

Environmental
Product
Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for: Adfil Durus S500

Provided by: Adfil N.V.



MRPI® registration **1.1.00733.2024** 

program operator
Stichting MRPI®
publisher
Stichting MRPI®

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# **COMPANY INFORMATION**

Adfil N.V.

Industriestraat 39, zone 2

9240

Zele

Belgium

js@adfil.com

Jeroen Smet

https://adfil.com

# **MRPI® REGISTRATION**

1.1.00733.2024

#### **DATE OF THIS ISSUE**

28-1-2025

# **EXPIRY DATE**

28-1-2030

#### SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Anne Kees Jeeninga, Advieslab VOF. The LCA study has been done by Tim Mol, EcoReview B.V. . The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate list of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

# **PRODUCT**

Adfil Durus S500

# **DECLARED UNIT / FUNCTIONAL UNIT**

1 Weight per piece (kg)

#### **DESCRIPTION OF PRODUCT**

Adfil Durus S500 is a high-performance macrofiber made from polypropylene, designed for concrete reinforcement. It enhances the durability, tensile strength, and crack resistance of concrete, offering a sustainable alternative to traditional steel reinforcement. The fibers ensure uniform distribution in the mix, improving performance and reducing shrinkage cracks. Adfil Durus S500 is CE-certified and provides an eco-friendly solution for construction applications.

#### **VISUAL PRODUCT**



### **MORE INFORMATION**

https://adfil.com/synthetic-macro-fibres/durus-s500

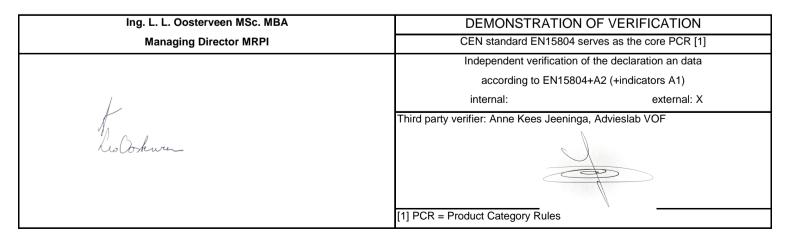
# PROGRAM OPERATOR

Stichting MRPI®

Kingsfordweg 151

1043 GR

Amsterdam









# **DETAILED PRODUCT DESCRIPTION (PART 1)**

Adfil Durus S500 is an innovative macrofiber made from high-quality polypropylene, designed for concrete reinforcement. These fibers offer an excellent combination of tensile strength, durability, and crack resistance, ensuring a longer lifespan for concrete structures. The unique structure of the S500 fibers guarantees uniform distribution within the concrete matrix, resulting in improved performance and reduced risk of shrinkage cracks. Adfil Durus S500 is an efficient, sustainable solution that can replace traditional reinforcement such as steel, with the added benefit of a lower carbon footprint.

Durus S500 synthetic fibres are designed with dimensions of 30, 40, 48 and 55 mm in length and a 0.7 mm equivalent diameter, featuring a density of 0.922 kg/m³. These fibres are EN 14889-2 certified, ensuring compliance with industry standards for quality and performance.

The fibres are extruded from high-quality polypropylene (PP) polymers, ensuring optimal strength, flexibility, and chemical resistance. These fibres are non-corrosive, lightweight, and easy to integrate into various concrete mixes, leading to significant reductions in labour and transportation costs. The product is certified with CE, ATG, and SECO certificates.

The polypropylene granules and additives are gravimetrically dosed and mixed in the extrusion feed hopper. This composition is melted and blended into a homogeneous polymer mixture. After filtration and dosing, the liquid polymers are extruded through a die plate, forming the fibers. To enhance the mechanical strength of the fibers, they are drawn and hardened in multiple steps. In the next stage, the fiber surface is shaped. Subsequently, the fibers are bundled and cut to length simultaneously. Edge trimming waste is re-ground and fed back into the extruder. In the final process step, the fibers are packed into paper bags. A certain amount of production waste is generated afterward, which is not recycled within the product system boundaries but used in another production process within Adfil. Finally, the bags are stacked on pallets, wrapped with PE stretch film, and covered with a protective hood to prepare the products for shipping.

Component (> 1%)	(kg / %)
Polyolefins	0,964493437
Calcium Carbonate	0,035002047

# **SCOPE AND TYPE**

The type of this EPD is Cradle-to-Gate. All major steps from the extraction of natural resources to the factory gate are included in the environmental performance of the manufacturing phase, except those that are not relevant to the environmental performance of the product. The software SimaPro is used to perform the LCA. The background databases used are:

• Ecoinvent (v3.6) . It is not determined as to how the synthetic fibers are to be processed at the end of life (after 50 years). Therefore, this module is not considered in this LCA study. As new and improved systems for the recycling of building products are developed over time, these can be determined and then applied to a future LCA study.

PRODU	JCT ST/	<b>\GE</b>	CONSTRUC PROCESS S				us	ER STA	.GE			EN	D OF LI	FE STA	.GE	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling potential
A1	A2	А3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
Х	Х	Х	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

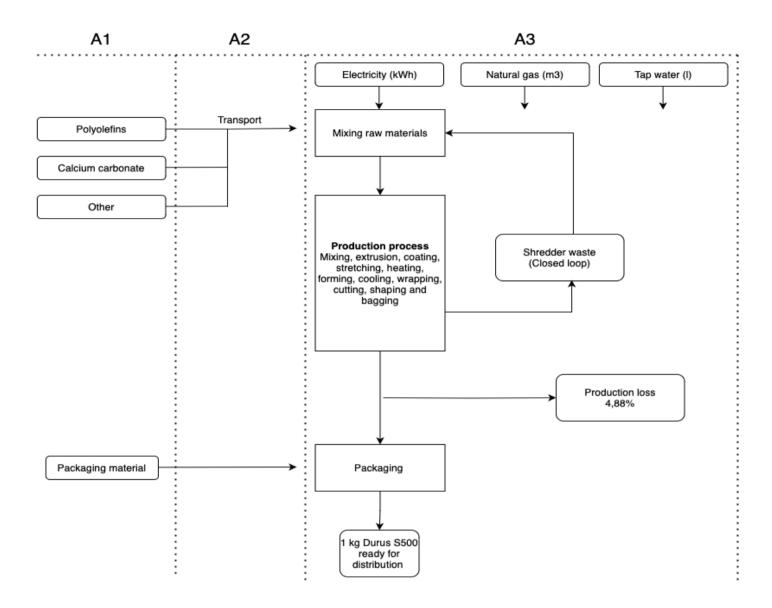
X = Modules Assessed

ND = Not Declared









# **REPRESENTATIVENESS**

This EPD is representative for products produced and sold in the EU. The synthetic fibers are produced and cut to demand at the production site of Adfil N.V.







# **ENVIRONMENTAL IMPACT** per functional unit or declared unit (indicators A1)

E	enheid	A1	A2	A3	A1-A3	<b>A</b> 4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,89E-05	7,36E-07	2,51E-06	2,22E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	MJ	7,36E+01	4,41E-01	1,56E+00	7,57E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP	kg CO2 eq.	2,03E+00	2,88E-02	2,18E-01	2,27E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	4,20E-08	5,11E-09	8,16E-08	1,29E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg ethene eq.	1,69E-03	1,74E-05	1,05E-05	1,72E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	kg SO2 eq.	6,19E-03	1,27E-04	3,55E-04	6,67E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP	kg (PO4) 3- eq.	5,68E-04	2,49E-05	6,84E-05	6,62E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxicity	indicate	ors and I	ECI (Du	tch marl	ket)														

| НТР   | kg DCB eq. | 3,25E-01 | 1,21E-02 | 4,81E-02 | 3,86E-01 | ND |
|-------|------------|----------|----------|----------|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| FAETP | kg DCB eq. | 8,83E-03 | 3,54E-04 | 1,67E-03 | 1,09E-02 | ND |
| MAETP | kg DCB eq. | 1,91E+01 | 1,27E+00 | 5,40E+00 | 2,58E+01 | ND |
| TETP  | kg DCB eq. | 1,62E-03 | 4,29E-05 | 3,21E-03 | 4,87E-03 | ND |
| ECI   | euro       | 1,72E-01 | 3,00E-03 | 1,80E-02 | 1,94E-01 | ND |
| ADPF  | kg Sn eq.  | 3,54E-02 | 2,12E-04 | 7,51E-04 | 3,64E-02 | ND |

ADPE = Abiotic Depletion Potential for non-fossil resources

ADPF = Abiotic Depletion Potential for fossil resources

GWP = Global Warming Potential

ODP = Depletion potential of the stratospheric ozone layer

POCP = Formation potential of tropospheric ozone photochemical oxidants

AP = Acidification Potential of land and water

EP = Eutrophication Potential
HTP = Human Toxicity Potential

FAETP = Fresh water aquatic ecotoxicity potential

MAETP = Marine aquatic ecotoxicity potential

TETP = Terrestrial ecotoxicity potential

ECI = Environmental Cost Indicator

ADPF = Abiotic Depletion Potential for fossil resources







# **ENVIRONMENTAL IMPACT** per functional unit or declared unit (core indicators A2)

				10 1									· · · · · /						
	Unit	A1	A2	<b>A</b> 3	A1-A3	A4	A5	B1	B2	В3	B4	B5	B6	В7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
GWP-fossil	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
GWP- biogenic	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
GWP-luluc	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
ODP	kg CFC11 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
AP	mol H+ eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
EP-fresh water	kg PO4 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
EP-marine	kg N eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
EP- terrestrial	mol N eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
POCP	kg NMVOC eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
ADP- minerals & metals	kg Sb eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
ADP-fossil	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							
WDP	m3 world eq. Deprived	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND							

GWP-total = Global Warming Potential total

GWP-fossil = Global Warming Potential fossil fuels

GWP-biogenic = Global Warming Potential biogenictotal

GWP-luluc = Global Warming Potential land use and land use change

ODP = Depletion potential of the stratospheric ozone layer

AP = Acidification Potential, Accumulated Exceedence

EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment

EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment

EP-terrestrial = Eutrophication Potential, Accumulated Exceedence

POCP = Formation potential of tropospheric ozone photochemical oxidants

ADP-minerals & metals = Abiotic Depletion Potential for non-fossil resources [1]

ADP-fossil = Abiotic Depletion for fossil resources potential [1]

WDP = Water (user) deprivation potential, deprivation-weighted water consumption [1]

# Disclaimer [1]:

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.







# **ENVIRONMENTAL IMPACT** per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
PM	Disease inci-dence	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
IRP	kBq U235 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
ETP-fw	CTUe	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
HTP-c	CTUh	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
HTP-nc	CTUh	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
SQP	-	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													

PM = Potential incidence of disease due to PM emissions

IRP = Potential Human exposure efficiency relative to U235 [1]

ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]

HTP-c = Potential Comparative Toxic Unit for humans [2]

HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]

SQP = Potential soil quality index [2]

# Disclaimer [1]:

- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste.

# Disclaimer [2]:

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.







# **OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 en A2)**

	Unit	A1	A2	А3	A1-A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
HWD	kg	8,11E-06	1,11E-06	8,33E-06	1,76E-05	ND													
NHWD	kg	7,08E-02	2,78E-02	1,67E-02	1,15E-01	ND													
RWD	kg	3,55E-05	2,88E-06	1,00E-04	1,38E-04	ND													
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													

NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

Hazardous Waste Disposed

HWD







# RESOURCE USE per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	А3	A1-A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
PERE	MJ	2,55E+00	5,49E-03	1,13E+00	3,69E+00	ND													
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
PERT	MJ	2,55E+00	5,49E-03	1,13E+00	3,69E+00	ND													
PENRE	MJ	7,98E+01	4,65E-01	8,63E+00	8,89E+01	ND													
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
PENRT	MJ	7,98E+01	4,65E-01	8,63E+00	8,89E+01	ND													
SM	kg	0,00E+00	0,00E+00	1,39E-05	1,39E-05	ND													
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
NSRF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
FW	m3	2,24E-02	5,34E-05	2,52E-03	2,50E-02	ND													

PERE = Use of renewable energy excluding renewable primary energy resources

PERM = Use of renewable energy resources used as raw materials

PERT = Total use of renewable primary energy resources

PENRE = Use of non-renewable primary energy resources excluding non-renewable energy resources used as raw materials

PENRM = Use of non-renewable primary energy resources used as raw materials

PENRT = Total use of non-renewable primary energy resources

SM = Use of secondary materials

RSF = Use of renewable secondary fuels

NSRF = Use of non-renewable secondary fuels

FW = Use of net fresh water

# **BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 and A2)**

													-						
	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
BBCpr	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													
ВССра	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND													

BCCpr = Biogenic carbon content in product

BCCpa = Biogenic carbon content in packaging







# **CALCULATION RULES (PART 1)**

### "Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

#### Data collection period

The dataset is representative for the production processes used in 2021.

#### Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated."

#### Cut Off

In this study, all inputs and outputs - such as emissions, energy and material inputs - are included in the calculation according to the Determination Method (5). The contribution to each impact category by the capital goods is calculated to be no more than 5%. To substantiate this, the relative contribution of capital goods to the most comparable NMD process was examined: "0223-fab&Polypropylene, PP, fibers, application in concrete (based on Polypropylene, granulate {GLO}| market for | Cut-off, U + Extrusion, plastic film {GLO}| market for | Cut-off, U)." It was found that the capital goods from the extrusion process ("Packaging box factory {GLO}| market for | Cut-off, U") do not make a significant contribution to the overall environmental profile in any of the impact categories.

# SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 1)

"A1. Raw materials supply

All materials needed for production as well as packaging is taken into account.

#### A2. Transport of raw materials to manufacturer

The transportation of the suppliers to Adfil N.V. is done by truck.

#### A3. Manufacturing

All relevant production processes in phase A3, such as internal transport and potential production losses, have been included in this study. In the final process step, the fibers are packaged in paper bags. Finally, the bags are stacked on pallets, wrapped with PE stretch film, and covered with a protective hood to prepare the products for shipment. There are no direct emissions. Throughout the entire manufacturing process electricity, natural gas, and water are used during production. The process results in a production loss of 4.88%. For energy purposes the following reference was selected: A grey low voltage market for with 0,244 kg GWP per KWh (Electricity, low voltage {BE}) market for).

# **DECLARATION OF SVHC**

None of the substances contained in the product are listed in the "Candidate List of Substances of Very High Concern for authorisation", or they do not exceed the threshold with the European Chemicals Agency.

### **REFERENCES**

- 1. ISO. 'ISO 14040: Environmental management Life cycle assessment Principles and Framework', International Organization for Standardization, ISO14040:2006. 2006.
- 2. —. 'ISO 14044: Environmental management Life cycle assessment Requirements and guidelines', International Organization for Standardization, ISO14044:2006. 2006.
- 3. NEN. 'NEN-EN 15804: Duurzaamheid van bouwwerken Milieuverklaringen van producten Basisregels voor de productgroep bouwproducten', NEN-EN 15804+A2:2019. 2019.
- 4. ISO. 'ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Prin-ciples and procedures', International Organization for Standardization, ISO14025:2006. 2006.
- 5. NMD. Bepalingsmethode 'Milieuprestatie Bouwwerken' versie 1.1 inclusief de bijbehorende wijzigingsbladen. 2022.
- 6. CE Delft. Handboek Schaduwprijzen. [Online] 2010. https://ce.nl/publicaties/handboek-schaduwprijzen-waardering-en-weging-van-emissies-en-milieueffecten/.
- 7. TNO. Toxiciteit heeft z'n prijs: schaduwprijzen voor (eco-)toxiciteit en uitputting van abiotische grondstoffen binnen DuboCalc. [Online] https://puc.overheid.nl/rijkswaterstaat/doc/PUC\_119145\_31/.

#### **REMARKS**

EPD of construction products may not be comparable if they do not comply with EN15804



