## 1. SCOPE

### 1.1. Description of Test

This test covers the determination of the approximate percentage of lightweight pieces in aggregate by means of sink-float separation in a heavy liquid of suitable specific gravity.

### 1.2. Application of Test

This method may be used in identifying pourous aggregate particles in research activities or in petrographic analysis.

### 1.3. Units of Measure

Expressed as a percentage of dry weight of pieces that float to the dry weight of fine or coarse material.

## 2. APPARATUS AND MATERIALS

### 2.1. Equipment Required

- Balance - 0.1 g accuracy

- Container or pan for drying aggregate

- Skimmer made of 400 µm sieve cloth

- Oven - controlled at $105 \pm 5^{o}$ C

- Sieves - 400 µm, 5.00 mm

- Hydrometer - 1.000 to 2.000 specific gravity range

### 2.2. Materials Required

Heavy Liquid - dissolve enough zinc chloride in water to obtain a specific gravity of 2.0.

### 2.3. Sample To Be Tested

Obtain sufficient representative material for a test sample size as shown in the following table:

| Nominal Aggregate Size | Approximate Sample Weight |
|---|---|
| 5.0 mm | 200 g |
| 19.0 mm | 300 g |
| 37.5 mm | 5000 g |
| 75.0 mm | 10,000 g |

### 2.4. Data Required

Sample information such as contract number, pit file or land location, date sampled, operation that aggregate will be used for, sample number and control section.

## 3. PROCEDURE

### 3.1. Description of Equipment Preparation

Ensure equipment is clean and ready for use.

### 3.2. Sample Preparation

Use a riffle splitter to reduce sample to the approximate weight required as shown above. Dry the sample in oven for 2 hours and then cool it. Coarse and fine aggregates are considered separately; "coarse aggregates" are materials which are mostly retained on the 5.0 mm sieve while for "fine aggregates" most of the material passes the 5.0 mm sieve.

### 3.3. Test Procedure

#### 3.3.1. Procedure For Fine Aggregate

Hand sieve sample over 400 µm sieve. Discard any material passing, then weigh material retained to nearest 0.1 g.

Add enough water (about 1%) to bring sample to saturated surface dry condition, mix well, cover pan and let stand for 30 minutes.
Add heavy liquid, equivalent to about 3 times the volume of the sample and stir well.

Pour floating particles onto skimmer and collect liquid in another pan, then return liquid to the first pan.

Stir the sample and again collect floating particles on the skimmer and repeat the process until no more pieces float.

Wash collected lightweight particles in the skimmer with tap water, then dry them in an oven for 1 hour, cool and weigh them.

### 3.3.2. Procedure For Coarse Aggregate

Hand sieve sample over 5.00 mm sieve. Discard any material passing, then weigh material retained to the nearest 1 g.

The balance of the procedure is the same as for fine aggregate.

## 4. RESULTS AND CALCULATIONS

### 4.1. Collection of Test Results

The results of tests should be recorded on the required Department form.

### 4.2. Calculations

Calculate percentage of lightweight particles using the formula:

$L = W_1/W_2 \times 100$

Where: $W_1$ = dry weight of lightweight particles
$W_2$ = dry weight of material retained on the 400 µm sieve
or 5.00 mm sieve for fine or coarse aggregates, respectively.

### 4.3. Reporting Results

Results should be reported on the required Department form.

## 5. CALIBRATIONS, CORRECTIONS, REPEATABILITY

### 5.1. Equipment Calibration

Ensure that scale is accurate as well as temperature control for the oven.

### 5.2. Tolerances and Repeatability

There have been none determined for this test as of this date.

### 5.3. Sources of Error

Loss of material through handling.

Scale inaccuracy

The specific gravity of the zinc chloride solution should be checked frequently.

## 6. ADDED INFORMATION

### 6.1. References

ASTM Designation C123, Standard Test Method for Lightweight Pieces in Aggregate.

### 6.2. Safety

Goggles and gloves should be worn to prevent contact with skin or eyes with the zinc chloride solution. Be sure to rinse all equipment after test is completed.

### 6.3. WHMIS

Ensure that containers are properly labelled and that a MSDS sheet is available for zinc chloride.

### 6.4. Other

The amount of water to add to obtain the saturated surface dry condition depends on the absorption characteristics of the aggregates. Absorption can be determined by ASTM methods C127 or C128. If an absorption factor is assumed, it should be noted on the report.

## APPROVAL

New __ Revision _X_ Date of Previous Document 92-04-07

Effective Date: 94-03-18

Description of Revision (Reason for Revision):

Section 2.3, Samples to be Tested, the approximate sample weight for the 19.00 mm sieve was changed from 3,000 grams to 300 grams.

Review/Implementation Process:

Lab Supervisors Committee

Other Manuals/Policies Affected:

Nil

Follow Up/Training Required:

Nil

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

Prepared and Recommended by D. MacLeod — 94 -03-03
Materials Standards Engineer — Date

Approval Recommended by R.A. Widger — 94 -03-15
Senior Materials Engineer — Date

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

Approved by D.G. Metz — 94 -03-18
Assistant Deputy Minister, Operations Division — Date

Electronic File Updated - -

Update Mailed - -