



INFORMATION BULLETIN

HIGH VISIBILITY WARNING CLOTHING

BS EN471: 2003 is the current European standard for High Visibility warning clothes for professional use. High Visibility garments to EN471 ensure wearers are visible to drivers, thus enhancing their protection and significantly reducing the risk of death or serious injury from being hit by a moving vehicle.

The requirements of EN471:2003 cover the area of materials used, their colour and retro reflection, the design of the garment, user information and labelling. Each requirement must be certified as compliant by a Notified Body in order for an EN471 2003 certificate to be issued.

Since July 1995 PPE (Personal Protective Equipment) supplied within the EU has been subject to Council Directive 89/686/EEC

It is now illegal to place an item of PPE on the market in a EU state unless it carries a CE mark. High Visibility clothing is classed as Intermediate PPE

Employers have the following Legal Obligations when supplying PPE

- Compliance with community provision on design and manufacture
- How the PPE is used
- Personal use not shared use
- Free of charge
- Training on use
- Information made available
- Inform the worker of the risk
- Used for purpose specified

All Reference to EN471 in this document relates to BS EN471:2003.

However although EN471:2003 replaces EN471:1994, garments certified to the earlier Standard do and will continue to meet EC Directive 89/686.

Garment Design

There are three classes of garments; Classes 1,2 and 3. Class 3 offers the greatest level of protection and Class 1 the lowest. The amount of Reflective and Background material used is related directly to the Class of the garment. The material required for each Class is indicated on the diagram overleaf. EN471 2003 covers specific design requirements on the positioning of the retro reflective and background materials.

Retro Reflective material

Night-time visibility is achieved through the use of retro reflective materials, which make a brilliant reflection in vehicle headlights. The incident light from the headlights is reflected back in the same direction, making the wearer instantly visible to the driver.

Retroreflective materials use two different technologies for reflecting light; Glass Bead Technology and Prismatic Technology. Both types of materials have their own advantages in application and offer conforming levels of reflection. The retroreflective material can be applied onto a garment either by heat application, ultrasonic welding or sewing. The minimum width of reflective tape on an EN471 garment is 50 mm. All retroreflective material in the UK must meet the highest brightness category, in level 2, to EN471 in order to comply with the appropriate highways legislation and directives. There are also reflective materials that have both fluorescent and reflective properties, these are known as 'combined performance materials' (CPM)

EN471 compliant materials need to meet specific brightness performance criteria both 'as new' and after laundry with strict testing carried out to simulate abrasion, flexing, folding at cold temperatures, temperature variation, washing, dry cleaning and the influence of rainfall.

Wearers and purchasers need to ensure that the reflective material used is from a known, reputable supplier to ensure full compliance with EN471 both when new and through the working life of the garment. Normal wear and tear, washing and storage should not compromise the reflective performance of the material.

Background Material

These materials are generally composed of 100% Polyester or Polyester-rich fabrics in the following colours. HV Yellow, HV Orange and HV Red. The colours are designed to provide daytime contrast (conspicuity) and the choice will depend on, amongst other factors; national preference, environment for use e.g. rural or urban, emergency personnel visual differentiation.

Fabric types can include lightweight polyester knits, fleeces and woven fabrics of varying weights, as long as they meet the performance standard of EN471:2003, EN343:2003 and EN340: 2003.

Waterproof fabrics are generally referred to as foul weather protective fabrics. Testing under the performance standard EN343 (protection against rain) specifically covers water penetration and water vapour resistance (breathability).

The waterproof layer is generally provided by a coating applied directly or transfer coated to the fabric or by a membrane (thin film) adhesive laminated to the textile layer using a number of different methods.

Breathability can be defined as the movement of body perspiration (moisture) away from the body to improve wearer comfort; this is achieved by a moisture

diffusion process through the fabric layers.

Breathable membranes or coatings fall into two basic categories; hydrophilic or micro porous. Hydrophilic - transmits perspiration in the form of water molecules through the hydrophilic film from inside the garment to outside. Microporous - microscopic pores in the film are small enough to allow moisture vapour (perspiration) to pass in one direction but too small for water droplets (rain) to pass in the other direction.

Foul weather performance is enhanced by the application of a water/oil repellent fluorocarbon treatment to the outer face fabric usually referred to as DWR (durable water repellent).

Decoration

Most companies - regardless of size - now issue items of work wear decorated with their corporate logo. High Visibility garments are no exception.

There are a myriad of different branding options, including embroidery, screen printing, heat applied transfers and sew-on badges. Fully reflective logo options are also widely available, and often utilise the same reflective materials as the tapes on EN471 garments.

Following the application of a logo and to remain in compliance with EN471, the exposed area of background material remaining must not be less than the minimum specified in the standard.

Many garments are produced with this in mind and include additional background material to allow for branding, but the amount will vary from supplier to supplier and garment to garment and are therefore worth checking.

Ensure also that the corporate logo is applied to the fluorescent background material only. An EN471 garment is compromised if the logo has been applied in such a way that it encroaches onto the reflective tape.

Marking, Labels and Information for users

Marks and labelling on each garment must show specific information as defined in EN340 - Protective Clothing - General Requirements. These include the manufacturer's name or method of identification, product code, size designation, relevant pictograms and level of performance (see over for more details)

Information for use should be supplied in the official language of the country of sale. The information given should include fitting; necessary warnings of misuse; limitations on use; storage - how to store and maintain correctly; maintenance and cleaning - how to clean or decontaminate correctly and the number of cleaning processes without impairment of its performance levels.

Laundry and Aftercare

In the UK, health and safety regulations require that "every employer shall ensure that any personal protective equipment provided to his employees is maintained (including replaced or cleaned as appropriate) in an efficient state, in an efficient working order and in good repair".

Materials must maintain optimum performance levels throughout the life cycle of the garment. Garments must state the maximum number of care cycles to which the garment has been certified. Any garment that becomes stained or damaged beyond repair should be discarded and replaced.

GARMENTS

RETRO REFLECTIVE MATERIAL

The certificate should show the following test results :

- 6.1 Retroreflective performance requirements of new material
- 6.2 Retroreflective performance requirements after test exposure to abrasion, flexing, folding at cold temperatures, temperature variation, washing and dry cleaning (according to care label) and influence of rainfall.

Examples of :

- A** COMBINED PERFORMANCE TAPE
- B** PRISMATIC TAPE
- C** GLASS BEAD TAPE

BACKGROUND FABRIC

Certification to EN471 should show where appropriate:-

- 5.1 Initial Colour
- 5.2 Colour after xenon test (fading)
 - 5.3.1 Colour fastness to rubbing
 - 5.3.2 Colour fastness to perspiration
 - 5.3.3 Colour fastness when laundered
- 5.4 Dimensional change
 - 5.5.1 Tensile strength of woven material
 - 5.5.2 Burst strength of knitted material
 - 5.5.3 Tensile strength and tear resistance of coated fabrics and laminates
- 5.6 Water vapour resistance of coated fabrics and laminates



Garment for illustrative purposes only.

CLASSIFICATION AND DESIGN

Minimum required areas of visible material in m²

| | Class 3 | Class 2 | Class 1 |
|---------------------------|---------|---------|---------|
| Background Material | 0.80 | 0.50 | 0.14 |
| Retroreflective Material | 0.20 | 0.13 | 0.10 |
| Combined Performance Tape | - | - | 0.20 |

The proportions of the background material shall be 50% on the front and back of the garment ± 10%.

GARMENT CARE LABEL

On a Garment label you should find the following information

- CE mark
- The manufacturers name or other method of identification.
- The product code or name.
- The garment size along with a sizing pictogram (fig. 1).
- Wash care instructions that match the EN471 Certificate for reflective and Background material.
- The EN471 Pictogram showing the Class of the garment (fig.2).



fig.1

Sizing Pictogram shows the measurements of the person wearing the garment not the measurement of the garment.



fig.2

EN471 Pictogram shows the classification of the garment (fig.2 "X") and the classification of the reflective tape (fig.2 "Y")

REMA

The Retroreflective Equipment Manufacturers Association

For further information contact your supplier or visit our REMA website
www.rema.org.uk