

Metric/English (M or E)  (Entry Field Located on Menu)

Project No.  Date Tested  Material Code   
 Submitted By  Purpose Code  Spec. Code   
 Test Method  N = Nuclear S = Sand Cone Item Number   
 Station Tested  +  Section & Test No.

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

(TR 415) Cross Reference Test No. _____	Sta. No.: _____	<b>Max. Dry Density Method</b> <input type="checkbox"/>
		(1 = TR 415 A 2 = TR 415 B 3 = TR 418)
a: Total Wet Mass (Wt.) of Sample		
b: Mass (Wt.) of +4.75 (+4) Material		
c: % By Mass (Wt.) of 4.75 (+4) Retained (100 b/a)		
d: Mass (Wt.) of Mold & Soil		
e: Mass (Wt.) of Mold		
f: Mass (Wt.) of Compacted Soil (d - e)		
g: Wet Density (f / 0.944) or (f / 2.832) or (f / 2.124) (f x 30) or (f x 10) or (f / 0.075)		
h: Mass (Wt.) of Wet Soil		
i: Mass (Wt.) of Dry Soil		
j: Mass (Wt.) of Water (h - i)		
k: % Moisture Content (100 j/i) (TR 403)		
l: Dry Density 100g / (100 + k)		

om (from Family of Curves): \_\_\_\_\_ pr (from Family of Curves): \_\_\_\_\_ FAMILY OF CURVES ZONE NUMBER

SAND METHOD (TR 401)		NUCLEAR METHOD (TR 401)		
SA: Mass (Wt.) of Sand in Mold		Nuclear Device Number <input type="text"/>	Test 1	Test 2
SB: Vol. of Mold		Insp. (Nuclear Badge No.) <input type="text"/>		Test 3
SC: Unit Mass (Wt.) of Sand (SA/SB)		DS: Density Standard Count		
SD: Orig. Mass (Wt.) of Sand		DC: Density Test Count		
SE: Final Mass (Wt.) of Sand		DR: Density Count Ratio (DC / DS)		
SF: Mass (Wt.) of Sand in Cone (SD-SE)		WD: Wet Density		
SG: Orig. Mass (Wt.) of Sand		MS: Moisture Standard Count		
SH: Final Mass (Wt.) of Sand		MC: Moisture Test Count		
SI: Mass (Wt.) of Sand in Cone & Hole (SG-SH)		MR: Moisture Count Ratio (MC / MS)		
SJ: Mass (Wt.) of Sand in Hole (SI-SF)		M: Moisture by Mass (Wt.)		
SV: Vol. of Hole (SJ/SC)		MP: Moisture by Percent - TR 401 <input type="checkbox"/> / TR 403 <input type="checkbox"/>		
SW: Dry Mass (Wt.) of Material		NDD: Dry Density (WD - M) or $\frac{100 \times WD}{100 + MP}$		
SDD: Dry Density (SW / SV)	<input type="text"/>	%NPR: % Density (NDD / PR) x 100		
PR: Maximum Dry Dens. (TR 415 / TR 418)	<input type="text"/>	ADD: Average Dry Density (NDD) or (NDD/3)	<input type="text"/>	
%PR: % Density (Sand) (SDD / PR) x 100	<input type="text"/>	PR: Maximum Dry Density (TR 415/TR 418)	<input type="text"/>	
		%PR: % Dens.(Nuclear) (% NPR) or (% NPR/3)	<input type="text"/>	

Remarks  \_\_\_\_\_ (Signature)

### Pulverization, P<sub>1</sub> and P<sub>2</sub> (TR 431)

* Test No.      * Utilize as many columns as necessary per test section.		1	2	3	4
Adjusted Wet Mass (Wt) Sample (A)					
Mass (Wt) of + 19 mm (3/4 in) Material (B <sub>1</sub> )					
Mass (Wt) of + 4.75 mm (No. 4) Material (B <sub>2</sub> )					
% Pulverization 19 mm (3/4 in) (P <sub>1</sub> )	$100 \times \frac{(A - B_1)}{A}$				
% Pulverization 4.75 mm (No. 4) (P <sub>2</sub> )	$100 \times \frac{A - (B_1 + B_2)}{A}$				

### Field Moisture Content at Compaction, % FM (TR 403)

* Test No.      * Utilize as many columns as necessary per test section.		1	2	3	4
Total Wet Mass (Wt) of Matl. at Compaction (A)					
Total Dry Mass ( Wt) of Matl. at Compaction (B)					
Mass (Wt) of Water (C)	(A - B)				
% Field Moisture Content (% FM)	$100 \times \frac{C}{B}$				

### Optimum Moisture and Maximum Dry Density Adjustments for Material Containing 20% - 60 % Siliceous Aggregate (TR 415)

		1	2	3
Optimum % Moist. of Tot. Material, (OM)	$OM = \left[ \left( \frac{100 - c}{100} \right) \times om \right] + \frac{c}{100}$			
Maximum Dry Density, lb/ft <sup>3</sup> (PR) <i>(English)</i>	$PR = \frac{160 \times pr \times z}{\frac{c}{100} \times pr \times z + \left[ 160 \times \left( 1 - \frac{c}{100} \right) \right]}$			
Maximum Dry Density, kg/m <sup>3</sup> (PR) <i>(Metric)</i>	$PR = \frac{2564 \times pr \times z}{\frac{c}{100} \times pr \times z + \left[ 2564 \times \left( 1 - \frac{c}{100} \right) \right]}$			