

# EPD – Environmental Product Declaration.

In accordance with ISO 14025 for:  
High Vis Green stretch shorts class 2 2648 GSTP.

## General information

**Owner of the EPD:**

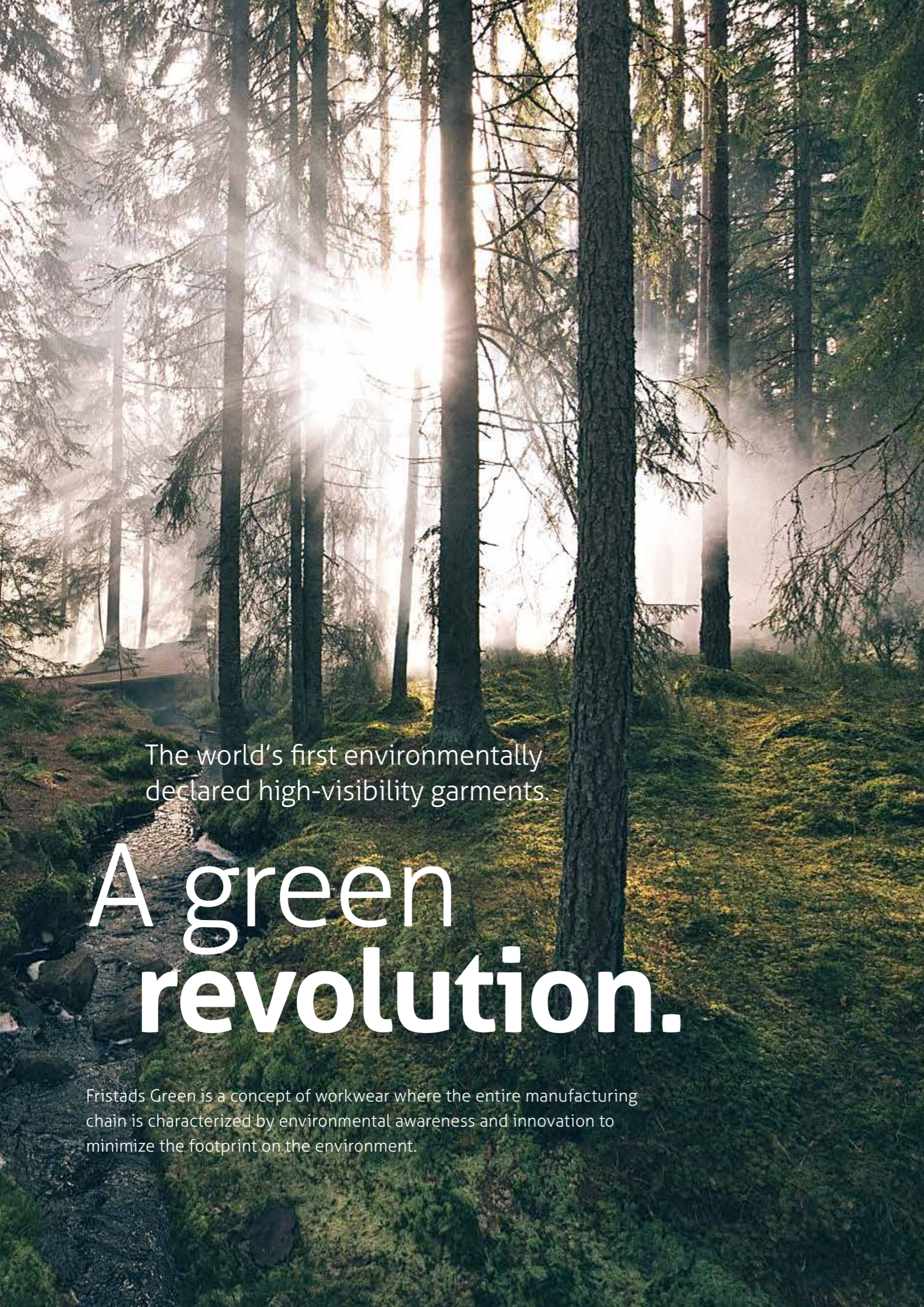
Fristads AB Prognosgatan 24, 501 11 Borås, Sweden  
Contact person: Lene Jul, Product management director,  
lene.jul@fristads.com  
www.fristads.com

**Location of production site:**

Laos and Ukraine

Programme:	The international EPD <sup>®</sup> system www.environdec.com
Programme operator:	EPD international AB
EPD registration number:	S-P-03890
Publication date:	2021-10-08
Validity date:	2026-10-01

Geographical scope:	Global
Prepared with the assistance of Rise AB.	



The world's first environmentally declared high-visibility garments.

# A green revolution.

Fristads Green is a concept of workwear where the entire manufacturing chain is characterized by environmental awareness and innovation to minimize the footprint on the environment.

## Committed to sustainability.

In 2019 Fristads became the first clothing producer in the world to introduce a new standard for measuring the total environmental impact of a garment – from choice of material to delivery of the finished garment.

With three own factories in Europe and sales in more than 20 countries, there are many people around the world working for us – and we care for each and every one of them. These are fine words of course, and we stand firmly behind them. Injustices, unreasonable working hours, low wages, corruption – these are all issues that we resist, where we are constantly on our guard. We work hard to exert our influence wherever our products are made.

We have set high requirements for the companies that want to be our suppliers, at all stages. We give consideration to all the details in the chain, from human rights to environmental impact. It's our duty.

Our work with sustainability is based on the 10 principles in the UN's Global Compact, which forms the basis for our Code of Conduct. We respect and promote human rights according to the United Nations Declaration of Human rights and the Core Conventions of the International Labour Organisation. As a member of amfori BSCI (Business Social Compliance Initiative), we pursue a constructive and open dialogue among our business partners and stakeholders to reinforce the principles of a socially responsible business.

We are certified according to ISO 14001 and work constantly to improve our environmental performance. We monitor the use of chemicals in our products throughout our supply chain. Our Restricted Substance List, shared among all suppliers, reflects the latest EU harmonized legislation which includes REACH, pops regulation, Biocide Regulation and Product Safety Regulation, and is updated regularly based on the guidance of our partner RISE, the Swedish Chemical Group. Furthermore, most of our products are OEKO-TEX® certified.

These efforts are rarely visible from the outside. But, we know they make a difference. For this reason, they are extremely important for us as we strive to make a better world to live in, a world we can proudly leave for the generations that follow us.

Read more at [fristads.com](http://fristads.com).



Human rights, labour, environment, anti-corruption



Social compliance



Environment



Chemical regulations

"It is easy to say that a product is produced in a sustainable way, but without objective, verifiable data, the claim falls flat".



Fristads aims to contribute to positive change and greater transparency when it comes to environmental impact.

# Garments with care for the future.

# EPD

## Environmental Product Declaration

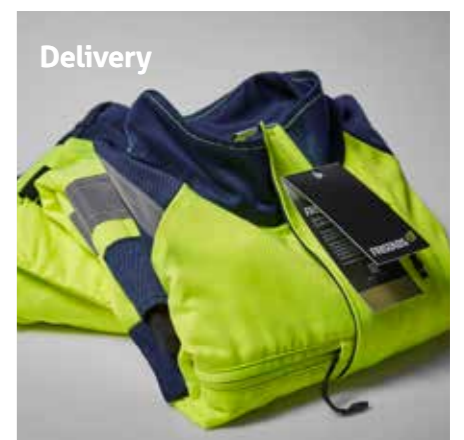
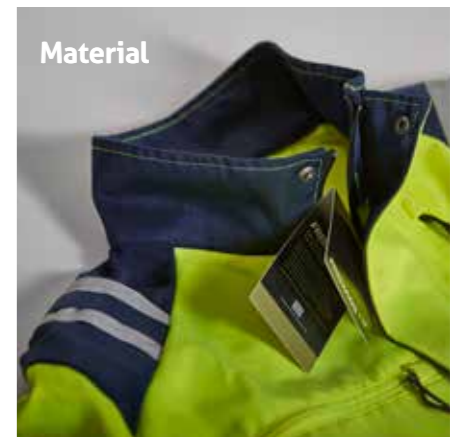
"A long-term, sustainable and transparent measuring tool for environmental impact".

- Fristads is the first clothing producer in the world to introduce a new standard for measuring the total environmental impact of a garment – from choice of material to delivery of the finished garment
- A standard can be used throughout the textile industry
- The EPD measures the impact in four main areas: material, construction, production and delivery

An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impact of products. The relevant standard for Environmental Product Declarations is ISO 14025, where they are referred to as "Type III environmental declarations". A Type III environmental declaration is created and registered in the framework of a programme, such as the International EPD® System.

The International EPD® System has, as a main objective, the ambition to enable and support organisations in any country to communicate quantified environmental information on the life cycle of their products in a credible, comparable, and understandable way. All EPDs registered in the International EPD® System are publically available and free to download on this website: [www.environdec.com](http://www.environdec.com).

All EPDs are based on Product Category Rules providing rules, requirements, and guidelines for a defined product category. The overall goal of an EPD is to provide relevant and verified information to meet the communication needs in the various applications: procurement, ecodesign or environmental management systems. An important aspect of EPD is to provide the basis of a fair comparison of products and services by its environmental performance. EPDs can reflect the continuous environmental improvement of products and services over time and are able to communicate and add up relevant environmental information along a product's supply chain.



# High-visibility shorts with an EPD.

2 reinforced bellowed back pockets, one with zip

D-ring for e.g. keys, id-card

Rib-knit stretch panels at waist

Concealed front button

2 front pockets

Hammer loop

Double reinforced crotch seam

Leg pocket with snap fastening, zip pocket and D-ring

CORDURA®-reinforced folding rule pocket with tool pocket, pen pocket, buttons and loops for sheath knife



# Our environmental choices make a difference.

- 4-way stretch fabric made of recycled polyester and bio-based material
- Front zipper is made of 100% recycled polyester, with the exception of the zip puller
- Tool holders and loops are made of 100% recycled polyester
- Product label and inside size label are made of 100% recycled polyester
- Pin for hangtag and norm books is made of 100% PBS (biodegradable polybutylene succinate). Norm books and hangtag are printed on sustainable paper made of FSC (The Forest Stewardship Council™) certified/recycled wood
- Packed in plastic bags made from 100% LDPE (low density polyethylene)
- All surplus material from production is utilised on site and turned into new products like e.g. mattressfilling
- OEKO-TEX® Standard 100 certified at garment level



## HIGH VIS GREEN STRETCH SHORTS CLASS 2 2648 GSTP

Art. no 134245

Part of Fristads Green collection / Sustainable / 4-way stretch fabric / Rib-knit stretch panels at waist / Concealed front button / D-ring / 2 front pockets / 2 reinforced bellowed back pockets, one with zip / Double reinforced crotch seam / Hammer loop / CORDURA®-reinforced folding rule pocket with tool pocket, pen pocket, buttons and loops for sheath knife / Leg pocket with snap fastening, zip pocket and D-ring / Approved according to EN ISO 20471 class 1 in sizes C42-C48 and class 2 in sizes C50-C66. Colour 271 sizes C50-C66 is approved according to RIS-3279-TOM issue 1 UK Railway Standard / Approved after 50 washes / With EPD (Environmental Product Declaration) / OEKO-TEX® certified.

**MATERIAL** Stretch fabric 44% PTT (partly biobased material), 44% polyester, 12% recycled polyester.

**WEIGHT** 260 g/m².

**COLOUR** 130 Hi-Vis Yellow, 230 Hi-Vis Orange.

**SIZES** C42-C66.



# LCA information – Life cycle assessment.

Life Cycle Assessment is a method for analysing the environmental impact of a product throughout its life-cycle, from the extraction of raw materials (the cradle) to handling the waste (the grave).

## Goal of the study

An LCA study has been conducted in accordance with ISO 14044 and the requirements stated in the General Programme Instructions by The International EPD® System<sup>1</sup>. The goal of the present LCA study has been to calculate environmental impact values for Fristads' High Vis Green stretch shorts class 2 2648 GSTP to create this Environmental Product Declaration, to be used for communicating environmental performance to customers<sup>2</sup>.

## Scope of the study

The scope of the study is cradle to gate and includes all processes up until the jacket is manufactured and transported to Fristads' warehouse in Sweden, see Figure 1. Retail, use and end-of-life processes are not included in this EPD. All material and resource consumption is tracked back to the point of raw material extraction, mainly by using cradle-to-gate data<sup>3</sup> from the Ecoinvent database<sup>4</sup>. The functional unit of the study is 1 (one) garment, in accordance with the Product Category Rules (PCR)<sup>5</sup>. The declared unit for shorts is one garment in size C50.

## Data collection

The inventory for the LCA study was carried out during 2021. The data for the textile processing was provided by the Fristads' suppliers. Data for confectioning was collected by Fristads' staff<sup>6, 7, 8, 9, 10, 11</sup>.

## Allocation

Whenever it has been necessary to partition the system inputs and outputs, mass criteria have been used in accordance with the PCR. Such situations have for example been when the share of energy and water consumption, or the wastewater treatment of an entire production plant has been allocated to the specific fabric based on the total production volume of the plant.

## Cut-off rules

The PCR states that life cycle inventory data for a minimum of 99 % of total inflows to the three life cycle stages (up-stream, core and downstream modules) shall be included and a cut-off rule of 1% regarding energy, mass and environmental relevance shall apply.

## Assumptions and limitations

Some general assumptions have been made around transport vehicles to enable use of database data from Ecoinvent to represent primary data. Transport distances are assumed based on Google Maps distances between locations given by Fristads' suppliers. It is assumed that similar vehicles are used throughout Asia and throughout Europe respectively. Country electricity mix datasets have been used for electricity based on the fact that production sites are using country electricity net.

Generally, the LCA data should be used with precaution if interpreted for any other purpose than this EPD.

## Data quality

The data quality has been considerably increased by the experience from making a similar study in the past<sup>12, 13</sup>. Generic data, selected generic data and proxy data has been used. It has been investigated and secured in the study that proxy data does not contribute more than 10% to the total impact of each environmental impact category, in accordance with the PCRs.

## Additional information about the LCA study

### Time representativeness:

2021

### Database(s) and LCA software used:

SimaPro version 9.1.1.1<sup>14</sup>  
ecoinvent version 3.6<sup>4</sup>

### Calculation methods

Potential environmental impacts are calculated with the EPD (2018) v1.01 methods as implemented in SimaPro: CML-IA baseline v3.05 for the impact categories acidification potential, eutrophication potential, abiotic depletion potential-fossil fuels, and abiotic depletion potential-elements; AWARE v1.02 for water scarcity potential and ReCiPe 2016 Midpoint (H) v1.1 for photochemical oxidant formation potential. For global warming potential the default characterization factors are the IPCC 2013 GWP 100a as implemented in the CML baseline method. Use of resources are calculated from Cumulative Energy Demand v1.11. Voluntary impact categories eutrophication – fresh water, eutrophication – marine, and particulate matter are calculated with the method EF 3.0 as implemented in SimaPro.

### Description of system boundaries:

Cradle-to-gate

### LCA practitioner:

The LCA has been conducted by the Raw Material team at Fristads with support from RISE.

### Third party reviewer:

Marcus Wendin, Miljögraff AB, Övre Hövik 25 B, SE-430 84 Göteborg, Sweden

# System diagram.

The system boundaries of this EPD are decided by the Product Category Rules (PCR) and illustrated by Figure 1.

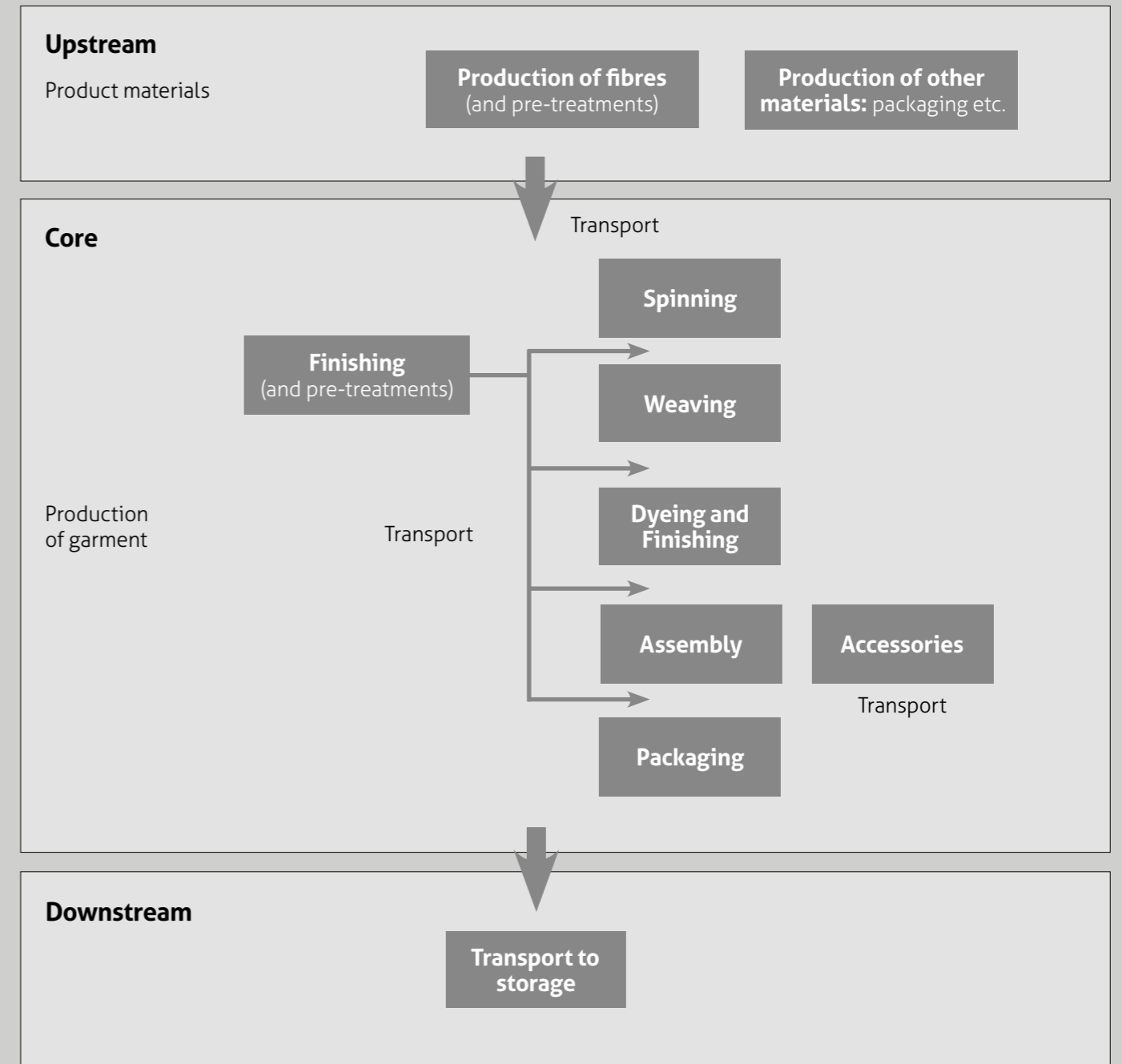


Figure 1. The system boundaries include upstream, core and downstream processes.

<sup>1</sup> EPD International. (2019). *General Programme Instructions for the International EPD® System version 3.1*. www.environdec.com.

<sup>2</sup> Rosengren, L., Lindström, F. & Hildenbrand, J. (2021). Life cycle assessment of Fristads workwear – Fifth batch.

<sup>3</sup> Cradle-to-gate = all processes from cradle (mining site, forest etc.) to gate (until the goods is produced and ready for delivery at the factory gate).

<sup>4</sup> Ecoinvent. (2020). *Ecoinvent (3.6)*. Ecoinvent. <https://www.ecoinvent.org/database/database.html>

<sup>5</sup> EPD International. (2020). *PCR 2019:06 Trousers, shorts, slacks and similar garments: UN CPC 282. Product Category Rules according to ISO 14025. Version 1.02*. Stockholm, Sweden.

<sup>6</sup> Anonymous. (2020). *Facility S for non-woven manufacturing*.

<sup>7</sup> Anonymous. (2021a). *Facility H for spinning, weaving, dyeing and finishing*.

<sup>8</sup> Anonymous. (2021b). *Facility W for weaving, dyeing and finishing*.

<sup>9</sup> Anonymous. (2021c). *Facility L for confectioning*.

<sup>10</sup> Anonymous. (2021d). *Facility TR for transfer reflective tape*.

<sup>11</sup> Anonymous. (2021e). *Facility C for recycled polyester zippers*.

<sup>12</sup> EPD International. 'EPD Fristads Green craftsman jacket 4538 GRN. EPD Registration Number S-P-01534.' (2019) <<http://www.environdec.com/en/Detail/epd710#:VVx1J2cw-M8>>.

<sup>13</sup> EPD International. (2021). *S-P-03878 High Vis Green jacket class 2 4067/4068 GPLU and High Vis jacket class 3 4026 PLU*.

<sup>14</sup> PRé Sustainability. (2020). *SimaPro 9.1.1.1*.

## Content declaration

### High Vis Green stretch shorts class 2 2648 GSTP .

Content Declaration	%	Environmental/Hazardous properties
Main fabric GSTP	61,1	100% polyester (12% recycled)
Stretch trim STCN	7	87% polyamide, 13% elastane
Trims for pockets	1,9	100% polyamide
Trims of GPLU	3,2	70% recycled polyester, 30% organic cotton
Fabric FBLA	7,8	65% polyester, 35% cotton
Interlining cotton	0,1	100% cotton
Thread polyester	0,2	100% polyester
Transfer reflective	8,6	35% glass beads, 33,5% polyester, 31,5% polyurethane
Smock GSTP	5,6	78,9% polyester, 15,4% elastane, 5,7% polyamide
Zipper recycled PES	0,4	100% polyester
Metal trims	1	100% brass
Care and size labels	1,5	100% polyester
Paper trims	1,5	100% paper

### Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The polyester used in GSTP garments is recycled and made from recycled post-consumer waste, certified according to Global Recycled Standard (GRS).

### Bio-based material

The GSTP fabric is made from partly bio-based material, extracted from annually renewable plants.

### Packaging

Distribution packaging: Plastic bags made from 100% recycled LDPE (low density polyethylene). Cardboard box. Pallets are excluded from the calculations.

## Environmental performance

### High Vis Green stretch shorts class 2 2648 GSTP. Declared unit size C50.

#### Potential environmental impact

Parameter	Unit	Upstream	CORE	Downstream	Total	
Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	4,4	2,97	0,168	7,54
	Biogenic	kg CO <sub>2</sub> eq.	0,374	0,222	0,000653	0,597
	Land use and land change	kg CO <sub>2</sub> eq.	0,0881	0,0183	0,0000925	0,106
	<b>Total</b>	kg CO <sub>2</sub> eq.	4,86	3,21	0,169	8,24
Acidification potential (AP)	kg SO <sub>2</sub> eq.	0,023	0,0146	0,00258	0,0402	
Eutrophication potential (EP)	kg PO <sub>4</sub> <sup>3-</sup> eq.	0,0121	0,00453	0,00032	0,0170	
Photochemical oxidant formation potential	kg NMVOC eq.	0,0153	0,0106	0,00234	0,0282	
Abiotic depletion potential – Fossil fuels	MJ, net calorific value	63,8	34,5	2,31	101	
Abiotic depletion potential – Elements	kg Sb eq.	0,000227	0,0000192	0,00000354	0,000250	
Water Scarcity Footprint (WSF)	m <sup>3</sup> H <sub>2</sub> O eq.	7,64	1,52	0,00633	9,17	
Eutrophication – Fresh water	kg P eq.	0,00141	0,000723	0,0000115	0,00214	
Eutrophication – Marine	kg N eq.	0,012	0,00359	0,000801	0,0164	
Particulate matter	Disease inc.	0,000000276	0,000000227	0,0000000985	0,000000513	

#### Use of resources

Parameter	Unit	Upstream	CORE	Downstream	Total	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	12,3	3,52	0,0234	15,9
	Used as raw materials	MJ, net calorific value	0	0	0	0
	<b>Total</b>	MJ, net calorific value	12,3	3,52	0,0234	15,9
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	73,8	39,5	2,49	116
	Used as raw materials	MJ, net calorific value	19,8	0	0	19,8
	<b>Total</b>	MJ, net calorific value	93,6	39,5	2,49	136
Secondary material	kg	0,0815	0	0	0,0815	
Renewable secondary fuels	MJ, net calorific value	0	0	0	0	
Non-renewable secondary fuels	MJ, net calorific value	0	0	0	0	
Net use of fresh water	m <sup>3</sup>	0,0111	0,0178	0	0,0289	

# Product characteristics

## Product characteristics

Characteristic	Test method	Results GSTP
<b>Composition</b>	Regulation EU No 1007/2011	100% polyester
<b>Weave</b>	ISO 3572	Double weave
<b>Mass per unit area</b>	EN 12127	260 g/m <sup>2</sup>
<b>Width</b>	EN 1773	142 cm
<b>Colour index</b>		
<b>Abrasion strength</b>	ISO 12947-2	40000 rubs
<b>Tear strength</b>	ISO 13937-2	Warp: 40 N Weft: 70 N
<b>Tensile strength</b>	ISO 13934-1	Warp: 850 N Weft: 490 N
<b>Seam slippage</b>	ISO 13936-2	Warp: 2 mm Weft: 2 mm
<b>Pilling test (Martindale) after 5000 rubs</b>	EN ISO 12945-2	4
<b>Dimensional change to washing</b>	EN ISO 6330 EN ISO 3759 EN ISO 5077	Warp: ±3% Weft: ±3%
<b>pH of water extract</b>	EN ISO 3071	5-7,5
<b>Colour fastness to artificial light: Xenon arc fading lamp test</b>	EN ISO 105 B02	4-5
<b>Colour fastness to washing</b>	EN ISO 105 C06	Color change: 4-5  Color staining: Cotton 4 Polyester 4
<b>Acid and alkaline perspiration</b>	EN ISO 105 E04	Alkaline and acid Color change: 4-5  Color staining: Cotton 4-5 Polyester 4-5
<b>Dry and wet rubbing</b>	EN ISO 105 X12	Dry : 4-5 Wet : 4-5

# Waste production and output flows

## Waste production

Parameter	Unit	Upstream	CORE	Downstream	Total
Hazardous waste disposed	kg	0	0	0	0
Non-hazardous waste disposed	kg	0,211	0,182	0	0,393
Radioactive waste disposed	kg	0	0	0	0

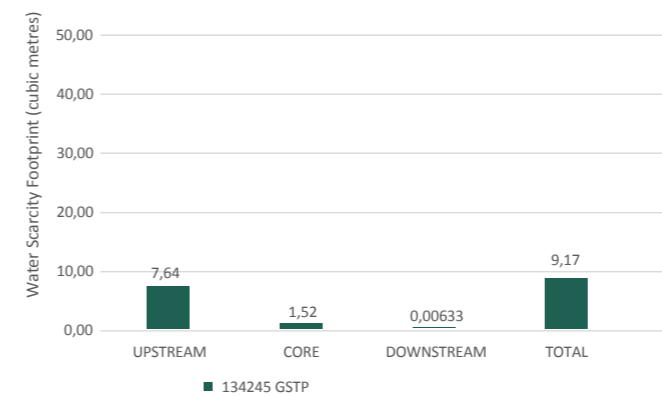
## Additional information

Our garments are OEKO-TEX® certified at garment level and we have a well-established programme to monitor chemical safety compliance.

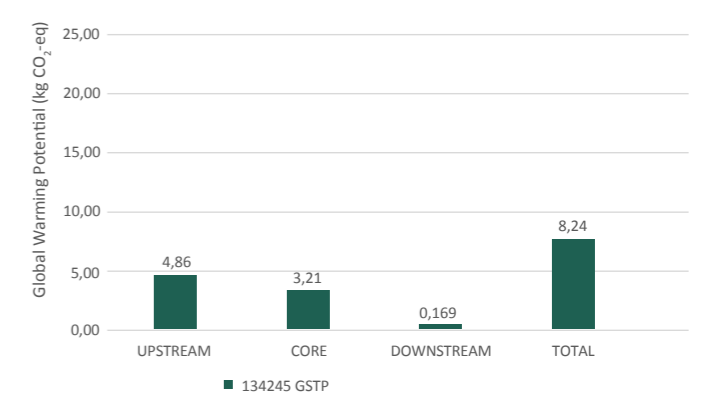
The results in this EPD is for the declared unit size C50, which is in the middle of Fristads' size range. Results may vary depending on the garment size within the size range, smaller sizes giving a lower impact and larger sizes giving a higher impact depending on the material consumption.

Water Scarcity Footprint of High Vis Green stretch shorts class 2 2648 GSTP is illustrated in Figure 1.

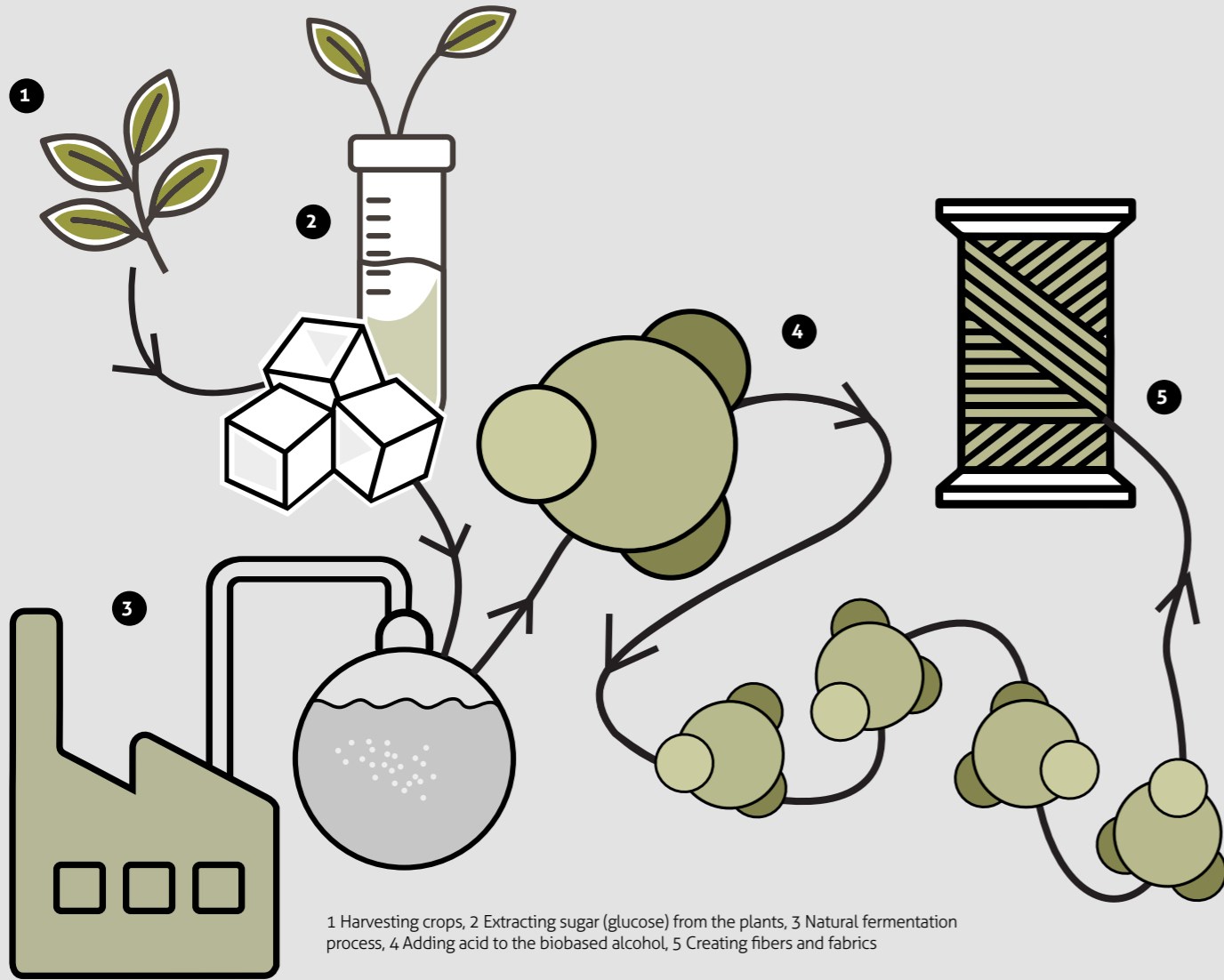
The Global Warming Potential (GWP) of High Vis Green stretch shorts class 2 2648 GSTP is shown in Figure 2.



**Figure 1.** The Water Scarcity Footprint of High Vis Green stretch jacket class 3 4647 GSTP. Figures for one jacket.



**Figure 2.** The Global Warming Potential of High Vis Green stretch shorts class 2 2648 GSTP. Figures for one pair of shorts.



Extracted from annually renewable plants.

# Bio-based material.

The GSTP fabric is made from partly bio-based material, extracted from annually renewable plants. The process starts with harvesting the crops. The second step is extracting sugar (glucose) from the plants. The sugar is then fermented in a natural process into an alcohol, called 1,3-propanediol. Finally, the bio-based alcohol is turned into a textile fibre by adding an acid. This partly bio-based textile fibre can be used in several different applications, for example in garments providing good stretch properties and high comfort. By using bio-based materials instead of fossil-based materials the use of fossil resources can be reduced.

Recycled polyester is made from an already produced resource instead of using virgin fossil resources. The recycled polyester used in Fristads collections are tested and secured to meet our high quality requirements.

Recycled polyester can be produced in several ways, either mechanically from PET bottles or chemically from various waste materials, for example production waste from the textile industry. Fristads Green High vis collection is partly made of recycled polyester from PET bottles.

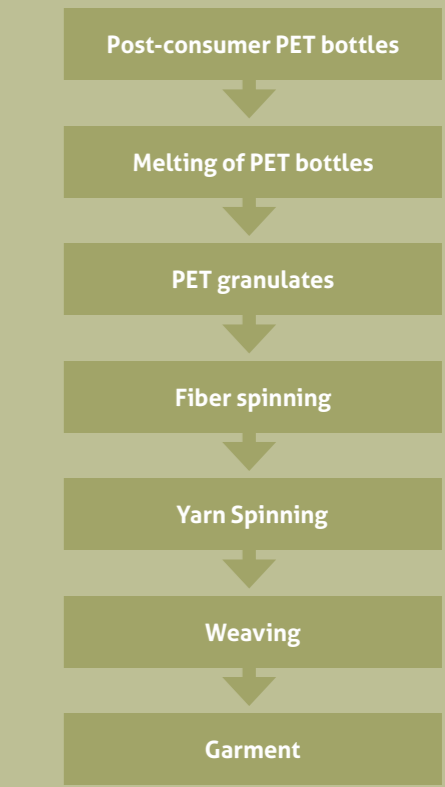
When using recycled materials it is important to secure traceability throughout the supply chain. Fristads work with transparent suppliers who can provide certificates for traceability.



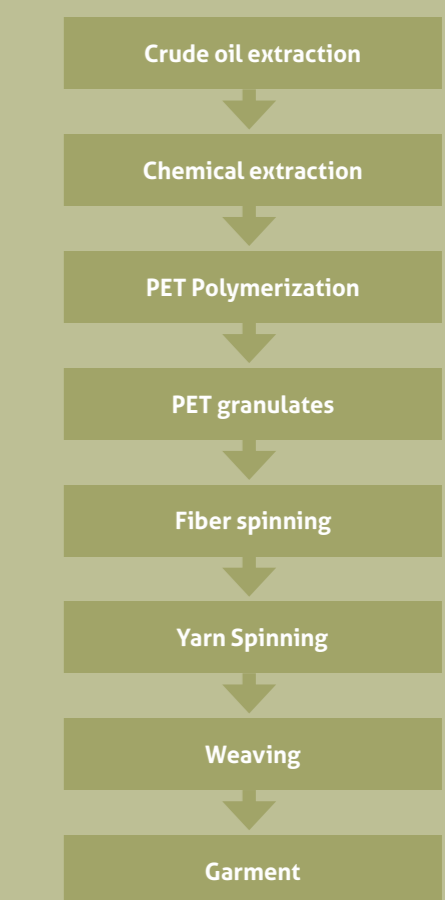
Used PET bottles turn into a great workwear.

# Recycled polyester.

## Mechanical recycled polyester:



## Virgin polyester:





## Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable

Programme:	The International EPD® System  EPD International AB Box 210 60 SE-100 31 Stockholm Sweden  www.environdec.com info@environdec.com
EPD registration number:	S-P-03890
Published:	2021-10-08
Valid until:	2026-10-01
Product Category Rules:	PCR 2019:06 Trousers, shorts, slacks and similar garments. Version 1.02
Product group classification:	UN CPC 282
Reference year for data:	2021
Geographical scope:	Global

Product category rules (PCR): Trousers, shorts, slacks and similar garments. PCR 2019:06, Version 1.02, UN CPC 282.
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members available on <a href="http://www.environdec.com">www.environdec.com</a> . The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> . Chair of the PCR review: Hüdai Kara, Metsims Sustainability Consulting.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:  <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier:  Marcus Wendin Miljögiraff AB  Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

## References

- Anonymous. (2020). *Facility S for non-woven manufacturing*.
- Anonymous. (2021a). *Facility H for spinning, weaving, dyeing and finishing*.
- Anonymous. (2021b). *Facility W for weaving, dyeing and finishing*.
- Anonymous. (2021c). *Facility L for confectioning*.
- Anonymous. (2021d). *Facility TR for transfer reflective tape*.
- Anonymous. (2021e). *Facility C for recycled polyester zippers*.
- Ecoinvent. (2020). *Ecoinvent (3.6)*. Ecoinvent. <https://www.ecoinvent.org/database/database.html>
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- EPD International. (2021). *S-P-03878 High Vis Green jacket class 2 4067/4068 GPLU and High Vis jacket class 3 4026 PLU*.
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- PRé Sustainability. (2020). SimaPro 9.1.1.1.

## Contact information

Parameter	Unit
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LCA authors:	<p><b>Fristads AB</b> Prognosgatan 24, 501 11 Borås Sweden</p> <p><b>Contact persons:</b> Lisa Rosengren Frida Lindström <a href="mailto:lisa.rosengren@fristads.com">lisa.rosengren@fristads.com</a></p> <p><b>RISE AB</b> PO Box 104, SE 431 22 Mölndal, Sweden</p> <p><b>Contact person:</b> Jutta Hildenbrand <a href="http://www.ri.se">www.ri.se</a></p>
Programme operator:	EPD International AB <a href="mailto:info@environdec.com">info@environdec.com</a>