

Environmental Product Declaration

Steel Mechanical Tubing

In accordance with ISO 14025 and ISO 21930:2017

Program Operator:
Smart EPD

Date of issue:
September 5, 2025

Expiration:
September 5, 2030



SmartEPD-2025-081

Date of Issue
Sep 05, 2025

Expiration Date
Sep 05, 2030

Last Updated
Mar 02, 2026



Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

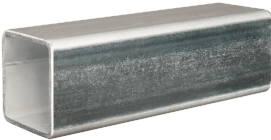
Atkore

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Product Name:	Steel Mechanical Tubing
Declared Unit:	1 metric ton
Declaration Number:	SmartEPD-2025-081-0581-01.2
Date of Issue:	September 05, 2025
Expiration:	September 05, 2030
Last updated:	March 02, 2026
EPD Scope:	Cradle to gate with other options A1 - A3, C1 - C4, D
Market(s) of Applicability:	North America

General Organization Information

Atkore is a leading manufacturer of electrical and critical infrastructure products for commercial, industrial, data center, telecommunications, water, and solar applications. Significant product categories include metal conduit, plastic conduit, electrical cable and flexible conduit, metal framing, and cable management systems.

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

Limitations, Liability and Ownership

It is recognized that by following the typical ISO 21930:2017 definitions of module A1, A2 and A3 for a specific production facility, inconsistencies will occur in classifying individual processes as either A1 or A3 based on the scope of the operations that take place at a given facility. Care must be taken not to compare A1, A2 or A3 on an individual basis for a given product from various mill producers, but, instead on the aggregated total of A1, A2 and A3. Separate A1, A2 and A3 values are provided for a better understanding of the processes taking place at a given facility and a greater level of transparency.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. Construction product environmental impact results provide a sufficient basis for comparison only when considered in the context of the construction works project. In all cases of comparing construction products, the principle that the basis for comparison of the assessment is the construction works level shall be maintained by ensuring that the same functional requirements are met and the criteria in ISO 21930:2017 Section 5.5 "Comparability of EPDs for construction products" are satisfied.

Much of the data utilized for this EPD is based on information supplied by the manufacturer. TrueNorth Collective is not responsible for the accuracy, completeness or reliability of the data provided by the manufacturer or any information or conclusions derived therefrom.

Reference Standards

Standard(s):	ISO 14025 and ISO 21930:2017
Core PCR:	Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, 1000, v1.2 Date of issue: March 14, 2025
Sub-category PCR:	Smart EPD® Part B PCR for Designated Steel Construction Products, 1000-008, v3.0 Date of issue: April 03, 2025 Valid until: April 03, 2030
Sub-category PCR review panel:	 Contact Smart EPD for more information.
General Program Instructions:	 Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

ACLCA PCR Guidance Version:	1.0
ACLCA PCR Conformance Level:	Transparency
LCA Author/Creator:	 Chris Carter  chris.carter@truenorthcollective.net
EPD Program Operator:	 Smart EPD  info@smartepd.com  www.smartepd.com  585 Grove St., Ste. 145, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071:  Sarah Curpen  curpen1996@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s):  Sarah Curpen  curpen1996@gmail.com

External

External

Product Information

Declared Unit:	1 metric ton
Mass:	1000 kg
Product Specificity:	 Product Average  Product Specific
Supply Chain Specific Data:	13.0 %
Variation in GWP Result (Products):	-2.0%% to 4%%

Product Description

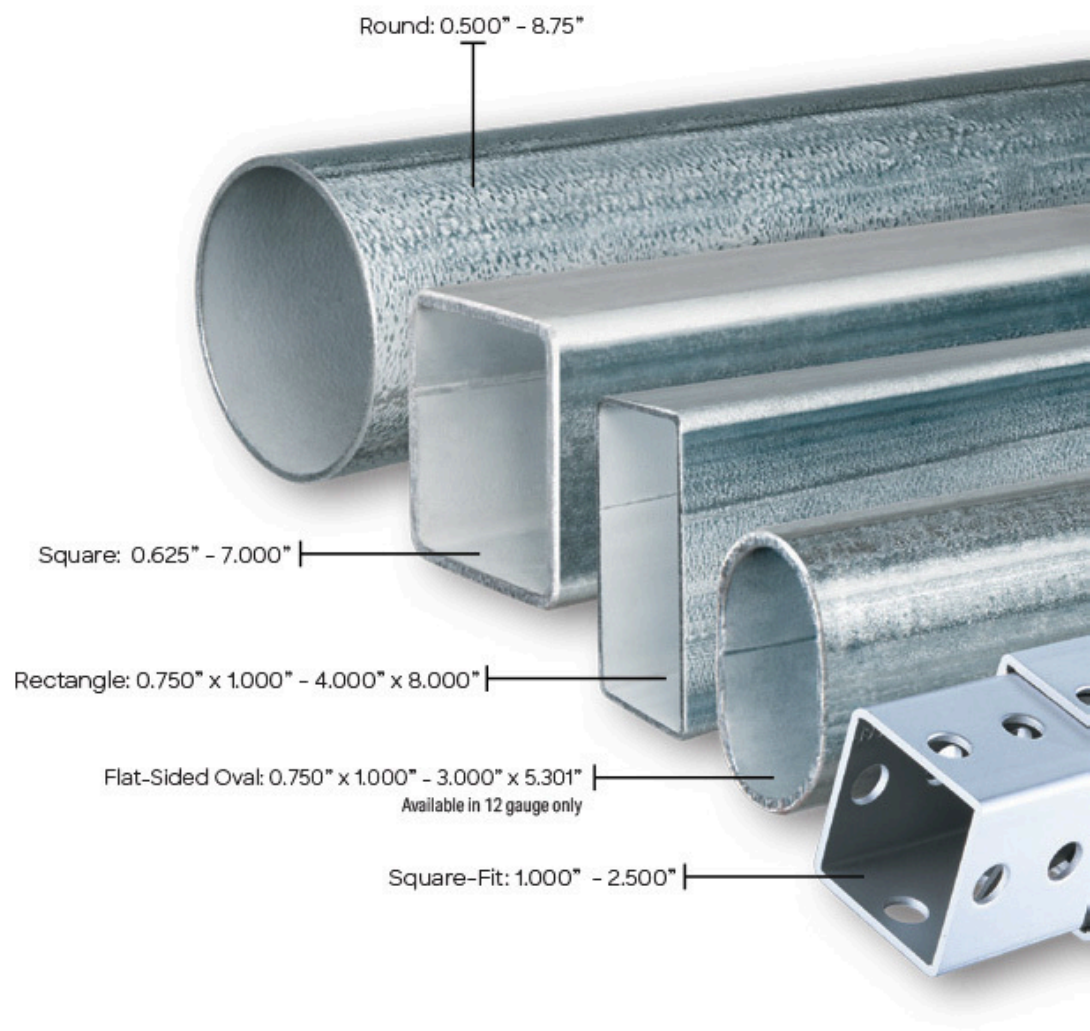
Galvanized tube from Allied Tube & Conduit has been manufactured with a combination of strength and advanced corrosion protection for over 40 years. Atkore's unique Gatorshield® coating produces superior corrosion resistance by utilizing a triple layer of protection. The tube can be easily fabricated including bending, swaging, and flattening without damaging the layers of protection. Ranging in size from .500" to 8.75" and varying shapes from square and rectangle to round and oval, Allied Tube & Conduit delivers an unmatched reliable and quality product. Atkore's galvanized tube conforms to UL2703.

Further information can be found at: <https://www.atkore.com/products/mechanical-tubing>

Product Specifications

Product SKU(s):	Square Solar Tube - 4"
Product Classification Codes:	CN - 73045189

Product Composition Diagram



Material Composition

Material/Component Category	Origin	% Mass
Steel	United States	99.1%
Zinc	United States	0.9%

Packaging Material	Origin	kg Mass
Wood	United States	9.78E+00
Steel banding	United States	2.57E+00

Packaging Material	Origin	kg Mass
Paper	United States	4.79E-03

Biogenic Carbon Content	kg C per metric ton
Biogenic carbon content in product	0None
Biogenic carbon content in accompanying packaging	65.8

Hazardous Materials
None

EPD Data Specificity

- Primary Data Year: FY2024
- Manufacturing Specificity:
 - ✗ Industry Average
 - ✓ Manufacturer Average
 - ✗ Facility Specific

Averaging:
For this product specific EPD, manufacturing impacts were averaged using production volumes.

System Boundary

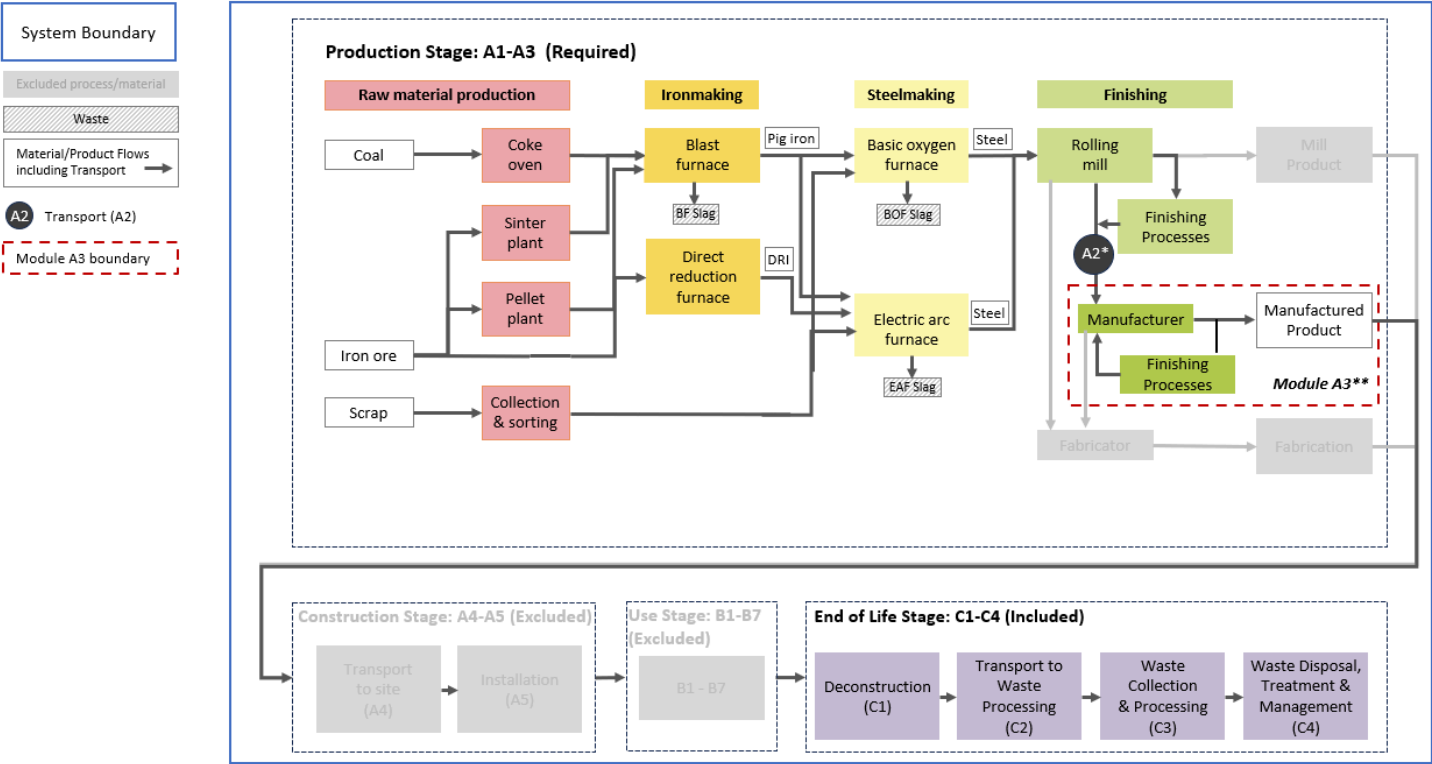
Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	ND
	A5	Assembly / Install	ND

Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
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

Product Composition Diagram



Notes

Each unit process shall account for resource inputs (fuels, electricity, water, materials, etc) and emissions to air/land/water, wastes and co-products, if relevant

* A2 transportation is represented by any grey arrow that crosses A1 / A3 boundary.

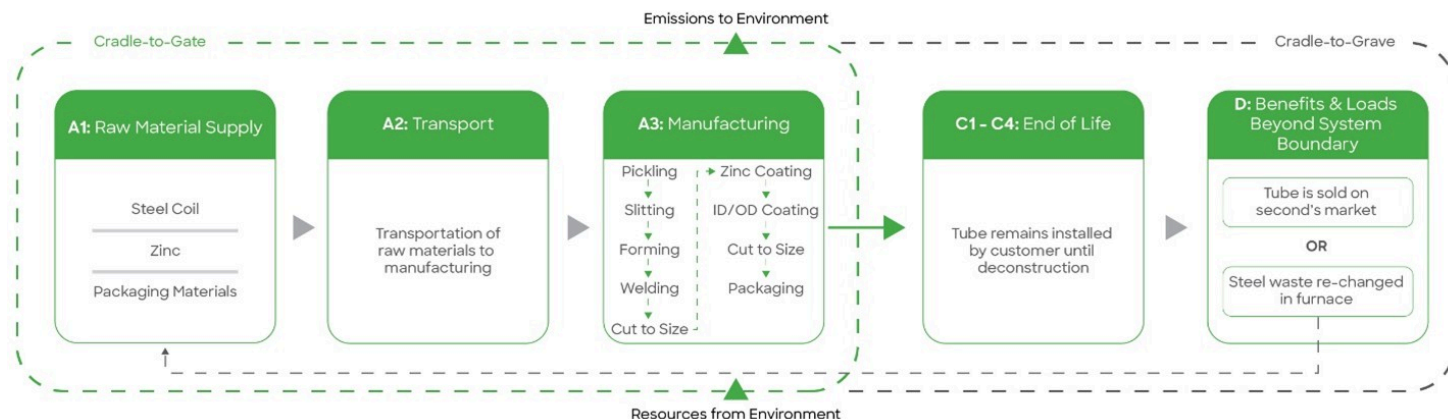
** Processes inside the red dashed line are in module A3 and should include specific data, if available.

Processes outside of the dashed red line indicate processes in module A1

Plants

-  Hobart, IN Hobart, IN, USA
-  Phoenix, AZ Phoenix, AZ, USA
-  Harvey, IL Harvey, IL, USA

Product Flow Diagram



No substances required to be reported as hazardous are associated with the production of this product.

Software And Database

LCA Software:

Simapro v. 9.6

LCI Foreground Database(s):

Ecoinvent v. 3.9.1

LCI Background Database(s):

Ecoinvent v. 3.9.1

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

In order to comply with ISO 14044 and ISO 14040 requirements, this EPD reports the results and conclusions of the LCA completely and accurately without bias to the intended audience.

Life cycle inventory data used in this study are evaluated based on three categories: precision and completeness, consistency and reproducibility, and representativeness.

Precision and completeness: Foreground data are sourced from primary information provided by the client and has been reviewed internally to ensure precision and completeness. In order to balance out seasonal variations, operations data over a 12-month period is used to represent production activities. In addition, key model input such as mass balance, energy balance and emission inventory are reviewed by TrueNorth Collective team.

Ecoinvent v3.9.1 cut-off by classification is used as the main database for background data. This version is published in 2023. Ecoinvent is widely used in research and industry to support life cycle assessment practices. Each version of this database goes through thorough review process and documentation of precision and completeness is available by the provider.

Consistency and reproducibility: To ensure consistency, primary data were collected at the same level of granularity. All input and output information, modelling assumptions and dataset choices are provided in this report for the purpose of reproducibility.

Representativeness: Refer to the sections above for details about representativeness.

Life Cycle Module Description

Raw Material Supply (A1):

The materials that make up each product in scope are steel and zinc, and primary data for those materials purchased for each plant was collected. The amount of material purchased to produce the recorded production is used to represent the raw materials supplied.

Transportation to Factory (A2):

Steel supplier names and locations were provided and used to create a weighted average distance to represent transportation distance for all supplied steel.

Manufacturing (A3):

Production aids, energy usage, water usage, waste generated, and packaging amounts were collected during FY2024. Manufacturing galvanized mechanical tube products includes several processing steps:

The steel coil through a strip cleaning process to remove contaminants from the surface of the coil before it is roll formed and welded.

Interior corrosion resistant coating is applied before being sent through acid tube cleaning tank. The tube is then heated in preparation for plating.

A 99.99% pure in-line zinc coating is applied to the heated tube. It is then cooled with water and sized to the required diameter (0.5" - 8.75").

A conversion coating is applied to the sized tube followed by a clear organic topcoat that seals in the protection and produces a smooth shiny appearance.

Finally, the tube is cured, cut to length, and packaged with steel bands, paper, and wood pallets.

End of Life - Deconstruction (C1):

At the end of the product's useful life, it is disassembled in preparation to be disposed of.

End of life - Transport (C2):

The mass of the disassembled product is transport to its final disposal.

End of life - Recycling (C3):

The mass of disassembled product that is expected to be recycled.

End of life - Disposal (C4):

The mass of disassembled product that is expected to be sent to landfill and incineration.

Benefits beyond system - (D):

In Module D, the potential environmental benefits and loads from steel recycling at the end-of-life stage are quantified. In Module A1 (raw material supply), 61% of the steel used in the product is sourced from recycled content, with the remaining 39% being virgin steel. At end-of-life, a 97% recycling rate is assumed, and the net virgin steel input is accounted for in the life cycle inventory to calculate benefits beyond the system boundary. These benefits reflect the avoided environmental impacts of virgin steel production minus the loads from recycling processes.

LCA Discussion

Allocation Procedure

The allocations of relevance for calculation (appropriation of impacts across various products) are performed as follows:

- The use of recycled and secondary raw materials is based on the mass of the material present in a ton of product.
- Manufacturing production is tracked by the mass produced, so energy, ancillary, and operating materials are allocated based on product mass.

No multi-output allocation was necessary in the foreground of the study, and the secondary data that is sourced from ecoinvent v3.9.1 cut-off by classification has allocation applied to it.

This study uses the cut-off approach method for recycling. According to this approach, the first life of a material bears the environmental burdens of its production (e.g., raw material extraction and processing) and the second life (e.g., scrap input) bears the burdens of refurbishment (e.g., collection and refining of scrap). The burdens from recycling waste treatment are taken on by the next life of the product and are not included in this study.

Cut-off Procedure

For the processes within the system boundary, described in Study Boundaries, input and output flows of mass and energy greater than 1% (based on total mass of final product and total energy usage of the product system) or greater than 1% of environmental impacts were included within the scope of the analysis. Flows of less than 1% were included if sufficient data were available to warrant inclusion and/or the flow was thought to have significant environmental impact. Where data gaps were identified, they are filled by conservative assumptions with average, generic, or proxy data and assumptions are documented.

Some customers require additional transport and processing to drill holes in the reference product. These operations are assumed to have no significant environmental impact are excluded from this study. No known flows relevant to the product system are deliberately excluded from this LCA.

All upstream and downstream activities are included using a combination of primary and secondary data. While the majority of inventory data is sourced from primary resources, representative proxies are used to close gaps in the absence of primary data.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:

✗ No

Scenarios

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected Separately:

1,000 kg

Recovery

Recycling:

970 kg

Landfill:

30 kg

Disposal

Product or Material for Final Disposal:

1,000 kg

Assumptions for scenario development:

Assume the product travels 80.5 km at end of life to be disposed of. Assume a recycling rate of 97% with a landfill rate of 3%.

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

D Module

Recycling Rate of Product:	97 %
Recycled Content of Product:	61.1 %
Pre-Consumer Recycled Content:	33.5 %
Post-Consumer Recycled Content:	66.5 %

Results

Environmental Impact Assessment Results

EF 3.1, TRACI 2.1

per 1 metric ton of product.

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

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	EF 3.1	2.32e+3	1.50e+2	2.45e+2	2.72e+3	0	1.55e+1	0	1.82e-1	6.66e+2
GWP-fossil	kg CO2 eq	EF 3.1	3.44e+0	3.88e-2	8.27e-1	4.30e+0	0	4.02e-3	0	7.21e-5	9.72e-1
GWP-biogenic	kg CO2 eq	EF 3.1	2.32e+3	1.50e+2	2.43e+2	2.71e+3	0	1.55e+1	0	1.82e-1	6.65e+2
GWP-luluc	kg CO2 eq	EF 3.1	2.06e+0	7.71e-2	1.32e+0	3.46e+0	0	7.97e-3	0	1.10e-4	5.74e-1
ODP	kg CFC 11 eq	TRACI 2.1	4.57e-5	2.48e-6	3.74e-6	5.19e-5	0	2.56e-7	0	5.68e-9	1.28e-5
AP	kg SO2 eq	TRACI 2.1	9.06e+0	8.04e-1	7.07e-1	1.06e+1	0	8.32e-2	0	1.23e-3	2.63e+0
EP	kg N eq	TRACI 2.1	9.50e+0	1.53e-1	1.71e+0	1.14e+1	0	1.58e-2	0	2.10e-4	2.87e+0
POCP	kg O3 eq	TRACI 2.1	1.32e+2	2.25e+1	8.87e+0	1.63e+2	0	2.33e+0	0	3.27e-2	3.80e+1

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.

These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes."

Resource Use Indicator

per 1 metric ton of product.

Indicator	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
RPRE	MJ	2.19e+3	2.68e+1	9.02e+2	3.11e+3	0	2.77e+0	0	3.85e-2	6.25e+2
RPRM	MJ	0	0	0	0	0	0	0	0	0
NRPRE	MJ	2.69e+4	2.25e+3	3.51e+3	3.27e+4	0	2.33e+2	0	4.83e+0	7.48e+3
NRPRM	MJ	0	0	0	0	0	0	0	0	0
SM	kg	7.14e+2	0	0	7.14e+2	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
RE	MJ	0	0	0	0	0	0	0	0	0
ADPF	MJ, LHV	2.36e+4	2.09e+3	2.84e+3	2.85e+4	0	2.16e+2	0	4.49e+0	6.64e+3
FW	m3	9.56e-1	2.94e-1	-2.39e-2	1.23e+0	0	3.05e-2	0	4.82e-3	-2.49e+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:

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, NRPRRT or PENRT = 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.

For RPRM and NRPRM indicators, packaging is not included.

Waste and Output Flow Indicators

per 1 metric ton of product.

Indicator	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0	0
NHWD	kg	0	0	1.84e+1	1.84e+1	0	0	0	3.00e+1	0
HLRW	kg	0	0	0	0	0	0	0	0	0
ILLRW	kg	0	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	1.01e+2	1.01e+2	0	0	9.70e+2	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0

Note:

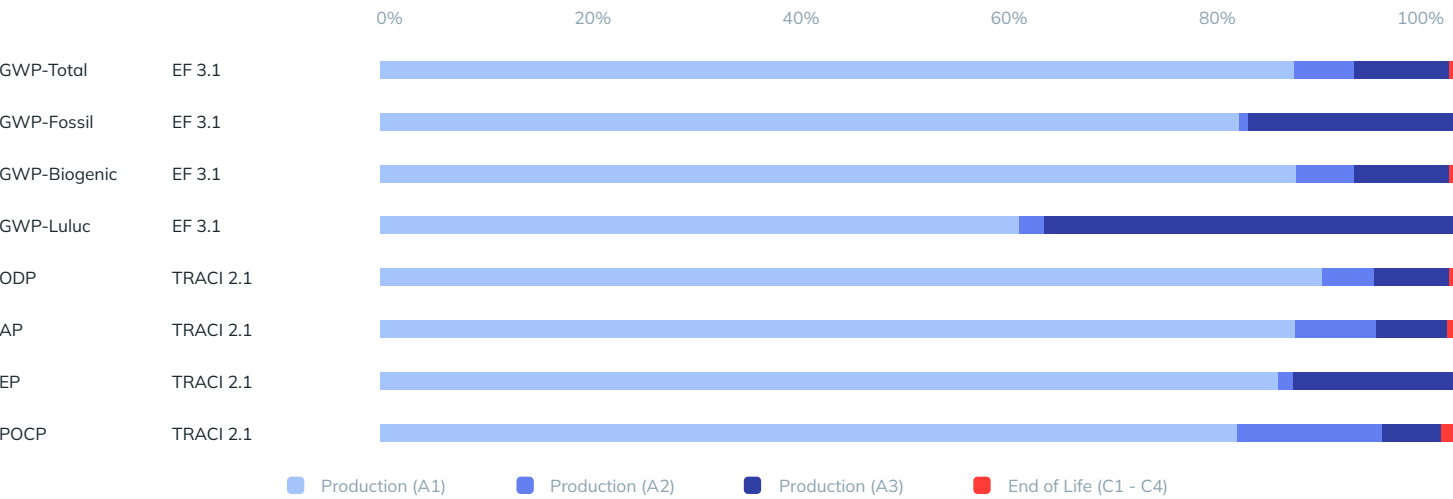
Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

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.

Interpretation

The analysis of Atkore's mechanical tubing products provides useful insights regarding the cradle-to-grave environmental impacts. The LCA results also identify where substantial impacts are occurring to allow further process and materials improvements to be implemented by the reporting company. The cradle-to-grave impacts for all products are dominated by the A1 Raw Materials stage (over 50% for all impact categories). This is due to the upstream impacts associated with the purchased steel.



Additional Environmental Information

In hopes to better understand opportunities and improve future impacts, the Atkore asked for additional analysis exploring hexavalent chromium, the acids used within manufacturing, and the recycled content of the supplied steel.

First, a comparison was made between hexavalent and trivalent chromium. Utilizing the USEtox 2 method v2.13, trivalent chromium is shown to have much less human toxicity and freshwater ecotoxicity impacts for both emissions to air and emissions to water. For human toxicity, the reduction is over 98%, and for ecotoxicity, it is over a 90% reduction when compared to hexavalent chromium.

In regard to the acids used in manufacturing, the combined impacts of hydrochloric acid, sodium hydroxide, and iron (III) chloride make up less than 1% of the cradle-to-gate impacts for all impacts evaluated: GWP, ODP, AP, EP, and SFP.

Lastly, in analyzing the supplied steel, the percentage of recycled content is a main driver for overall impacts. For BOF steel, recycled iron scrap makes up over 30% of the mass while only contributing less than 2% to GWP. Additionally, it contributes less than 1% to SFP, EP, and ODP, while also contributing less than 3% to AP. For EAF steel, recycled iron scrap makes up over 75% of the mass while contributing less than 5% to GWP. Its contribution to SFP is less than 12% with contribution to AP less than 8%, and its contribution to other impacts measures is less than 5%.

Since the supplied steel is the major driver to overall impacts, increasing the recycled content of the steel will have significant impact on reducing all impacts.

Further Information

Scaling Table

All of the results reported above are in relation to the declared unit of one metric ton of reference product. To accurately represent the mechanical tube products from the reference product and satisfy the scope of this project, a scaling table was created.

For all shapes of tube, the following calculations are used:

- Outer Diameter (OD) is converted to cm by multiplying to 2.54.
- Thickness is determined by the gauge size and is recorded below under assumptions
- Inner Diameter (ID) is the OD minus two times the thickness: $ID = OD - 2 * \text{Thickness}$

The following equations are used to determine the cross-sectional area of the tube depending on its shape:

- Square Tube: $\text{Area} = OD^2 - ID^2$
- Round Tube: $\text{Area} = \pi * [(OD/2)^2 - (ID/2)^2]$

The cross-sectional area is multiplied by 100 cm (1 m) and the density of the products to calculate the mass in kg for one meter of product:

- Mass per Length (kg/m) = $\text{Area} * 100 * 0.00785$

To understand the total length needed to satisfy the declared unit, 1,000 kg is divided by the kg mass per meter.

- Length (m) = $1,000 \text{ kg} / \text{Mass per Length}$

The table below shows the various properties of the products in scope that are needed to calculate the mass per meter of product. The table also includes the total length of product needed to meet the declared unit of 1 metric ton of product.

Scaling Table for Mechanical Tube Products

Product	Outer Diameter	Gauge Size	Cross-Sectional Area (cm ²)	Mass/Length (kg/m)	Length (m)
Square Solar Tube (reference product)	4"	12	10.95	8.59	3.67E+02
Round Mechanical Tube	1.9"	13	3.48	2.73	5.27E+02
Round Mechanical Tube	1.9"	16	2.42	1.90	2.09E+02
Round Mechanical Tube	2.375"	10	6.09	4.78	1.41E+02
Round Mechanical Tube	2.875"	8	9.06	7.11	2.60E+02
Round Mechanical Tube	3"	14	4.91	3.85	1.07E+02
Round Solar Tube	5"	11	11.87	9.32	1.35E+02
Round Solar Tube	5"	13	9.44	7.41	9.53E+01
Square Solar Tube	4"	10	13.37	10.50	1.16E+02
Square Solar Tube	5"	13	12.03	9.44	1.06E+02

- Density of mechanical tube products is: 0.00785 kg/cm³ (7850 kg/m³)
- 8 gauge has a thickness of 0.4191 cm
- 10 gauge has a thickness of 0.3404 cm
- 11 gauge has a thickness of 0.3048 cm
- 12 gauge has a thickness of 0.2769 cm

- 13 gauge has a thickness of 0.2413 cm
- 14 gauge has a thickness of 0.2108 cm
- 16 gauge has a thickness of 0.1651 cm

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