

UNDERSTAND EN 471 STANDARD

Status: European standard - product specification (high visibility).

Scope: This standard specifies the requirements for protective clothing aiming to signal the presence of the wearer visually in daylight as well as under illumination by headlights of cars. These requirements cover the area of materials used, their colour and retroreflection.

Comments:

- *fluorescent material: material that re-emits optical radiation at wavelengths longer than absorbed; this material is considered to be the background material of the high visibility clothing*
- *retroreflective material: material that reflects the light emitted by a light source back to that source*
- *combined material: material with combined fluorescent and retroreflective properties*

Contents

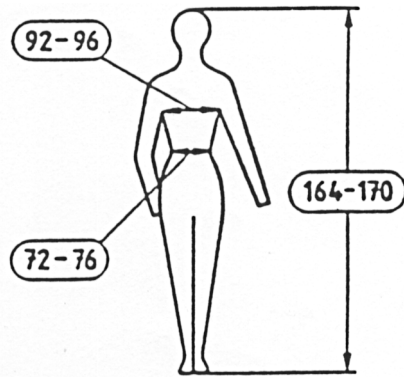
Requirement	<i>Parameter</i>	<i>Classification</i>
	Surface of back-ground, retro-reflective and combined material	<p>High visibility clothing is categorized in 3 classes on basis of the quantity of materials used (X):</p> <ul style="list-style-type: none"> - class 1: <ul style="list-style-type: none"> background material: > 0.14 m² retroreflective material: > 0.10 m² or combined material: > 0.20 m² - class 2: <ul style="list-style-type: none"> background material: > 0.5 m² retroreflective material: > 0.13 m² - class 3: <ul style="list-style-type: none"> background material: > 0.8 m² retroreflective material: > 0.2 m²

	High visibility clothing is categorized in 2 classes based on the quality of the used retroreflective material (Y).
<p>Clothing design</p> <p><i>Comment: The design requirements of EN 471 are very complicated; see the full text of the standard for details</i></p>	<ul style="list-style-type: none"> - the background material shall encircle the torso, sleeves and trouser legs horizontally, i.e. this material shall be used for both front and back - retroreflective bands shall be at least 50 mm large (30 mm for safety harnesses) - closure systems must not interrupt the background or retroreflective material by more than 50 mm - number and position of retroreflective bands: <ul style="list-style-type: none"> - <u>coveralls</u>: 2 horizontal bands around the torso; 2 bands on the sleeves on the same height as on the torso; 2 bands on the trouser legs - <u>jackets, waistcoats, tabards</u>: <ul style="list-style-type: none"> - 2 horizontal bands around the torso and around the sleeves at the same height - <u>or</u> 2 horizontal bands around the torso and around the sleeves at the same height <u>plus</u> a vertical band over each shoulder, reaching to the uppermost torso band - <u>or</u> 1 horizontal band around the torso <u>plus</u> a vertical band over each shoulder; 2 horizontal bands around the sleeves - <u>bib and brace trousers and waistband trousers</u>: 2 horizontal bands around the trouser legs

Colour	<p>The chromaticity and the luminance factor are specified for the following 3 colours:</p> <ul style="list-style-type: none"> - fluorescent yellow - fluorescent orange-red - fluorescent red <p>No other colours are allowed as background material. The requirement shall also be met after an artificial weathering test (UV radiation).</p> <p>Colour fastness shall also be guaranteed against rubbing, perspiration, washing, dry cleaning, hot pressing and bleaching.</p>
Other requirements for the background material	<ul style="list-style-type: none"> - dimensional stability (< 3 % shrinkage) - mechanical strength - impermeability to water (ENV 343) - water vapour permeability (ENV 343)
Requirements for retroreflective material	<ul style="list-style-type: none"> - new materials shall meet minimum reflectance criteria (these criteria are different for retroreflective materials and for combined materials; retroreflective materials are divided into 2 quality classes) - minimum criteria are also set after a number of test exposures: abrasion, flexing, folding at low temperature, temperature variation, washing, dry cleaning, influence of rainfall

Size designation

- a pictogram is used

**Marking**

- on a clearly visible and legible label resisting to the foreseeable number of cleaning cycles

- contents

- the CE marking (as appropriate for PPE category II)
- cleaning and maintenance symbols
- name or logo of the manufacturer
- type of the garment (manufacturer's reference)
- size designation (pictogram)
- reference to EN 471
- pictogram "high visibility jacket"
- classes:

- 3 classes based on area of material (X)

- 2 classes based on of reflective material quality(Y)

Information for the user

- to be provided by the manufacturer in at least the official language(s) of the country of use; precise and understandable for the user

- contents

- name and address of manufacturer or his authorized representative
- name and reference of the product
- reference to the relevant product standard
- explanation of pictograms and of the performance levels obtained
- instructions for use, e.g. safety checks before use, specific area of use and limitations of use (time of wear in specific conditions), storage and maintenance instructions, instructions for cleaning and disinfection, the maximum of cleaning cycles without impairment of the performance level etc.
- packaging instructions for transport

pictogram

