



## Environmental Product Declaration

IN ACCORDANCE WITH EN15804:2012+A2:2019 SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS - CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS



SmartEPD-2026-134-0878-01

# Microflex® Pre-Insulated Piping

Date of Issue

May 29, 2026

Expiration Date

May 29, 2031

Last Updated

May 29, 2026



Refer to the EPD Library at [www.smartepd.com](http://www.smartepd.com) for the latest EPD listing information

## General Information

### Watts

📍 1590 avenue d'Orange CS 10101 Sorgues 84275 VEDENE cedex France

☎ +33 (0)4 90 33 28 28

✉ contact@wattswater.com

🌐 watts.com



Product Name:	Microflex® Pre-Insulated Piping
Declared Unit:	1 m pre-insulated pipe including brass couplings
Declaration Number:	SmartEPD-2026-134-0878-01
Date of Issue:	May 29, 2026
Expiration:	May 29, 2031
Last updated:	May 29, 2026
EPD Scope:	Cradle to grave A1 - A3, A4, A5, B1 - B7, C1 - C4, D
Market(s) of Applicability:	Europe

## General Organization Information

Watts Water Technologies, Inc. (Watts) is a global leader of quality water solutions for residential, industrial, municipal, and commercial settings. Watts' family of brands offers one of the most varied product lines in the world, with world-class, water-related solutions focused on Drainage, HVAC and Hot Water, Plumbing & Flow Control and Water Quality & Rainwater Harvesting.

Further information can be found at: <https://www.watts.com/>

## Limitations, Liability and Ownership

EPDs of construction products may not be comparable if they do not comply with EN 15804+A2. Environmental declarations from different programs may not be comparable.

Even where EPDs are developed under the same PCR, variations and deviations may occur. For example, the use of different LCA software, background LCI databases, data quality assumptions, allocation procedures, or end-of-life scenarios may lead to differences in reported results, particularly for upstream and downstream life cycle stages. The EPD owner has sole ownership, liability, and responsibility for the content of this EPD.

## Reference Standards

Standard(s):	EN15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 Date of issue: April 15, 2024

Sub-category PCR:	IBU Part B: Requirements on the EPD for Preinsulated Pipes for District Heating and Cooling v.12
	Date of issue: July 24, 2023
	Valid until: July 24, 2028
Sub-category PCR review panel:	<a href="#">Contact Smart EPD for more information.</a>
General Program Instructions:	<a href="#">Smart EPD General Program Instructions v.2.0, March 2025</a>

## Verification Information

LCA Author/Creator:	<a href="#">Matthew Neiman</a> <a href="mailto:matt.neiman@truenorthcollective.net">matt.neiman@truenorthcollective.net</a>	
EPD Program Operator:	<a href="#">Smart EPD</a> <a href="mailto:info@smarteprd.com">info@smarteprd.com</a> <a href="http://www.smarteprd.com">www.smarteprd.com</a> <a href="#">585 Grove St., Ste. 145, Herndon, VA 20170, USA</a>	
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: <a href="#">Mari Kirss</a>   <a href="mailto:mari.kirss@meetripuu.ee">mari.kirss@meetripuu.ee</a>	External
	Independent external verification of EPD, according to ISO 14025 and reference PCR(s): <a href="#">Mari Kirss</a>   <a href="mailto:mari.kirss@meetripuu.ee">mari.kirss@meetripuu.ee</a>	External

## Product Information

Declared Unit:	1 rm pre-insulated pipe including brass couplings
Mass:	2.752 kg
Product Specificity:	<input checked="" type="checkbox"/> Product Average <input checked="" type="checkbox"/> Product Specific <input checked="" type="checkbox"/> Representative Product EPD
Variation in GWP Result (Products):	-1.88% to +2.56%

## Product Description

Watts Microflex® is a pre-insulated flexible pipe system **for underground installation and the transport of fluids in cooling and heating** systems (-10/+95°C) and domestic water. Ideal for residential systems and large district heating systems, Microflex® is suitable for hot and cold fluids, drinking water and other fluids for industrial systems. Supplied in **100 m coils or made to measure**, thanks to its **light weight, flexibility and ease of installation**, it allows you to **overcome obstacles without joints, reducing excavation time and costs**.

Microflex's pre-insulated piping system is composed of a thermal insulation around a carrier pipe and covered by a "closed chamber" protective UV-resistant outer casing. Brass couplings are used to connect the carrier pipe to the rest of the plumbing network.

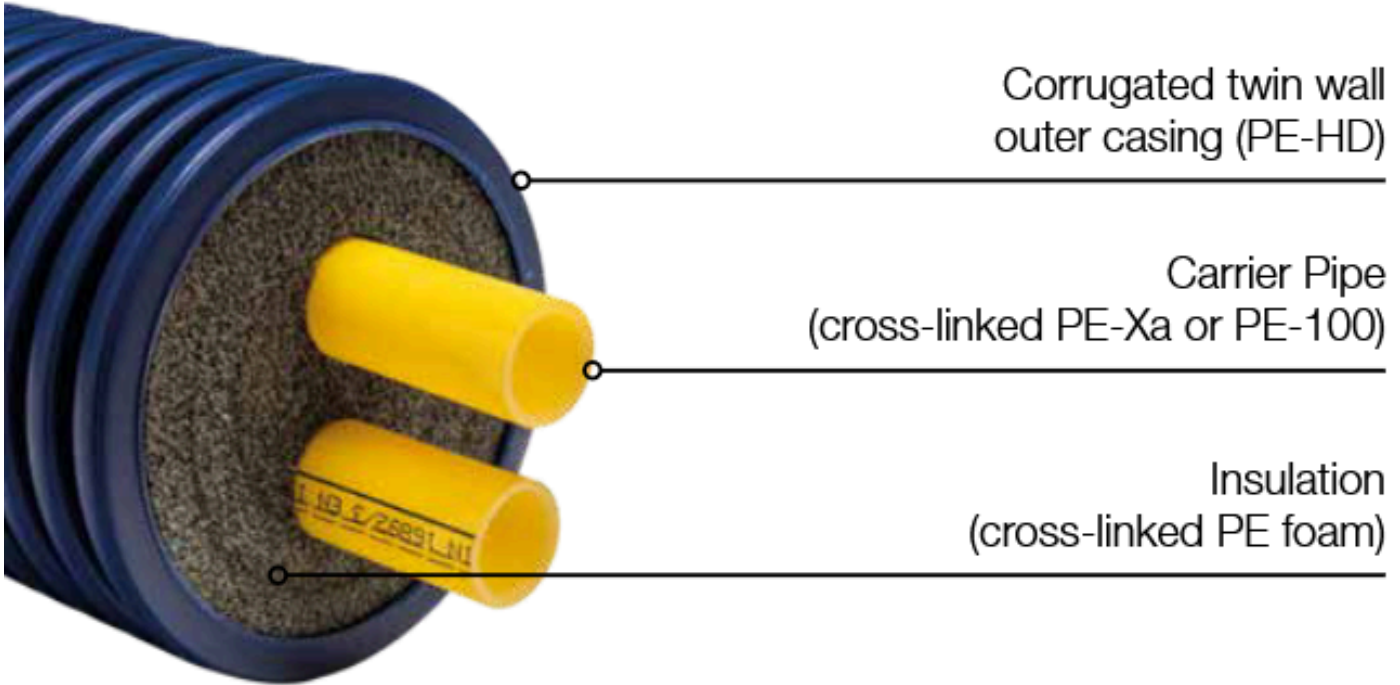
Watts sells Microflex® products covering a large range of sizes and applications. The carrier pipe for sanitary, HVAC and drinking water products are respectively made from cross-linked polyethylene (known as PE-Xa), from PE-Xa with an Ethylene Vinyl Alcohol (EVOH) membrane which acts as an oxygen diffusion barrier, or from PE100 polyethylene. Watts also offers a special Microflex® HP which includes corrugated PE conduit for hooking up power and network cables in heat pump applications.

Further information can be found at: <https://www.watts.eu/en/products/eu/microflex-pre-insulated-piping>

## Product Specifications

<b>Product SKU(s):</b>	MD16040C: Microflex DUO heating pipe with a 160 mm outer housing diameter and two 40 mm PE-Xa pipes with an oxygen diffusion barrier.
	This product was selected as the representative unit as it is the top-selling variant. EPD results are reported for 1 rm (running meter) of MD16040C. Other products in Watt's Microflex line, as described above, are also covered by this EPD. In order to calculate the associated results for each product, scaling factors are provide at the end of the EPD.
<b>Product Classification Codes:</b>	Microflex Cool products with self-regulating heating tape are explicitly excluded from this EPD. EC3 - UtilityPiping -> BuildingHeatingPiping
<b>Form Factor:</b>	UtilityPiping >> BuildingHeatingPiping
<b>Options:</b>	
<b>Options:</b>	✓ Plastic pre-insulated pipe system
<b>Options:</b>	✓ Service pipe

## Product Composition Diagram



**Table 1. Material Composition**

Material/Component Category	Origin	% Mass
PE-Xa Pipe	None	0 - 60 %
HDPE Pipe	None	20 - 90 %
PE-Xa Insulation	None	5 - 25 %
Tape	None	< 1 %
Brass Couplings	None	1 - 10 %

Packaging Material	Origin	kg Mass
LDPE Film	None	0.008
LDPE Caps and Plugs	None	0.009
PET Straps	None	0.005

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

## EPD Data Specificity

- Primary Data Year: 2024
- Manufacturing Specificity:
- ✗ Industry Average
  - ✗ Manufacturer Average
  - ✓ Facility Specific

**Averaging:**

MD16040C was selected as the representative product based on its status as the top-selling SKU. Impact results were calculated for all other products covered by this EPD, and variability was assessed. For most impact categories, including GWP, variation was low. However, for some categories, such as resource use (minerals and metals), variation ranged from up to 80% higher to 67% lower. For all categories where variation exceeded 20%, it was confirmed that the primary driver was the proportion of brass coupling weight relative to the rest of the pipe.

## Table 2. System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	✓
	B2	Maintenance	✓
	B3	Repair	✓
	B4	Replacement	✓
	B5	Refurbishment	✓
	B6	Operational Energy Use	✓
	B7	Operational Water Use	✓
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

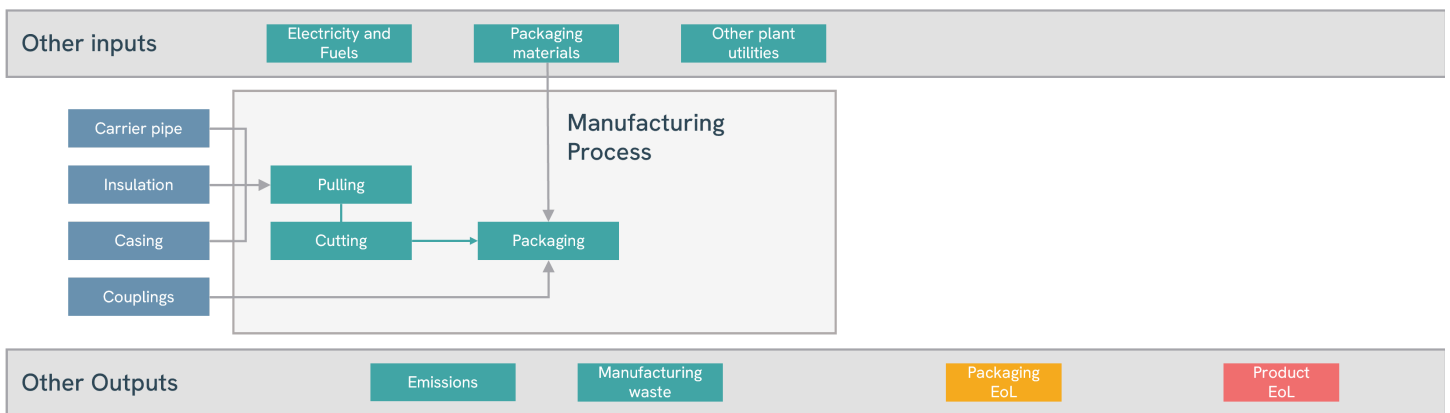
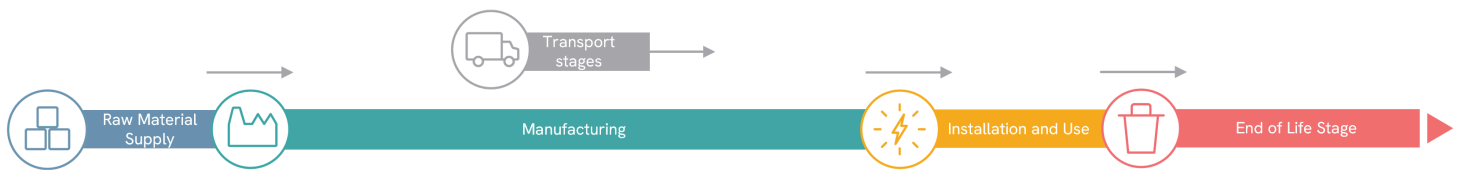
Note:

ND = Module not declared

## Plants

Gardolo Via Vienna, 3, Località Produttiva I, Autonomous Province of Trento, Italy

## Product Flow Diagram



The main components - casing, insulation, and carrier pipe - are purchased from suppliers and transported to the manufacturing facility. At the plant, these components are assembled using a pulling machine to produce pre-insulated pipe, typically in rolls of 100 meters.

The finished pipe is secured with PET straps and wrapped in protective plastic film. Brass couplings, plugs, and dust caps are supplied with the product to enable installation and to maintain the pipe ends clean.

Because installation lengths vary by project, the number of plugs, dust caps, and couplings per declared unit depends on the delivered pipe length. For modelling purposes, a reference delivery length of 20 meters is assumed to determine the proportion of these accessories per running meter.

## Software And Database

LCA Software:

SimaPro v. 10.2

LCI Foreground Database(s):

Ecoinvent v. 3.11 | RER | Cut-Off, EN15804

LCI Background Database(s):

Ecoinvent v. 3.11 | RER | Cut-Off, EN15804

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

## Data Quality

The LCI model is based on primary data from the Gardolo manufacturing facility for the 2024 production year. These data reflect the current technology, location, and operating conditions of the plant. The inventory is considered complete, as all relevant material, energy, and transport flows within the defined system boundaries have been included.

Data quality scores were assigned to both foreground data (activity data) and background datasets. Foreground data quality is generally high. Electricity data are metered and externally verified, and distribution data are based on actual sales and transport records. Bill-of-material data include minor adjustments to align with product weights and are therefore treated as calculated values. End-of-life assumptions follow the PCR.

Background data quality is also considered good. Most datasets are recent (less than three years old) and sourced from ecoinvent. Appropriate regional datasets were selected to reflect geographic conditions. Technological representativeness is high overall, with the exception of PE-Xa, for which no direct dataset exists and a proxy was used.

The PCR requires the EPD to report the GWP of the A3 electricity mix. Because the Gardolo plant uses 100% REC-backed electricity, electricity was modeled with the ecoinvent dataset "electricity production, hydro, reservoir, alpine region," which has a GWP of 0.066 kg CO<sub>2e</sub>/kWh.

## Life Cycle Module Description

**Information Module A1** covers the supply of all raw materials for pipe manufacturing, including additional material to account for production scrap. For installation accessories (brass couplings, plugs, and dust caps), quantities are based on a 20 m pipe length.

**Information Module A2** covers the transport of raw materials, based on known supplier distances.

**Information Module A3** includes manufacturing processes at the Gardolo facility, including assembly, cutting of Microflex products, and production of injection-molded components.

**Information Module A4** covers transport to the installation site, based on known sales regions. As pipes are delivered in bulk, a product-specific load factor is applied based on the amount of pipe that fits into a lorry.

**Information Module A5** includes disposal of packaging waste. No installation waste is considered, as the reference product is modeled as cut to size at the factory.

**Information Modules B1 - B7 (Use Phase)** are included in this assessment. No additional processes or inputs are required during these modules; therefore, the reported results are zero.

**Information Module C1** is included in this assessment. No additional processes or inputs are required during these modules; therefore, the reported results are zero.

**Information Module C2** covers transport to the end-of-life treatment facility, assuming a distance of 100 km.

**Information Modules C3 and C4** include waste processing and disposal. The main scenario assumes 100% incineration. An additional scenario assuming 100% recycling is also included.

**Information Module D**, covering potential burdens and benefits beyond the system boundary, includes the effects of recycled content in the brass couplings, recycling of couplings and packaging materials, and energy recovery from the incineration of packaging materials and pipe components.

## LCA Discussion

### Allocation Procedure

Allocation is based on mass and applied across all semifinished and finished goods produced at the plant. For electricity, total consumption is first distributed to departments using expert judgment and operating data (e.g., worked hours), and then allocated to the products manufactured within each department.

### Cut-off Procedure

No known mass or energy flows are excluded from the system boundary.

## Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✓ Yes
Electricity Source:	Offsite
Renewable type(s):	Hydroelectric
Percent of EPD Owner's product-related electricity covered:	100 %
Commitment pledged for entire EPD validity period:	✓ Yes
Electricity accounting methodology:	Market-based

## Scenarios

### Transport to the building/construction site (A4)

A4 Module

Vehicle Type:	Lorry, Barge
Transport Distance:	1580 km
Capacity Utilization:	35 %
Packaging Mass:	0.022 kg

### Installation in to the building/construction site (A5)

A5 Module

Mass of Packaging Waste Specified by Type:	0.022 kg
Assumptions for scenario development:	Packaging materials include injection molded polyethylene plugs and end-caps, LDPE film and PET straps. Recycling, incineration and landfilling rates are determined in accordance with Annex C of the Product Environmental Footprint (PEF) methodology.
PE Recycled:	0.005 kg

PE Incinerated:	0.005 kg
PE Landfilled:	0.007 kg
PET Recycled:	0.001 kg
PET Incinerated:	0.002 kg
PET Landfilled:	0.002 kg

## End of Life (C1 - C4)

C1 - C4 Modules

### Collection Process

Collected with Mixed Construction Waste:	2.752 kg
--	----------

### Recovery

Recycling:	0.116 kg
Landfill:	0.003 kg
Incineration:	0.003 kg
Incineration with Energy Recovery:	2.63 kg

### Assumptions for scenario development:

The main results assume 100% incineration of the pipe at end of life. Couplings are excluded from this assumption and instead follow PEF default rates for recycling (95%), landfilling (2.3%), and incineration (2.7%) of brass. An alternative scenario is also presented (see impact results below) assuming 100% landfilling of the pipe. Couplings again follow PEF default end-of-life rates.

## Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	4.2 %
Recycled Content of Product:	3.5 %
Net Energy Benefit from Energy Recovery from Waste Treatment Declared as Export Energy in C3:	38.4 MJ

## Results

**Table 3. Environmental Impact Assessment Results**

EF 3.1

per 1 rm of product pre-insulated pipe including brass couplings.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Main Scenario - Incineration at End of Life

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	EF 3.1	8.49e+0	1.61e-1	1.43e+0	1.01e+1	9.31e-1	2.16e-2	0	0	0	0	0	0	0	0	4.21e-2	8.16e+0	8.47e-5	-6.48e+0
GWP-fossil	kg CO2 eq	EF 3.1	8.50e+0	1.61e-1	1.33e+0	9.99e+0	9.30e-1	2.16e-2	0	0	0	0	0	0	0	0	4.21e-2	8.16e+0	8.46e-5	-6.43e+0
GWP-biogenic	kg CO2 eq	EF 3.1	-1.88e-2	6.78e-5	9.76e-2	7.89e-2	5.55e-4	1.37e-6	0	0	0	0	0	0	0	0	2.48e-5	3.06e-4	5.30e-8	-4.61e-2
GWP-luluc	kg CO2 eq	EF 3.1	7.04e-3	6.00e-5	1.74e-4	7.27e-3	3.31e-4	2.21e-7	0	0	0	0	0	0	0	0	1.43e-5	3.36e-5	3.85e-8	-4.22e-3
ODP	kg CFC 11 eq	EF 3.1	3.31e-7	3.03e-9	1.00e-7	4.34e-7	1.86e-8	1.21e-11	0	0	0	0	0	0	0	0	8.46e-10	1.40e-9	1.95e-12	-2.55e-7
AP	mol H+ eq	EF 3.1	8.69e-2	1.29e-3	1.38e-3	8.96e-2	4.25e-3	4.97e-6	0	0	0	0	0	0	0	0	1.89e-4	1.13e-3	5.15e-7	-1.73e-2
EP-freshwater	kg P eq	EF 3.1	6.71e-3	1.03e-5	5.89e-5	6.78e-3	6.41e-5	6.06e-8	0	0	0	0	0	0	0	0	2.89e-6	1.78e-5	8.76e-9	-1.73e-3
EP-marine	kg N eq	EF 3.1	9.44e-3	4.10e-4	7.74e-4	1.06e-2	1.68e-3	7.85e-6	0	0	0	0	0	0	0	0	7.43e-5	5.17e-4	1.99e-7	-2.90e-3
EP-terrestrial	mol N eq	EF 3.1	9.51e-2	4.51e-3	4.82e-3	1.04e-1	1.83e-2	2.36e-5	0	0	0	0	0	0	0	0	8.10e-4	5.46e-3	2.17e-6	-2.99e-2
POCP	kg NMVOC eq	EF 3.1	5.56e-2	1.45e-3	2.98e-3	6.00e-2	6.51e-3	7.05e-6	0	0	0	0	0	0	0	0	2.91e-4	1.36e-3	7.48e-7	-1.43e-2
ADP-minerals&metals	kg Sb eq	EF 3.1	9.00e-4	4.49e-7	1.19e-6	9.02e-4	2.85e-6	1.67e-9	0	0	0	0	0	0	0	0	1.30e-7	7.92e-7	2.08e-10	-1.06e-4
ADP-fossil	MJ	EF 3.1	2.34e+2	2.25e+0	1.86e+1	2.55e+2	1.33e+1	8.98e-3	0	0	0	0	0	0	0	0	6.02e-1	9.59e-1	1.57e-3	-1.11e+2
WDP	m3 world eq deprived	EF 3.1	4.32e+0	1.25e-2	4.01e+0	8.34e+0	7.86e-2	-1.17e-3	0	0	0	0	0	0	0	0	3.55e-3	8.77e-2	5.26e-5	-1.23e+0
PM	disease incidence	EF 3.1	3.53e-7	1.40e-8	1.11e-8	3.78e-7	8.89e-8	6.08e-11	0	0	0	0	0	0	0	0	4.08e-9	6.07e-9	1.38e-11	-6.11e-8
IRP	kBq U235 eq	EF 3.1	9.74e-1	2.66e-3	1.66e-2	9.93e-1	1.77e-2	1.07e-5	0	0	0	0	0	0	0	0	7.97e-4	2.47e-3	1.59e-6	-8.20e-1
ETP-fw	CTUe	EF 3.1	1.79e+2	5.61e-1	3.36e+0	1.83e+2	3.45e+0	9.74e-3	0	0	0	0	0	0	0	0	1.57e-1	2.79e+0	4.77e-4	-1.87e+1

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HTP-c	CTUh	EF 3.1	4.54e-8	1.01e-9	2.45e-9	4.89e-8	6.28e-9	5.57e-12	0	0	0	0	0	0	0	0	2.84e-10	1.18e-9	1.02e-12	-1.19e-8
HTP-nc	CTUh	EF 3.1	7.07e-7	1.48e-9	3.86e-9	7.12e-7	9.37e-9	4.53e-11	0	0	0	0	0	0	0	0	4.30e-10	1.22e-8	6.11e-13	-9.47e-8
SQP	-	EF 3.1	5.13e+1	1.50e+0	7.19e-1	5.35e+1	9.91e+0	9.03e-3	0	0	0	0	0	0	0	0	4.50e-1	3.62e-1	2.24e-3	-8.42e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

The impacts are calculated in accordance with EN 15804 using the 16 impact categories of the EF 3.1 reference package impact assessment method, as implemented in SimaPro and aligned with the ecoinvent database used for this EPD.

To calculate impacts for any product covered by this EPD, multiply the impact results by the product-specific scaling factor shown further down.

Alternate Scenario - Landfilling at End of Life

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	EF 3.1	8.49e+0	1.61e-1	1.43e+0	1.01e+1	9.31e-1	2.16e-2	0	0	0	0	0	0	0	0	4.21e-2	2.40e-2	3.15e-1	-1.36e-1
GWP-fossil	kg CO2 eq	EF 3.1	8.50e+0	1.61e-1	1.33e+0	9.99e+0	9.30e-1	2.16e-2	0	0	0	0	0	0	0	0	4.21e-2	2.39e-2	3.15e-1	-1.36e-1
GWP-biogenic	kg CO2 eq	EF 3.1	-1.88e-2	6.78e-5	9.76e-2	7.89e-2	5.55e-4	1.37e-6	0	0	0	0	0	0	0	0	2.48e-5	1.29e-4	2.42e-4	-7.67e-5
GWP-luluc	kg CO2 eq	EF 3.1	7.04e-3	6.00e-5	1.74e-4	7.27e-3	3.31e-4	2.21e-7	0	0	0	0	0	0	0	0	1.43e-5	1.15e-5	1.69e-5	-2.13e-4
ODP	kg CFC 11 eq	EF 3.1	3.31e-7	3.03e-9	1.00e-7	4.34e-7	1.86e-8	1.21e-11	0	0	0	0	0	0	0	0	8.46e-10	2.22e-10	7.62e-10	-1.92e-8
AP	mol H+ eq	EF 3.1	8.69e-2	1.29e-3	1.38e-3	8.96e-2	4.25e-3	4.97e-6	0	0	0	0	0	0	0	0	1.89e-4	8.38e-5	2.10e-4	-7.44e-3
EP-freshwater	kp P eq	EF 3.1	6.71e-3	1.03e-5	5.89e-5	6.78e-3	6.41e-5	6.06e-8	0	0	0	0	0	0	0	0	2.89e-6	6.41e-6	3.15e-6	-5.92e-4
EP-marine	kg N eq	EF 3.1	9.44e-3	4.10e-4	7.74e-4	1.06e-2	1.68e-3	7.85e-6	0	0	0	0	0	0	0	0	7.43e-5	1.03e-5	6.97e-4	-4.04e-4
EP-terrestrial	mol N eq	EF 3.1	9.51e-2	4.51e-3	4.82e-3	1.04e-1	1.83e-2	2.36e-5	0	0	0	0	0	0	0	0	8.10e-4	1.16e-4	8.56e-4	-5.49e-3
POCP	kg NMVOC eq	EF 3.1	5.56e-2	1.45e-3	2.98e-3	6.00e-2	6.51e-3	7.05e-6	0	0	0	0	0	0	0	0	2.91e-4	3.93e-5	3.72e-4	-1.60e-3
ADP-minerals&metals	kg Sb eq	EF 3.1	9.00e-4	4.49e-7	1.19e-6	9.02e-4	2.85e-6	1.67e-9	0	0	0	0	0	0	0	0	1.30e-7	6.17e-7	6.46e-8	-1.02e-4
ADP-fossil	MJ	EF 3.1	2.34e+2	2.25e+0	1.86e+1	2.55e+2	1.33e+1	8.98e-3	0	0	0	0	0	0	0	0	6.02e-1	1.52e-1	6.56e-1	-1.99e+0
WDP	m3 world eq deprived	EF 3.1	4.32e+0	1.25e-2	4.01e+0	8.34e+0	7.86e-2	-1.17e-3	0	0	0	0	0	0	0	0	3.55e-3	4.14e-3	-4.18e-1	-1.33e-1
PM	disease incidence	EF 3.1	3.53e-7	1.40e-8	1.11e-8	3.78e-7	8.89e-8	6.08e-11	0	0	0	0	0	0	0	0	4.08e-9	1.44e-9	4.75e-9	-1.79e-8
IRP	kBq U235 eq	EF 3.1	9.74e-1	2.66e-3	1.66e-2	9.93e-1	1.77e-2	1.07e-5	0	0	0	0	0	0	0	0	7.97e-4	1.50e-3	6.62e-4	-1.45e-2
ETP-fw	CTUe	EF 3.1	1.79e+2	5.61e-1	3.36e+0	1.83e+2	3.45e+0	9.74e-3	0	0	0	0	0	0	0	0	1.57e-1	1.29e-1	1.72e+0	-1.08e+1
HTP-c	CTUh	EF 3.1	4.54e-8	1.01e-9	2.45e-9	4.89e-8	6.28e-9	5.57e-12	0	0	0	0	0	0	0	0	2.84e-10	1.30e-10	1.73e-10	-1.42e-9
HTP-nc	CTUh	EF 3.1	7.07e-7	1.48e-9	3.86e-9	7.12e-7	9.37e-9	4.53e-11	0	0	0	0	0	0	0	0	4.30e-10	5.45e-10	3.03e-9	-7.77e-8
SQP	-	EF 3.1	5.13e+1	1.50e+0	7.19e-1	5.35e+1	9.91e+0	9.03e-3	0	0	0	0	0	0	0	0	4.50e-1	1.46e-1	1.53e+0	-2.46e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.



Alternate Scenario - Landfilling at End of Life

Indicator	Unit	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	1.32e+1	3.55e-2	1.21e+1	2.53e+1	2.31e-1	1.61e-4	0	0	0	0	0	0	0	0	1.04e-2	2.43e-2	9.84e-3	-3.65e-1
PERM	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ, net calorific value	1.32e+1	3.55e-2	1.21e+1	2.53e+1	2.31e-1	1.61e-4	0	0	0	0	0	0	0	0	1.04e-2	2.43e-2	9.84e-3	-3.65e-1
PENRE	MJ, net calorific value	1.20e+2	2.25e+0	1.95e+1	1.42e+2	1.33e+1	6.05e-1	0	0	0	0	0	0	0	0	6.02e-1	1.52e-1	1.13e+2	-1.99e+0
PENRM	MJ, net calorific value	1.14e+2	0	-8.75e-1	1.13e+2	0	-8.37e-1	0	0	0	0	0	0	0	0	0	0	-1.12e+2	0
PENRT	MJ, net calorific value	2.34e+2	2.25e+0	1.86e+1	2.55e+2	1.33e+1	-2.32e-1	0	0	0	0	0	0	0	0	6.02e-1	1.52e-1	6.56e-1	-1.99e+0
SM	kg	9.76e-2	0	0	9.76e-2	0	0	0	0	0	0	0	0	0	0	0	0	0	2.46e-2
RSF	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m3	1.05e-1	3.06e-4	9.38e-2	1.99e-1	1.93e-3	-2.71e-5	0	0	0	0	0	0	0	0	8.73e-5	1.02e-4	-9.72e-3	-3.26e-3

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRM or PENRM = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

### Table 5. Waste and Output Flow Indicators

per 1 rm of product pre-insulated pipe including brass couplings.

Main Scenario - Incineration at End of Life

Indicator	Unit	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	6.18e-1	3.28e-3	2.04e-2	6.42e-1	1.93e-2	1.75e-4	0	0	0	0	0	0	0	0	8.70e-4	7.37e-2	3.87e-6	-1.34e-1
NHWD	kg	8.13e+1	6.57e-2	6.31e+0	8.77e+1	4.07e-1	4.99e-2	0	0	0	0	0	0	0	0	1.84e-2	2.86e+0	7.76e-3	-8.05e+0
RWD	kg	2.50e-4	6.61e-7	4.17e-6	2.55e-4	4.40e-6	2.66e-9	0	0	0	0	0	0	0	0	1.98e-7	6.28e-7	3.93e-10	-2.10e-4
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	6.30e-3	0	0	0	0	0	0	0	0	0	1.16e-1	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	3.20e-2	0	0	0	0	0	0	0	0	0	1.31e+1	0	0
EET	MJ	0	0	0	0	0	6.21e-2	0	0	0	0	0	0	0	0	0	2.53e+1	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Alternate Scenario - Landfilling at End of Life

Indicator	Unit	A1	A2	A3	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	6.18e-1	3.28e-3	2.04e-2	6.42e-1	1.93e-2	1.75e-4	0	0	0	0	0	0	0	0	8.70e-4	2.37e-3	1.16e-3	-3.57e-2
NHWD	kg	8.13e+1	6.57e-2	6.31e+0	8.77e+1	4.07e-1	4.99e-2	0	0	0	0	0	0	0	0	1.84e-2	6.41e-2	1.31e+1	-2.29e+0
RWD	kg	2.50e-4	6.61e-7	4.17e-6	2.55e-4	4.40e-6	2.66e-9	0	0	0	0	0	0	0	0	1.98e-7	3.83e-7	1.62e-7	-3.76e-6
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	6.30e-3	0	0	0	0	0	0	0	0	0	1.16e-1	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	3.20e-2	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	6.21e-2	0	0	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

**Table 6. Scaling Factors**

Product	Pipe Weight (kg)	Coupling Weight	Scaling Factor
M12525C	1.8	0.022	0.66
M12525S	1.52	0.022	0.56
M12528S	1.55	0.035	0.58
M12532C	1.55	0.035	0.58
M12532S	1.6	0.035	0.59
M12540C	1.72	0.061	0.65
M12540S	1.89	0.061	0.71
M12550C	1.92	0.082	0.73
M12550PE	1.4	0.082	0.54
M12550S	2.19	0.082	0.83
M12563C	2.16	0.139	0.84
M12563PE	1.8	0.139	0.70
M12563S	2.59	0.139	0.99
M16032C	1.8	0.035	0.67
M16032S	2	0.035	0.74
M16040C	2.32	0.061	0.87
M16040S	2.6	0.061	0.97
M16050C	2.48	0.082	0.93
M16050S	2.5	0.082	0.94
M16063C	2.78	0.139	1.06

Product	Pipe Weight (kg)	Coupling Weight	Scaling Factor
M16063S	3.16	0.139	1.20
M16075C	3.2	0.18	1.23
M16075PE	2.5	0.18	0.97
M16090C	3.85	0.298	1.51
M16090PE	3.3	0.298	1.31
M200110C	5.64	0.377	2.19
M200110PE	5.74	0.377	2.22
M200110S	4.16	0.377	1.65
M200125C	6.5	0.475	2.53
M200125PE	5.5	0.475	2.17
M20075C	4.16	0.18	1.58
M20075S	4.65	0.18	1.76
M20090C	4.73	0.298	1.83
M20090S	4.16	0.298	1.62
M7522S	0.7	0.022	0.26
M7525C	0.68	0.022	0.26
M7525S	0.75	0.022	0.28
M7528S	0.75	0.035	0.29
M7532S	1	0.035	0.38
M9018S	0.8	0.022	0.30
M9032C	1	0.035	0.38
M9032PE	0.78	0.035	0.30
M9032S	1.12	0.035	0.42
M9040C	1.11	0.061	0.43
M9040PE	1	0.061	0.39
M9040S	1.2	0.061	0.46
MD1252520S	1.65	0.044	0.62
MD12525C	1.57	0.044	0.59

Product	Pipe Weight (kg)	Coupling Weight	Scaling Factor
MD1252818S	1.57	0.057	0.59
MD1253222S	2	0.057	0.75
MD1253225S	2	0.057	0.75
MD12532C	1.77	0.07	0.67
MD12532PE	1	0.07	0.39
MD16025C	2.21	0.044	0.82
MD16025S	2.35	0.044	0.87
MD1603218S	2.2	0.057	0.82
MD1603225S	2.5	0.057	0.93
MD1603228S	2.41	0.07	0.90
MD16032C	2.41	0.07	0.90
MD1604025S	2.71	0.083	1.01
MD1604028S	2.5	0.096	0.94
MD1604032S	2.5	0.096	0.94
MD16040C	2.63	0.122	1
MD16040PE	2.63	0.122	1.00
MD1605025S	2.89	0.104	1.09
MD1605032S	3.04	0.117	1.15
MD1605040S	3.25	0.143	1.23
MD16050C	3.55	0.164	1.35
MD16050PE	3.1	0.164	1.19
MD20032C	1	0.07	0.39
MD20040C	3.8	0.122	1.43
MD20050C	4.03	0.164	1.52
MD20063C	4.64	0.278	1.79
MD20063PE	4.64	0.278	1.79
MD20063S	5.8	0.278	2.21
MQ12525C3225E	1.6	0.044	0.60

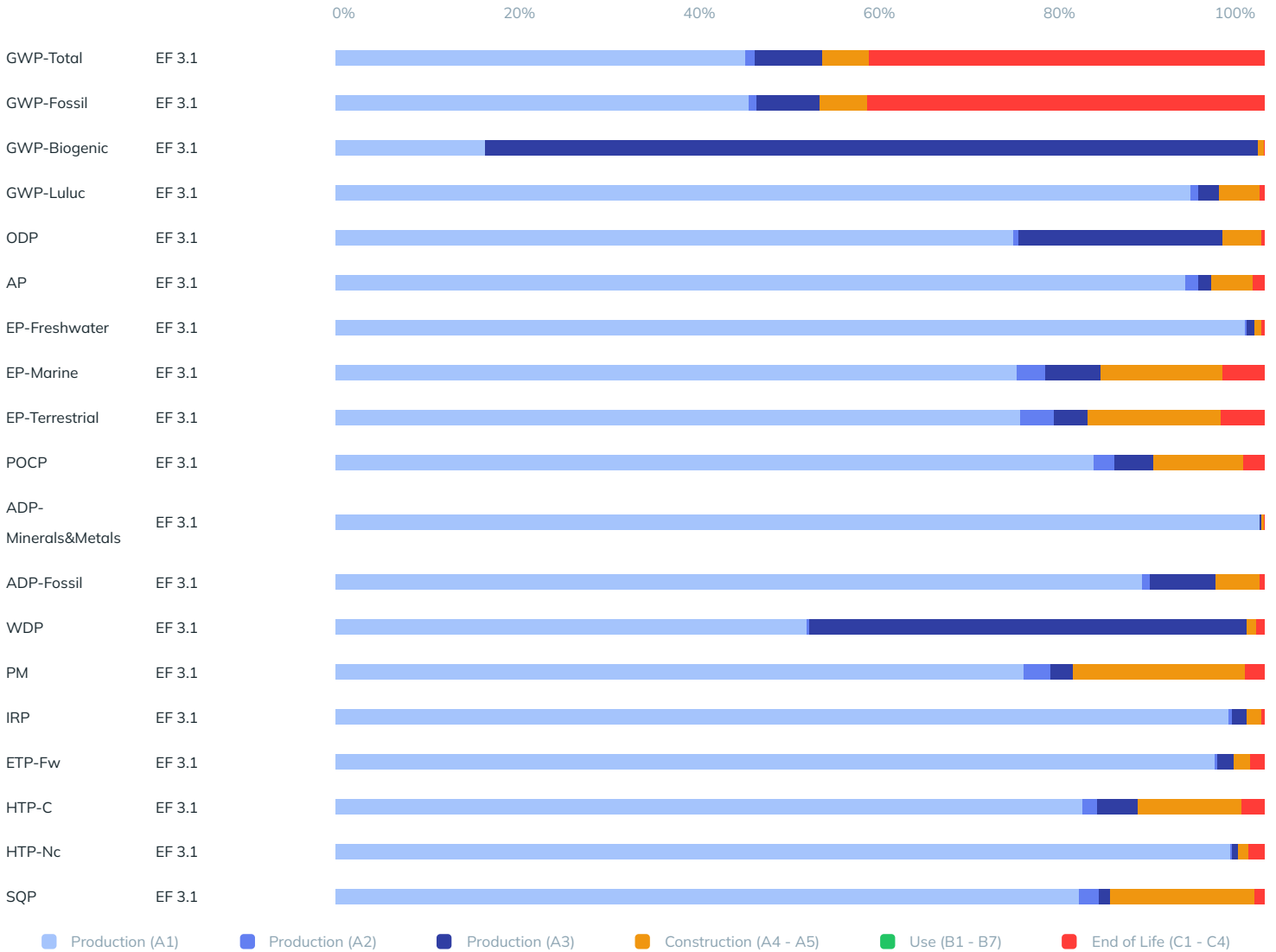
Product	Pipe Weight (kg)	Coupling Weight	Scaling Factor
MQ12532C3225E	1.8	0.07	0.68
MQ16025C2520S	2.4	0.088	0.90
MQ16025C2818S	2.3	0.101	0.87
MQ16032C2520S	2.6	0.114	0.99
MQ16032C2818S	2.6	0.127	0.99
MQ16032C3218S	2.84	0.127	1.08
MQ16032C3225E	2.55	0.07	0.95
MQ16032C3225S	2.7	0.127	1.03
MQ16040C32E	2.7	0.122	1.03
MQ20040C4028S	5	0.218	1.90
MQ20040C4032S	5.8	0.218	2.19
MQ20050C40E	5.2	0.164	1.95

List of products covered by this EPD at the time of publication. A scaling factor is provided for each product - this factor corresponds with the ratio between a given product's weight, and the representative product's weight (2.752 kg).

In order to calculate impact results for one running meter of a specific product, multiply the EPD results shown in the tables above by that product's scaling factor. For example, to calculate the GWP of M12525C you multiply the GWP of MD16040C by 0.66, which is the scaling factor of M12525C.

## Interpretation

The majority of life cycle impacts arise from raw material supply (A1) across most impact categories. Manufacturing (A3), distribution (A4), and end-of-life treatment (C4) each contribute up to approximately 20% in certain categories. Module D indicates potential offsets of life cycle impacts through material and energy substitution.



## References

- ISO 14025. (2006). ISO 14025:2006: Environmental labels and declarations — Type III environmental declarations — Principles and procedures. International Organization for Standardization.
- ISO 14044. (2006). ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines. International organization for Standardization (ISO).
- EN 15804. (2019). EN15804:2012+A2:2019, Sustainability of Construction Works Environmental Product Declarations- Core Rules for the Product Category of Construction Products.

- THE EUROPEAN COMMISSION. (2021). Commission Recommendation (EU) 2021/2279 of 15 December 2021 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organizations.
- Smart EPD. (2025). GENERAL PROGRAM INSTRUCTIONS for Smart EPD®
- IBU. (2024). Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019.
- IBU. (2023). Part B: Requirements on the EPD for Pre-insulated pipe systems for use in buildings.
- EN 15941. (2024). EN 15941:2024, Sustainability of construction works - Data quality for environmental assessment of products and construction work  
- Selection and use of data