

ENVIRONMENTAL PRODUCT DECLARATION

FABRICATED FIRE SPRINKLER PIPE — BLACK AND GALVANIZED

WHEATLAND TUBE, A DIVISION OF ZEKELMAN INDUSTRIES
WHEATLAND, PA AND WARREN, OH



Wheatland Tube manufactures the industry's most complete line of steel fire sprinkler pipe. It's all readily available — from Schedule 10 to our proprietary solutions, with a range of coatings and end finishes to choose from, including threading, swaging and grooving.



At Wheatland Tube, we've been making it easy for our customers to stock and install our products since we began manufacturing in 1931. We trace our legacy of service all the way back to 1877, when John Maneely, the founder of Wheatland's parent company, began selling pipe, valves and fittings in Philadelphia.

Today, Wheatland is a division of Zekelman Industries, the largest independent steel pipe and tube manufacturer in North America and a leader in modular construction innovations. We're proud to serve the industry with our expansive portfolio of American-made products and best-in-class technologies that MAKE IT eZ for distributors to work with us.

The North American steel industry is the cleanest of all the major steel producing areas of the world. Of the seven largest steel producing countries, the U.S. has the lowest CO₂ emissions per ton of steel produced and the lowest intensity (AISI, 2024). Wheatland Tube is committed to maintain this fact by constantly improving our processes. For more information about Wheatland Tube and the products we offer, please visit www.wheatland.com.




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EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Solutions 333 Pfingsten Road Northbrook, IL 60611 www.ul.com www.spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v 2.7 2022
MANUFACTURER NAME AND ADDRESS	Wheatland Tube 1 Council Avenue P.O. Box 608 Wheatland, PA 16161
DECLARATION NUMBER	4791523933.104.1
DECLARED PRODUCT & DECLARED UNIT	Fabricated Fire Sprinkler Pipe; 1 metric ton
REFERENCE PCR AND VERSION NUMBER	UL Part A: Life Cycle Assessment Calculation Rules and Report Requirements, v4.0 (2022) Part B: Steel Construction Product EPD Requirements, v2.0 (2020)
DESCRIPTION OF PRODUCT APPLICATION/USE	Fabricated Steel Fire Sprinkler Pipe. This product can be black or hot-dip galvanized, and comes in many different sizes and schedules.
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	December 10 th , 2024
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-specific Type III
EPD SCOPE	Cradle to gate
YEAR(S) OF REPORTED PRIMARY DATA	October 2021 – September 2022
LCA SOFTWARE & VERSION NUMBER	Sphera LCA for Experts 10.7 (formerly GaBi)
LCI DATABASE(S) & VERSION NUMBER	Sphera Managed LCA Content Database 2024.1 (formerly GaBi Database)
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1, IPCC AR5 GWP ₁₀₀ , CML 2001-Jan 2016 ADP _{fossil}
Part A PCR review was conducted by:	Lindita Bushi, PhD, Chair Hugues Imbeault-Tétrault, Eng., M.A. Sc. Jack Geibig
The sub-category PCR review was conducted by:	Dr. Tom Gloria (Chair) Brandie Sebastian James Littlefield
This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment “Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report,” v4.0, based on CEN Norm EN 15804 (2012) and ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017).	 Cooper McCollum, UL Solutions
<input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	WAP Sustainability Consulting

Limitations:

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of construction works and construction products using EPD information shall be based on the product's use and impacts at the construction works level. In general, EPDs may not be used for comparability purposes when not considered in a construction works context. Given this PCR ensures products meet the same functional requirements, comparability is permissible provided the information given for such comparison is transparent and the limitations of comparability explained.

When comparing EPDs created using this PCR, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

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1. Product Definition and Information

1.1. Description of Organization

At Wheatland Tube, we've been making it easy for our customers to stock and install our products since we began manufacturing in 1931. We trace our legacy of service all the way back to 1877, when John Maneely, the founder of Wheatland's parent company, began selling pipe, valves and fittings in Philadelphia.

Today, Wheatland is a division of Zekelman Industries, the largest independent steel pipe and tube manufacturer in North America and a leader in modular construction innovations. We're proud to serve the industry with our expansive portfolio of American-made products and best-in-class technologies that MAKE IT eZ for distributors to work with us.

1.2. Product Description

With more than 30 million connections installed since 2000, Wheatland Tube's swage groove is the easiest fire sprinkler pipe to install. Advanced in-line technology produces high-quality, consistent grooves to manufacturer specifications. And because our swage groove pipe is UL® Listed and FM Approved, you can have peace of mind. Just connect, install and you're done! Swage groove is available on Wheatland's light-wall Mega-Flow pipe, designed for improved hydraulics, and Schedule 10 black sprinkler pipe.

This EPD covers fire sprinkler pipe produced and sold from Wheatland, PA, and Warren, OH. The product can be black or hot-dip galvanized, and results are presented separately for these options.

Fabricated fire sprinkler pipe falls under CSI divisions and UNSPSC codes listed in Section 7.

Product Specification

This product is defined by the following standards:

- **ASTM A53** – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- **ASTM A795** – Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use
- **ASTM A135** – Standard Specification for Electric-Resistance-Welded Steel Pipe



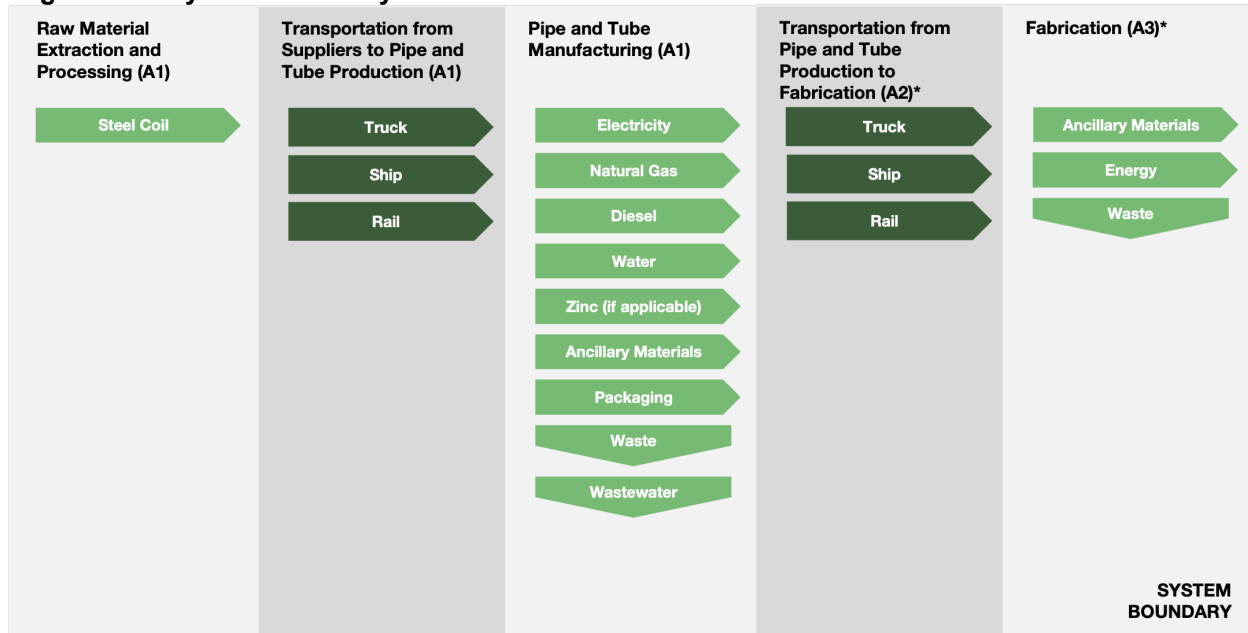
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Flow Diagram and System Boundary



All A1 steps represent manufacturing of unfabricated pipe by Wheatland Tube. Stages with an asterisk rely on data from the AISC & STI industry average EPD for fabricated HSS (AISC & STI, 2022). Use of these data is deemed appropriate for tubing since these fabrication data do not differentiate between fabrication of structural sections, steel plate, hollow structural sections, or non-structural steel. The AISC & STI EPD does not declare the modes of transportation used in A2, so it is assumed all common modes (truck, ship, rail) are used.

1.3. Application

Fire Sprinkler Pipe can be black or hot-dip galvanized, and comes in many different sizes and schedules.

1.4. Material Composition

Steel pipe products are made of carbon steel with a small percentage of alloy elements included. The products do not contain any hazardous substances according to the Resource Conservation and Recovery Act (RCRA), Subtitle 3. The products do not release dangerous substances to the environment, including indoor air emissions, gamma or ionizing radiation, or chemicals released to air or leached to water and soil.

1.5. Declaration of Methodological Framework

This LCA uses an attributional approach.

1.6. Manufacturing

Pipe is manufactured by either hot-forming (continuous-welding, CW) or cold-forming (electric-resistance welding, ERW) steel coil into pipe. Hot-rolled coil is first slit into sections of appropriate width. The narrower coils are then uncoiled and passed through a series of rollers that form the continuous sheet into pipe. Then the two edges of the coil are welded together and the ERW pipe can be seam annealed, when applicable at Warren, OH.



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Once welded, pipe is sent to the size mill, cut to length, straightened, beveled or faced at the ends, hydro-tested, painted with UV paint, stenciled, and threaded and coupled, where applicable. The pipe is subsequently packaged for shipment.

Fire sprinkler pipe at Wheatland and Warren can be black or hot-dip galvanized.

The primary input into pipe production is the steel itself, although small amounts of process materials are needed. Electricity is used for manufacturing and to move the materials. Manufacturing produces some metal scrap. This scrap is recycled by an external recycler.

Fabrication requires 1.08 metric tons of pipe per 1 metric ton of fabricated product (AISC & STI, 2022). A1 includes production of all 1.08 metric tons of pipe, A2 represents transportation to the fabrication facility, and A3 represents the fabrication activities.

1.7. Packaging

Pipe is packaged with steel banding and shipped using wood dunnage and plastic film, when applicable.

As required per ISO 21930 and the Part A PCR, information on packaging is provided to specify the end-of-life scenarios used for packaging or to support development of the end-of-life scenarios for packaging at the construction works level where the A5 module is not declared. These data are provided in the table below per metric ton of fabricated pipe.

Table 1. Packaging Waste Details for A5 Scenario Development, per Declared Unit of Fabricated Product

PACKAGING WASTE	PRODUCT FROM WHEATLAND, PA	PRODUCT FROM WARREN, OH	UNIT
Plastic Packaging Waste to Landfill	0.00E+00	7.56E-02	kg
Plastic Packaging Waste to Incineration	0.00E+00	1.84E-02	kg
Plastic Packaging Waste to Recycling	0.00E+00	1.48E-02	kg
Steel Packaging Waste to Landfill	3.94E-01	3.54E-01	kg
Steel Packaging Waste to Incineration	9.25E-02	8.30E-02	kg
Steel Packaging Waste to Recycling	1.37E+00	1.23E+00	kg
Wood Packaging Waste to Landfill	3.79E+00	0.00E+00	kg
Wood Packaging Waste to Incineration	9.19E-01	0.00E+00	kg
Wood Packaging Waste to Recycling	1.72E+00	0.00E+00	kg

1.8. Transportation

Transportation distances from suppliers to Wheatland Tube sites in A1 were calculated based on the supplier location and the location of manufacturing and modeled using primary data on the mode of transport.

Transportation from the pipe producer to the fabricator (A2) is included in the analysis and comes from the American Institute of Steel Construction (AISC) and Steel Tube Institute (STI) EPD for fabricated HSS (AISC & STI, 2022).



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1.9. Product Installation

Because the declared system boundary is A1-A3, product installation is not declared in this EPD.

1.10. Use

Because the declared system boundary is A1-A3, use of product is not declared in this EPD.

1.11. Reference Service Life and Estimated Building Service Life

Because the declared system boundary is A1-A3, a reference service life is not declared.

1.12. Reuse, Recycling, and Energy Recovery

Because the declared system boundary is A1-A3, reuse, recycling and energy recovery of product is not declared in this EPD.

1.13. Disposal

Because the declared system boundary is A1-A3, disposal of the product is not declared in this EPD.

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

The declared unit of calculation is one metric ton of fabricated pipe (1,000 kg).

Table 2. Functional Unit

NAME	VALUE	UNIT
Declared Unit	1	metric ton
Density	7,850	kg/m ³

2.2. System Boundary

The declared system boundary is cradle-to-gate. This includes the PCR life cycle modules A1, A2, and A3. Module A1 represents cradle-to-gate impacts for unfabricated pipe, including raw material supply, transport of raw materials to Wheatland Tube, and manufacturing of pipe by Wheatland Tube. Module A2 represents transport of unfabricated pipe to fabricators, and module A3 represents fabrication of pipe. The declared system boundaries are shown in Table 3.

2.3. Estimates and Assumptions

All estimates and assumptions are within the requirements of ISO 14040/44. The primary energy and ancillary material data were collected as annual totals including all utility usage and production information. For the LCA, the energy and ancillary usage information was divided by the production to use per metric ton.

Assumptions and limitations to the study have been identified as follows:



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- Supplier EPDs utilized in this LCA reported all LCA results as site-specific values. In the case of some suppliers, results for resource use indicators and waste and output flows are reported as production weighted-average results over multiple mills. The site-weighted average results are used in this LCA's results since they are the best data available.
- In absence of fabricator-specific data, industry average results from the AISC & STI EPD for Fabricated HSS were used to represent impacts of transport to fabrication (A2) and fabrication (A3) portions of the life cycle.
- Steel scrap generated in production is accounted for in A1 (raw materials) and A2 (transportation of raw materials), where impacts are modeled for sourcing and transporting the materials that are lost in production.
- Availability of geographically more accurate background LCI datasets would have improved the accuracy of the study.
- Since this LCA uses the cut-off approach to model recycled material in the product, no credit is given to the product system. Instead, the manufacturer realizes reduced environmental impacts through the absence of the burden of extracting virgin material.
- Only known and quantifiable environmental impacts are considered.
- Due to the assumptions and value choices listed above, The LCA does not reflect real-life scenarios and hence cannot assess actual and exact impacts, but only potential environmental impacts.

2.4. Cut-off Criteria

Input and output flows of mass and energy greater than 1% (based on total mass final product and total energy usage of the product system) or greater than 1% of environmental impacts were included within the scope of analysis. Flows less than 1% were included if sufficient data were available to warrant inclusion and/or the flow was thought to have significant environmental impact. Cumulative excluded flows and environmental impacts are less than 5% per module based on total mass, energy usage, and impacts of the product system. Where data gaps were identified, they are filled by conservative assumptions with average, generic, or proxy data and assumptions are documented.

No known flows relevant to the product system are deliberately excluded from this LCA and EPD. Some material inputs may have been excluded within the MLC datasets used for this project. All MLC datasets have been critically reviewed and conform to the exclusion requirement of the PCR, Part A: "Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report."

2.5. Data Sources

Primary data were collected by facility personnel and from utility bills and were used for all manufacturing processes for fiscal year 2022, defined as October 2021 to September 2022. Whenever available, supplier data were used for raw materials used in the production process. Supplier EPDs were utilized for steel coils purchased by Wheatland Tube, when available. When primary data do not exist, secondary data for raw material production were utilized from the AISI industry average dataset for hot rolled coil in North America (AISI, 2020). Secondary data for pipe manufacturing energy and materials were sourced from Sphera Managed LCA Content (fka GaBi) Database 2024.1. LCA results for transport to fabricators (A2) and fabrication (A3) were taken from the AISC & STI EPD for fabricated HSS. This data in this EPD represents fabrication activity in 2019 and 2020, intended to represent production in 2020.

2.6. Data Quality

The geographical scope of the pipe manufacturing portion of the life cycle is North America. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered very good.





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The primary data provided by Wheatland Tube represents all information for October 2021 to September 2022. Using this data meets the PCR requirements. Time coverage of this data is considered very good. Primary data provided by Wheatland Tube are specific to technology used in manufacturing their product. They are site-specific and considered of good quality.

Supplier EPDs were utilized for representing steel coil production, where available. This data represents the technology specific to the suppliers and technological representativeness of this data is considered very good. This data represents the site-specific results for the suppliers and geographic coverage of this data is considered very good. Time coverage of EPDs ranges from 2019 to 2022 and is considered of very good quality. Supplier EPD consistency is considered good. A majority of steel supplier EPDs reported product- and site-specific results for LCIA impact categories. Supplier EPDs used consistent PCRs and LCIA methodologies for global warming potential (IPCC AR5 GWP₁₀₀) and other LCA impact categories (TRACI, with CML 2001-2016 for ADP_{fossil}). However, the LCA modeling software and databases used were not consistent across all supplier EPDs. For a majority of the steel supply, supplier EPD results were modeled in LCA FE using MLC datasets. A minority of EPD results were modeled in SimaPro using ecoinvent datasets or modeled in openLCA using ecoinvent datasets. Use of consistent LCA software and background LCA data would improve the consistency of this LCA.

When supplier EPDs were not available, this study utilized the AISI industry average dataset for hot rolled coil produced in North America (AISI, 2020). This dataset represents industry average production for 2017 in the relevant region. In absence of supplier data, time, technological, and geographical coverage of this data is considered good.

Secondary data for transport to fabricators and fabrication from AISC & STI represent fabrication activities in 2019. It represents industry average technology in the relevant region. According to AISC & STI, these fabrication data do not differentiate between fabrication of structural sections, steel plate, hollow structural sections, or non-structural steel. Therefore, use of these data is deemed appropriate for tubing. In absence of primary fabrication data, technological and geographical coverage of this data is considered good.

It is worth noting that the electricity, water, and thermal energy used in pipe manufacturing includes overhead energy such as lighting and heating. Sub-metering would improve the technological coverage of data quality. Data necessary to model cradle-to-gate unit processes were sourced from Sphera Managed LCA Content (fka GaBi) datasets and critically reviewed LCAs.

2.7. Period under Review

Period under review is the manufacturer's 2022 fiscal year, defined as October 2021 to September 2022.

2.8. Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. No co-product allocation was applied to the primary manufacturing data. As a default, Sphera Managed LCA Content datasets use a physical mass basis for allocation.

For fabrication, allocation based on shop hours was used to separate the manufacturing of fabricated structural steel from that of fabricated non-structural steel, according to the AISC & STI industry average EPD.

Of relevance to the defined system boundary is the method in which recycled materials were handled. Throughout the study recycled materials were accounted for via the cut-off method. Under this method, impacts and benefits associated with the previous life of a raw material from recycled stock are excluded from the system boundary. Additionally, impacts and benefits associated with secondary functions of materials at end of life are also excluded (i.e., production into a third life or energy generation from the incineration plant). The study does include the impacts associated with reprocessing and preparation of recycled materials that are part of the bill of materials of the products under study.



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3. Life Cycle Assessment Results

Table 3. Description of the system boundary modules

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X=module is declared, MND=module not declared

3.1. Life Cycle Assessment Results – Fabricated Fire Sprinkler Pipe (Black), Wheatland, PA

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

Table 4. North American Impact Assessment Results: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Wheatland, PA

IPCC AR5 GWP ₁₀₀ , TRACI, AND CML 2001-2016	A1	A2	A3	A1-A3
GWP [kg CO ₂ eq]	1.98E+03	4.46E+01	9.67E+01	2.12E+03
ODP [kg CFC 11 eq]	4.68E-05	8.67E-14	1.62E-09	4.68E-05
AP [kg SO ₂ eq]	5.46E+00	1.83E-01	1.52E-01	5.80E+00
EP [kg N eq]	2.30E+00	1.64E-02	1.23E-02	2.33E+00
SFP [kg O ₃ eq]	8.52E+01	4.44E+00	2.23E+00	9.19E+01
ADP _{fossil} [MJ, LHV]	7.94E+03	7.16E+01	1.04E+02	8.12E+03

Comparability: 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. 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.



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Table 5. Resource Use: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Wheatland, PA

PARAMETER	A1	A2	A3	A1-A3
RPR _E [MJ, LHV]	1.17E+03	6.24E+01	2.16E+02	1.45E+03
RPR _M [MJ, LHV]	1.31E+02	0.00E+00	0.00E+00	1.31E+02
NRPR _E [MJ, LHV]	2.72E+04	6.91E+02	1.47E+03	2.94E+04
NRPR _M [MJ, LHV]	6.91E+02	0.00E+00	1.26E+01	7.03E+02
SM [kg]	9.34E+02	0.00E+00	7.62E-01	9.35E+02
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	9.63E+00	1.81E-01	6.82E-01	1.05E+01

Table 6. Output Flows and Waste Categories: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Wheatland, PA

PARAMETER	A1	A2	A3	A1-A3
HWD [kg]	1.47E+01	0.00E+00	3.32E-01	1.50E+01
NHWD [kg]	0.00E+00	0.00E+00	9.66E+00	9.66E+00
HLRW [kg]	7.55E-04	3.16E-05	1.18E-04	9.04E-04
ILLRW [kg]	6.08E-01	2.64E-02	9.85E-02	7.33E-01
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	1.05E+02	0.00E+00	7.71E+01	1.83E+02
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ, LHV]	2.10E+00	0.00E+00	0.00E+00	2.10E+00
EET [MJ, LHV]	8.88E-01	0.00E+00	0.00E+00	8.88E-01



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3.2. Life Cycle Assessment Results – Fabricated Fire Sprinkler Pipe (Black), Warren, OH

Table 7. North American Impact Assessment Results: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Warren, OH

TRACI, IPCC AR5 GWP ₁₀₀ , AND CML 2001-2016	A1	A2	A3	A1-A3
GWP [kg CO ₂ eq]	1.83E+03	4.46E+01	9.67E+01	1.97E+03
ODP [kg CFC 11 eq]	1.03E-05	8.67E-14	1.62E-09	1.03E-05
AP [kg SO ₂ eq]	4.40E+00	1.83E-01	1.52E-01	4.73E+00
EP [kg N eq]	6.73E-01	1.64E-02	1.23E-02	7.01E-01
SFP [kg O ₃ eq]	7.37E+01	4.44E+00	2.23E+00	8.04E+01
ADP _{fossil} [MJ, LHV]	1.44E+04	7.16E+01	1.04E+02	1.46E+04

Table 8. Resource Use: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Warren, OH

PARAMETER	A1	A2	A3	A1-A3
RPR _E [MJ, LHV]	1.01E+03	6.24E+01	2.16E+02	1.29E+03
RPR _M [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E [MJ, LHV]	2.35E+04	6.91E+02	1.47E+03	2.57E+04
NRPR _M [MJ, LHV]	2.56E+02	0.00E+00	1.26E+01	2.68E+02
SM [kg]	7.33E+02	0.00E+00	7.62E-01	7.34E+02
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	8.90E+00	1.81E-01	6.82E-01	9.77E+00

Table 9. Output Flows and Waste Categories: 1 metric ton of Fabricated Fire Sprinkler Pipe (Black), Warren, OH

PARAMETER	A1	A2	A3	A1-A3
HWD [kg]	6.30E-03	0.00E+00	3.32E-01	3.38E-01
NHWD [kg]	6.72E-01	0.00E+00	9.66E+00	1.03E+01
HLRW [kg]	9.25E-04	3.16E-05	1.18E-04	1.07E-03
ILLRW [kg]	7.69E-01	2.64E-02	9.85E-02	8.94E-01
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	1.20E+02	0.00E+00	7.71E+01	1.97E+02
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ, LHV]	9.32E-02	0.00E+00	0.00E+00	9.32E-02
EET [MJ, LHV]	4.03E-02	0.00E+00	0.00E+00	4.03E-02



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 Fabricated Sprinkler Pipe
 Wheatland, PA and Warren, OH

According to ISO 14025
 and ISO 21930:2017

3.3. Life Cycle Assessment Results – Fabricated Fire Sprinkler Pipe (Galvanized), Wheatland, PA

Table 10. North American Impact Assessment Results: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Wheatland, PA

TRACI, IPCC AR5 GWP ₁₀₀ , AND CML 2001-2016	A1	A2	A3	A1-A3
GWP [kg CO ₂ eq]	2.51E+03	4.46E+01	9.67E+01	2.65E+03
ODP [kg CFC 11 eq]	4.90E-05	8.67E-14	1.62E-09	4.90E-05
AP [kg SO ₂ eq]	7.67E+00	1.83E-01	1.52E-01	8.00E+00
EP [kg N eq]	2.49E+00	1.64E-02	1.23E-02	2.52E+00
SFP [kg O ₃ eq]	1.14E+02	4.44E+00	2.23E+00	1.21E+02
ADP _{fossil} [MJ, LHV]	1.32E+04	7.16E+01	1.04E+02	1.34E+04

Table 11. Resource Use: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Wheatland, PA

PARAMETER	A1	A2	A3	A1-A3
RPR _E [MJ, LHV]	2.60E+03	6.24E+01	2.16E+02	2.88E+03
RPR _M [MJ, LHV]	1.31E+02	0.00E+00	0.00E+00	1.31E+02
NRPR _E [MJ, LHV]	3.41E+04	6.91E+02	1.47E+03	3.62E+04
NRPR _M [MJ, LHV]	7.22E+02	0.00E+00	1.26E+01	7.35E+02
SM [kg]	9.77E+02	0.00E+00	7.62E-01	9.78E+02
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	1.32E+01	1.81E-01	6.82E-01	1.41E+01

Table 12. Output Flows and Waste Categories: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Wheatland, PA

PARAMETER	A1	A2	A3	A1-A3
HWD [kg]	1.55E+01	0.00E+00	3.32E-01	1.59E+01
NHWD [kg]	0.00E+00	0.00E+00	9.66E+00	9.66E+00
HLRW [kg]	1.10E-03	3.16E-05	1.18E-04	1.25E-03
ILLRW [kg]	9.07E-01	2.64E-02	9.85E-02	1.03E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	2.52E+02	0.00E+00	7.71E+01	3.29E+02
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ, LHV]	2.22E+00	0.00E+00	0.00E+00	2.22E+00
EET [MJ, LHV]	9.38E-01	0.00E+00	0.00E+00	9.38E-01



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3.4. Life Cycle Assessment Results – Fabricated Fire Sprinkler Pipe (Galvanized), Warren, OH

Table 13. North American Impact Assessment Results: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Warren, OH

TRACI, IPCC AR5 GWP ₁₀₀ , AND CML 2001-2016	A1	A2	A3	A1-A3
GWP [kg CO ₂ eq]	2.36E+03	4.46E+01	9.67E+01	2.50E+03
ODP [kg CFC 11 eq]	1.08E-05	8.67E-14	1.62E-09	1.08E-05
AP [kg SO ₂ eq]	6.58E+00	1.83E-01	1.52E-01	6.91E+00
EP [kg N eq]	7.91E-01	1.64E-02	1.23E-02	8.20E-01
SFP [kg O ₃ eq]	1.03E+02	4.44E+00	2.23E+00	1.09E+02
ADP _{fossil} [MJ, LHV]	2.01E+04	7.16E+01	1.04E+02	2.02E+04

Table 14. Resource Use: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Warren, OH

PARAMETER	A1	A2	A3	A1-A3
RPR _E [MJ, LHV]	2.45E+03	6.24E+01	2.16E+02	2.73E+03
RPR _M [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E [MJ, LHV]	3.05E+04	6.91E+02	1.47E+03	3.26E+04
NRPR _M [MJ, LHV]	2.69E+02	0.00E+00	1.26E+01	2.82E+02
SM [kg]	7.73E+02	0.00E+00	7.62E-01	7.74E+02
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	1.25E+01	1.81E-01	6.82E-01	1.34E+01

Table 15. Output Flows and Waste Categories: 1 metric ton of Fabricated Fire Sprinkler Pipe (Galvanized), Warren, OH

PARAMETER	A1	A2	A3	A1-A3
HWD [kg]	6.66E-03	0.00E+00	3.32E-01	3.39E-01
NHWD [kg]	7.10E-01	0.00E+00	9.66E+00	1.04E+01
HLRW [kg]	1.29E-03	3.16E-05	1.18E-04	1.44E-03
ILLRW [kg]	1.09E+00	2.64E-02	9.85E-02	1.21E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	2.67E+02	0.00E+00	7.71E+01	3.44E+02
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ, LHV]	9.85E-02	0.00E+00	0.00E+00	9.85E-02
EET [MJ, LHV]	4.26E-02	0.00E+00	0.00E+00	4.26E-02



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3.5. Life Cycle Impact Assessment Results – Unfabricated Product

Table 16. Cradle-to-Gate Global Warming Potential (GWP₁₀₀) per IPCC AR5: 1 metric ton of Unfabricated Pipe

PRODUCT	SITE	CRADLE-TO-GATE, MILL PRODUCT	UNIT
Fire Sprinkler Pipe (Black)	Wheatland, PA	1.84E+03	kg CO ₂ eq
Fire Sprinkler Pipe (Black)	Warren, OH	1.69E+03	kg CO ₂ eq
Fire Sprinkler Pipe (Galvanized)	Wheatland, PA	2.32E+03	kg CO ₂ eq
Fire Sprinkler Pipe (Galvanized)	Warren, OH	2.18E+03	kg CO ₂ eq

4. Life Cycle Assessment Interpretation

For all the impact categories and products included in this EPD, pipe manufacturing (A1) has the highest contribution, 92% or more, to cradle-to-gate impacts. Transportation of pipe to fabricators (A2) and pipe fabrication (A3) each contribute contributes less than 10% to all impact categories.

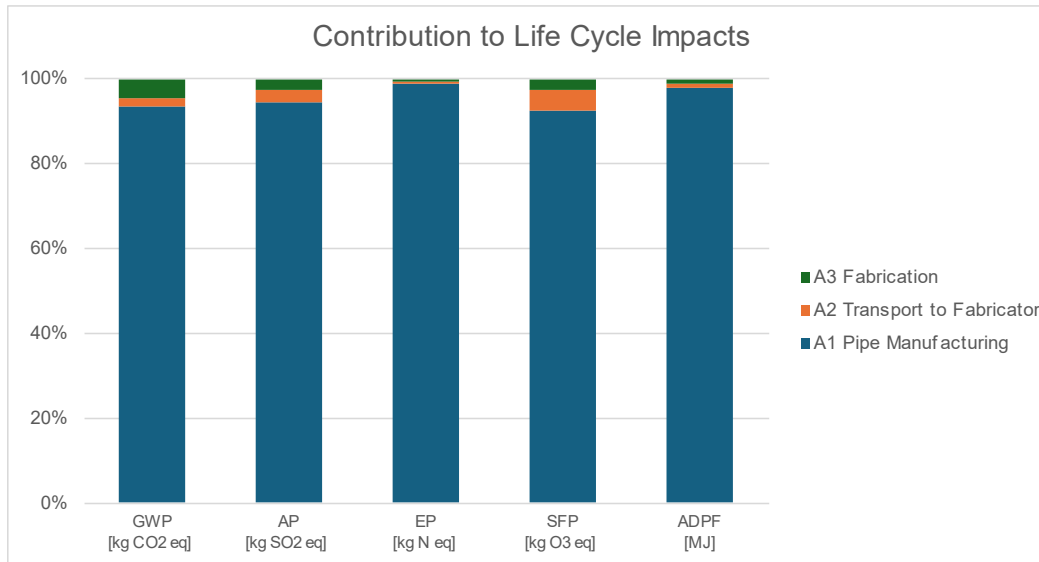


Figure 1: Fabricated Fire Sprinkler Pipe (Black and Galvanized), Wheatland, PA and Warren, OH

5. Additional Environmental Information

5.1. Environment and Health During Manufacturing

Wheatland Tube maintains an SDS of the product which contains specific Environmental, Health and Safety information of finished goods as it relates to local and international regulations. An SDS database is a centralized location in which recommended handling and regulatory exposure limits and recommended control measures can be found.

Wheatland Tube always implements compliance focused measures with regulatory requirements in mind. A proactive compliance approach is used as a guidance tool at all Wheatland Tube facilities. Each facility is accountable and held



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to a proactive compliance standard.

5.2. Environmental Activities and Certifications

Waste/Recycling: Wheatland Tube facilities generate very little hazardous waste streams. All locations are classified as being a small quantity generator or very small quantity generator. Where feasible, Wheatland Tube recycles what would otherwise be deemed a waste, with a goal of diverting wastes from landfill. All facilities have a procedure in place to extend the life expectancy of coolant minimizing overall generated industrial waste while reducing the introduction of virgin coolant. Contaminants are continuously removed from the process allowing coolants to be reused in a closed loop system for an extended period of time.

Emissions: The process at Wheatland Tube generates minimal air emissions. Rust inhibitors used are generally water based with a very low organics content. All cleaners are either water based or federally exempt organic based materials.

Safety: Zekelman Industries understands that health and safety of its teammates are critical to the success of the organization and strives to provide a safe and healthy workplace that exceeds the most established health and safety standards. Our consistent improvements to safety and health are accomplished through the integration of safety in all teammates' daily duties and responsibilities. This has resulted in a sustainable level of safety, engagement, empowerment, and accountability throughout the organization.





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6. References

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7. Product Codes

Table 17. Product CSI Masterformat Codes

CSI CODE			
10 26 16	21 22 13	23 11 00	40 15 00
11 12 23	21 23 13	23 21 13	40 16 00
11 14 13	21 24 13	23 22 13	40 17 00
21 11 00	22 11 13	33 14 11	40 18 00
21 13 13	22 11 16	33 14 13	40 20 00
21 13 16	22 15 13	33 14 16	40 21 00
21 13 19	22 51 13	33 52 13	40 22 00
21 13 23	22 52 13	33 52 16	40 23 00
21 13 26	22 61 13	33 63 13	40 24 00
21 13 29	22 62 13	40 05 24	40 25 00
21 13 36	22 63 13	40 10 00	
21 13 39	22 66 53	40 11 00	
21 21 13	22 66 70	40 12 00	

Table 18. Product UNSPSC Codes

UNSPSC CODE	
46191602	40171501

