

ENVIRONMENTAL PRODUCT DECLARATION FOR RECO NYLON YARN BY NUREL, S.A.

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Nurel S.A.

The International EPD® System, www.environdec.com

EPD International AB

According to ISO 14025



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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.

THE INTERNATIONAL EPD® SYSTEM
- Address of programme operator:
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com
- EPDs of the same category of products but from different programmes may not be comparable.
- 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
Textile yarn and thread of natural fibres, man-made filaments or staple fibres, version 2.1. UN CPC 263 and 264.
- PCR review was conducted by:
The Technical Committee of the International EPD® System.
Barbara Nebel - 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
- Third-party verification:
Lorena Pereda Pered (CTME)
- Approved by:
The International EPD® System Technical Committee, supported by the Secretariat
- 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 2.1.**
- Date of publication: **February 13, 2019.**
Valid until: **January 21, 2024.**
Revision date: **November 5, 2021**
- Geographical scope of application of the EPD: **global.**
- Year of reference of the data used in the EPD: **the first six months of 2018.**
- Reference to useful websites for obtaining further information:
www.environdec.com
www.nurel.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 (Spain)**
- Telephone: **+34 976 465 579**
- Production centre: **Ctra. Barcelona, km 329, 50016 Zaragoza (Spain)**
- Production country: **Spain**

NUREL began producing polyamide fibre in 1968 and in 1999 it was purchased by the **SAMCA group**. The entry of **SAMCA** brought successive investments in the area of polymerization and new spinning facilities. Thanks to this and to the security of belonging to a solid industrial group, **NUREL** has become a global lead supplier of **Nylon 6 and 66**.

NUREL's production plant in **Zaragoza (Spain)** is organised in three different business units: **ENGINEERING POLYMERS, BIOPOLYMERS and SYNTHETIC FIBERS**, with an overall turnover of 80 million Euros, a polymerisation capacity of 27,000 tons, 14,000 tons of compounds and a yarn production capacity of 7,500 tons. **NUREL** currently employs 350 people.

Around 75% of its production is exported to the main European and Asian markets.

NUREL, has **2 polymerization lines**, 2 compounding lines, a recycling line, **2 nylon spinning plants** and cutting-edge **draw-warping** facilities that allow it to offer a range of products for underwear, swimwear, sportswear and technical applications, that is unique in the market, capable of meeting the needs of the most demanding customers.

Our production of polymers and Nylon fibres is totally integrated. The degree of excellence of our products comes from our in-depth knowledge of the chemistry of polymers, our expertise in spinning synthetic fibres and our mastery of draw-warping techniques.

NUREL's goal is to achieve sustainable economic growth that is responsible with the environment and with its surroundings.

NUREL's production processes are defined in accordance with its Health, Safety and Environmental Protection policy. These are top priorities for **NUREL** over and above any other objective.

In line with its commitment to quality **NUREL, S.A.** has **ISO 9001, 14001 and ISO 50001 certifications**.

NUREL is committed to enhancing the sustainability of all of its products and processes, by carrying out cradle to gate **analyses of the impacts** of all its products within life cycle assessments. These LCA allow the environmental **impacts of similar products and processes** to be compared.

NUREL recycles and recovers most of the hazardous chemical substances generated, thus reducing the impact on the environment. Its plant in Zaragoza is designed to recover and recycle a large part of the waste itself.

NUREL has recently invested in a **new recycling line** that has enabled it to develop the new range of **Reco Nylon®** products, which are polyamide fibres made from recovered waste obtained during the production of nylon.

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 company Abaleo S.L., whose contact details are:

- José Luis Canga Cabañes
- +34 639 901 043
- jlcanga@dabaleo.es
- info@dabaleo.es



2.3. PRODUCT SPECIFICATION.

- Trade name: **Reco Nylon®**.
- This EPD includes the manufacture of **Reco Nylon®** yarn for use in textiles, produced with pre-consumer waste from **NUREL**'s own industrial manufacturing process.
- CPC code: **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.

Technical description of the product:

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	Not applicable
Other properties	Lustre	Not 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..

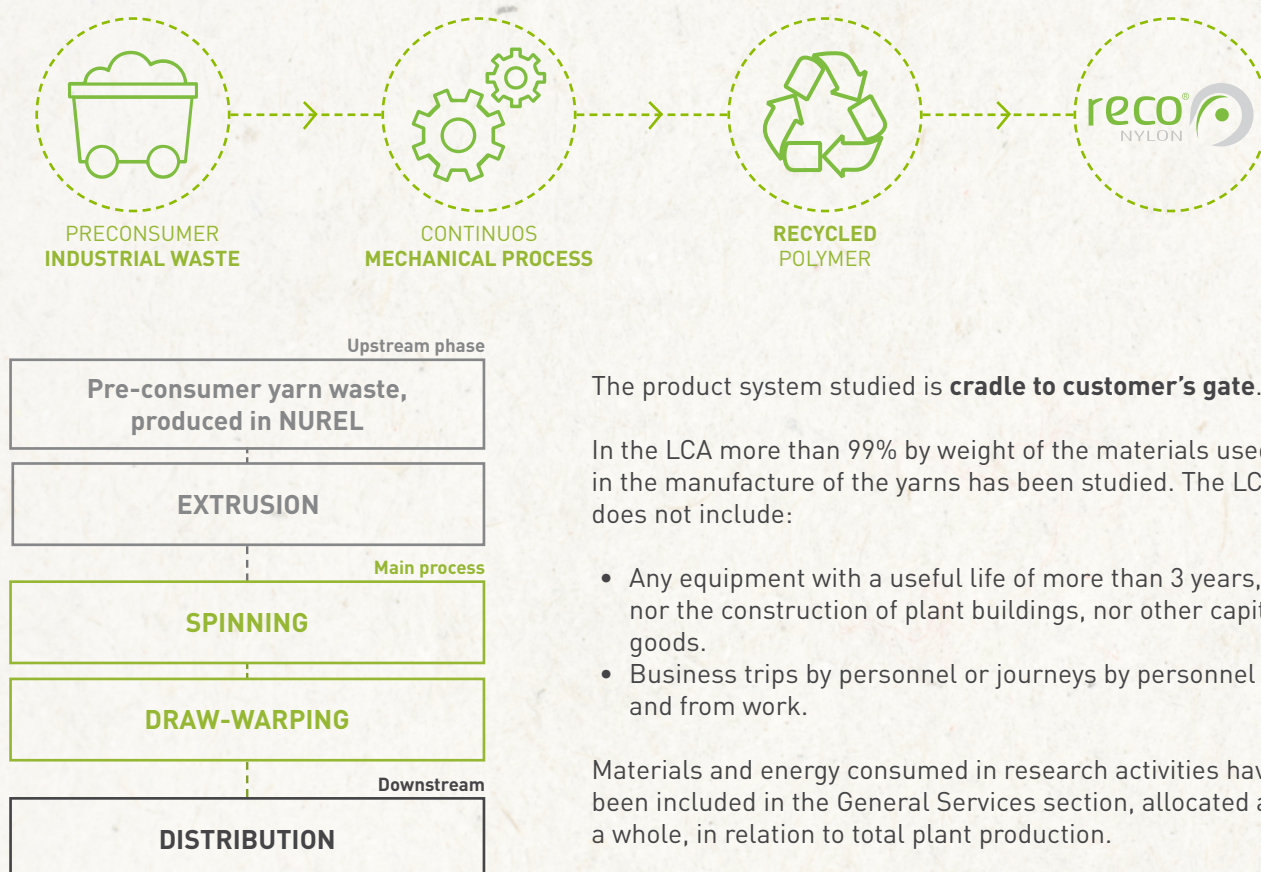
2.6. REFERENCE YEAR OF DATA USED IN THE EPD.

The data employed to prepare the EPD are from **the first six months of 2018**.

For the production of electricity, the **Spanish electricity mix of 2017** has been used, this being the most recent available at the time the EPD was drafted.

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 gate, 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 customer's gate**.

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.

Materials and energy consumed in research activities have been included in the General Services section, allocated as a whole, in relation to total plant production.

In the downstream phase, only the transport of yarns to customers is taken into account, applying a default criterion that the transport distance is **1,000 km by road**.

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 has 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 employed in the EPD meet the quality requirements established in the PCR. To assess the quality of the primary data employed, the criteria of semi-quantitative assessment of data quality proposed by the European Union in its Product and Organisation Environmental Footprint Guide have been applied. **The Data Quality Rate (DQR) obtained indicates that the data quality level is excellent.**

2.11. COMPARISON BETWEEN EPDS OF THIS 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** and **PCR 2013:12, version 2.1**.

2.12. UNITS AND QUANTITIES.

The units required in the PCR are used. Decimals are indicated with commas, in SI style (French version); for example, 2.156,234.

CONTENT DECLARATION OF MATERIALS AND CHEMICAL SUBSTANCES.

3



The composition of Reco yarn is as follows:

Components	% by total weight	% of biobased material	% of recycled yarn	
			PRE-consumer	POST-consumer
Polyamide / Nylon 6	98,8	0	100	0
Sizings	1,19	0	0	0
Other materials	0	0	0	0
Water	0 %			
Total	100 %			

The manufacture of Reco Nylon yarn is based on pre-consumer waste from Nurel's own industrial manufacturing process of other products. The yarn does not have any type of pigment or dye. Nor does it have any materials/substances classed as hazardous to health or to the environment, that are carcinogenic, mutagenic or toxic for reproduction (CMR), allergenic, PBT5 or vPvB6.

INFORMATION ON ENVIRONMENTAL PERFORMANCE.



4.1. ENVIRONMENTAL IMPACTS.

The results obtained for **Reco Nylon** yarn in the categories of environmental impact required by the PCR, in each of the three phases of the life cycle, are as follows:

TABLA 4.1. Potential environmental impacts of 1 kg of Reco Nylon yarn

Impact category		Unit	Upstream	Main process	Downstream	Total
Global warming potential (GWP)	Fossil sources	kg CO ₂ eq.	0,58	1,76	0,58	2,41
	Biogenic sources	kg CO ₂ eq.	0	0	0	0
	Use and change of use of land	kg CO ₂ eq.	0,04	0,03	2*10 ⁻⁶	0,04
	TOTAL	kg CO ₂ eq.	0,61	1,77	0,07	2,45
Acidification potential (AP)		kg SO ₂ eq.	0,003	0,008	1,8.10 ⁻⁴	0,011
Eutrophication potential (EP)		kg PO4 ³⁻ eq.	0,000	0,001	0	0,001
Photochemical oxidant formation potential.		kg NMVOC eq.	0,002	0,0053	0,0002	0,0075
Abiotic resource depletion potential - Elements.		Kg Sb eq.	5,46*10 ⁻⁷	1,17*10 ⁻⁷	2,60*10 ⁻¹⁰	6,63*10 ⁻⁷
Abiotic resource depletion potential - Fossil fuels.		MJ, net calorific value	10,34	19,5	1,01	30,9
Water shortage potential		m³ eq.	0,54	6,87	0,002	7,41

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.

TABLA 4.2. Use of resources for the production of 1 kg of Reco Nylon yarn

Parameter		Unit	Upstream	Main process	Downstream	Total
Primary energy resources - renewable resources	Use of energy	MJ, net cal. value	3,42	6,65	0,002	10,1
	As raw materials	MJ, net cal. value	1,12	2,34	0,001	3,46
	TOTAL	MJ, net cal. value	4,53	8,99	0,003	13,52
Primary energy resources - non-renewable resources	Use of energy	MJ, net cal. value	0	0	0	0
	As raw materials	MJ, net cal. value	559	1100	1,95	1660
	TOTAL	MJ, net cal. value	559	1100	1,95	1660
Secondary materials		kg	0	0	0	0
Renewable secondary fuels		MJ, net cal. value	0	0	0	0
Non-renewable secondary fuels		MJ, net cal. value	0	0	0	0
Net consumption of fresh water		m ³	0,008	0,09	0,000	0,098

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

4.3. WASTE PRODUCTION.

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

TABLA 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	0,000	0
Non-hazardous waste generated	kg	0	0,008	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.

**TABLA 4.3.b Indicators of flow outputs from the system
in the manufacture of 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	0,013	0
Materials for energy recovery	kg	0	0	0
Exported electrical energy	MJ	0	0	0
Exported thermal energy	MJ	0	0	0

4.4. OTHER INDICATORS.

The energy content of **Reco yarn**, evaluated with the gross calorific value of the yarn material is **29,3 MJ/kg**.

**TABLA 4.4.a Toxic emissions to produce Reco Nylon yarn
(in PAF.m3.day per kg of yarn) USEtox 2 methodology (recommended only) V1.00**

Impact category	Upstream	Main process	Downstream	Total
Freshwater ecotoxicity	0,018	0,008	1,2*10 ⁻⁴	0,026

The **co-products** generated during the yarn manufacturing process and their destinations are as follows :

TABLA 4.4.b Co-products generated in the manufacture of the yarns (in kg per kg of yarn)

Co-product	Quantity (kg/kg of yarn)	Destination
Yarn from warping	0,131	Reused within the manufacturing process of Reco Nylon yarn by NUREL, S.A.
Yarn from spinning	0,144	

Note: values obtained from factory data and estimates carried out.

ADDITIONAL INFORMATION. 5



As additional information on the environmental performance of the product, the values obtained by applying the ILCD 2011 Midpoint+ environmental impact assessment method, as proposed in **2013/179/EU COMMISSION RECOMMENDATION of 9 April 2013, on the use of common methods to measures and communicate the life cycle environmental performance of products and organisations** are presented.

All of the results are in reference to the declared unit, which is 1 kg of yarn. The values for the environmental impact categories considered in the methodology applied are shown.

Impact category	Unit	Reco Nylon yarn			
		Total	Upstream	Main process	Downstream
Climate change	kg CO ₂ eq.	2,43	0,575	1,79	0,071
Ozone depletion	kg CFC-11 eq.	9,7*10 ⁻⁶	9,5*10 ⁻⁶	2,5*10 ⁻⁷	1,3*10 ⁻⁸
Human toxicity, non-cancer effects	CTUh	3,3*10 ⁻⁷	6,9*10 ⁻⁸	2,4*10 ⁻⁷	1,4*10 ⁻⁸
Human toxicity, cancer effects	CTUh	7*10 ⁻⁹	3,1*10 ⁻⁹	3,8*10 ⁻⁹	5,7*10 ⁻¹¹
Particulate matter	kg PM2.5 eq.	0,001	3,7*10 ⁻⁴	7,6*10 ⁻⁴	3,2*10 ⁻⁵
Ionizing radiation HH	kBq U235 eq.	0,28	0,075	0,20	4,5*10 ⁻³
Ionizing radiation E (interim)	CTUe	2,1*10 ⁻⁶	5,7*10 ⁻⁷	1,5*10 ⁻⁶	3,2*10 ⁻⁸
Photochemical ozone formation	kg NMVOC eq.	0,007	0,002	0,005	2,2*10 ⁻⁴
Acidification	molc H+ eq.	0,014	0,004	0,009	2,4*10 ⁻⁴
Terrestrial eutrophication	molc N eq.	0,03	7,6*10 ⁻³	0,022	8,2*10 ⁻⁴
Freshwater eutrophication	kg P eq.	5,5*10 ⁻⁵	2,2*10 ⁻⁵	3,3*10 ⁻⁵	9,6*10 ⁻⁸
Marine eutrophication	kg N eq.	0,003	7,8*10 ⁻⁴	0,002	7,5*10 ⁻⁵
Freshwater ecotoxicity	CTUe	3,11	0,198	2,62	0,29
Land use	kg C deficit	2,21	0,80	1,42	5,3*10 ⁻⁴
Water resource depletion	m ³ water eq	0,15	0,009	0,14	1,8*10 ⁻⁵
Mineral, fossil & ren resource depletion	kg Sb eq.	6,4*10 ⁻⁵	5,8*10 ⁻⁵	6,0*10 ⁻⁶	1,6*10 ⁻⁸

DIFFERENCES BETWEEN THIS EPD AND PREVIOUS VERSIONS.

6



Version 1.0, 2021-11-5

The changes in this hotfix are listed below:

Incorporation on the cover of:

- Validity date
- Name of the company that owns the EPD
- Reference to the program
- Reference to the program operator
- "Made in accordance with ISO 14025"
- External verifier independent of EPD update
- Review date

7 REFERENCES.



- **Life Cycle Analysis of Reco Nylon yarn** carried out by the company Abaleo, S.L.
- PCR reference document:
PCR 2013:12 Textile yarn and thread of natural fibres, man-made filaments or staple fibres, version 2.1. UN CPC 263 and 264. DATE 2019-01-08. VALID UNTIL: 2021-08-01.
- **EPD International (2017) General Programme Instructions** for the International EPD® System. Version 3.0 date 2017-12-11. www.environdec.com,
- **(2018) APOS system model**, ecoinvent database version 3.4
- Environmental impact assessment methodology:
 - **CML-IA baseline V3.05** / EU25+3,2000.
 - **ReCiPe 2008**.
 - **AWARE** (Available WAter Remaining) by WULCA March 2017, version 1.01,
 - **USEtox 2 methodology** (recommended only) V1.00
 - **ILCD 2011 Midpoint+**
- **SimaPro 8.5.2.0** databases and environmental impact methodologies.
- **UNE-EN ISO 14040 standard**. Environmental Management. Life Cycle Analysis Principles and framework. 2006.
- **UNE-EN ISO 14044 standard**. Environmental Management. Life Cycle Analysis Requirements and guidelines 2006.
- **UNE-EN ISO 14025 standard**. Environmental labels and declarations. Type III environmental declarations. Principles and procedures.
- **COMMISSION RECOMMENDATION 2013/179/EU** of 9 April 2013, on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations (Published in the OJEU 4/05/2013).
- **ILCD handbook** (International Reference Life Cycle Data System). 2011.

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