

Determination of MSW Specific Weight





Problem Definition

Determine the specific weight of the collected MSW with the composition given in Table 1.

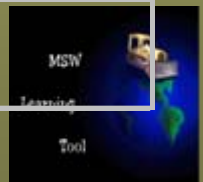
It is recommended that you use an electronic spreadsheet when you do this problem.





Table 1. Composition of MSW

Waste Category	As Collected, % by weight
Food Waste	30
Paper	35
Yard Waste	15
Plastics	5
Aluminum	6
Other	9
Total	100





Step1. Determine Specific Weight of Categories

- In order to determine the overall specific weight, it is necessary to calculate the volume of individual categories
- Assumed values for this problem are given in Table 2.



Table 2. Category Specific Weight

Waste Category	As Collected, % by weight	Specific Weight, lb/cuyd
Food Waste	30	490
Paper	35	150
Yard Waste	15	170
Plastics	5	110
Aluminum	6	270
Other	9	810
Total	100	



Step 2. Determine Volume of Categories

- Assume you have 100 lb of waste. What would be the volume of 100 lbs of waste?
- To calculate the volume, determine the volume of the individual waste categories
- Then total the volume
- Example:

$$\begin{aligned}\text{Food Waste Vol., cu yd} &= 30\text{lb}/490 \text{ lb/cu yd} \\ &= 0.061 \text{ cu yd}\end{aligned}$$





Table 3. Volumes of Categories

Waste Category	As Collected, % by weight	Specific Weight, lb/cu yd	Volume, cu yd
Food Waste	30	490	0.061
Paper	35	150	0.233
Yard Waste	15	170	0.088
Plastics	5	110	0.045
Aluminum	6	270	0.022
Other	9	810	0.011
Total	100		0.460



Step 3. Determine Specific Weight

Total volume of 100 lb of weight is 0.460 cu yd

$$\begin{aligned}\text{Specific weight} &= 100 \text{ lb}/0.460 \text{ cu yd} \\ &= 217 \text{ lb/cu yd}\end{aligned}$$



Further Thoughts

- Calculate the composition of the waste based on % volume.
- Which component has the greatest impact on the volume of the waste?
- How does the volume composition differ from the waste composition by weight?



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