



THE INTERNATIONAL EPD® SYSTEM

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NUREL, S.A

The International EPD® System, www.environdec.com

EPD International AB

According to ISO 14025

A background image showing several spools of white synthetic yarn, arranged in a circular pattern, partially obscured by the central text.

ENVIRONMENTAL PRODUCT DECLARATION FOR RECONYLON YARN BY NUREL, S.A.



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1 INFORMATION ABOUT THE PROGRAMME.



This Environmental Product Declaration is developed under the PCR of the following programme:

- Programme name: **The International EPD® System**
Programme operator: **EPD International AB.**



- Address of programme operator:
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com
- EPDs within the same product category but from different programmes 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 characterisation factors); have equivalent content declarations; and be valid at the time of comparison.
- The EPD holder has the sole ownership, liability and responsibility for the EPD.
- PCR reference document on which the EPD is based:
Product category rules (PCR): PCR 2013:12 version 3.0
Textile yarn and thread of natural fibres, man-made filaments or staple fibres, version 2.1. UN CPC 263 & 264. Valid to: 2026-02-25
- PCR review was conducted by:
The Technical Committee of the International EPD® System.
Hüdai Kara- contact via info@environdec.com.
- Verification of the Declaration and data by an independent third party in accordance with ISO 14025:2006:
 EPD process certification EPD verification Pre-verified tool
- Third-party verification:
Cristina Gazulla Santos (Tecnalia R&I Certification)
- Approved by:
The International EPD® System Technical Committee, supported by the Secretariat
Accreditation body: ENAC. Accreditation no.125/C-PR283
- The procedure for monitoring the data during the validity of the EPD involves the third-party verifier:
 Yes No
- Registration number: **UN CPC 263 & 264. 2013:12 Version 0.3.**
- Date of publication: 2019.02.08.
Valid until: 2028.12.18.
Revision Date: 2023.12.20.
- Geographical scope of application of the EPD: **global.**
- Year of reference of the data used in the EPD: **2022.**
- Reference to useful websites for obtaining further information:
www.environdec.com
www.nurel.com

The EPD must provide up-to-date information and may be updated if conditions change. The stated validity is therefore subject to registration and publication on www.environdec.com.

2 INFORMATION ABOUT THE PRODUCT.



2.1. COMPANY INFORMATION AND CONTACT DETAILS.

- Company name: **NUREL, S.A.**
- Issuer and contact data: **NUREL, S.A., José Carlos Martín**
- Address: Ctra. Barcelona, km 329, 50016 Zaragoza (España)
- Telephone: +34 976 465 579
- Production centre: Ctra. Barcelona, km 329, 50016 Zaragoza (España)
- Production country: España



The production of polyamide fibers at **NUREL** began in 1968, and in 1999, the SAMCA group acquired the company. SAMCA's entry led to successive investments in polymerization and new spinning facilities. Thanks to these investments and the security of being part of a robust industrial group, **NUREL has positioned itself as a leading global supplier of polyamide 6 and 6.6.**

NUREL's production plant in Zaragoza, Spain, is structured into **three distinct business units: ENGINEERING POLYMERS, BIOPOLYMERS, and SYNTHETIC FIBERS**, with a combined turnover of approximately **170 million euros**. The polymerization capacity reaches **27,000 tons**, with **49,000 tons of compounds** and **7,500 tons of yarn production**. Currently, NUREL employs **350 people**.

About **80%** of its production is exported to major markets within and outside the EU.

Production operations at NUREL are **rigorously aligned with its Health, Safety, and Environmental Protection policy**, which takes precedence over any other objectives in the company.

NUREL is committed to **promoting sustainability in all its products and processes**, conducting comprehensive analyses of environmental impacts from creation to the final use of products through **Life Cycle Assessments (LCA)**. These LCAs enable the **comparison of environmental impacts between similar products and processes**.

NUREL demonstrates its commitment to sustainability by **recycling and recovering the majority of hazardous chemicals generated to minimize their environmental impact**. The Zaragoza plant is specifically designed to carry out the recovery and recycling of a significant portion of waste, contributing to responsible resource management and the **reduction of its environmental footprint**.

Recently, NUREL has introduced an **electrical supply system based on renewable sources**, primarily consisting of **renewable energy (81%)**. Additionally, a significant percentage of electrical energy (**19%**) **comes from photovoltaic solar panels installed in our plant**, used in both production processes and general services.

Furthermore, NUREL has made a significant investment in a **new recycling line**, resulting in the creation of the advanced **Reco Nylon®** product line. These polyamide fibers are manufactured using the valorization of waste generated during the production process of polyamide 6.

2.2. INFORMATION ON THE COMPANY THAT IS THE AUTHOR OF THE LCA AND EPD.

The LCA study and the EPD have been prepared by the Packaging, Transport & Logistics Research Center - ITENE, whose contact details are:

- Antonio Dobón López
- Area Manager Recycling Technologies & Valorisation
- Parque Tecnológico. C/ Albert Einstein, 1 46980 Paterna. Valencia - Spain
- +34 627 38 77 27
- antonio.dobon@itene.com



2.3. PRODUCT SPECIFICATION.

Trade name: **Reco Nylon®**.

This EPD includes the manufacture of Reco Nylon® yarn for textile use, produced from pre-consumer waste from NUREL's own industrial manufacturing process.
CPC code: 2642.

For the calculation of this DAP, all references of the Reco Nylon family manufactured in 2022 have been considered. Among these references there are technical differences in terms of their title, tenacity and elongation, so that we obtain an average value of the total manufacturing 2022. Pertinent information from the technical sheets can be requested upon request to tecnico@samca.com

	Information	Preferred methods
Description of the commercial article	Reco Nylon®	
Basic polymer	100% Polyamide/100% Nylon	EN ISO 1043-1:2011/ISO 2076:2010
Type of yarn or fibre	Filament yarn	ISO 8159:1987
Type of processing	Oriented Yarn Spinning (POY)	
Intended use	Textile	
Properties	Count (dtex)	ISO 2060:94
	Tenacity at break (CN/Tex)	ISO 2062:2009
	Elongation(%)	ISO 2062:2009
	Shrinkage (%)	ISO 2062:2009
	Filament number of the final product	no applicable
Other properties	Lustre	no applicable

2.4. GEOGRAPHICAL SCOPE OF THE EPD.

The geographical scope of the EPD is global. It is valid for the sale of all of the product manufactured in NUREL and sold anywhere in the world.

2.5 DECLARED UNIT.

The declared unit is **1 kg of Reco Nylon® yarn for textile use**, accompanied by the corresponding part of the packaging and type of support. The packaging includes both the cops and the reusable folders.

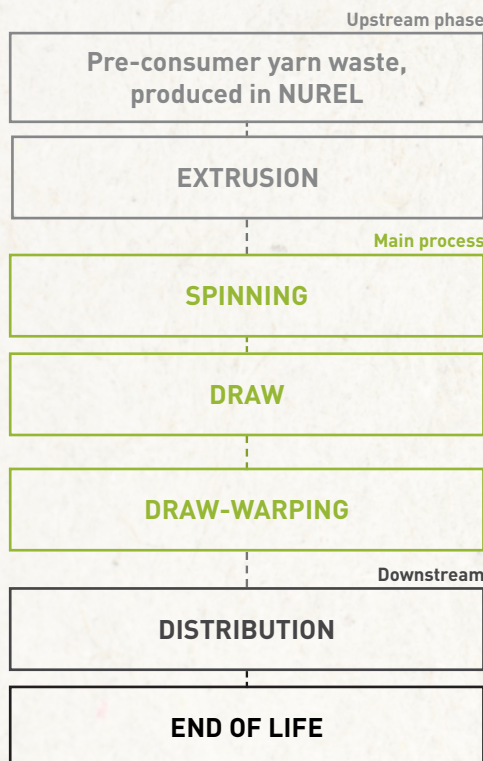
2.6. REFERENCE YEAR OF DATA USED IN THE EPD.

The data used for the WTP are from the **annual data of the 2022 production reports**.

For electricity production, **NUREL, S.A. employs its proprietary electricity mix, comprising 66.6% wind energy, 14.4% hydropower, 18.7% solar energy and 0.3% other renewable energy sources., and 19% from electricity generated by solar panels** installed on the roofs of NUREL, S.A. warehouses. Both forms of electricity are utilized in both the manufacturing process and for general services.

2.7. PROCESS FLOWCHART OF SYSTEM LIMITS STUDIED IN THE EPD.

All of the phases in the life cycle have been studied, **from cradle to grave**, without omitting any material, energy or process in the study. The limits of the system studied in the Life Cycle Analysis are summarised in the diagram and in the following table:



The product system studied is **cradle to grave**.

In the LCA **more than 99% by weight of the materials used in the manufacture of the yarns has been studied**. The LCA does not include:

- Any equipment with a useful life of more than 3 years, - nor the construction of plant buildings, nor other capital goods.
- Business trips by personnel or journeys by personnel to and from work.

The **material and energy consumption** of the research activities has been included in the General Services section, allocated by mass, with respect to the total production of the plant.

In the **downstream** phase, the transport of the yarns to the customers is considered, applying a weighted average for the most relevant customers in 2022 that the transport distance is 1,333 km by road.

The end-of-life is also included considering a generic scenario for apparel where 44% of the yarn goes to landfill, 39% to incineration with energy recovery and 17% to recycling. The scenario is based on the draft PEFCR for apparel and footwear [2022].

2.8. CUT-OFF RULES.

As a general rule, in accordance with the criteria of the PCR, the LCA includes the **weight/gross volume of all of the materials used in the manufacturing** process so that at least 99% of the weight of the product unit is obtained.

2.9. ALLOCATION RULES APPLIED.

In accordance with the criteria of the PCR, the criterion applied as been to **allocate the system's inputs and outputs based** on the yarn mass produced. It has not been necessary to apply any other types of allocation criteria such as economic allocation.

2.10. DATA QUALITY ASSESSMENT.

The data used in the EPD **meet the quality requirements set out in the PCR**. Most of the primary data used were taken directly from production and financial reports. For some auxiliary raw materials, data from renowned databases such as Ecoinvent (2023) have been used, looking for similarities in terms of composition and chemical formulation.

2.11. COMPARISON BETWEEN DAPS OF THE PRODUCT CATEGORY.

EPDs within the same product category but from different programmes may not be comparable.

The results presented in this document do not represent comparative statements. However, the results will be disclosed to the public in the EPD, which may be used to compare Nurel's products with similar products presented in other EPDs that follow the same PCR.

EPDs of other similar products from different programmes may not be comparable unless they comply with **EN15804+A2:2019 y PCR 2023:12, version 3.0**.

2.12. UNITS AND QUANTITIES.

The units required in the PCR are used. Decimals are indicated with commas, in French style of the International System; for example, 2,156.234.

3 CONTENT DECLARATION OF MATERIALS AND CHEMICAL SUBSTANCES.



The composition of **Reco Nylon®** is as follows:

Components	% by total weight	% of biobased material	% of recycled yarn	
			PRE-consumer	POST-consumer
Polyamide / Nylon 6	99.25	0	100	0
Sizings	0.75	0	0	0
Other materials	0	0	0	0
Water	0			
Total	100 %			

Reco Nylon® yarn is manufactured from **pre-consumer waste from NUREL's own industrial manufacturing process** of other NUREL products. The yarn does not contain any pigments or dyes. Neither does it contain materials/substances hazardous to health and the environment, which are carcinogenic, mutagenic or toxic for reproduction (CMR), allergenic, PBT5 or vPvB6.

Reco Nylon® yarn is distributed in two different packaging formats. The most common packaging system is reusable steel folders, which are used in the majority of orders and are intended for customers who require a larger volume of product. Steel folders do not require additional packaging, transporting an average of 180 kg of Reco Nylon thread per folder. Likewise, Reco Nylon thread can be supplied to customers in the format of cops that in turn go in cardboard boxes, and which are used in orders from small customers, being a much less common packaging format than that of reusable folders. In the case of the police officers, an average of 2 kg of Reco Nylon thread was transported.

The packaging formats in which Reco Nylon thread is distributed (COP and Folders) are always reusable formats, being the declared unit ratio 0.031 Kg of folders for each Kg of Reco Nylon and 0.015 Kg of COP for each Kg of Reco Nylon thread.

4 INFORMATION ON ENVIRONMENTAL PERFORMANCE.



4.1. ENVIRONMENTAL IMPACTS.

According to the GPI's v4.0 of the Environdec EPD Programme, environmental performance results are declared for the life cycle stage included (upstream, downstream and main process).

TABLE 4.1. Potential environmental impacts of 1 kg of Reco Nylon®

Impact category	Unit	Upstream	Core	Downstream (only transport to customer)	Downstream (only end-of-life)	Downstream (transport to customer + end-of-life)	Total (excluding end-of-life)	Total (including end-of-life)	
Global warming potential (GWP)	Fossil resources	kg CO ₂ eq.	0.323	1.248	0.395	0.983	1.378	1.966	2.949
	Biogenic sources	kg CO ₂ eq.	-0.008	0.065	1.20·10 ⁻⁰⁴	1.23·10 ⁻⁰⁴	2.43·10 ⁻⁰⁴	0.057	0.057
	Land use and LU change	kg CO ₂ eq.	0.003	0.021	7,75·10 ⁻⁰⁶	1.13·10 ⁻⁰⁵	1.90·10 ⁻⁰⁵	0.024	0.024
	TOTAL	kg CO ₂ eq.	0.317	1.334	0.395	0.983	1.379	2.047	3.030
Acidification potential (AP)	mol H+ eq.	0.001	0.002	4.97·10 ⁻⁰⁴	2.87·10 ⁻⁰⁴	0.001	0.003	0.004	
Eutrophication potential in the marine environment (MEP)	kg N eq.	2.94·10 ⁻⁰⁴	0.001	1.23·10 ⁻⁰⁴	1.88·10 ⁻⁰⁴	3.11·10 ⁻⁰⁴	0.001	0.001	
Eutrophication potential in fresh water (FWEP)	kg P eq.	2.37·10 ⁻⁰⁶	1.18·10 ⁻⁰⁵	3.11·10 ⁻⁰⁷	2.45·10 ⁻⁰⁷	5.55·10 ⁻⁰⁷	1.44·10 ⁻⁰⁵	1.47·10⁻⁰⁵	
Terrestrial eutrophication potential (TEP)	mol N eq	0.003	0.008	0.001	0.001	0.003	0.012	0.013	
Photochemical ozone formation of photochemical oxidants	kg NMVOC eq	0.002	0.002	0.001	3.83·10 ⁻⁰⁴	0.001	0.006	0.006	
Abiotic resource depletion potential - Elements (*)	Kg Sb eq.	4.26·10 ⁻⁰⁸	1.69·10 ⁻⁰⁸	1.36·10 ⁻⁰⁸	1.36·10 ⁻⁰⁸	2.72·10 ⁻⁰⁸	7.31·10 ⁻⁰⁸	8.67·10⁻⁰⁸	
Abiotic resource depletion potential - Fossil fuels (*)	MJ	18.372	5.076	5.259	0.403	5.662	28.708	29.110	
Water shortage potential (*)	m3 depriv.	0.180	1.288	0.005	0.042	0.047	1.473	1.515	
Ozone layer depletion	kg CFC11 eq	1.04·10 ⁻⁰⁷	1.12·10 ⁻⁰⁸	8.55·10 ⁻⁰⁹	1.29·10 ⁻⁰⁹	9.84·10 ⁻⁰⁹	1.24·10 ⁻⁰⁷	1.25·10⁻⁰⁷	

(*) The results of this environmental impact indicator shall be used with care as the uncertainties of the results are high and as there is limited experience with the indicator.

4.2. USE OF RESOURCES.

The consumption of natural resources and other types of resources used by the functional unit are shown, differentiating between the main process, the upstream phase and the downstream phase.

TABLE 4.2. Use of resources for the production of 1 kg of hilo Reco Nylon®

Parameter	Unit	Upstream	Core	Downstream	Total	
Primary energy resources - renewable resources	Use of energy	MJ, net cal. value	0.07	15.27	0.01	15.36
	As raw materials	MJ, net cal. value	0.25	2.58	0.02	2.84
	TOTAL	MJ, net cal. value	0.32	17.85	0.02	18.20
Primary energy resources - non-renewable resources	Use of energy	MJ, net cal. value	0.12	0.05	0.05	0.22
	As raw materials	MJ, net cal. value	20.22	5.44	4.17	29.84
	TOTAL	MJ, net cal. value	20.35	5.49	4.22	30.06
Secondary materials	kg	0.00	0.00	0.00	0.00	
Renewable secondary fuels	MJ, net cal. value	0.00	0.00	0.00	0.00	
Non-renewable secondary fuels	MJ, net cal. value	0.00	0.00	0.00	0.00	
Net consumption of fresh water	m ³	3.72	9.56	0.18	13.47	

Note: Data obtained from SimaPro inventory analysis; raw material compartment..

4.3. WASTE PRODUCTION.

The quantity of waste generated to manufacture the yarn is as follows:

TABLE 4.3.a Generation of waste to manufacture Reco Nylon® yarn (in kg per kg of yarn)				
Parameter	Unit	Upstream	Main process	Downstream
Hazardous waste generated	kg	0	$1,07 \cdot 10^{-02}$	0
Non-hazardous waste generated	kg	0	$1,58 \cdot 10^{-03}$	0
Radioactive waste	kg	0	0	0

Note: data obtained from the SimaPro inventory analysis; final waste flow compartment.

Radioactive waste is not produced in the industrial processes carried out in NUREL.

On the other hand, the production of waste material for recycling that is not recycled in the NUREL manufacturing process is practically negligible, due to the value of the yarn. Only exceptionally small batches of yarn, typically weighing just a few kilograms and potentially stained with oil or similar substances, are dispatched for disposal.

TABLE 4.3.b Indicators of flow outputs from the system in the manufacture of hilo Reco Nylon® yarn (in kg per kg of yarn)				
Parameter	Unit	Upstream	Main process	Downstream
Components for reuse	kg	0	0	0
Material for recycling	kg	0	≈ 0	0
Materials for energy recovery	kg	0	0	0
Exported electrical energy	MJ	0	0	0
Exported thermal energy	MJ	0	0	0

5 DIFFERENCES BETWEEN THIS EPD AND PREVIOUS VERSIONS.



5.1 SIGNIFICANT CHANGES

This is a fully updated version, enhanced with 2022 production data. Notable modifications include:

- a) **The implementation of a more accurate and updated inventory of the production processes**, which incorporates the changes and improvements made in the industrial spinning process.
- b) The consideration of an **electricity consumption model based on the use of energy from renewable sources (66.6% wind energy, 14.4% hydropower, 18.7% solar energy, and 0.3% other renewables)**, through a supplier of renewable energy (81% of the total energy consumed in the plant), as well as the use of photovoltaic solar energy through panels installed in the industrial facilities of NUREL, S.A. (19% of the total energy consumed in the plant).
- c) The use of a cradle-to-grave approach where a generic end-of-life is required to be included in accordance with PCR 2013:12 v3.0 and GPI's v4.0, based on the draft version of the PEFCR on apparel and footwear, as this is a major change from the previous version of the EPD.

5.2 IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE COMPARED TO PREVIOUS EPD

The environmental performance of NUREL S.A.'s **Reco Nylon®** yarn EPD, measured in terms of global warming potential (upstream + main process + downstream (only transports to customers), excluding end-of-life), has **improved by over 16%** compared to the previous version (S-P-01518) published on 2021-11-05.

Age	Global Warming Potential (kg CO ₂ eq.)
2021	2.45
2023	2.047
%	16

This **reduction in environmental impact is mainly attributed to a different approach in the distribution of the energy mix used** (81% of renewable origin and 19% of energy from two self-consumption solar power plants), **energy optimisation** of production processes, **reduction of the amount of industrial waste** produced, and **reduction of water consumption**, among others.

6 REFERENCES.



- **Life Cycle Assessment Report on Reco Nylon® yarn** (with 2022 data) carried out by the Instituto Tecnológico del Embalaje, Transporte y Logística - ITENE.
- PCR reference document:
PCR 2013:12 Textile yarn and thread of natural fibres, man- made filaments or staple fibres, version 3.0.
 UN CPC 263 and 264.
 DATE: 2022-02-25.
 VALID UNTIL: 2026-02-25.
- **EPD International (2021) General Programme Instructions** for the Internacional EPD® System. Version 4.0 date 2021-03-29. www.environdec.com.
- (2023) **Data base Ecoinvent 3.0** version 3.9.1 (cut-off).
- Environmental impact databases and methods of **SimaPro 9.5.0.1**.
- **UNE-EN ISO 14040 Standard:** 2006. Environmental Management. Life Cycle Analysis. Principles and reference framework. 2006.
- **UNE-EN ISO 14044 Standard:2006.** Environmental Management. Life Cycle Analysis. Requirements and guidelines. 2006.
- **UNE-EN ISO 14025 Standard:** 2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.
- **UNE-EN 15804 Standard:** 2012+A2:2020. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
- **COMMISSION RECOMMENDATION 2013/179/EU** of 9 April 2013 on the use of common methods for measuring and communicating the environmental performance of products and organisations throughout their life cycle (Published in OJEC on 4/05/2013).
- **ILCD** (International Life Cycle Reference Data System) Manual. 2011.

VERIFICATION STATEMENT CERTIFICATE CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD09801

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

TECNALIA R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

NUREL, S.A.
Ctra. Barcelona, km 329
50016 ZARAGOZA - SPAIN

for the following product(s):
para el siguiente(s) producto(s):

Reco Nylon Yarn
Hilo Reco Nylon

with registration number **S-P-01518** in the International EPD® System (www.environdec.com).
*con número de registro **S-P-01518** en el Sistema Internacional EPD® (www.environdec.com).*

it's in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.4.0.**
- **PCR 2013:12 v3.0 Textile yarn and thread of natural fibres, man-made filaments or staple fibre.**
- **UN CPC 2642 Yarn of man-made filaments, multiple or cabled (other than sewing thread, high tenacity yarn of polyamides, polyesters or viscose rayon), not put up for retail sale; man-made filament yarn (other than sewing thread), put up for retail sale**



Carlos Nazabal Alsua
Manager

Issued date / Fecha de emisión:	19/12/2023
Update date / Fecha de actualización:	19/12/2023
Valid until / Válido hasta:	18/12/2028
Serial Nº / Nº Serie:	EPD0980100-E

*This certificate is not valid without its related EPD.
Este certificado no es válido sin su correspondiente EPD.*

*El presente certificado está sujeto a modificaciones, suspensiones temporales y retiradas por TECNALIA R&I CERTIFICACION.
This certificate is subject to modifications, temporary suspensions and withdrawals by TECNALIA R&I CERTIFICACION.*

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The validity of this certificate can be checked through consultation in www.tecnaliacertificacion.com.*



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NUREL
SYNTHETIC FIBERS

The logo graphic consists of a blue square with a white L-shaped cutout on the right side, and a smaller green square positioned below the right side of the blue square.

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