



2011

Salt Testing For Moisture



Mn/DOT office of Maintenance

Minnesota Department of transportation

5/3/2011



Why do we test for salt moisture?

- Do not want to pay for “water weight”
- Salt with higher moisture will clump and freeze in sheds in cold weather becoming hard to handle
- Need dry salt for mixing of treated salt to ensure leaching does not take place

IMPORTANT

If deductions from moisture testing are going to be pursued, be sure that the procedure is strictly followed.

Be sure to check scales for calibration and repeatability. Scale should show same weight (within .1 gram) if a known weight is put on the scale numerous times. This should be done before each use or if scale has been moved.



IMPORTANT

Do not compromise the sample in any way

- Make sure the sample is a good representation of the pile being tested
- If larger or discolored particles of salt exist do not pick them out
- Take sample from 4-5 areas of the pile
- Dig into pile as to not get just the outer part of pile

IMPORTANT

Microwaves will vary in wattage

- Adjust wattage or replace microwave if sample pops while cooking (maximum wattage should be 1200)

IMPORTANT

We need to insure the accuracy of our equipment so our results will be credible and able to withstand scrutiny.

Testing Tools Needed

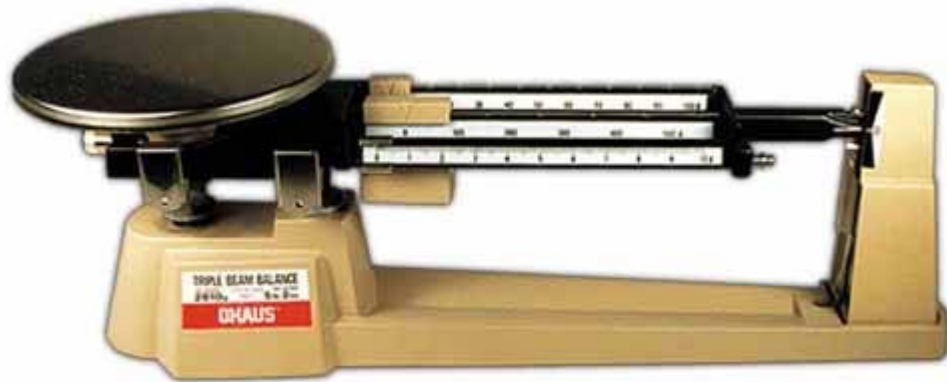
Microwave



- Should not exceed 1200 watts
- Heating salt too fast will cause salt particles to pop. This will compromise the weight of the sample

Scales

- **Calibrated Triple Beam**



- **Calibrated Digital Scale**



Air Tight sampling containers



Scoop



Spoon



Standard Test Method for Field Measurement of Moisture Content in Rock Salt by Microwave Drying

Sampling (reference – ASTM D632)

Take a minimum of three sample increments from the load / pile by scraping off the top 1 inch of material and then by means of scoop or sample thief take approximately 500 g of material to a depth of 6 inches. The sample increments shall be combined and mixed thoroughly to constitute the composite sample of the load.





Testing (Mn/DOT Method)

1. Using a balance accurate to 0.1 gram or better, weigh a microwave safe container and record the weight.
2. Weigh an approximately 100 g sample of salt into the weighed microwave safe container from the composite sample taken.
Record weight as “Weight A”.
3. Microwave the sample on high for a period of 2 minutes. If the sample “pops” during heating restart the test. **Material could have popped out of container affecting the test.**
4. Cool on the counter for 1 minute, weigh dried sample and record weight as “Weight B”.
5. Repeat steps 3 and 4 until sample weight changes less than 0.1 gram.

The difference in weight is the moisture content.

Warning!! Do not cook the salt so long it starts to pop like popcorn.

Fill out the Salt Moisture Worksheet



Salt Moisture Worksheet	
Date:	
Company:	
P.O. #	
Ticket #:	
Truck #:	Tarped: Yes/ No
Weight of Container	grams
A. Weight of Wet Salt	grams
B. Weight of Dry Salt	grams
C. Weight Loss (A-B)	grams
Moisture Calculation	
(C/A)x 100 = % Moisture	%

Moisture Balance Method



The moisture balance used should have a capacity of 35g and a minimum readability of 0.005g. Set up the moisture balance according to the manufacturer's recommendations. Operate instrument in an automatic mode for the stop point and at 160 C drying temperature. Place approximately 25 g on the sample pan and press start. Record the % moisture at completion of the test.

For questions or training please contact;

Mn/DOT Winter Maintenance Coordinator 651-366-3586

LTAP Instructor

651-366-3575



Salt Testing Equipment Quality Assurance Checklist

Microwave

- Wattage should be 1200 or less (1.2 kw or less)
- Turn down the wattage of Microwave if popping occurs (If wattage is unknown replace if having popping issues)
- Microwave shall be designated as **“Salt Testing Only”**
- Check for cleanliness and clean periodically (once a Month)

Scales

- Scale shall read to the nearest .1/gram
- Be sure that measurement is repeatable to .1/gram (weigh an object numerous times, weight should not vary more than .1/gram)
- Check scale measurements before each use or if scale has been moved