Environmental Product Declaration

In accordance with ISO 14025 for:

Coloreel

from

Coloreel Group AB

Program:	The International EPD® System, www.environdec.com
Program operator:	EPD International AB
EPD registration number:	S-P-04933
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

Program information

Program:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
EPDs within the same product category but from different programs may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison.	

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: Other special- and general-purpose machinery and parts thereof. 2010:08, version 4.0. UN CPC 44629
PCR review was conducted by: *Version 1.0, 2.0 and 3.0 were reviewed by the Technical Committee of the International EPD® System. Chair of the PCR review: Lars-Gunnar Lindfors.*
Life Cycle Assessment (LCA)
LCA practitioner: Marcus Bernhard, Miljögiraff Coloreel (the EPD owner) has the sole ownership, liability and responsibility of the EPD.
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Dr. Niels Jungbluth, ESU-services GmbH, Schaffhausen, Switzerland, www.esu-services.ch* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: ☐ Yes ☒ No

Company information

Owner of the EPD: Mattias Nordin, +46 708 558 557, mattias.nordin@coloreel.com, Science Park 553 18 Jönköping, Sweden
Description of the organization:
Coloreel is a Swedish textile innovation brand with a groundbreaking technology for embroidery that enables high-quality coloring of textile thread on demand.

We use our technology to both preserve the craftsmanship of embroidery and take embroidery to the next level. The unique solution makes previously complicated designs accessible, including gradients, textures, and other stunning effects. Using only a single thread and needle means that it also significantly improves quality and efficiency, enabling immediate start up and faster delivery. In short, Coloreel empowers creativity and enhances quality and efficiency, making the ordinary extraordinary. In the future, the technology can also be used for sewing, knitting, weaving and more.

Coloreel is also part of the movement to reduce waste and move the textile industry towards more sustainable production. By coloring the thread directly, there is no wastewater, hence no water pollution. And using a single reel of thread and needle also means minimized thread waste and minimized microfiber pollution.

Product-related or management system-related certifications:
Coloreel declare that the ITC-U is in accordance with the following Directives and Regulations:

- The Low Voltage Directive 2014/35/EU. Based on the following harmonized standard: EN 62368-1:2014 + A11:2017
- The Electromagnetic Compatibility Equipment Directive 2014/30/E. UBased on the following harmonized standards: EN 61000-6-2 (2005), EN 55035 (2017), EN. 61000-6-3 (2007), EN 55032 (2015)
- The Restriction of Hazardous Substances (RoHS) Directive 2011/65/EC of June 8, 2011
- The Registration, Evaluation, Authorisation and restriction of Chemicals (REACH). Regulation (EC) No 1907/2006 of 18 December, 2006.

Name and location of production site:
The assembly of the Coloreel unit is performed by Scanfil Åtvidaberg AB located in Åtvidaberg, Sweden.

Product information

Product name: Coloreel
Product identification: Coloreel Instant Thread Coloring Unit (ITCU)
Product description: Coloreel technology is an innovation that enables high-quality coloring of thread on demand. It provides a new thread coloring process by instantly coloring a white base thread in any desired color during the embroidery production, without the need to change the thread. The thread can be used for the same/whole embroidery regardless of required color changes in the motive. The Coloreel unit provides new design possibilities, allows freedom in the use of colors and it improves efficiency by minimizing re-threading time as well as significantly reducing the need for keeping stock of thread. By coloring the thread directly, there is no wastewater, hence no water pollution. And using a single reel of thread and needle also means minimized thread waste. The Coloreel unit is compatible with several embroidery machines brands. The embroidery machine is sold separately and is out of scope of the LCA.

UN CPC code: 44629

Geographical scope: Global, based on market shares of where Coloreel is sold (60% Europe, 30% US and 10% Asia).

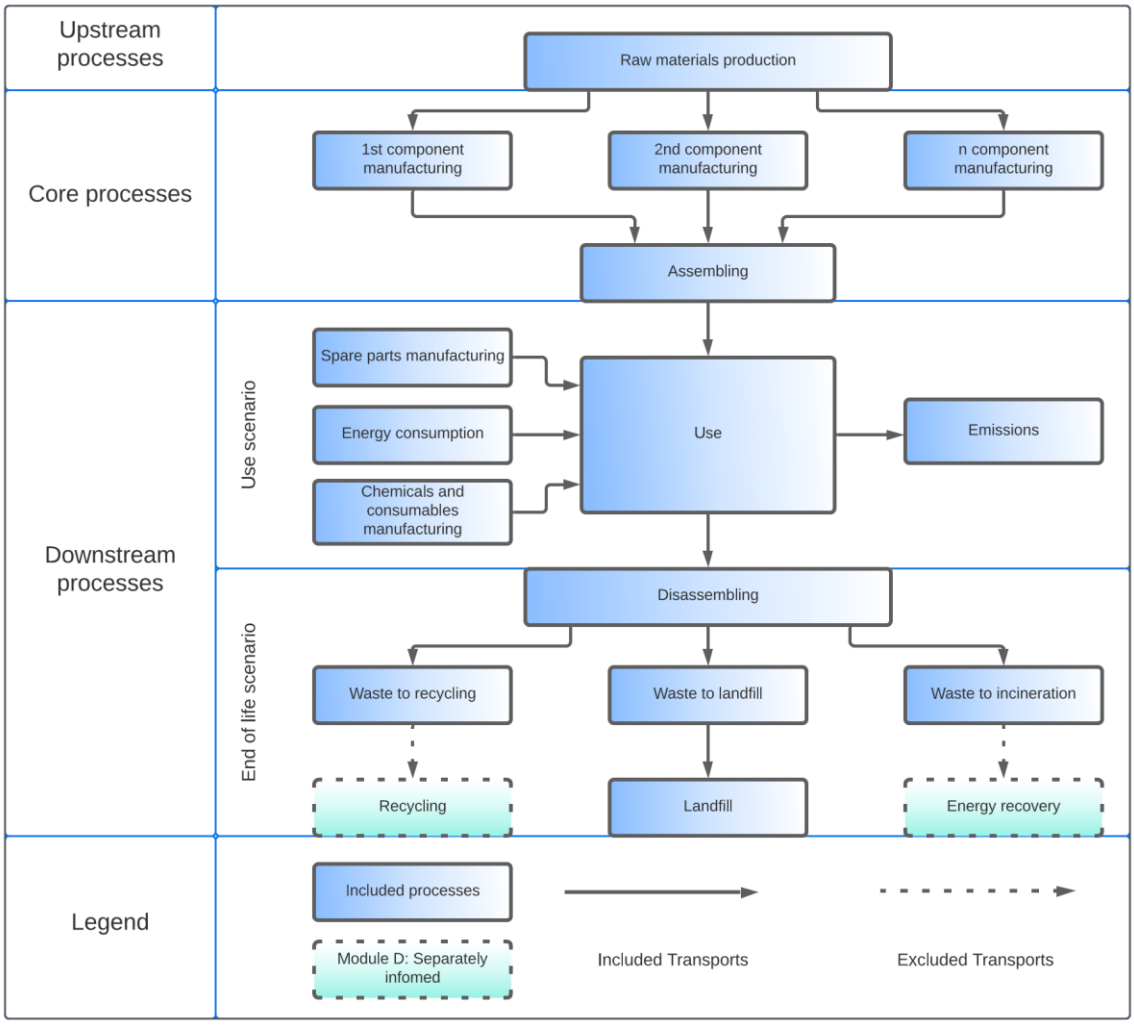
LCA information

Functional unit / declared unit: 1 declared unit including use stage.

Time representativeness: Specific data has been provided for the year 2021. Secondary data come from the ecoinvent v.3.8 database.

Database(s) and LCA software used: SimaPro 9.3 and ecoinvent 3.8, Cut-Off system model

System diagram:
According to PCR. D-module not included.



Description of system boundaries: Cradle-to-grave

More information: The underlining LCA-study was conducted by Marcus Bernhard at Miljögiraff.
Contact: marcusbernhard@miljogiraff.se

Machine description

Information	Examples/explanations
Commercial name	Coloreel
Functions	Instant coloring of thread in the embroidery process.
Main components	Print engine (9 kg) Chassis (34 kg)
Spare parts	Print heads
Used fuels or energy vectors	Electricity
Size and dimension (Length, height, width)	1,265 x 0,844 x 0,305 m
Weight	66 kg

Technical information

Information	Examples/explanations
Functional performance (productivity)	Average thread coloring speed: 59 mm/s Maximum thread coloring speed: 200 mm/s 360 000 000 stitches per Coloreel lifetime
Technical lifetime	10 000 hours. Based on stress tests of individual modules in the unit.
Energy consumption	Average power consumption 290 W
Spare parts consumption	Print heads, every 5000 hours. Waste ink tank, every 427 hours Cartridge refill, every 328 hours
Chemical products and other consumables consumption	Total ink: 0,021 ml/1000 stitches Thread consumption: 0,0044 km/1000 stitches Total lubrication: 0,0098 g/1000 stitches Total washing fluid: 0,090 g/1000 stitches Filter weight: 0,0029 g/1000 stiches

Content declaration

Product

Materials / chemical substances	Kg
Steel	47,6
Electronics	7,0
Plastic other	3,1
ABS	2,9
PC ABS	2,5
PMMA	0,8
Nylon	0,7
Aluminum	0,6
Rubber	0,5
Other	0,3
Total:	**66,0**

Coloreel Group AB has declared that the Coloreel unit follows the Restriction of Hazardous Substances (RoHS) directive and the Registration, Evaluation, Authorisation and restriction of Chemicals (REACH) regulation.

Packaging

The Coloreel unit is packaged in cardboard boxes for distribution to the customer. Plastic foam is added to the boxes for protection. The units come packed with installation- and operation manuals and cables for the markets where the unit is sold.

Materials / chemical substances	Kg
Cardboard	5,7
Paper	4,5
Plastic	2,6
Cables	1,4
Other	0,1
Total:	**14,3**

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The thread used by the Coloreel unit is made of 100% post-consumer recycled polyester.

Environmental performance

The environmental performance for one Coloreel unit over its entire lifecycle is now declared. For more information on how to convert the result into per 1000 stitches, see “Additional information”.

Potential environmental impact

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO2 eq.	6,85E+02	3,27E+01	1,76E+03	2,48E+03
	Biogenic	kg CO2 eq.	2,89E+00	3,58E-01	2,39E+01	2,71E+01
	Land use and land transformation	kg CO2 eq.	9,88E-01	1,70E+00	8,45E+00	1,11E+01
	TOTAL	kg CO2 eq.	6,88E+02	3,47E+01	1,79E+03	2,52E+03
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	1,17E-03	8,45E-06	9,61E-05	1,27E-03
Acidification potential (AP)		kg mol H+ eq.	4,76E+00	3,11E-01	8,43E+00	1,35E+01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	6,76E-01	1,32E-02	1,24E+00	1,93E+00
	Aquatic marine	kg N eq.	1,01E+00	7,71E-02	1,71E+00	2,80E+00
	Aquatic terrestrial	mol N eq.	8,61E+00	9,61E-01	1,47E+01	2,42E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	2,63E+00	2,51E-01	4,39E+00	7,27E+00
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	1,68E-01	1,10E-03	1,14E-02	1,81E-01
	Fossil resources	MJ, net calorific value	8,54E+03	3,65E+02	2,93E+04	3,82E+04
Water deprivation potential (WDP)		m3 world eq.	2,14E+02	1,31E+01	3,64E+02	5,91E+02

Use of resources

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	8,27E+02	1,24E+03	4,66E+03	6,72E+03
	Used as raw materials	MJ, net calorific value	1,49E+02	0,00E+00	0,00E+00	1,49E+02

	TOTAL	MJ, net calorific value	9,76E+02	1,24E+03	4,66E+03	6,87E+03
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	8,35E+03	3,86E+02	3,10E+04	3,97E+04
	Used as raw materials	MJ, net calorific value	7,54E+02	0,00E+00	2,48E-03	7,54E+02
	TOTAL	MJ, net calorific value	9,10E+03	3,86E+02	3,10E+04	4,05E+04
Secondary material (optional)		kg	0	0	4,09E+01	4,09E+01
Renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Net use of fresh water (optional)		m^3	7,86E+00	1,60E-01	1,18E+01	1,98E+01

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	0	0	0
Radioactive waste disposed	kg	0	0	0	0

Output flows

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	7,55E-02	4,63E+01	4,63E+01
Materials for energy recovery	kg	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0

Additional environmental information

A large part of the environmental impact comes from the use of electricity in the use phase (global electricity use based on market shares). The environmental impact if the customer of Coloreel is using renewable electricity will now be presented. The ecoinvent process "*Electricity, low voltage, renewable energy products {CH}| market for electricity, low voltage, renewable energy products | Cut-off, U*" has been used. It represents the renewable electricity consumption in Switzerland for the year 2019. The main energy source is hydropower followed by smaller shares of wind-, bio- and solar energy.

Potential environmental impact – Renewable electricity in use phase

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO2 eq.	6,85E+02	3,27E+01	4,12E+02	1,13E+03
	Biogenic	kg CO2 eq.	2,89E+00	3,58E-01	2,35E+01	2,67E+01
	Land use and land transformation	kg CO2 eq.	9,88E-01	1,70E+00	5,59E+00	8,28E+00
	TOTAL	kg CO2 eq.	6,88E+02	3,47E+01	4,41E+02	1,16E+03
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	1,17E-03	8,45E-06	3,52E-05	1,21E-03
Acidification potential (AP)		kg mol H+ eq.	4,76E+00	3,11E-01	2,16E+00	7,23E+00
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	6,76E-01	1,32E-02	1,68E-01	8,57E-01
	Aquatic marine	kg N eq.	1,01E+00	7,71E-02	5,64E-01	1,65E+00
	Aquatic terrestrial	mol N eq.	8,61E+00	9,61E-01	4,47E+00	1,40E+01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	2,63E+00	2,51E-01	1,56E+00	4,44E+00
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	1,68E-01	1,10E-03	1,09E-02	1,80E-01
	Fossil resources	MJ, net calorific value	8,54E+03	3,65E+02	4,82E+03	1,37E+04
Water deprivation potential (WDP)		m3 world eq.	2,14E+02	1,31E+01	1,47E+02	3,74E+02

Use of resources - Renewable electricity in use phase

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy	Use as energy carrier	MJ, net calorific value	8,27E+02	1,24E+03	1,25E+04	1,46E+04

resources – Renewable	Used as raw materials	MJ, net calorific value	1,49E+02	0,00E+00	0,00E+00	1,49E+02
	TOTAL	MJ, net calorific value	9,76E+02	1,24E+03	1,25E+04	1,48E+04
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	8,35E+03	3,86E+02	5,14E+03	1,39E+04
	Used as raw materials	MJ, net calorific value	7,54E+02	0,00E+00	2,48E-03	7,54E+02
	TOTAL	MJ, net calorific value	9,10E+03	3,86E+02	5,14E+03	1,46E+04
Secondary material (optional)		kg	0	0	4,09E+01	4,09E+01
Renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Net use of fresh water (optional)		m^3	7,86E+00	1,60E-01	4,38E+00	1,24E+01

Additional information

Coloreel guarantees that spare parts are available for at least 7 years after purchase.

To get the environmental impact per 1000 stitches instead of for one declared unit, the results should be divided by 360 000. This is based on a lifetime of 10 000 hours with a total of 360 000 000 stitches per lifetime.

References

General Programme Instructions of the International EPD® System. Version 4.0.
PCR: Other special- and general-purpose machinery and parts thereof. 2010:08, version 4.0.
Bernhard, M (Miljögiraff ab). (2022). 1032 Life Cycle Assessment of Coloreel

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