

Séance 1-Signaling textiles: The high-visibility waistcoat

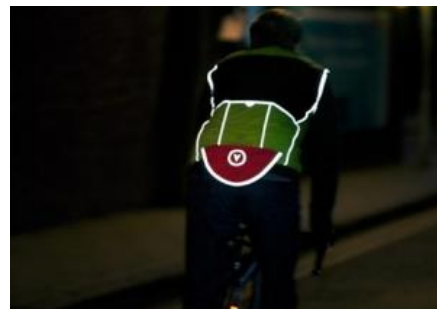
I- Problematic and solutions

1- Describe the situation, what's the problem?

→ A cyclist/ At night/ very dark/ invisible/ not seen so not protected/ dangerous because exposed to road accidents



2- Compare with the following situations: What's the difference? In what way is it safer?



- Two cyclists BUT equipped with a safety jacket = more visible, so safer
- Why? High visibility reflective strips / stripes on clothing and bag, easily discernible in the dark / at night.

3- What is the purpose of high-visibility clothing?

It is worn to alert drivers and other vehicle operators of a person's presence, especially in low light and dark conditions. High-visibility can also be worn to increase the visibility of the wearer in situations where part or all of the wearer's body are not seen.

4- Have a look at this document: Analyse and comment the two different cases:

a- without the high-visibility garment / b - with the high-visibility garment



- Who can be concerned?

Cyclists, railway and highway workers, airport workers, emergency workers (firefighters, paramedics, policemen ...), fishermen...

- List the different types of safety gear:

waistcoats / vests, jackets , shorts, pants, overalls, tee shirts, polo shirts , raingear / shoes (sports, working) / accessories: gloves, glasses, headwear / headgear (cap, hat, helmet)

II- Different types of safety materials:

1-Practise:

a – Read the two definitions and list the technical vocabulary

Fluorescent material	Retro reflective material
Uses <u>invisible ultraviolet light</u> (UV) from sunlight, and through <u>special pigments</u> , sends it back to the viewer as more visible light. This material only functions when there is a <u>source of natural sunlight</u> . This property offers <u>daytime visibility enhancement</u> not present with other colours.	Created to <u>return light in the direction of the light's source</u> . This property will let a driver to see the <u>light being reflected from the retro reflective material</u> on a person's garment as long as the person is standing in the <u>light's beam</u> .

b-You are given two samples of fabric. Study them, using your cellphone torch to find whether they are different. Note down your findings

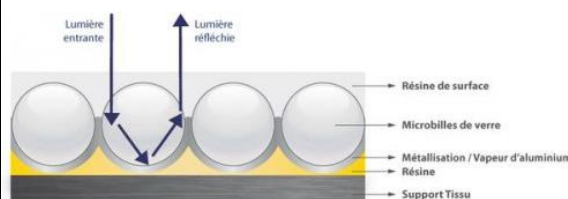
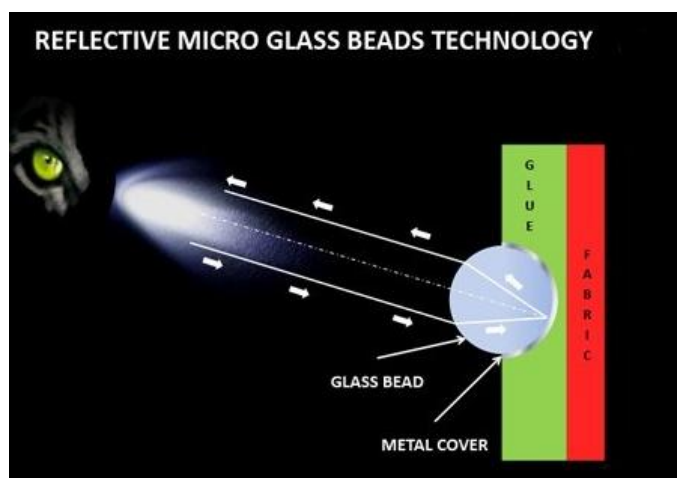
c- Match each sample with its definition

d- Report to the class.

2- The different technologies of retroreflective materials

a- Group work: The class is split in 2 groups. Each group studies one technology and explains it to the other group using a precise technical vocabulary

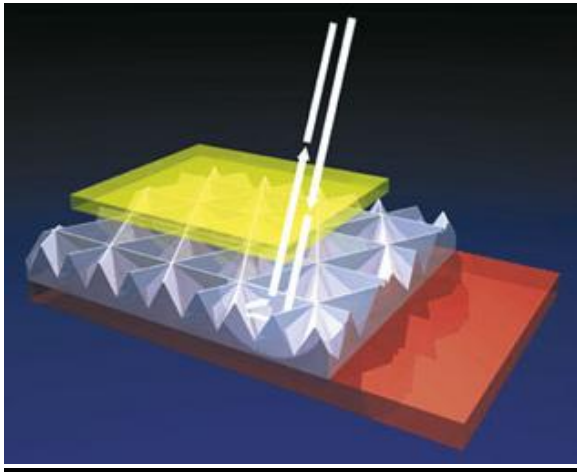
Group 1: - The micro glass beads technology : the oldest technique



Some tiny / microscopic glass beads are glued to the fabric. The spheres' surface that is glued to the fabric is half- covered with metal. When a light is directed toward the fabric, the beads reflect and return it in the direction of the light source. Wide angle, like a flood lamp (returns approximately 30 % of the light to its source) – an affordable because easy-to-make technology

Proprieties of this retroreflective fabric: soft, supple, comfortable to wear . So this technology can be used on an entire piece of clothing / CAD cuttable (easy to use for letters or other designs)

Group 2: - The micro prismatic technology : the most recent technique



The fabric is equipped with tiny prisms glued to its surface. Each prism has 3 surfaces (hard angle mirrors) on which the light strikes before being returned to its source. So, the reflective surface is more important than the glass beads , it is more efficient, the beam is brighter and extends much further The beam is also tighter, like a targeted spot light so the light is more focused. (returns 80 % of the light to the source) but more expensive

Proprieties: more resistant = hardwearing / stiffer than the glass bead technology and heavier : better for elements of garments.

III- The different classes of safety apparels:

1- Read the definitions corresponding to the different classes

There are specific standards that impose levels of retro reflective performance,. There are **three classes** of garments based on body coverage. Each class covers the torso (waist to neck) and/or limbs according to the minimum body coverage areas

- **Class 1** provides the lowest recognized coverage and good visibility.
- **Class 2** provides moderate body coverage and superior visibility.
- **Class 3** provides the greatest body coverage and visibility under poor light conditions and at great distance.

2- Look at these safety garments and classify them according to their level of retroreflective performance in the chart below – Add other examples:



Baudrier
Classe 1



Blouson
Classe 2



Blouson
Classe 3



Combinaison
Classe 3

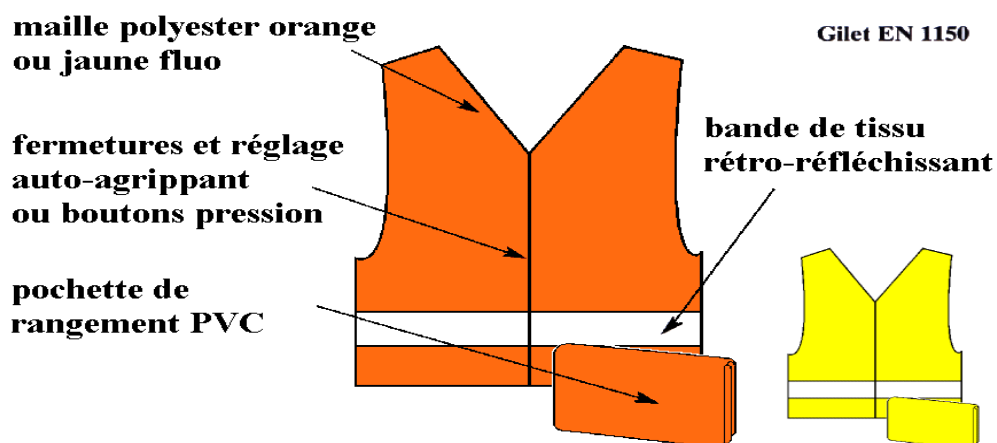


Pantalon + veste
Classe 3

	Matière fluorescente (rouge, jaune ou orange-rouge)	Bandes rétro-réfléchissantes	Exemples
Classe 1	0.14 m ²	0.10 m ²	Small items : gloves, caps, glasses, headband, wristband / pants / harnesses
Classe 2	0.50 m ²	0.13 m ²	Waistcoats, overalls, vests with reflective stripes on the front or back but not on the sleeves
Classe 3	0.8 m ²	0.20 m ²	Parkas, long sleeve jacket, full overalls , suits (jacket+pants)

IV- The safety waistcoat

1- Oral exercise: Translate the different elements in English :



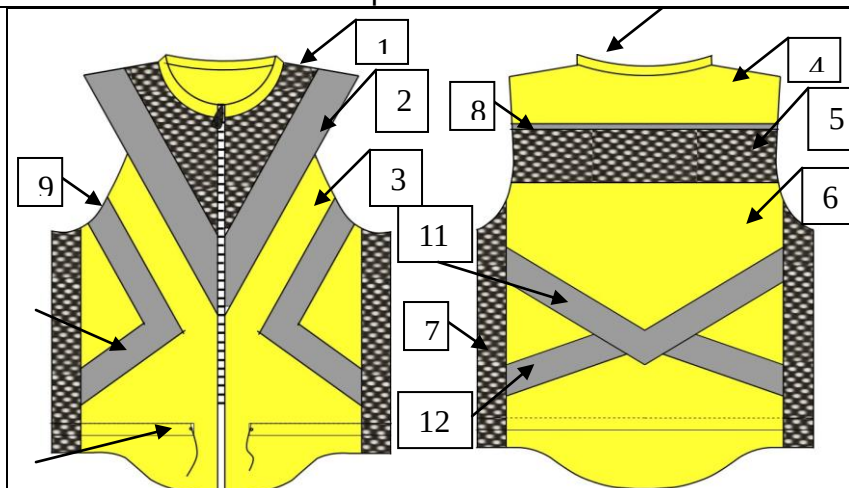
2- The specification sheet : the safety roller vest

a-Pair work : write the specification sheet of your roller vest in English : use the dictionary if necessary.

Fiche technique/ Technical Sheet

Produit /Item : Gilet/ waistcoat Référence / reference: Roller	Composition :	Tricot fluorescent 100% polyester (120 g/m²). Fluorescent knit 100% polyester (120 g/m²)
	Tissu 1/ fabric 1:	
	Tissu 2/ fabric 2 :	Bandes rétro réfléchissantes 65% polyester 35% coton enduit élastomère et billes de verre (30 lavages max à 40°C). Reflective stripes 65% polyester 35% elastomer coated cotton and micro glass beads (30 wash max à 40°C).
Code d'entretien/ care code	Tissu 3/Fabric 3 :	Maille filet 100% polyester (140 g/m²). Mesh 100% polyester (140 g/m²)
		Lavage à 40°, traitement mécanique réduit, essorage réduit Machine Wash, Warm, Gentle or Delicate Chlorage interdit Do Not Bleach Séchage en tambour interdit Do Not Tumble Dry Repassage 110°C Iron, Low Nettoyage à sec interdit Do Not Dryclean

Croquis/ sketch :



Fournitures/ small wares	Coloris / colors	Éléments du patronnage/ pattern elements
Tissu 1/ fabric1 :	Jaune/ yellow	1-high front yoke
Matière 2/ fabric 2 :	Argent/ silver	2-Middle front yoke
Matière 3/ fabric 3 :	Noir/ Black	3-Front
Fil couture/ seam thread	Jaune/ yellow	4-high back yoke
Fil surpiqûre/ topstitching thread	Argent/ silver	5-Center back yoke
Fermeture à glissière/ zip	Noir/ black	6-back
Cordon élastique/ elastic cord	Noir/ black	7-Side cut-out
Stoppeur/ cord lock	Noir/ black	8-piping
Biais/ bias	Noir/ black	9-High front band
Vignette de composition/ composition label	Blanc/ white	10-Bottom front band
Puce taille/ size tag	Blanc/ white	11-High back band
Étiquette d'entretien/ care code	Blanc/ white	12-Bottom back band
Sachet plastique/ plastic bag	Transparent/ transparent	13-Stand- up collar
		14-inside band

Description/ **description** :

High visibility waistcoat

The front is composed of a high front yoke in a mesh fabric, a pointed middle yoke in a reflective fabric and a front in a fluorescent fabric. On the front, the pointed stripes are patched and topstitched.

The back is composed of a high yoke and a back in a fluorescent fabric, a middle yoke in a mesh fabric. A reflective piping is inserted between the high and the middle back yoke. Cross stripes are patched on the back.

The front and the back are connected with a side cut-out.

The neckline is finished with a straight collar in fluorescent fabric.

At the hip, an inside band with an elastic cord and a cord lock can tighten the waistcoat.

The waistcoat is closed by a zip

V- Test

Séance 2- Other technical fabrics

I- Smart, technical and interactive textiles: General definitions

1- **What are the differences between smart, technical and interactive textiles?**

Smart = sense and react materials / interact with the environment and the wearer // technical = fibers or fabrics that are developed for their performance/Interactive/electronic textiles= electronic devices or sensors integrated in the garments.

2- **Think of some examples that could fit in each group:**

Exchange with your classmates:

SMART TEXTILES	TECHNICAL TEXTILES	INTERACTIVE TEXTILES

3- **The high-visibility jacket: a smart, technical or interactive textile? Discuss altogether**

II- Group work: Oral presentation

1- Introduce your slide to your classmates

Groups	Pages
1	MICRO-ENCAPSULATION: slide 11
2	THERMOCHROMIC INKS: slide 12
3	PHOTOCHROMIC INKS + PHOSPHORESCENT INKS: slides 13, 14
4	TECHNICAL TEXTILES 1: slides 6, 7,8
5	INTERACTIVE TEXTILES 1: slide 15
6	INTERACTIVE TEXTILES 2: slide 16
7	TECHNICAL TEXTILES 2: slides 9, 10
8	NANOTECHNOLOGY: slide 17

2- Assessed questionnaire : After each presentation, answer the questions on the developed theme - Be as clear and precise as you can (Lexicon + Technologies)

MICRO-ENCAPSULATION:

1- What do the tiny bubbles or capsules contain? How are they activated?

Scents or chemical, released when activated with heat or friction

2-What are the two main purposes of this technique?

Medical (healing properties) or novelty items (comfort, relaxation)

3-Give examples of their end use for each purpose.

Medical: antibacterial (bandages releasing drugs, babies clothes, nappies) / Comfort : aromatherapy(pillows, bed linens)/ scented garments to mask odors (socks, sportswear)

THERMOCHROMIC INKS

1-What do thermochromic inks react to? How do they react?

changes in temperature(body heat, boiling water)/ change colors, become colored when activated

2-What is their purpose?

Act as temperature warning / novelty fashion items

3-What are their limits/ weaknesses?

The color fades when washing / short life span (5/10 washes)

PHOTOCHROMIC INKS + PHOSPHORESCENT INKS

1-What is the difference between thermochromic and photochromic inks?

photo = color change when exposed to ultraviolet sunlight

2-Explain their purpose: **UV overexposure warning / useful for sun suits, sunglasses**

3- Explain briefly the functioning of phosphorescent materials:

the energy from the sun is absorbed by a 'material' and it is released slowly over a long time, in the form of light. glows in the dark. (like a glowing worm).

INTERACTIVE TEXTILES- INTEGRATED WEARABLE ELECTRONICS

1-What is their principle?

Contain removable or permanent miniaturized electrical circuits or conductive fibres integrated into textiles to communicate with the exterior / triggered by solar power, battery or human power

2-What is the aim of wearable electronics in sportswear?

health monitoring (heart rate , blood pressure , energy consumption ..)

3-In which other fields are they used?

Leisure (mobile phone connectors, MP3 players) GPS (tracking syst)// Industrial (voice active wearable computers

TECHNICAL TEXTILES

1- Explain the role of Kevlar

To create bullet proof vest.

2-What kind of garments are moisture absorbing?

sportswear(to keep the wearer dry and comfortable)

3- Give the name of a fabric used for a mountain anorak and list the proprieties

GORE TEX / breathable/ waterproof/ windproof

4- What is the concept of biomimetics fabric?

To mimic nature's proprieties

4- Define the functioning of the pressure response fabric

A material that moulds to the shape of the body

NANOTECHNOLOGY

1-For which hygienic purpose can you use nanotechnology?

self-cleaning textiles in sportswear or medical field (nanoparticles that kill bacteria thanks to a protective coating formed on the fibres)

2-Why are nanotechnologies a revolution in textiles?

They enhance fabrics at a molecular level: atoms are manipulated and located in the desired structures without altering their comfort qualities: new generation of fabrics (spill, static resistant, stain or moisture resistant, health improving)

III- Some proprieties of technical garments

1- For each outfit, find the proprieties – Exchange with your classmates

			
fireproof	Insulating / comfortable	waterproof	Stretch
			
UV resistant	Collection "sans repassage" easy-to-care for : without ironing / noncreasing	hardwearing	Breathable