

High visibility clothing for use around moving vehicles

Information sheet

October 2022

Introduction

Serious injuries or fatalities occur in workplaces because people are struck by vehicles such as cars, vans, trucks or buses or mobile work equipment such as industrial trucks (e.g. forklifts or telehandlers). The most effective way to reduce the risk of a person being hit by moving vehicles is to have a system of work which effectively keeps pedestrians and vehicles apart.

This typically involves keeping people and vehicles physically separate from one another as much as possible. **Where people and vehicles cannot be physically separated, other measures will need to be put in place. Where people must work in areas with moving vehicles or have to work close to moving vehicles, the risk may be further reduced by using high visibility clothing to signal their presence.**

High visibility clothing is a vital and necessary requirement in any workplace where a significant proportion of the work occurs near, in, on and around moving vehicles. It is also of critical importance for people working at night or in low-light conditions.

High visibility clothing should be an important element of any safe system to minimise the risk of being hit by vehicles.

High visibility clothing is defined as warning clothing intended to provide improved conspicuity in situations where the risk of not being seen is high.

The main purpose of high visibility clothing is to make the wearer stand out from the background so they can be seen more easily, particularly by drivers of vehicles and mobile work equipment, in any light or weather conditions. This reduces the risk of incidents occurring in potentially dangerous situations.



Examples of risks arising from the movement of vehicles include:

Pedestrians and drivers in the vicinity of vehicle loading and unloading operations

Pedestrians crossing a transport yard

Drivers being hit by passing vehicles in the case of a breakdown, if they need to exit from the vehicle on the road

Drivers simply getting out of their vehicle in an area where there are other moving vehicles, such as a transport yard

What the law requires

An employer must make an assessment of the hazards in the workplace in order to identify the correct type of high visibility clothing to be provided and to make sure that it is appropriate to the risk(s) present in the workplace.

The type and level of risk must be assessed so that the performance requirements of the high visibility clothing can be determined.

High visibility clothing is personal protective equipment (PPE) and should comply with the requirements of the European Union (Personal Protective Equipment) Regulations 2018. These regulations require high visibility PPE to be:

- “capable of signalling the user’s presence visually” and
- “CE marked”, which signifies that it satisfies certain essential health and safety requirements.

The General Application Regulations 2007¹, as amended, refers to the requirement for ‘Reflective Clothing’ in work situations “where the employees must be clearly visible”.



**HELP YOURSELF
BE SEEN**

As is the case with all forms of personal protective equipment, the law obliges employers to provide any high visibility clothing needed for the job **free of charge** to any employees who may be exposed to significant risks to their safety. In addition, they should have a safety management system to make sure that:

- high visibility clothing is checked for suitability before being given to employees,
- it is maintained in a clean state and in good working order,
- adequate information, instruction and training is provided so that employees can use high visibility clothing correctly (This should include an explanation of the risks, why the clothing is needed, how and when it should be worn and how to check, maintain and store it.),
- employees are monitored and supervised to make sure that they wear the clothing correctly and whenever it is needed, and
- storage facilities are provided for clothing when not in use.

Employees have a duty to participate in any training or instruction provided and to use the high visibility clothing properly whenever it is required to be used. Garments are only compliant if worn correctly. This means, for example, that a vest or jacket must be worn closed so that it achieves 360° visibility. Users should look after garments carefully and report any defects or damage immediately.



The standard – EN ISO 20471

I.S. EN ISO 20471:2013 & A1:2016 is an international standard for the safety requirements and test methods of high visibility clothing. It specifies requirements for “high visibility clothing which is capable of visually signalling the user’s presence”.

It states that high visibility clothing is intended to provide conspicuity of the wearer in any light condition when viewed by operators of vehicles or other mechanised equipment during daylight conditions and under illumination of headlights in the dark.

Conspicuity is the property that makes an object readily attract visual attention. This is a particularly important feature in complex environments which have visually competing objects.

The standard sets out performance requirements for **colour** and **retroreflection** as well as for the **minimum areas** and for **the placement of the materials** in protective clothing. It categorises high visibility garments into three classes; Class 1, Class 2, and Class 3 (see below). All garments, such as vests, t-shirts, polo shirts, trousers and jackets, etc., should be labelled with the EN ISO 20471 icon and accompanied by the appropriate class number.

This is an example of how the label would look for a Class 2 garment:



Performance requirements for high visibility clothing

EN ISO 20471 sets out design and performance requirements of each element of a garment. There are usually **three main components**:

1. The fluorescent background material

This boosts visibility during daylight hours and can also increase visibility at night.

There are 3 colours approved in the standard, – Yellow, Orange-Red and Red.

2. The retroreflective strips

These are designed to enhance visibility during the darker hours of the day. Reflective strips require a light source to work and create retroreflection. They are essential for those working at night.

3. The contrast material

Some high visibility clothing is designed with darker-coloured parts that are less sensitive to dirt than the fluorescent material and reflective strips, without which the functionality would diminish. The areas covered with the contrast fabric tend to be where dirt is most likely to build up – for example, the sleeve ends and across the abdomen on high visibility fleeces and jackets, and the ankle and knee sections of high visibility work trousers and waterproof trousers.

1. S.I. 229 of 2007 Safety, Health and Welfare at Work (General Application) Regulations 2007; Chapter 3 – Personal Protective Equipment

Classes of high visibility clothing

Three classes of garment are defined based on three different minimum areas of retroreflective, fluorescent and/or combined performance materials.

Minimum required areas of visible material in m ²			
Material	Class 1	Class 2	Class 3
Background fluorescent material	0.14	0.50	0.80
Retroreflective material	0.10	0.13	0.20
Combined performance material	n.a.	n.a.	0.20

Each of these classes will provide a different level of conspicuity, class 3 being the class that provides the highest degree of conspicuity against most backgrounds found in urban and rural situations in daylight and in night-time.

High Visibility Class 1: The lowest level of visibility

- Items that commonly meet class 1 include high visibility trousers when worn separately from other high visibility garments.

High Visibility Class 2: The intermediate level of visibility

- Items that commonly meet class 2 include high visibility sleeveless vests.

High Visibility Class 3: The highest level of visibility

- Items that commonly meet class 3 are high visibility jackets and sleeved high visibility vests.

Class 3 can be achieved in 2 ways:

1. By wearing an individual garment rated as class 3, or
2. By wearing jointly certified products that make up class 3 based on the total area of fluorescent and reflective material

Products that are jointly certified can be identified by looking on the inner label where the joint article will be stated.

To achieve Class 3, garments must cover the torso and shall have as a minimum either sleeves with retroreflective bands or full-length trouser legs with retroreflective bands, if not both.

Working close to moving vehicles is a high-risk situation, so it is good practice to wear the highest class of high visibility clothing available to increase the likelihood of being seen.

Choosing high visibility clothing

- The selection of high visibility clothing should be based on a risk assessment of the hazards in the workplace to identify the correct type to be provided and to make sure that it is appropriate to the risk. The level of risk must be assessed so that the performance required of the high visibility clothing can be determined. Factors to be considered include the volume and speed of moving vehicles, size and sightlines of the vehicles, visibility, lighting conditions, weather conditions and duration of exposure.
- The employer, in discussion with the user, should choose a suitable class and design of clothing based on the risk assessment of the places and situations where high visibility clothing protection is required.
- The choice of clothing should take into account ambient and artificial lighting conditions at the workplace, both during the day and at night. For example, yellow might be preferable in indoor or gloomier conditions where orange may not be as visible.
- To be effective the clothing should be of a colour that will allow the wearer to stand out against the surroundings found in the working environment. For example, if it is outdoors in an area with a lot of greenery, yellow will blend in so orange garments might be preferable. Orange is specifically required by RIS-3279-TOM, which is a high visibility clothing standard, based on EN ISO 20471:2013, that applies to the rail industry in the UK.
- The kind of activity the wearer will be doing should be carefully considered. For example, if the work activity involves carrying objects that would obscure part of an upper body garment, the use of a lower body garment would increase visibility; similarly, if the work involves the worker bending over. If working in dirty environments, garments may need to be easy to clean.
- It is likely that high visibility clothing will be used throughout a whole working day, so it should be comfortable, fit the wearer properly and not cause any additional thermal load for the user. It should always be suitable for the work and cause the minimum of restriction in the wearer's movement. Having a range of high visibility garments that workers can layer also means individuals can more easily change what they wear depending on changing weather, their work activity and personal needs.

- With so many different garments to choose from, it is a good idea to ask workers about their preferences. Some workers may have personal issues, such as a medical condition, that must be considered. Involving workers in choosing their high visibility clothing makes it more likely that they will wear it.

It is a good idea to incorporate high-visibility clothing into the regular wear of workers who regularly operate in the vicinity of moving vehicles.

Examples of high visibility clothing for regular wear



- High visibility clothing may be required to provide weather protection in adverse weather conditions such as low temperatures, rain, fog, and snow, but it should also provide protection in terms of increasing visibility in such conditions.
- Corporate branding or personalising high visibility clothing needs to be given careful consideration to make sure the clothing remains compliant. Logos or typography should not be allowed to cover part of the fluorescent background to an extent that it affects the minimum surface area calculation.

Maintenance and care

It is important to maintain high visibility clothing in clean and good working condition and to check that its performance isn't compromised over time. The lifetime of a garment will depend on how it is used, stored, and washed. Two key issues to look for are physical damage, especially to reflective strips, and general cleanliness.

Care instructions should be followed correctly. The performance requirements in the standard sets out the maximum number of washes and this should be marked on the garment's permanent label. Most high visibility clothing products have a maximum life of 25 washes unless stated otherwise on the label. This means that there is a balance to be struck, because while over-cleaning can decrease the visual performance, not washing regularly enough can also impact the visual performance, as stains and dirt will also reduce the item's visibility.

Employers should put a system in place to make sure that high visibility clothing continues to be capable of performing to its certified class and is replaced when this is no longer the case.

Biomotion cues explained

Biomotion cues optimise the attraction of visual attention

A person can be seen more easily, through the recognition of human movement, if they are wearing high-visibility clothing consisting of upper garments with sleeves combined with lower garments, both incorporating retroreflective bands on the limbs.

It goes on to say that "If the user is limited to a single high visibility garment on the torso, a jacket with bands on the sleeves offers superior performance to a sleeveless vest. The use of trousers alone, even if they include the minimum areas of high visibility materials, is generally not recognized good practice".

Annex D of EN ISO 20471 states,

“It has been demonstrated that it is useful for drivers to recognize a distant object as a human being through motion cues. Retroreflective material should be present as bands on the ends of the limbs in order to best convey human activity. This concept is sometimes referred to as the biomotion effect.”

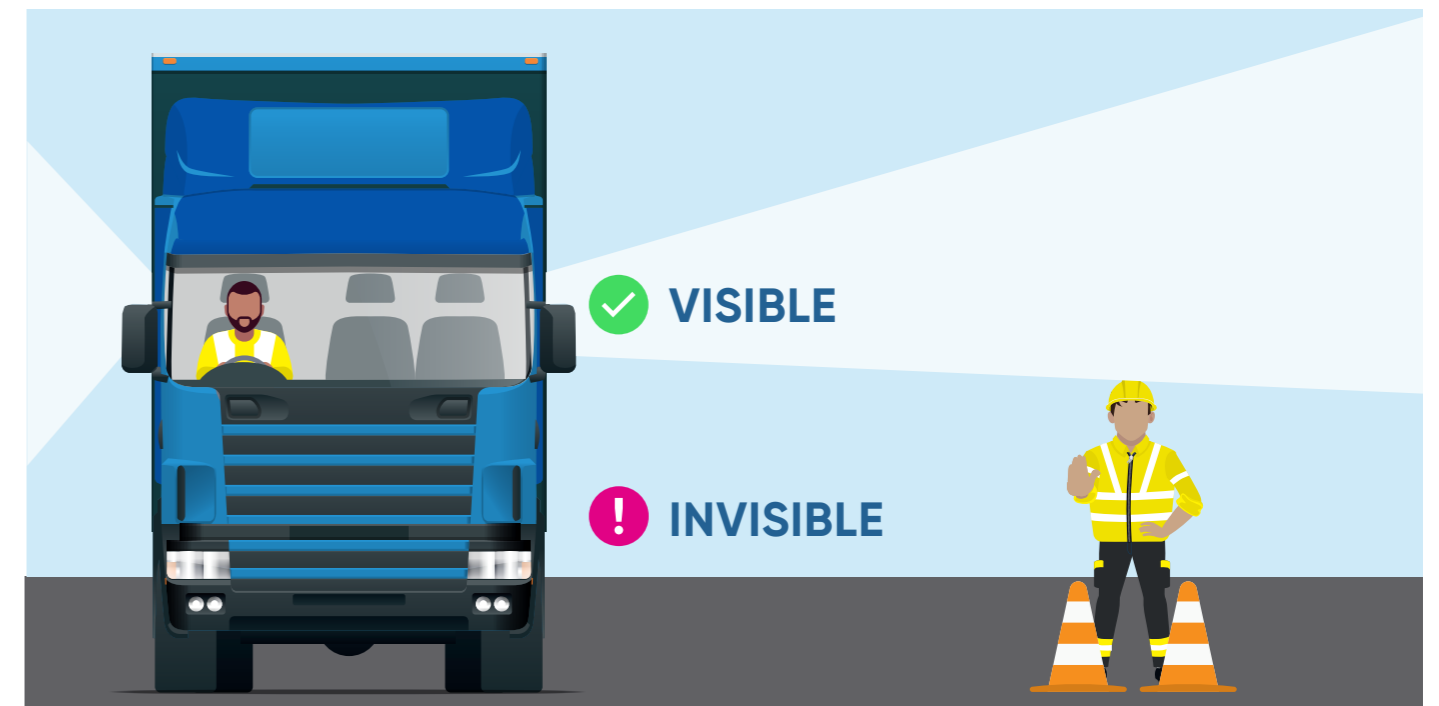
Driver blind spots

It is very important to be mindful that wearing conspicuity-enhancing high visibility clothing does not guarantee that the wearer will be visible to drivers under all conditions. Users should be aware that changes in the environment, weather, location, or objects around them can affect how easily they can be seen.

One situation where **a person will not be seen by the driver of a vehicle**, regardless of how much high visibility clothing they are wearing, is **if they are in the driver's blind spot**.

Blind spots are areas around vehicles, particularly larger vehicles of all kinds and shapes, that cannot be seen by the driver.

WARNING
BE AWARE OF DRIVER
BLIND SPOTS



It is vitally important to provide training and information to all pedestrians in workplaces where vehicles operate so that they are aware of drivers' restricted line of vision and UNDERSTAND THE HAZARD OF VEHICLE BLIND SPOTS.

Useful Information

1. Health and Safety Authority, Personal Protective Equipment - Frequently Asked Questions
https://www.hsa.ie/eng/topics/personal_protective_equipment_-_ppe/ppes_faqs/
2. Health and Safety Authority, Vehicles at work
https://www.hsa.ie/eng/vehicles_at_work/

Further Information and Guidance:

Visit our website at www.hsa.ie, telephone our contact centre on **0818 289 389** or email contactus@hsa.ie

Use BeSMART, our free online risk assessment tool at www.besmart.ie

Check out our range of free online courses at www.hslearning

The logo for the Health and Safety Authority (HSA) features the letters 'HSA' in a large, serif font. The 'H' and 'S' are dark blue, while the 'A' is orange.

An tÚdarás Sláinte agus Sábháilteachta
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