

Method of Test for
**DETERMINING THE AMOUNT OF FOREIGN MATTER IN CLAM
SHELL, REEF SHELL AND MIXTURES OF CLAM AND REEF SHELL**
DOTD Designation: TR 109M/109-95

I. Scope

- A. This method is designed to determine the percent by weight of foreign matter in clam shell, reef shell and mixtures of clam and reef shell. All substances other than shell and all material passing the No. 75 μm sieve shall be considered foreign matter.
- B. Reference Documents
 - 1. DOTD TR 108, "Splitting and Quartering Samples"
 - 2. DOTD TR 110, "Determining the Quantity of Clam Shell in Clam and Reef Shell Mixtures"
 - 3. AASHTO M 92, "Wire Cloth Sieves for Testing Purposes"

II. Apparatus

- A. **Sieves** - nest of two sieves, the lower being a 75 μm sieve and the upper a 1.18 mm sieve, both conforming to the requirements AASHTO M 92.
- B. **Container** - pan or vessel of a sufficient size to contain the sample covered with water and to permit vigorous agitation without loss of any part of the sample or water.
- C. **Balance or scale** - minimum capacity of 12,000g readable to 1 g or larger.
- D. **Oven** - capable of maintaining a temperature of $110 \pm 5^\circ\text{C}$.
- E. **Weigh pans** - sufficient to hold the sample without spilling and to provide for adequate drying of the sample.
- F. **Spoon or spatula**.
- G. **Worksheet** - Aggregate Test Report, DOTD Form No. 03-22-0745 (Figures 1 & 2).

III. Health Precautions

Proper equipment and precautions are to be used whenever hot materials or equipment must be handled. Use container holders or gloves while handling hot containers.

IV. Sample

Use a representative sample of one sack of

material. Obtain a test specimen of at least 5000 g by splitting or quartering the entire sample in accordance with DOTD TR 108.

V. Procedure

- A. Place the entire test specimen in a pan and hand pick as many pieces of foreign matter as possible (wood, sticks, bark, etc.) from the test specimen and place them in a tared container and weigh. Record the weight of the deleterious materials on the worksheet as A.
- B. Place the remaining portion of the test specimen in the oven and dry to a constant weight at a temperature of 110°C . Record this weight on the worksheet as D.

Note 1: Constant weight for drying purposes is defined as less than 0.1% weight loss between successive weighings no less than 15 minutes apart.

- C. Determine the total sample weight in accordance with step VI.A.
- D. Place the dried sample in a container and cover with water.
- E. Nest the sieves with the coarser sieve on top.
- F. Agitate the contents of the container by stirring with the spoon. Agitate sufficiently to completely separate the finer particles from the coarse aggregate and bring the finer material into suspension. Immediately pour the wash water carefully over the nested sieves. Do not pour out the coarse particles with the wash water.
- G. Repeat steps E and F until the wash water is clear.
- H. Return all material retained on the sieves to the washed test sample.
- I. Place the washed test sample in the oven and dry to a constant weight at a temperature of 110°C . Record the weight on the worksheet as E.

VI. Calculations

- A. Calculate the total sample weight (B) to the

nearest gram using the following formula:

$$B = A + D$$

where:

A = wt. of material removed by hand, g
D = weight of dried portion, g

example:

A = 55
D = 5035

$$B = 55 + 5035$$

$$B = 5090$$

B. Calculate the weight of material removed by washing (C) to the nearest gram using the following formula:

$$C = D - E$$

where:

D = wt. of dried portion, g
E = dry wt. of portion after wash, g

example:

D = 5035
E = 5020

$$C = 5035 - 5020$$

$$C = 15$$

C. Calculate the foreign matter (F) to the nearest whole percent using the following formula:

$$F = \frac{(A + C)}{B} \times 100$$

where:

A = wt. of material removed by hand, g
B = total wt. of sample, g
C = wt. of material removed by wash, g
100 = constant

example:

A = 55
B = 5090
C = 15

$$F = \frac{(55 + 15)}{5090} \times 100$$

$$= \frac{70}{5090} \times 100$$

$$= 0.0137 \times 100$$

$$= 1.37$$

$$F = 1$$

VII. Report

Report the foreign matter (F) to the nearest whole percent.

VIII. Normal Test Reporting Time

Normal test reporting time is 3 days.

MATT MENU SELECTION - 2

Louisiana Department of Transportation and Development
 AGGREGATE TEST REPORT

DOTD03-22-0745
 Rev. 7/95

Project No. 999-99-9999 Material Code 471 Lab No. 22-999999
 Date Sampled 07-21-94 Submitted By 0071 Quantity 1.000
 Purpose Code 3 Source Code A09.9 Spec Code 1 P.O. No. _____
 Date Tested 07-28-94 Ident EX-1 Plant Code _____ Frict. Rating _____ (1-4)
 Item No. 6.01 Date Rec'd (lab) 7/22/94 Sampled By: B.W.

Remarks 1 _____

Tested By H.C. Date 7/28/94 Checked By J.S. Date 7/28/94

DOTD TR 102, 112, 113 & 309

Sieve		Wt. Retained	% Retained	% Coarser	% Passing
mm	in.				
63	2 1/2				
50	2				
37.5	1 1/2				
31.5	1 1/4				
25.0	1				
19.0	3/4				
16.0	5/8				
12.5	1/2				
9.5	3/8				
4.75	No. 4				
Wt Mat. in Pan					
Acc. Total					
Initial Dry Total Wt				% Diff:	

DOTD TR 428

Sieve		Wt. Retained	% Retained	% Coarser	% Passing
mm/µm	No.				
2.36	8				
2.00	10				
1.18	16				
600	30				
425	40				
300	50				
180	80				
150	100				
75	200				
53	270				
Wt Mat. in Pan					
Decant Loss					
Acc. Total					
Initial Dry Total Wt				% Diff:	
Dry Wt After Washing					

Liquid Limit _____ Plastic Limit _____
 No. of Blows _____
 Wt Cup + Wet Soil, g _____
 Wt Cup + Dry Soil, g _____
 Wt Water _____
 Cup No. _____
 Factor _____
 Wt Cup, g _____
 Wt Dry Soil _____
 % Moisture _____
 Plasticity Index _____

Absorption (T84 or T85) _____
 Spec Grav SSD (T84 or T85) _____
 Spec Grav APP (TR 300) _____
 Effective Spec Grav (TR 300) _____
 Opt Moist Content, % (TR 418) _____
 Maximum Density (TR 418) _____
 Lab Comp Method (TR 418) _____
 Cement, % (TR 432 or SPECIFIED) _____
 Lime, % (TR 416 or SPECIFIED) _____
 Other (Additive) Code _____ % _____
 Clay Lumps, % (TR 119) _____
 Friable Particles, % (TR 119) _____
 Clay Lumps & Friable Particles % (TR 119) _____
 Flat or Elongated Part, % (TR 119) _____
 Coal & Lignite, % (TR 119) _____
 Glassy Particles, % (TR 119) _____
 Iron Ore, % (TR 119) _____
 Wood, % (TR 119) _____
 Total (Clay Lumps, Fri. Part., Iron Ore, Coal & Lignite, Wood), % (TR 119) _____
 Foreign Matter, % (TR 109) _____
 Clam Shell, % (TR 110) _____
 Soundness, % Loss (T 104) _____
 Abrasion, % Loss (T 98) _____
 Colorimetric Test (1 = Pass, 2 = Fail) (T 21) _____
 Asphalt Content, % (TR 307) _____
 Retained Asphalt Coating, % (TR 317) _____
 Percent Crushed (TR 306) _____
 Retained Marshall Stability (TR 313) _____
 Resistivity (TR 429) _____
 pH (TR 430) _____
 Organic Content, % (TR 413) _____
 Sand Equivalent (TR 120) _____

Remarks 2: _____

Approved By: _____ Date: _____

Aggregate Test Report (Front)
 Figure 1

APPARENT SPECIFIC GRAVITY (DOTD TR 300)

Tested By: _____		Date: _____	
Coarse Aggregate			
Wt in Air	a		
Wt in Water	b		
Difference	c	a - b	
Apparent Specific Gravity	D	$\frac{a}{c}$	
Fine Aggregate			
Fine Aggregate			
Wt of Flask & Dry Sand	e		
Wt of Flask	b		
Wt of Dry Sand	d	a - b	
Wt of Flask + Sand + Water	c		
Apparent Specific Gravity	E	$\frac{d}{(c-a) - (c-b)}$	
Combined Coarse and Fine Aggregates			
% Passing 4.75mm (No. 4) Sieve	F		
Coarse Spec Grav Portion	G	1100 - F.D	
Fine Spec Grav Portion	H	F.I.E	
Apparent Spec Grav	I	G + H	

EFFECTIVE SPECIFIC GRAVITY (DOTD TR 300)

Tested By: _____		Date: _____	
Wt of Aggregate	A		
Wt of Mix	B		
% Asphalt in Mix	C	$\frac{B-A}{B} \times 100$	
Wt of Jar + Water	D		
Wt of Jar + Water + Mix	E		
Spec Grav of Mix	F	$\frac{D-E}{E-B-E}$	
% Aggregate in Mix	X	$100 - C$	
Specific Gravity of Asphalt Cement	H		
Effective Specific Grav of Aggregate	G	$\frac{X}{\frac{100}{F} - \frac{C}{H}}$	

SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE (AASHTO T85)

Tested By: _____		Date: _____	
Wt of Oven Dry Test Sample in Air, g	A		
Wt of Saturated Surf-Dry Test Sample in Air, g	B		
Wt of Saturated Test Sample in Water, g	C		
Bulk Spec Grav (Saturated Surf-Dry)		$\frac{B}{C}$	
Absorption, %		$\frac{B-A}{A} \times 100$	

PERCENT FOREIGN MATTER (DOTD TR 109)

Tested By: <u>N.D.V.</u>		Date: <u>7/28/94</u>	
Wt of Material Removed by Hand	A		55
Wt of Dried Portion	D		5035
Wt Total Sample	B	A + B	5090
Wt of Portion After Wash, Dry	E		5020
Wt of Material Removed by Wash	C	B - E	15
Foreign Matter, %	F	$\frac{A-C}{B} \times 100$	1.4%

PERCENT CLAM SHELL (DOTD TR 110)

Tested By: _____		Date: _____	
Wt Retained 4.75 mm (No. 4)	A		
Wt Clam Shell	B		
Clam Shell, %	C	$\frac{B}{A} \times 100$	