



**CARPET AMERICA RECOVERY EFFORT<sup>SM</sup>**  
 Developing market-based solutions for the recycling & reuse  
 of post-consumer carpet

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**CA CARPET STEWARDSHIP PROGRAM  
 NOTICE TO PROCESSORS**

**NOVEMBER 2015**

**1. New Ash & Moisture Testing Protocol — Effective Q4 2015**

CARE has refined our **ash and moisture testing protocols** for participating processors. All processors are required to comply with new testing protocols by January 1, 2016.

Processors must complete and submit at least 1 ash & moisture test per 1M pounds processed and no less than 1 per reporting period.

- Samples must result in less than 25% ash in order to qualify for Type 1 incentive payouts.
- Materials with greater than 25% ash will be considered Type 2.

The following processors are exempt from ash and moisture testing at this time (tile consumes 100% of material in recycling and depolymerization removes moisture in the chemical process):

- Carpet tile processors
- Processors utilizing depolymerization chemical process

**New Protocol Process**

In order to establish these new protocols, CARE engaged the Georgia Institute of Technology Research Institute and the services of a Ph.D. statistician who reviewed all prior data and testing protocols. They recommended changes for both our methods that ensure a better quality and more accurate result. **Attached you will find the revised protocols.**

- The new ash test requires drying prior to ash testing. As such, Step 1 of the new protocol outlines requirements for the moisture measurement.
- Once samples have been dried and weighed for moisture (if relevant), the dried sample is then used for the ash test.
- Note, if you are interested in more information regarding the new lower temperature for ash testing, details are available upon request. This was deemed necessary due to chemistry taking place at the previous elevated temperature, resulting in inaccurate test results.

### **Independent Sampling by CARE**

In addition to processor submitted testing in line with the new protocol, all participating processors are subject to regular independent sampling by CARE representative(s). CARE will follow a general sampling protocol (multiple hand samples pulled from several locations in one or more opened bales) and schedule for sampling frequency. This schedule for CARE sampling and sampling will be on an unannounced basis in most cases.

A CARE representative will arrive, select one or more bales for opening and pulling of required blended samples. Please note, more than one bale may be sampled. We understand this is a cost and hassle for our processors and we sincerely appreciate your cooperation as we strive to make the process transparent and fair to all participants. All Tier 1 processors are covered under these requirements.

CARE plans to use at least two independent labs for conducting these analyses. CRT in California and Polymers Center of Excellence in South Carolina. Details are available to anyone interested.

Companies are welcome to request their own test results and once we have sufficient competitors and samples, CARE may consider sharing blinded data sets, if appropriate. However, CARE will from time to time and upon request share results with CalRecycle. Each processor is entitled to request copies of their own results.

### **Ash Threshold**

**At this time the ash requirement is <25%** in order to be eligible for Type 1 incentive payouts. Qualifying material above this threshold will be eligible for Type 2 incentive payouts. This performance requirement may be modified in the future based on market conditions, results and experience.

### **Moisture Threshold**

CARE has established a maximum moisture level above which a correction to weight reported will be made. This is a standard practice in the textile industry since it is not appropriate to pay for water weight above an equilibrium level. **At this time, CARE has established a program equilibrium weight of no greater than 5%.**

As a result and following the newly established moisture protocol, CARE will allow moisture content up to 5% by weight without any adjustment to processed material weight or payout. Any moisture above this level however, will be subtracted from the reported weights for each month/quarter. The remaining adjusted total weight after this correction, will be eligible for incentive payouts in line with other program policies.

Moisture Reading Percentage (M) – Allowable Equilibrium Percentage (E) =  
Correction Factor Percentage (C)

- For example, if a processor moisture reading comes back at 11%, the correction factor would be 6%:

$$(M) - (E) = (C)$$

*e.g. 11% - 5% = 6%*

- To calculate the corrected weight, the correction factor percentage (C) shall be subtracted from 100% and multiplied by the reported weight.

$$[100\% - \text{Correction Factor Percentage (C)}] \times [\text{Reported Weight (R)}]$$

- Thus, if weight reported was 1M pounds the corrected weight would be 940,000 (or 94% of the original weight due to the water correction).

$$[100\% - (C)] \times (R)$$

*e.g. (100% - 6%) x (1,000,000 lbs)*  
*= (96% x 1,000,000) = 940,000 lbs*

- The same sampling/testing frequency for ash will apply for moisture as well. A minimum of one analysis per million pounds of shipped material is required. CARE independent sampling for moisture will occur at the same time as ash sampling takes place.

CARE encourages all processor to speak with their CARE representative to make sure they understand these changes.

Thank you for your attention to this request.

*Should you have any questions about this notice, please contact:  
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## CARE Moisture and Ash Test Protocol

### 1. Moisture Content (Protocol to Dry Carpet Fluff Prior to Ash Content Test)

- 1.1. From the fluff test lot, select 3 portions of 5 grams each of material while wearing surgical gloves. This represents triplicate test runs.
- 1.2. Weigh 3 clean, dry crucibles to 0.1g. Make certain the crucibles are large enough to properly hold 5 grams of starting fluff. Record the crucible weight as  $W_c$ . You will have three initial weights of each crucible.
- 1.3. Place each sample into the clean pre-weighed crucibles and record the weight of each sample and crucible to 0.1g. You will have three initial weights of sample + crucible recorded as  $W_{MF}$
- 1.4. Place the crucibles into an air circulating drying oven and with the oven temperature set at 120 °C for 1 hour.
- 1.5. At the completion of 1 hour, open the oven, remove the crucibles, and place the crucibles inside a desiccator with active drying agent such as silica gel.

Safety Note: Use heat-protective gloves to prevent burns.

- 1.6. Allow crucibles to cool to room temperature (30 minutes).
- 1.7. Reweigh the crucible + dry fluff in grams and record each mass as  $W_1$ . You will have three,  $W_1$  weights.
- 1.8. Calculate the moisture content (reported as weight percent) of the three specimens as follows:

$$\text{Moisture, weight \%} = [ 1 - ( (W_1 - W_c) / (W_{MF} - W_c) ) ] \times 100$$

where,

$W_c$  = Crucible Weight, grams

$W_1$  = Dried Fluff + Crucible, grams

$W_{MF}$  = Moist Fluff Sample + Crucible, grams

- 1.9. Average the three Moisture weight % values in 1.8 to obtain the fluff sample Average Moisture %.
- 1.10. Note: All dried test specimen  $W_1$  must be maintained in a desiccator with active drying agent (silica gel). If possible, the time between drying and ash testing should be less than 30 minutes. This set of samples will be used for the ash test below.

### 2. Ash Content Test

- 2.1. Preheat or condition Muffle furnace to >100 °C but less than 140 °C for at least 10 minutes prior to the start of ash tests.

- 2.2. Place approximately 5 grams of virgin nylon fiber (i.e. the char control) into a fourth clean crucible. The sample does NOT require a weight as it will only serve as a visual indicator for complete combustion of any nylon in the sample.
- 2.3. Remove dried sample crucibles with fiber from the desiccator and place into the preheated muffle furnace.

Safety Note: Use heat-protective gloves to prevent burns.

- 2.4. Heat all three crucibles and the virgin nylon standard crucible in the muffle furnace at 565°C for 30 minutes or until all black carbonaceous material has disappeared from the nylon standard. It is imperative that the entire nylon standard is gone thus indicating full ash.
- 2.5. Carefully remove the three hot sample crucibles (using safety apparel and steel tongs) and place back into the desiccator to cool to room temperature. Reweigh each crucible to the nearest 0.1 gram. This is **W<sub>2</sub>** for each of the three samples.
- 2.6. Calculations

Calculate the ash content (reported as weight percent) of the three specimens as follows:

$$\text{Ash, weight \%} = [(W_2 - W_c) / (W_1 - W_c)] \times 100$$

where,

$W_c$  = Crucible Weight, grams

$W_1$  = Dried Fluff + Crucible, grams

$W_2$  = Ash + Crucible, grams

- 2.7. Average the three Ash weight % values in 2.6 to obtain the sample Average Ash %.

### 3. Reporting

Report the Average Moisture % from Section 1.9.

Report the Average Ash % from Section 2.7. Also validate that the nylon control sample was completely ashed – i.e. there was no visible char or other residue remaining in the control crucible.

### 4. Equipment

**Balance** – Balance having the capability to weight the sample to the nearest 0.1 g.

**Air Circulating Drying Oven** - Oven Capable 120°C ± 5 °C

**Muffle Furnace** – Electric-resistance-heated capable of maintaining a temperature of 565 +/- 20°C.

Note: Muffle furnace must be placed in a well-ventilated hood during ash tests to prevent breathing of the byproducts of combustion.

**Cooling Assembly** – High temperature safe desiccator utilizing active anhydrous calcium sulfate or silica gel

**Crucibles** – Dry porcelain, stainless steel, or quartz fiber of sufficient size and inert to the carpet fluff.

Must be able to handle at least 5 gram capacity of material.

**Safety Equipment** – Heat protective gloves, metal crucible tongs.

***All raw data must be logged and supplied with the final test results reporting for all samples run.***