements for welding filters with different welding scale numbers in the clear zone (called welding filters with a double scale number).

These filters are used for welder protective eyewear or system-mounted protection.

### EN175 WELDING GOGGLES AND EQUIPMENT

This European standard specifies the requirements and test methods related to **personal protective equipment used to protect the operator's eyes and face against harmful optical radiation and other specific risks due to customary welding or cutting processes or other associated techniques**.

The standard specifies protection, **including ergonomic** aspects, against various risks or hazards including radiation, fire, mechanical and electrical risks.

This standard defines the terms used and specifies the requirements related to materials, design and manufacture.

*Standards EN170, EN171 and EN172 also apply for welding and laser work.*

# MATERIALS

//03

LENS  
FRAME

# MATERIALS

## LENS



### **POLYCARBONATE**

Lighter and more resistant to impacts than plastic whilst being less sensitive to scratches, polycarbonate is the perfect material for safety spectacles and sports glasses, for which light weight and resistance are much sought-after assets. Excellent resistance in extreme temperatures:  $-80^{\circ}\text{C}$  to  $+135^{\circ}\text{C}$ . Polycarbonate absorbs 100% of UV radiation. It is more resistant over time with regard to mechanical risks (impacts, scratches, etc.).

### **CR39 / ORGANIC**

This is a plastic resin. CR39 is particularly used against chemical risks as it withstands abrasion better than polycarbonate. It is also very strong and light-weight and resists fogging better. However, it has two major disadvantages: it only absorbs part of ultraviolet radiation (the UV400 option can be applied to rectify this) and the soft surface is easily scratched (an anti-scratch coating can be applied to rectify this). It should also be noted that at equal power, organic lenses are thicker than mineral or polycarbonate lenses.

### **MINERAL**

This material is composed of sand and chemical elements that constitute traditional glass. Its main properties are excellent optical quality and scratch resistance (as it is very hard). Thus, nearly 92% of light is transmitted by mineral glass. In addition to its high weight (two and a half times that of polycarbonate or CR39), its main disadvantage lies in its low impact resistance and the fact that it breaks into several small pieces that could damage the eye.

### **CELLULOSE ACETATE / CELLULOSE PROPIONATE**

With its excellent resistance to impacts and scratches, this is the material of choice for extreme environments. With low electrostatic and flammability characteristics, it offers good resistance to alcohols, petrol, oil, grease and fuel oil. This material is pleasant to touch and can also be sterilised. It has a lower resistance to temperature as the acetate loses its flexibility.

## FRAME

### **POLYCARBONATE**

Lighter and more resistant to impacts than plastic whilst being less sensitive to scratches, polycarbonate is the perfect material for safety spectacles and sports glasses, for which light weight and resistance are much sought-after assets. Excellent resistance in extreme temperatures:  $-80^{\circ}\text{C}$  to  $+135^{\circ}\text{C}$ . Polycarbonate absorbs 100% of UV radiation. It is more resistant over time with regard to mechanical risks (impacts, scratches, etc.).

### **NYLON**

Flexible with excellent resistance to wear, chemical products (fuel, paint, lacquer, lubricants, etc.) and heat but poor resistance to humidity.

### **THERMOPLASTIC RUBBER (TPR)**

A compromise between rubber and plastic, TPR has a pleasant, soft texture. It is a flexible "non-slip" material which is resistant to vibrations and extreme temperatures and which absorbs impacts.

# MATERIALS

## FRAME



### **ETHYLENE VINYL ACETATE (EVA)**

Light and soft to the touch, this food-grade material is highly resistant to petroleum products and impacts even at low temperatures. Good resistance to bad weather and UV rays. Can be easily torn and distorted.

### **STYRENE BUTADIENE RUBBER (SBR)**

The properties are similar to natural rubber but with improved ageing and heat resistance. Highly resistant to abrasion and good resistance to many inorganic chemical products.

### **NEOPRENE**

Resistant to ozone and hydrocarbons (oil, petrol) and ageing. Light-weight, thermal insulation, elasticity and resistance to crushing and damage. Resists temperatures up to + 120°C. Not totally impermeable, it is sensitive to storage.

### **ALUMINIUM**

Corrosion resistant, light-weight and attractive appearance.

### **THERMOPLASTIC POLYAMIDE / ZYTEL**

Resistant to impacts, traction and distortion, polyamide also has excellent resistance to heat, chemical products and electricity. It is one of the strongest thermoplastics and is increasingly used for technical applications.

### **NICKEL**

Nickel is a strong, malleable, ductile material whilst still being hard, resistant to oxidation and corrosion.

### **POLYVINYL CHLORIDE (PVC)**

PVC is light-weight, malleable, gas- and liquid-tight and has good insulation properties (electrical, thermal and acoustic). However, it has low resistance to UV rays and is toxic in case of fire or combustion as it emits hydrochloric acid. However, it is self-extinguishing.

### **THERMOPLASTIC ELASTOMER (TPE)**

TPE has the elastic properties of the elastomers. It has excellent wear resistance and good chemical resistance against mechanical grease and oils. Excellent resistance to extreme conditions: between -70°C and +200°C.

### **THERMOPLASTIC POLYURETHANE (TPU)**

Excellent mechanical resistance, high resistance to abrasion, very flexible (between -40°C and +100°C), TPU is also resistant to ageing and ozone. Good resistance to mineral and silicone grease and oils. Low flammability.

### **THERMOPLASTIC VULCANIZATE (TPV)**

Excellent resistance to UV rays and ozone. Excellent resistance from -40°C to +130°C.

# RISKS

//04

**IDENTIFY THE RISKS**

**MECHANICAL RISKS**

**CHEMICAL RISKS**

**ELECTRICAL RISKS**

**THERMAL RISKS**

**RISKS LINKED TO RADIATION**

# IDENTIFY THE RISKS

## AND THE APPROPRIATE EYE PROTECTION

### What type of protection should you choose?

Assessment of occupational risks involves identifying, assessing and ranking risks in the workplace to implement relevant preventive measures.

It is the initial step in occupational health and safety. It is vital to check that the risk identified, the directives of the standard and the markings on the product all match.

Standard EN 166 identifies the basic risk and risks concerning the eyes linked to the field of use, as follows:

| RISKS                                                                                                             | DESCRIPTION OF THE FIELD OF USE                                                                                                                                | TYPICAL USE                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INSTRUCTIONS ON THE EQUIPMENT |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Mechanical</b><br>           | Particle projection                                                                                                                                            | Grinding, drilling, descaling, fragmentation, polishing, sanding, riveting, stamping, shredding using hammers, crushing, heavy sawing, planing, handling wires and strips, hammering, unpacking, nailing, punching using a press, lathe-work, etc.                                                                                                                                                                                                             | <b>Frame and lens</b> marking |
| <b>Linked to radiation</b><br> | Presence of visible, ultraviolet, infrared and solar radiation                                                                                                 | Reflections, solar radiation and bright lights, welding arc reflection, photographic reproduction and welding procedures: flame cutting, welding, brazing, furnace work, metal casting, spot welding, photographic reproduction, etc.                                                                                                                                                                                                                          | <b>Lens</b> marking           |
| <b>Chemical</b><br>            | Presence of liquids in the form of droplets or splashes, dust or dust particles, gas vapours, vaporised droplets, and smoke. Splashes of acid, chemical burns. | Carpentry, sanding, light metalwork and machining, exposure to dust and wind, resistance welding (without exposure to radiation), handling sand, cement and aggregates, painting, concreting, plastering, batching and mixing materials, sand and water blasting, shot-blasting, sprayed concrete, etc. Handling acids and alkalis, degreasing, chemical stripping and electroplating, glass breakage, spraying chemical products, laying liquid asphalt, etc. | <b>Frame</b> marking          |
| <b>Thermal</b><br>             | Splattering of molten metal, heat, sparks and splashes of molten material                                                                                      | Babitting, casting, pouring molten metal, brazing, soldering, spot welding, stud welding, hot-dip operations.                                                                                                                                                                                                                                                                                                                                                  | <b>Frame and lens</b> marking |
| <b>Electrical</b><br>          | Electric arc produced when electrical equipment short-circuits                                                                                                 | Electric welding procedures: coated electrodes, TIG, MIG-MAG, grinding, etc.                                                                                                                                                                                                                                                                                                                                                                                   | <b>Frame and lens</b> marking |

# IDENTIFY THE RISKS

## WHAT TYPE OF PROTECTION SHOULD YOU CHOOSE?



### PROTECTING YOURSELF FROM MECHANICAL RISKS

Grinding work, particle projections, projections of metal filings or debris from tools.

**Top product**  
**COBRA**



| Risks or use                 | Symbol* | Safety spectacles | Safety goggles | Face shields | Standard |
|------------------------------|---------|-------------------|----------------|--------------|----------|
| Low energy impact 45 m/s     | F       |                   |                |              | EN 166   |
| Medium energy impact 120 m/s | B       |                   |                |              | EN 166   |
| High energy impact 190 m/s   | A       |                   |                |              | EN 166   |

The F, B or A symbol must imperatively be indicated on the lens and the frame to guarantee protection from mechanical risks. If the symbols differ, the symbol representing the lowest resistance is applied to the protection as a whole.



### PROTECTING YOURSELF FROM ELECTRIC RISKS

Protection from live contact and short-circuit electric arcs.

**Top product**  
**SPHERE**



| Risks or use               | Symbol* | Safety spectacles | Safety goggles | Face shields | Standard |
|----------------------------|---------|-------------------|----------------|--------------|----------|
| Short-circuit electric arc | 8       |                   |                |              | EN 166   |

The 8 symbol must imperatively be indicated on the lens and the frame to guarantee protection from electrical risks.



### PROTECTING YOURSELF FROM THERMAL RISKS

Sprays of hot liquids or solids, intense heat radiation, radiating heat from furnaces.

**Top product**  
**CHRONOSOFT**



| Risks or use                              | Symbol* | Safety spectacles | Safety goggles | Face shields | Standard |
|-------------------------------------------|---------|-------------------|----------------|--------------|----------|
| Splatters of molten metals and hot solids | 9       |                   |                |              | EN 166   |

The 9 symbol must imperatively be indicated on the lens and the frame to guarantee protection from thermal risks.



### PROTECTING YOURSELF FROM RADIATION RISKS

Exposure of the eyes to high intensity, ultraviolet, infrared and visible light sources, welding activities, steelworks, surgery.

**Top product**  
**SMOKE CONTOUR**



| Risks or use                       | Symbol*                                      | Safety spectacles | Safety goggles | Face shields | Standard                       |
|------------------------------------|----------------------------------------------|-------------------|----------------|--------------|--------------------------------|
| Ultraviolet radiation              | 2                                            |                   |                |              | EN 166<br>EN 170               |
| Infrared radiation                 | 4                                            |                   |                |              | EN 166<br>EN 171               |
| Solar radiation for industrial use | 5 or 6                                       |                   |                |              | EN 166<br>EN 172               |
| Electric welding                   | EN 175 for the hood<br>EN 379 for the filter |                   |                |              | EN 166-169<br>EN 175<br>EN 379 |
| Gas welding                        | 1.7/3/5                                      |                   |                |              | EN 166<br>EN 169               |
| Laser radiation                    | R1 to R5<br>LB1 to LB10                      |                   |                |              | EN 207<br>EN 208               |

The standard is identified on the lens markings.



### PROTECTING YOURSELF FROM CHEMICAL RISKS

Flying particles of toxic dust, aerosols, dangerous liquids, gas or toxic vapours.

**Top product**  
**BLAST**



| Risks or use                            | Symbol* | Safety spectacles | Safety goggles | Face shields | Standard |
|-----------------------------------------|---------|-------------------|----------------|--------------|----------|
| Liquid droplets                         | 3       |                   |                |              | EN 166   |
| Liquid splashes                         | 3       |                   |                |              | EN 166   |
| Large dust particles > 5 microns        | 4       |                   |                |              | EN 166   |
| Gas and fine dust particles < 5 microns | 5       |                   |                |              | EN 166   |

The 3, 4 and 5 symbol or symbols must imperatively be indicated on the frame. If none of these symbols is indicated in the markings, then the equipment is not suitable for chemical risks.

# CHEMICAL RISK



## The mechanical risk is defined as:

Impacts, flying chips or solid particles.

Mechanical risks are mainly present during machining operations when sharp-edged particles or those with high kinetic energy are thrown out.

To protect you against mechanical risks, Bollé Safety has developed a wide range of safety eyewear, including safety spectacles, safety goggles and safety face shields.

## Practical examples:

Metal chips, shards or particles coming from tools, etc.

To choose between safety spectacles, safety goggles and safety face shields, the type and extent of the risk must be known:

- for a turning operation, safety spectacles may be sufficient.
- for cutting work, a face shield is essential to protect the eyes and face.

| Risks or application                      | Symbol / marking to identify | Safety spectacles                                                                  | Safety goggles                                                                       | Face shields                                                                          | Reference standard |
|-------------------------------------------|------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|
| Minimum resistance to impact - 5.1 m/s ** | S                            |   |    |    | EN166              |
| Low energy impact - 45 m/s **             | F or F T*                    |  |   |   | EN166              |
| Medium energy impact - 120 m/s **         | B or B T*                    | Not suitable                                                                       |  |  | EN166              |
| High energy impact - 190 m/s **           | A or A T*                    | Not suitable                                                                       | Not suitable                                                                         |  | EN166              |

\* The letter T, immediately after the mechanical strength symbol, authorises use for high speed particles at extreme temperatures (-5°C/+55°C)..

## Is your equipment suitable for mechanical risks?

To check that your eyewear + frame are suitable for the mechanical risk identified, the symbol S, F, B or A must be marked on the frame and lens.

If the symbols differ, the symbol representing the lowest resistance applies to the whole protection equipment (see example 2).

## Example:



Lens marking: 2C-1.2  1 **F** T CE  
Frame marking:  1 **F** T CE

**1 - In this example, the symbol F on both the lens and the frame indicates that the whole item of equipment is suitable for a low energy impact - 45 m/s, hence F.**



Lens marking: 2C-1.2  1 **B** T CE  
Frame marking:  1 **F** T CE

**2 - In this example, the mechanical resistance markings are different. F being the symbol of lowest mechanical resistance, the equipment is deemed to protect against a risk of low-energy projectiles - 45 m/s, hence F.**

## \*\* Test methods:

**S-** The lenses must withstand the impact of a steel ball having a nominal diameter of 22 mm and a minimum weight of 43 g hitting them at a speed of approximately 5.1 m/s.

**F-** The lenses must withstand the impact of a steel ball having a nominal diameter of 6 mm and a minimum weight of 0.86 g hitting them at a speed of approximately 45 m/s.

**B-** The lenses must withstand the impact of a steel ball having a nominal diameter of 6 mm and a minimum weight of 0.86 g hitting them at a speed of approximately 120 m/s.

**A-** The lenses must withstand the impact of a steel ball having a nominal diameter of 6 mm and a minimum weight of 0.86 g hitting them at a speed of approximately 190 m/s.

# CHEMICAL RISKS



## Chemical and biological risks are defined as:

Splatters of hazardous liquids, toxic dust, gas, toxic vapours.

Chemical risk occurs when a substance splashed or present in the environment reacts with the components of the eye or the skin and it is present in most industrial sectors.

This risk is particularly present in the medical field, the agri-food industry or in waste management, where micro-organisms are likely to contaminate individuals.

To prevent any risk of chemical splashes, Bollé Safety offers a wide range of safety goggles and face shields for protection against chemical and biological risks.

## Practical examples:

Dust, aerosols, liquids, gas or vapours.

To choose between safety goggles and safety face shields, the type and extent of the risk must be known. In all cases, safety spectacles are not adapted to chemical risks.

| Risks or application                    | Symbol / marking to identify | Safety spectacles | Safety goggles                                                                                                     | Face shields                                                                          | Reference standard |
|-----------------------------------------|------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|
| Liquid droplets                         | 3                            | Not suitable      | <br>Ventilated or sealed goggles | Not suitable                                                                          | EN166              |
| Liquid splashes                         | 3                            | Not suitable      | Not suitable                                                                                                       |  | EN166              |
| Large dust particles > 5 microns        | 4                            | Not suitable      | <br>sealed goggles             | Not suitable                                                                          | EN166              |
| Gas and fine dust particles < 5 microns | 5                            | Not suitable      | <br>sealed goggles             | Not suitable                                                                          | EN166              |

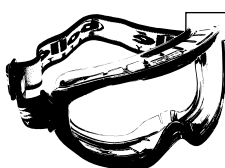
## Is your equipment suitable for chemical risks?

To check that your equipment is suitable for the chemical risk identified, the symbol 3, 4 or 5 must be marked on the frame.

If no figure appears on the frame, the equipment is not suitable for chemical risks.

Warning: in the case of chemical risks, it is the frame marking only which indicates the symbol for chemical resistance.

## Example:



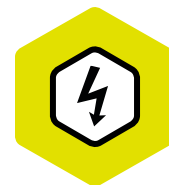
Frame marking:  EN166 3 4  CE  
Lens marking: 2C-1.2  1 B T CE

In this example, the chemical resistance markings show two levels of protection: 3 and 4. The frame is sealed as the symbol 4 appears, and these goggles protect against droplets and splashes of liquid (symbol 3) and against large dust particles > 5 microns (symbol 4).

## Did you know?

The better the sealing of your goggles, the higher the level of protection against chemical risks.

**Equipment which is totally sealed thus protects against the ingress of any chemical or biological products or particles into the protected eye area.** Always examine the condition of your goggles carefully - if the frame or lens is distorted, damaged or has a hole, your equipment can no longer protect you effectively against the chemical risk.



# ELECTRICAL RISKS

## Electrical risk is defined as:

Live contact and short-circuit electric arcs.

Eye protection against short-circuit electric arcs must be safety face shields only. It must not have exposed metal parts and all the outer edges of the protection must be rounded, chamfered or otherwise treated so that there are no sharp edges.

The consequences of electric shock can be cornea burns, retinal lesions and conjunctivitis.

## Practical examples:

Arc eye, electric arcs

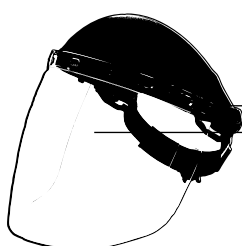
| Risks or application       | Symbol / marking to identify | Safety spectacles | Safety goggles | Face shields                                                                         | Reference standard |
|----------------------------|------------------------------|-------------------|----------------|--------------------------------------------------------------------------------------|--------------------|
| Short-circuit electric arc | 8                            | Not suitable      | Not suitable   |  | EN166              |

## Is your equipment suitable for electrical risks?

To check if your equipment is suitable for the electrical risk identified, the symbol 8 must be marked on the lens and the frame.

If the symbol 8 does not appear on the frame or the lens, the equipment is not suitable for electrical risks.

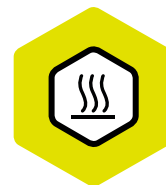
## Example:



Frame marking:  EN166 3 **8** BT 9 CE

Lens marking: 2C-1.2  1 BT **8** 9 CE

In this example, the electrical resistance marking appears both on the lens and the frame, thus guaranteeing protection against electrical risks for the entire equipment.



# THERMAL RISKS

## Thermal risk is defined as:

Splatters of hot liquids, intense thermal radiation.

Thermal risk occurs when liquids or hot solids are splashed or intense radiation is emitted.

## Practical examples:

Radiant heat coming from ovens, splashes of molten metal or hot solids, etc.

| Risks or application                      | Symbol / marking to identify | Safety spectacles | Safety goggles                                                                     | Face shields                                                                        | Reference standard |
|-------------------------------------------|------------------------------|-------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|
| Splatters of molten metals and hot solids | 9                            | Not suitable      |  |  | EN166              |

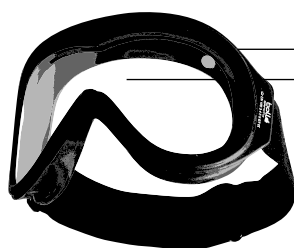
## Is your equipment suitable for thermal risks?

To check if your equipment is suitable for the thermal risk identified, the symbol 9 must be marked on the lens and the frame.

If the symbol 9 does not appear on the frame or the lens, the equipment is not suitable for thermal risks.

The symbol 9 indicates the non-adherence of molten metal and resistance to penetration by hot solids (if necessary) on the equipment.

## Example:



Frame marking:  EN166 3 4 5 B T **9** CE

Lens marking: 2C-1.2  1 B T **9** K N CE

In this example, the thermal resistance marking appears both on the lens and the frame, thus guaranteeing protection against thermal risks for the entire equipment.

# RISKS LINKED TO RADIATION



## Risks linked to radiation are defined as:

Ultraviolet, infrared, visible light, gas welding, electric welding, laser.

Optical radiation is present in many activities in industrial, medical or commercial fields.

Welding, steel works and surgical processes are all concerned.

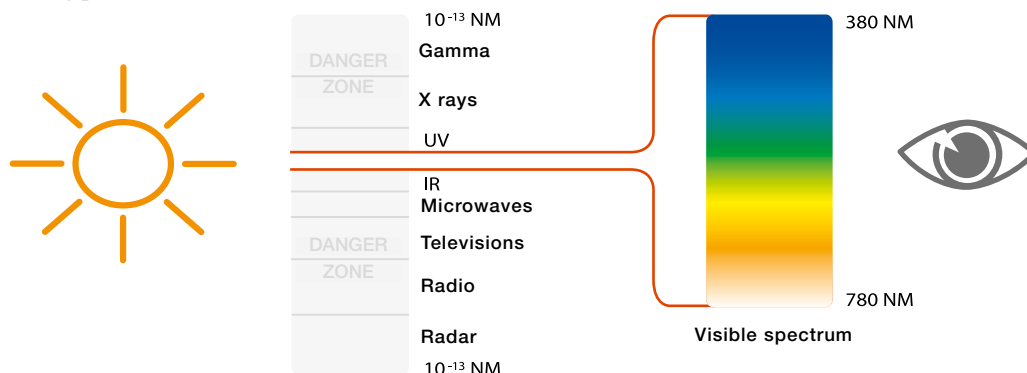
Over-exposure of the eyes to high intensity sources can cause burns and lesions of the eye.

Bollé Safety has developed safety spectacles, safety goggles, safety face shields and welding helmets to protect against optical radiation.

## Practical examples:

Invisible UV radiation, visible and invisible IR radiation, etc.

## The various types of radiation:



**Gamma radiation:** very dangerous, can penetrate through cement and even lead. It destroys cells in living organisms.

**X-rays:** can go through our body's tissue but are stopped by our bones – this is why radiography is possible.

**Ultraviolet radiation:** comes from the sun, is partially blocked by the ozone layer surrounding the Earth. Those that pass through delight sunbathers but over-exposure can be very damaging.

**Infrared rays:** are emitted by all warm objects. These rays are not visible but their heat can be detected.

**Radio waves:** are used to transmit sounds, images and digital data. The human eye is not able to identify the various elements of a ray – it only sees the result. The human eye can only see wavelengths between 380 and 780 nanometres in length – this is known as the "visible spectrum".

## Visible effects of UV and IR on the eye

| INVISIBLE SPECTRUM - UV                                                                                                                                                                                                                                                                     |        |        | VISIBLE SPECTRUM                                                                                                                                                                                                                        |        |        |                                                                                                                                                                                                                                                                                                           |        | INVISIBLE SPECTRUM - INFRARED |                                                                                                                                                                                                                                                                                                                                                                                               |         |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|
| U.V.C                                                                                                                                                                                                                                                                                       |        | U.V.B  | U.V.A                                                                                                                                                                                                                                   | INDIGO | BLUE   | ORANGE                                                                                                                                                                                                                                                                                                    |        |                               |                                                                                                                                                                                                                                                                                                                                                                                               |         |         |
|                                                                                                                                                                                                                                                                                             |        |        |                                                                                                                                                                                                                                         | PURPLE |        | GREEN                                                                                                                                                                                                                                                                                                     | YELLOW | RED                           | NEAR INFRARED                                                                                                                                                                                                                                                                                                                                                                                 |         |         |
|                                                                                                                                                                                                                                                                                             |        |        |                                                                                                                                                                                                                                         |        |        |                                                                                                                                                                                                                                                                                                           |        |                               | MID INFRARED                                                                                                                                                                                                                                                                                                                                                                                  |         |         |
| 100 NM                                                                                                                                                                                                                                                                                      | 280 NM | 315 NM | 380 NM                                                                                                                                                                                                                                  | 480 NM | 500 NM | 570 NM                                                                                                                                                                                                                                                                                                    | 600 NM | 650 NM                        | 780 NM                                                                                                                                                                                                                                                                                                                                                                                        | 1440 NM | 2000 NM |
| RADIATIONS                                                                                                                                                                                                                                                                                  |        |        | ORGANS AFFECTED                                                                                                                                                                                                                         |        |        | LESIONS                                                                                                                                                                                                                                                                                                   |        |                               | EFFECTS ON SIGHT                                                                                                                                                                                                                                                                                                                                                                              |         |         |
| <ul style="list-style-type: none"><li>■ UVC 100 to 280 nm</li><li>■ UVB 280 to 315 nm</li><li>■ UVA 315 to 380 nm</li><li>■ Blue/violet light approximately 380 to 490 nm</li><li>■ Visible light 380 to 780 nm</li><li>■ Near IR 780 to 1400 nm</li><li>■ Mid IR 1400 to 2000 nm</li></ul> |        |        | <ul style="list-style-type: none"><li>■ Cornea</li><li>■ Cornea and crystalline lens</li><li>■ Cornea and crystalline lens</li><li>■ Retina</li><li>■ Retina</li><li>■ Crystalline lens and retina</li><li>■ Crystalline lens</li></ul> |        |        | <ul style="list-style-type: none"><li>■ Corneal lesions</li><li>■ Premature ageing of the crystalline lens</li><li>■ Degeneration of retina photoreceptors</li><li>■ Photoreceptor trauma due to intense dazzling light</li><li>■ Macular degeneration</li><li>■ Crystalline lens opacification</li></ul> |        |                               | <ul style="list-style-type: none"><li>■ Conjunctivitis - partial blindness</li><li>■ Cataracts - conjunctivitis - partial blindness</li><li>■ Cataracts - conjunctivitis - partial blindness</li><li>■ Partial or total blindness</li><li>■ Sight complaints - imbalanced perception</li><li>■ Retinitis pigmentosa - cataracts - blindness</li><li>■ Cataracts - partial blindness</li></ul> |         |         |

### Is your equipment suitable for the radiation you have identified?

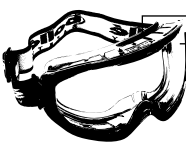
To check if your equipment is suitable for the specific type of radiation identified, a code and a filter index must appear on the lens of your equipment.

The first figure indicates the filter code, i.e. the type of filtering provided by the lens, and the following figure indicates the scale number, i.e. the filtering shade.

Warning, for lenses filtering radiation linked to welding there is no filter code. The single figure indicates the filtering shade. The higher this figure, the stronger the radiation filtering.

#### Example:

 Lens marking: **2C-1.2**  1 F T CE  
Frame marking:  1 F T CE

 Frame marking:  EN166 3 4 B T CE  
Lens marking: **2C-1.2**  1 B T CE

|                                                                                                                                                                                                                  | Ultraviolet filters                                                                                                                                                                                                                                 |                                                                                                        | Infrared filters                                                                                                                                                                            | Solar filters                                                                                              |                                                                                                            | Welding filters                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Code</b>                                                                                                                                                                                                      | <b>2</b><br>Ultraviolet filter, colour recognition may be affected.<br><b>2C or 3:</b><br>Ultraviolet filter with good colour recognition.<br><b>3</b><br><b>Former code, equivalent to 2C:</b><br>Ultraviolet filter with good colour recognition. |                                                                                                        | <b>4</b><br>Infrared filter (artificial radiation)                                                                                                                                          | <b>5</b><br>Solar filter without infrared protection                                                       | <b>6</b><br>Solar filter with infrared protection(solar IR)                                                | <b>X:</b><br>The scale number for welding filters does not include a code number. It only features the protection class.                                                                                                                                                                            |
| <b>Scale number:</b><br>The scale number is a combination of the code number and the protection code for a filter. This number defines the transmission factor of a filter and is represented by a scale number. | <b>2-1.2</b><br><b>1-1.4</b><br><b>2-1.7</b><br><b>2-2</b><br><b>2-2.5</b><br><b>2-3</b><br><b>2-4</b><br><b>2-5</b>                                                                                                                                | <b>3-1.2</b><br><b>3-1.4</b><br><b>3-1.7</b><br><b>3-2</b><br><b>3-2.5</b><br><b>3-3</b><br><b>3-5</b> | <b>4-1.2</b><br><b>4-1.4</b><br><b>4-1.7</b><br><b>4-2</b><br><b>4-2.5</b><br><b>4-3</b><br><b>4-4</b><br><b>4-5</b><br><b>4-6</b><br><b>4-7</b><br><b>4-8</b><br><b>4-9</b><br><b>4-10</b> | <b>5-1.1</b><br><b>5-1.4</b><br><b>5-1.7</b><br><b>5-2</b><br><b>5-2.5</b><br><b>5-3.1</b><br><b>5-4.1</b> | <b>6-1.1</b><br><b>6-1.4</b><br><b>6-1.7</b><br><b>6-2</b><br><b>6-2.5</b><br><b>6-3.1</b><br><b>6-4.1</b> | <b>1.2</b><br><b>1.4</b><br><b>1.7</b><br><b>2</b><br><b>2.5</b><br><b>3</b><br><b>4</b><br><b>4a</b><br><b>5</b><br><b>5a</b><br><b>6</b><br><b>6a</b><br><b>7</b><br><b>7a</b><br><b>8</b><br><b>9</b><br><b>10</b><br><b>11</b><br><b>12</b><br><b>13</b><br><b>14</b><br><b>15</b><br><b>16</b> |



# RISKS

## LINKED TO RADIATION // WELDING

| Risks or application | Scale number | Safety spectacles                                                                 | Safety goggles                                                                     | Face shields                                                                        | Reference standard |
|----------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|
| Gas welding          | 1.7 - 3 - 5* |  |  |  | EN166<br>EN 169    |

### MARKING OF FIELD OF USE SYMBOLS

- Frame: no symbol
- Lenses\*:
  - for welding assistants: 1.2 1.4 1.7 2 2.5 3.4
  - for welding and hard soldering: 4 5 6 7
  - for flame cutting: 5 6 7

The symbols above correspond to protection classes and supplement the mechanical resistance symbols S - F - B and A and possibly other symbols for the field of use and the optical class.

| Risks or application | Scale number | Spectacles & face shields | Hand-held welding shield                                                             | Welding helmet                                                                        | Reference standard                 |
|----------------------|--------------|---------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------|
| Electric welding     | 9 to16*      | Not suitable              |  |  | EN166 -<br>169<br>EN 175<br>EN 379 |

### MARKING OF THE MECHANICAL RESISTANCE SYMBOLS

- Shield (optional marking):
  - S (increased robustness)
  - F (low energy)
  - B (medium energy)
- Filter: possible symbols S - F or B

### WEIGHT MARKING

- For hand-held shields: compulsory if > 500 g.
- For helmets: compulsory if > 450 g.

### MARKING OF FIELD OF USE SYMBOLS

- Shield (optional marking):
  - 9 (molten metals and hot solids)
  - W (immersion in water)
- Filter: Scale of 9 to 16

N.B. The symbols for the field of use of the filters correspond to protection classes and supplement the optical class symbols and other symbols of mechanical resistance.

### Did you know?

There are various sources of UV radiation which are very dangerous for the eyes, many of which are linked to industrial activity. Among them are:

- **Welding arcs**, which cause a significant amount of UV radiation. Closing your eyes is not sufficient to protect yourself against it. It is therefore vital to wear suitable safety goggles containing a quartz envelope in particular as the glass does not allow the UV radiation to pass through.
- **Low-pressure fluorescent tubes** (sun beds) and high-pressure lamps
- **UV diodes**: developed in Japan. These diodes are used in many applications (disinfection of instruments, engraving printed circuits, spectroscopy and fluorescence microscopy in laboratories, etc.)



# RISKS

## LINKED TO RADIATION // ULTRAVIOLET

| Risks or application                   | Scale number | Safety spectacles                                                                 | Safety goggles                                                                     | Face shields                                                                        | Reference standard |
|----------------------------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|
| Ultraviolet radiation<br>210 to 380 nm | 2, 2C or 3*  |  |  |  | EN166<br>EN170     |

### MARKING OF FIELD OF USE SYMBOLS

- Frame: no symbol
- Lenses\*: code 2, 2C or 3
  - 2: code number of the ultraviolet filter for which colour recognition may be affected.
  - 2C: code number of the ultraviolet filter with good colour recognition.
  - 3: ultraviolet filter, good colour recognition (code replaced by 2C)

These codes must be followed by a scale number which defines the transmission factor of the lens.

\*The symbols above correspond to protection classes and supplement the mechanical resistance symbols S - F - B and A and possibly other symbols for the field of use and the optical class.

Recommendation concerning scale degrees (source: EN170):

| Scale number            | Colour recognition                                                | Typical applications                                                                                                                                                                                                  | Example of sources                                                                                                              |
|-------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 2-1.2<br>2-1.4<br>2-1.7 | May be affected, unless otherwise stated<br>"2C-protection class" | To be used with sources which emit predominantly ultraviolet radiation at wavelengths < 313 nm and when glare is not an important factor.<br>This applies to U.V.C radiation and to a major part of U.V.B. radiation. | Low pressure mercury vapour lamps, such as those used to stimulate fluorescence or "black lights", actinic and germicide lamps. |
| 2-2<br>2-2.5            | May be affected, unless otherwise stated<br>"2C-protection class" | To be used with sources which emit strong radiation both in the UV spectral fields and in the visible field and which therefore require attenuation against visible radiation.                                        | Medium pressure mercury vapour lamps such as photo-chemical lamps.                                                              |
| 2-3<br>2-4              |                                                                   |                                                                                                                                                                                                                       | High-pressure mercury vapour lamps and metal halide lamps, such as sunlamps.                                                    |
| 2-5                     |                                                                   |                                                                                                                                                                                                                       | Pulsed lamp systems. High and very high pressure mercury vapour lamps and xenon lamps such as sunlamps.                         |



### Did you know?

All lenses marked with a code 2, 3 and 5 filter UVA and UVB radiation, whatever their colour. It is the quality and type of material used to manufacture the lenses which give them their filtration quality. The colour (clear, yellow, brown, smoke, etc.) is a "comfort" colour. Only the indication of the filter code can tell you if it offers proper protection against ultraviolet radiation.



# RISKS

## LINKED TO RADIATION // INFRARED

| Risks or application                           | Scale number | Safety spectacles                                                                 | Safety goggles                                                                     | Safety facial shields                                                               | Reference standard |
|------------------------------------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|
| Artificial infrared radiation - 780 to 2000 nm | 4            |  |  |  | EN166<br>EN171     |

### MARKING OF FIELD OF USE SYMBOLS

- Frame: no symbol
- Lenses\*: code 4

This code must be followed by a scale number which defines the transmission factor of the lens.

\*The symbols above correspond to protection classes and supplement the mechanical resistance symbols S - F - B and A and possibly other symbols for the field of use and the optical class.



# RISKS

## LINKED TO

## SOLAR RADIATION FOR INDUSTRIAL USE

| Risks or application                                                      | Scale number | Safety spectacles                                                                 | Safety goggles                                                                     | Face shields                                                                        | Reference standard |
|---------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|
| Ultraviolet radiation<br>280 to 380 nm & UV radiation<br>in natural light | 5 or 6       |  |  |  | EN166<br>EN172     |

### MARKING OF FIELD OF USE SYMBOLS

- Frame: no symbol
- Lenses\*: code 5 or 6
  - 5: number of the solar filter code without infrared protection.
  - 6: number of the solar filter code with infrared protection.

These codes must be followed by a scale number which defines the transmission factor of the lens.

Table of shading scale numbers:

| Scale number    | Use                                                                                                                                                                                                                                                                                                       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-1.1 and 6-1.1 | Used for some photochromatic filters in a clear state                                                                                                                                                                                                                                                     |
| 5-1.4 and 6-1.4 | Very clear filter                                                                                                                                                                                                                                                                                         |
| 5-1.7 and 6-1.7 | Clear filter                                                                                                                                                                                                                                                                                              |
| 5-2 and 6-2     | Medium filter - Universal filter, recommended for most situations                                                                                                                                                                                                                                         |
| 5-2.5 and 6-2.5 | Dark filter - Generally used in Central Europe                                                                                                                                                                                                                                                            |
| 5-3.1 and 6-3.1 | Very dark filter, to be used: <ul style="list-style-type: none"><li>- in tropical and sub-tropical regions to observe the sky,</li><li>- at high altitude for snow-covered areas</li><li>- stretches of water and sand</li><li>- chalk and lime quarries</li><li>- not recommended for driving.</li></ul> |
| 5-4.1 and 6-4.1 | Extremely dark filter - filters very intense radiation.<br>Not to be used for driving.                                                                                                                                                                                                                    |

EN172 filters are not designed to look at the sun. To do so, it is essential to use welding protection filters having a scale number between 12 and 16.

\*The symbols above correspond to protection classes and supplement the mechanical resistance symbols S - F - B and A and possibly other symbols for the field of use and the optical class.

### Did you know?



Standard EN172 specifies a protection against "solar radiation for industrial use", meaning exposure to UV radiation linked to natural light. This standard is specific to PPE and does not apply either to glasses for skiing or any other type of glasses used for leisure activities, for which there are two specific standards: ISO 12312 and ISO 12311.



# RISKS

## LINKED TO RADIATION // LASER

### There are two classifications for protection against laser radiation:

- Direct protection: between 180 nm and 1,000,000 nm, EN 207
- Adjustment work: between 400 nm and 700 nm, EN 208

### The choice of filter is determined according to the following parameters:

- wavelength of the laser
- power of the laser
- diameter of the beam
- energy of the beam

In the case of pulsed lasers, additional parameters are necessary:

- energy per pulse
- duration of the pulse
- frequency of the pulse

| Risks or application                                      | Filter marking | Safety spectacles                                                                   | Safety goggles                                                                       | Safety facial shields                                                                 | Reference standard |
|-----------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|
| Laser radiation:<br>direct exposure                       | LB1 to LB10    |  |  |  | EN207              |
| Laser radiation:<br>Adjustment work / accidental exposure | R1 to R5       |  |  |  | EN208              |

### MARKING OF FIELD OF USE SYMBOLS

- Direct protection: LB1 to LB10
- Adjustment work: R1 to R5

The various parameters below are essential to calculate the scale number of the filter. This information will be supplied to Bollé through a questionnaire sent to the user.

# MARKINGS

//05

INTRODUCTION  
MARKING FOR GLASSES  
MARKING FOR GOGGLES  
MARKING FOR LASER GOGGLES  
MARKING FOR FACE SHIELDS  
MARKING FOR WELDING  
SUMMARY OF MARKING & RISKS

# MARKING AND PROTECTION

**Bollé Safety lens and frame marking is specific to each product.**

Certified by **independent laboratories**, this information guarantees protective eyewear quality and resistance.

Each marking corresponds to a specific use and protection.

To know the level of protection of the equipment, 2 types of marking must be identified:



**- The lens marking:**

whether for spectacles, goggles or a face shield, **a marking must be present on each lens**. It guarantees the quality of the lens. It indicates the type of filtration of the shield(s), identifies the manufacturer, the mechanical, electrical and thermal resistance, the optical class and the **CE** standard.



**- The frame marking:**

whether for spectacles, goggles or a face shield, **a marking must be present on the frame**. It guarantees the quality of the frame. It identifies the manufacturer and indicates the mechanical, electrical, chemical and thermal resistance, and the EN and **CE** standard.

.....

It is vital to identify the markings to validate the various types of protection the equipment provides. Refer to the specific specifications to know and analyse the various markings.

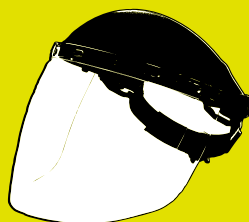


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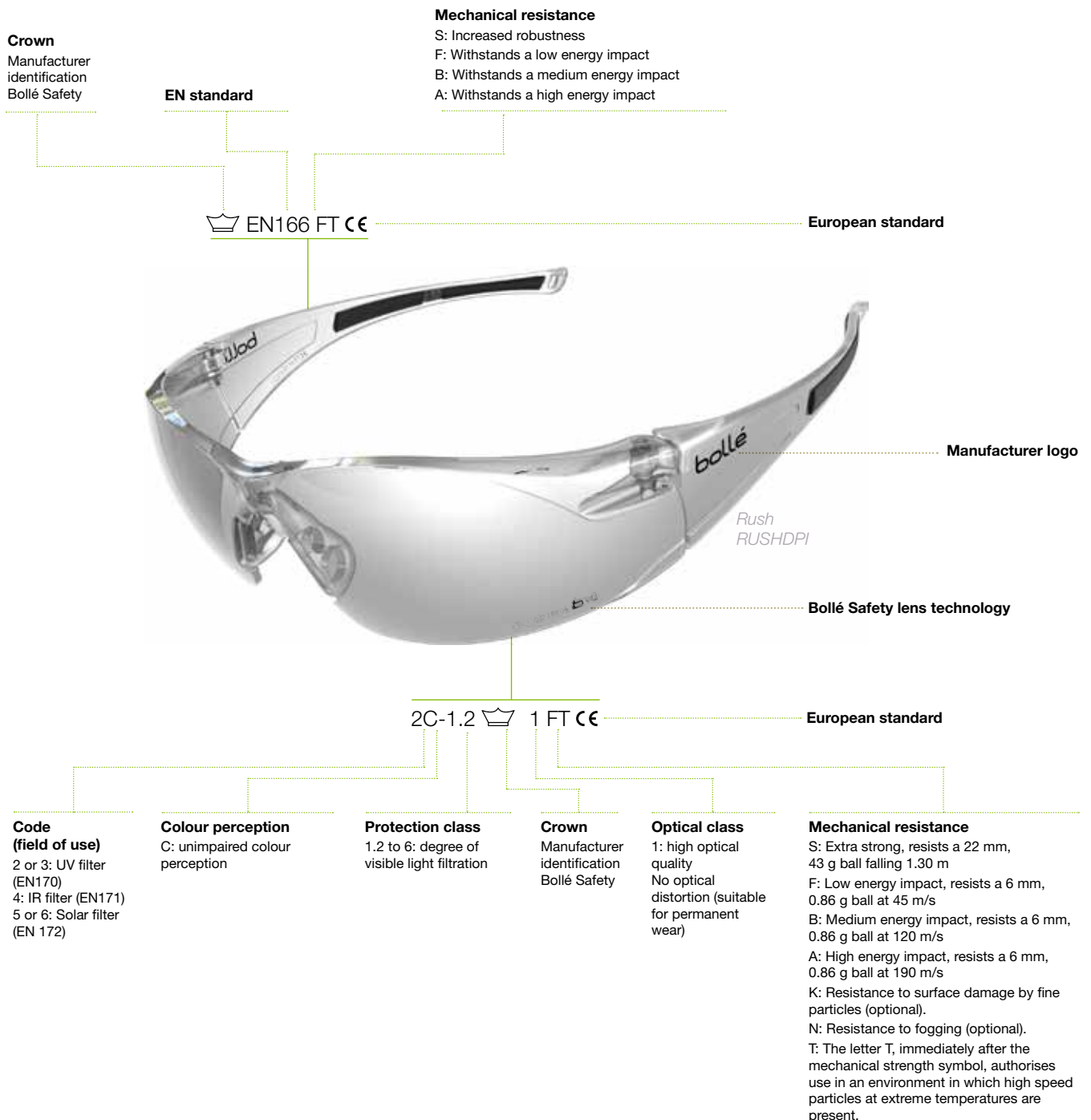


### Did you know?

All products available on the European market must comply with the European standards. The **logo CE** must be present on personal protective equipment. Your supplier must be able to provide you with the CE declaration of compliance and instructions containing all the data concerning storage, conditions for use and maintenance of the equipment, the expiry date, the protection class, etc.

# MARKING AND PROTECTION

## Identify and understand the markings on glasses



# MARKING AND PROTECTION

## Identify and understand the markings on goggles



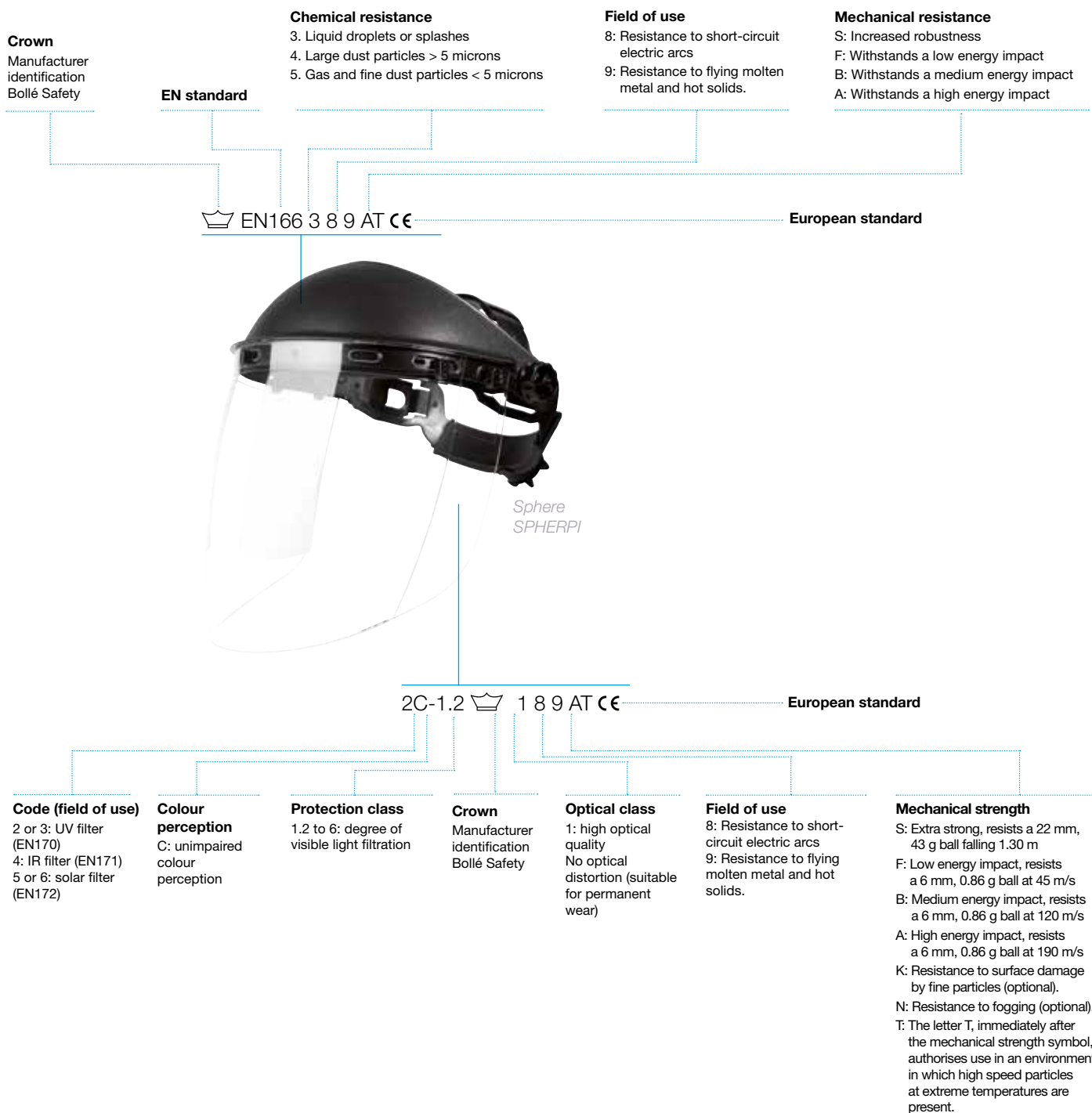
# MARKING AND PROTECTION

## Identify and understand the markings on laser goggles



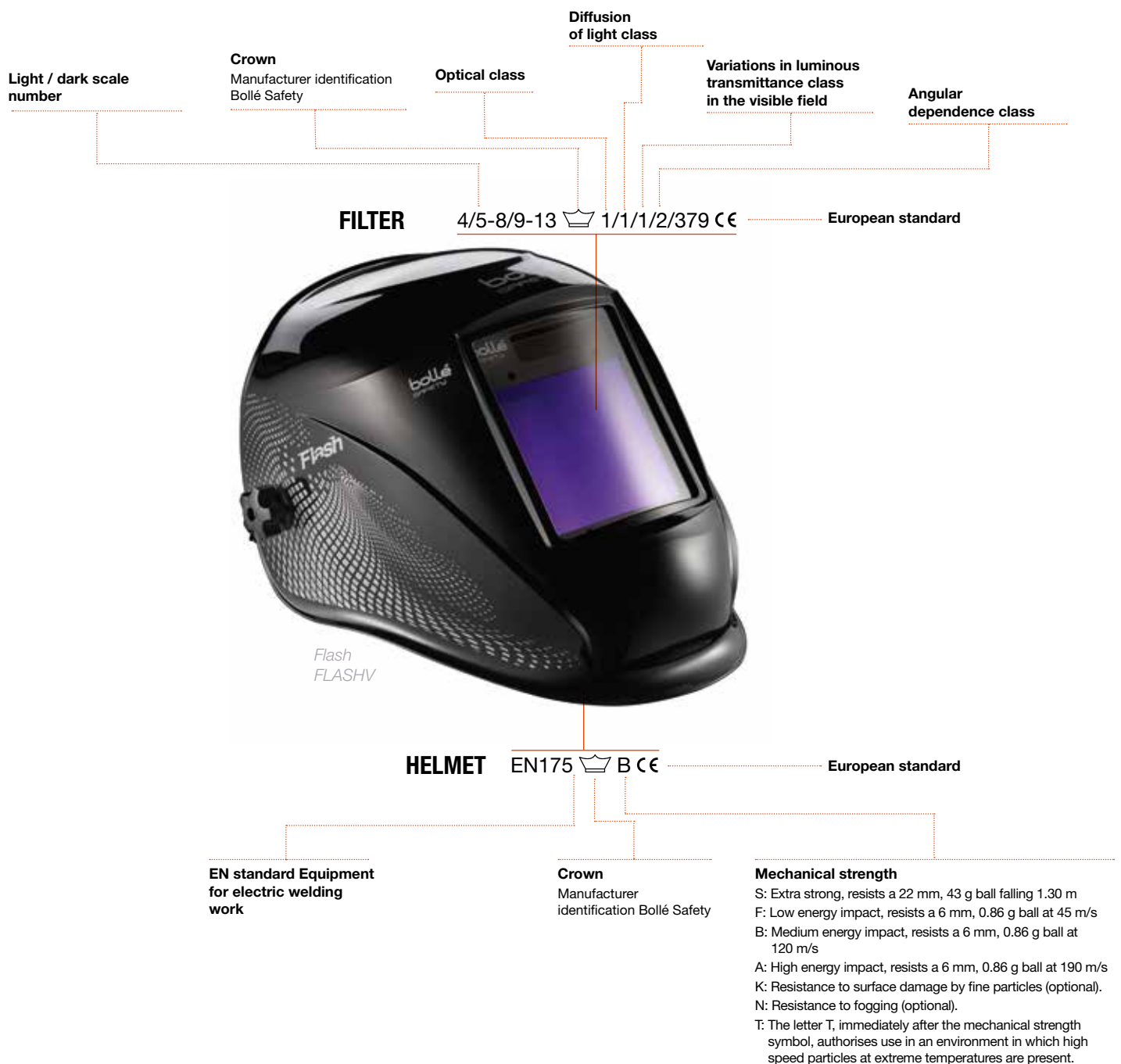
# MARKING AND PROTECTION

## Identify and understand the markings on face shields



# MARKING AND PROTECTION

## Identify and understand the markings on welding helmets



# SUMMARY

## MARKING & RISKS

### LENS

| Radiation / filter                            | Code and scale number | Identification of the manufacturer                                                | Optical quality                                       | Resistance to impacts                                                                                                                      | Resistance to extreme temperatures | Thermal resistance | Resistance to electric arcs | Resistance to immersion in water | European standard |  |  |  |  |  |  |
|-----------------------------------------------|-----------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------|-----------------------------|----------------------------------|-------------------|--|--|--|--|--|--|
| 2 - Ultraviolet                               | 1.2 to 5              |  | 1 - Perfect optical quality / constant use            | S: Increased robustness<br>F: Withstands a low energy impact<br>B: Withstands a medium energy impact<br>A: Withstands a high energy impact | T                                  | 9                  | 8                           | W                                | CE                |  |  |  |  |  |  |
| 2C - Ultraviolet with good colour recognition |                       |                                                                                   | 2- Intermittent use                                   |                                                                                                                                            |                                    |                    |                             |                                  |                   |  |  |  |  |  |  |
| 4 - Infrared                                  | 1.2 to 10             |                                                                                   | 3- Occasional work, but must not be worn continuously |                                                                                                                                            |                                    |                    |                             |                                  |                   |  |  |  |  |  |  |
| 5 - Solar filter                              | 1.1 to 4.1            |                                                                                   |                                                       |                                                                                                                                            |                                    |                    |                             |                                  |                   |  |  |  |  |  |  |
| 6 - Solar + infrared filter                   | 1.1 to 4.1            |                                                                                   |                                                       |                                                                                                                                            |                                    |                    |                             |                                  |                   |  |  |  |  |  |  |
| Single figure: welding filter                 | 1.7 to 16             |                                                                                   |                                                       |                                                                                                                                            |                                    |                    |                             |                                  |                   |  |  |  |  |  |  |

### FRAME

|                | Identification of the manufacturer                                                  | Standard                                                                                                                                                                                                                                       | Resistance to chemical splashes                                                                                     | Thermal resistance | Resistance to electric arcs | Resistance to impacts                                                                                                                      | Resistance to extreme temperatures | European standard |
|----------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------|
| No indications |  | EN166: common to all equipment<br>EN169: Gas welding radiation<br>EN175: Electric welding work<br>EN379: Welding helmets and goggles<br>EN170: UV radiation<br>EN171: IR radiation<br>EN172: Solar radiation<br>EN207 & EN208: Laser radiation | 3. Liquid droplets or splashes<br>4. Large dust particles > 5 microns<br>5. Gas and fine dust particles < 5 microns | 9                  | 8                           | S: Increased robustness<br>F: Withstands a low energy impact<br>B: Withstands a medium energy impact<br>A: Withstands a high energy impact | T                                  | CE                |

# CHOOSING YOUR PROTECTION

//06

ACCORDING TO YOUR TRADE  
ACCORDING TO THE  
SECTOR OF ACTIVITY  
FITTING YOUR FACE

# WHAT LENS TYPE?

## ACCORDING TO YOUR TRADE

The colour of the protection shading you need depends on your trade:

### If you work indoors:

| Polycarbonate Lenses (PC)                                                                    | Use                                                                               | Compatible with PLATINUM                                                          | UV light absorption: 280-380 nm | Visible light transmission: 380-780 nm | Infrared light absorption: 780-1400 nm | Blue light absorption: 380-500 nm |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|----------------------------------------|----------------------------------------|-----------------------------------|
|  Clear      |  |  | 99.99%                          | 92%                                    | 13%                                    | 10%                               |
|  B-CONTRAST |  |                                                                                   | 99.99%                          | 82%                                    | 30%                                    | 30%                               |

### If you work in a medical environment, indoors and you need to see as clearly as possible:

|                                                                                         |                                                                                    |  |        |     |     |     |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--------|-----|-----|-----|
|  B-HD |  |  | 99.99% | 96% | 23% | 10% |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--------|-----|-----|-----|

### If you work outdoors:

|                                                                                                  |                                                                                     |                                                                                     |        |     |     |     |
|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-----|-----|-----|
|  B-TWILIGHT   |  |  | 99.99% | 43% | 19% | 76% |
|  B-POLARIZED  |  |                                                                                     | 99.99% | 10% | 13% | 91% |
|  Smoke        |  |  | 99.99% | 13% | 56% | 86% |
|  Blue flash   |  |                                                                                     | 99.99% | 10% | 47% | 89% |
|  Red flash    |  |                                                                                     | 99.99% | 13% | 60% | 89% |
|  Silver flash |  |                                                                                     | 99.99% | 13% | 57% | 86% |

### If you work both indoors and outdoors:

|                                                                                            |                                                                                     |                                                                                     |        |     |     |     |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-----|-----|-----|
|  Yellow |  |  | 99.99% | 90% | 11% | 47% |
|  B-ESP  |  |                                                                                     | 99.99% | 64% | 28% | 62% |
|  B-CSP  |  |  | 99.99% | 63% | 14% | 52% |

### If you work in a welding environment:

|                                                                                                 |                                                                                     |  |        |     |     |     |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--------|-----|-----|-----|
|  Welding 1.7 |  |  | 99.99% | 46% | 95% | 94% |
|  Welding 3   |  |  | 99.99% | 21% | 97% | 98% |
|  Welding 5   |  |  | 99.99% | 2%  | 99% | 99% |



Photo: Getty Images/Jean Vincent Canto Boig



## NEW ANTI-FOG AND ANTI-SCRATCH PLATINUM COATING

Bollé Safety revolutionizes eye protection with an innovation that meets all international standards, particularly EN166 option K and N. The new exclusive anti-fog and anti-scratch PLATINUM coating is now available on many models including COBRA\*, IRI-s\*, RUSH+, CONTOUR, SILIUM+, SLAM+, B808, TRACKER, ATOM and BACKDRAFT.

It guarantees more safety and reliability, and a comfort fit. Washable \*\*, this permanent coating on both sides of the lenses gives them a high scratch resistance and delays fogging.

In all circumstances and at every moment, PLATINUM provides the highest safety for eyes.

\* COBRA foam models, IRI-s except dioptries.

\*\* Washing using water and soap.

[bolle-safety.com](http://bolle-safety.com)

**bolle**  
SAFETY

# WHAT LENS TYPE?

## ACCORDING TO YOUR TRADE

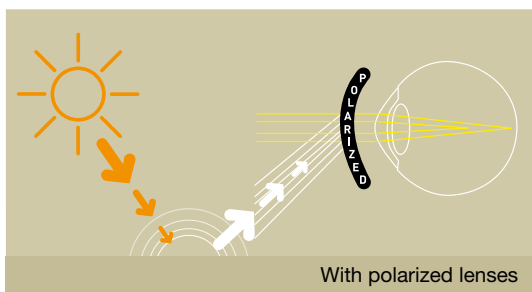
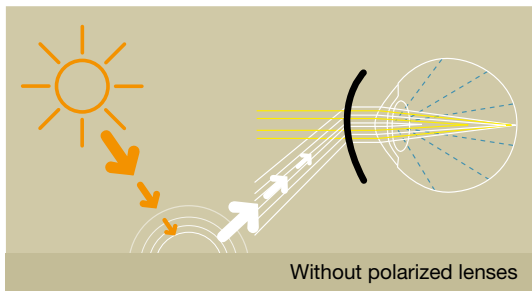
Exclusive Bollé coatings, the best of Bollé Safety innovation!

### **B POLARIZED**



#### **AN END TO GLARE!**

POLARIZED technology is ideal for use in an urban or seagoing environment, for driving, and more generally for all outdoor activities in which there is a high risk of glare. POLARIZED technology offers incomparable comfort by eliminating glare and reflections.



### **B TWILIGHT**



#### **IDEAL FOR OUTDOOR USE IN LOW LIGHT CONDITIONS**

Recommended for outdoor work at dawn and at dusk, TWILIGHT is a real shield against blue light. Contrasts are accentuated for better visibility and the double inner/outer anti-fog coating is effective even in the most extreme conditions.

### **B ESP** Extra Sensory Perception



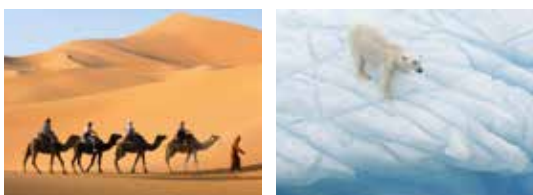
#### **COMBATS GLARE DURING FREQUENT SWITCHES FROM INDOORS TO OUTDOORS**

ESP combines the advantages of clear and tinted lenses in a single model. It reduces glare when passing from a shaded zone to a bright zone and very efficiently filters blue light.

# WHAT LENS TYPE?

## ACCORDING TO YOUR TRADE

**b CSP** Comfort Sensivity Perception



### RECOMMENDED FOR INDOOR/OUTDOOR USE IN ALL CONDITIONS

Like ESP, this innovating coating is an effective solution for all activities that alternate exposure to bright light and low light, while also being suitable for extreme temperature environments. Ideal for cold and hot countries, from the Far East to Siberia! CSP technology to filter blue light is combined with the exclusive PLATINUM coating, to sustainably combat fogging and provide permanent visual comfort from a single pair of glasses.

**b CONTRAST**



### FOR BETTER INDOOR WORKING COMFORT

The CONTRAST coating is applied as a graduation and recommended to combat the aggression of artificial lighting. Ideal for activity at a static workstation lit using neons, halogens or other sources of blue light that can affect the eyes. The CONTRAST coating protects from the harmful effects on the retina and the crystalline lens of the eye and reduces eye fatigue by providing optimum working comfort and by improving contrast and relief.

**b HD** High Definition



### FOR UNEQUALLED PRECISION!

This revolutionary coating provides an exceptional clarity and transmission of light with a rate of 96% compared to 92% for a classic clear lens! HD is reflection resistant and provides excellent visibility, it is ideal for activities that demand a high level of precision. It also has a water-repellent coating which makes it a barrier against liquid and dirt.

### *Classic tints: make the right choice for optimum comfort!*



#### **CLEAR**

Primarily for indoor use.



#### **SMOKE**

Outdoor use only. Filters UVA and UVB (99.99%). It provides the maximum protection from solar radiation.



#### **YELLOW**

Recommended for low light environments, both indoors and outdoors, the yellow tint increases contrasts (e.g. ideal for driving at night).



#### **WELDING**

Protection from UV and infrared radiation linked to certain welding activities that do not require to wear a welding helmet.

# WHAT PRODUCT?

## ACCORDING TO THE SECTOR OF ACTIVITY

### PETROCHEMICAL & OFFSHORE



#### HUSTLER

##### COMBINING STYLE AND PROTECTION

- Side shields
- Non-slip bridge
- Comfortable, non-slip temples

Water-repellent, the blue mirror-coated polarised version of HUSTLER repels heat, providing optimum protection and reducing glare. HUSTLER is ideal for offshore activities where there is strong light reflection.

### CHEMICALS

#### ATOM

##### ULTRA COMPACT

- High resistance to fogging:  PLATINUM coating
- Ideal for the most abrasive environments
- Compatible with a face shield

Compact, lightweight and ultra-comfortable thanks to its TPR frame, ATOM is pure concentrated effectiveness and a barrier to the most abrasive chemicals. In its double lens version ATOM is fully sealed and provides the best of protection for a goggles model, with high fogging resistance from its EQUALIZER system and its PLATINUM coating.



Other models may apply. Ask your sales representative to help you define the risk factors linked to your working environment.

## CONSTRUCTION INDUSTRY

### RUSH +

#### PANORAMIC AND SPORTY

- Side and upper shields
- Flexible frame with co-injected colour temples
- Exclusive anti-fog **PLATINUM** coating

Panoramic and lightweight, RUSH + glasses have an ultra-sporty design with their ergonomic twin material, coloured temples. Available with optional comfort foam and adjustable strap, RUSH + is especially recommended for intense physical activity and can be worn for extended periods of time.



## MINING & DRILLING

### MASTERALL

#### HIGHLY RESILIENT

- Ultra-compact
- Sealed PVC frame
- Comfort foam
- Double lens
- **PLATINUM** coating
- Equalizer technology

Highly resilient Inspired by the BACKDRAFT model, MASTERALL goggles offer total reinforced protection thanks to the double lens and its anti-fog technology. Ideal for offshore and the petrochemical environment.



## PHARMACEUTICAL & MEDICAL

### COVERALL AUTOCLAVE

#### CLEAN ROOMS" SPECIAL

- TPR frame / Upper indirect ventilation / Sealed in the lower part
- High-comfort autoclavable goggles
- "Clean" neoprene strap
- Liquid overflow chute
- Fits over prescription glasses
- **PLATINUM** coating

COVERALL AUTOCLAVE protective goggles are specially designed to guarantee total comfort and optimum protection in sensitive and sterile environments such as pharmacies, micro-electronics and operating theatres.



*Other models may apply. Ask your sales representative to help you define the risk factors linked to your working environment.*

# CHOOSE THE PRODUCT? THAT FITS YOUR FACE

Bollé Safety develops numerous innovations to ensure the equipment is adapted to the face of each user.

## ***Removable temples***

This technology is used to quickly and easily transform safety spectacles into safety goggles. The temples can be replaced with the foam and strap kit.



## ***160° Flex***

Soft and ultra pliable, 160° flex frames can be used to adjust the space between the temples for better wearer comfort.



## ***Non-slip TIPGRIP***

The non-slip TIPGRIP technology ensures a better fit thanks to its dual-material design and innovative shape, improving temple comfort and hold.



## **B FLEX**

The revolutionary B-Flex technology provides unique flexibility. Light, soft and fully pliable, the B-Flex bridge is fully adjustable in all directions and perfectly fits all faces thanks to its shape-memory material.



# CHOOSE THE PRODUCT? THAT FITS YOUR FACE

## ***Pivoting temples / Tilting-front***

This technology is used to adapt the angle of the glasses to your face shape.



## ***Adjustable bridge***

Designed to adapt to the nose so the frame sits perfectly on the face.

COBRA Safety spectacles

COBRA Goggles

Removable temples

Foam and strap kit



# PREVENTION

//07

POPULAR MISCONCEPTIONS  
MAINTENANCE  
VISION  
PRESCRIPTION LENSES

# POPULAR MISCONCEPTIONS

## ABOUT EYE PROTECTION

### **Safety spectacles distort your vision!**

**FALSE**

Our spectacles are optical quality 1 as defined by standard EN166. Beyond our ISO9001 certified process, Bollé Safety attaches great importance to the quality of manufacture of our products and to our brand image. However, some of the curved models may be uncomfortable for certain users. This is usually due to an emerging or as yet undetected visual defect. The wearer should therefore request an eye test.

### **The equipment is not compatible with the tasks the workers are required to perform!**

**FALSE /  
TRUE...**

When choosing the frame and also the lenses, it is important for the wearer to state their job in order to assess the risks linked to the work carried out. They can then be allocated a product corresponding to their needs. For example, for chemical risks, the CR39 is the most suitable product, unlike polycarbonate which is better for mechanical risks.

### **Safety spectacles give you a headache!**

**FALSE**

Take care that there are no reflections and that the spectacles are not in poor condition (scratches, dirt, traces of oil, etc.) which may indeed impair vision.

- You are strongly advised to change the spectacles if they are damaged, and clean them carefully on a regular basis if necessary.
- If the problem persists, the wearer should be re-assessed: eye test, anti-reflection coating to improve comfort and reduce eye strain, etc.
- A period of adaptation is necessary for prescription spectacles with progressive lenses: Maximum 3 weeks.

# POPULAR MISCONCEPTIONS ABOUT EYE PROTECTION

## Eye protection doesn't look good!

**FALSE**

Manufacturers offer products combining technology, comfort, protection and an attractive look. The frames have a more attractive design which encourages users to wear them. Coloured models such as the red B808 spectacles are available. Products such as Iri-s also fit the shape of the face better, making them more comfortable.

## Safety spectacles are uncomfortable!

**FALSE /  
TRUE...**

You need to take time to choose the right frame. Safety equipment today is designed to improve the wearer's comfort (e.g. two sizes available for some models)

Of course, wearing safety spectacles is slightly restrictive but the effort made by Bollé Safety to innovate in terms of comfort, design and coatings provides numerous solutions.

Before making your final choice, you should allow a trial period for the staff to try out the protection and assess if wearing the PPE causes any discomfort, restriction or difficulty.

## Eye protection must be worn all the time!

**FALSE /  
TRUE...**

Some companies require their employees to wear the protection all day. It is vital to wear PPE to reduce work-related accidents throughout the establishment. The company is responsible for any accident which occurs on its premises.

**Eye accidents don't only happen to other people and they often occur in places and conditions where you least expect them!**

# MAINTENANCE IS IMPORTANT!



## BOLLÉ SOLUTIONS



### 1 CLEAN

The spectacles can be **cleaned with soap and water** then dried with a soft cloth to avoid scratches. However, **cleaning products** are available to clean more effectively.

#### RANGE OF B-CLEAN CLEANERS



➤ The range is certified alcohol and silicone free by the COLTS laboratory and suitable for all lenses for optimum cleaning.



### 2 PUT THEM AWAY

To avoid damaging spectacles or face shields, they must be **put away in a specific place** intended for this purpose after use.

#### PROTECTIVE CASES



➤ Practical accessories that are perfect for cleaning and making the best possible use of your spectacles.



### 3 REPLACE

Spectacles or face shields which are **scratched** or **whose frame is damaged must be replaced**.

#### OVER 80 REFERENCES



➤ There are plenty of models to choose from at Bollé Safety so you can find THE product which is right for you!

# THE RIGHT PROTECTION

## HOW WE SEE

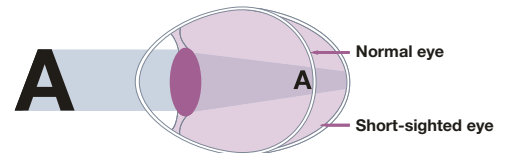
Vision begins when light rays enter the eye through the cornea, the first transparent tissue. Then, the rays pass through the pupil whose size varies according to the quantity of light that enters the eye.

The light rays then pass through the crystalline lens, which, by changing its shape, focuses the light rays on the retina. The information then travels to the brain via the optic nerve, for interpretation.

### Myopia

#### (short-sightedness):

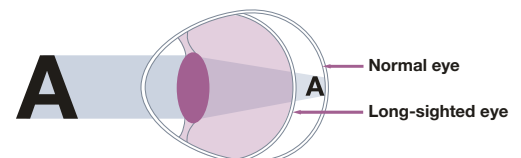
Short-sighted people can see close up but objects at a distance are blurred. This is because the image perceived by the eye is no longer projected perfectly on the retina but in front of it.



### Hypermetropia

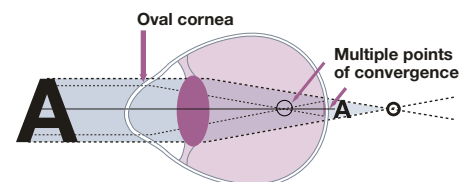
#### (long-sightedness):

Long-sighted people can see objects at a distance but those close up are blurred. This is because the image perceived by the eye is no longer projected perfectly on the retina but behind it.



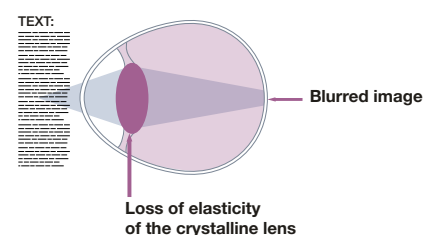
### Astigmatism:

People with astigmatism have distorted vision at all distances. This condition is due to an abnormal curve of the cornea and/or crystalline lens.



### Presbyopia:

People with presbyopia have blurred near vision (for reading in particular) as, with time, the crystalline lens loses its elasticity and its ability to focus on images perceived.





# THE RIGHT PROTECTION

## TYPES OF CORRECTIVE LENS

### Single vision lenses:

Called single vision, these lenses feature one correction for a given distance: myopia, hypermetropia and/or astigmatism. They are known as single vision because the optical power is the same for the entire lens.

### Progressive or varifocal lenses:

Varifocal lenses do not have any visible lines so they are more aesthetically appealing. The power gradually changes from the top to the bottom of the lens. It makes it possible to focus on objects at variable distances whereas a bifocal lens only allows clear vision at two given distances.

### Free Form lenses:

Available on a wide range of lenses, Digital Free Form technology guarantees the highest level of visual performance with outstanding style. It results from an improved inner part of the lens with a significantly larger field of vision.

### Degressive lenses:

The purpose of degressive lenses is first to correct near vision, then intermediate vision with decreasing power towards the top of the lens. Four fixed degressions are possible from 0.75, 1.25, 1.75 or 2.25 diopetre depending on the needs.

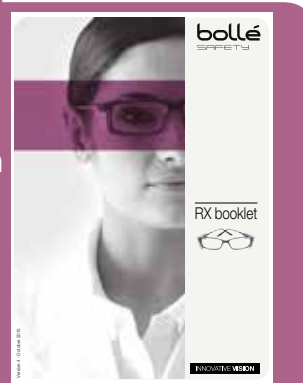
### Bifocal lenses:

Bifocal lenses are designed for people who require two corrections, one for distance and for near vision. The upper part of the lens corrects distance vision and the lower area corrects near vision.

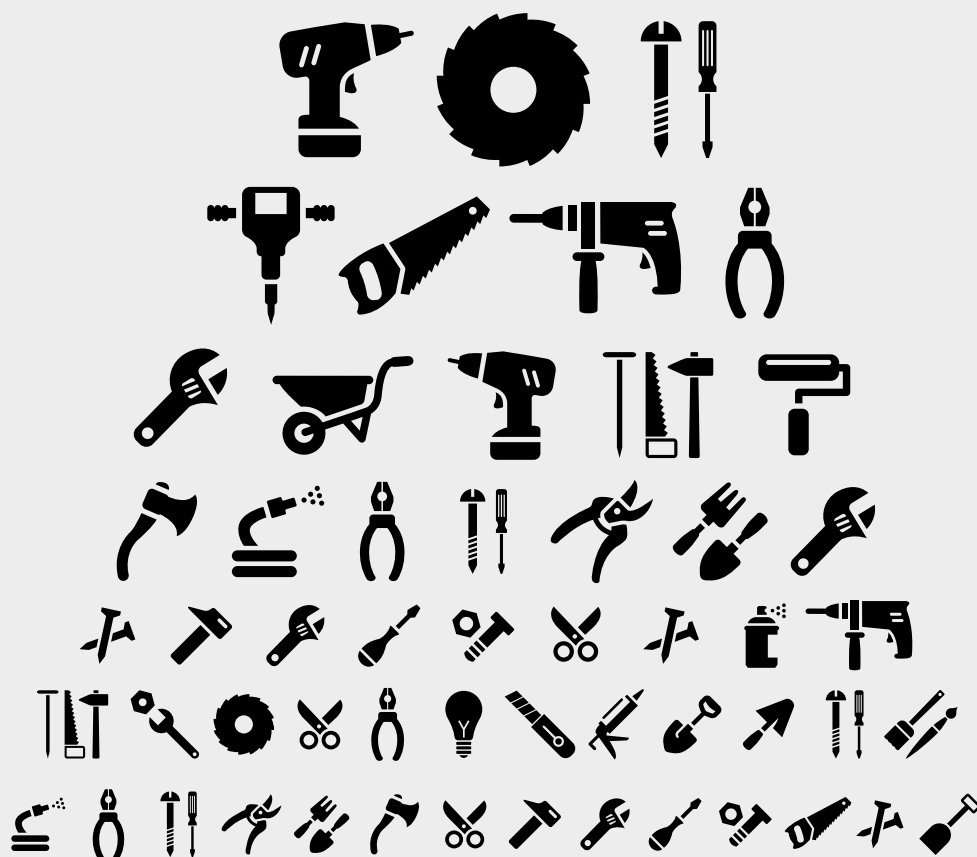
## FOR MORE INFORMATION

### ASK FOR THE RX BOOKLET!

It presents the lines of prescription glasses, the assembly restrictions and the technical information about our lenses.



EVERYTHING CAN BE "FIDDLER WITH",  
EXCEPT PROTECTION ADAPTED TO YOUR SIGHT!  
**PRESCRIPTION SAFETY SPECTACLES:**  
SAFETY, COMFORT, PRECISION.



## PRESCRIPTION SAFETY SPECTACLES

### SAFETY, COMFORT, PRECISION

Thanks to our unequalled experience, a certified laboratory and designers and technicians, our range of prescription safety glasses has been carefully chosen to provide you with a wide choice of plastic and metal frames guaranteeing optimum protection. Each item of safety eyewear must be adaptable to its wearer.

To accompany our partner opticians in advising and sales, we have a wide range of exclusive tools, especially the Webshop.

Not to wear glasses, is to ignore these risks and endanger the health of your eyes. Protect yourself today...with Bollé Safety!

A wide range of  
metal and plastic protections:  
more than 20 frames available!





**HE DID NOT SEE THE INTEREST IN PROTECTION. TODAY HE DOESN'T SEE ANYMORE.**

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David, 42, brick layer, totally disabled.



Photo: Getty Images

Because a single accident can cripple you for life, for over 120 years, Bollé Safety has been committed to offer maximum eye protection for every professional risk.

Not to wear glasses, is to ignore these risks and endanger the health of your eyes. Protect yourself today...with Bollé Safety!

**[bolle-safety.com](http://bolle-safety.com)**

**bolle**  
SAFETY



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