APPENDIX 3

EUROPEAN STANDARDS AND MARKINGS FOR EYE AND FACE PROTECTION

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INTRODUCTION

Harmonised European Standards for Personal Protective Equipment (PPE) have been developed as the preferred means of demonstrating equipment conformity with the basic health and safety requirements (BHSRs) of the EC Personal Protective Equipment Directive (89/686/EEC). Only equipment which meets these BHSRs is entitled to carry the CE mark and to be sold for use in the EC.

The alternative route to obtaining the CE mark involves the manufacturer producing a 'technical file' for the equipment which also demonstrates that it satisfies the BHSRs. In such cases, the equipment will carry the CE mark but may not display any Standard number. The manufacturer's information will contain the performance specification.

For Category III PPE (for use against “mortal danger”), the CE mark will be accompanied by a four-digit code number identifying the responsible Notified Body appointed to ensure that the manufactured product continues to satisfy the BHSRs.

Increasingly, European Standards (prefixed EN – European Norm) are being superseded or subsumed by International Standards (prefixed ISO). Where these are adopted in the UK, they will also be issued as British Standards and be prefixed BS. The British versions of standards (BS EN, BS ISO or BS EN ISO) may have minor differences from the original versions of the standard, usually in the form of a National Foreword or National Annex, to account for legislative or technical variations specific to the UK. If such a UK variation exists, this is flagged up in the attached listings below for the individual standards. BS versions may also differ slightly in the stated year of issue from the EN or ISO versions; the original EN or ISO issue dates are quoted here.

The Standards may contain design, performance and marking requirements for the different types of equipment. This document lists the Standards, and gives a brief explanation of the markings which they define.

ORGANISATION OF THE INFORMATION

PPE Standards are separated into broad categories, depending on the type of protection intended, eg head protection, foot protection. Separate documents have been produced for each category.

Within a category, where possible, Standards have been further subdivided according to the hazard (eg mechanical hazards, heat and flame) or component type (eg filters; facepieces) as appropriate. Both current and recently superseded versions are listed, as equipment marked according to either version may be encountered in the field.

Standard number and date are given, with the title (sometimes abridged).

If a UK National variation applies to this standard, the nature of this variation is described.

Markings and classifications defined in the Standard for that class of equipment are listed and briefly described.

Related Standards, eg specific test methods which will not usually appear in the markings on equipment are listed separately at the end of each document.

Pictograms and symbols for each type of equipment are included at the rear of the relevant document.

STANDARDS FOR EYE AND FACE PROTECTION

General

EN 166:2001 - Personal eye protection - specifications
Not all types of eye protector are permitted to meet all these requirements. Order of marking on **oculars** where relevant:

Scale number (filters only)	Manufacturer identification	Optical class	Mechanical strength	Fields of use	Scratch resist	Fog resist	Radiant heat

Order of marking on **frames** where relevant:

	Manufacturer identification	EN 166	Fields of use	Mechanical strength		

Scale Number - for oculars with filtering effect only.

Scale number consists of a **code** number and a **shade** number separated by a hyphen, except for welding filters which have no code number. Higher shade numbers have a stronger filtering effect (e.g. are darker for welding).
Example: an IR filter with shade number 4 has the scale number 4-4.

Welding filters See EN 169 and EN 379	No code number. Shade number between **1.2** and **16**. Suffix **a** denotes filter for use in gas welding with flux
UV filters See EN 170	**2-** or **3-** - code number denoting UV filter without or with good colour recognition respectively, plus; shade number between **1.2** and **5**.
IR filters See EN 171	**4-** - code number for IR filters, plus; shade number between **1.2** and **10**

Sunglare See EN 172 and EN 1836	**5-** or **6-** - code number for sunglare filters without and with IR specification respectively, plus; shade number between **1.1** and **4.1**
Optical class **1**, **2** or **3** - indicates optical quality of the ocular. Class 1 is the best.	
Mechanical strength - marked on frames and/or oculars.	
	S - increased robustness (oculars only) **F** - high speed particles, low energy impact (any type) **B** - high speed particles, medium energy impact (goggles and faceshields only) **A** - high speed particles, high energy impact (faceshields only)
Fields of use	
Frames	**3** - resistant to liquid droplets (goggles), or liquid splashes (faceshields, but not mesh) **4** - resistant to coarse dust particles **5** - resistant to gas and fine dust particles **9** - resistant to molten metals and hot solids **G** - resistant to radiant heat (old EN 1731 faceshields only – this requirement since deleted from EN 1731)
Oculars	**8** - resistant to short circuit electric arc (faceshields only) ***Note:*** *Since publication, the requirements given in EN 166 have been shown to be inadequate in assessing practical protection against short-circuit arc. Alternatives for demonstrating this type of performance are under development)* **9** - resistant to molten metals and hot solids (goggles and faceshields only)
Other ocular markings	
	K - resistant to surface damage by fine particles **N** - resistant to fogging **G** - resistant to radiant heat (old EN 1731 faceshields only – this requirement since deleted from EN 1731)
EN 1731:2006 - Mesh type eye and face protectors	
Note: Requirements and markings for radiant heat have been deleted in this revision of the standard. Markings (following EN166) are, where applicable, in the order:	

Manufacturer identification	EN 1731	Mechanical strength
Mechanical strength	**S**, **F**, **B** or **A** - as for EN 166	

Welding

EN 169:2002 - Filters for welding and related techniques
Markings follow EN166. Contains informative annex giving guidance on selection and use of welding filters.

EN 175:1997 - Eye and face protection during welding and allied processes
Note – this describes the frame or holder which must be used in conjunction with an appropriate welding filter - EN 169 or EN 379.)

Markings (following EN166 with additions) are, where applicable:

	S, **F** or **B** - mechanical strength (as for EN 166) **9** - resistant to molten metal splash or hot solids **W** - face/hand shield sizes stable after water immersion # - if mass of shield >450g (faceshield) or >500g (handshield), mass in grams (where applicable)

EN 379:2003 – Personal eye-protection — Automatic welding Filters (amended 2009)

Markings follow EN166 with additions.
It is easiest to explain the markings for different types of device.

Automatic welding filters and automatic welding filters with manual scale number setting
The order of markings (each separated by an oblique stroke */*)is:

Light shade	Dark shade [or range(s)]	Manufacturer identification	Optical class	Light diffusion class	Variations in luminous transmittance	Angle dependence of luminous transmittance class

followed by the standard number **379**

Light and dark scale (shade) numbers

The light state scale number and the lightest dark state scale number(s), separated by an oblique stroke, are given instead of a single scale number. If the dark state is manually controlled, the limits of the range are separated by a hyphen.

Light shade
- scale number between **1.2** and **5** (typically)

Dark shade [or range(s)]
Options:
- one dark state – single number
- one dark state range – top and bottom of range separated by hyphen
- two dark state ranges – each range as above, with ranges separated by hyphen

Examples of light and dark scale numbers
a) A simple device with one light state (5) and one dark state (11): 5/11
b) A device with one light state (4) and manual control of the dark state in one range (9-13): 4/9-13
c) A device with one light state (4) and manual control of the dark state in two ranges (5-7) & (10-13) : 4/5-7 /10-13

Optical class	**1**, **2** or **3** - indicates optical quality of the ocular. Class 1 is the best.

Light diffusion class - (switchable filters only)

	1, **2** or **3** - indicates light diffusion by the ocular. Class 1 is the best.	

Variations in luminous transmittance - (switchable filters only)

	1, **2** or **3** - indicates shade variability in the dark state of the ocular. Class 1 is the best.

Angle dependence of luminous transmittance class (optional) If applicable, marked before the standard number. Classes **1, 2** or **3** with class 1 the best.
Welding filter with automatic scale number setting The order of markings (each separated by an oblique stroke ***/***) is:

Light shade	Dark shade range	Manual offset (if applies)	Manufacturer identification	Optical class	Light diffusion class	Variations in luminous transmittance	Angle dependence of luminous transmittance class

followed by the standard number **379**
The light state scale number and the lightest dark state scale number, separated by an oblique stroke, are given instead of a single scale number. The darkest state scale number is marked separated by the symbol "<". For filters with manual offset, "M" is added after the number for the darkest state.
Light shade - scale number between **1.2** and **5** (typically)
Dark shade range top and bottom of range separated by **<**
Manual offset (if applicable) - marked **M**
Example of light and dark scale numbers A device with one light state (4) and a dark state range (9-13): 4/9<13
The other markings are as described for automatic welding filters.
Note – For all device types there may also be a marking, if the device does not meet optical requirements at temperatures below 10^{o}C:

	" DO NOT USE BELOW 10^{O}C"

Laser and intense light

EN 207:1998 - Filters and eye protection against laser radiation Markings, where applicable, in the order:				
Now superseded by EN 207:2009				
Wavelength	**Laser type(s)**	**Scale number**	**Manufacturer's identification mark**	**Mechanical strength**

Wavelength	# - single wavelength or range (nm), e.g '1060' or '630 - 700'
Laser types - if applicable to all types of laser, no mark appears.	
	D - continuous wave laser **I** - pulsed laser **R** - giant pulsed laser **M** - mode-coupled laser
Scale number	**L# -** in range **L1** to **L10** denoting spectral transmittance. Higher numbers are lower transmittance
Manufacturer's identification mark	e.g. company logo

Mechanical strength	**S**, **F**, **B**, **A** - as for EN 166

EN 207:2009 - Filters and eye protection against laser radiation
Corrected 2012

If the eye protector claims protection against more than one wavelength or range, separate markings will appear for each. Markings, where applicable, in the order:

Wavelength	Test condition	Scale number	Manufacturer's identification mark	Certification mark	Mechanical strength

Wavelength	# - single wavelength or range (nm), e.g '1060' or'630 - 700'
Test condition.	
	D - continuous wave laser **I** - pulsed laser **R** - Q-switched pulsed laser **M** - mode-coupled pulsed laser
Scale number	**LB#** - in range **LB1** to **LB10** denoting spectral transmittance. Higher numbers are lower transmittance. **Y** will be added to scale number if the protector has not been tested at low repetition rates.
Manufacturer's identification mark	e.g. company logo
Certification mark	e.g. Kitemark (if applicable)
Mechanical strength	**S**, **F**, **B**, **A** - as for EN 166

EN 208:1998 - Personal eye protectors for adjustment work on lasers

Now superseded by EN 208:2009

Frames must be marked **adjustment eye protectors**. Other markings, where applicable, in the order:

Max power	Max pulse energy	Wavelength	Scale no.	Manufacturer's identification mark	Certification mark	Mechanical strength

Maximum power	**#W** - maximum laser power (Watts), e.g. '10W'
Maximum pulse energy	**#J** - maximum laser energy (Joules), e.g '$2x10^{-3}$J'
Wavelength	# - single wavelength or range (nm), e.g '1060' or '630 - 700'
Scale number	**R#** - in range **R1** to **R5** denoting spectral transmittance. Higher numbers are lower transmittance
Manufacturer's identification mark	e.g. company logo
Certification mark	eg Kitemark (if applicable)
Mechanical strength	**S**, **F**, **B** or **A** - as for EN 166

EN 208:2009 - Personal eye protectors for adjustment work on lasers

Frames must be marked **adjustment eye protectors**. Other markings, where applicable, in the order:

Max	Max	Wavelength	Scale	Manufacturer's	Certification	Mechanical

power	pulse energy		no.	identification mark	mark	strength

Maximum power	**#W** - maximum laser power (Watts), e.g. '10W'
Maximum pulse energy	**#J** - maximum laser energy (Joules), e.g '2x10^{-3}J'
Wavelength	# - single wavelength or range (nm), e.g '1060' or '630 - 700'
Scale number	**RB#** - in range **RB1** to **RB5** denoting spectral transmittance. Higher numbers are lower transmittance. **Y** will be added to scale number if the protector has not been tested at low repetition rates.
Manufacturer's identification mark	e.g. company logo
Certification mark	eg Kitemark (if applicable)
Mechanical strength	**S**, **F**, **B** or **A** - as for EN 166
BS 8497-1:2008 – Eyewear for protection against intense light sources used on humans and animals for cosmetic and medical applications: Part 1 – Specification for products	
	- model number - whether intended for patient only - manufacturer

Firefighters and emergency teams

EN 14458:2004 – Facecshields and visors for firefighters, ambulance and emergency services. Corrected 2004	
Revised version expected 2014, but will be renamed as "Personal eye protection – High performance visors intended only for use with protective helmets"	
	= General (non-firefighting) use, or **+** Firefighters' use
	😐 face guard, or ⊙ eye guard
Options	**Scale number** appropriate to filtering performance (see EN 166) **T** – resistance to medium energy impact at extremes of temperature **A** – resistance to high energy impact **AT** – resistance to high energy impact at extremes of temperature **K** – resistance to abrasion **N** – resistance to fogging **R** – enhanced infrared reflection **Ω** - electrical properties

Sport

EN 174:2001 - Ski goggles for downhill skiing	
Filtering oculars marked according to transmittance:	
	S# - in range **S0** to **S4**. Higher number indicates lower transmittance.
BS 7930-1:1998 - Eye protectors for racket sports - Squash.	
Oculars	- manufacturer identification - Standard number (**BS 7930-1**)
Frames	- manufacturer identification - Standard number (**BS 7930-1**) - model size if applicable

OTHER STANDARDS RELEVANT TO EYE PROTECTORS

Occupational personal protective equipment is unlikely to be marked with these Standard numbers, but they may contain useful information on equipment performance or test methods.

EN 165:2005	Personal eye protection – vocabulary. Now nominally replaced by: **EN ISO 4007:2012** Personal protective equipment – Eye and face protection – Vocabulary. ***Note:*** *ISO 4007:2012 does not currently contain all the terms and definitions required for all forms of eye protection. Only those required for sunglare are included. As Occupational and Sports ISO standards develop, the content of ISO 4007 will be updated.*
EN 167:2001	Personal eye protection - optical test methods
EN 168:2001	Personal eye protection - non-optical test methods
EN 170:2002	Specification for UV filters
EN 171:2002	Specification for IR filters
EN 172:1994	Specification for sunglare filters for industrial use (amended 2000 and 2002)
EN 1836:2005	Sunglasses and sunglare filters for general use. Expected to be replaced by **ISO 12312-1** by 2014.
EN 1938:2010	Goggles for motorcycle and moped riders
BS 4110:1999	Specification for visors for vehicle users
BS 7028:1999	Eye protection for industrial and other uses. Guidance on selection, use and maintenance
BS 8497-2: 2008	Eyewear for protection against intense light sources used on humans and animals for cosmetic and medical applications: Part 2 – Guidance on use
EN 12254: 2010	Screens for laser working places - Safety requirements and testing National foreword on correct selection procedure.
EN 13178: 2000	Eye protective equipment - Eye protectors for snowmobile drivers