25.0 Appendix F: Moisture Content Monitoring Procedure

Laboratory & Field Tests to Determine Moisture Content

Laboratory Test

1. Weigh an oven proof container to determine its tare weight 2. Place a small sample in the container and weigh it 3. Subtract the tare weight to determine the wet weight of the sample 4. Dry the sample in an oven at 220oF for 24 hours 5. Weigh the dried sample and subtract the tare weight 6. Determine the moisture content of the sample using the following equation:

Moisture Content (%) = (Wet Weight – Dry Weight / Wet Weight) x 100

Procedures for the Hand-Squeeze Test

1. Reach into a pile (bucket) and grab a handful of compost mix 2. Squeeze the material very tightly; check for drips of water 3. Release your grip and allow the material to stay in your hand, smear some between finger and thumb; 4. Inspect material and your hand; 5. Use "Rules of Thumb" for Estimating Moisture (see Table B-1, below).

Table B-1: "Rules of Thumb" for Estimating Compost Moisture Content

Observations vs. % Moisture (Estimate)	
• Material feels very dry and dusty	42% or less
• Material feels mostly dry with a hint of moisture	42% – 47%
• Material feels tacky and sticks together	47% - 52%
• Material feels moist, but no water comes out when squeezed	52% - 58%
• Material leaves a wet sheen on hand	58% - 63%
• One or two drops of water come out, bead of water between fingers	63% - 68%
• Many drops of water come out during squeezing	68% - 73%
• Stream of water from material when squeezed or pudding texture	73% or more

As an example of the desired moisture content, place 1 cup of wood pellets in a Ziploc bag (provided with your equipment package) and add 1 ¼ cups of water to the pellets. Close the bag and allow it to sit for 30-minutes or longer. Mix the contents of the bag and perform the squeeze test as described above. The moisture content of the wood pellets will be ~65%.

Adjusting the Moisture Content

In some cases your initial mix will be too wet. In order to dry the mix you will need to either:

1) spread the material out and allow the excess water evaporate; or
2) add dry bulking material to the mix.

If the initial mix is too dry, we need to add water as we mix the materials together to make sure we get uniform distribution throughout the mix.

Adding water to a compost pile by simply spraying the top of the pile does not work well. The outer layer of material (perhaps to a depth of 150 – 300mm) will get wet, but the core of the pile will remain dry. Additionally, if the feedstocks become very dry, they will likely be hydrophobic (i.e., water off of a duck's back) and will require a shearing action like that provided when running material through a manure spreader. It is surprising how much water is required to change the moisture percentage of the initial mix. The following equation will serve you well in terms of judging how much water will be required:

$$W = Q \times (G - M) / (100 – G)$$

Where:

W = required water mass Q = Mass of material / feedstock G = Moisture goal in % M = Moisture content of material / feedstock in %

Example:

You have 540kg of yard waste with a moisture content of 40% and your moisture goal is 65%. How much additional water is required?

W = 540kg x (65 - 40) / (100 – 65)

W = 386kg

Water weighs 1kg/lt therefore:

W = 386kg = 386lt

For a given water source (e.g., garden hose), you can determine the volume of water delivered by measuring the time it takes to fill a 20lt bucket. Let's assume that you conduct this test and discover that your garden hose fills a 20lt bucket in 1 minute.

W = 386lt / 20lt = 19.3 minutes