

TECHNYL[®] 4EARTH[®]

Sustainable polyamide

A2E 216 (COLOR) H
unfilled & reinforced

Based on

PCR 2010:16 (versions 3.01).
Plastics in primary forms
UN CPC 347

Date of publication

2017-09-29

Date of validity

2026-08-05

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2023-02-15

Version: 03

Editorial change: new product
name and new product image.

Certification number

S-P-01080

Programme

The International EPD[®] System
www.environdec.com

Programme operator

EPD International AB

This EPD has been developed in accordance with ISO 14025. 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

THE GROUP



DOMO Chemicals is a leading producer of high-quality engineering nylon materials for a diverse range of markets, including the automotive, food, medical, pharmaceutical, chemicals and electronics industries.

The company offers a complete portfolio of integrated nylon 6 and 66 products, including intermediates, resins, engineering plastics, performance fibres and distribution of petrochemical products. Headquartered in Germany, the family-owned company leverages advanced technology and consumer insights to deliver sustainable & innovative solutions.

The Company

The Company DOMO Engineering Plastics Italy S.p.A is part of DOMO Chemicals with several production units and professional teams in Germany, Italy, France, China, India and US.

The synergies between our state-of-the-art compounding plants support our strategy to continuously grow our innovative capabilities and provide globally a high quality product line and excellent service levels. DOMO Engineering Plastics Italy S.p.A implemented a new integrated Quality and Environment Management system and aligns itself with the new ISO 9001: 2015 and ISO 14001: 2015. The environmental behavior of our industry's businesses and companies is indisputable one of the most important issues of the last decade.

Businesses need to acknowledge their responsibilities and act accordingly. We at DOMO have decided early on to do everything in our power to reduce our ecological and carbon footprint. We have been creating links between different industries to provide our customers with ecological friendly products and raw materials of excellent quality.

Our approach to sustainability

Sustainability is deeply anchored in our vision and mission for the company and is one of four strategic pillars for the Group. We are driving a carefully planned transformation for our sustainability journey to be successful. As an active actor, DOMO is committed to its ambitious targets and takes its responsibility seriously to become climate-neutral by 2050.

Clear priorities and sustainability targets: Discover our 2030 agenda.

By 2030, we are committing to a neutral CO₂ emissions growth versus 2019, a 15% reduction in the carbon content of DOMO's energy mix and a 7% reduction of industrial waste.

We are also pledging to support our customers by enhancing our offering of sustainable solutions, including a 20% reduction in the carbon footprint of DOMO's products.

With the recently Care to be Safe launch, we embarked on a journey to provide a safe workplace, aiming for Zero incidents, with common principles and values for employees and contractors at all locations. We are also implementing clear and measurable commitments and obligations related to HR practice areas like recruiting and development, compensation, employment contracts, diversity and inclusion to become an employer of choice, ahead of industry benchmark and aiming for 80% employee engagement.

Sustainability
is the only valuable
performance

Our Global Presence



THE PRODUCT

Detailed product description



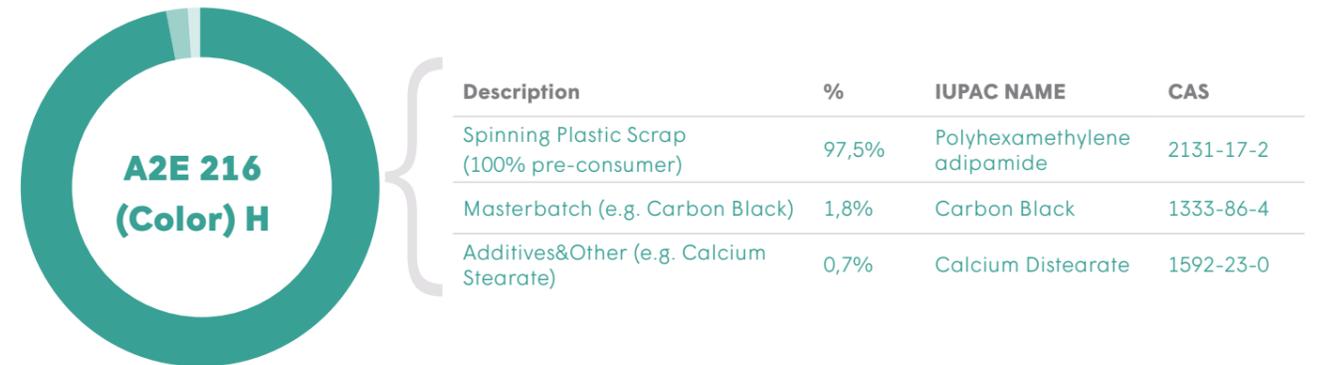
The TECHNYL® 4EARTH® Engineering Plastics range offers a complete assortment of A2E 216 (Color) H compounds, based on high quality pre-consumer fiber feedstock coming from carpet and textile production. Thanks to the deep connection with the textile industries DOMO has been able to secure long term supply agreements of this valuable raw materials. The line includes unfilled, filled, glass fiber reinforced versions, as well as flame retardants alternatives.

The EPD refers to 100% reprocessed PA66 compounds, which is used in several end markets such as automotive, railways, agriculture, electric & electronic and building & construction applications. The declaration refers to **TECHNYL® 4EARTH® A2E 216 (Color) H** and **TECHNYL® 4EARTH® A2E 216 V30 (Color) H**

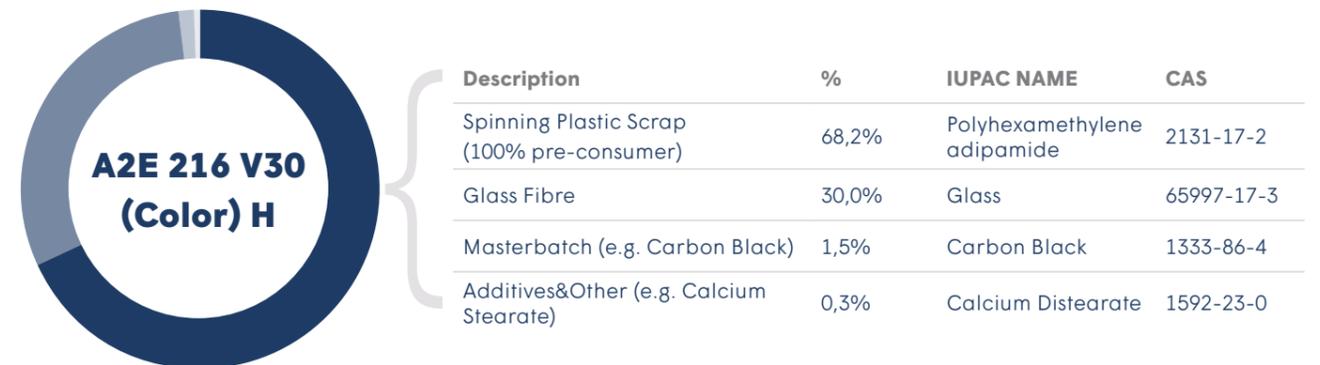
TRADE NAME	TECHNYL® 4EARTH® A2E 216 (Color) H	TECHNYL® 4EARTH® A2E 216 V30 (Color) H
ISO CODE	PA66	PA66-GF30
IUPAC NAME	Polyhexamethylene adipamide	Polyhexamethylene adipamide
CAS NUMBER	2131-17-2	2131-17-2
CLASSIFICATION ACCORDING TO GHS	not dangerous	not dangerous
DENSITY [g/cm³] ISO 1183	1.14	1.35
TENSILE MODULUS [MPa] ISO 527	2900	8500
CHARPY NOTCHED [kJ/m²] ISO 179/1EA	5	6,5
HEAT DEFLECTION TEMPERATURE (HDT-A) [MPa] ISO 75	70	245
FLAMMABILITY [Class] UL94	HB	HB

CONTENT DECLARATION

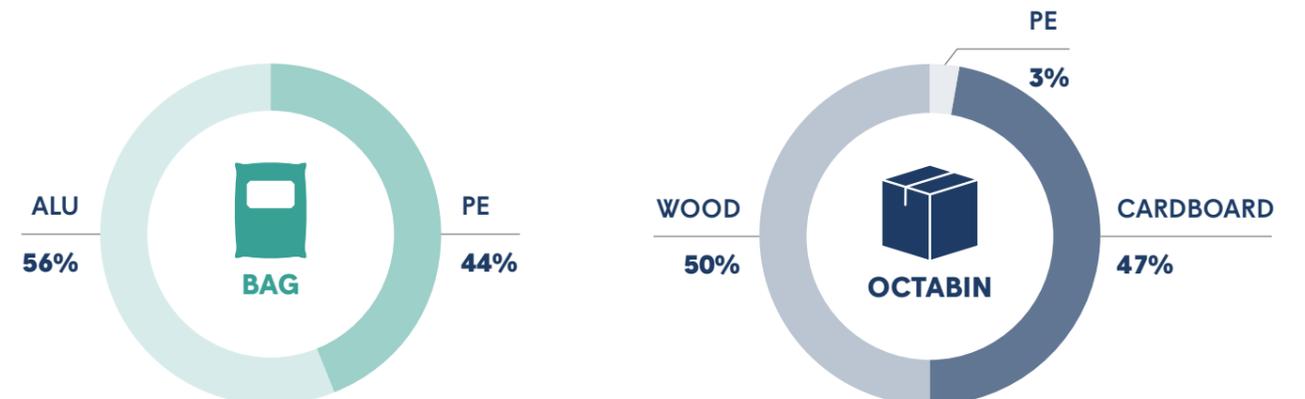
TECHNYL® 4EARTH® A2E 216 (Color) H does not contain any materials / substances hazardous to health and the environment (carcinogenic, mutagenic or toxic to reproduction, allergic, PBT, vPvB).



TECHNYL® 4EARTH® A2E 216 V30 (Color) H does not contain any materials / substances hazardous to health and the environment (carcinogenic, mutagenic or toxic to reproduction, allergic, PBT, vPvB).



PACKAGING



THE PROCESS

Pre-consumer scrap from spinning process represents TECHNYL® 4EARTH® feedstock classified as secondary material or recycled according to ISO 14021.

DOMO collects different spinning plastic scraps in form of coil, bales and loose fibres from textile industries and reprocess them for TECHNYL® 4EARTH® production. The pre-treatment is purely mechanical, fibres are cut and milled before being poured in the feed hopper placed on the head of the extruder; other raw materials (i.e. glass fibre, masterbatch, additives) are dosed according to the standard recipe during the compounding phase. Once the Bill of Material (or BOM) is finalized, the extruder melts the raw materials through proper heating systems and force them into a die. The resulting strands are then cooled into water and pelletized.

The ready-pellet product is then packed in bags, octabin and tank for delivery to the final end-user.

TECHNYL® 4EARTH® - Production Cycle

SUPPLY CHAIN
PA6 AND PA66 FIBRE
AND YARN PRODUCTION

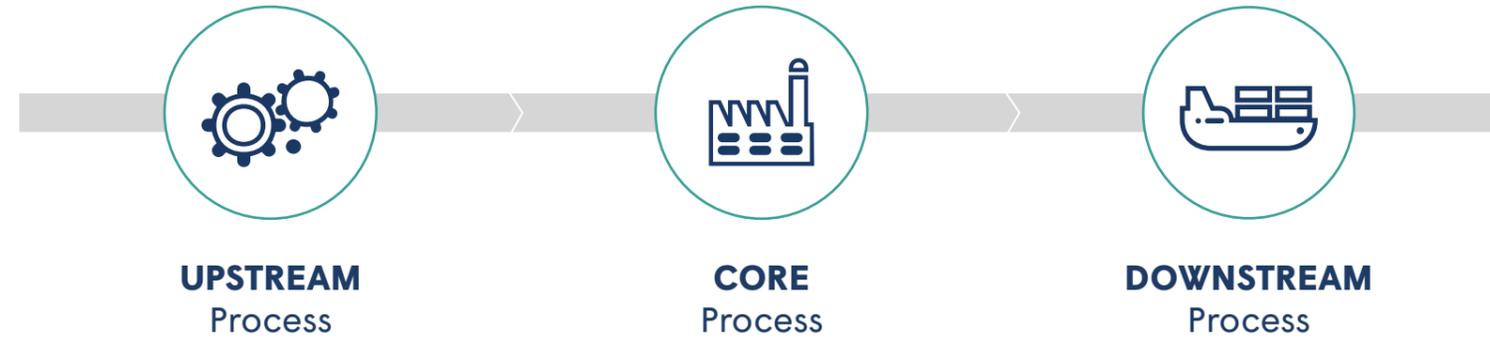
PROCESS
TECHNYL® 4EARTH®
ENGINEERING PLASTIC

MARKET
INJECTION/EXTRUSION
MOULDING



SYSTEM BOUNDARIES

According to the PCR 2010:16 v. 3.01 the main activities are listed and divided in three subsystems: UPSTREAM Process, CORE Process, DOWNSTREAM Process



LCA METHODOLOGY

Product environmental burden has been processed in accordance with EPD general instructions issued by International EPD® System (GPI v 3.01) and N.PCR 2010:16 v 3.01, Plastics in primary forms UN CPC 347 (Cradle to gate with delivery). Econamid® at plant level was described by using specific data from DOMO manufacturing facility for year 2020 (Arco, IT).

Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system such as bill of material, scrap pre-treatments, process efficiencies, compounding process, air emissions and process waste management. Product delivery scenarios refer to 2020. Further process in downstream, use phase and product end of life is out of the scope of the study.

UPSTREAM PROCESS



UPSTREAM
Process

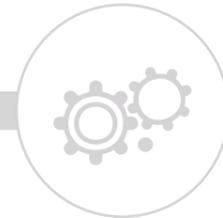


CORE
Process



DOWNSTREAM
Process

CORE PROCESS



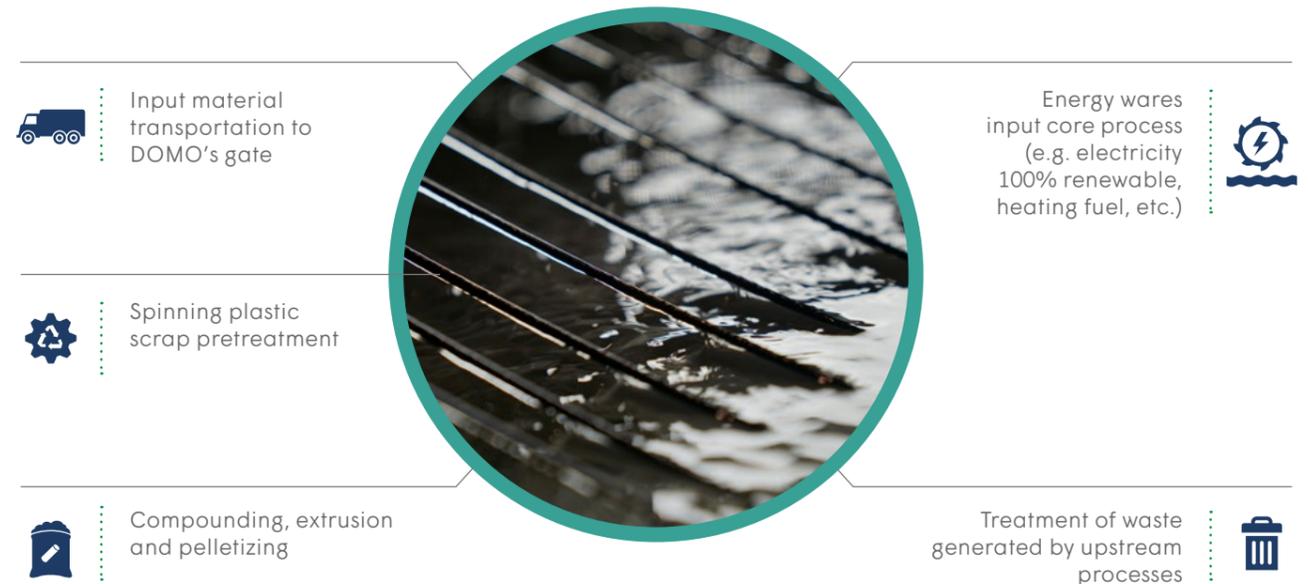
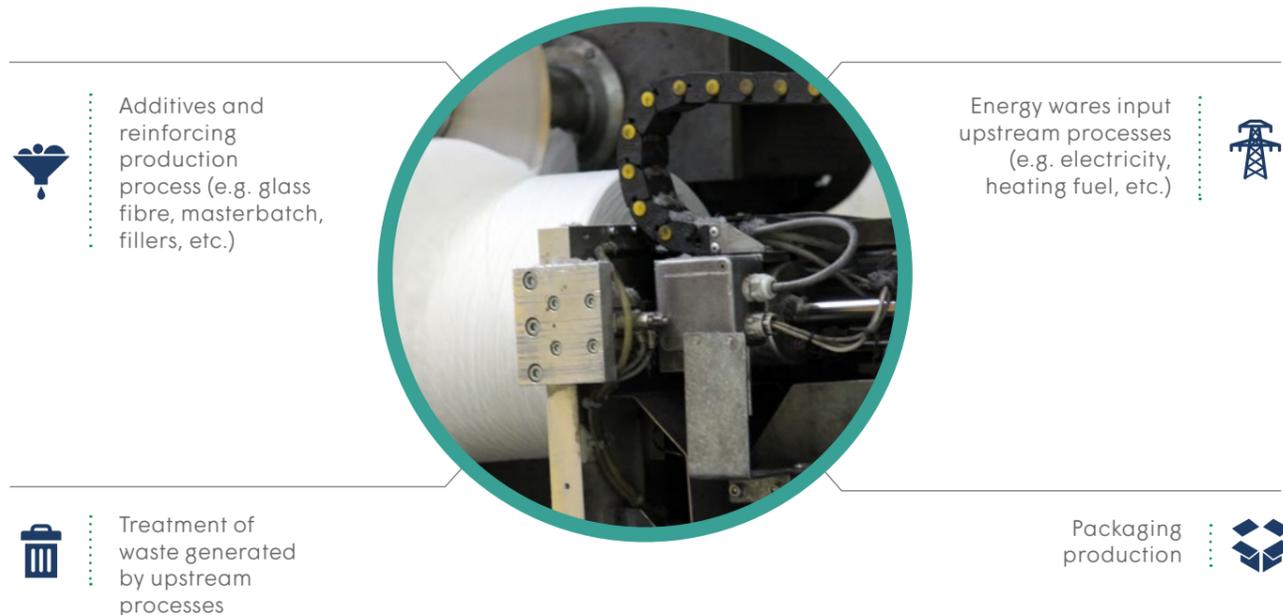
UPSTREAM
Process



CORE
Process



DOWNSTREAM
Process



DOWNSTREAM PROCESS



UPSTREAM
Process



CORE
Process



DOWNSTREAM
Process

TRANSPORT TO CUSTOMERS (general market average):



ITALY (100%):
DISTANCE BY TRUCK ~ 200 km



END LIFE PACK



BAGS
DISPOSAL 100%



OCTABIN
DISPOSAL 29%
RECYCLING 64%
INCINERATION 7%

ENVIRONMENTAL PERFORMANCE

The detailed environmental performance (in terms of use of resources, waste generation, potential environmental impacts) is presented for the three phases: Upstream, Core and Downstream

Declared unit (D.U.)

This study uses 1 kg of TECHNYL® 4EARTH® compound delivered in pellet form and packed in bags, tanks and octabins



TECHNYL® 4EARTH® A2E 216 (COLOR) H						
ENVIRONMENTAL IMPACT INDICATORS		UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global Warming Potential (GWP)	fossil	kg CO ₂ eq	1,30E-01	8,36E-02	3,10E-02	2,45E-01
	biogenic	kg CO ₂ eq	1,75E-04	2,64E-04	1,67E-06	4,41E-04
	land use and land use change	kg CO ₂ eq	2,58E-04	1,08E-06	2,84E-07	2,59E-04
	TOTAL	kg CO ₂ eq	1,30E-01	8,39E-02	3,10E-02	2,45E-01
Acidification potential, AP		kg SO ₂ eq	8,12E-04	2,43E-04	8,85E-05	1,14E-03
Eutrophication potential, EP		kg PO ₄ ⁻⁻⁻ eq	9,32E-05	3,65E-05	1,35E-05	1,43E-04
Photochemical oxidation potential, POFPP		kg NMVOC eq	4,82E-04	2,88E-04	9,78E-05	8,68E-04
Abiotic impoverishment potential - elements		kg Sb eq	1,91E-07	5,13E-09	2,03E-09	1,98E-07
Abiotic impoverishment potential - fossil fuels		MJ, net calorific value	2,88E+00	1,18E+00	3,97E-01	4,46E+00
Water scarcity potential		m ³ eq	1,06E-01	2,22E+00	1,32E-04	2,33E+00

TECHNYL® 4EARTH® A2E 216 (COLOR) H						
USE OF RESOURCES		UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Primary energy resources - Renewable	Use as energy carrier	MJ, net calorific value	1,25E-01	2,94E+00	6,19E-04	3,06E+00
	Used as raw materials	MJ, net calorific value	4,70E-01	0,00E+00	0,00E+00	4,70E-01
	TOTAL	MJ, net calorific value	5,95E-01	2,94E+00	6,19E-04	3,53E+00
Primary energy resources - Non-renewable	Use as energy carrier	MJ, net calorific value	2,03E+00	1,19E+00	3,98E-01	3,61E+00
	Used as raw materials	MJ, net calorific value	1,05E+00	0,00E+00	0,00E+00	1,05E+00
	TOTAL	MJ, net calorific value	3,08E+00	1,19E+00	3,98E-01	4,67E+00
Secondary material		kg	1,53E-02	1,01E+00	0,00E+00	1,02E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m ³	3,57E-03	4,96E-02	1,33E-05	5,32E-02

TECHNYL® 4EARTH® A2E 216 V30 (COLOR) H						
ENVIRONMENTAL IMPACT INDICATORS		UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global Warming Potential (GWP)	fossil	kg CO ₂ eq	7,42E-01	1,01E-01	3,10E-02	8,74E-01
	biogenic	kg CO ₂ eq	1,33E-03	2,10E-04	1,67E-06	1,55E-03
	land use and land use change	kg CO ₂ eq	8,02E-04	1,22E-06	2,84E-07	8,04E-04
	TOTAL	kg CO ₂ eq	7,44E-01	1,01E-01	3,10E-02	8,76E-01
Acidification potential, AP		kg SO ₂ eq	4,80E-03	2,97E-04	8,85E-05	5,18E-03
Eutrophication potential, EP		kg PO ₄ ⁻⁻⁻ eq	9,80E-04	4,47E-05	1,35E-05	1,04E-03
Photochemical oxidation potential, POFPP		kg NMVOC eq	3,29E-03	3,48E-04	9,78E-05	3,74E-03
Abiotic impoverishment potential - elements		kg Sb eq	2,73E-05	6,11E-09	2,03E-09	2,73E-05
Abiotic impoverishment potential - fossil fuels		MJ, net calorific value	1,20E+01	1,43E+00	3,97E-01	1,38E+01
Water scarcity potential		m ³ eq	2,07E-01	2,02E+00	1,32E-04	2,23E+00

TECHNYL® 4EARTH® A2E 216 V30 (COLOR) H						
USE OF RESOURCES		UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Primary energy resources - Renewable	Use as energy carrier	MJ, net calorific value	9,09E-01	2,30E+00	6,19E-04	3,21E+00
	Used as raw materials	MJ, net calorific value	4,70E-01	0,00E+00	0,00E+00	4,70E-01
	TOTAL	MJ, net calorific value	1,38E+00	2,30E+00	6,19E-04	3,68E+00
Primary energy resources - Non-renewable	Use as energy carrier	MJ, net calorific value	1,35E+01	1,43E+00	3,98E-01	1,53E+01
	Used as raw materials	MJ, net calorific value	8,41E-01	0,00E+00	0,00E+00	8,41E-01
	TOTAL	MJ, net calorific value	1,43E+01	1,43E+00	3,98E-01	1,62E+01
Secondary material		kg	1,53E-02	7,04E-01	0,00E+00	7,19E-01
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m ³	9,91E-03	4,50E-02	1,33E-05	5,50E-02

TECHNYL® 4EARTH® A2E 216 (COLOR) H					
WASTE	UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	5,95E-06	7,88E-06	2,95E-06	1,68E-05

TECHNYL® 4EARTH® A2E 216 V30 (COLOR) H					
WASTE	UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	4,15E-05	9,70E-06	2,95E-06	5,42E-05

TECHNYL® 4EARTH® A2E 216 (COLOR) H					
OUTPUT FLOWS	UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,27E-03	9,18E-02	1,91E-02	1,13E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	5,54E-03	5,54E-03
Exported energy, electricity	MJ	0,00E+00	0,00E+00	5,97E-03	5,97E-03
Exported energy, thermal	MJ	0,00E+00	0,00E+00	1,25E-02	1,25E-02

TECHNYL® 4EARTH® A2E 216 V30 (COLOR) H					
OUTPUT FLOWS	UNIT OF MEASURE	UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,27E-03	9,18E-02	1,91E-02	1,13E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	5,54E-03	5,54E-03
Exported energy, electricity	MJ	0,00E+00	0,00E+00	5,97E-03	5,97E-03
Exported energy, thermal	MJ	0,00E+00	0,00E+00	1,25E-02	1,25E-02

OTHER ENVIRONMENTAL INDICATORS

In addition to the main environmental impact indicators, there are additional indicators, which must be declared in accordance with the provisions of the PCR 2010:16 v.3.01 "Plastics in primary forms".

Always referring to the declared unit, these are:

- The energy content of products accounted, considered the gross calorific value of the product in MJ, is the one that can be recovered at the end-of-life. In the following table, the value of the energy content of product for the different types of products is reported:

TECHNYL® 4EARTH® A2E 216 V30 (COLOR) H	34,10 MJ/kg
TECHNYL® 4EARTH® A2E 216 (COLOR) H	48,75 MJ/kg

- The primary energy demand, differentiated between Non-renewable primary energy resources and Renewable primary energy resources, is already accounted for among the main environmental indicators and measured in MJ
- The bio-based material content declared as a percentage is 0%.

In addition to the environmental indicators, the PCR also requests the following information:

- This EPD refer to a mechanical recycling process, where selection, grinding, extrusion and packaging are most relevant phases
- The per cent of recovered materials with respect to the total waste treated is 97%
- The fractions not recovered are sent to recycling.

DIFFERENCES VERSUS PREVIOUS VERSIONS

The current EPD follows the requirements of the new versions of the GPI (v 3.01) and the PCR 2010:16 (v. 3.01). The input data has been updated to the last available set (2020) as well as the energy mixes. The datasets have been updated to the latest version of Ecoinvent 3.

REFERENCE

EPD REFERENCES

DOMO ENGINEERING PLASTICS ITALY SPA (VIA LINFANO 18 – 38062 ARCO (TN) ITALY

PROGRAM OPERATOR: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com,

LCA REPORT: Life Cycle Assessment applied to TECHNYL® 4EARTH® Compounds v04

REFERENCE DATABASE: Ecoinvent 3.6

SOFTWARE: SimaPro ver. 9.1.1.1 (www.pre.nl)

INDEPENDENT VERIFICATION

This declaration has been developed referring to the International EPD System, following the General Programme Instructions; further information and the document itself are available at: www.environdec.com. EPD document valid within the following geographical area: Italy and other countries according to sales market conditions (Europe).

PCR review was conducted by: The Technical Committee of the International EPD® System.

PCR 2010:16 (versions 3.01).

Plastics in primary forms, UN CPC 347

Contact via info@environdec.com

Independent third-party verification of the declaration and data, according to ISO 14025:2006

EPD process certification (Internal)

EPD verification (External)

Third party verifier: Ugo Pretato, Recognized Individual Verifier, Corso Vittorio Emanuele II 18 - 10123 Torino, Italy

Approved by: International EPD System. Procedure for follow-up of data during EPD validity involves third-party verifier:

YES

NO

EPDs within the same product category but from different programmes may not be comparable. EPD owner has the sole ownership, liability and responsibility of the EPD.

CONTACTS

To get more information about this environmental declaration or about Domo activities please contact:

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Technical support to Domo was provided by Life Cycle Engineering, Italy.
(info@studiolce.it, www.lceengineering.eu).



CHANGES VERSUS PREVIOUS VERSION

The version v3 of the current EPD includes the following editorial change from the previous version v2 in order to have the new product reference name aligned:

- » ECONAMID®: TECHNYL® 4EARTH®
- » FL 66: A2E 216 (Color) H
- » FL 66G30: A2E 216 V30 (Color) H



DOMO
caring is our formula