SATRA SPOTLIGHT

High-visibility and visibility products

Outlining the types of visibility products used in different risk-related situations.

Making a person conspicuous, recognisable as a human form, to be seen at a distance, and, perhaps, standing out against a complicated background, is the purpose of high-visibility clothing. The EN ISO 20471 standard defines the performance and assessment of such garments.

The use of personal protective equipment (PPE) increasingly has much emphasis placed on the nature of the risk environment in which a product is to be used. High-visibility clothing is intended to be worn in environments that are associated with high risk. An example of a high-risk environment is one in which vehicular traffic is moving at speed, and where a person within that environment is required to carry out activities that do not permit him or her to focus on the moving traffic. A road worker and an emergency response worker are examples of such a person.

There are also products which enhance visibility now being viewed as usable under circumstances defined as ‘medium risk’ situations. These visibility products are designed to be worn or held by users. They may be considered suitable for ‘passive’ users under conditions where traffic is moving at no more than 15 km/h or ‘active’ users where traffic is moving at no more than 60 km/h. Cyclists and pedestrians are examples of active users, as they can apply their attention to the traffic.

High-visibility clothing is intended to make a wearer conspicuous in any light conditions when viewed by operators of vehicles or other mechanised equipment during daylight conditions, and under illumination of headlights in the dark.

Considering the risk that is to be countered by using high-visibility clothing or enhanced visibility products is important, and Annex A of the EN ISO 20471 standard may be used to guide those procuring products that are most suitable to address particular risk situations.

Where there is a requirement to make a worker conspicuous, most employers choose to provide garments that are compliant with EN ISO 20471, even though workers may not be involved in high risk situations. Choosing such garments allows a procurement body or a safety manager to have confidence that a workforce is protected under a wide range of conditions. This assures that a person has the best possible protection, whether working on a highway, an adjacent pathway or embankment, or in a storage facility, loading bay or dock.

Non-professional high-visibility garments allow scope for fashion consideration

Although high-visibility clothing is the only type of PPE that protects in high-risk situations, other garment types are now being considered as suitable for medium-risk situations. There are also accessories that are used as 'aids to conspicuity', although such visibility accessories are only used to make a person conspicuous at night.

Various standards

The safety standards used for product assessment are as follows:

- EN ISO 20471:2013+A1:2016 – 'High visibility clothing – Test methods and requirements'
- EN 1150:1999 – 'Protective clothing – Visibility clothing for non-professional use – Test methods and requirements'
- EN 13356:2001 – 'Visibility accessories for non-professional use – Test methods and requirements'.

New trends

Although the EN 1150 standard makes reference to high visibility, and although it and EN 13356 reference products for non-professional use, the current thinking on conspicuity is that risk should be addressed rather than trying to define a type of use. Revisions of the EN 1150 and EN 13356 standards are moving into line with this concept.

Common factors

All the product types mentioned above incorporate the use of retro-reflective materials that are visible in low light conditions when a directional light is shone onto them. Garments are also made conspicuous in daylight by having fluorescent materials incorporated into them.

Colour

Different coloured fluorescent materials are allowed for use by each of the clothing standards. Garments conforming to EN ISO 20471 must be made with yellow, orange-red or red fluorescent colours. Garments meeting the requirements of EN 1150 may be manufactured using one or combinations of up to eight fluorescent colours. The permitted colours are defined according to their chromaticity (colour) and luminance (brightness). The chromaticity of a colour must fall within a colour space specified in the individual standards. Materials that are to be used in garments must be capable of remaining compliant with colour specifications after being exposed in a xenon artificial light-fading test. Similarly, colour retention requirements must be met when materials are subjected to washing trials for those garments that can be laundered.

Retro-reflectance

Retro-reflective materials used in garments must be assessed to determine their specific retro-reflection. This involves using a 'gonio-photometer' system to determine levels of light reflectance from the surface of a material. The measurement of light return is conducted on materials in their manufactured state (as new), and after they have been subjected to various pre-treatments. The pre-treatments applied to retro-reflective materials, include temperature cycling, abrasion, folding at extreme cold temperature, flexing, and cleaning (washing and/or dry cleaning). Cleaning pre-treatments are often carried out for 25 to 50 cycles, and they are the most exacting forms of pre-treatment when it comes to assessing the durability of materials. Additionally, the retro-reflectance of materials is assessed under a simulated rainfall. Accessories, which are measured to determine their luminous intensity, are also subjected to the various pre-treatments.

Visible area

All three standards include requirements for the minimum amount of visibility materials incorporated into their structure. The clothing standards also have requirements for how visibility materials are placed around the body to achieve effective levels of conspicuity.

Accessories

The EN 13356 standard defines different types of accessories that may be used to make their users conspicuous at night under illumination. Accessories do not confer day-time conspicuity on an end user. Accessory types may be cord suspended, free-hanging, items which have a visibility dependent on the utility of movement or, alternatively, sleeve or wrist bands (so-called 'slap-wraps'). Retro-reflective badges may also be used, providing they are judiciously placed around the body.

Clothing

Unlike accessories, clothing requires a more extensive assessment of suitability for use. In addition to colour and retro-reflectivity measurements and visible area assessments, colour fastness and physical tests are conducted on materials used in a construction. Materials must also be assessed to determine correct design, physiological properties, and health and hygiene issues. However, the extent to which these are assessed depends upon whether the garments are for high-visibility (high-risk use) or another application.

Garments that comply with EN 1150 have less strict requirements relating to their design. Although a freer design is allowed by the standard, garments best protect an end user by using background and retro-reflective materials in such a way that all-round conspicuity is maintained.

How can we help?

SATRA has the facilities to test all component materials used in clothing and accessories in order to assess the design of products, as well as to evaluate the use of finished PPE articles. As an EU Notified Body and UK Approved Body, SATRA can also issue type-examination (CE mark and UKCA mark approval) certificates. Please email ppe@satra.com for further information.