

**2104****ROCK SALT SIEVE ANALYSIS**  
ASTM C136 (MN/DOT Modified)**2104.1 General**

This method of test covers a procedure for the determination of the particle size distribution of Rock Salt using sieves with square openings.

**2104.2 Apparatus**

- A.** Balance - Shall conform to AASHTO M 231 (Class G2).  
Readability & sensitivity = 0.1 grams, accuracy = 0.1 grams or 0.1%.
- B.** Sieves - Standard 300mm (12") round sieves with square openings shall be used and the woven wire cloth shall conform to AASHTO M 92. Suitable sieve sizes shall be selected to furnish the information required by the specifications covering the material to be tested. **See Section 1203.7, Table 1 for sieve nests to use for various materials.**
- C.** Shaker (Mechanical) - Shall be equipped with a device that locks the screens in place. The shaker shall impart a vertical, or lateral and vertical motion to the sieve(s), causing the particles thereon to bounce and turn so as to present different orientations to the sieving surface. Also, it shall be equipped with a timer capable of turning off the shaker after a required time limit has been achieved. Other mechanical shakers are acceptable so long as the equipment provides a result in which not more than 0.5 percent by weight of total sample passes any sieve during one minute of hand sieving.
- D.** Oven - The oven shall be capable of maintaining a uniform temperature of  $110 \pm 5$  °C ( $230 \pm 9$  °F).
- E.** Miscellaneous - Necessary bowls, pans, spatulas etc.
- F.** Sample Splitter - Shall conform to AASHTO T 248. **See Section 1002 for requirements and procedure.**

**2104.3 Procedure**

**Note 1:** Do not attempt to obtain an exact, predetermined weight for any sample that is to be sieved.

- A.** Split out an approximately 1000g sample from the composite sample taken in 2101.1.
- B.** Dry the sample at  $110 \pm 5$  °C ( $230 \pm 9$  °F) to a constant weight, the sample shall be cooled to room temperature and weighed (including pan) to 0.1 gram. Record that weight on the gradation work sheet under "Pan & Sample Weight."

**Note 2:** Do not sieve hot samples. Hot aggregate will distort the mesh of the finer sieves.

- C.** Pour entire sample into a nested set of (12") round sieves. (Use sieve sizes required by specifications for the type of material being tested - Refer to Section 1203 Table 1.) Place the sieve nest in the shaker and sieve until no more than 0.5% by weight of total sample passes any individual sieve during one minute of shaking.

**Note 3:** Shaking time shall be determined for each mechanical shaker by a calibration procedure. For information purposes only the existing Mn/DOT Central Laboratory equipment: the "Maryann" satisfactory results can be obtained by sieving for a minimum of 15 minutes and the "Ro-Tap" satisfactory results can be obtained by sieving for a minimum of 7 minutes.

- D.** After sieving has been completed, remove each sieve from top to bottom, weigh and record the material retained on each sieve (to the nearest 0.1 gram) on the work sheet under the correct sieve size. Also, weigh and record the material in the bottom pan and the pan weight (both to the nearest 0.1 gram). After all weights have been recorded, add all the weights. The total weight **must check with the original dry weight within  $\pm 0.3\%$** . If not the sample shall be re-sieved and each individual sieve re-weighed. In no case; however, shall the fraction retained on any sieve at the completion of the sieving operation weigh more than 450 grams (300mm [12"] sieves). This can be regulated by the introduction of a sieve having a larger opening placed above the critical sieve.

**Note 4:** Removing particles stuck in the mesh of the sieve can be accomplished by the following procedures: (1) For the 425 $\mu$ m (#40) sieve and coarser, clean by brushing with a brass wire brush. (2) For sieves finer than the 425 $\mu$ m (#40), clean by brushing with small paint brush. Finer sieves are easily damaged.

**Do not** use a sharp object to remove particles stuck in the mesh. This can result in oversize openings making the sieve unacceptable.

## 2104.4

### Calculations

$$\% \text{ Passing} = \frac{\text{Total Weight of Material Passing a Particular Sieve}}{\text{Total of Weights Retained on All Sieves Plus Bottom Pan}} \times 100$$