NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Diesel Bulk Storage Tank, Construction

Reference Flow: 1 pcs of Diesel Bulk Storage Tank, 30,000 Gallon

Brief Description: Diesel bulk storage tank based on Eagle Tanks Inc's 30,000 gal tank, adjusted to the needed capacity on a kg material/kg fuel basis. Includes security storage space. Materials include carbon and stainless steel.

Section I: Meta Data

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

Year Data Best Represents: 2009

Process Type: Manufacturing Process (MP)

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

Allocation Applied: No

Completeness: Individual Relevant Flows Recorded

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:

Required Capacity	*The volume of the tank to hold the required quantity*
Additional Storage Percent	*The added percent over the flow rate stored in the tank in case of emergency*

Tracked Input Flows:

Steel Plate, BF (85% Recovery Rate) [Metals]	*Steel plate from blast furnace used to construct the storage tank, assumes 85% recycled/recovery rate*

Stainless steel, 316 2B, 80% Recycled [Metals]	*Stainless steel used to construct the storage tank, assumes 80% recycled/recovery rate*

Tracked Output Flows:

Diesel Bulk Storage Tank, 30,000 Gallon [Construction]	*Construction of a single diesel bulk storage tank*

Section II: Process Description

Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_Stage4_C_Diesel_Bulk_Storage_Tank_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 diesel bulk storage tank needed to store diesel fuel while it is en route from the energy conversion facility through a pipeline to tanker transport to the refueling station as part of Life Cycle (LC) Stage #4. The process is based on the reference flow of 1 piece of diesel bulk storage tank, as described below and shown in **Figure 1**. The diesel bulk storage tank is assumed to be constructed of steel plate and stainless steel; other materials are assumed to be negligible.

This unit process is used in LC Stage #4 for the storage of diesel during the transportation from the energy conversion facility ultimately to the refueling station. This unit process specifically focuses on the construction of the storage tank which holds the diesel after it has been transported by a pipeline before it is transported by a tanker truck to the refueling station. The emissions associated with evaporation and power to run the bulk storage tank are not included; a separate unit process calculates these associated emissions.

Boundary and Description

The construction of the diesel bulk storage tank is based on manufacturer specifications for an Eagle Tank Double-Wall Horizontal-One Product tank with a capacity of 30,000 gallons. The bulk storage tank is used to store the diesel after it has been produced but before the refueling stations have space to store and dispense the fuel. Steel types and weights were selected based on manufacturer specifications.

Figure 1 provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the diesel bulk storage tank (e.g., emitted while putting

together the components of the storage tank, including transport of those components) are not considered in this study. Upstream emission from the production of raw materials used for the construction of the diesel bulk storage tank (e.g., the steels) are calculated outside the boundary of this unit process, based on proprietary profiles available in the GaBi model. As shown in Figure 1 and discussed above, the diesel storage tank constructed in this unit process is a step during LC Stage #4.

The total weight of a diesel storage tank is readily available along with the material breakdown. The tank is comprised of stainless steel and steel plate (Eagle 2009a). According to Eagle Tanks, the ratio between the two is 75 percent to 25 percent respectively (Eagle 2009b). It is assumed that the kg of steel per kg of diesel ratio does not change based on the capacity of the tank.

The adjustable parameters include the required capacity and the additional storage percentage. The required capacity is based on the output of the energy conversion facility. Values may range from 7,500 barrels/day to 50,000 barrels/day. The additional storage percentage should be a non-negative number and less than or equal to 20 percent at maximum.

Table 1 shows relevant properties and assumptions used to calculate the amount of the types of steel contained in a single diesel bulk storage tank. Total weight for one bulk storage tank was found to be approximately 14,735 kg (32,486 lbs) (Eagle 2009a). **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

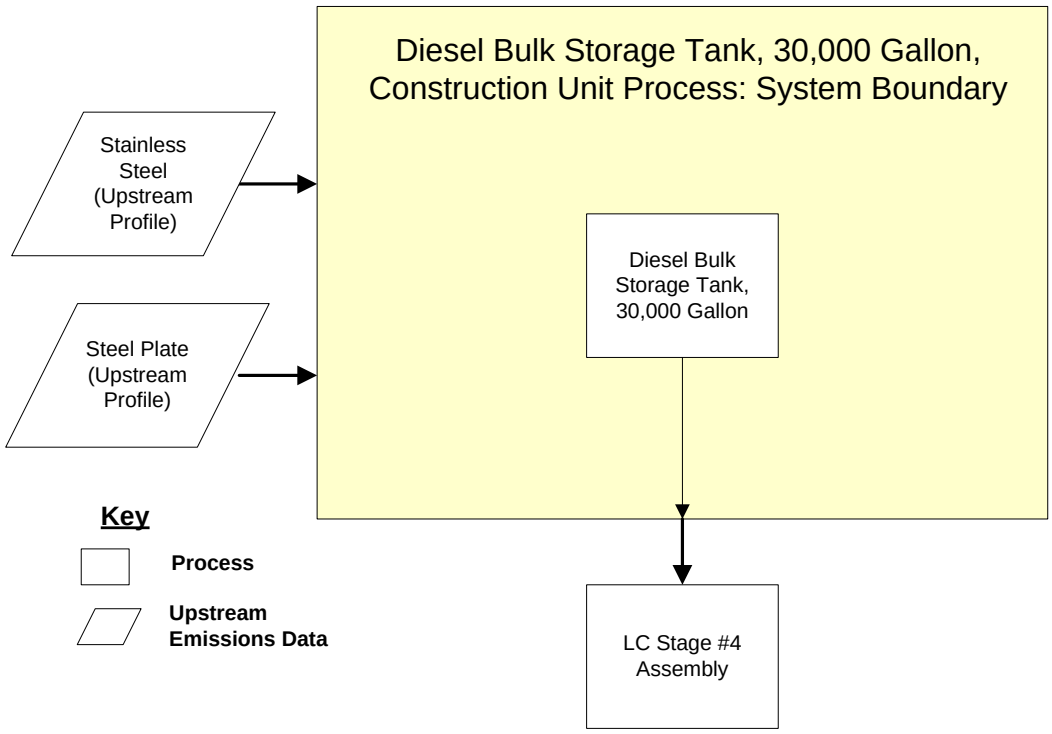

Table 1: General Properties

Property	Value	Reference
Eagle Tank's Double-Wall Horizontal One Product Tank Capacity (gal)	30,000	Eagle 2009a
Eagle Tank's Double-Wall Horizontal One Product Tank Weight (kg)	14,735	Eagle 2009a
Storage Requirements for a 50,000 barrel/day Plant (kg/day)	6,741,000	NETL Engineering Calculation
Emergency Storage Allotment (%)	5	NETL Assumption
Storage Requirements with Emergency Storage (kg)	7,140,000	NETL Engineering Calculation

Table 2: Unit Process Input and Output Flows

Flow Name*	Value	Units (Per Reference Flow)
Inputs		
Steel plate, BF (85% Recovery Rate) [Metals]	**3.49351E-06**	**kg**
Stainless steel, 316 2B, 80% Recycled [Metals]	**1.04805E-05**	**kg**
Outputs		
Diesel Bulk Storage Tank	1.00	pcs

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

Embedded Unit Processes

None.

References

Eagle 2009a — Eagles Tanks Incorporated. 2009. Double-wall Horizontal-One Product. Eagle Tanks Incorporated. http://www.eagletanks.com/tankspage/index.html (accessed December 17, 2009).

Eagle 2009b — Eagle Tanks Incorporated. 2009. Oral Communication via Telephone. May 26, 2009.

Section III: Document Control Information

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