EPD

MICROFIBRE FOR INTERNAL COVERINGS FOR THE AUTOMOTIVE SECTOR

NABUK PLUS

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An EPD should provide current information, and may be updated if conditions change.

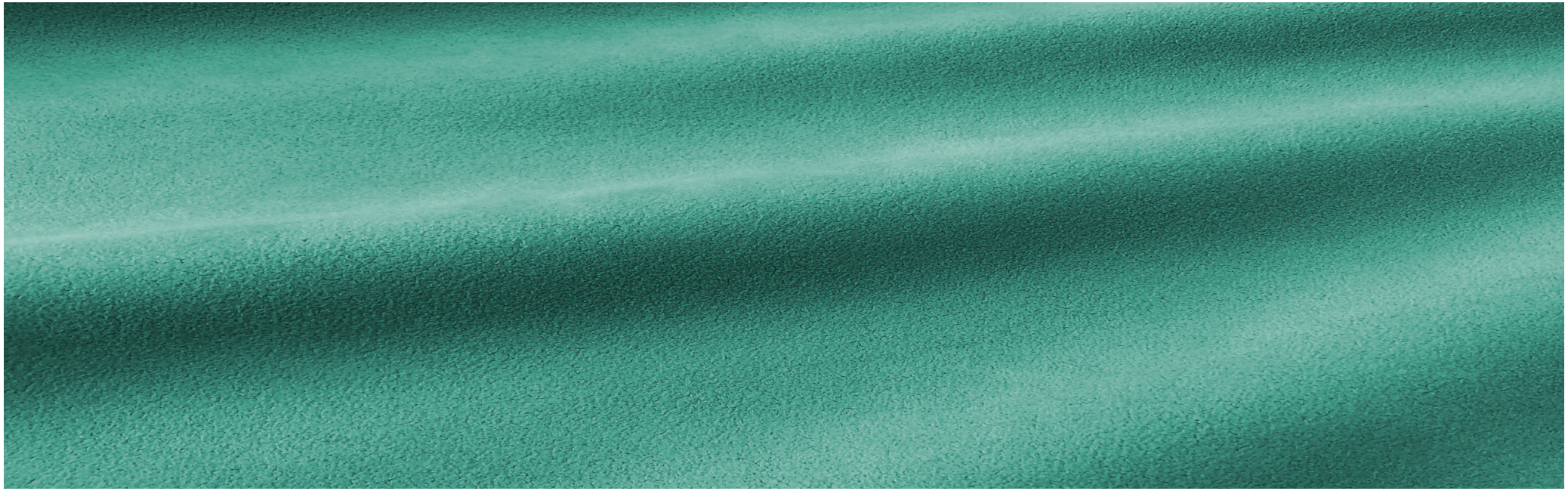
The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

This EPD is compliant with ISO 14025

Dinamica® by MIKO

ENVIRONMENTAL PRODUCT DECLARATION

EPD®



1. Company and product description

1.1 THE GROUP

Miko S.r.l. was established in 1997 in Gorizia as a producer of non-woven microfibres for the furniture sector. Miko's core business is the production of **Dinamica® by Miko**, a microfibre obtained from recycled PET fibres, produced using processes that pay attention to environmental sustainability. Through the years, Miko has broadened its product range to respond to the demands of other areas of application including the automotive sector. Today, internal car coverings constitute the main sector of use for Dinamica®.

In 2015, Miko was acquired by **Sage Automotive Interior**, one of the world's leading providers of automotive bodycloth with headquarters in South Carolina (U.S.) and in 2018 the Sage Group including Miko was purchased by the Japanese **Asahi Kasei**, the producer of the raw material of Dinamica®.

1.2 THE PRODUCTION SITES

Miko's headquarters are in Gorizia, via Ressel 3. The whole process takes place at this exclusive site in Italy: transformation, dyeing and finishing of the raw support supplied by the Japanese partner **Asahi Kasei**, to obtain a product that meets the requirements of customers and the sector. The company is mainly active in the following geographical areas: Europe, North and South America, Asia and Australia.

The production of Dinamica® for the automotive sector has been continuously expanding since 2010 and currently accounts for 95% of Miko's production. Following significant revenue increases, the Sage Group and Asahi Kasei have adopted important commercial and production strategies based on new car programs.

1.3 ENVIRONMENT AND RESPONSIBILITY

Environment

Over the years, Miko has demonstrated **its constant and active commitment to preventing and minimizing the impacts of its processes and products on the environment**, a commitment to which the adopted Environmental Policy bears witness.

Since its establishment in 1997, Miko applies the principles of the Circular Economy with the main objective of limiting the use of virgin raw materials in favor of **secondary raw materials** (fig. 1.1). In the case of Dinamica® it is possible to speak of real **upcycling** because the waste of plastic origin (PET) becomes a raw material of higher value compared to previous life. Dinamica® is in fact applied to products for the luxury, design and hi-tech segments. **Plastic is too valuable to be disposed as waste**: to ensure circularity throughout the life cycle of the microfibre, Miko is advancing some proposals to **recycle Dinamica® at the end of its life** transforming it into also for the automotive sector, such as panels for thermal and acoustic insulation. These proposals have already been shared with some major European car manufacturers and fit into Miko's future environmental sustainability development programs.

Miko considers **respect for the environment and sustainable development** as strategic factors in the exercise and development of its activities and decisive for consolidating its leadership in the market. For these reasons, the organization has adopted a **Life Cycle Thinking approach and credible communication** of the environmental performance of its products.

With the aim of making systematic the method applied for the **EPD® certification of the Dinamica® Auto line** (EPD No. SP-00351) to all the company's products, Miko laid the foundations of a project completed in 2013 with the certification of the EPD® Process.

This certification gives Miko the possibility to internally handle the management of EPD® data involved in the verification procedure by itself and issue new EPDs for registration. This will lead to eco-design: products designed to increase the environmental performances of Dinamica®.

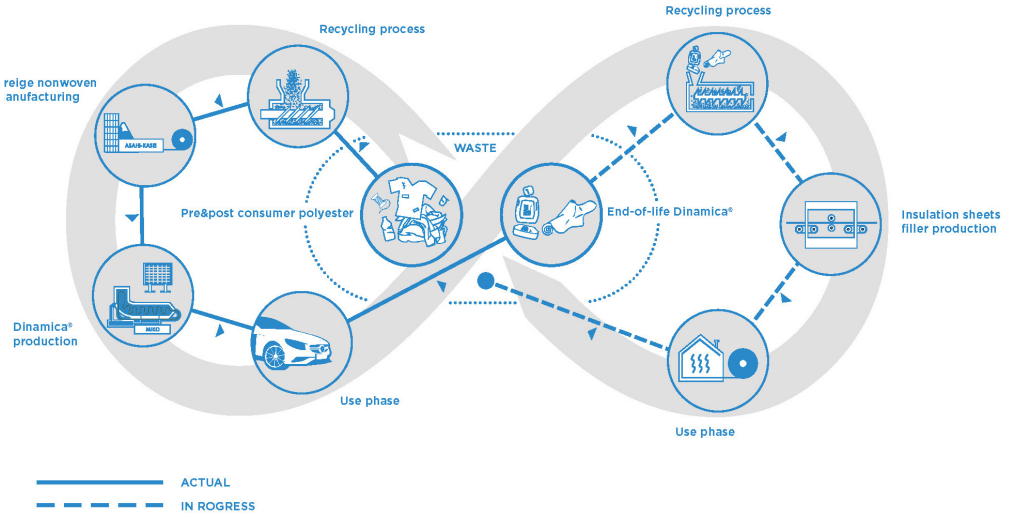


Fig. 1.1 Miko and Circular Economy

In this context, the strategic objectives pursued by Miko are:

- to communicate the environmental data of its products through EPD® certifications;
- to monitor the environmental impacts associated with the life cycle of products through LCA;
- to improve the environmental performance of products through eco-design, in synergy with the objectives of the environmental policy;
- to activate partnerships with its customers and suppliers in order to obtain information about the environmental performance of products during the various stages of the supply chain, and to evaluate opportunities for improvement;
- to provide guidance to stakeholders through specific initiatives, to raise external awareness and communication activities, and to train the employees on the most important environmental issues.

Miko's attention to environmental issues is also evidenced by the certification of the Environmental Management System (EMS) in accordance with the **ISO 14001** standard, which allows to systematically monitor the impacts due to the activities carried out by the various production phases and which guarantees regulatory compliance of the organization. Miko's production processes are certified by **ISO 9001 and ISO / TS 16949**, which certifies the compliance of its business processes with the most advanced quality management system in the automotive industry. Starting from February 2018, Miko has obtained the **IATF 16949:2016** certification which replaces the old ISO / TS 16949 specification.

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With the scope to improve its environmental performance, in recent years Miko has developed important projects that have contributed to optimizing production cycles leading to a significant reduction in energy consumption, water and chemical products used in the various stages of production. Furthermore, since 2014, Miko has reduced the consumption of process water by adopting an internal recirculation system of the part of water used for the washing phase.

In 2017, R&D activities focused on some specific activities applied to internal processes and in particular:

• the optimization of dyeing cycles with a consequent reduction in the consumption of water for the washing of Dinamica® and of chemical products for dyeing

• the use of raw material with 70% and 90% of black fiber in order to reduce the amount of colorants used in dark-based recipes

With a view to always supply cutting-edge microfibre products of high quality, in 2020 Miko designed **a new line for cars called Pure** featuring a much higher proportion* of recycled polyester fibres made from a mixture of pre and post-consumer origin ensuing the usual technical performance.

Since 2013, Miko has covered part of its electrical energy needs through renewable energy from the 1 MW photovoltaic plant located on the roof of the production plant, further evidence of its commitment to the application of the fundamentals of the Circular Economy. In addition, starting from 2021, **the company purchases the remaining amount of electricity from renewable sources** covered by Guarantee of Origin.

* For example, from 45% to 73% of recycled polyester when Dinamica Auto is compared with Dinamica Pure (source: EPD S-P_00351 v.3.1)

Responsibility

On July 26th 2013, the Board of Directors of Miko S.r.l. formally adopted the **Organization and Management Model** (Modello di Organizzazione e Gestione), pursuant to Legislative Decree no. 231/01 (Liability of legal persons), together with the relevant Code of Ethics and Conduct both under review from 2017 in order to adapt to current regulatory changes. This fundamental document is geared to ensure fairness and transparency in the conduct of business and corporate activities, to protect its position and image, as well as the expectations of its stakeholders.

In 2014, Miko obtained the authorization for emissions into the atmosphere, discharge of industrial wastewater and compliance with the forecast of the future acoustic zoning of the industrial zone with a validity of 15 years. During the same year, the organization implemented an accident prevention and protection system - emergency management - technically updating its staff and experimenting with specific risk scenarios.

1.4 THE PRODUCT

The product covered by this EPD is the microfibre Dinamica® Nabuk Plus, Art: 100.N407.

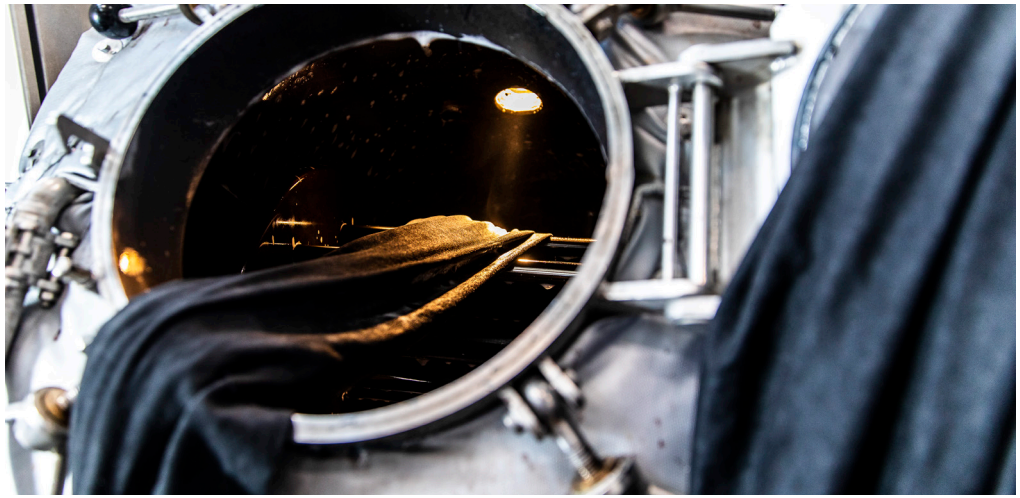
Dinamica® by Miko is the made-in-Italy microfibre which is produced in part by using **recycled polyester** (the recycled content varies according to the product line and application) **without the use of organic solvents** but using a water-based process**. The manufacturing process used by Dinamica® makes it possible to extract fewer virgin raw materials since it uses a part of **recycled fibres of waste products** which would otherwise be sent to landfill sites or incinerated, thereby reducing CO_2 emissions and other environmental impacts associated with these processes.

Under the microscope, **Dinamica®** is composed of three layers: face, inner scrim and backing. Submerged in a water solution, the inner scrim attracts small polyester fibres, which are suspended in the liquid, to both surfaces; these are compacted using a water-based needle punching process. The microfibre is then immersed in a **water polyurethane bath**, which, in contrast to normal production cycles, does not contain the solvents that are harmful to health and the environment. This process compacts the fibres, making them elastic and resistant. During the dyeing and finishing stage, the production cycles are optimised and monitored managing the energy consumption at best and minimising the waste of chemical products and water which is then drained through our purifier and partially re-used.

In 2019, Dinamica® received the "PETA-approved Vegan" certification, attributed by PETA to companies that undertake not to use raw materials of animal origin in the making of their products.

For the automotive sector, Dinamica® Nabuk Plus was developed in 2010 with the scope to satisfy some specific aesthetics requests.

**For example, DMF and trichloroethylene that can be used to manufacture synthetic materials.



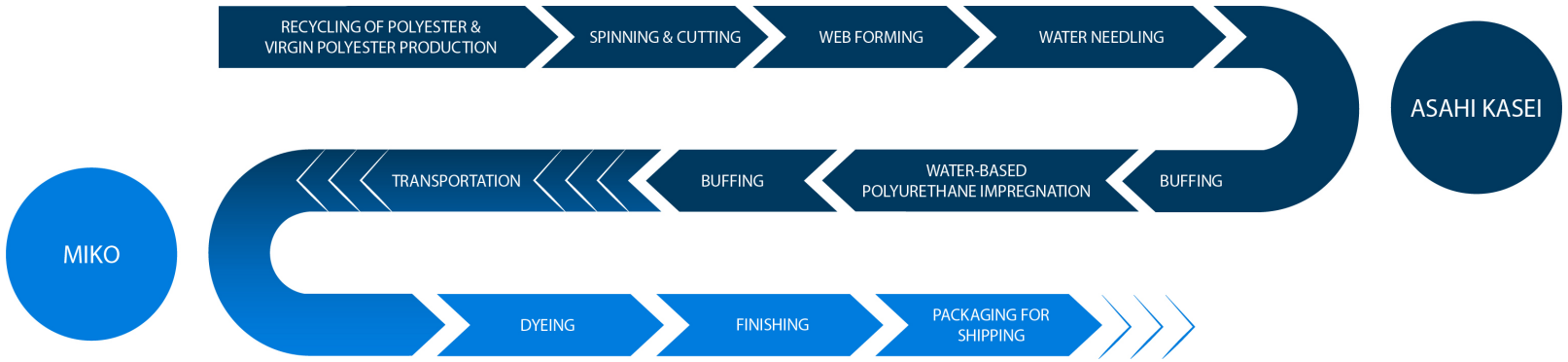


Fig. 1.2 - Dinamica® Nabuk Plus production process from Asahi Kasei to Miko

Physical & mechanicals Properties od Dinamica®Nabuk Plus

Dinamica® Nabuk Plus is tested according to the requirements of the automotive sector through the application of control plans that include all the different regulations applicable by customers. The following table contains a summary of the methods (widely used international standards) Miko applies and refers to while testing different properties of **Dinamica®**.

The selection of the standards presented in the below table contains a whole set of simulations of the performance of the product when it is processed and put on the market for use:

TYPE OF TEST	TEST METHOD	UNIT	Value
Weight	ISO 12127	g/m²	350
Thickness	ISO 5084	mm	1,05
Usable width	UNI EN 1773	mm	≥ 1400
Tensile strength	ISO 13934/1	N/5cm	≥ 600
Tear strength	ISO 13937/2	N	≥ 25
Abrasion resistance with Martindale	ISO 12947	Cycles	35000
Flame behavior	FMW SS 302	mm/min	≤100
Color tolerance versus master sample	≥ 4 Grey scale (ISO 105-A02)		

Tab. 1.1 Technical specification of Dinamica® Nabuk Plus microfibre

The above data are indicative and generally represent the Dinamica® **Nabuk product family. Dyeing and physical-mechanical performances of Dinamica®** Nabuk are established ad hoc in specific technical specifications signed according to the user's needs.

1.5 PRODUCT COMPOSITION

Dinamica® Nabuk Plus

19% recycled polyester
68% virgin polyester
13% polyurethane.

The recycled polyester comes from pre and post-consumer polyester.

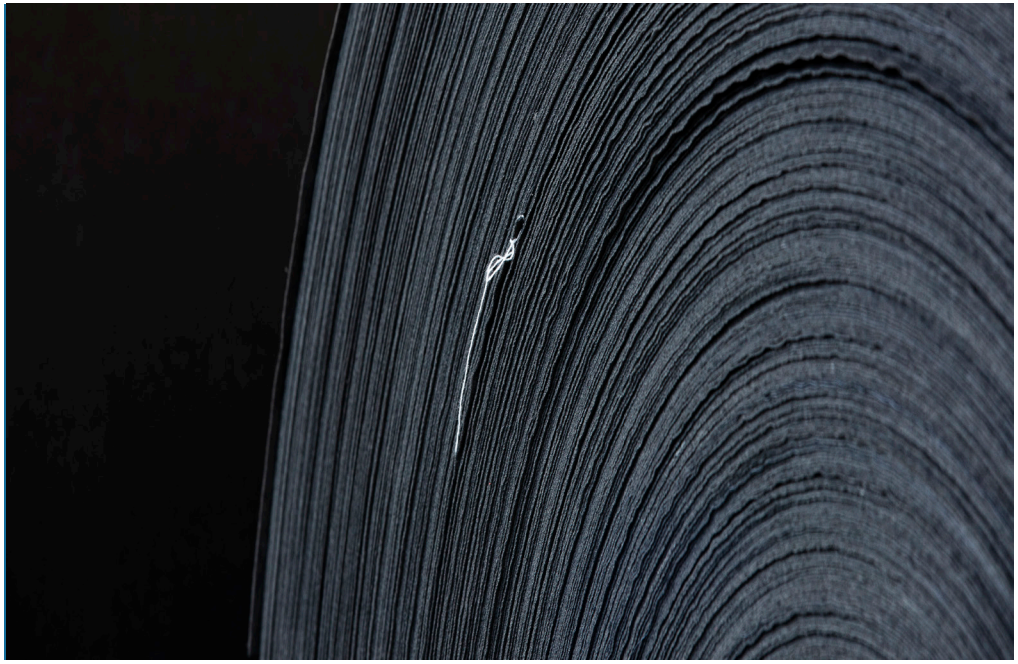
1.6 INFORMATION ON THE PHASES OF USE AND END-OF-LIFE MANAGEMENT

Dinamica® Nabuk Plus is a microfibre used to cover seats, pillows, bolster, armrest, piping, headrests, and parcel shelf. Thanks to its excellent performance, it is also suitable for bolster and armrest applications where the microfibre is subjected to a high level of abrasion. At the end of its life cycle, **Dinamica®** is disposed of in **compliance with the directives concerning vehicles in the various countries of use and disposal. Miko is starting partnerships with some European car manufacturers interested in monitoring the life cycle of Dinamica® from cradle to grave. This study will allow us to understand the concrete impact of Dinamica® on the environment but will also offer** food for thought on the end-of-life management of non-woven fabrics. Some initial tests have shown that **Dinamica®** can be recycled and fully transformed into semi-finished products such as thermal and sound insulation panels.

2. Evaluation of environmental performance

The environmental performance of **Dinamica®** has been assessed using the LCA (Life Cycle Assessment) analysis method, starting from the extraction of the raw materials up to the completion of the finished product and its packaging.

The study was carried out in conformity with the ISO 14040 standards, following the Product Category Rules (PCR), approved by the technical committee of the International EPD System: PCR 2011:06 NONWOVENS FOR CLOTHING, PROTECTIVE CLOTHING AND UPHOLSTERY.



2.1 DECLARED UNIT

The declared unit is represented by 1m^2 of **Dinamica®** non-woven fabric with a weight of:

350 g/m^2 for **Dinamica® Nabuk Plus**.

2.2 SYSTEM BOUNDARIES

The system boundaries, presented in Figure 2.1, include the **Upstream Processes and the Core Processes** of the microfibre **Dinamica®**. The definition of the system boundaries complies with the rules laid down in the referenced PCR document.

The Upstream Processes include:

- extraction and processing of the raw materials;
- production of inputs for the production of the raw non-woven fabric;
- production of chemicals for dyeing, finishing and water treatment;
- production of packaging for the non-woven fabric and the finished product;
- transport of waste for the production of recycled PET.

The Core Processes include:

- production of raw non-woven fabric;
- dyeing and finishing;
- treatment of process waters;
- transport of inputs for the production of raw non-woven fabric;
- transport of chemicals for dyeing, finishing and water treatment;
- transport of the raw non-woven fabric;
- transport and treatment of waste produced in the various phases.

The treatments of the process waters and production waste are included in the system boundaries. Moreover, the R&D activities (electricity consumption, chemicals, etc.) are included in the system boundaries.

Due to the lack of reliable data, Use phase and End-of-life treatment are excluded from the system boundaries

2.3 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a **minimum of 99%** of the declared environmental impacts have been included.

2.4 DATA QUALITY

The data quality requirements considered in the study are those laid down in the referenced PCR document. In line with these rules, **specific data taken directly from the production sites for the year 2021** were used, as well as secondary data taken from the **Ecoinvent v.3.7.1 database**.

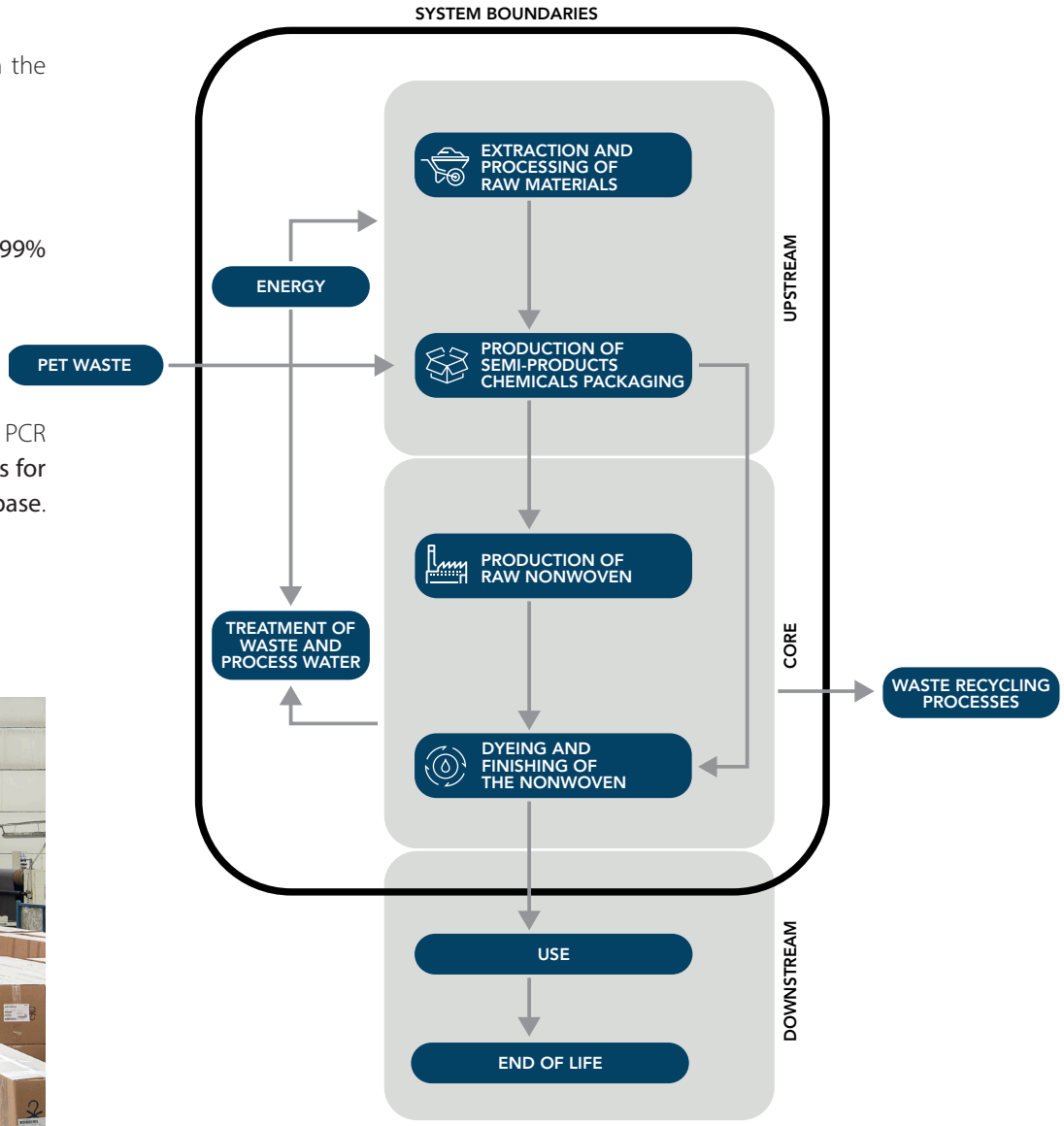


Fig. 2.1 – System boundaries

UPSTREAM PROCESSES

RAW MATERIAL PRODUCTION

Extraction and processing of the raw materials, the production of all input materials for the raw non-woven, the dyeing, and finishing as well as for the production of packaging.

PACKAGING PRODUCTION

CORE PROCESSES

RAW NON-WOVEN FABRIC PRODUCTION

Core Processes carried out by Asahi Kasei (Japan) include all the operations for the production of raw non-woven fabric.

RAW NON-WOVEN FABRIC TRANSPORT

Transport of the raw non-woven fabric.

DYEING AND FINISHING

Core Processes carried out by Miko include all the operations for dyeing and finishing of the raw non-woven fabric which lead to Dinamica® final products.

2.5 ENVIRONMENTAL PROFILE OF THE PRODUCT

Here below are the environmental profiles of Dinamica® Nabuk Plus.

The data concern the production of 1 m^2 of non-woven fabric, divided into Upstream Processes and Core Processes.

In the tables totals may not match because of rounded data.

2.5.1 ENVIRONMENTAL PERFORMANCE DINAMICA® NABUK PLUS

Environmental Impacts

PARAMETER		UNIT	UPSTREAM		CORE			TOTAL
			RAW MATERIALS PRODUCTION	PACKAGING PRODUCTION	RAW NON-WOVEN FABRIC PRODUCTION	RAW NON-WOVEN FABRIC TRANSPORT	DYEING AND FINISHING	
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1,79	0,09	3,19	0,49	1,13	6,69
	Biogenic	kg CO_2 eq.	3,6E-03	2,0E-03	3,3E-03	4,7E-05	1,2E-02	2,0E-02
	Land use and land transformation	kg CO_2 eq.	1,3E-03	4,8E-04	6,1E-04	4,9E-05	2,2E-04	2,6E-03
	TOTAL	kg CO_2 eq.	1,79	0,10	3,19	0,49	1,14	6,71
Acidification potential (AP)		kg SO_2 eq.	8,0E-03	4,5E-04	1,3E-02	3,1E-03	2,1E-03	2,7E-02
Eutrophication potential (EP)		kg PO_4^{3-} eq.	2,4E-03	2,4E-04	3,3E-03	4,4E-04	5,7E-04	7,0E-03
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq.	7,3E-03	4,5E-04	8,0E-03	3,2E-03	2,0E-03	2,1E-02
Abiotic depletion potential – Elements		kg Sb eq.	2,3E-05	1,0E-06	9,1E-06	1,6E-07	3,4E-06	3,7E-05
Abiotic depletion potential – Fossil fuels		MJ, net calorific value	32,5	1,16	37,2	6,90	18,3	96,0
Water scarcity potential		m^3 eq.	1,3E+00	5,8E-02	5,4E-01	4,8E-03	5,3E-01	2,4E+00

Recycled material content per declared unit

The recycled content in 1m^2 of Dinamica® Nabuk Plus corresponds to approximately 19% of the total product weight.

Use of resources

PARAMETER		UNIT	UPSTREAM		CORE			TOTAL
			RAW MATERIALS PRODUCTION	PACKAGING PRODUCTION	RAW NON-WOVEN FABRIC PRODUCTION	RAW NON-WOVEN FABRIC TRANSPORT	DYEING AND FINISHING	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,69	0,79	2,39	0,02	3,45	8,35
	Used as raw materials	MJ, net calorific value	0,36	0,63	0,61	0,01	0,35	1,96
	TOTAL	MJ, net calorific value	2,05	1,42	3,00	0,03	3,81	10,3
Primary energy resources – Non Renewable	Use as energy carrier	MJ, net calorific value	30,0	1,38	41,7	7,35	20,8	101
	Used as raw materials	MJ, net calorific value	7,72	0	1,54	0	0	9,26
	TOTAL	MJ, net calorific value	37,7	1,38	43,3	7,35	20,8	111
Secondary material		kg	0,06	0	0	0	0	0,06
Renewable secondary fuels		MJ, net calorific value	0	0	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0	0	0
Net use of fresh water		m^3	3,0E-02	1,8E-03	7,9E-02	1,9E-04	1,3E-02	1,2E-01

Waste production and output flows

Hazardous waste disposed	kg	1,6E-03	4,2E-06	4,2E-05	1,8E-05	3,7E-05	1,7E-03
Non-hazardous waste disposed	kg	2,1E-01	2,7E-02	4,1E-01	4,3E-03	5,4E-02	7,0E-01
Radioactive waste* disposed	kg	5,9E-05	3,5E-06	8,1E-05	4,9E-05	1,2E-05	2,1E-04
Components for reuse	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Material for recycling	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,1E-02	2,1E-02
Materials for energy recovery	kg	0,0E+00	0,0E+00	8,6E-03	0,0E+00	9,1E-03	1,8E-02
Exported energy, electricity	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	6,1E-02	6,1E-02
Exported energy, thermal	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

(*) related to the energy mix dataset used for the LCA modelling


ID.

3. Additional environmental information

3.1 COMMITMENT TO CLIMATE POSITIVE

In line with its commitment in taking care of the environment, Miko has activated new projects of restoration and preservation of forests certified by FSC® in order to become **Climate Positive by 2030**. Not only Miko is aiming to capture 100% of its total emissions but also to generate a positive social and environmental impact.

Miko is committed to achieve this goal by taking intermediate steps which include:

- reducing and off-setting the direct GHG emissions generated by the production plant in Gorizia (Scope 1 and 2)
- compensating the indirect GHG emissions of the pre-production stages involved in the production of the raw materials (upstream process) and by the following stages in Asahi Kasei (core process) up to when the goods are delivered to Miko.

RAW MATERIALS PRODUCTION

Extraction and processing of the raw materials, production of all input materials for the raw non-woven, dyeing, and finishing as well as for the production of packaging.

RAW NON-WOVEN FABRIC PRODUCTION - ASHAI-KASEI

Core processes carried out by Asahi Kasei in Japan which include all the operations for the production of raw non-woven fabric.

RAW NON-WOVEN FABRIC TRANSPORT

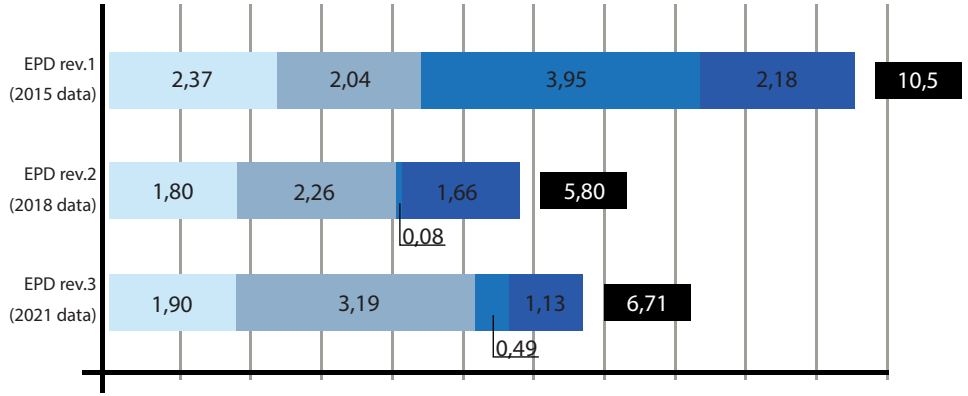
Transport of the raw non-woven fabric from Asahi Kasei plant (Japan) to Miko plant (Italy)

DYEING AND FINISHING - MIKO

Core processes carried out by Miko which include all the operations for dyeing and finishing of the raw non-woven fabric which lead to Dinamica® final products.

3.2 TREND OF THE CARBON FOOTPRINT

The following chart shows the trend of the Carbon Footprint data for Dinamica® Nabuk Plus. The scheme emphasizes the impact of the raw material production, raw nonwoven fabric production (Asahi Kasei – Japan), raw non-woven fabric transport, Dyeing and finishing (Miko - Italy). The results refer to 1m² of microfibre. The trend of the carbon footprint shows a worsening of the indicator compared to the calculation carried out with the 2018 data, mainly due to the method of shipping the raw nonwoven fabric from Japan which required a contribution by plane and the increase of the energy load necessary for the production of the raw fabric, direct consequence of a refinement of the LCA data collection methods which are now more accurate and specific for raw nonwoven fabric produced. The contribution relating to the dyeing and finishing phase carried out in Miko, on the other hand, decreased thanks to the adoption of electricity entirely from renewable sources.



4. Additional information

CONTACTS

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Product category rules (PCR):	PCR 2011:06 nonwovens for clothing, protective clothing and upholstery, v. 3.01, CPC 27922
The review of the PCR document was conducted by:	Technical Committee of the International EPD® System
Chair:	Filippo Sessa info@environdec.com
PCR Moderator:	Paolo Simon Ostan
Independent verification of the declaration and data, according to ISO 14025:	☒ EPD Process Certification ☐ EPD Verification
Third party verifier:	SGS Italia S.p.A. via Caldera, 21 _ 20129 - Milano Tel. +39 02.73931 - Fax +39 02.70124630 - www.it.sgs.com
Accredited by:	ACCREDIA, certificate n. 006H

Programme operator:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm - Sweden — www.environdec.com

EPD within the same product category, but form different programs may not be comparable

Miko s.r.l. has the sole ownership, liability and responsibility of the EPD

DIFFERENCES from EPD® rev2.1, October 2021

Specific data for the year 2021 and generic data from Ecoinvent v.3.7.1 database were used

Updated technical sheet on paragraph 1.4

Updated figures: 1.1, 1.3, 3.1

Other minor editorial and stylistic changes

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