1. **SCOPE**

1.1. **Description of Test**

This test method covers the approximate determination of clay lumps and friable particles in aggregates.

1.2. **Application of Test**

This test method is of primary significance in determining the acceptability of aggregate with respect to the requirements of Specification C33. This specification defines the requirements for grading and quality of fine and coarse aggregates.

1.3. **Units of Measure**

The clay lumps and friable particles will be reported as a percentage of the total sample tested.

2. **APPARATUS AND MATERIALS**

2.1. **Equipment Required**

Balance - a scale accurate to within 0.1% of the weight of the test sample at any point within the range of use.

Containers - rust resistant containers of a size and shape that will permit the spreading of the sample on the bottom in a thin layer.

Sieves - conforming to Specification E11.

Oven - drying oven providing free circulation of air and capable of maintaining a temperature of 110 ± 5° C.
2.2. **Materials Required**

Aggregate for this test method shall consist of the material remaining after completion of testing in accordance with STP 206-1. To provide the quantities designated it may be necessary to combine material from more than one test by test method STP 206-1.

2.3. **Data Required**

Contact Number, pit file or land location, sample number, control section, etc is all important data required with sample submission.

3. **PROCEDURE**

3.1. **Sample Preparation**

The aggregate shall be dried to a constant weight at a temperature of 110º C. Test samples of fine aggregate shall consist of the particles coarser than a 1.18 mm (No. 16) sieve and shall weigh not less than 100 g.

Test samples of coarse aggregate shall be separated in different sizes, using the following sieves: 5.00 mm (No. 4), 9.00 mm (3/4), 18.00 mm (3/4), 40 mm (1 1/2). The test sample shall weigh not less than indicated in the following table:

<table>
<thead>
<tr>
<th>Size of Particles Making Up Test Sample</th>
<th>Weight of Test Sample (minimum, g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00 - 9.00 mm</td>
<td>1000</td>
</tr>
<tr>
<td>9.00 - 18.00 mm</td>
<td>2000</td>
</tr>
<tr>
<td>18.00 - 40.00 mm</td>
<td>3000</td>
</tr>
<tr>
<td>Over 40.00 mm</td>
<td>4000</td>
</tr>
</tbody>
</table>

In the case of mixtures of fine and coarse aggregates, the material shall be separated into two sizes on the 5.00 mm (No. 4) sieve, and the samples of fine and coarse aggregates shall be prepared as previously described.

3.2. **Test Procedure**

Weigh the test sample and spread it in a thin layer on the bottom of the container, cover it with distilled water and allow it to soak for a period of 24 ± 4 hours. Roll and squeeze particles individually between the thumb and forefinger to attempt to break the particle
into smaller sizes. Do not use the fingernails to break up particles or press particles against a hard surface or each other. Any particles than can be broken with the fingers into fines removable by wet sieving shall be classified as clay lumps or friable particles. After all discernable clay lumps and friable particles have been broken, separate the detritus from the remainder of the sample by wet sieving over the sieves prescribed in the following table:

<table>
<thead>
<tr>
<th>Size of Particles Making Up Sample</th>
<th>Size of Sieve for Removing Residue of Clay Lumps &amp; Friable Particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Aggregate Retained on 1.18 (No. 16) Sieve</td>
<td>900 um (No. 20)</td>
</tr>
<tr>
<td>5.00 mm to 9.00 mm</td>
<td>2.36 mm (No. 8)</td>
</tr>
<tr>
<td>9.00 mm to 18.00 mm</td>
<td>5.00 mm (No. 4)</td>
</tr>
<tr>
<td>18.00 mm to 40.00 mm</td>
<td>5.00 mm (No. 4)</td>
</tr>
<tr>
<td>Over 40.00 mm</td>
<td>5.00 mm (No. 4)</td>
</tr>
</tbody>
</table>

Perform the wet sieving by passing water over the sample through the sieve while manually agitating the sieve, until all undersize material has been removed.

Remove the retained particles carefully from the sieve, dry to substantially constant weight at a temperature of 110 ± 5°C, allow to cool and weigh to the nearest 0.1% of the weight of the test sample as defined in 3.1.

4. **RESULTS & CALCULATIONS**

4.1. **Calculations**

Calculate the percent of clay lumps and friable particles in the fine aggregate or individual sizes of coarse aggregate as follows:

\[ P = \left( \frac{(W-R)}{W} \right) \times 100 \]

Where:

- **P** = percent of clay lumps and friable particles
- **W** = weight of test sample (for fine aggregate the weight of the portion coarser than the 1.18 mm (No. 16) sieve as described in 3.1
- **R** = weight of particles retained on designated sieve as determined in accordance with 3.2
5. **CALIBRATIONS, CORRECTIONS, REPEATABILITY**

5.1. **Corrections to Results**

For coarse aggregates, the percent of clay lumps and friable particles shall be an average based on the percent of clay lumps and friable particles in each sieve size fraction weighted in accordance with the grading of the original sample before separation or preferably, the average grading of the supply represented by the sample. Should the aggregate contain less than 5% of any of the sizes specified in 3.2, that size shall not be tested but, for the purpose of calculating the weighted average, shall be considered to contain the same percent of clay lumps and friable particles as the next larger or next smaller size, whichever is present.

5.2. **Tolerances and Repeatability**

Precision of this test method has not yet been determined.

6. **ADDED INFORMATION**

6.1. **References**

ASTM C142-78 (Reapproved 1984)

AASHTO No. T112
APPROVAL SHEET
New _ Revision _X_ Date of Previous Document 90-03-12
Effective Date: __-__
Description of Revision (Reason for Revision):

Format of test procedure updated.

Review/Implementation Process:

Reviewed by the Materials Section of the Technical Standards and Policies Branch.

Other Manuals/Policies Affected:

Nil

Follow Up/Training Required:

Nil

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Prepared and Recommended by D. MacLeod ____________ 93-05-17
Materials Standards Engineer Date

Approval Recommended by R.A. Widger ____________ __-__
Senior Materials Engineer Date

Approval Recommended by A.R. Gerbrandt ____________ __-__
Dir., Technical Standards & Policies Br. Date

Approved by D.G. Metz ____________ __-__
Assistant Deputy Minister, Infrastructure Date

Electronic File Updated __-__
Update Mailed __-__