NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Tanker Railcar, 26,470 Gal Net Capacity, Construction

Reference Flow: 1 piece (pcs) of Tanker Railcar, 26,470 Gal Net Capacity

Brief Description: The amount of aluminum used in the construction of one 26,470 gallon net capacity tanker railcar to be used to haul liquid fuel. The railcar was assumed to be composed entirely of aluminum.

Section I: Meta Data

Geographical Coverage: US **Region:** N/A

Year Data Best Represents: 2008

Process Type: Manufacturing Process (MP)

Process Scope: Gate-to-Gate Process (GG)

Allocation Applied: No

Completeness: Individual Relevant Flows Captured

Flows Aggregated in Data Set:

☒ Process ☐ Energy Use ☐ Energy P&D ☐ Material P&D

Relevant Output Flows Included in Data Set:

Releases to Air:	☐ Greenhouse Gases	☐ Criteria Air Pollutants	☐ Other
Releases to Water:	☐ Inorganic Emissions	☐ Organic Emissions	☐ Other
Water Usage:	☐ Water Consumption	☐ Water Demand (throughput)	
Releases to Soil:	☐ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

Tracked Input Flows:

Aluminum sheet [Metals]	*Amount of aluminum used in construction of tanker railcar*

Tracked Output Flows:

Tanker Railcar, 26,470 Gal Net Capacity [Construction]	*Construction of a single, 26,470 gallon net capacity tanker railcar*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage2_C_Tanker_Railcar_26470_Gal_Net_Capacity_2010.01.xls*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

The scope of this unit process covers the materials required for the construction of a single, 26,470 gallon capacity railcar needed to carry liquid fuel, as described below. The tanker railcar is assumed to be composed entirely of aluminum. This is based on the assumption that the material makeup of a tanker railcar would be similar to that of a tanker trailer, for use with a semi-trailer truck. The process is based on the reference flow of 1 piece of tanker railcar, as described below and shown in **Figure 1**.

This unit process is used under Life Cycle (LC) Stage #2 to assist in the transport of liquid fuel. It is combined with other relevant equipment for LC Stage #2 in a separate construction assembly process, DF_Stage2_C_Assembly_Tanker_Unit_Train_2010.01.doc. The assembly process quantifies the fraction of each piece of equipment needed under LC Stage #2 to transport 1 kg of fuel.

Boundary and Description

The total weight for one empty tanker railcar was estimated to be approximately 29,257 kg (64,500 lbs). This figure represents the weight of an empty tanker railcar, based on manufacturer specifications for a 26,470 gallon capacity car (Trinity Rail 2009). The total weight of a tanker railcar is readily available from published sources, but only minimal data for the material breakdown of railcar subcomponents were found. Therefore, the railcar is assumed to be composed entirely of aluminum, according to the specifications for a tanker trailer, for use with a semi-trailer truck (Hoffman 2009). It was assumed that a tanker railcar would be constructed of similar materials.

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the tanker railcar (e.g., emitted while assembling the components of a railcar, including transport of those components) are not considered in this study. Upstream emissions from the production of raw materials used for the construction of the tanker railcar (e.g., aluminum) are calculated outside of the

boundary of this unit process, based on profiles found elsewhere, such as the GaBi model. As shown in Figure 1 and discussed above, the tanker railcar constructed in this unit process is incorporated into the assembly process for rail transport of liquid fuel under LC Stage #2.

Table 1 summarizes the relevant properties and assumptions used to calculate the amount of aluminum contained in a single tanker railcar. **Table 2** provides a summary of modeled input and output flows. Additional detail regarding input and output flows, including calculation methods, is contained in the associated DS.

Figure 1: Unit Process Scope and Boundary

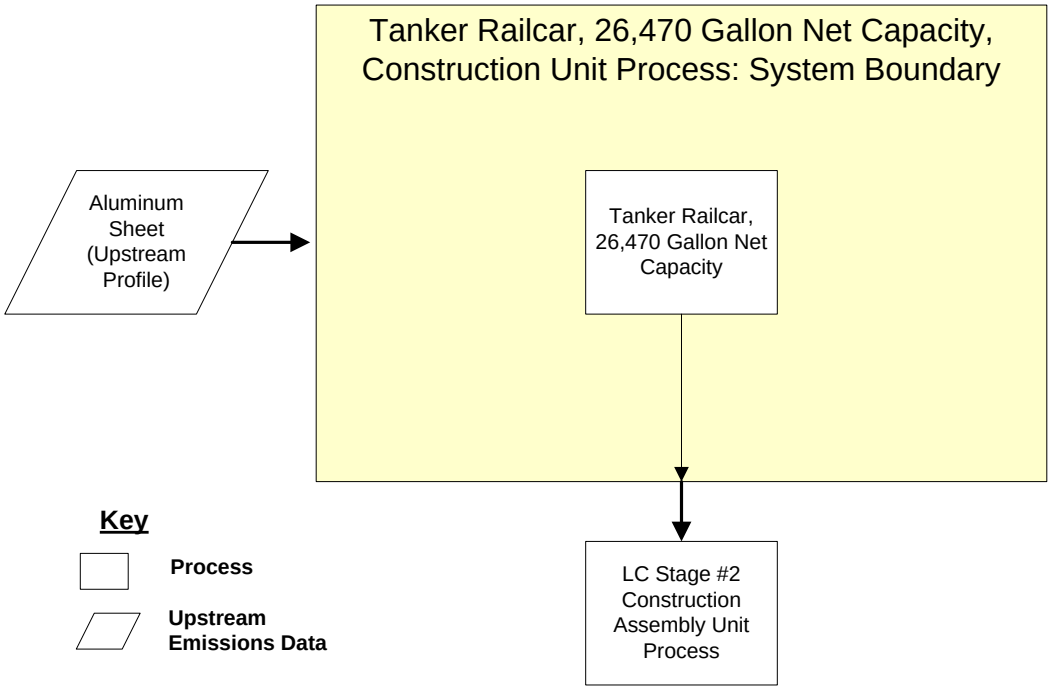

Table 1: Properties of a Single Tanker Railcar

Material Composition and Weights		
Material	**Weight**	**Reference**
Average Weight of 1 Tanker Railcar, kg (lbs)	29,257 (64,500)	TrinityRail 2009
Aluminum Weight, kg (lbs)	29,257 (64,500)	NETL Engineering Calculation

Table 2: Unit Process Input and Output Flows

Flow Name	Value	Units (Per Reference Flow)
Inputs		
Aluminum Sheet [Metals]	**29,257**	**kg**
Outputs		
Tanker Railcar, 26,470 Gal Net Capacity [Construction]	1	pcs

* **Bold face** clarifies that the value shown *does not* include upstream environmental flows. Upstream environmental flows must be added during the modeling process using information obtained elsewhere, such as GaBi modeling software, as shown in Figure 1.

Embedded Unit Processes

None.

References

Hoffman 2009 — Hoffman Transportation. 2009. *2008 Polar Alum. Double Conical DOT 407 Single Compartment*. Penton Media, Inc. http://www.trucker.com/TrailerDetail.aspx?TrailerID=187032&CompanyID=30429 (Accessed December 18, 2009).

Trinity Rail 2009 — Trinity Rail. 2009. *26,470 Gallon Non-Coiled and Non-Insulated Tank Car*. Trinity Industries, Inc. http://www.trinityrailcar.com/railcars/tank/pdfs/tank_26470.pdf (Accessed December 18, 2009).

Section III: Document Control Information

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