

Method of Test for
DETERMINING PULVERIZATION
 DOTD Designation: TR 431M/431-95

I. Scope

- A. This method of test is designed to determine the particle size distribution by wet weight of a soil or soil-aggregate with or without additive.
- B. Reference Document:
 AASHTO M 92 - Wire Cloth Sieves for Testing Purposes.

- E. Gently manipulate any conglomerations of pulverized materials to reduce them to their original pulverized state.
- F. Weigh the material retained on each sieve and record as B₁ or B₂.
- G. Determine the percent pulverization in accordance with step V.

II. Apparatus

- A. **Scale**- a scale of 10 kg (20 lb) or more capacity, sensitive to 1 g (0.01 lb).
- B. **Sieves** - wire sieves as specified conforming to the requirements of AASHTO M 92.
- C. **Sample container** - at least 4 L (1 gal) capacity can(s).
- D. **Weigh pan(s)**.
- E. **Appropriate documentation**
 1. Daily Central Mix Plant Report, DOTD Form No. 03-22-0754.
 2. Density and Moisture Content Worksheet, DOTD Form 03-22-0750 (Figure 1).

V. Calculations

Calculate the percent pulverization (P_n) to the nearest whole percent using the following formula.

$$P_n = 100 \times \frac{(A - B_n)}{A}$$

where:

- A = wet weight of sample minus nonsoil particles
- B_n = sum of wet weights of material retained on and above the sieve for which the percent pulverization is being determined

example: (using two sieves)

- A = 1984 g
- B₁ = 95 g, retained on 19 mm sieve
- B₂ = 750 g, retained on 4.75 mm sieve

$$P_1 = 100 \times \frac{(A - B_1)}{A}$$

$$= 100 \times \frac{(1984 - 95)}{1984}$$

$$= 100 \times \frac{1889}{1984}$$

$$= 100 \times (0.9521)$$

$$= 95.21$$

$$P_1 = 95$$

III. Sample

The sample shall consist of a minimum of 2000 g (4 lbs) of material.

IV. Procedure

- A. Hand pick any nonsoil particles and remove from the sample.

Note 1: *Reclaimed or recycled materials, with the exception of treated or stabilized soil, are to be counted as nonsoil particles.*

- B. Obtain and record the wet weight of the remaining sample.
- C. If more than one sieve is specified, nest the sieves with the larger sieve on top.
- D. Pour the entire remaining sample over the top sieve and shake to refusal.

$$\begin{aligned} P_2 &= 100 \times \frac{A - (B_1 + B_2)}{A} \\ &= 100 \times \left[\frac{1984 - (95 + 750)}{1984} \right] \\ &= 100 \times \left(\frac{1139}{1984} \right) \\ &= 100 \times (0.5740) \\ &= 57.40 \\ P_2 &= 57 \end{aligned}$$

VI. Report

Report percent pulverization to the nearest whole percent.

VII. Normal Test Reporting Time

Normal test reporting time is 30 minutes.

MATT MENU SELECTION - 07

Louisiana Department of Transportation and Development
DENSITY & MOISTURE CONTENT WORK SHEET

DOTD03-22-0750
 Rev. 6/95

Project No. 999-99-9999 Date Tested 11-16-94 Material Code 434
 Submitted By 0.071 Purpose Code L Spec. Code 3
 Test Method N=Nuclear S=Sand Cone Item Number 305(01)
 Station Tested 125+45 Section & Test No. _____

Location:	Lift No:	Depth of Test:
OM: Optimum % Moisture Content (TR 415 or TR 418)	OM	<u> </u>
%FM: Field % Moisture Content at Compaction (TR 403) (See back for calculations)	%FM	<u> </u>
P ₁ : % Pulverization 19mm (3/4" SIEVE) (TR 431) (See back for calculations)	P ₁	<u>95</u>
P ₂ : % Pulverization 4.75mm (NO.4 SIEVE) (TR 431) (See back for calculations)	P ₂	<u>57</u>

(TR 415) FOR CROSS REFERENCE, See Test No.	Station Number:
a: Total Wet Wt. of Sample	
b: Wt. of +4 Material	
c: % By Wt. +4 Retained (100 b/a)	
d: Wt. of Mold & Soil	
e: Wt. of Mold	
f: Wt. of Compacted Soil (d - e)	
g: Wet Density (f x 10) or (f x 30)	
h: Wt. of Wet Soil	
i: Wt. of Dry Soil	
j: Wt. of Water (h - i)	
k: % Moisture Content (100 j/i) (TR 403)	
l: Dry Density 100g/(100 + k)	
FAMILY OF CURVES NUMBER <u> </u>	

SAND METHOD (TR 401)		NUCLEAR METHOD (TR 401)			
SA: Wt. of Sand in Mold		Nuclear Device No. <u> </u>	Test 1	Test 2	Test 3
SB: Vol. of Mold					
SC: Unit Wt. of Sand (SA/SB)		DS: Dens. Standard Count			
SD: Orig. Wt. of Sand		DC: Dens. Test Count			
SE: Final Wt. of Sand		DR: Dens. Count Ratio (DC/DS)			
SF: Wt. of Sand in Cone (SD-SE)		WD: Wet Density			
SG: Orig. Wt. of Sand		MS: Moist. Standard Count			
SH: Final Wt. of Sand		MC: Moist. Test Count			
SI: Wt. of Sand in Cone & Hole (SG-SH)		MR: Moist. Count Ratio (MC/MS)			
SJ: Wt. of Sand in Hole (SI-SF)		M: Moisture			
SV: Vol. of Hole (SJ/SC)		NDD: Dry Density (WD-M)			
SW: Dry Wt. of Material		%NPR: % Density (NDD/PR) x 100			
SDD: Dry Density (SW/SV)	<u> </u>	ADD: Average Dry Density (NDD) or (NDD/3)	<u> </u>		
PR: Theoret. Dry Dens. (TR 415/TR 418)	<u> </u>	PR: Theoret. Dry Dens. (TR 415/418)	<u> </u>		
%PR: % Density (Sand) (SDD/PR) x 100	<u> </u>	%PR: % Dens. (Nuclear) (% NPR) or (% NPR/3)	<u> </u>		

Remarks _____

Inspector _____ (Nuclear Film Badge No.) _____ (Signature)

Pulverization, P ₁ and P ₂ (TR 431)					
Test No. *		1	2	3	4
Adjusted Wet Wt Sample (A)		1984			
Wt of + 19 mm (3/4 in) Material (B ₁)		95			
Wt of + 4.75 mm (No. 4) Material (B ₂)		750			
% Pulverization 19 mm (3/4 in) (P ₁)	$100 \times \frac{(A - B_1)}{A}$	95%			
% Pulverization 4.75 mm (No. 4) (P ₂)	$100 \times \frac{A - (B_1 + B_2)}{A}$	57%			

Field Moisture Content at Compaction, % FM (TR 403)					
Test No. *		1	2	3	4
Total Wet Wt of Matl. at Compaction (A)					
Total Dry Wt of Matl. at Compaction (B)					
Wt of Water (C)	(A - B)				
% Field Moisture Content (% FM)	$100 \times \frac{C}{B}$				

* Utilize as many columns as necessary per test section.