

Estimation of the Moisture Content in Typical MSW





Problem Statement

Calculate the composition and moisture content of typical MSW is given in the Table 1.



Table 1. Composition and Moisture Content Data

Component	Composition, % by wt	Moisture Content, %
Food Wastes	9.0	70.0
Paper	34.0	6.0
Cardboard	6.0	5.0
Plastic	7.0	2.0
Textile	2.0	10.0
Rubber	0.5	2.0
Leather	0.5	10.0
Yard Waste	18.5	60.0
Wood	2.0	20.0
Glass	8.0	2.0
Tin Cans	6.0	3.0
Aluminum	0.5	2.0
Other Metal	3.0	3.0
Dirt, ashes, etc	3.0	8.0
Total	100.0	





Step 1: Calculate the Dry Weight of Each Component

- Assume there are 100 lbs of total waste
- From Table 1, we see that food waste is 9% of the total weight of a 100 lb sample of MSW.
- Its moisture content is 70%, therefore we can calculate the dry weight of food waste.



Step 1: Cont'd

➤ To calculate dry weight:

Total Weight = Dry Weight + Moisture Content

therefore,

Dry Weight = Total Weight - Moisture Content



Step 1: Cont'd

For food waste:

Total Weight = 9 lbs

Moisture Content = 70lb/100 lb
= 0.7

Dry Weight = $9 - 0.7(9) = 2.7$

We can calculate the dry weight for other waste components:





Table 2. Dry Weight Calculations

Component	%by Weight	Moisture Content, %	Dry Weight, lb/100 lb
Food Wastes	9.0	70.0	2.7
Paper	34.0	6.0	
Cardboard	6.0	5.0	
Plastic	7.0	2.0	
Textile	2.0	10.0	
Rubber	0.5	2.0	
Leather	0.5	10.0	
Yard Waste	18.5	60.0	
Wood	2.0	20.0	
Glass	8.0	2.0	
Tin Cans	6.0	3.0	
Aluminum	0.5	2.0	
Other Metal	3.0	3.0	
Dirt, ashes, etc	3.0	8.0	
Total	100.0		



Table 2. Dry Weight Calculations

Component	%by Weight	Moisture Content, %	Dry Weight, lb/100 lb
Food Wastes	9.0	70.0	2.7
Paper	34.0	6.0	32.0
Cardboard	6.0	5.0	5.7
Plastic	7.0	2.0	6.9
Textile	2.0	10.0	1.8
Rubber	0.5	2.0	0.5
Leather	0.5	10.0	0.5
Yard Waste	18.5	60.0	7.4
Wood	2.0	20.0	1.6
Glass	8.0	2.0	7.8
Tin Cans	6.0	3.0	5.8
Aluminum	0.5	2.0	0.5
Other Metal	3.0	3.0	2.9
Dirt, ashes, etc	3.0	8.0	2.8
Total	100.0		78.8



Step 2: Calculate the Overall Moisture Content

Total weight = Dry weight + Moisture.

Total weight	=	100 lbs
Dry weight	=	78.8 lbs
Moisture	=	100 - 78.8
	=	21.2 lb/100 lb
Moisture Content	=	21.2%



Class Example

Component	Composition, % by wt.
Food Waste	10
Paper	32
Cardboard	7
Plastics	6
Textiles	2
Rubber	1
Leather	2
Yard Waste	18
Wood	5
Glass	7
Metals	10

Repeat this example with the waste composition shown

Which component(s) have the greatest impact on waste moisture content?
Why is this important?





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Last updated July 2004 by Dr. Reinhart

