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# NETL Life Cycle Inventory Data

## Process Documentation File

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### Section II: Process Description

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#### Associated Documentation

This unit process is comprised of this document, as well as the data sheet (DS) *DS\_Stage1\_C\_Disc\_Wood\_Micro-Chipper\_765HP\_2012.01.xlsx*, which provides additional details regarding calculations, data quality, and references as relevant.

#### Goal and Scope

The scope of this process encompasses the materials and weights of those materials necessary to construct a single 43,990 lb, 765 HP disc micro-chipper, to be used for the harvesting of short rotation woody crop (SRWC) biomass. The process is based on the reference flow of 1 piece of micro-chipper, 765 HP, as described below, and as shown in **Figure 1**. The micro-chipper is assumed to be constructed entirely of steel. Other materials are assumed to be negligible. By default, all steel within this study was assumed to be steel plate, based on available GaBi profiles, unless other steel types were specified per available data, or a higher grade of steel would be required, per NETL engineering judgment. Therefore, all steel considered in this unit process was assumed to be steel plate.

This process is used during LC Stage #1 to assist in the harvesting of short rotation woody crop (SRWC) biomass feedstocks. It is combined with other cultivation equipment construction unit processes in individual assembly cultivation unit processes for SRWC biomass, *DS\_Stage1\_C\_Land\_Use\_Direct\_Indirect\_2012.01.xlsx*, *DS\_Stage1\_C\_Standard\_Drum\_Wood\_Chipper\_630HP\_2012.01.xlsx*, *DS\_Stage1\_C\_Grapple\_Skidder\_172HP\_2012.01.xlsx*, and *DS\_Stage1\_C\_Tree\_Harvester\_241HP\_2012.01.xlsx*. These assembly unit processes quantify the fraction of each piece of equipment needed under LC Stage #1 to produce 1 kg of biomass ready for transport (LC Stage #2) to the energy conversion facility (LC Stage #3).

#### Boundary and Description

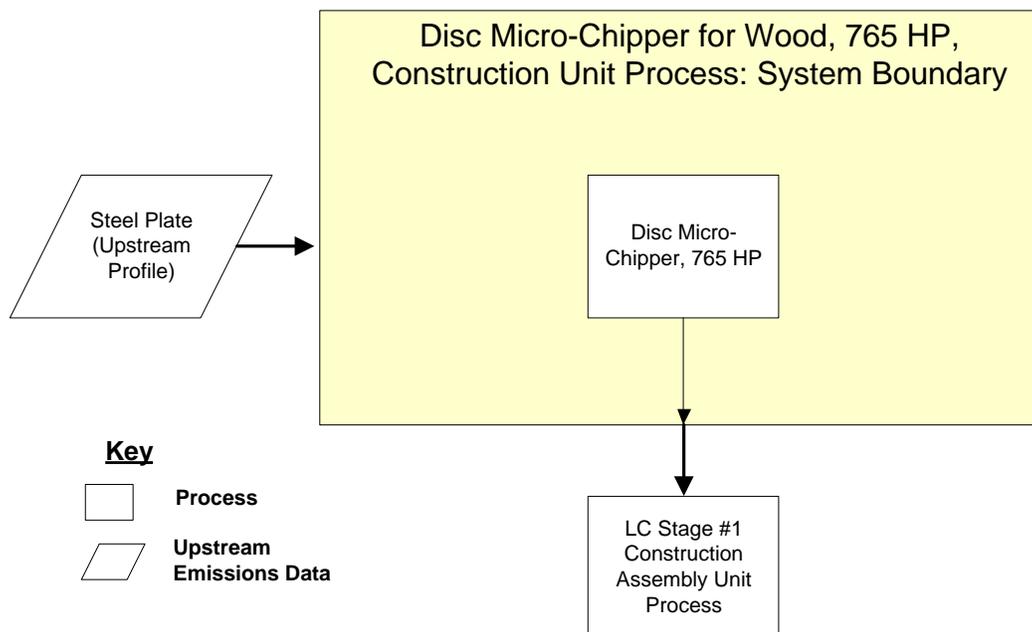
Construction of the micro-chipper is based on manufacturer specifications for a Peterson model 5900, 43,990 lb 765 HP disc micro-chipper. The micro-chipper is used to process harvested short rotation woody crop (SRWC) biomass.

**Figure 1** provides an overview of the boundary of this unit process. Emissions related to the physical assembly of the micro-chipper (e.g., that are emitted while putting together the components of a micro-chipper, 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 micro-chipper (e.g., steel plate) are calculated outside the boundary of this unit process, based on proprietary profiles available within the GaBi model. As shown in **Figure 1** and discussed above, the harvester constructed in this unit process is incorporated into the cultivation assembly processes for LC Stage #1 for SRWC biomass.

The total weight of a micro-chipper was readily available but reliable data for the material breakdown of harvester subcomponents was not. Therefore, the micro-chipper was assumed to be composed entirely of steel plate (Steel plate, BF (85% Recovery Rate) [Metals]).

**Table 1** shows relevant properties and assumptions used to calculate the amount of steel plate contained in a single micro-chipper. Total weight for one micro-chipper is estimated to be approximately 19,953 kg (43,990 lbs) (Peterson 2011). Based on the assumption that the micro-chipper is constructed entirely out of carbon steel, the total weight is assigned to this material. **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 sheet.

**Figure 1: Unit Process Scope and Boundary**



**Table 1: Properties of the 765 HP Disc Micro-Chipper**

Total Weight of Single Harvester	Weight	Reference
One Micro-Chipper Weight, kg (lbs)	19,953 (43,990)	Peterson 2011
Total Steel Plate in One Micro-Chipper, kg (lbs)	19,953 (43,990)	NETL Engineering Judgment

**Table 2: Unit Process Input and Output Flows**

Flow Name*	Value	Units (Per Reference Flow)
<b>Inputs</b>		
<b>Steel Plate, BF (85% Recovery Rate) [Metals]</b>	<b>19,953</b>	<b>kg</b>
<b>Outputs</b>		
Micro-Chipper, 765 HP [Construction]	1	piece

\* **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

Peterson 2011

Peterson, 2011. Model 5900 Whole Tree Disc Chipper. Available at: [http://www.petersoncorp.com/images/documents/brochures/5900\\_brochure.pdf](http://www.petersoncorp.com/images/documents/brochures/5900_brochure.pdf) (Accessed February 3, 2012)

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### Section III: Document Control Information

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### Revision History:

Original/no revisions

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**Section IV: Disclaimer**

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