



Protect your patients and yourself

Gordon Carson discusses the legal ramifications of the sale and supply of protective eyewear and what needs to be borne in mind by the eye care professional when dispensing a safety appliance. Module C16143, one general CET point suitable for optometrists and dispensing opticians

The provision of personal protective equipment (PPE) is often considered as an area which is the responsibility of another person and is only related to those patients who work in a 'hazardous' environment.

One could argue that this is an outdated view. Patients now have easy access to 'industrial' tools and chemicals for use in a domestic environment. A short walk around any DIY warehouse will offer your patients access to a whole range of potential ocular hazards that they can use in their own leisure time.

In addition to this, the clinician has a duty of care to the patient to understand their visual needs and provide an appropriate solution. This responsibility was illustrated by the recent case reported in *Optician* (14.12.09) when a clinician failed in his duty of care to a patient by not recommending the latest contact lenses. This does not mean that you need to supply every patient with PPE but does suggest that you need to fully understand your patient's needs and offer enough information to them in order for them to make an informed choice.

A brief reminder of tort will underpin this concept. Tort is defined as 'a wrongful act or omission for which damages can be obtained...' ¹ All clinicians have a duty of care to their patients and breach of this duty of care together with loss by or injury to the patient will leave the clinician in a difficult position.

In the current economic climate, supplying PPE may also provide an additional revenue stream or offer a 'bolt on' to the payment plans that are used within the wider optometry business in the situation where PPE is not offered by an employer.

Statutes

Legislation relating to the provision of PPE at work has been established for a number of years:

- Health and Safety at Work Act 1974.² This defines the responsibility of an employer and an employee to ensure a



Figure 1 Inappropriate use of PPE

safe working environment

- Personal Protective Equipment at Work Regulations 1992.³ This includes sections on the provision, maintenance and compatibility of personal protective equipment (PPE). This set of regulations addressed all types of PPE from gloves to respirators.

As with all statutory instruments, they can be difficult to interpret and reference to a user friendly version is often helpful. The author would guide readers to the Health and Safety Executive for clear and practical guidance, in particular A short guide to the Personal Protective Equipment at Work Regulations 1992.⁴ This is archived at www.hse.gov.uk/pubns/indg174.pdf

Discussion of all types of PPE is beyond the scope of this article, which will simply look at the provision of prescription protective eyewear.

The reader will be aware that current legislation does not apply to the provision and use of PPE in the domestic environment. There is, therefore, a certain amount of responsibility for the patient to look after their own safety; the legislation can, however, be used as a framework to which clinicians can refer.

Provision of PPE - employers

When provided in a work setting, the responsibility for the provision and

suitability of eye protection is shared between the employer, employee and optometrist. The Health and Safety at Work Act considers that much of the responsibility is with the employer and states that the employer should 'ensure, so far as is reasonably practicable, the health, safety and welfare of all their employees.'

To ensure that the health, safety and welfare of the employees is being addressed, the employer needs to conduct a risk assessment to establish the categories of risk to which the employee will be exposed. From this risk assessment, the employer will be able to address all the possible hazards and the protective measures which need to be in place.

In the first instance, risks must be controlled; PPE is then supplied and used at work wherever there are risks that cannot be adequately controlled in other ways.

A risk assessment will evaluate risks to the eyes and other parts of the body and will normally be carried out by either a health and safety officer in larger companies or a named individual in smaller concerns. The Health and Safety Executive publish a guide entitled *Five Steps to Risk Assessment*⁵ which is archived at www.hse.gov.uk/pubns/indg163.pdf

In considering the provision of PPE by an employer, once the need for eye protection has been established, the employer needs to ensure that the employee is trained to use the appliance correctly; this will include fitting, cleaning and storage.

Supply of PPE will be free of charge as stated in Section 9 of the Health and Safety at Work Act 1974: 'No employer shall levy or permit to be levied on any employee of his any charge in respect of anything done or provided in pursuance of any specific requirements of the relevant statutory provisions.'

The employee's responsibility is simple – wear the PPE. In addition, the employee needs to report any loss or defects in the appliance.

Employees will, on occasion abuse their PPE or when they cannot be



bothered to use an additional item of PPE where required. Figure 1 shows such abuse where a worker has been welding in a pair of Round 38 Glass bifocals. The surface of the lens is spattered with molten metal that has fused with the surface of the lens.

The appropriate PPE for this activity is a full face shield with welding filter.

Provision of PPE - Opticians

When providing PPE that has not been requested by an employer the same rules of common sense apply. The key difference relates to risk assessment. The Health and Safety Executive state in their guide 'Five Steps to Risk Assessment' that 'if...you are confident you understand what's involved, you can do the assessment yourself. You don't have to be a health and safety expert.'

There is, arguably, no one who is better placed to inform and educate patients who require PPE for domestic use than the clinician.

Manufacturers also provide online guidance and a useful place to start is by looking at the JSP Safety Eyewear at www.jsp.co.uk/faqs.aspx?&id=28.⁶ This page outlines 'appropriate' types of PPE for various hazardous tasks.

If a little more detail is required then reference to the same manufacturer will offer tables on chemical splash protection for visors (www.jsp.co.uk/faqs.aspx?&id=30)⁷ and an application guide for different types of PPE (www.jsp.co.uk/faqs.aspx?&id=29).⁸

The clinician's responsibility to the patient is the same whether the spectacles are provided by an employer or as a private transaction. The clinician needs to ask three questions about the PPE that will be supplied.

● Will this appliance provide appropriate protection for the task? For example, protection from a gas hazard will only be provided by goggles. Supplying prescription protective spectacles in this instance would not be appropriate as the gas would leak through the side shields!

● Will this appliance be comfortable? Protective eyewear is not usually worn in isolation. Spectacles are often combined with ear defenders, respirators, face shields and hard hats. If in doubt refer to the Health and Safety Officer or ask the patient to bring in all their personal protective equipment to make sure that it all fits together happily

● Will this appliance be fit for the job?

Protective eyewear is subject to rough treatment. Clinicians should

be especially aware where there are additional hazards such as organic solvents. This would, for instance, exclude polycarbonate as a material for oculars.

Upon collection, the clinician should, as with all other spectacles, offer guidance on use, fitting, cleaning and storage. This is also a requirement of the employer when PPE is provided for work.

Prescription PPE

The key standard used in the supply of prescription PPE (also known as safety spectacles or protective appliance) is the now familiar BS EN 166: 2002 Personal Eye Protection – Specifications.⁹ This document relates to all types of PPE and describes the markings that are found on the whole range of optical PPE.

When referring to PPE, there is also a precise vocabulary which is used to describe protective appliances – there is even a British Standard! In simple terms, if we think about a pair of 'safety spectacles', the lenses are called 'oculars' and the frame is called a 'housing.' This is the nomenclature that will be adopted in this article.¹⁰

As part of the manufacturing process, protective appliances need to be tested to ensure that they meet the required standard. The tests are both optical and non-optical and are defined by the British Standards Institute in two documents:

- BS EN 167: 2002 Personal Eye Protection – Optical test methods
- BS EN 168: 2002 Personal Eye Protection – Non-optical test methods.

Clinicians should note that

prescription PPE will only provide a low degree of protection and this is primarily against impact. Should protection be required beyond this level, than a combination of appliances may be required eg prescription PPE and face shield.

The mechanical strength of an appliance (or impact resistance) according to BS EN 166 may satisfy one of four levels. These are, in ascending order of mechanical strength, referred to as increased robustness, low, medium and high energy impact. This is discussed later in this paper.

Understanding BS EN 166

There are a series of markings on PPE which cover all eventualities. The information reproduced in Table 1 covers the full range of information that may be found on housings and oculars. The markings found on prescription PPE is considerably shorter

Typical ocular markings on prescription PPE

For the provision of prescription PPE the relevant markings will usually be expressed as a short sequence. The protection offered by prescription PPE is essentially against impact.

Manufacturer's ID

This will be a symbol or trademark that will vary dependent upon the manufacturer and will be found on all types of optical PPE.

Optical class

The tolerances applied to the lenses are described as optical class. This applies to both prescription PPE (spectacles) and non-prescription PPE (goggles,

TABLE 1

Table 1 Complete ocular and housing information (after BS EN 166)

Ocular	Housing
Scale number	Manufacturer's identification
Manufacturer's identification	Standard number
Optical class	Field of intended use
Mechanical strength	Resistance to high speed particles
Non adherence of molten metals and penetration of hot solids	Certification mark
Resistance to surface damage by fine particles	Mechanical strength at extremes of temperature
Resistance to fogging	Designed to fit a small head
Enhanced infra-red reflectance	Highest ocular scale number (compatible with the housing)
Protection of high speed particles at extremes of temperature	
Laminated oculars	
Certification mark	



face-shields). Tolerance has three categories – Class 3 will typically be a disposable PPE for occasional rather than prolonged wear.

The inclusion of optical class does not excuse the clinician from their duty of care to check prescription PPE on the focimeter.

Mechanical strength

The impact resistance of PPE is tested using ballistic methods. This is colloquially known as the drop ball test. A steel ball, of given size and velocity, is projected at the appliance to establish the strength. For prescription PPE, the velocity of the ball is shown in Table 3

The data shown in Table 3 relates to ballistic tests for a complete appliance. When related to a more familiar unit, the velocity of the steel ball projected at a low energy impact appliance is equivalent to around 100mph.

Certification mark

There may be a certification mark which in the UK is a kite mark, in Europe may be a DIN number and if manufactured in the USA will usually carry an ANSI number.

The kite mark is a system of quality control operated by the British Standards Institute. Use of this mark on a product is effectively a quality assurance mark similar to the red tractor logo for food. The kite mark, typically is found on both the oculars and the housing.

Figure 3 illustrates the ocular markings on prescription PPE supplied by Norville. This lens has optical class one and offers impact resistance at the level of increased robustness. This is a toughened glass lens in a metal frame.

Typical housing markings on prescription PPE

Manufacturer's identification

As with the oculars, this will be a

TABLE 2
Tolerances - optical class

Optical class	Spherical tolerance (DS)	Cylindrical tolerance (DC)	Prismatic tolerance (Δ)		
			Base Out	Base In	Vertical
1	± 0.06	± 0.06	0.75	0.25	0.25
2	± 0.12	± 0.12	1.00	0.25	0.25
3	+0.12 / -0.25	± 0.25	1.00	0.25	0.25

TABLE 3
Table 3 Mechanical strength - ballistic tests and ocular markings (prescription PPE)

Impact resistance	Projectile diameter (mm)	Mass (grammes)	Projective velocity (ms-1)	Ocular symbol
Increased robustness	6	0.86	12	S
Low energy			45	F



Figure 2 Kite mark and CE mark



Figure 3 Prescription PPE - ocular markings

symbol or trademark that will vary dependent upon the manufacturer.

Standard

BS EN 166 will appear only on the housing. The marking should not appear on the oculars or filters.

CE mark

In addition, there must also be a CE mark on protective eyewear which confirms that the product complies with Medical Devices Regulations. Protective clothing and footwear, eyesight and hearing protectors and breathing apparatus all fall within the scope of the Personal Protective Equipment Directive (Figure 2).

Field of intended use

This describes which types of hazard the PPE will protect you from. In the case of Prescription PPE, this will only be suitable for basic use and has no additional symbols.

Resistance to high speed particles (mechanical strength)

The housing will be marked with the same letters as the ocular, except there will be a hyphen prefix. Under the terms of BS EN 166, appliances that have increased robustness only require the marking on the ocular.

The impact resistance of the ocular and housing should be identical. If the symbols F and -F are not common to

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both the ocular and the housing then it is the lower level which shall be assigned to the complete eye-protector.

Designed to fit a small head

The housing will carry a letter H. This ensures that hobbits and small people are looked after! Figure 4 illustrates the housing markings on prescription PPE supplied by Norville. This shows manufacturer's mark, certification (Kite) mark, standard and CE mark. The CE mark is also found on the zyllo tip.

Materials

There are a range of materials which are typically used for prescription PPE. These are listed below. Clinicians should, however, refer to data supplied by manufacturers for the exact materials and combinations that are available.

Oculars

● Toughened glass

The original lens material which is the default choice for work with organic solvents and other chemicals.

● CR39

A common choice for basic protection.

● Polycarbonate

This is widely used in prescription PPE and can offer low energy impact protection. One issue is that the material

TABLE 4

Mechanical strength - housing markings (prescription PPE)

Impact resistance	Marking
Low energy impact	- F



Figure 4 Prescription PPE - housing markings

can scratch easily and have a low v-value, which may lead to chromatic aberration. In addition, polycarbonate will show poor resistance to organic solvents (eg acetone).

● Trivex

This is a new generation material which is comparable to polycarbonate in terms of impact resistance. In addition, this lens material has enhanced resistance to solvents and improved chromatic aberration vs polycarbonate.

Polycarbonate and Trivex will provide higher impact resistance than toughened glass or CR39. This material

in combination with an appropriate frame will offer low energy impact protection.

Housing

There is a range of materials used for housings that are familiar to the clinician. Common examples are:

- Cellulose acetate
- Metal frames (nickel silver/stainless steel) (Figure 5)
- Polyamide (nylon) (Figure 6).

As a rule of thumb, the clinician should note that metal frames may cause more damage if subject to impact as rim screws may work loose, lenses may come out and the frame or nose pads may cut the face. In addition, metal frames are not suitable for use in either a hot environment, due to heat conduction or where there is the risk of electrocution due to electrical conduction.

Summary

The supply of prescription PPE should be considered as part of the duty of care owed by the clinician to their patient. The provision of prescription PPE is simple and this is well supported by specialist companies such as Norville and Bollé.

This is a specialist area that offers an ideal opportunity to further address patient needs. Provision of PPE helps to enhance both patient satisfaction and retention while creating an additional revenue stream for the business. ●

References

- 1 Oxford Dictionary of Law (Third Edition) Oxford University Press 1994.
- 2 Health and Safety at Work Act HMSO 1974.
- 3 Personal Protective Equipment at Work Regulations 1992, HMSO 1992.
- 4 'A short guide to the Personal Protective Equipment at Work Regulations 1992'



Figure 5 Bollé B706 - Metal frame

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HSE www.hse.gov.uk/pubns/indg163.pdf.

5 'Five Steps to Risk Assessment'

HSE www.hse.gov.uk/pubns/indg163.pdf.

6 Appropriate Eyewear Chart

JSP Limited www.jsp.co.uk/faqs.aspx?id=28.

7 Chemical Splash Protection for Visors

JSP Limited www.jsp.co.uk/faqs.aspx?id=30.

8 Application Guide to Eye Protection

JSP Limited www.jsp.co.uk/faqs.aspx?id=29.

9 BS EN 166: 2002 Personal Eye Protection - Specifications, British Standards Institute 2002.

10 BS EN 165: 2005 Personal eye-protection - Vocabulary, British Standards Institute 2005.

Further reading

● Gordon Carson. *Eye Essentials - Occupational and Environmental Optometry*, Elsevier Oct 2008.

● The Specification of Safety Eyewear D Elks *Optometry In Practice Vol 5* (2004) 33 - 40.

● Gordon Carson. Practice-based dispensing Part 4 - Protective eyewear in practice. *Optician*, May 18 2001, No 5801, Vol 221

● Rachel North. Eye protection and ocular hazards - standards and requirements. *Optometry Today*, November 14 2003.

● Krysten Williams. Toughen up your patients - Get into protective eyewear. *Optometry Today*, September 5 2003.

● DOCET Distance Learning Project Occupational Optometry www.docet.info/index.aspx/pcms/site.distance_learning/00/

Acknowledgements

Thanks to Bollé Safety for the images of frames.

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Figure 6 Bollé URBN - Nylon frame

MULTIPLE-CHOICE QUESTIONS - take part at opticianonline.net

1 What is the current British Standard that relates to the specifications of prescription PPE?

- A Health and Safety at Work Etc Act 1974
- B BS EN 166: 2002 Personal Eye Protection - Specifications
- C Personal Protective Equipment at Work Regulations 1992
- D HSE - Five Steps to Risk Assessment

2 Which ocular material will provide the greatest degree of impact protection?

- A Toughened glass
- B CR39
- C Laminated glass
- D Trivex

3 In which field of intended use will Prescription PPE offer suitable protection?

- A Basic use
- B Droplets or splashes
- C Gas and fine dust particles
- D Molten metal/hot solids

4 Which marking will indicate the impact resistance on the housing of a PPE with increased robustness?

- A -S
- B S
- C -F
- D No marking

5 What level of impact protection will be offered by PPE which has an ocular marking of S and a housing marking of - F?

- A Unsuitable for use
- B Low energy impact
- C Medium energy impact
- D Increased robustness

6 What does the CE mark on PPE indicate?

- A PPE conformity with Medical Device Regulations
- B PPE has been tested according to BS EN 167: 2002
- C PPE is resistance to chemical splashes and short circuit/electric arc
- D Manufactured by Ce-Tru Eyewear, Austin, TX

Successful participation in this module counts as one credit towards the GOC CET scheme administered by Vantage and one towards the Association of Optometrists Ireland's scheme. **The deadline for responses is April 14 2011**



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