

Calculation of the environmental footprint 2019

CO₂ FOOTPRINT OF L. VAN HEEK TEXTILES

Simulation non-fossil electric energy use

COMMISSIONED BY



van Heek textiles

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CALCULATED BY

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INTRODUCTION

L. van Heek Textiles (Van Heek) has commissioned MODINT to calculate the CO₂-footprint for the production of Van Heek, including the transport of the raw materials to the production site in Losser and the transport of the finished products to the customers (as far as this transport was the responsibility of Van Heek, depending on the INCOTerms).

In this report not only the environmental impact of the actual use of electric energy from fossil sources is calculated, but also the simulation of using green energy. Van Heek Textiles will be using green energy starting from January 1, 2021.

The calculations were performed by Anton Luiken of Alcon Advies BV assigned by MODINT, using the MODINT Ecotool, version 3.0. The Modint Ecotool is a dedicated tool for the calculation of the environmental impact of textiles and textile products in all stages of production and use. The development of the tool was commissioned by the Dutch Branch organization for the textile and clothing industry MODINT to CE Delft and Alcon Advies BV. The Modint Ecotool is a versatile tool with a database for fibers, textile processes and transports. This database is based on data from the Swiss EcoInvent database (<https://www.ecoinvent.org/>) and verified sources from textile literature. Besides using the standard data, the Modint Ecotool also offers the option to use company specific data for processes and energy use. More background information on the Modint Ecotool can be found at http://www.avnir.org/documentation/book/LCAconf_bijlevel1_2012_en.pdf.

THE PRODUCTS

Van Heek is an industrial supplier of exclusive woven and knitted fabrics. The company is vertically integrated and produces a large range of fabrics, which are dyed and finished in the Van Heek factory in Losser. The finished fabrics are used in various product market combinations. Most important products are textile cover materials for books and luxury packaging, technical textiles e.g. insect-repellent mesh screens, and transparent and blackout window decoration fabrics.

ENVIRONMENTAL POLICY OF VAN HEEK

As Van Heek and its customers are asking about the quantification of the sustainability of the products, Van Heek has assigned MODINT to calculate the carbon footprint of the production facility in Losser. By knowing the impact, Van Heek will start to reduce the environmental impact caused by the production processes. A first step to be taken is to implement a number of good-housekeeping measures in the 4th quarter of 2020. A second step to be taken in the 1st quarter of 2021 is the installation of a water treatment plant, with the potential to reuse the purified water. And a 3rd step will be the installation of solar panels to reduce the carbon footprint related to the electricity use of especially the weaving and knitting machines. Van Heek Textiles has decided to start buying certified non-fossil derived electric energy from January 2021 on. In this report the effect of using green (wind) energy is simulated for the electricity consumption in 2019.

CARBON FOOTPRINT

The carbon footprint at Van Heek is determined by external processes and by internal processes. The focus in this report is on the internal processes

- ✓ The raw materials (yarns, paper) purchased (including the footprint of the transport)
- ✓ The production processes at the Losser factory performed in 2019
- ✓ The transport of the finished goods to the customers

In the next tables the results of the footprint calculations are given (besides the carbon footprint also the energy use is given). The carbon footprint of the energy used is based on the Dutch electricity mix. Although most of the yarns are spun in foreign countries (with each their own specific energy mix), it was decided to use the Dutch electricity mix in all the carbon footprint calculations to make them comparable with the results of the calculation of the footprint of the Losser factory of Van Heek.

CARBON FOOTPRINT OF THE RAW MATERIALS PURCHASED BY VAN HEEK

Van Heek processes yarns made out of cotton, polyester, cotton/polyester blends and viscose. The carbon footprint of the production of these fibers and the spinning of the fibers to yarn is calculated. It is assumed that the spinning of the yarns takes 1,63 MJ/kg.

	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Materials	5,076	5.76	102,476	116.2
Yarn spinning	775	0.88	1,060	13.7
Paper	277	2.08	4,304	32.4
Transport	114	0.13	1,965	2.2
Total	6,242	8.85	120,805	164.5

With respect to the transports of the raw materials only the distances between the supplier and van Heek are calculated. As some materials are purchased from trading companies, and the origin of the materials is not always known, the actual impact of the transport may be somewhat higher. However this will influence the outcome of the total impact of the incoming goods only by 1 or 2 percent maximum (transport is calculated now as 1,8% of the impact of the incoming goods).

CARBON FOOTPRINT OF THE PRODUCTION PROCESSES AT THE LOSSER FACTORY OF VAN HEEK IN 2019

In order to calculate the footprint of the textile processes, an inventory was made of the energy used (electricity and natural gas) as well as the chemicals used in the processes. Main chemicals used are starches, dyes and pigments, polymeric dispersions and salts. For the polymeric dispersions it is assumed that the dry matter content is 50%. The processes include weaving (incl. sizing) or knitting, desizing or washing, bleaching, dyeing, coating and

laminating with paper. Only the total amount of energy use as well as the total production are given, so no specification per process step can be given.

The results of the calculations are given in table 2.

	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Energy	5,449	6.19	90,269	102.5
Chemicals	1,744	2.13	46,477	56.6
Total	7,193	8.31	136,746	159.1

The products produced are sold world-wide by Van Heek. Most of the transports are by truck (mainly European destinations), by boat (America's and Asia) and some products are shipped as air freight. The environmental impact of the transport of the products to the customers is given in table 3.

	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Truck	73	0.10	1,245	1.7
Air	217	8.59	3,277	129.6
Boat	14	0.09	218	1.5
Total	304	0.33	4,740	5.1

From table 3 it becomes clear, that air freight has an enormous environmental impact. Although only 2,7 % of the product is shipped in this way, the environmental impact of air freight is nearly 70% of the impact of the transport of the outgoing products.

The totals of the calculations of tables 1, 2 and 3 give the total impact of the finished goods of Van Heek from cradle to gate or (more precisely) from cradle to customer. These totals are given in table 4.

	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Raw materials	6,242	8.85	120,805	164.5
Processing at Van Heek	7,193	8.31	136,746	159.1
Transport to customer	304	0.33	4,740	5.1
Total	13,739	17.49	262.291	328.7

From table 4 it can be seen that the processes of the Van Heek Losser factory are responsible for about 52% of the carbon footprint of the product and 48% of the energy consumption.

As stated before, Van Heek is planning to reduce their impact with respect to the carbon footprint by a number of measures which are planned for 2020 and 2021.

SIMULATION OF THE USE OF NON-FOSSIL ELECTRIC ENERGY AT VAN HEEK LOSSER

Starting January 2021, Van Heek Textiles will be using non-fossil electric energy at their plant in Losser. When non-fossil electric energy was already used in 2019, the footprint of the production would have been lowered. The results of this simulation are given in table 5.

TABLE 5: SIMULATION OF THE CARBON FOOTPRINT OF PRODUCTION PROCESSES AT VAN HEEK (2019), ASSUMING THE USE OF NON-FOSSIL ELECTRIC ENERGY				
	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Energy	2,720	3.09	53,547	60.8
Chemicals	1,744	2.13	46,477	56.6
Total	4,464	5.22	100,024	117.4

If table 4 (total carbon footprint from cradle to gate) is adjusted for the use of non-fossil electric energy, this will result in a lowered footprint, as is showed in table 6.

TABLE 6: CARBON FOOTPRINT FROM CRADLE TO GATE VAN HEEK PRODUCTS IN 2019, ASSUMING THE USE OF NON-FOSSIL ELECTRIC ENERGY				
	CO ₂ -eq total (ton/yr)	CO ₂ -eq kg/kg	Energy use total (GJ/yr)	Primary energy use (MJ/kg)
Raw materials	6,242	8.85	120,805	164.5
Processing at Van Heek	4,464	5.22	100,024	117.4
Transport to customer	304	0.33	4,740	5.1
Total	11,010	14.4	225,569	287.0

CONCLUSION

The change from using fossil derived electricity to non-fossil (wind) derived electricity reduces the carbon footprint of Van Heek Textiles products with 19.8%. For the activities at the Losser factory of Van Heek this reduction is 37.9%