# ADOT Asphalt Review Calculations

- This is not a training class, it is a review class.
- Persons attending this class should have knowledge of the test methods that will be presented.

# Rounding Procedure

# ROUNDING PROCEDURE

The following describes the rounding procedure which is to be used for rounding numbers to the required degree of accuracy:

(a) Except as specified in paragraph (b) below, the following procedure will apply. This procedure correlates with the "built-in" rounding method normally utilized by calculators and computers.

1) When the figure next beyond the last figure or place to be retained is less than 5, the figure in the last place retained is left unchanged.

Examples: Rounding 2.6324 to the nearest thousandth is 2.632
Rounding 7843.343 to the nearest hundredth is 7843.34
Rounding 4928.22 to the nearest tenth is 4928.2
Rounding 7293.1 to the nearest whole number is 7293
Rounding 2042 to the nearest units of 10 is 2040
Rounding 3548 to the nearest units of 100 is 3500
Rounding 8436 to the nearest units of 1000 is 8000

2) When the figure next beyond the last figure or place to be retained is 5 or larger, the figure in the last place retained is increased by 1.

Examples: Rounding 4839.4575 to the nearest thousandth is 4839.458
Rounding 9347.215 to the nearest hundredth is 9347.22
Rounding 8420.35 to the nearest tenth is 8420.4
Rounding 1728.5 to the nearest whole number is 1729
Rounding 3685 to the nearest units of 10 is 3690
Rounding 6650 to the nearest units of 100 is 6700
Rounding 2500 to the nearest units of 1000 is 3000

Rounding to the tenth

125.3**4**~~52236~~ = **125.3**

127.1**5**~~33262~~ = **127.2**

Rounding to the thousandths

2.465**4**~~56697~~ = **2.465**

2.465**7**~~17041~~ = **2.466**

# AZ 427
# Ignition Furnace Calculations

ADOT
44-9372 R03/16

# ARIZONA DEPARTMENT OF TRANSPORTATION
# ASPHALTIC CONCRETE TABULATION – IGNITION FURNACE

USE CAPITAL LETTERS

LAB NUMBER: 
UNIT NUMBER: 
MATL: 
TYPE: 
PURPOSE: 
TEST LAB: 
SIZE: 
SIZE %:

TEST NO.: 
LOT OR SUFFIX: 
SAMPLED BY: 
MO DAY YEAR: 
TIME: : MILITARY TIME

SAMPLED FROM: 
LIFT NO.: 
RDWY: 
STATION: + IF MILEPOST, INPUT DECIMAL

ORIGINAL SOURCE: 
PROJECT ENGINEER / SUPERVISOR: 
PROJECT NUMBER: 
TRACS NUMBER:

REMARKS:

CONTACT NUMBER:

COARSE FACTOR . = 100 / COARSE SIEVE TOTAL

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| 3" | | | | |
| 2 1/2" | | | | |
| 2" | | | | |
| 1 1/2" | | | | |
| 1" | 75 | | | |
| 3/4" | 191 | | | |
| 1/2" | 528 | | | |
| 3/8" | 281 | | | |
| 1/4" | 320 | | | |
| #4 | 139 | | | |
| #8 | 330 | | | |
| - #8 | 1046 | | | |
| Total | | = I (Rounded) | | |

Weight of Pass # 8 Split: 533 = p

FINE FACTOR . = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| #10 | 46 | | | |
| #16 | 107 | | | |
| #30 | 119 | | | |
| #40 | 62 | | | |
| #50 | 51 | | | |
| #100 | 66 | | | |
| #200 | 28 | | | |
| -#200 | 2 | | r . | |
| Total | 480 q = Dry Weight | | | |
| Elutriation | = p - q | | | |

r - s: . Corrected % Pass No. 200

% Pass No. 200 Correction Factor (±) . s

## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

| | | |
|---|---|---|
| a. Wet Mass of Moisture Sample | 992.6 | g |
| b. Dry Mass of Moisture Sample | 989.9 | g |
| c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 | . | % |
| d. Mass of Basket Assembly | 3050.6 | g |
| e. Mass of Sample and Basket Assembly | 6101.0 | g |
| f. Initial Mass of Sample (e - d) | . | g |
| g. Ignition Furnace Set Temperature | 538 | °C |
| h. Mass of Sample and Basket Assembly After Ignition | 5961.1 | g |
| i. Mass of Sample After Ignition (h - d) | . | g |
| j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 | . | % |
| k. Asphalt Binder Content Calibration Factor (±) | + 0.15 | % |
| l. Ignition Furnace Correction (Tank Slab Correction) (±) | 0.00 | % |
| m. Corrected Asphalt Binder Content (j - k - c - l) | . | % |
| n. Design Asphalt Binder Content | 5.50 | % |
| o. Elapsed Time of Test (minutes) | 64 | |

## COMPACTION

Marshall = M Gyratory = G Core = C ☐

### RICE

Sample Max. Sp. Gr. (Gmm): .

Sample Max. Density [(Gmm) x (62.3)]: . pcf

### MARSHALL

Average Bulk O.D. Sp. Gr. (Gmb): .

Average Bulk Density [(Gmb) x (62.3)]: . pcf

Air Voids = . %

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max Density From Rice Test}}\right] \times 100$$

Stability: lbs

Flow: 0.01 in

### GYRATORY

Average Relative Density (% Gmm) at Ndesign: . pcf

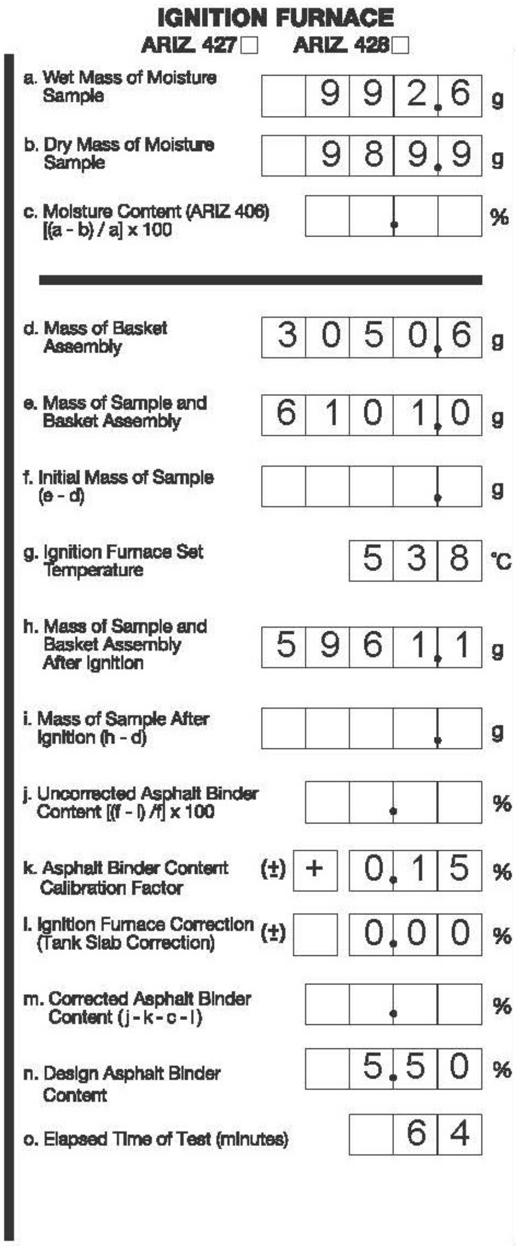
Air Voids = . %

$$100 - \left[\text{Average Relative Density \% (Gmm) at Ndesign}\right]$$

WHITE 
YELLOW 
BLUE

RECEIVED DATE 
TEST OPERATOR AND DATE 
SUPERVISOR AND DATE

SEE BACK ALSO



**IGNITION FURNACE**

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample 992.6 g

b. Dry Mass of Moisture Sample 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 . %

d. Mass of Basket Assembly 3050.6 g

e. Mass of Sample and Basket Assembly 6101.0 g

f. Initial Mass of Sample (e - d) . g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5961.1 g

i. Mass of Sample After Ignition (h - d) . g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 . %

k. Asphalt Binder Content Calibration Factor (±) + 0.15 %

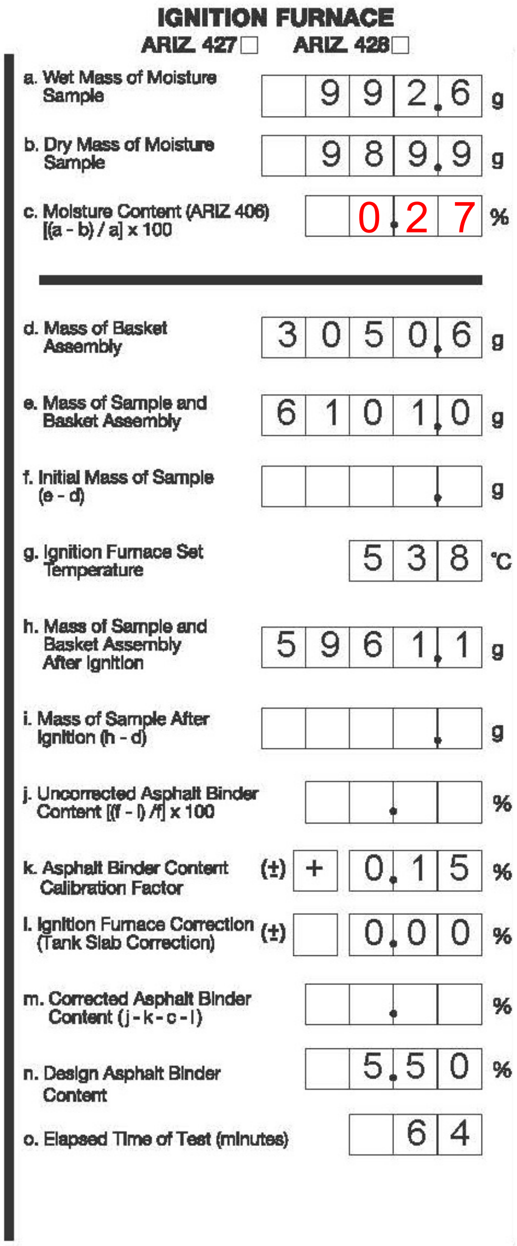
l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l) . %

n. Design Asphalt Binder Content 5.50 %

o. Elapsed Time of Test (minutes) 64

c. = 992.6 - 989.9 = 2.7



## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample 992.6 g

b. Dry Mass of Moisture Sample 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 0.27 %

d. Mass of Basket Assembly 3050.6 g

e. Mass of Sample and Basket Assembly 6101.0 g

f. Initial Mass of Sample (e - d) g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5961.1 g

i. Mass of Sample After Ignition (h - d) g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 %

k. Asphalt Binder Content Calibration Factor (±) + 0.15 %

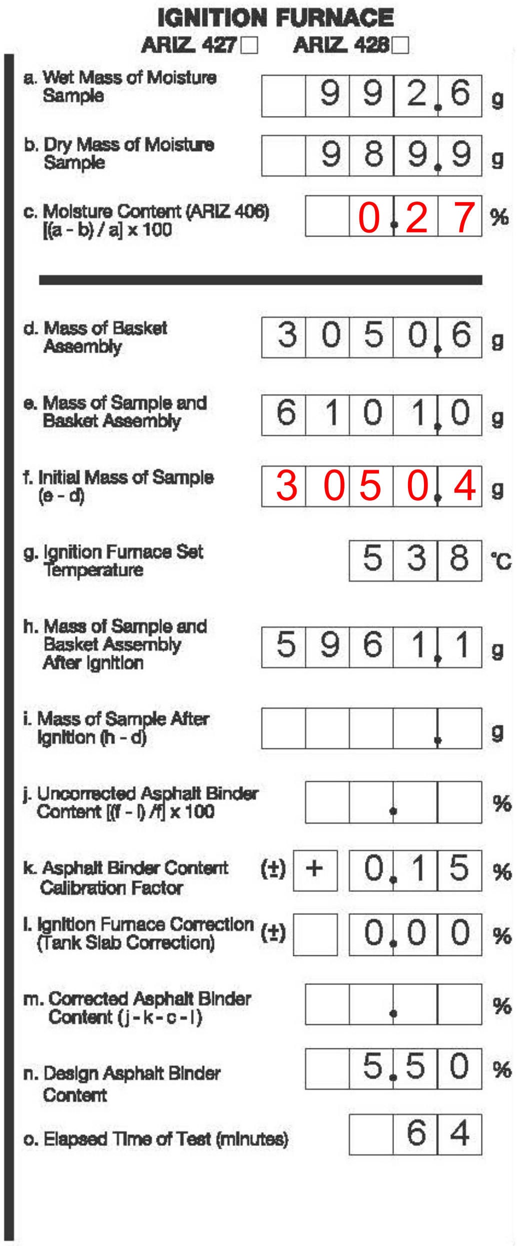
l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l) %

n. Design Asphalt Binder Content 5.50 %

o. Elapsed Time of Test (minutes) 64

c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895



**IGNITION FURNACE**

**ARIZ. 427☐ ARIZ. 428☐**

a. Wet Mass of Moisture Sample 992.6 g

b. Dry Mass of Moisture Sample 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 0.27 %

d. Mass of Basket Assembly 3050.6 g

e. Mass of Sample and Basket Assembly 6101.0 g

f. Initial Mass of Sample (e - d) 3050.4 g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5961.1 g

i. Mass of Sample After Ignition (h - d) . g

j. Uncorrected Asphalt Binder Content [(f - I) /f] x 100 . %

k. Asphalt Binder Content Calibration Factor (±) + 0.15 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

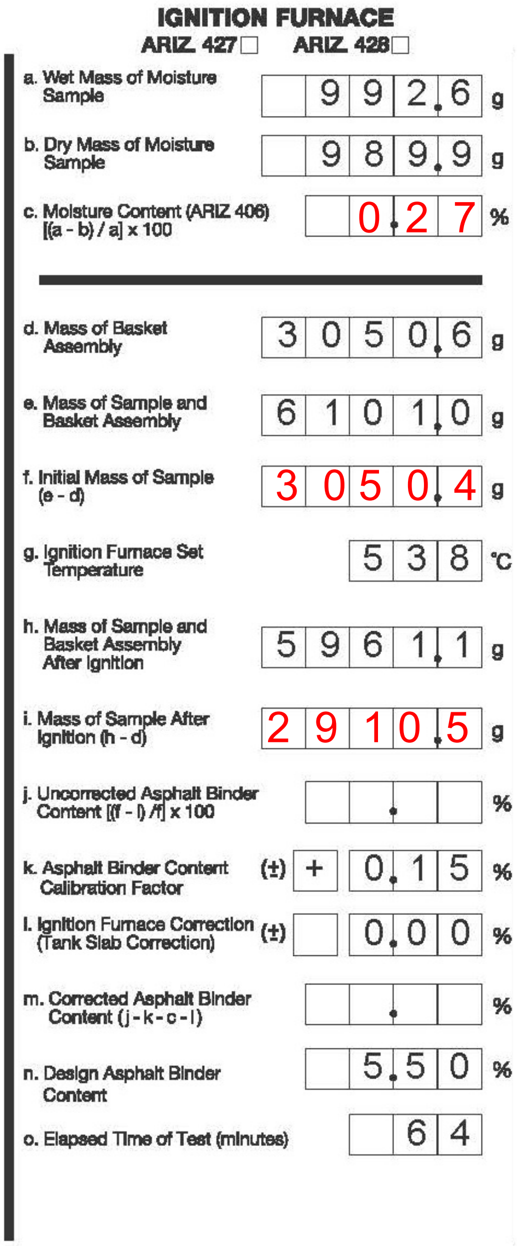
m. Corrected Asphalt Binder Content (j - k - c - l) . %

n. Design Asphalt Binder Content 5.50 %

o. Elapsed Time of Test (minutes) 64

c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895

f. = 6101.0 – 3050.6 = 3050.4



## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample: 992.6 g

b. Dry Mass of Moisture Sample: 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100: 0.27 %

d. Mass of Basket Assembly: 3050.6 g

e. Mass of Sample and Basket Assembly: 6101.0 g

f. Initial Mass of Sample (e - d): 3050.4 g

g. Ignition Furnace Set Temperature: 538 °C

h. Mass of Sample and Basket Assembly After Ignition: 5961.1 g

i. Mass of Sample After Ignition (h - d): 2910.5 g

j. Uncorrected Asphalt Binder Content [(f - I) /f] x 100: . %

k. Asphalt Binder Content Calibration Factor (±): + 0.15 %

l. Ignition Furnace Correction (Tank Slab Correction) (±): 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l): . %

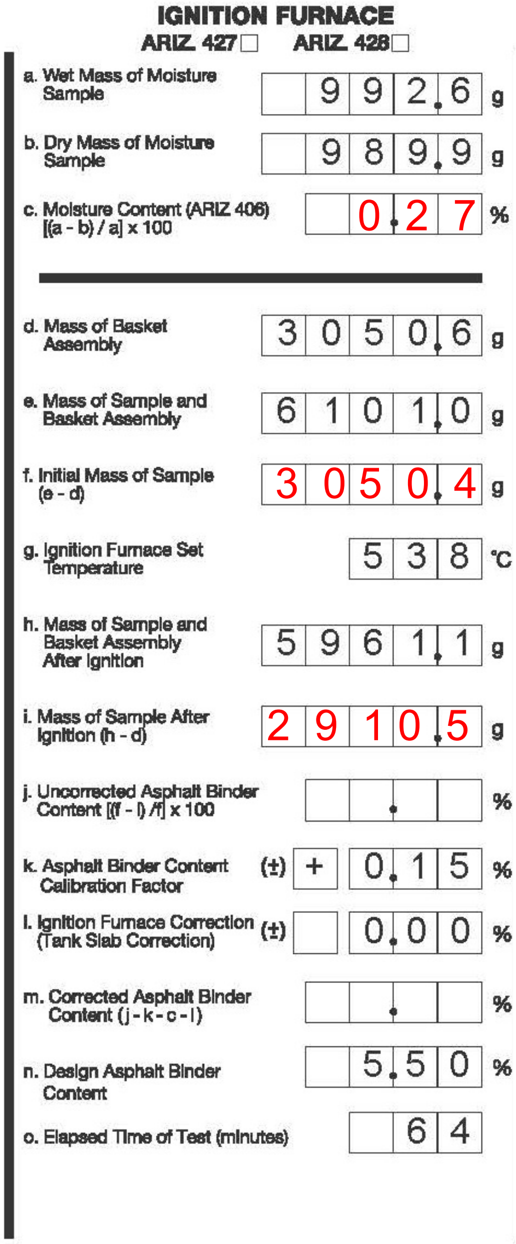
n. Design Asphalt Binder Content: 5.50 %

o. Elapsed Time of Test (minutes): 64

c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895

f. = 6101.0 – 3050.6 = 3050.4

i. = 5961.1 – 3050.6 = 2910.5



## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

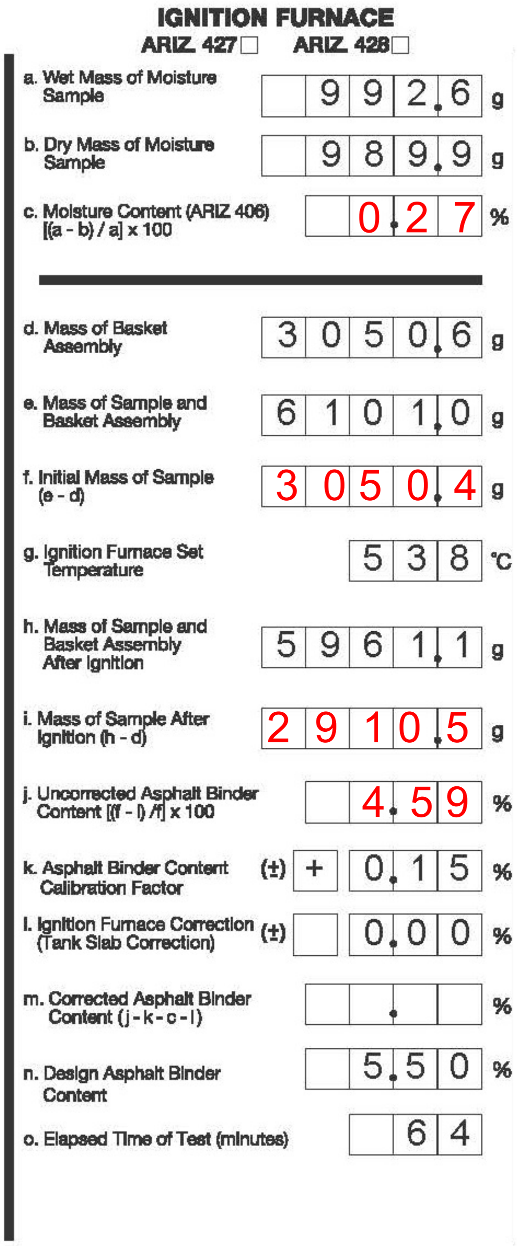
| | | | |
|---|---|---|---|
| a. Wet Mass of Moisture Sample | | 992.6 | g |
| b. Dry Mass of Moisture Sample | | 989.9 | g |
| c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 | | 0.27 | % |
| d. Mass of Basket Assembly | | 3050.6 | g |
| e. Mass of Sample and Basket Assembly | | 6101.0 | g |
| f. Initial Mass of Sample (e - d) | | 3050.4 | g |
| g. Ignition Furnace Set Temperature | | 538 | °C |
| h. Mass of Sample and Basket Assembly After Ignition | | 5961.1 | g |
| i. Mass of Sample After Ignition (h - d) | | 2910.5 | g |
| j. Uncorrected Asphalt Binder Content [(f - I) /f] x 100 | | . | % |
| k. Asphalt Binder Content Calibration Factor | (±) + | 0.15 | % |
| l. Ignition Furnace Correction (Tank Slab Correction) | (±) | 0.00 | % |
| m. Corrected Asphalt Binder Content (j - k - c - l) | | . | % |
| n. Design Asphalt Binder Content | | 5.50 | % |
| o. Elapsed Time of Test (minutes) | | 64 | |

c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895

f. = 6101.0 – 3050.6 = 3050.4

i. = 5961.1 – 3050.6 = 2910.5

j. = 3050.4 – 2910.5 = 139.9



## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample 992.6 g

b. Dry Mass of Moisture Sample 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 0.27 %

d. Mass of Basket Assembly 3050.6 g

e. Mass of Sample and Basket Assembly 6101.0 g

f. Initial Mass of Sample (e - d) 3050.4 g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5961.1 g

i. Mass of Sample After Ignition (h - d) 2910.5 g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 4.59 %

k. Asphalt Binder Content Calibration Factor (±) + 0.15 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l) . %

n. Design Asphalt Binder Content 5.50 %

o. Elapsed Time of Test (minutes) 64

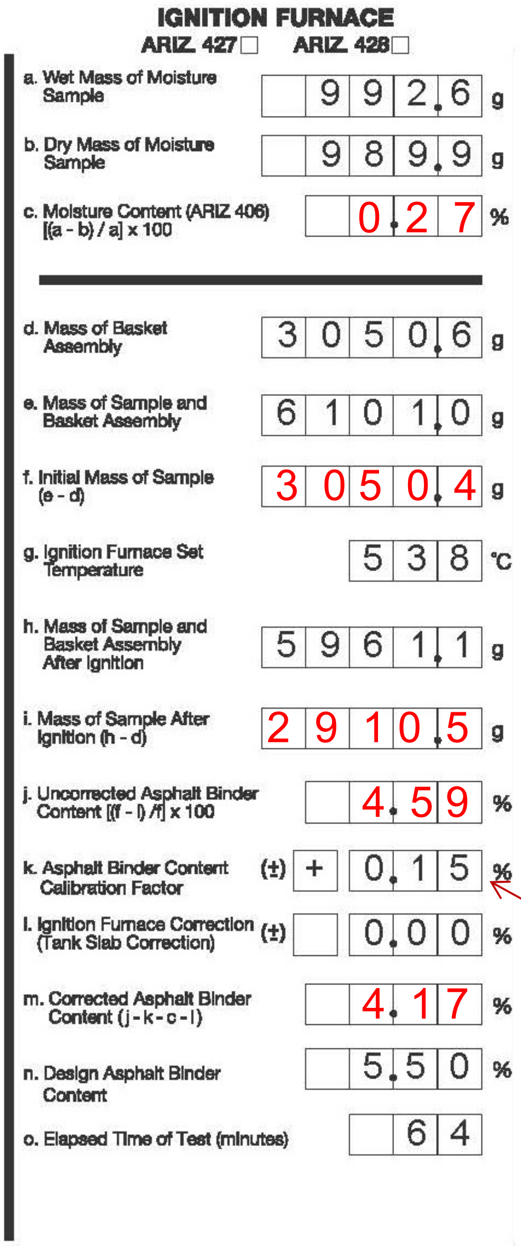
c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895

f. = 6101.0 – 3050.6 = 3050.4

i. = 5961.1 – 3050.6 = 2910.5

j. = 3050.4 – 2910.5 = 139.9

139.9 / 3050.4 X 100 = 4.586283766



## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample 992.6 g

b. Dry Mass of Moisture Sample 989.9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 0.27 %

d. Mass of Basket Assembly 3050.6 g

e. Mass of Sample and Basket Assembly 6101.0 g

f. Initial Mass of Sample (e - d) 3050.4 g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5961.1 g

i. Mass of Sample After Ignition (h - d) 2910.5 g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 4.59 %

k. Asphalt Binder Content Calibration Factor (±) + 0.15 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l) 4.17 %

n. Design Asphalt Binder Content 5.50 %

o. Elapsed Time of Test (minutes) 64

c. = 992.6 - 989.9 = 2.7 / 992.6 X 100 = .272012895

f. = 6101.0 – 3050.6 = 3050.4

i. = 5961.1 – 3050.6 = 2910.5

j. = 3050.4 – 2910.5 = 139.9

139.9 / 3050.4 X 100 = 4.586283766

m. = 4.59 – 0.15 – 0.27 – 0.00 = 4.17

Note: Notice “k” is a positive number. When the Ignition Oven calculated binder content, it showed it being +0.15 , more than the Calibration design. You have to subtract the +0.15 to get the corrected binder, not add.

COARSE FACTOR ☐ = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

**WEIGHTS RETAINED**

| | | | | | % RET | % PASS | SPECS |
|---|---|---|---|---|---|---|---|
| 3" | | | | | | | |
| 2 1/2" | | | | | | | |
| 2" | | | | | | | |
| 1 1/2" | | | | | | | |
| 1" | | | 7 | 5 | | | |
| 3/4" | | 1 | 9 | 1 | | | |
| 1/2" | | 5 | 2 | 8 | | | |
| 3/8" | | 2 | 8 | 1 | | | |
| 1/4" | | 3 | 2 | 0 | | | |
| #4 | | 1 | 3 | 9 | | | |
| #8 | | 3 | 3 | 0 | | | |
| - #8 | 1 | 0 | 4 | 6 | | | |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | | |

Weight of Pass # 8 Split: 5 3 3 p

FINE FACTOR

% Pass #8

The Total sample weight from the Ignition Oven, rounded to the whole number.

| | | | | |
|---|---|---|---|---|
| #200 | | 2 | 8 | |
| -#200 | | | 2 | |
| Total | 4 | 8 | 0 | q = Dry Weight |
| Elutri-ation | | | | = p - q |

r ☐ . ☐

r - s ☐ . Corrected % Pass No. 200

% Pass No. 200 Correction Factor (±) ☐ ☐ . s

## IGNITION FURNACE

ARIZ. 427☐ ARIZ. 428☐

a. Wet Mass of Moisture Sample: 9 9 2 . 6 g

b. Dry Mass of Moisture Sample: 9 8 9 . 9 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100: 0 . 2 7 %

d. Mass of Basket Assembly: 3 0 5 0 . 6 g

e. Mass of Sample and Basket Assembly: 6 1 0 1 . 0 g

f. Initial Mass of Sample (e - d): 3 0 5 0 . 4 g

g. Ignition Furnace Set Temperature: 5 3 8 °C

h. Mass of Sample and Basket Assembly After Ignition: 5 9 6 1 . 1 g

i. Mass of Sample After Ignition (h - d): 2 9 1 0 . 5 g

j. Uncorrected Asphalt Binder Content [(f - I) /f] x 100: 4 . 5 9 %

k. Asphalt Binder Content Calibration Factor (±) + 0 . 1 5 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) ☐ 0 . 0 0 %

m. Corrected Asphalt Binder Content ( j - k - c - l): 4 . 1 7 %

n. Design Asphalt Binder Content: 5 . 5 0 %

o. Elapsed Time of Test (minutes): 6 4

## COMPACTION

Marshall = M Gyratory = G Core = C ☐

### RICE

Sample Max. Sp. Gr. (Gmm) ☐ . ☐

Sample Max. Density [(Gmm) x (62.3)] ☐ . ☐ pcf

### MARSHALL

Average Bulk O.D. Sp. Gr. (Gmb) ☐ . ☐

Average Bulk Density [(Gmb) x (62.3)] ☐ . ☐ pcf

Air Voids = ☐ . ☐ %

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max Density From Rice Test}}\right] \times 100$$

Stability ☐ lbs

Flow ☐ 0.01 in

### GYRATORY

Average Relative Density (% Gmm) at Ndesign ☐ . ☐ pcf

Air Voids = ☐ . ☐ %

$$100 - \left[\text{Average Relative Density \% (Gmm) at Ndesign}\right]$$

WHITE

YELLOW

BLUE

RECEIVED DATE

TEST OPERATOR AND DATE

SUPERVISOR AND DATE

SEE BACK ALSO

COARSE FACTOR [ . ] = 100 / COARSE SIEVE TOTAL

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| 3" | | | | | | |
| 2 1/2" | | | | | | |
| 2" | | | | | | |
| 1 1/2" | | | | | | |
| 1" | | | 7 | 5 | | |
| 3/4" | | 1 | 9 | 1 | | |
| 1/2" | | 5 | 2 | 8 | | |
| 3/8" | | 2 | 8 | 1 | | |
| 1/4" | | 3 | 2 | 0 | | |
| #4 | | 1 | 3 | 9 | | |
| #8 | | 3 | 3 | 0 | | |
| - #8 | 1 | 0 | 4 | 6 | | |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

Weight of Pass # 8 Split [ 5 3 3 ] = p

FINE FACTOR [ . ] = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| #10 | | 4 | 6 | | | |
| #16 | 1 | 0 | 7 | | | |
| #30 | 1 | 1 | 9 | | | |
| #40 | | 6 | 2 | | | |
| #50 | | 5 | 1 | | | |
| #100 | | 6 | 6 | | | |
| #200 | | 2 | 8 | | | |
| -#200 | | | 2 | | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | | |
| Elutriation | | | | = p - q | | |

After Thoroughness of Sieving has been achieved, add up the weights of the sieves and determine they are within 1.0% of the starting weight.

COARSE FACTOR ☐ = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

| | WEIGHTS RETAINED | % RET | % PASS |
|---|---|---|---|
| 3" | | | |
| 2 1/2" | | | |
| 2" | | | |
| 1 1/2" | | | |
| 1" | 75 | | |
| 3/4" | 191 | | |
| 1/2" | 528 | | |
| 3/8" | 281 | | |
| 1/4" | 320 | | |
| #4 | 139 | | |
| #8 | 330 | | |
| - #8 | 1046 | | |
| Total | 2911 = I (Rounded) | | |

2910

Weight of Pass # 8 Split: 533 = p

FINE FACTOR ☐ = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | WEIGHTS RETAINED | % RET | % PASS |
|---|---|---|---|
| #10 | 46 | | |
| #16 | 107 | | |
| #30 | 119 | | |
| #40 | 62 | | |
| #50 | 51 | | |
| #100 | 66 | | |
| #200 | 28 | | |
| -#200 | 2 | | r . |
| Total | 480 q = Dry Weight | | |
| Elutriation | = p - q | | |

481

The weight of the coarse sieves actual total is 2910, the starting total from the Ignition Burn off is 2911. If the total is 1.0% or less, adjust the sieve with the most retained. You can not adjust the - #8, this is not a retained value but the total passing the #8 sieve.

The weight of the fine sieves actual total is 481, the starting total after the washing of the material is 480. Total is 1.0% or less adjust the sieve with the most retained. You can not adjust the - #200, this is not a retained value.

COARSE FACTOR ☐ = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | |
| | 1" | | | 7 | 5 | | |
| | 3/4" | | 1 | 9 | 1 | | |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | |
| | 3/8" | | 2 | 8 | 1 | | |
| | 1/4" | | 3 | 2 | 0 | | |
| | #4 | | 1 | 3 | 9 | | |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |
| 2910 | | | | | | | |

Weight of Pass # 8 Split: 533 = p

FINE FACTOR ☐ = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | | WEIGHTS RETAINED | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | |
| | #16 | 1 | 0 | 7 | | |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | |
| | #40 | | 6 | 2 | | |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |
| 481 | | | | | | |

Determine the amount to + or -, to the sieve with the most retained. The actual sieve total is 2910, you have to + 1 to get to the starting total of 2911. Add + 1 to the sieve with the most retained.

Since the -8 is more than 800 grams, the -8 needs to be split for fine sieving to a minimum 500 grams. This will split will be "**Weight of Pass #8 Split" (533).**

Determine the amount to + or -, to the sieve with the most retained. The actual fine sieve total is 481, you have to – 1 to get to the starting total of 480. Subtract -1 from the sieve with the most retained.

Determine the Elutriation, formula p-q
533-480=53

COARSE FACTOR ☐ = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

Determine the Coarse Factor to at least 6 decimal places.

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| 3" | | | | | | |
| 2 1/2" | | | | | | |
| 2" | | | | | | |
| 1 1/2" | | | | | | |
| 1" | | | 7 | 5 | | |
| 3/4" | | 1 | 9 | 1 | | |
| 529 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | |
| 3/8" | | 2 | 8 | 1 | | |
| 1/4" | | 3 | 2 | 0 | | |
| #4 | | 1 | 3 | 9 | | |
| #8 | | 3 | 3 | 0 | | |
| - #8 | 1 | 0 | 4 | 6 | | |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

Weight of Pass # 8 Split: 5 3 3 = p

FINE FACTOR ☐ = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | WEIGHTS RETAINED | | | % RET | % PASS |
|---|---|---|---|---|---|
| #10 | | 4 | 6 | | |
| #16 | 1 | 0 | 7 | | |
| #30 | 1 | 1 | 9 | | |
| #40 | | 6 | 2 | | |
| #50 | | 5 | 1 | | |
| #100 | | 6 | 6 | | |
| #200 | | 2 | 8 | | |
| -#200 | | | 2 | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | |
| Elutriation | | | | = p - q | |

COARSE FACTOR

.034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

100 / 2911 = 0.034352456
Make sure you use the starting Total, not the actual.

| | | WEIGHTS RETAINED | % RET | % PASS |
|---|---|---|---|---|
| | 3" | | | |
| | 2 1/2" | | | |
| | 2" | | | |
| | 1 1/2" | | | |
| | 1" | 75 | | |
| | 3/4" | 191 | | |
| 529 | 1/2" | ~~528~~ | | |
| | 3/8" | 281 | | |
| | 1/4" | 320 | | |
| | #4 | 139 | | |
| | #8 | 330 | | |
| | - #8 | 1046 | | |
| | Total | 2911 = I (Rounded) | | |
| 2910 | | | | |

Weight of Pass # 8 Split

533 = p

FINE FACTOR

. = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | WEIGHTS RETAINED | % RET | % PASS |
|---|---|---|---|
| #10 | 46 | | |
| #16 | 107 | | |
| #30 | 119 | | |
| #40 | 62 | | |
| #50 | 51 | | |
| #100 | 66 | | |
| #200 | 28 | | |
| -#200 | 2 | r | . |
| Total | 480 q = Dry Weight | | |
| Elutriation | = p - q | | |

100 / 2911 = 0.034352456

COARSE FACTOR

$.034352 = \frac{100}{\text{COARSE SIEVE TOTAL}}$

| WEIGHTS RETAINED | | % RET | % PASS |
|---|---|---|---|
| 3" | | | |
| 2 1/2" | | | |
| 2" | | | |
| 1 1/2" | | | 100 |
| 1" | 75 | | |
| 3/4" | 191 | | |
| 1/2" | ~~528~~ 529 | | |
| 3/8" | 281 | | |
| 1/4" | 320 | | |
| #4 | 139 | | |
| #8 | 330 | | |
| - #8 | 1046 | | |
| Total | 2911 = I (Rounded) | | |

2910

Determine the % Passing. Start with the sieve that has 100% passing, record 100 in the box.

Weight of Pass # 8 Split

533 = p

FINE FACTOR

$. \quad = \frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| WEIGHTS RETAINED | | % RET | % PASS |
|---|---|---|---|
| #10 | 46 | | |
| #16 | 107 | | |
| #30 | 119 | | |
| #40 | 62 | | |
| #50 | 51 | | |
| #100 | 66 | | |
| #200 | 28 | | |
| -#200 | 2 | r | . |
| Total | 480 q = Dry Weight | | |
| Elutriation | = p - q | | |

COARSE FACTOR

034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | % RET | % PASS |
|---|---|---|---|
| | 3" | | | |
| | 2 1/2" | | | |
| | 2" | | | |
| | 1 1/2" | | | 100 |
| | 1" | 75 | | |
| | 3/4" | 191 | | |
| 529 | 1/2" | ~~528~~ | | |
| | 3/8" | 281 | | |
| | 1/4" | 320 | | |
| | #4 | 139 | | |
| | #8 | 330 | | |
| | - #8 | 1046 | | |
| | Total | 2911 = I (Rounded) | | |

2910

Weight of Pass # 8 Split 533 = p

FINE FACTOR ☐ = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| WEIGHTS RETAINED | | % RET | % PASS |
|---|---|---|---|
| #10 | 46 | | |
| #16 | 107 | | |
| #30 | 119 | | |
| #40 | 62 | | |
| #50 | 51 | | |
| #100 | 66 | | |
| #200 | 28 | | |
| -#200 | 2 | r | . |
| Total | 480 q = Dry Weight | | |
| Elutriation | = p - q | | |

(MR)

100 – 75 X .034352456 =

Place the factor in the memory of the calculator or you will have to manually enter it in each time. Enter 100 in the calculator, then the minus key. Next enter the first weight retained (75), then the multiplication key, then the coarse factor (.034352) at least 6 decimal places, then hit the equal key. This will give you the % passing that sieve. Round the answer to the whole number. Do not hit the clear key.

COARSE FACTOR

034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

|  | WEIGHTS RETAINED |  |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|---|
|  | 3" |  |  |  |  |  |  |
|  | 2 1/2" |  |  |  |  |  |  |
|  | 2" |  |  |  |  |  |  |
|  | 1 1/2" |  |  |  |  |  | 100 |
|  | 1" |  |  | 7 | 5 |  | 97 |
|  | 3/4" |  | 1 | 9 | 1 |  |  |
| 529 | 1/2" |  | ~~5~~ | ~~2~~ | ~~8~~ |  |  |
|  | 3/8" |  | 2 | 8 | 1 |  |  |
|  | 1/4" |  | 3 | 2 | 0 |  |  |
|  | #4 |  | 1 | 3 | 9 |  |  |
|  | #8 |  | 3 | 3 | 0 |  |  |
|  | - #8 | 1 | 0 | 4 | 6 |  |  |
|  | Total | 2 | 9 | 1 | 1 | = I (Rounded) |  |

2910

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

= $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| WEIGHTS RETAINED |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|
| #10 |  | 4 | 6 |  |  |
| #16 | 1 | 0 | 7 |  |  |
| #30 | 1 | 1 | 9 |  |  |
| #40 |  | 6 | 2 |  |  |
| #50 |  | 5 | 1 |  |  |
| #100 |  | 6 | 6 |  |  |
| #200 |  | 2 | 8 |  |  |
| -#200 |  |  | 2 | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight |  |
| Elutriation |  |  |  | = p - q |  |

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

You report the % passing to the whole number, rounded. Keeping the answer (97.42356579) in the calculator, hit the minus key, then enter the next weight retained (191). Hit the multiplication key and enter the coarse sieve factor (.034352), then the equal key.

Note: Understand that the calculator is performing the math functions in order of operation. In this equation, the multiplication is performed first, then the subtraction. That is how the calculator is calculating the answer.

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | |
| | 3/8" | | 2 | 8 | 1 | | |
| | 1/4" | | 3 | 2 | 0 | | |
| | #4 | | 1 | 3 | 9 | | |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |
| 2910 | | | | | | | |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

The % passing is reported to the whole number, rounded. Continue this process for all of the coarse sieves.

This is a long continuous calculation. If you hit clear or make an input error, you will have to start from the beginning.

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

. = % Pass #8 / Wt. of Pass #8 Split

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| #10 | | 4 | 6 | | | |
| #16 | 1 | 0 | 7 | | | |
| #30 | 1 | 1 | 9 | | | |
| #40 | | 6 | 2 | | | |
| #50 | | 5 | 1 | | | |
| #100 | | 6 | 6 | | | |
| #200 | | 2 | 8 | | | |
| -#200 | | | 2 | | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | | |
| Elutriation | | | | = p - q | | |

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| 3" | | | | | | |
| 2 1/2" | | | | | | |
| 2" | | | | | | |
| 1 1/2" | | | | | | 100 |
| 1" | | | 7 | 5 | | 97 |
| 3/4" | | 1 | 9 | 1 | | 91 |
| 529 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| 3/8" | | 2 | 8 | 1 | | |
| 1/4" | | 3 | 2 | 0 | | |
| #4 | | 1 | 3 | 9 | | |
| #8 | | 3 | 3 | 0 | | |
| - #8 | 1 | 0 | 4 | 6 | | |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

Weight of Pass # 8 Split: 5 3 3 = p

FINE FACTOR . = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|
| #10 | | 4 | 6 | | |
| #16 | 1 | 0 | 7 | | |
| #30 | 1 | 1 | 9 | | |
| #40 | | 6 | 2 | | |
| #50 | | 5 | 1 | | |
| #100 | | 6 | 6 | | |
| #200 | | 2 | 8 | | |
| -#200 | | | 2 | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | |
| Elutri-ation | | | | = p - q | |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

Note: The adjusted weight retained is used. If you did not adjust the correct sieve, your calculation will not be correct. Remember to adjust the sieve with the most retained, and not the - # 8 material.

COARSE FACTOR

$\boxed{034352} = \frac{100}{\text{COARSE SIEVE TOTAL}}$

100 / 2911 = 0.034352456

|  | WEIGHTS RETAINED |  |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|---|
|  | 3" |  |  |  |  |  |  |
|  | 2 1/2" |  |  |  |  |  |  |
|  | 2" |  |  |  |  |  |  |
|  | 1 1/2" |  |  |  |  |  | 100 |
|  | 1" |  |  | 7 | 5 |  | 97 |
|  | 3/4" |  | 1 | 9 | 1 |  | 91 |
| 529 | 1/2" |  | ~~5~~ | ~~2~~ | ~~8~~ |  | 73 |
|  | 3/8" |  | 2 | 8 | 1 |  | 63 |
|  | 1/4" |  | 3 | 2 | 0 |  |  |
|  | #4 |  | 1 | 3 | 9 |  |  |
|  | #8 |  | 3 | 3 | 0 |  |  |
|  | - #8 | 1 | 0 | 4 | 6 |  |  |
|  | Total | 2 | 9 | 1 | 1 | = I (Rounded) |  |

2910

Weight of Pass # 8 Split

| 5 | 3 | 3 | = p |
|---|---|---|---|

FINE FACTOR

$\boxed{\phantom{000}} = \frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| WEIGHTS RETAINED |  |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|
| #10 |  | 4 | 6 |  |  |  |
| #16 | 1 | 0 | 7 |  |  |  |
| #30 | 1 | 1 | 9 |  |  |  |
| #40 |  | 6 | 2 |  |  |  |
| #50 |  | 5 | 1 |  |  |  |
| #100 |  | 6 | 6 |  |  |  |
| #200 |  | 2 | 8 |  |  |  |
| -#200 |  |  | 2 |  | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight |  |  |
| Elutri-ation |  |  |  | = p - q |  |  |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

COARSE FACTOR

034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

Weight of Pass # 8 Split: 5 3 3 = p

FINE FACTOR ________ = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| #10 | | 4 | 6 | | | |
| #16 | 1 | 0 | 7 | | | |
| #30 | 1 | 1 | 9 | | | |
| #40 | | 6 | 2 | | | |
| #50 | | 5 | 1 | | | |
| #100 | | 6 | 6 | | | |
| #200 | | 2 | 8 | | | |
| -#200 | | | 2 | | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | | |
| Elutriation | | | | = p - q | | |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

COARSE FACTOR

034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | |
| | Total | 2 | 9 | 1 | 1 = I (Rounded) | | |

2910

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

. = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|
| #10 | | 4 | 6 | | |
| #16 | 1 | 0 | 7 | | |
| #30 | 1 | 1 | 9 | | |
| #40 | | 6 | 2 | | |
| #50 | | 5 | 1 | | |
| #100 | | 6 | 6 | | |
| #200 | | 2 | 8 | | |
| -#200 | | | 2 | r | . |
| Total | 4 | 8 | 0 q = Dry Weight | | |
| Elutri-ation | | | = p - q | | |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

| | | | |
|---|---|---|---|
| 5 | 3 | 3 | = p |

FINE FACTOR

. = % Pass #8 / Wt. of Pass #8 Split

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | |
| | #16 | 1 | 0 | 7 | | |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | |
| | #40 | | 6 | 2 | | |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

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Determine the % Passing for the fine sieving.

COARSE FACTOR

034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

|  | WEIGHTS RETAINED |  |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|---|
|  | 3" |  |  |  |  |  |  |
|  | 2 1/2" |  |  |  |  |  |  |
|  | 2" |  |  |  |  |  |  |
|  | 1 1/2" |  |  |  |  |  | 100 |
|  | 1" |  |  | 7 | 5 |  | 97 |
|  | 3/4" |  | 1 | 9 | 1 |  | 91 |
| 529 | 1/2" |  | ~~5~~ | ~~2~~ | ~~8~~ |  | 73 |
|  | 3/8" |  | 2 | 8 | 1 |  | 63 |
|  | 1/4" |  | 3 | 2 | 0 |  | 52 |
|  | #4 |  | 1 | 3 | 9 |  | 47 |
|  | #8 |  | 3 | 3 | 0 |  |  |
|  | - #8 | 1 | 0 | 4 | 6 |  | 36 |
|  | Total | 2 | 9 | 1 | 1 | = I (Rounded) |  |
| 2910 |  |  |  |  |  |  |  |

Weight of Pass # 8 Split 5 3 3 = p

FINE FACTOR [ ] = % Pass #8 / Wt. of Pass #8 Split

|  | WEIGHTS RETAINED |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|
|  | #10 |  | 4 | 6 |  |  |
|  | #16 | 1 | 0 | 7 |  |  |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ |  |  |
|  | #40 |  | 6 | 2 |  |  |
|  | #50 |  | 5 | 1 |  |  |
|  | #100 |  | 6 | 6 |  |  |
|  | #200 |  | 2 | 8 |  |  |
|  | -#200 |  |  | 2 |  | r . |
|  | Total | 4 | 8 | 0 | q = Dry Weight |  |
|  | Elutriation |  | 5 | 3 | = p - q |  |
| 481 |  |  |  |  |  |  |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

36 / 533 = 0.067542214

First determine the fine factor. Formula is
% Pass #8 / Wt. of Pass #8
When determining the Fine Factor, make sure you use the % Pass #8 Rounded (36) not the unrounded (35.93266919)

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 = I (Rounded) | | |

2910

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

36 / 533 = 0.067542214

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | |
| | #16 | 1 | 0 | 7 | | |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | |
| | #40 | | 6 | 2 | | |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 q = Dry Weight | | |
| | Elutriation | | 5 | 3 = p - q | | |

481

COARSE FACTOR

$\boxed{034352} = \frac{100}{\text{COARSE SIEVE TOTAL}}$

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |
| 2910 | | | | | | | |

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

| | | |
|---|---|---|
| 5 | 3 | 3 |

= p

FINE FACTOR

$\boxed{067542} = \frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | |
| | #16 | 1 | 0 | 7 | | |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | |
| | #40 | | 6 | 2 | | |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |
| 481 | | | | | | |

After the Fine Factor has been determined, complete the calculation for the fine sieve % Pass.

Enter the % Pass #8 in the calculator, then press the minus key. Enter the weight retained, then the multiplication key and enter the fine factor, hit enter.

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| 3" | | | | | | |
| 2 1/2" | | | | | | |
| 2" | | | | | | |
| 1 1/2" | | | | | | 100 |
| 1" | | | 7 | 5 | | 97 |
| 3/4" | | 1 | 9 | 1 | | 91 |
| 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| 3/8" | | 2 | 8 | 1 | | 63 |
| 1/4" | | 3 | 2 | 0 | | 52 |
| #4 | | 1 | 3 | 9 | | 47 |
| #8 | | 3 | 3 | 0 | | |
| - #8 | 1 | 0 | 4 | 6 | | 36 |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

529

2910

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| #10 | | 4 | 6 | | | 33 |
| #16 | 1 | 0 | 7 | | | |
| #30 | ~~1~~ | ~~1~~ | ~~9~~ | | | |
| #40 | | 6 | 2 | | | |
| #50 | | 5 | 1 | | | |
| #100 | | 6 | 6 | | | |
| #200 | | 2 | 8 | | | |
| -#200 | | | 2 | | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | | |
| Elutriation | | 5 | 3 | = p - q | | |

118

481

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816

The % Pass is recorded to the whole number, rounded. Continue this process for the remaining sieves.

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

Weight of Pass
# 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | |
| | #40 | | 6 | 2 | | |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutriation | | 5 | 3 | = p - q | |

481

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579
97.42356579 – 191 X .034352456 = 90.86224665
90.86224665 – 529 X .034352456 = 72.68979732
72.68979732 – 281 X .034352456 = 63.03675713
63.03675713 – 320 X .034352456 = 52.04397114
52.04397114 – 139 X .034352456 = 47.26897973
47.26897973 – 330 X .034352456 = 35.93266919

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816
32.89305816 – 107 X .067542214 = 25.66604128

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|---|
| | 3" | | | | | | | |
| | 2 1/2" | | | | | | | |
| | 2" | | | | | | | |
| | 1 1/2" | | | | | | | 100 |
| | 1" | | | 7 | 5 | | | 97 |
| | 3/4" | | 1 | 9 | 1 | | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | | 73 |
| | 3/8" | | 2 | 8 | 1 | | | 63 |
| | 1/4" | | 3 | 2 | 0 | | | 52 |
| | #4 | | 1 | 3 | 9 | | | 47 |
| | #8 | | 3 | 3 | 0 | | | |
| | - #8 | 1 | 0 | 4 | 6 | | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | | |

2910

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

36 / 533 = 0.067542214

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | | 33 |
| | #16 | 1 | 0 | 7 | | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | | 18 |
| | #40 | | 6 | 2 | | | |
| | #50 | | 5 | 1 | | | |
| | #100 | | 6 | 6 | | | |
| | #200 | | 2 | 8 | | | |
| | -#200 | | | 2 | | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | | |
| | Elutri-ation | | 5 | 3 | = p - q | | |

481

(MR)

36 – 46 X .067542214 = 32.89305816

32.89305816 – 107 X .067542214 = 25.66604128

25.66604128 – 118 X .067542214 = 17.69606004

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

(MR)

100 – 75 X .034352456 = 97.42356579

97.42356579 – 191 X .034352456 = 90.86224665

90.86224665 – 529 X .034352456 = 72.68979732

72.68979732 – 281 X .034352456 = 63.03675713

63.03675713 – 320 X .034352456 = 52.04397114

52.04397114 – 139 X .034352456 = 47.26897973

47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

36 / 533 = 0.067542214

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

481

(MR)

36 – 46 X .067542214 = 32.89305816

32.89305816 – 107 X .067542214 = 25.66604128

25.66604128 – 118 X .067542214 = 17.69606004

17.69606004 – 62 X .067542214 = 13.50844278

COARSE FACTOR

034352 = 100 / COARSE SIEVE TOTAL

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579
97.42356579 – 191 X .034352456 = 90.86224665
90.86224665 – 529 X .034352456 = 72.68979732
72.68979732 – 281 X .034352456 = 63.03675713
63.03675713 – 320 X .034352456 = 52.04397114
52.04397114 – 139 X .034352456 = 47.26897973
47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

067542 = % Pass #8 / Wt. of Pass #8 Split

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | 10 |
| | #100 | | 6 | 6 | | |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | . |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

481

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816
32.89305816 – 107 X .067542214 = 25.66604128
25.66604128 – 118 X .067542214 = 17.69606004
17.69606004 – 62 X .067542214 = 13.50844278
13.50844278 – 51 X .067542214 = 10.06378987

COARSE FACTOR

034352 = 100 / COARSE SIEVE TOTAL

100 / 2911 = 0.034352456

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| 3" | | | | | | |
| 2 1/2" | | | | | | |
| 2" | | | | | | |
| 1 1/2" | | | | | | 100 |
| 1" | | | 7 | 5 | | 97 |
| 3/4" | | 1 | 9 | 1 | | 91 |
| 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| 3/8" | | 2 | 8 | 1 | | 63 |
| 1/4" | | 3 | 2 | 0 | | 52 |
| #4 | | 1 | 3 | 9 | | 47 |
| #8 | | 3 | 3 | 0 | | |
| - #8 | 1 | 0 | 4 | 6 | | 36 |
| Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

529

2910

(MR)

100 – 75 X .034352456 = 97.42356579
97.42356579 – 191 X .034352456 = 90.86224665
90.86224665 – 529 X .034352456 = 72.68979732
72.68979732 – 281 X .034352456 = 63.03675713
63.03675713 – 320 X .034352456 = 52.04397114
52.04397114 – 139 X .034352456 = 47.26897973
47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

067542 = % Pass #8 / Wt. of Pass #8 Split

36 / 533 = 0.067542214

| | WEIGHTS RETAINED | | | % RET | % PASS |
|---|---|---|---|---|---|
| #10 | | 4 | 6 | | 33 |
| #16 | 1 | 0 | 7 | | 26 |
| #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| #40 | | 6 | 2 | | 14 |
| #50 | | 5 | 1 | | 10 |
| #100 | | 6 | 6 | | 6 |
| #200 | | 2 | 8 | | |
| -#200 | | | 2 | r | . |
| Total | 4 | 8 | 0 | q = Dry Weight | |
| Elutriation | | 5 | 3 | = p - q | |

118

481

(MR)

36 – 46 X .067542214 = 32.89305816
32.89305816 – 107 X .067542214 = 25.66604128
25.66604128 – 118 X .067542214 = 17.69606004
17.69606004 – 62 X .067542214 = 13.50844278
13.50844278 – 51 X .067542214 = 10.06378987
10.06378987 – 66 X .067542214 = 5.606003752

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

|  | WEIGHTS RETAINED |  |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|---|
|  | 3" |  |  |  |  |  |  |
|  | 2 1/2" |  |  |  |  |  |  |
|  | 2" |  |  |  |  |  |  |
|  | 1 1/2" |  |  |  |  |  | 100 |
|  | 1" |  |  | 7 | 5 |  | 97 |
|  | 3/4" |  | 1 | 9 | 1 |  | 91 |
| 529 | 1/2" |  | ~~5~~ | ~~2~~ | ~~8~~ |  | 73 |
|  | 3/8" |  | 2 | 8 | 1 |  | 63 |
|  | 1/4" |  | 3 | 2 | 0 |  | 52 |
|  | #4 |  | 1 | 3 | 9 |  | 47 |
|  | #8 |  | 3 | 3 | 0 |  |  |
|  | - #8 | 1 | 0 | 4 | 6 |  | 36 |
|  | Total | 2 | 9 | 1 | 1 | = I (Rounded) |  |

2910

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579
97.42356579 – 191 X .034352456 = 90.86224665
90.86224665 – 529 X .034352456 = 72.68979732
72.68979732 – 281 X .034352456 = 63.03675713
63.03675713 – 320 X .034352456 = 52.04397114
52.04397114 – 139 X .034352456 = 47.26897973
47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

5 3 3 = p

FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

|  | WEIGHTS RETAINED |  |  |  | % RET | % PASS |
|---|---|---|---|---|---|---|
|  | #10 |  | 4 | 6 |  | 33 |
|  | #16 | 1 | 0 | 7 |  | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ |  | 18 |
|  | #40 |  | 6 | 2 |  | 14 |
|  | #50 |  | 5 | 1 |  | 10 |
|  | #100 |  | 6 | 6 |  | 6 |
|  | #200 |  | 2 | 8 |  |  |
|  | -#200 |  |  | 2 | r | . |
|  | Total | 4 | 8 | 0 | q = Dry Weight |  |
|  | Elutriation |  | 5 | 3 | = p - q |  |

481

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816
32.89305816 – 107 X .067542214 = 25.66604128
25.66604128 – 118 X .067542214 = 17.69606004
17.69606004 – 62 X .067542214 = 13.50844278
13.50844278 – 51 X .067542214 = 10.06378987
10.06378987 – 66 X .067542214 = 5.606003752
5.606003752 – 28 X .067542214 = 3.714821764

COARSE FACTOR

034352 = 100 / COARSE SIEVE TOTAL

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

100 / 2911 = 0.034352456

(MR)

100 – 75 X .034352456 = 97.42356579
97.42356579 – 191 X .034352456 = 90.86224665
90.86224665 – 529 X .034352456 = 72.68979732
72.68979732 – 281 X .034352456 = 63.03675713
63.03675713 – 320 X .034352456 = 52.04397114
52.04397114 – 139 X .034352456 = 47.26897973
47.26897973 – 330 X .034352456 = 35.93266919

Weight of Pass # 8 Split

533 = p

FINE FACTOR

067542 = % Pass #8 / Wt. of Pass #8 Split

| | | WEIGHTS RETAINED | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | 10 |
| | #100 | | 6 | 6 | | 6 |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | | 3 .7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

481

36 / 533 = 0.067542214

(MR)

36 – 46 X .067542214 = 32.89305816
32.89305816 – 107 X .067542214 = 25.66604128
25.66604128 – 118 X .067542214 = 17.69606004
17.69606004 – 62 X .067542214 = 13.50844278
13.50844278 – 51 X .067542214 = 10.06378987
10.06378987 – 66 X .067542214 = 5.606003752
5.606003752 – 28 X .067542214 = 3.714821764

The % Pass the #200 is recorded to 1 (0.0) decimals, rounded.

COARSE FACTOR

.034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

Weight of Pass # 8 Split: 5 3 3 = p

FINE FACTOR

.067542 = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | 10 |
| | #100 | | 6 | 6 | | 6 |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | 3 .7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutriation | | 5 | 3 | = p - q | |

481

Check the % fine sieve calculation by multiplying the total passing #200 by the Fine Factor. Total passing the #200 is determined by adding the -#200 (2) and the Elutriation (53).

2+53=55

55 X .067542=3.71481

This answer should match to the 1 (0.0) decimal, rounded.

COARSE FACTOR

.034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |
| 2910 | | | | | | | |

Weight of Pass # 8 Split

| | | |
|---|---|---|
| 5 | 3 | 3 |

= p

FINE FACTOR

.067542 = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | | 33 |
| | #16 | 1 | 0 | 7 | | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | | 18 |
| | #40 | | 6 | 2 | | | 14 |
| | #50 | | 5 | 1 | | | 10 |
| | #100 | | 6 | 6 | | | 6 |
| | #200 | | 2 | 8 | | | |
| | -#200 | | | 2 | | r | 3 .7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | | |
| | Elutriation | | 5 | 3 | = p - q | | |
| 481 | | | | | | | |

100 – 97 = 3

Determine the % Retained. Minus the top Sieve (% pass) by the sieve below its (% pass).

COARSE FACTOR

$$.034352 = \frac{100}{\text{COARSE SIEVE TOTAL}}$$

| | WEIGHTS RETAINED | | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | 3 | 97 |
| | 3/4" | | 1 | 9 | 1 | | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | | 73 |
| | 3/8" | | 2 | 8 | 1 | | 63 |
| | 1/4" | | 3 | 2 | 0 | | 52 |
| | #4 | | 1 | 3 | 9 | | 47 |
| | #8 | | 3 | 3 | 0 | | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

100 – 97 = 3

Weight of Pass # 8 Split

| | | | |
|---|---|---|---|
| 5 | 3 | 3 | = p |

FINE FACTOR

$$.067542 = \frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$$

| | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | 10 |
| | #100 | | 6 | 6 | | 6 |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | 3.7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

481

COARSE FACTOR

.034352 = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | 3 | 97 |
| | 3/4" | | 1 | 9 | 1 | 6 | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | 18 | 73 |
| | 3/8" | | 2 | 8 | 1 | 10 | 63 |
| | 1/4" | | 3 | 2 | 0 | 11 | 52 |
| | #4 | | 1 | 3 | 9 | 5 | 47 |
| | #8 | | 3 | 3 | 0 | 11 | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |

2910

100 – 97 = 3
97 – 91 = 6
91 – 73 = 18
73 – 63 = 10
63 – 52 = 11
52 – 47 = 5
47 – 36 = 11

Weight of Pass # 8 Split

| | | |
|---|---|---|
| 5 | 3 | 3 |

= p

FINE FACTOR

.067542 = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

| | | WEIGHTS RETAINED | | | % RET | % PASS |
|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 33 |
| | #16 | 1 | 0 | 7 | | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 18 |
| | #40 | | 6 | 2 | | 14 |
| | #50 | | 5 | 1 | | 10 |
| | #100 | | 6 | 6 | | 6 |
| | #200 | | 2 | 8 | | |
| | -#200 | | | 2 | r | 3.7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | |
| | Elutri-ation | | 5 | 3 | = p - q | |

481

COARSE FACTOR

.034352 = 100 / COARSE SIEVE TOTAL

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | 3" | | | | | | |
| | 2 1/2" | | | | | | |
| | 2" | | | | | | |
| | 1 1/2" | | | | | | 100 |
| | 1" | | | 7 | 5 | 3 | 97 |
| | 3/4" | | 1 | 9 | 1 | 6 | 91 |
| 529 | 1/2" | | ~~5~~ | ~~2~~ | ~~8~~ | 18 | 73 |
| | 3/8" | | 2 | 8 | 1 | 10 | 63 |
| | 1/4" | | 3 | 2 | 0 | 11 | 52 |
| | #4 | | 1 | 3 | 9 | 5 | 47 |
| | #8 | | 3 | 3 | 0 | 11 | |
| | - #8 | 1 | 0 | 4 | 6 | | 36 |
| | Total | 2 | 9 | 1 | 1 | = I (Rounded) | |
| 2910 | | | | | | | |

100 – 97 = 3
97 – 91 = 6
91 – 73 = 18
73 – 63 = 10
63 – 52 = 11
52 – 47 = 5
47 – 36 = 11

Weight of Pass # 8 Split

| | | | |
|---|---|---|---|
| 5 | 3 | 3 | = p |

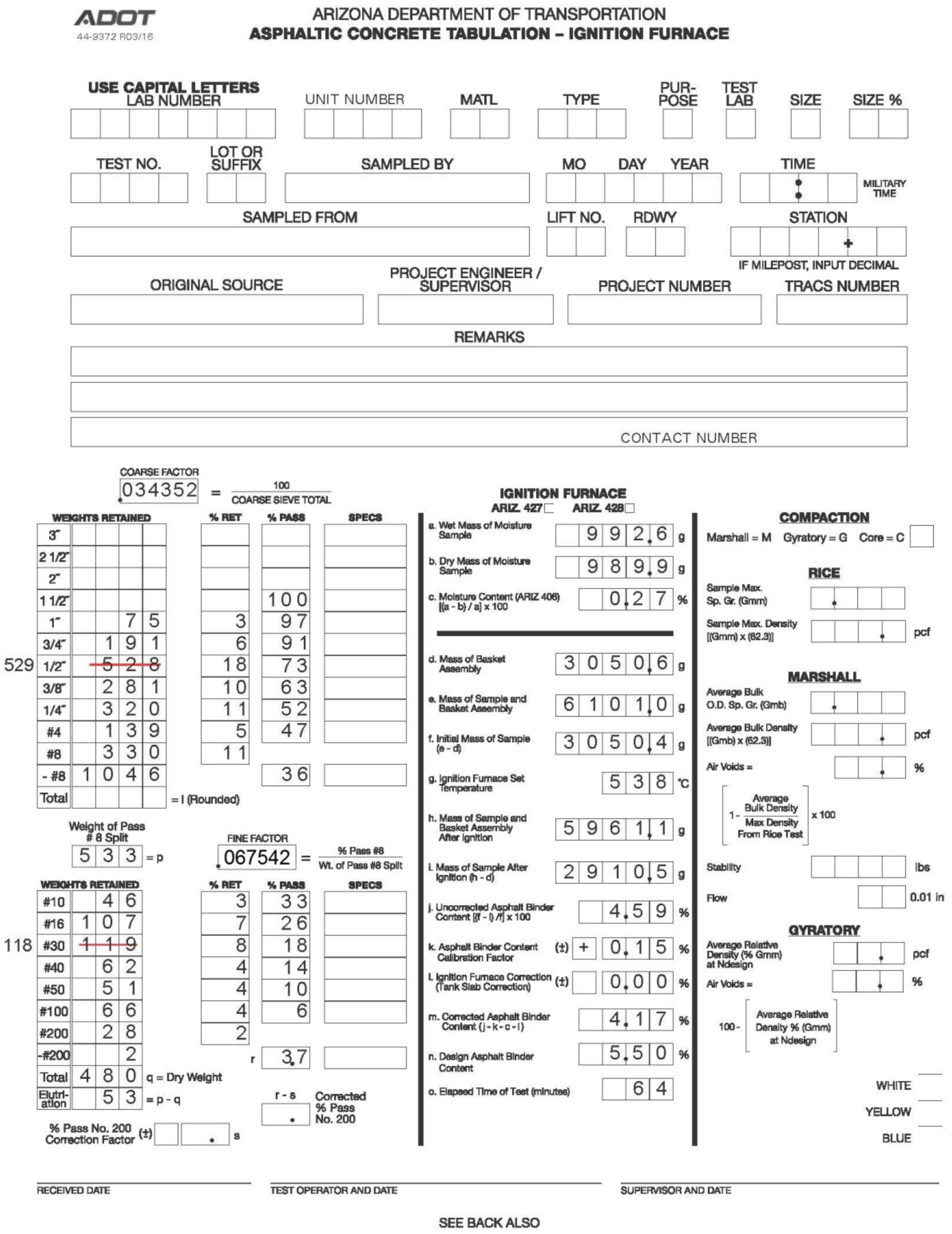
FINE FACTOR

.067542 = % Pass #8 / Wt. of Pass #8 Split

| | | WEIGHTS RETAINED | | | | % RET | % PASS |
|---|---|---|---|---|---|---|---|
| | #10 | | 4 | 6 | | 3 | 33 |
| | #16 | 1 | 0 | 7 | | 7 | 26 |
| 118 | #30 | ~~1~~ | ~~1~~ | ~~9~~ | | 8 | 18 |
| | #40 | | 6 | 2 | | 4 | 14 |
| | #50 | | 5 | 1 | | 4 | 10 |
| | #100 | | 6 | 6 | | 4 | 6 |
| | #200 | | 2 | 8 | | 2 | |
| | -#200 | | | 2 | | r | 3.7 |
| | Total | 4 | 8 | 0 | q = Dry Weight | | |
| | Elutriation | | 5 | 3 | = p - q | | |
| 481 | | | | | | | |

36 – 33 = 3
33 – 26 = 7
26 – 18 = 8
18 – 14 = 4
14 – 10 = 4
10 – 6 = 4
6 – 3.7 = 2

# Completed Calculations.



ADOT
44-9372 R03/16

ARIZONA DEPARTMENT OF TRANSPORTATION
**ASPHALTIC CONCRETE TABULATION – IGNITION FURNACE**

USE CAPITAL LETTERS
LAB NUMBER
UNIT NUMBER
MATL
TYPE
PURPOSE
TEST LAB
SIZE
SIZE %
TEST NO.
LOT OR SUFFIX
SAMPLED BY
MO DAY YEAR
TIME : MILITARY TIME
SAMPLED FROM
LIFT NO.
RDWY
STATION +
IF MILEPOST, INPUT DECIMAL
ORIGINAL SOURCE
PROJECT ENGINEER / SUPERVISOR
PROJECT NUMBER
TRACS NUMBER
REMARKS
CONTACT NUMBER

COARSE FACTOR .034352 = 100 / COARSE SIEVE TOTAL

| | WEIGHTS RETAINED | % RET | % PASS | SPECS |
|---|---|---|---|---|
| 3" | | | | |
| 2 1/2" | | | | |
| 2" | | | | |
| 1 1/2" | | | 100 | |
| 1" | 75 | 3 | 97 | |
| 3/4" | 191 | 6 | 91 | |
| 529 1/2" | ~~528~~ | 18 | 73 | |
| 3/8" | 281 | 10 | 63 | |
| 1/4" | 320 | 11 | 52 | |
| #4 | 139 | 5 | 47 | |
| #8 | 330 | 11 | | |
| - #8 | 1046 | | 36 | |
| Total | = I (Rounded) | | | |

Weight of Pass # 8 Split 533 = p

FINE FACTOR .067542 = % Pass #8 / Wt. of Pass #8 Split

| | WEIGHTS RETAINED | % RET | % PASS | SPECS |
|---|---|---|---|---|
| #10 | 46 | 3 | 33 | |
| #16 | 107 | 7 | 26 | |
| 118 #30 | ~~119~~ | 8 | 18 | |
| #40 | 62 | 4 | 14 | |
| #50 | 51 | 4 | 10 | |
| #100 | 66 | 4 | 6 | |
| #200 | 28 | 2 | | |
| -#200 | 2 | | r 3.7 | |
| Total | 480 q = Dry Weight | | | |
| Elutriation | 53 = p - q | | | |

% Pass No. 200 Correction Factor (±) . s

r - s . Corrected % Pass No. 200

**IGNITION FURNACE**
ARIZ. 427 ☐ ARIZ. 428 ☐

| | | | |
|---|---|---|---|
| a. Wet Mass of Moisture Sample | | 992.6 | g |
| b. Dry Mass of Moisture Sample | | 989.9 | g |
| c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 | | 0.27 | % |
| d. Mass of Basket Assembly | | 3050.6 | g |
| e. Mass of Sample and Basket Assembly | | 6101.0 | g |
| f. Initial Mass of Sample (e - d) | | 3050.4 | g |
| g. Ignition Furnace Set Temperature | | 538 | °C |
| h. Mass of Sample and Basket Assembly After Ignition | | 5961.1 | g |
| i. Mass of Sample After Ignition (h - d) | | 2910.5 | g |
| j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 | | 4.59 | % |
| k. Asphalt Binder Content Calibration Factor | (±) + | 0.15 | % |
| l. Ignition Furnace Correction (Tank Slab Correction) | (±) | 0.00 | % |
| m. Corrected Asphalt Binder Content (j - k - c - l) | | 4.17 | % |
| n. Design Asphalt Binder Content | | 5.50 | % |
| o. Elapsed Time of Test (minutes) | | 64 | |

**COMPACTION**
Marshall = M Gyratory = G Core = C

**RICE**
Sample Max. Sp. Gr. (Gmm) .
Sample Max. Density [(Gmm) x (62.3)] . pcf

**MARSHALL**
Average Bulk O.D. Sp. Gr. (Gmb) .
Average Bulk Density [(Gmb) x (62.3)] . pcf
Air Voids = . %

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max Density From Rice Test}}\right] \times 100$$

Stability lbs
Flow 0.01 in

**GYRATORY**
Average Relative Density (% Gmm) at Ndesign . pcf
Air Voids = . %

$$100 - \left[\text{Average Relative Density \% (Gmm) at Ndesign}\right]$$

WHITE
YELLOW
BLUE

RECEIVED DATE
TEST OPERATOR AND DATE
SUPERVISOR AND DATE

SEE BACK ALSO

# *AZ 417*
# *Rice Calculations*

Arizona Department of Transportation
**ARIZONA TEST METHOD 417**

44-3941 R12/15

Lab#: ____________ Date: ____________ Project #: ____________ TRACS#: ____________

Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ____________

Lot#: ____________ Sample #: ____________ Maximum Specific Gravity Range: ____________

Tested By: ____________ Checked By: ____________

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

| Flask Number or I. D. | "Wf" Wt. of Flask | "Wmm" Wt. of Sample in Air Wfs - Wf | "B" Wt. of Flask + Water | "C" Wt. of Flask + Sample + Water Wa - Wp | "Vvm" Volume of Voidless Mix Wmm + B - C | "Gmm" Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 | "Wsd" Surface Dry Weight (See Below) | "Vvm" Volume of Voidless Mix Wsd + B - C | "Gmm" Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **998.7** | | **3215.7** | | | | | | | | |
| **2** | **977.6** | | **3178.7** | | | | | | | | |
| **3** | **994.3** | | **3194.1** | | | | | | | | |
| | | | | | | | | | | | |

Remarks:

| Flask Number or I. D. | 1 | 2 | 3 |
|---|---|---|---|
| Wt. of Flask + Sample, **"Wfs"** | **2063.6** | **2054.1** | **2061.7** |
| Wt. of Flask + Sample Water + Glass Plate, **"Wa"** | **3931.1** | **3901.6** | **3907.5** |
| Wt. of Glass Plate, **"Wp"** | **82.4** | **82.4** | **82.4** |

| **Max. Specific Gravity Range:** | **Range of 3:** | **Range of 2 If needed:** |
|---|---|---|
| Non Fan Dried: | | |
| Fan Dried: | | |

***Maximum Specific Gravity (Rice) Fan Dry Weigh backs "Wsd"***

| **Flask Numer or I.D.** | **1** | **2** | **3** |
|---|---|---|---|
| **Tare weight of Pan** | 453.7 | 502.4 | 499.6 |
| **Weight of Pan and Sample** | **1523.2** | **1584.7** | **1572.6** |
| **Weight of Pan and Sample** | **1522.5** | **1584.0** | **1571.9** |
| **Weight of Pan and Sample** | **1521.9** | **1583.4** | **1571.2** |
| **Weight of Pan and Sample** | **1521.4** | **1582.9** | **1570.8** |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Surface Dry Weight (Wsd)** | | | |

**Air Voids Calculations**

$$\left[1-\frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \times 100 =$$

$$\left[1-\frac{\qquad}{\qquad}\right] \times 100 = \underline{\qquad}$$ Non Fan Dried

$$\left[1-\frac{\qquad}{\qquad}\right] \times 100 = \underline{\qquad}$$ Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) ______ %

44-9372 R03/16 (BACK)

## Rice Test (ARIZ 417)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | | 3215.7 | | | | | | | | |
| 2 | 977.6 | | 3178.7 | | | | | | | | |
| 3 | 994.3 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

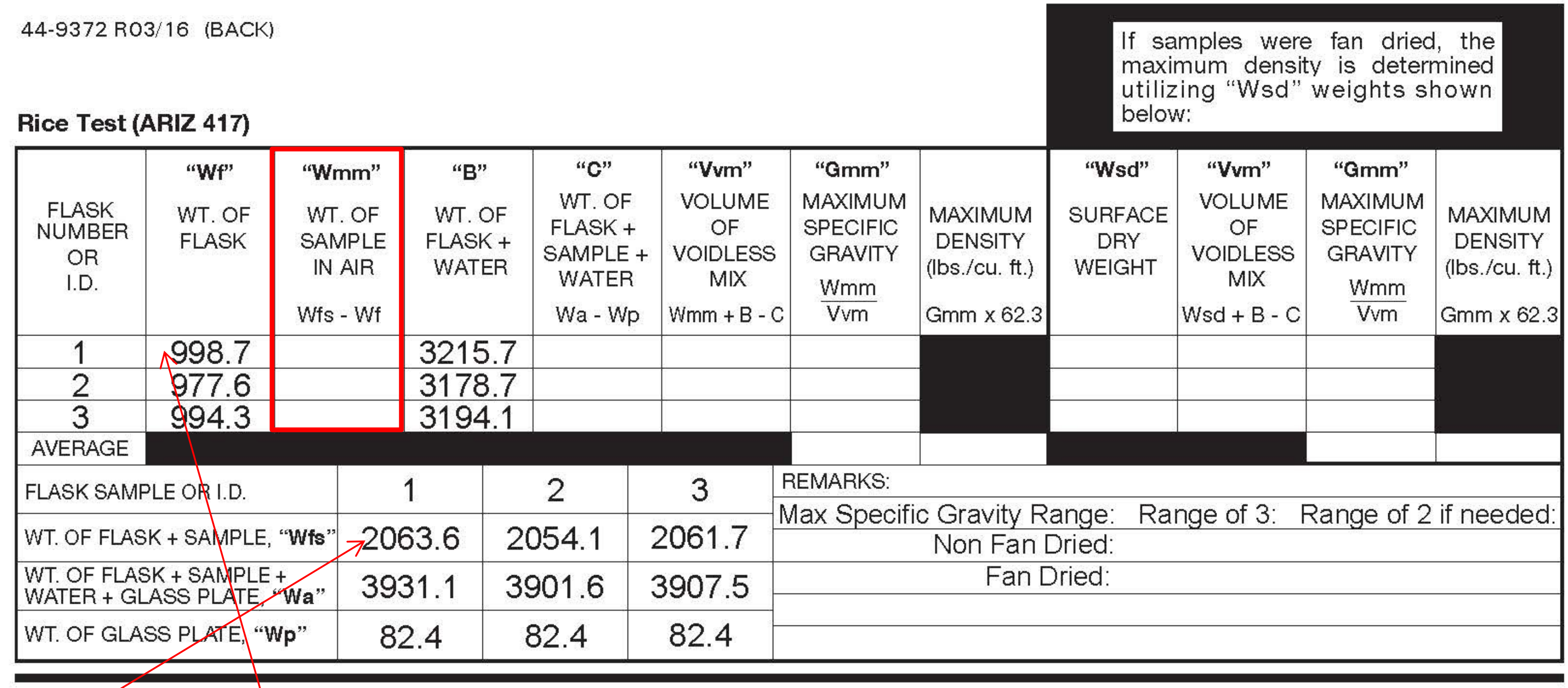
| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | | 3215.7 | | | | | | | | |
| 2 | 977.6 | | 3178.7 | | | | | | | | |
| 3 | 994.3 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

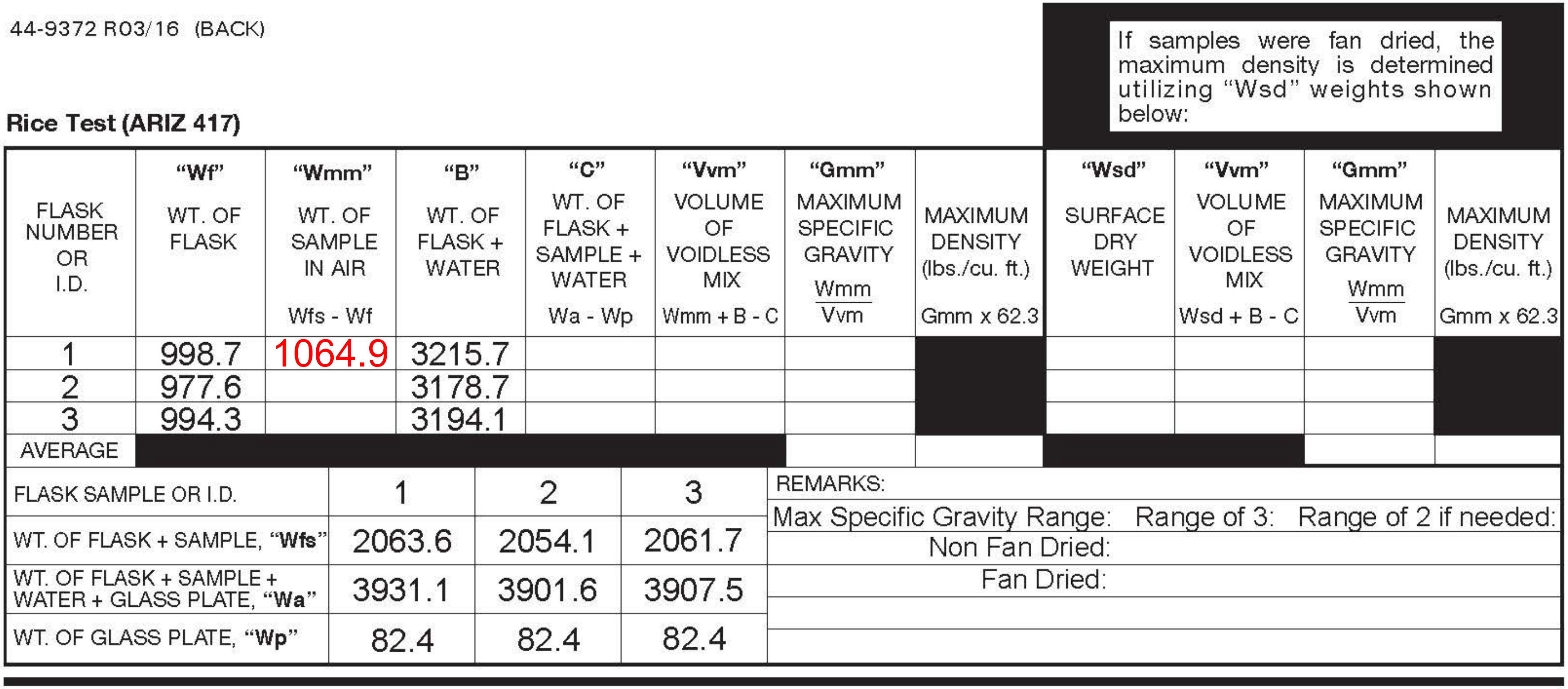
Non Fan Dried:

Fan Dried:

2063.6 – 998.7 = 1064.9

Formula: Wfs-Wf

Complete Calculations for remaining Column Wmm. This is weight of sample in air for each flask.



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | **"Wf"** WT. OF FLASK | **"Wmm"** WT. OF SAMPLE IN AIR Wfs - Wf | **"B"** WT. OF FLASK + WATER | **"C"** WT. OF FLASK + SAMPLE + WATER Wa - Wp | **"Vvm"** VOLUME OF VOIDLESS MIX Wmm + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | **"Wsd"** SURFACE DRY WEIGHT | **"Vvm"** VOLUME OF VOIDLESS MIX Wsd + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | | | | | | | | |
| 2 | 977.6 | | 3178.7 | | | | | | | | |
| 3 | 994.3 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

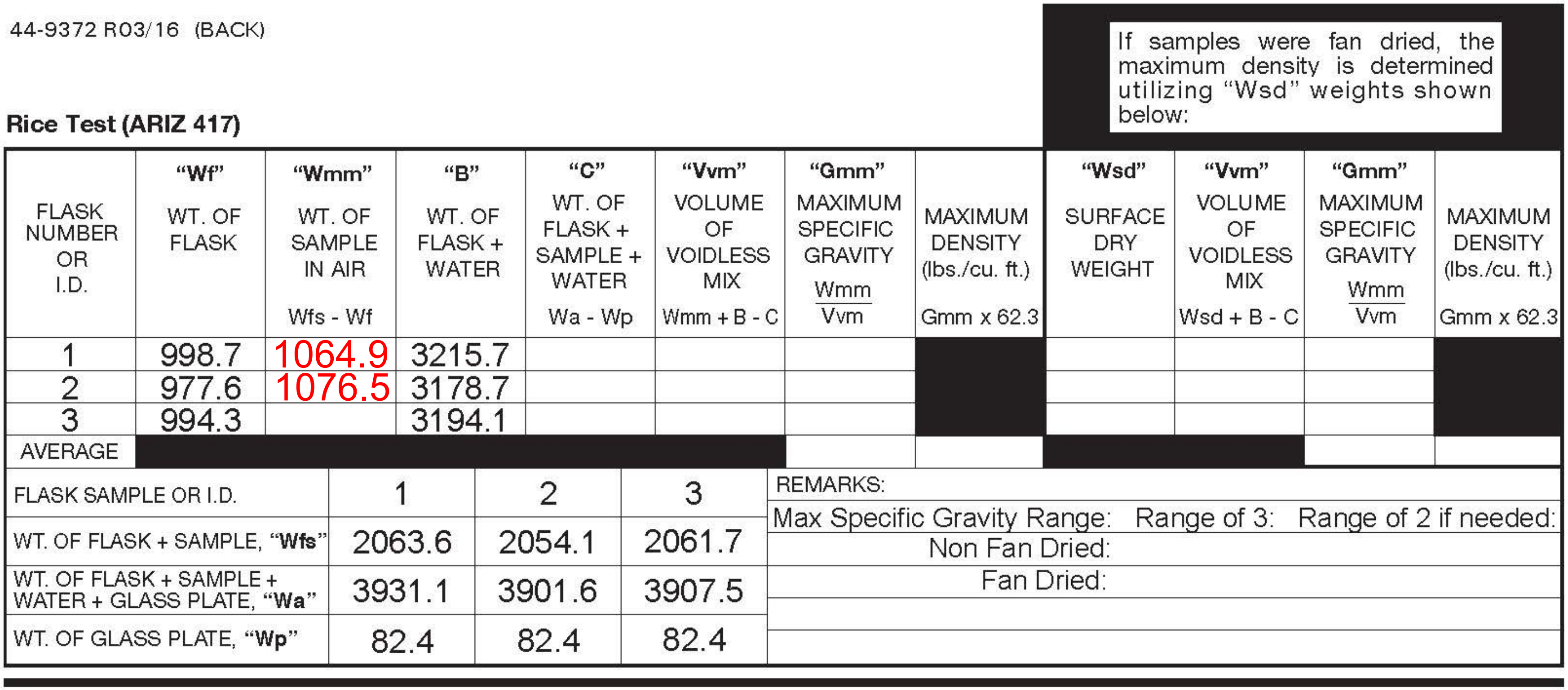
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

2063.6 – 998.7 = 1064.9



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | | | | | | | | |
| 3 | 994.3 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "**Wp**" | 82.4 | 82.4 | 82.4 |

REMARKS:

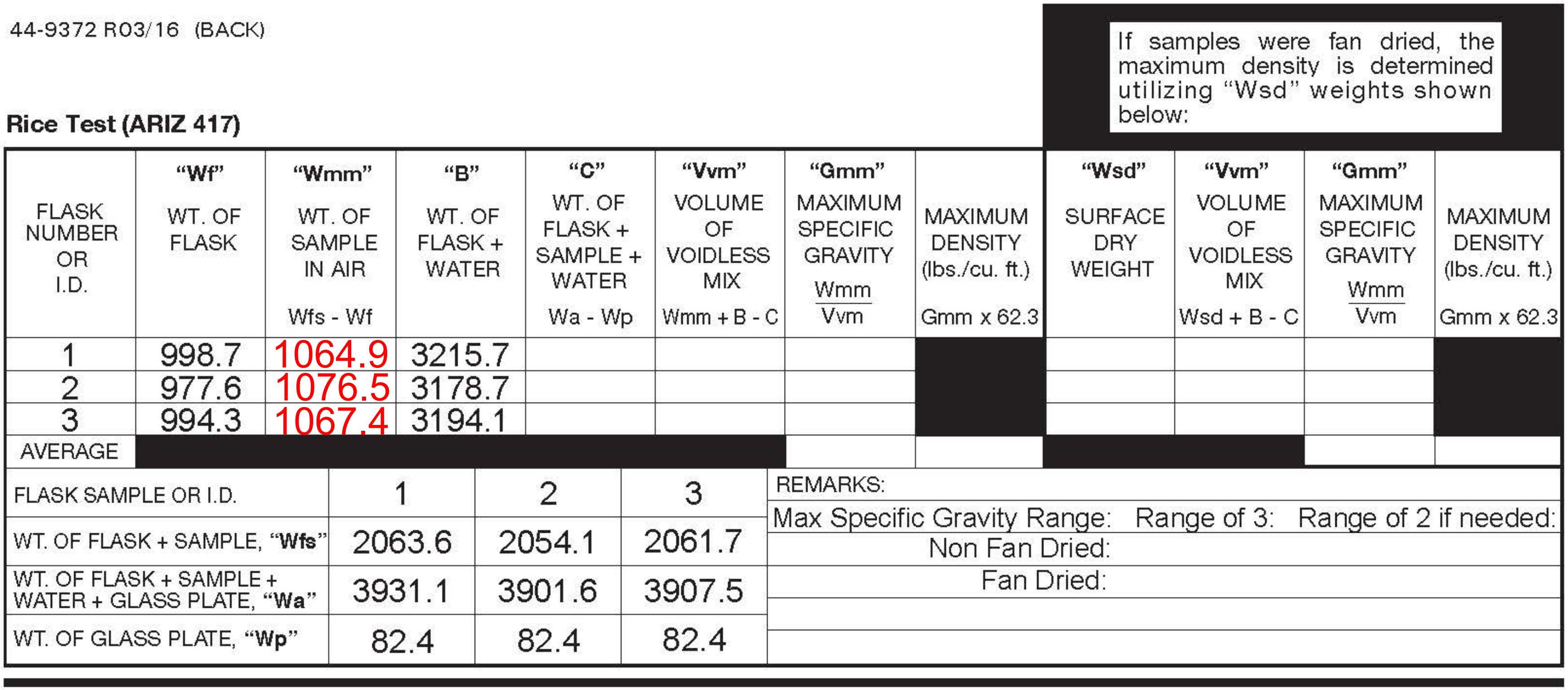
Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

2063.6 – 998.7 = 1064.9

2054.1 – 977.6 = 1076.5



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

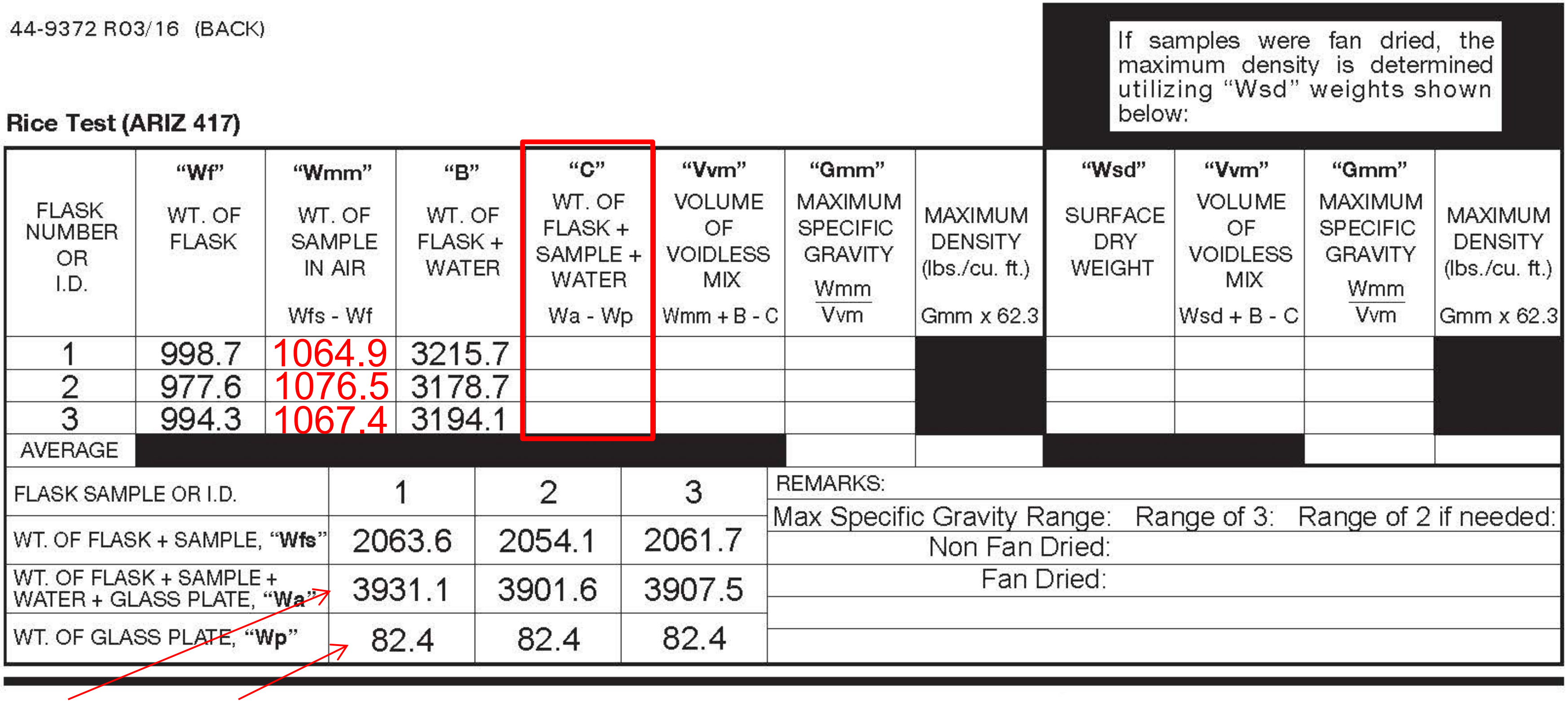
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

2063.6 – 998.7 = 1064.9
2054.1 – 977.6 = 1076.5
2061.7 – 994.3 = 1067.4



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

3931.1 – 82.4 = 3848.7

Formula is Wa – Wp. Weight of Flask + Sample + Water. Complete for column " C ".

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

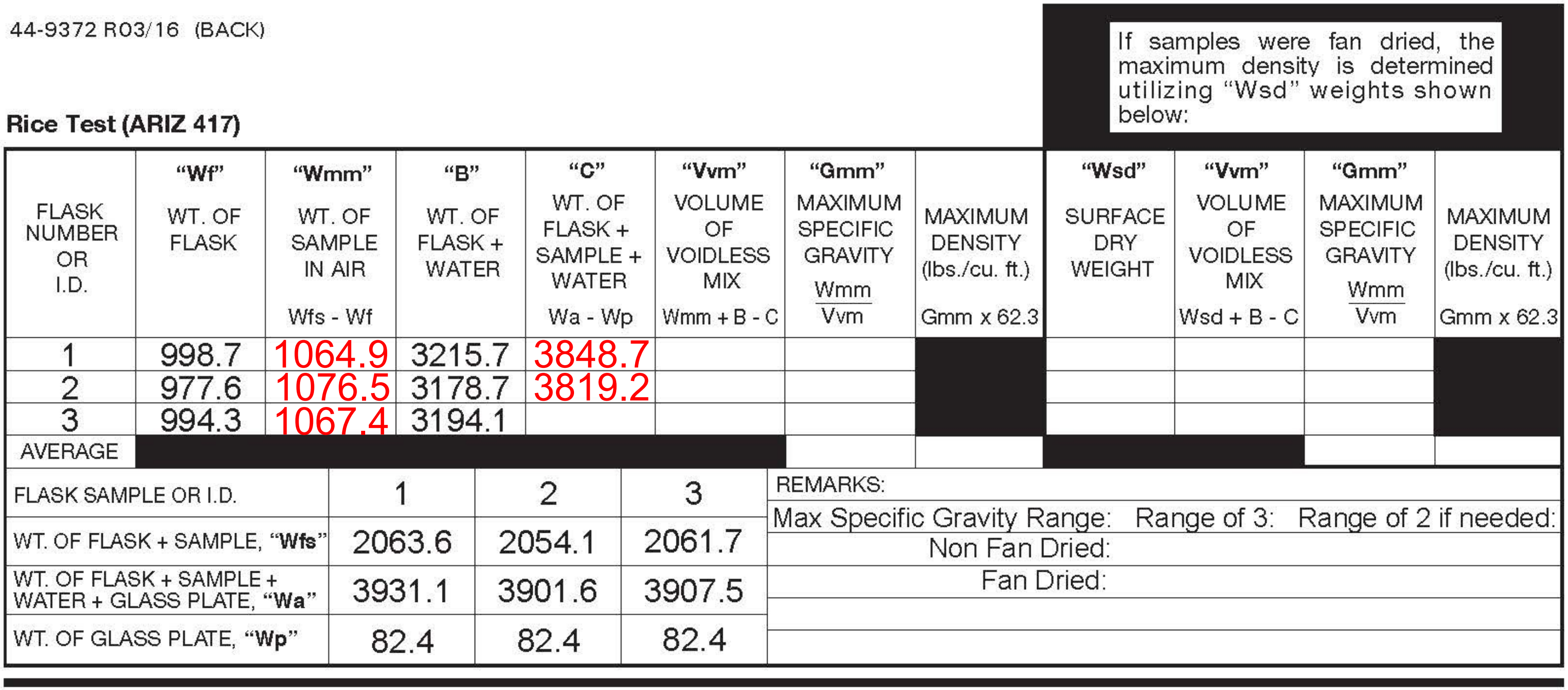
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

3931.1 – 82.4 = 3848.7



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

3931.1 – 82.4 = 3848.7

3901.6 – 82.4 = 3819.2

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

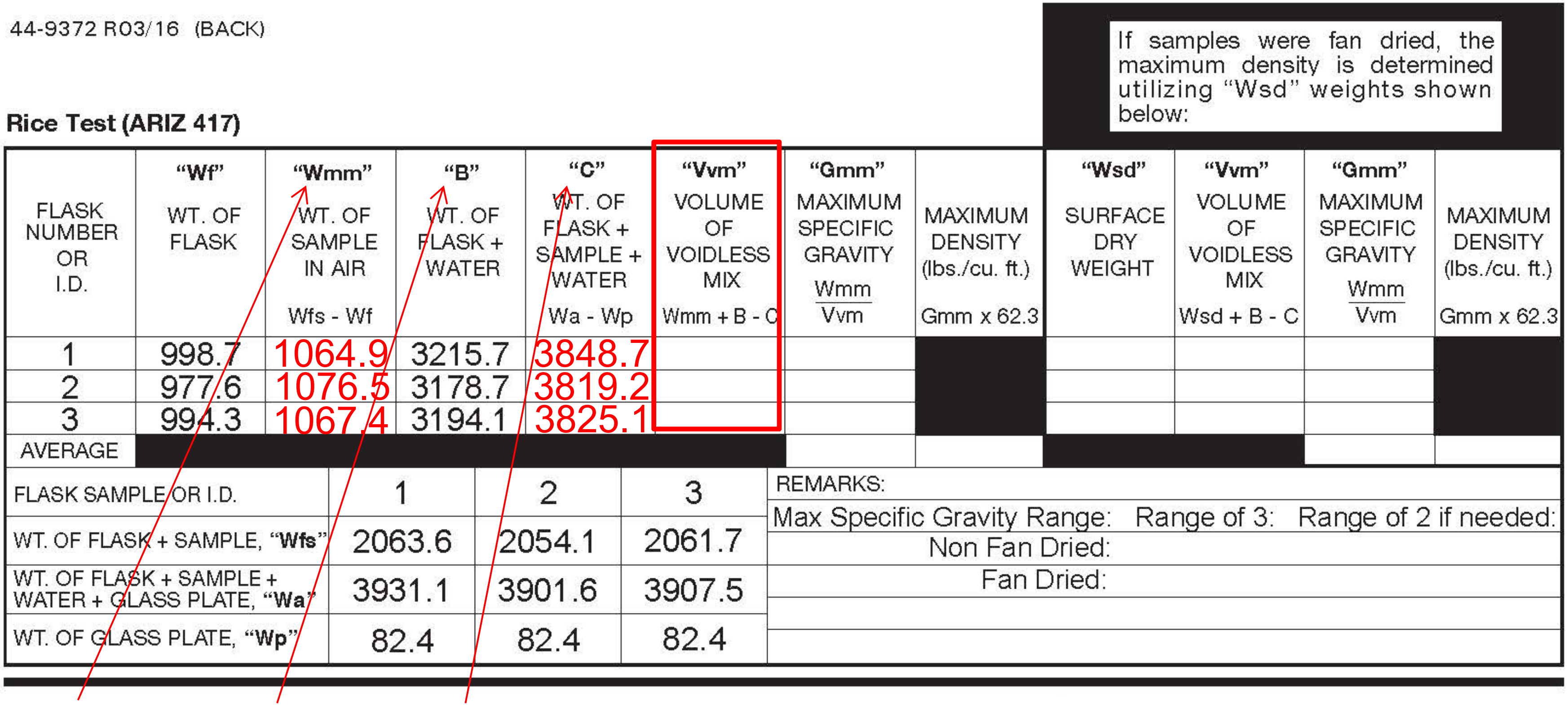
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

3931.1 – 82.4 = 3848.7
3901.6 – 82.4 = 3819.2
3907.5 – 82.4 = 3825.1



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

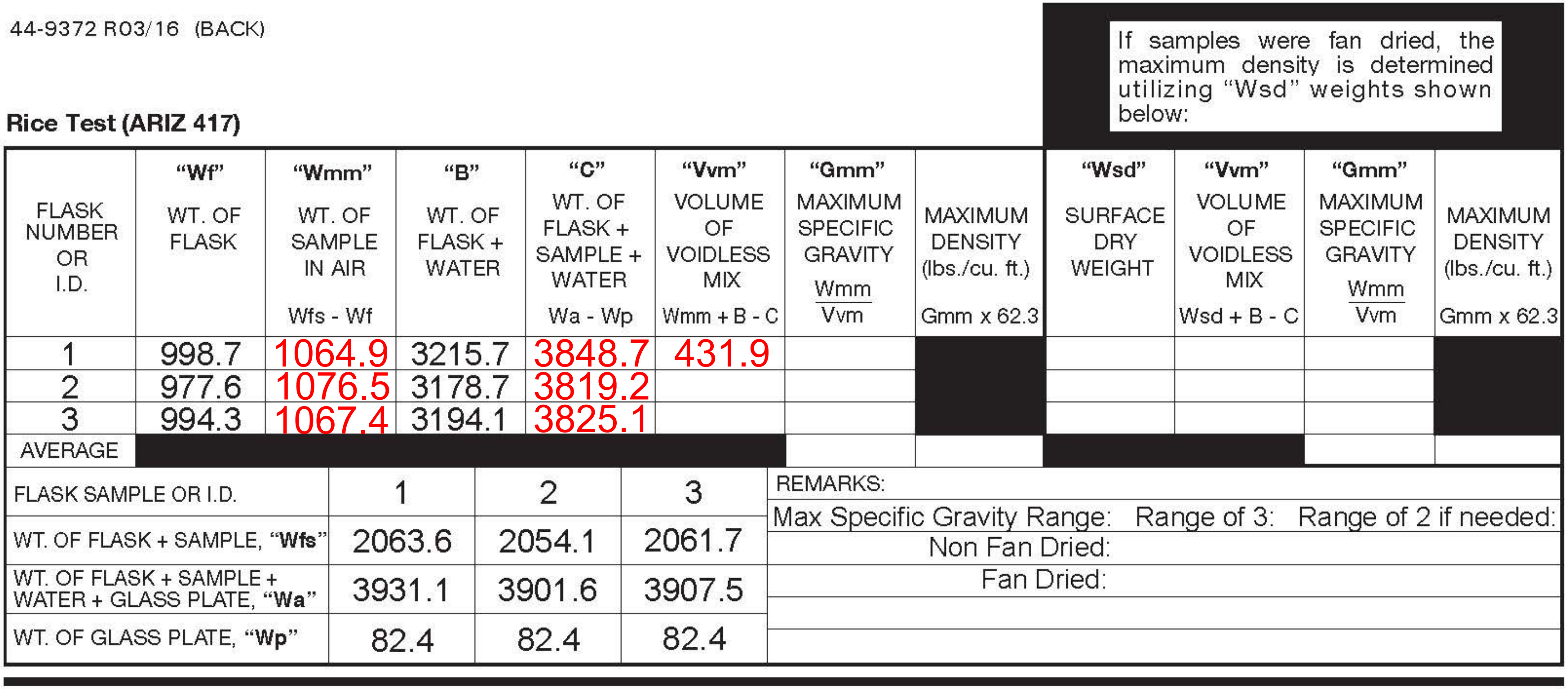
Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 + 3215.7 – 3848.7 = 431.9

Formula is Wmm + B – C. This is Volume of Voidless Mix. Complete for Column "Vvm"



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 + 3215.7 – 3848.7 = 431.9

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing “Wsd” weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | “Wf” WT. OF FLASK | “Wmm” WT. OF SAMPLE IN AIR Wfs - Wf | “B” WT. OF FLASK + WATER | “C” WT. OF FLASK + SAMPLE + WATER Wa - Wp | “Vvm” VOLUME OF VOIDLESS MIX Wmm + B - C | “Gmm” MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | “Wsd” SURFACE DRY WEIGHT | “Vvm” VOLUME OF VOIDLESS MIX Wsd + B - C | “Gmm” MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, “Wfs” | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, “Wa” | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, “Wp” | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 + 3215.7 – 3848.7 = 431.9

1076.5 + 3178.7 – 3819.2 = 436.0

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

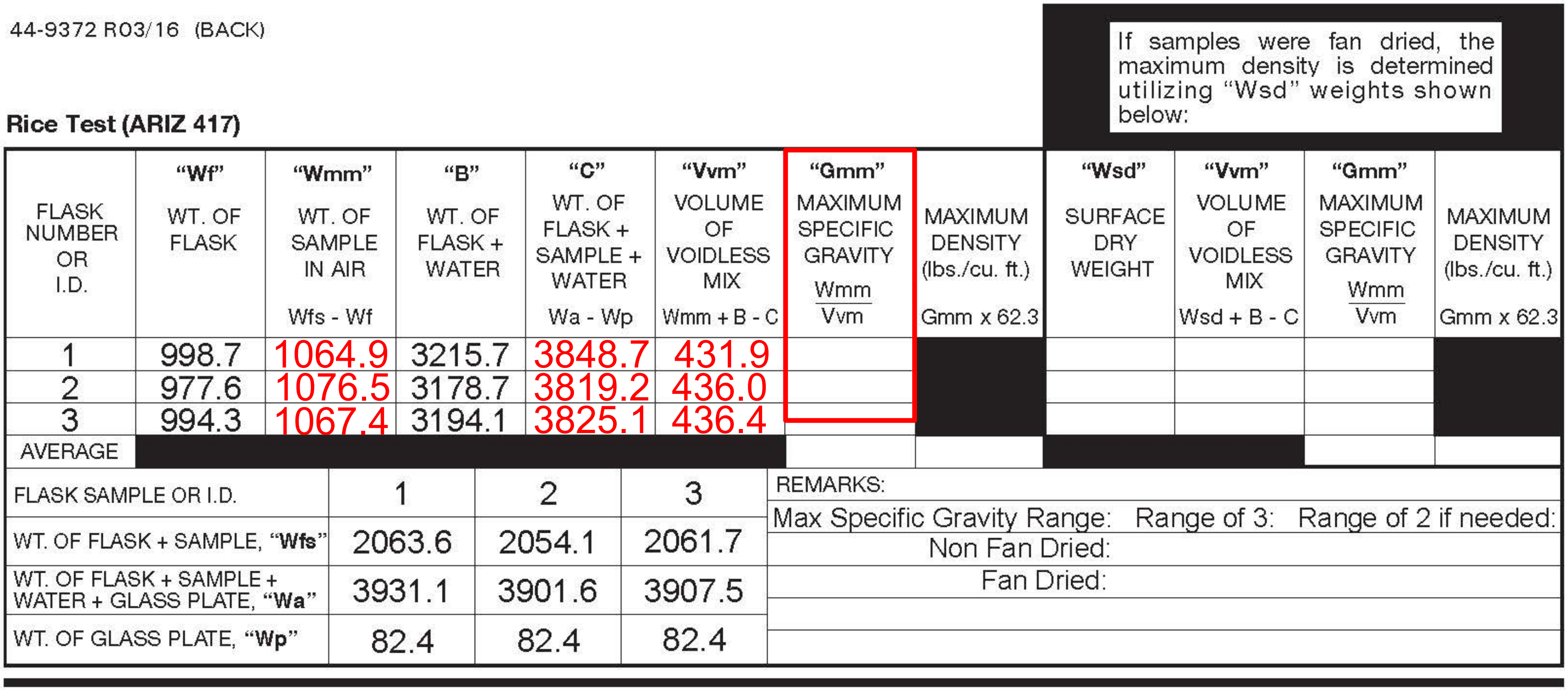
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 + 3215.7 – 3848.7 = 431.9
1076.5 + 3178.7 – 3819.2 = 436.0
1067.4 + 3194.1 – 3825.1 = 436.4



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 431.9 = 2.465617041

Formula is Wmm / Vvm. This is the Maximum Specific Gravity for Non Fan Dried Sample. Complete for Column "Gmm" Report this to 3 (0.000) decimal places, rounded. If the number to the right is 5 or greater round up.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "**Wp**" | 82.4 | 82.4 | 82.4 |

REMARKS:

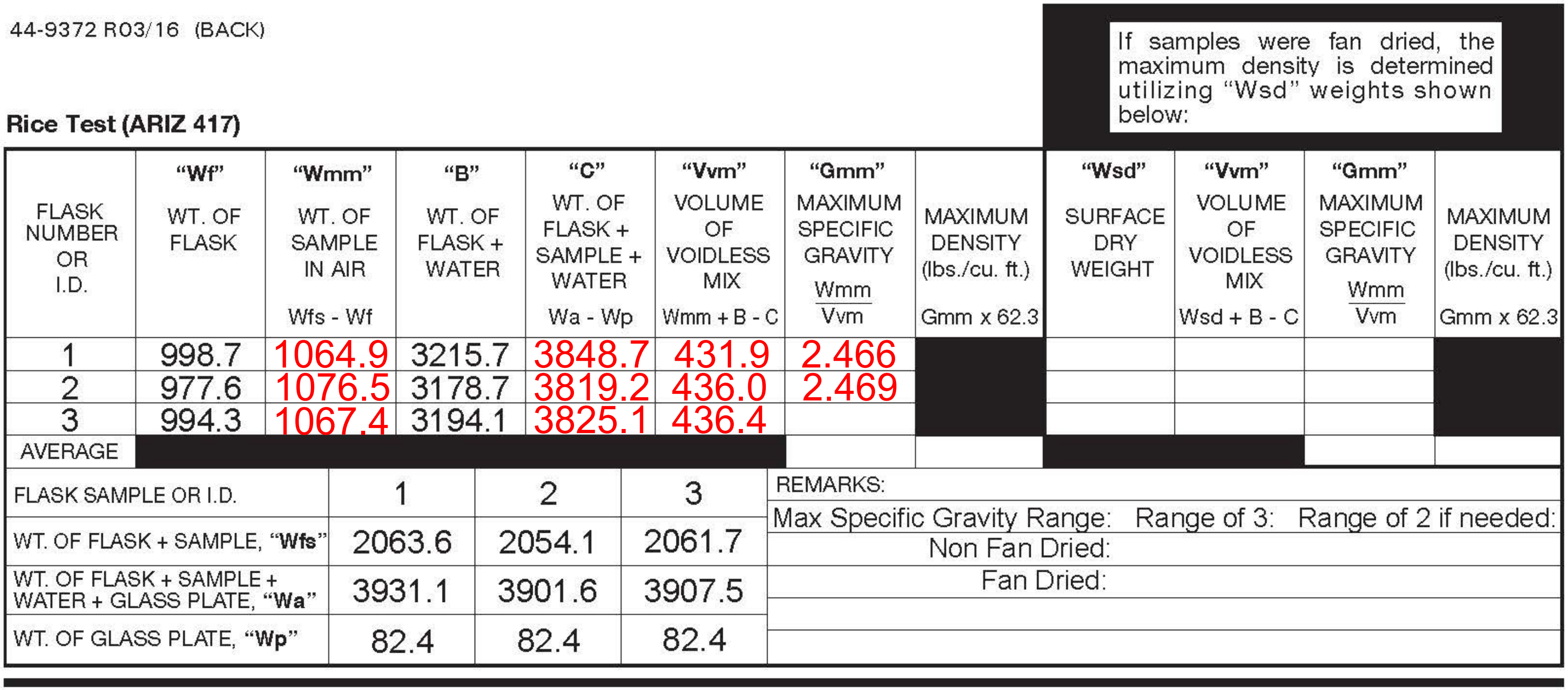
Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 431.9 = 2.465617041

44-9372 R03/16 (BACK)



If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

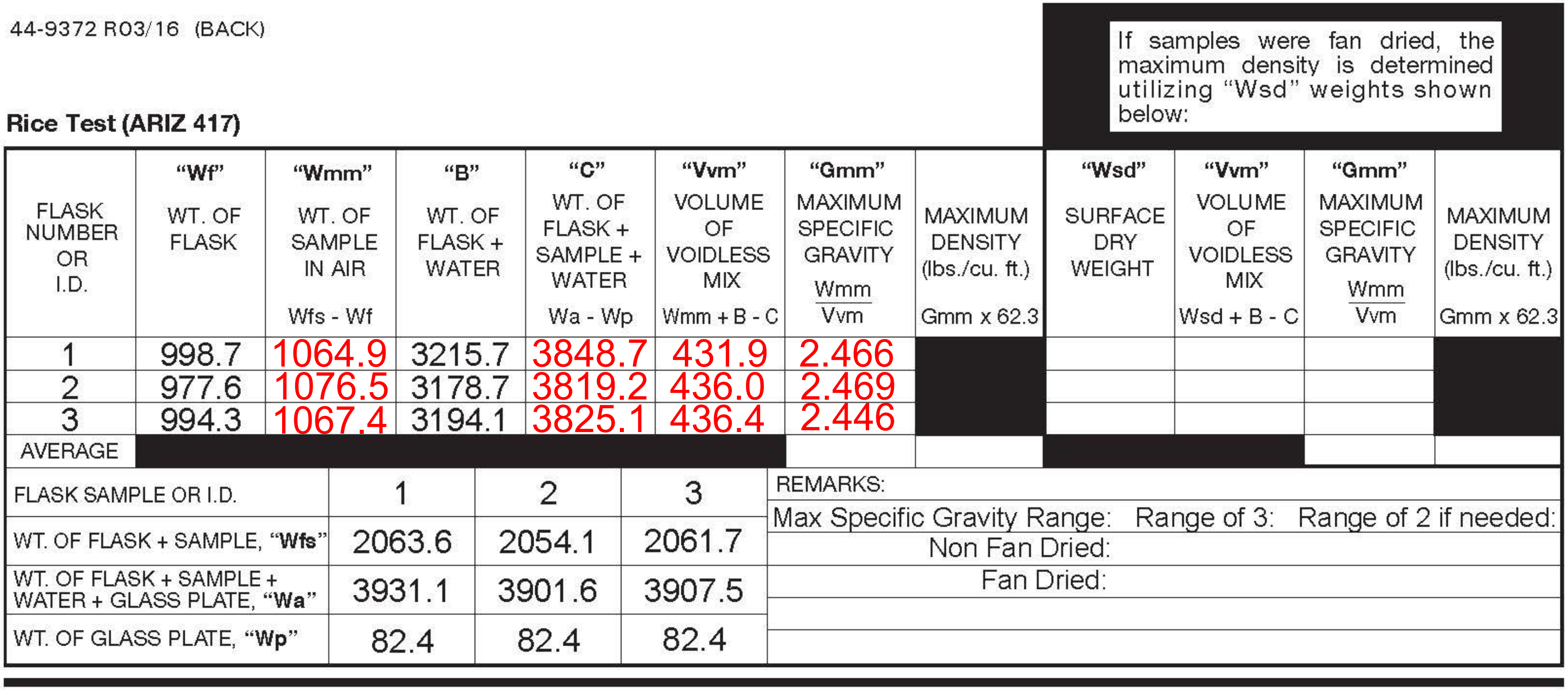
Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 431.9 = 2.465617041

1076.5 / 436.0 = $2.46\underline{9}036697$



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | **"Wf"** WT. OF FLASK | **"Wmm"** WT. OF SAMPLE IN AIR Wfs - Wf | **"B"** WT. OF FLASK + WATER | **"C"** WT. OF FLASK + SAMPLE + WATER Wa - Wp | **"Vvm"** VOLUME OF VOIDLESS MIX Wmm + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | **"Wsd"** SURFACE DRY WEIGHT | **"Vvm"** VOLUME OF VOIDLESS MIX Wsd + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

Two methods are provided for determining the maximum specific gravity. This is without fan drying. The next slides will show the calculations described in Section 7 of AZ 417, when fan drying is used.

Arizona Department of Transportation
**ARIZONA TEST METHOD 417**

44-3941 R12/15

Lab#: ______ Date: ______ Project #: ______ TRACS#: ______
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ______
Lot#: ______ Sample #: ______ Maximum Specific Gravity Range: ______
Tested By: ______ Checked By: ______

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

To determine the Maximum Density Fan Dry Method. Continue fan drying until the weight of the pan and material do not change by 0.5 grams at 15 minute intervals. If the "Wsd" weight for any of the three samples is less than "Wmm", discard all samples. Three new samples shall be tested.

| Maximum Density (lbs./cu. ft.)<br>Gmm X 62.3 | **"Wsd"** Surface Dry Weight<br>(See Below) | **"Vvm"** Volume of Voidless Mix<br>Wsd + B - C | **"Gmm"** Maximum Specific Gravity<br>$\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.)<br>Gmm X 62.3 |
|---|---|---|---|---|
| ▨ | | | | ▨ |
| ▨ | | | | ▨ |
| ▨ | | | | ▨ |
| | ▨ | ▨ | | |

Remarks:

| Max. Specific Gravity Range: | Range of 3: | Range of 2 If needed: |
|---|---|---|
| Non Fan Dried: | | |
| Fan Dried: | | |

| | | | |
|---|---|---|---|
| Wt. of Flask + Sample Water + Glass Plate, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| Wt. of Glass Plate, **"Wp"** | 82.4 | 82.4 | 82.4 |

***Maximum Specific Gravity (Rice) Fan Dry Weigh backs "Wsd"***

| **Flask Numer or I.D.** | **1** | **2** | **3** |
|---|---|---|---|
| **Tare weight of Pan** | 453.7 | 502.4 | 499.6 |
| **Weight of Pan and Sample** | 1523.2 | 1584.7 | 1572.6 |
| | 1522.5 | 1584.0 | 1571.9 |
| | 1521.9 | 1583.4 | 1571.2 |
| | 1521.4 | 1582.9 | 1570.8 |
| | | | |
| | | | |
| | | | |
| | | | |
| **Surface Dry Weight (Wsd)** | | | |

Final weight – Tare weight of pan = Wsd

**Air Voids Calculations**

$$\left[1-\frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \times 100 =$$

$$\left[1-\frac{\qquad}{\qquad}\right] \times 100 = \_\_\_\_\_\_$$ Non Fan Dried

$$\left[1-\frac{\qquad}{\qquad}\right] \times 100 = \_\_\_\_\_\_$$ Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) ______ %

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

## Fan Dry Weights

| | 1 | 2 | 3 |
|---|---|---|---|
| Weight of Pan | 453.7 | 502.4 | 499.6 |
| Pan and Sample | 1523.2 | 1584.7 | 1572.6 |
| Pan and Sample | 1522.5 | 1584.0 | 1571.9 |
| Pan and Sample | 1521.9 | 1583.4 | 1571.2 |
| Pan and Sample | 1521.4 | 1582.9 | 1570.8 |
| Surface Dry Weight (WSD) | 1067.7 | | |

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

## Fan Dry Weights

| | 1 | 2 | 3 |
|---|---|---|---|
| Weight of Pan | 453.7 | 502.4 | 499.6 |
| Pan and Sample | 1523.2 | 1584.7 | 1572.6 |
| Pan and Sample | 1522.5 | 1584.0 | 1571.9 |
| Pan and Sample | 1521.9 | 1583.4 | 1571.2 |
| Pan and Sample | 1521.4 | 1582.9 | 1570.8 |
| Surface Dry Weight (WSD) | 1067.7 | | |

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "**Wp**" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

## Fan Dry Weights

| | 1 | 2 | 3 |
|---|---|---|---|
| Weight of Pan | 453.7 | 502.4 | 499.6 |
| Pan and Sample | 1523.2 | 1584.7 | 1572.6 |
| Pan and Sample | 1522.5 | 1584.0 | 1571.9 |
| Pan and Sample | 1521.9 | 1583.4 | 1571.2 |
| Pan and Sample | 1521.4 | 1582.9 | 1570.8 |
| Surface Dry Weight (WSD) | 1067.7 | 1080.5 | 1071.2 |

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

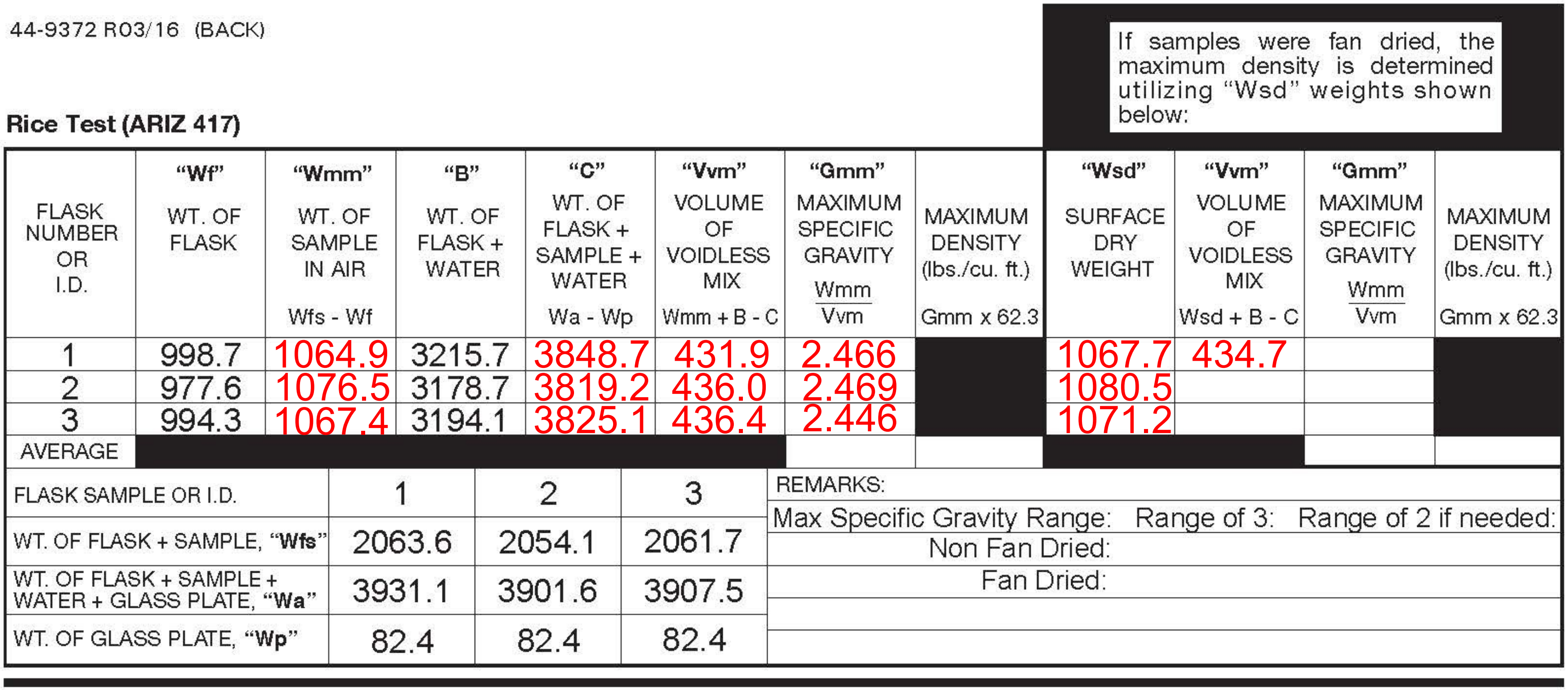
Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1067.7 + 3215.7 – 3848.7 = 434.7

Formula Wsd + B – C. Volume of Voidless Mix Fan Dried. Complete for Column Vvm.



44-9372 R03/16 (BACK)

**Rice Test (ARIZ 417)**

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1067.7 + 3215.7 – 3848.7 = 434.7

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1067.7 + 3215.7 – 3848.7 = 434.7

1080.5 + 3178.7 – 3819.2 = 440.0

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

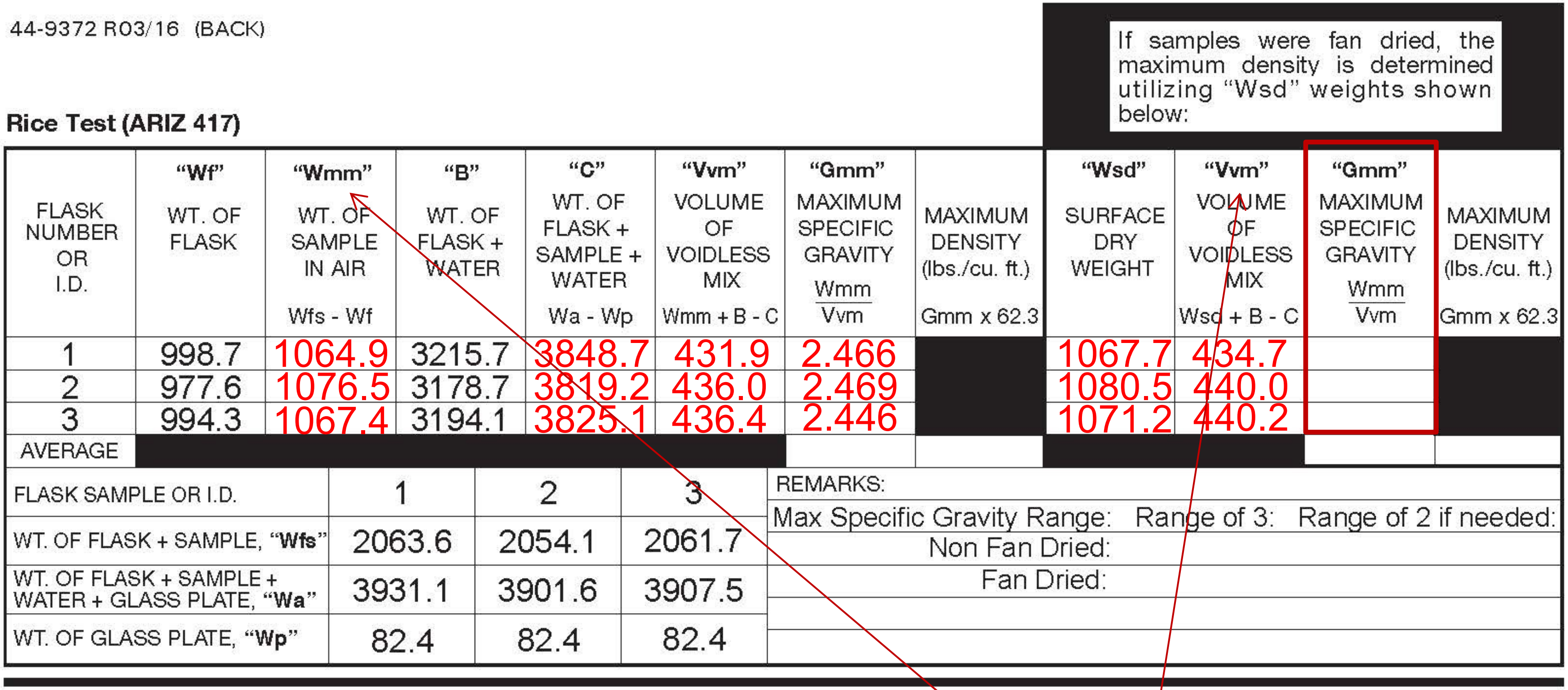
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1067.7 + 3215.7 – 3848.7 = 434.7
1080.5 + 3178.7 – 3819.2 = 440.0
1071.2 + 3194.1 – 3825.1 = 440.2



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "**Wp**" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

$1064.9 / 434.7 = 2.44\underline{9}73545$

Formula Wmm / Vvm. This is Gmm, Maximum Specific Gravity Fan Dried. Reported to 3 (0.000) decimal places, rounded. If the number to the right is greater than 5, round to the next higher number.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "**Wp**" | 82.4 | 82.4 | 82.4 |

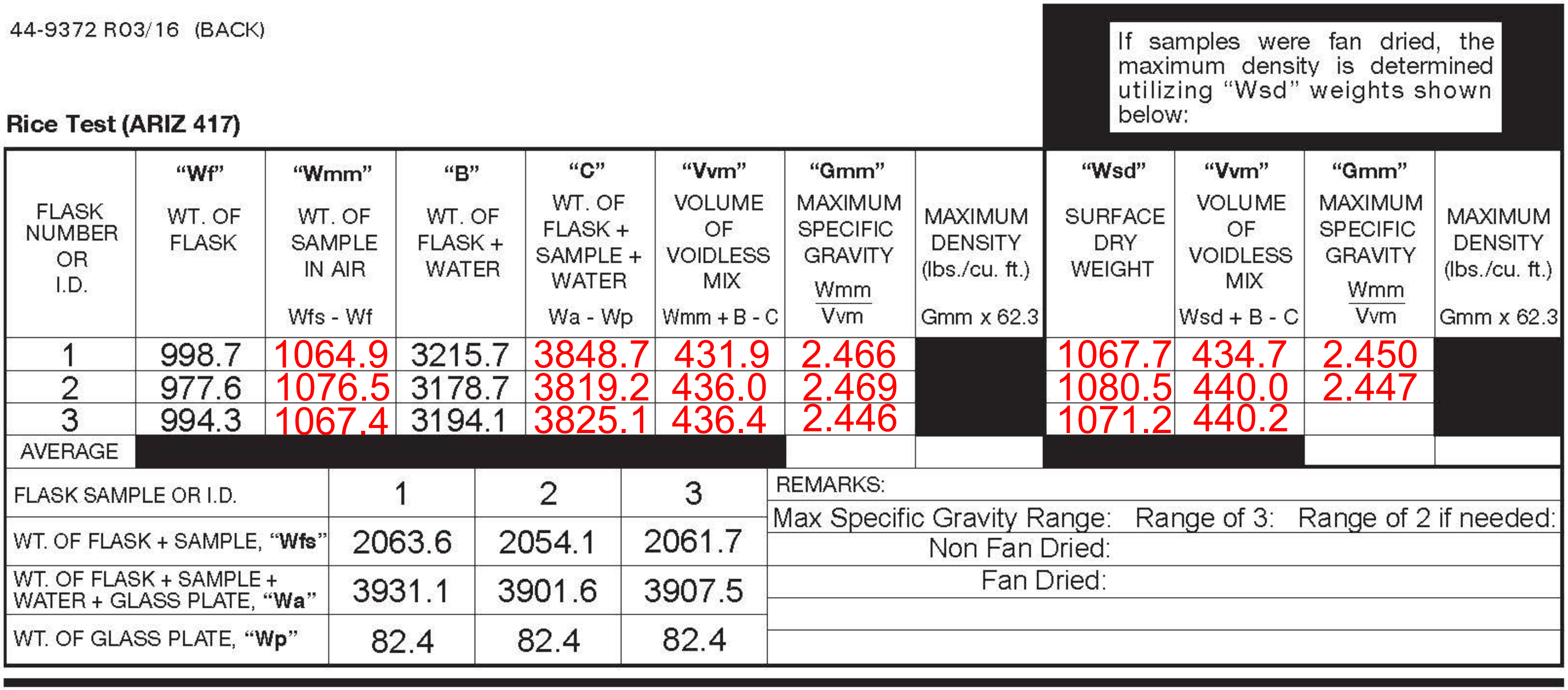
REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 434.7 = 2.44973545



44-9372 R03/16 (BACK)

**Rice Test (ARIZ 417)**

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 434.7 = 2.44973545

1076.5 / 440.0 = 2.446590909

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

1064.9 / 434.7 = 2.44973545

1076.5 / 440.0 = 2.446590909

1067.4 / 440.2 = 2.434806906

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing “Wsd” weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | “Wf”<br>WT. OF FLASK | “Wmm”<br>WT. OF SAMPLE IN AIR<br>Wfs - Wf | “B”<br>WT. OF FLASK + WATER | “C”<br>WT. OF FLASK + SAMPLE + WATER<br>Wa - Wp | “Vvm”<br>VOLUME OF VOIDLESS MIX<br>Wmm + B - C | “Gmm”<br>MAXIMUM SPECIFIC GRAVITY<br>$\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.)<br>Gmm x 62.3 | “Wsd”<br>SURFACE DRY WEIGHT | “Vvm”<br>VOLUME OF VOIDLESS MIX<br>Wsd + B - C | “Gmm”<br>MAXIMUM SPECIFIC GRAVITY<br>$\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.)<br>Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **“Wfs”** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **“Wa”** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **“Wp”** | 82.4 | 82.4 | 82.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

2.469 – 2.446 = 0.023

High – Low = Range

We have to determine the “Gmm” Maximum Specific Gravity Range for the Non Fan Dried and the Fan Dried, AZ 417 Section 6.2. Find the “Gmm” high and low, then compute the difference.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

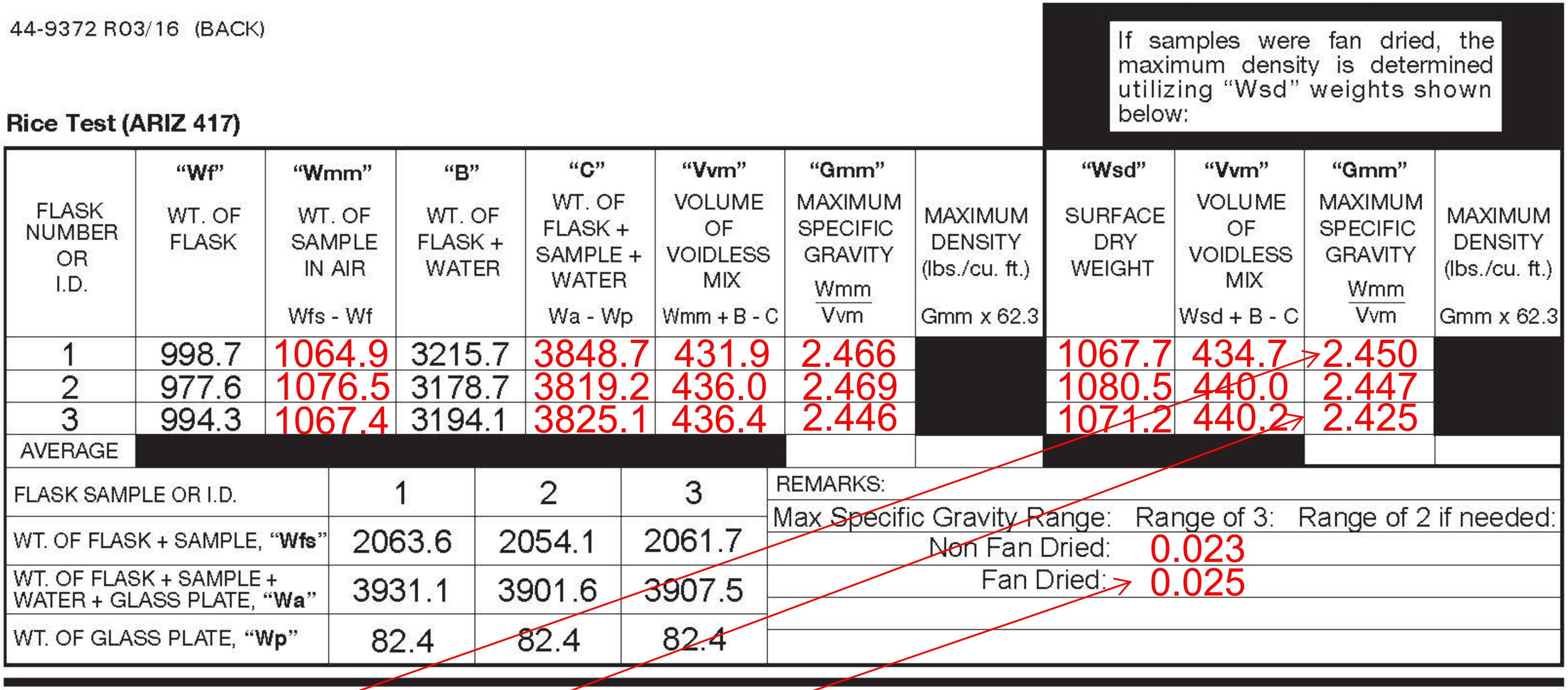
| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | |
| Fan Dried: | | |

2.469 – 2.446 = 0.023



44-9372 R03/16 (BACK)

**Rice Test (ARIZ 417)**

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | 994.3 | 1067.4 | 3194.1 | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | |
| Fan Dried: | 0.025 | |

2.469 – 2.446 = 0.023

2.450 – 2.425 = 0.025

High – Low = Range

If the range of three is within 0.024, all are used to determine the "Gmm" Maximum Specific Gravity. If the range is greater than 0.024, then the average of two may be used if within 0.012.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

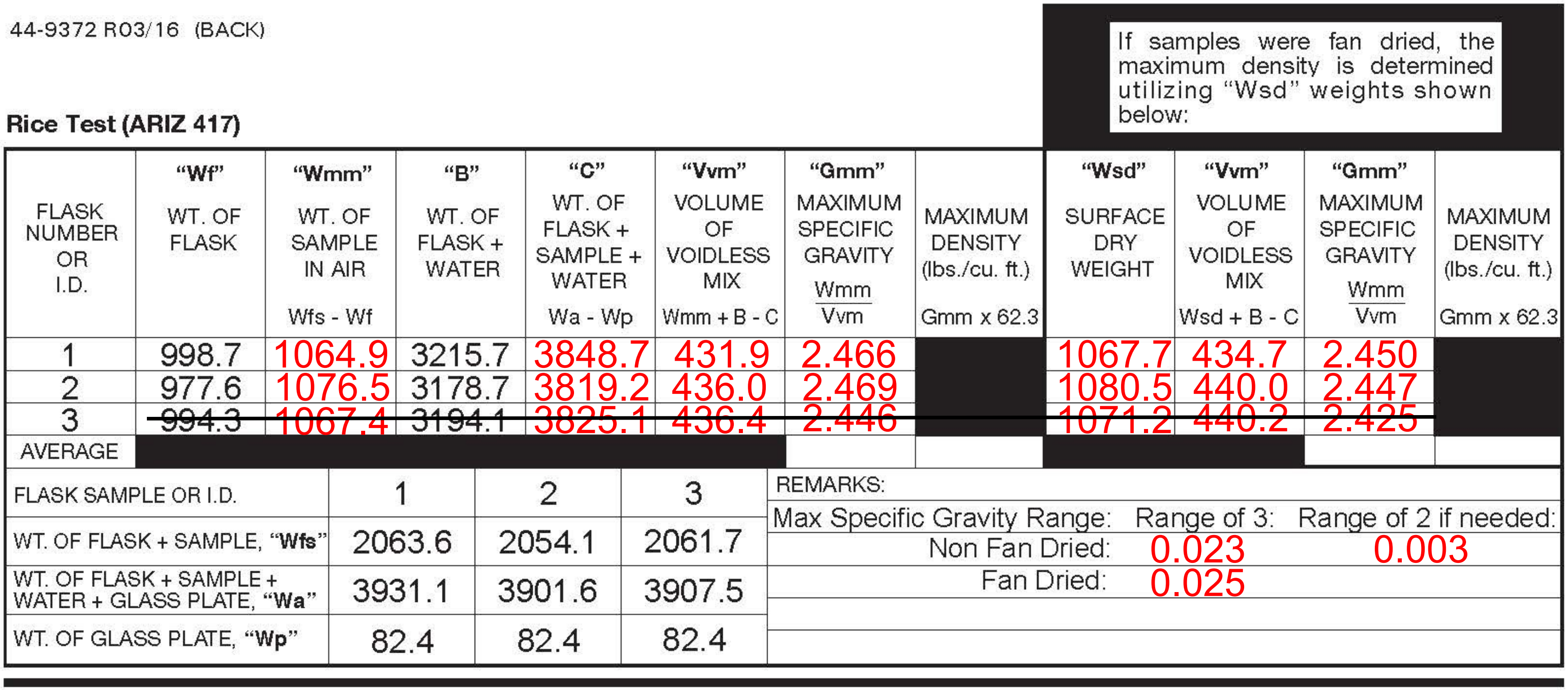
| FLASK NUMBER OR I.D. | **"Wf"** WT. OF FLASK | **"Wmm"** WT. OF SAMPLE IN AIR Wfs - Wf | **"B"** WT. OF FLASK + WATER | **"C"** WT. OF FLASK + SAMPLE + WATER Wa - Wp | **"Vvm"** VOLUME OF VOIDLESS MIX Wmm + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | **"Wsd"** SURFACE DRY WEIGHT | **"Vvm"** VOLUME OF VOIDLESS MIX Wsd + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | |
| Fan Dried: | 0.025 | |

As you can see, the range of the fan dried is greater than 0.024. Determine which two "Gmm" are the closest and find the range. Crossing out the one that is farthest out.



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | | | | | | |

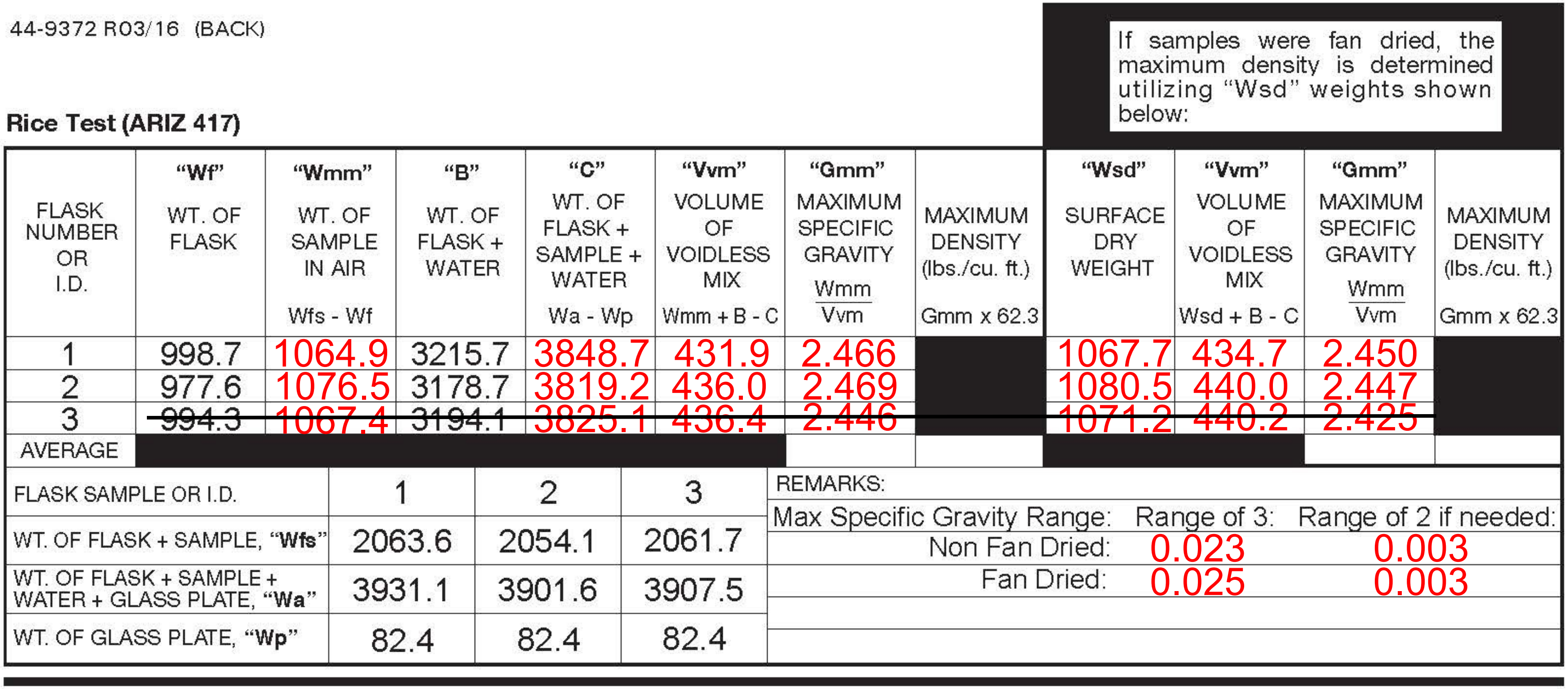
| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | |

2.469 – 2.466 = 0.003

Determine the range for the two "Gmm". Find the difference between them, this has to be 0.012 or less.



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | **"Wf"** WT. OF FLASK | **"Wmm"** WT. OF SAMPLE IN AIR Wfs - Wf | **"B"** WT. OF FLASK + WATER | **"C"** WT. OF FLASK + SAMPLE + WATER Wa - Wp | **"Vvm"** VOLUME OF VOIDLESS MIX Wmm + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | **"Wsd"** SURFACE DRY WEIGHT | **"Vvm"** VOLUME OF VOIDLESS MIX Wsd + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

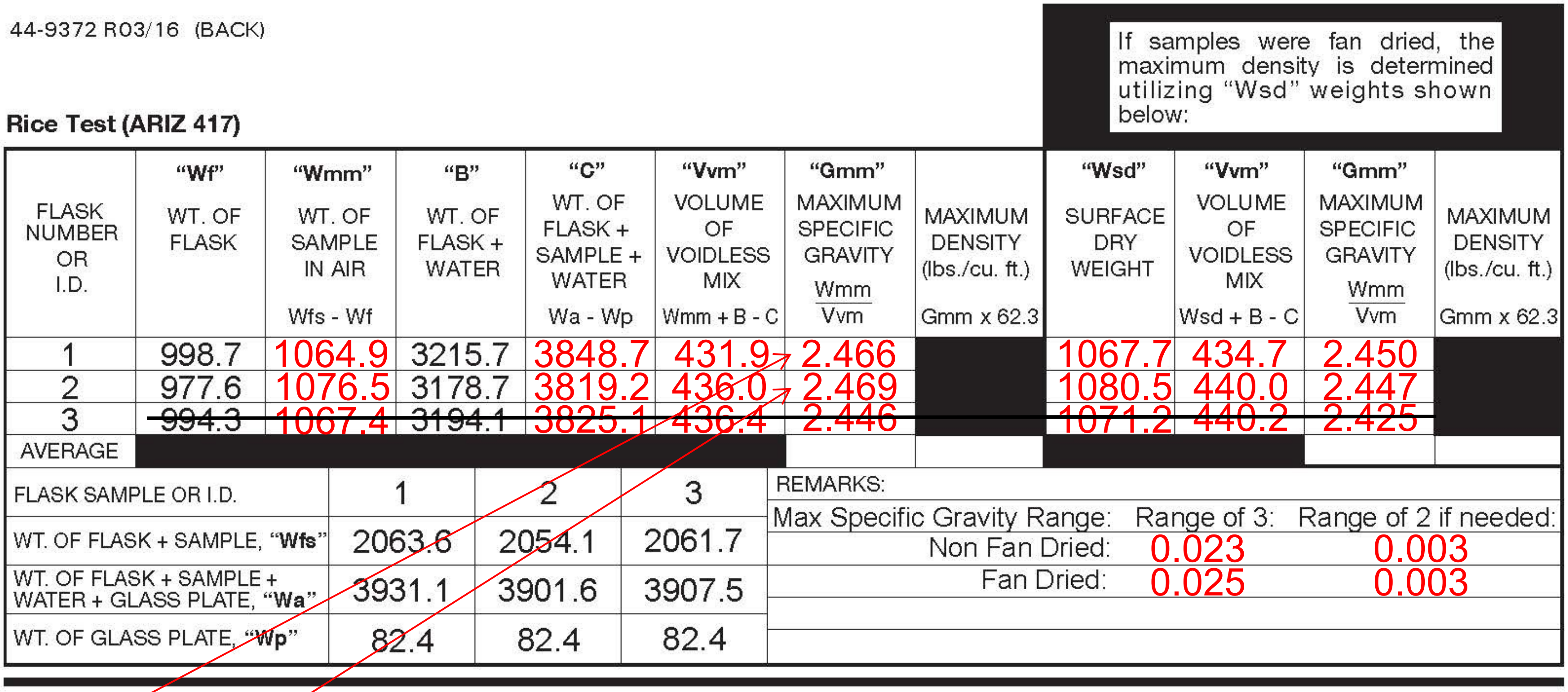
REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

2.469 – 2.466 = 0.003

2.450 – 2.447 = 0.003

The range of the two "Gmm" is less than 0.012. We can now determine the average "Gmm".



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "Wfs" | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "Wa" | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, "Wp" | 82.4 | 82.4 | 82.4 |

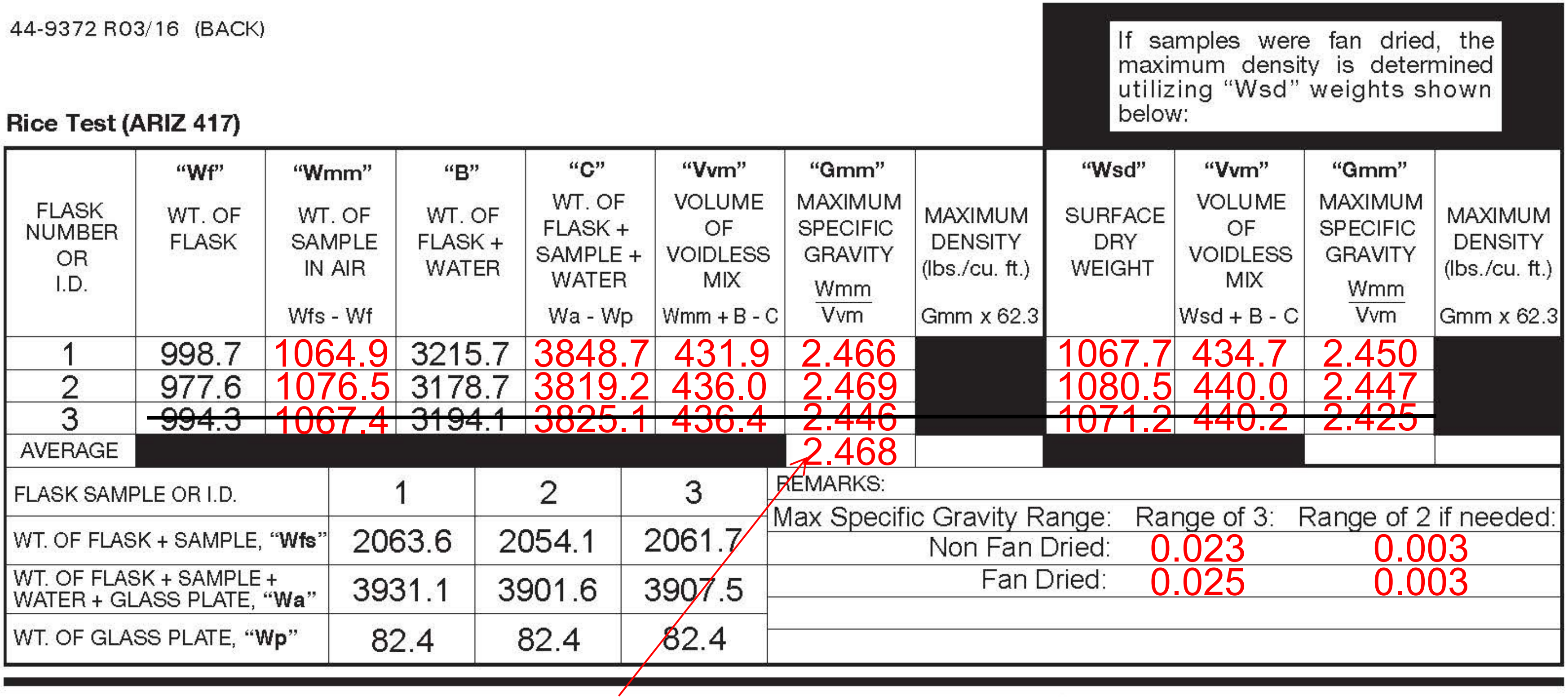
REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

(2.466 + 2.469) / 2 = 2.4675

Determine the Gmm Average. The average "Gmm" is determined by adding the two together and dividing by 2.

Note: Please note, that if the Range of 3 "Gmm" was within the Specification of 0.024, you would average the three "Gmm".



44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | 2.468 | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

(2.466 + 2.469) / 2 = 2.4675

The average "Gmm" is reported to 3 (0.000) decimal places, rounded.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | 2.468 | | | | 2.449 | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

(2.466 + 2.469) / 2 = 2.4675

(2.450 + 2.447) / 2 = 2.4485

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | 2.468 | | | | 2.449 | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

2.468 X 62.3 = 153.7564

The formula for Maximum Density is ("Gmm" x 62.3). Maximum Density is reported to 1 (0.0) decimal places, rounded.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | **"Wf"** WT. OF FLASK | **"Wmm"** WT. OF SAMPLE IN AIR Wfs - Wf | **"B"** WT. OF FLASK + WATER | **"C"** WT. OF FLASK + SAMPLE + WATER Wa - Wp | **"Vvm"** VOLUME OF VOIDLESS MIX Wmm + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | **"Wsd"** SURFACE DRY WEIGHT | **"Vvm"** VOLUME OF VOIDLESS MIX Wsd + B - C | **"Gmm"** MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | 2.468 | 153.8 | | | 2.449 | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| | | |
|---|---|---|
| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

2.468 X 62.3 = 153.7564

This is your Maximum Density for your Fan Dried Sample. Recorded to 1 (0.0) decimal places, rounded.

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

## Rice Test (ARIZ 417)

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY Wmm / Vvm | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 998.7 | 1064.9 | 3215.7 | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | 977.6 | 1076.5 | 3178.7 | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | ~~994.3~~ | ~~1067.4~~ | ~~3194.1~~ | ~~3825.1~~ | ~~436.4~~ | ~~2.446~~ | | ~~1071.2~~ | ~~440.2~~ | ~~2.425~~ | |
| AVERAGE | | | | | | 2.468 | 153.8 | | | 2.449 | 152.6 |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2063.6 | 2054.1 | 2061.7 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3931.1 | 3901.6 | 3907.5 |
| WT. OF GLASS PLATE, **"Wp"** | 82.4 | 82.4 | 82.4 |

REMARKS:

| | | |
|---|---|---|
| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

Arizona Department of Transportation
**ARIZONA TEST METHOD 417**

44-3941 R12/15

Lab#: ________ Date: ________ Project #: ________ TRACS#: ________
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ________
Lot#: ________ Sample #: ________ Maximum Specific Gravity Range: ________
Tested By: ________ Checked By: ________

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

| Flask Number or I. D. | **"Wf"** Wt. of Flask | **"Wmm"** Wt. of Sample in Air Wfs - Wf | **"B"** Wt. of Flask + Water | **"C"** Wt. of Flask + Sample + Water Wa - Wp | **"Vvm"** Volume of Voidless Mix Wmm + B - C | **"Gmm"** Maximum Specific Gravity Wmm / Vvm | Maximum Density (lbs./cu. ft.) Gmm X 62.3 | **"Wsd"** Surface Dry Weight (See Below) | **"Vvm"** Volume of Voidless Mix Wsd + B - C | **"Gmm"** Maximum Specific Gravity Wmm / Vvm | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **998.7** | 1064.9 | **3215.7** | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| **2** | **977.6** | 1076.5 | **3178.7** | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| **3** | **994.3** | 1067.4 | **3194.1** | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| | | | | | | 2.468 | 153.8 | | | 2.449 | 152.6 |

Remarks:

| |
|---|
| **3** |
| **2061.7** |
| **3907.5** |
| **82.4** |

| **Max. Specific Gravity Range:** | **Range of 3:** | **Range of 2 If needed:** |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

To calculate the Air Voids, you need to determine the A.C. Mix Bulk Density by Marshall Compaction AZ 410. Calculated using AZ 415.

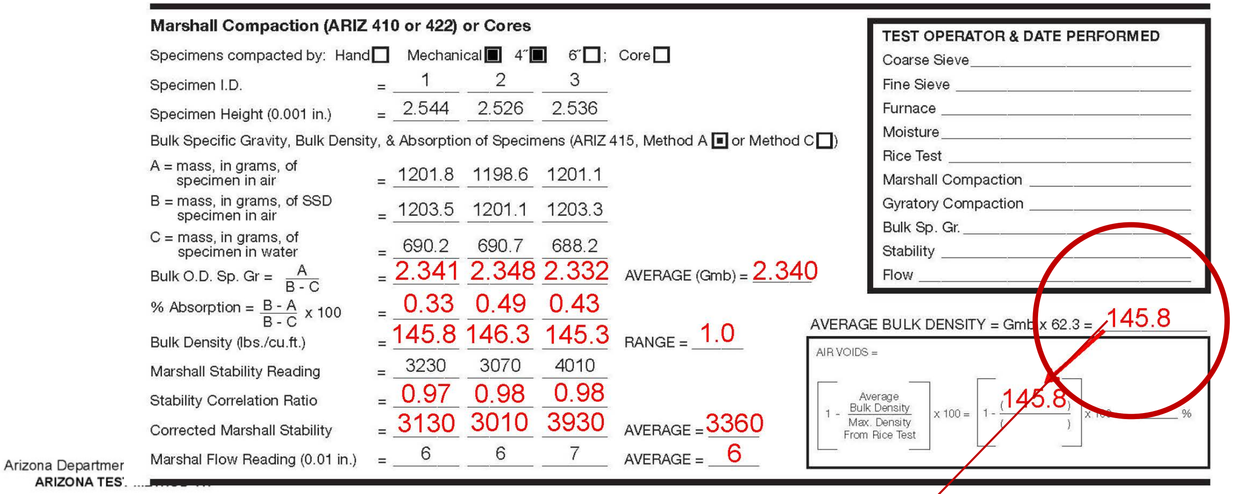
**Air Voids Calculations**

$$\left[1-\frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \times 100 =$$

$$\left[1-\frac{\quad}{\quad}\right] \times 100 = \_\_\_\_\_\_$$ Non Fan Dried

$$\left[1-\frac{\quad}{\quad}\right] \times 100 = \_\_\_\_\_\_$$ Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) ______ %



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | 1 | 2 | 3 | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | | |
| Corrected Marshall Stability | = | 3130 | 3010 | 3930 | AVERAGE = | 3360 |
| Marshal Flow Reading (0.01 in.) | = | 6 | 6 | 7 | AVERAGE = | 6 |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______
Fine Sieve ______
Furnace ______
Moisture ______
Rice Test ______
Marshall Compaction ______
Gyratory Compaction ______
Bulk Sp. Gr. ______
Stability ______
Flow ______

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x 100} = \left[1 - \frac{(145.8)}{(\quad)}\right] \text{x 100} \_\_\_\_ \%$$

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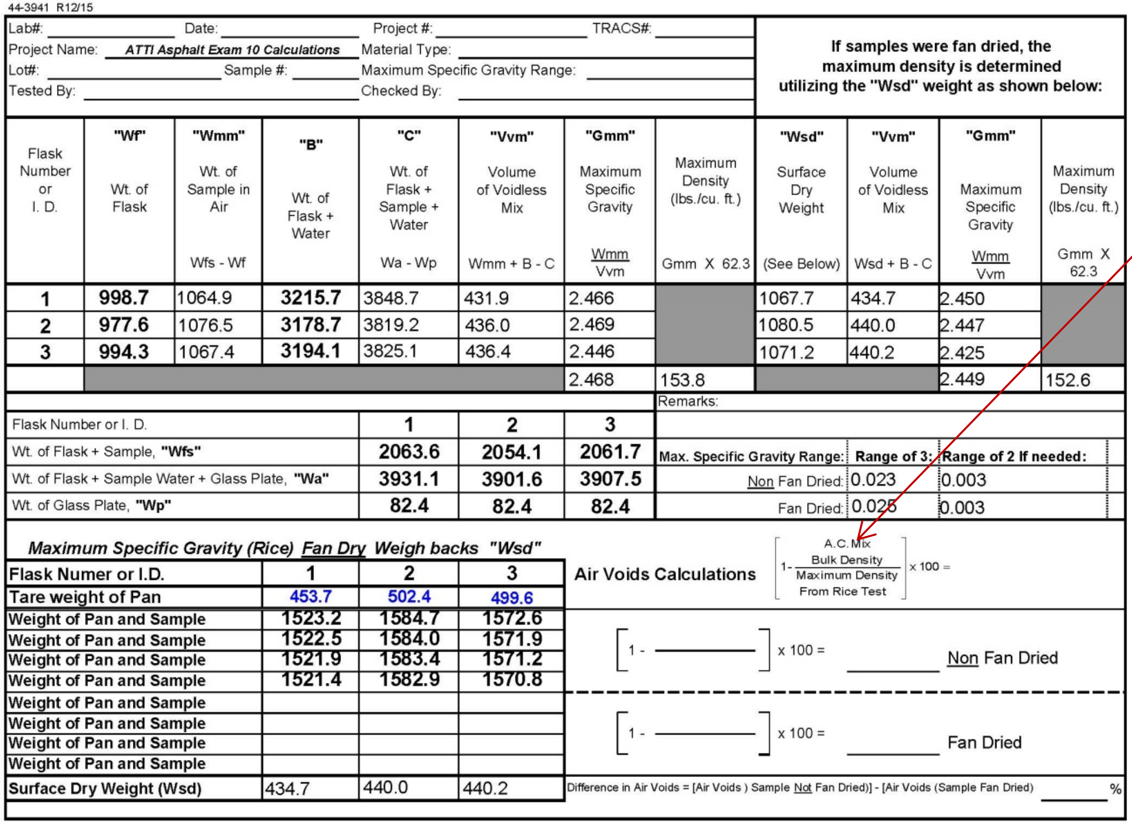


44-3941 R12/15

Lab#: ______ Date: ______ Project #: ______ TRACS#: ______
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ______
Lot#: ______ Sample #: ______ Maximum Specific Gravity Range: ______
Tested By: ______ Checked By: ______

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

| Flask Number or I. D. | **"Wf"** Wt. of Flask | **"Wmm"** Wt. of Sample in Air Wfs - Wf | **"B"** Wt. of Flask + Water | **"C"** Wt. of Flask + Sample + Water Wa - Wp | **"Vvm"** Volume of Voidless Mix Wmm + B - C | **"Gmm"** Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 | **"Wsd"** Surface Dry Weight (See Below) | **"Vvm"** Volume of Voidless Mix Wsd + B - C | **"Gmm"** Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **998.7** | 1064.9 | **3215.7** | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| 2 | **977.6** | 1076.5 | **3178.7** | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| 3 | **994.3** | 1067.4 | **3194.1** | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| | | | | | | 2.468 | 153.8 | | | 2.449 | 152.6 |

| Flask Number or I. D. | 1 | 2 | 3 |
|---|---|---|---|
| Wt. of Flask + Sample, **"Wfs"** | **2063.6** | **2054.1** | **2061.7** |
| Wt. of Flask + Sample Water + Glass Plate, **"Wa"** | **3931.1** | **3901.6** | **3907.5** |
| Wt. of Glass Plate, **"Wp"** | **82.4** | **82.4** | **82.4** |

Remarks:

| **Max. Specific Gravity Range:** | **Range of 3:** | **Range of 2 If needed:** |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

***Maximum Specific Gravity (Rice) Fan Dry Weigh backs "Wsd"***

| **Flask Numer or I.D.** | **1** | **2** | **3** |
|---|---|---|---|
| **Tare weight of Pan** | 453.7 | 502.4 | 499.6 |
| **Weight of Pan and Sample** | **1523.2** | **1584.7** | **1572.6** |
| **Weight of Pan and Sample** | **1522.5** | **1584.0** | **1571.9** |
| **Weight of Pan and Sample** | **1521.9** | **1583.4** | **1571.2** |
| **Weight of Pan and Sample** | **1521.4** | **1582.9** | **1570.8** |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Weight of Pan and Sample** | | | |
| **Surface Dry Weight (Wsd)** | 434.7 | 440.0 | 440.2 |

**Air Voids Calculations**

$$\left[1 - \frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \text{x 100} =$$

$$\left[1 - \frac{\quad}{\quad}\right] \text{x 100} = \_\_\_\_\_\_$$ Non Fan Dried

$$\left[1 - \frac{\quad}{\quad}\right] \text{x 100} = \_\_\_\_\_\_$$ Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) ______ %

To Calculate Air Voids for Non Fan & Fan Dried. Use the Average Bulk Density from AZ 410.

Arizona Department of Transportation
**ARIZONA TEST METHOD 417**

44-3941 R12/15

Lab#: ____ Date: ____ Project #: ____ TRACS#: ____
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ____
Lot#: ____ Sample #: ____ Maximum Specific Gravity Range: ____
Tested By: ____ Checked By: ____

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

| Flask Number or I. D. | **"Wf"** Wt. of Flask | **"Wmm"** Wt. of Sample in Air Wfs - Wf | **"B"** Wt. of Flask + Water | **"C"** Wt. of Flask + Sample + Water Wa - Wp | **"Vvm"** Volume of Voidless Mix Wmm + B - C | **"Gmm"** Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 | **"Wsd"** Surface Dry Weight (See Below) | **"Vvm"** Volume of Voidless Mix Wsd + B - C | **"Gmm"** Maximum Specific Gravity $\frac{Wmm}{Vvm}$ | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **998.7** | 1064.9 | **3215.7** | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| **2** | **977.6** | 1076.5 | **3178.7** | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| **3** | **994.3** | 1067.4 | **3194.1** | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| | | | | | | 2.468 | 153.8 | | | 2.449 | 152.6 |

Remarks:

Determine the Air Voids. Bring the Average Bulk Density from AZ 410. Insert the Maximum Density from the Rice for the Non Fan and Fan Dried. Report Air Voids to 1 (0.0) decimal places, rounded.

**3**
**2061.7**
**3907.5**
**82.4**

| **Max. Specific Gravity Range:** | **Range of 3:** | **Range of 2 If needed:** |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

**Air Voids Calculations** $\left[1 - \frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \times 100 =$

$\left[1 - \frac{145.8}{153.8}\right] \times 100 =$ 5.2 Non Fan Dried

$\left[1 - \frac{145.8}{152.6}\right] \times 100 =$ 4.5 Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) ____ %

Arizona Department of Transportation
**ARIZONA TEST METHOD 417**

44-3941 R12/15

Lab#: ______ Date: ______ Project #: ______ TRACS#: ______
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ______
Lot#: ______ Sample #: ______ Maximum Specific Gravity Range: ______
Tested By: ______ Checked By: ______

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

| Flask Number or I. D. | "Wf" Wt. of Flask | "Wmm" Wt. of Sample in Air Wfs - Wf | "B" Wt. of Flask + Water | "C" Wt. of Flask + Sample + Water Wa - Wp | "Vvm" Volume of Voidless Mix Wmm + B - C | "Gmm" Maximum Specific Gravity Wmm / Vvm | Maximum Density (lbs./cu. ft.) Gmm X 62.3 | "Wsd" Surface Dry Weight (See Below) | "Vvm" Volume of Voidless Mix Wsd + B - C | "Gmm" Maximum Specific Gravity Wmm / Vvm | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **998.7** | 1064.9 | **3215.7** | 3848.7 | 431.9 | 2.466 | | 1067.7 | 434.7 | 2.450 | |
| **2** | **977.6** | 1076.5 | **3178.7** | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| **3** | **994.3** | 1067.4 | **3194.1** | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| | | | | | | 2.468 | 153.8 | | | 2.449 | 152.6 |
| | | | | | | **3** | | | | | |
| | | | | | | **2061.7** | | | | | |
| | | | | | | **3907.5** | | | | | |
| | | | | | | **82.4** | | | | | |

Remarks:

| **Max. Specific Gravity Range:** | **Range of 3:** | **Range of 2 If needed:** |
|---|---|---|
| Non Fan Dried: | 0.023 | 0.003 |
| Fan Dried: | 0.025 | 0.003 |

Determine the difference between the Non Fan Dried and Fan Dried Air Voids.

5.2 - 4.5= 0.7.

If the difference is greater than 0.2%, Subsequent samples will be subjected to fan drying.

**Air Voids Calculations**

$$\left[1 - \frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}}\right] \times 100 =$$

$$\left[1 - \frac{145.8}{153.8}\right] \times 100 = 5.2$$ Non Fan Dried

$$\left[1 - \frac{145.8}{152.6}\right] \times 100 = 4.5$$ Fan Dried

Difference in Air Voids = [Air Voids ) Sample Not Fan Dried)] - [Air Voids (Sample Fan Dried) 0.7 %

# *AZ 410*
# *Marshall Calculations*

TEST OPERATOR & DATE PERFORMED

Coarse Sieve ____________
Fine Sieve ____________
Furnace ____________
Moisture ____________
Rice Test ____________
Marshall Compaction ____________
Gyratory Compaction ____________
Bulk Sp. Gr. ____________
Stability ____________
Flow ____________

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens Compacted by: Hand ☐ Mechanical ☐ 4 inch ☐ 6 inch ☐ Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I. D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (Method A ☐ Method C ☐ or Vacuum Method ☐)

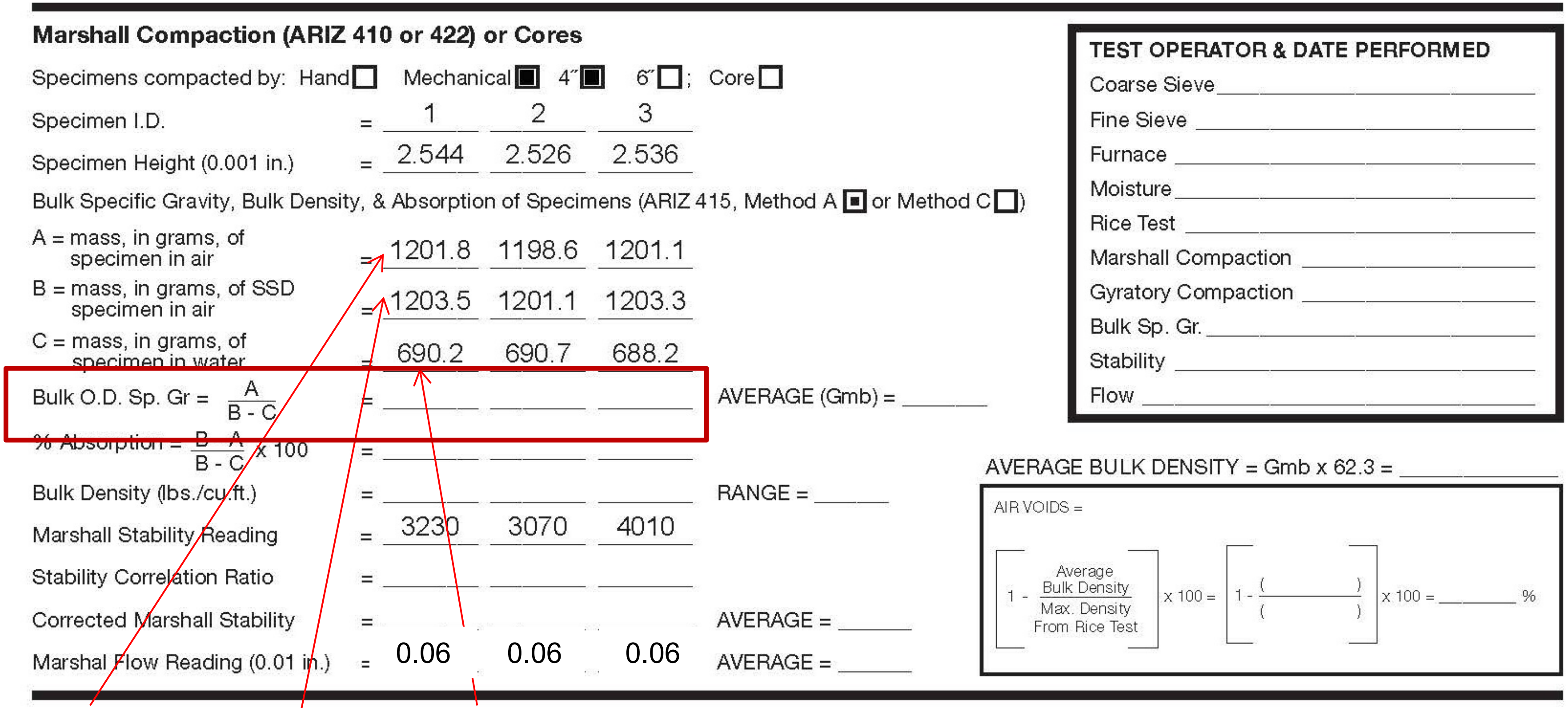
| | | | | | |
|---|---|---|---|---|---|
| A = Mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = Mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = Mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = A / ( B - C ) | = | | | | Average (Gmb) = |
| % Absorption = [(B - A) / (B - C)] X 100 | = | | | | |
| Bulk Density (lbs. / cu.ft.) | = | | | | Range = ______ Average Bulk Density = Gmb X 62.3 **=** |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | Average = |
| Marshall Flow Reading (0.01 in) | = | 0.06 | 0.06 | 0.06 | Average = |

**AIR VOIDS:**

$$1 - \left[ \frac{\text{A.C. Mix Bulk Density}}{\text{Maximum Density From Rice Test}} \right] \times 100 =$$

Calculation covered on AZ 417

$$1 - \left[ \frac{(\qquad)}{(\qquad)} \right] \text{X } 100 = \_\_\_\_\_\_ \%$$



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ■ 4″ ■ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ▣ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | | | | AVERAGE (Gmb) = ________ |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = _______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = _______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______________________
Fine Sieve ______________________
Furnace ______________________
Moisture ______________________
Rice Test ______________________
Marshall Compaction ______________________
Gyratory Compaction ______________________
Bulk Sp. Gr. ______________________
Stability ______________________
Flow ______________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

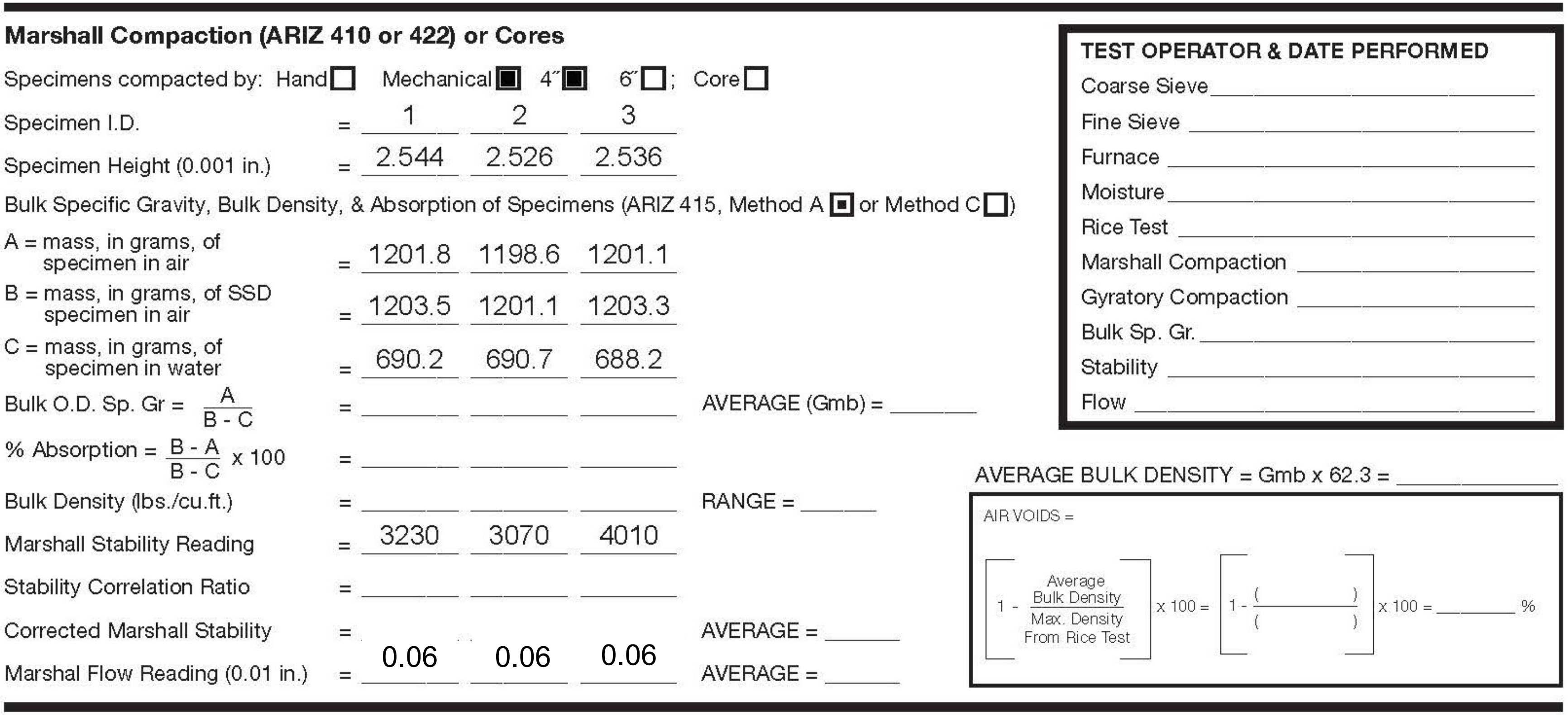
AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

1201.8 / (1203.5 – 690.2) =

Determine Bulk O.D. Specific Gravity. Fill in the formula and calculate.

A / B-C



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | | | | AVERAGE (Gmb) = |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

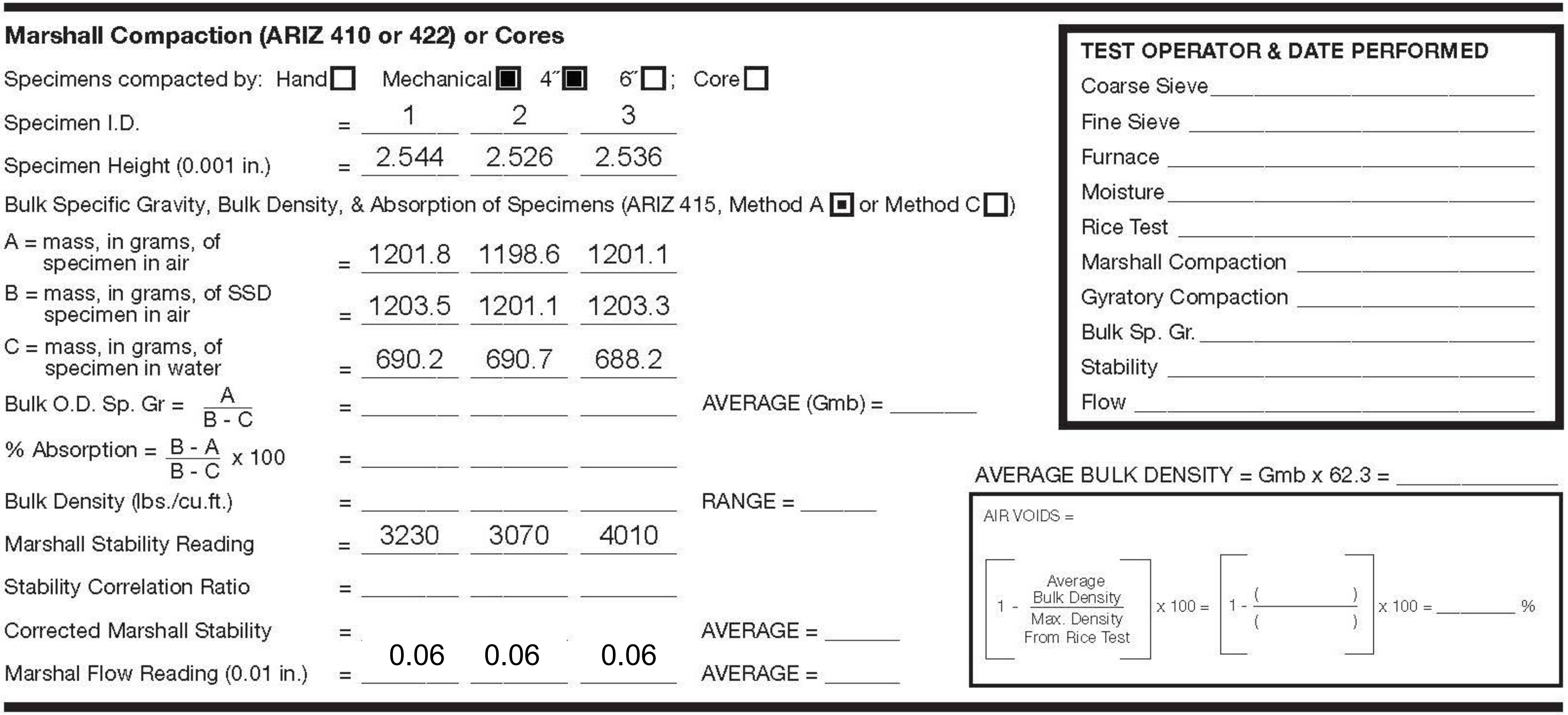
AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\ \%$$

1201.8 / (1203.5 – 690.2) =

1201.8 / (513.3) =



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | | | | AVERAGE (Gmb) = |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve __________

Fine Sieve __________

Furnace __________

Moisture __________

Rice Test __________

Marshall Compaction __________

Gyratory Compaction __________

Bulk Sp. Gr. __________

Stability __________

Flow __________

AVERAGE BULK DENSITY = Gmb x 62.3 = __________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad\quad)}{(\quad\quad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

1201.8 / (1203.5 – 690.2) =
1201.8 / (513.3) = 2.341320865

Specific Gravities are reported to 3 (0.000) decimal places rounded.

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B-C}$ | = | 2.341 | | | AVERAGE (Gmb) = |
| % Absorption = $\frac{B-A}{B-C} \times 100$ | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve __________

Fine Sieve __________

Furnace __________

Moisture __________

Rice Test __________

Marshall Compaction __________

Gyratory Compaction __________

Bulk Sp. Gr. __________

Stability __________

Flow __________

AVERAGE BULK DENSITY = Gmb x 62.3 = __________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

1201.8 / (1203.5 – 690.2) =

1201.8 / (513.3) = 2.341320865

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | | AVERAGE (Gmb) = ________ |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = _______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = _______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

Stability ____________________

Flow ____________________

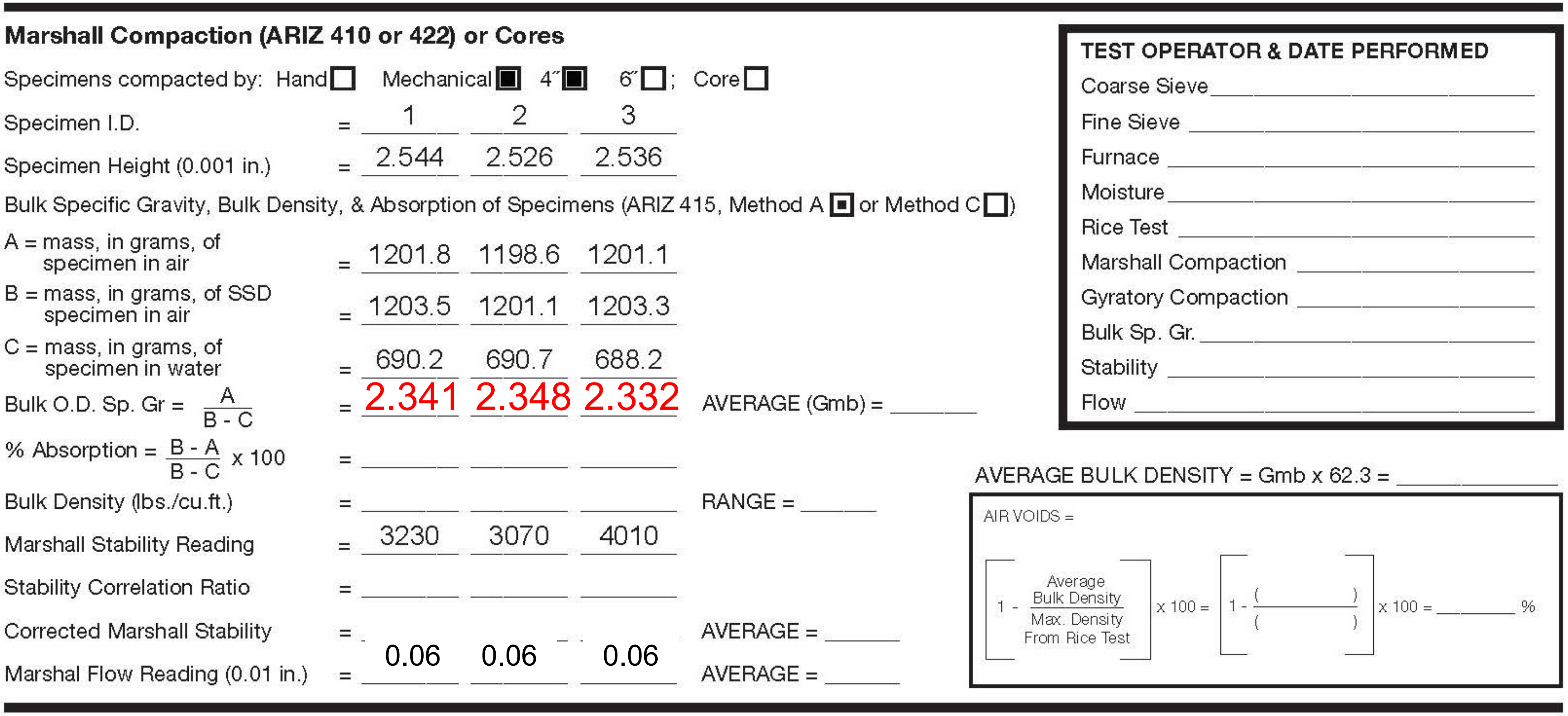
AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_\_\_ \%$$

1201.8 / (1203.5 – 690.2) = 2.341320865

1198.6 / (1201.1 – 690.7) = 2.348354232



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = ________ |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | ________ | ________ | ________ | |
| Bulk Density (lbs./cu.ft.) | = | ________ | ________ | ________ | RANGE = _______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | ________ | ________ | ________ | |
| Corrected Marshall Stability | = | ________ | ________ | ________ | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = _______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________________

Fine Sieve ____________________________

Furnace ____________________________

Moisture ____________________________

Rice Test ____________________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________________

Stability ____________________________

Flow ____________________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

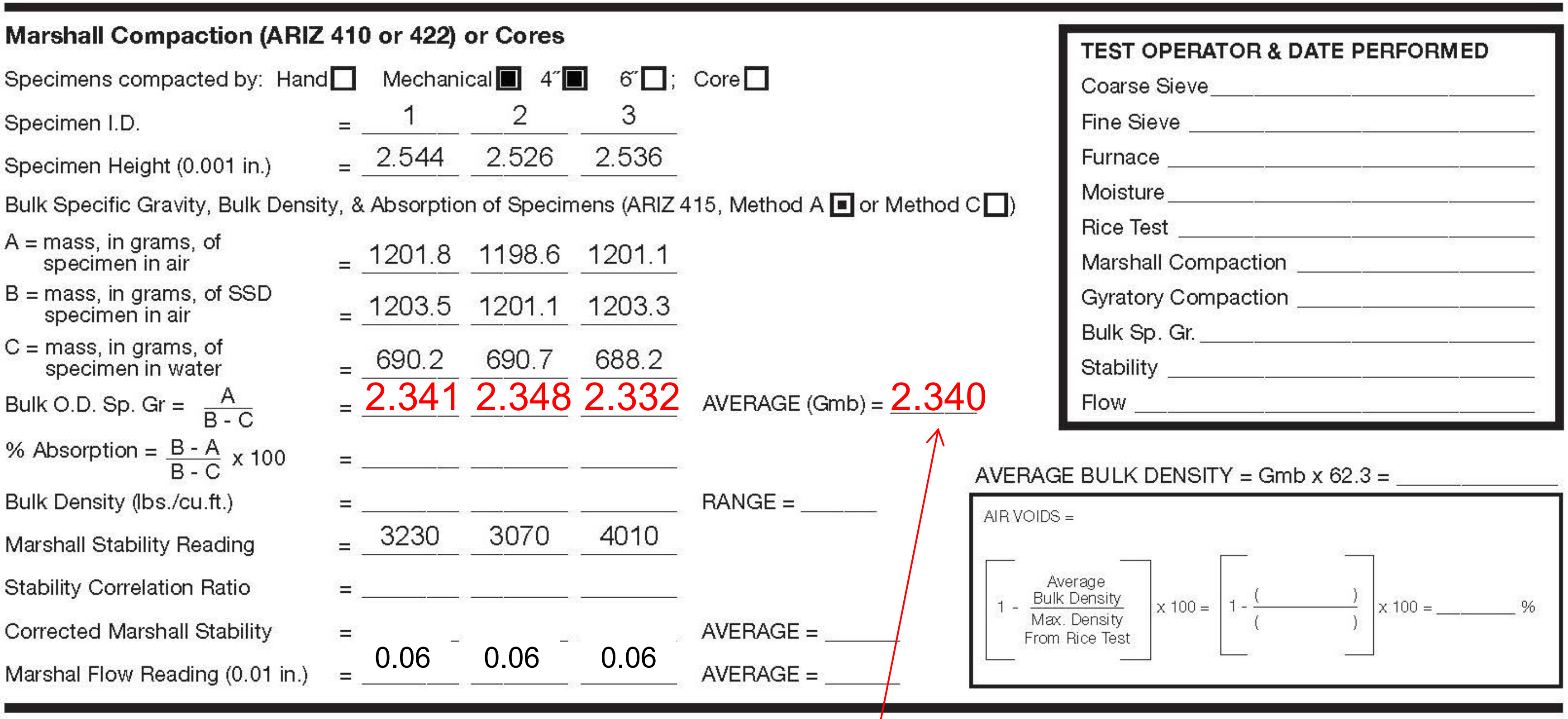
AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

1201.8 / (1203.5 – 690.2) = 2.341320865

1198.6 / (1201.1 – 690.7) = 2.348354232

1201.1 / (1203.3 – 688.2) = 2.331780237



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

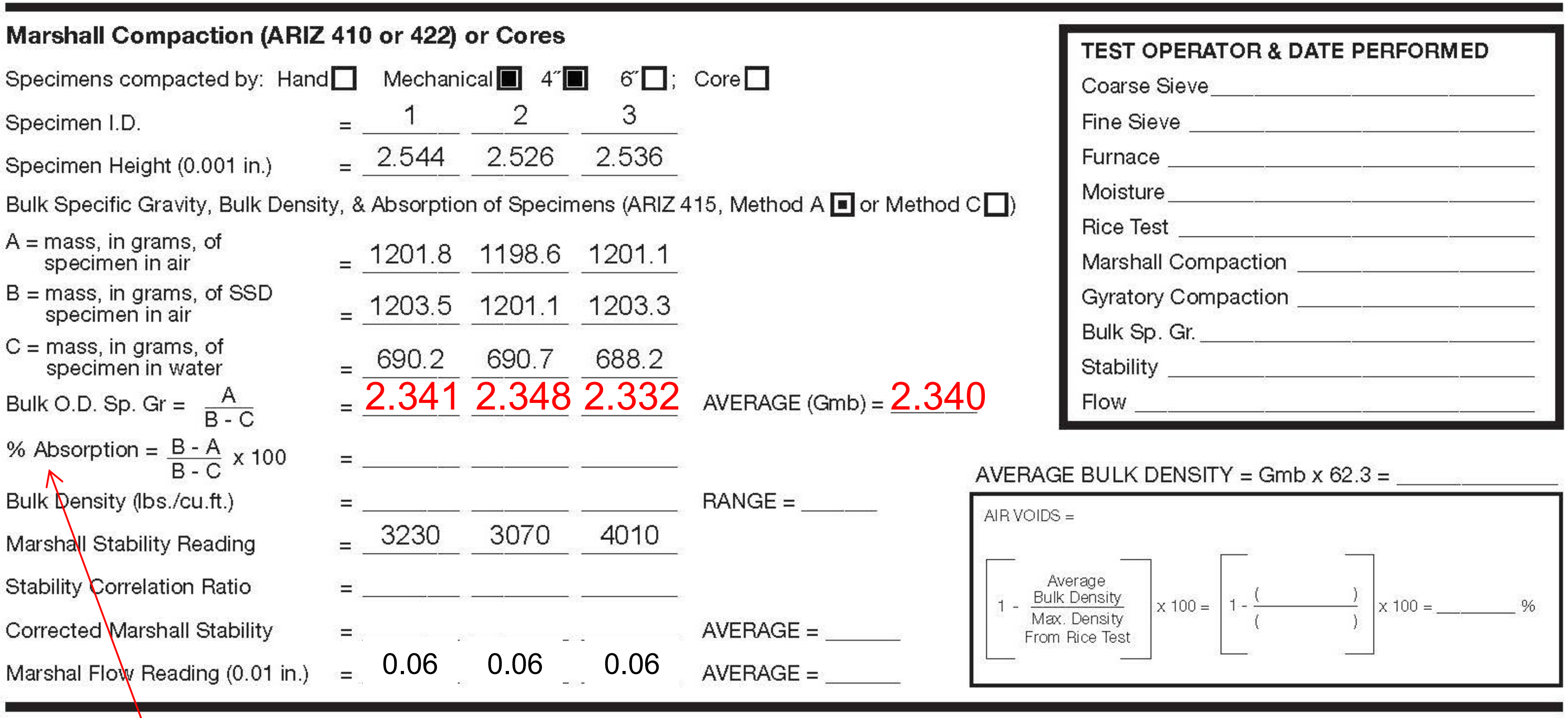
Flow ____

AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_ \%$$

Average the three.
2.341+2.348+2.332 = 7.021
7.021 / 3 = 2.3403333. This is rounded to three (0.000) decimal places.



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______
Fine Sieve ______
Furnace ______
Moisture ______
Rice Test ______
Marshall Compaction ______
Gyratory Compaction ______
Bulk Sp. Gr. ______
Stability ______
Flow ______

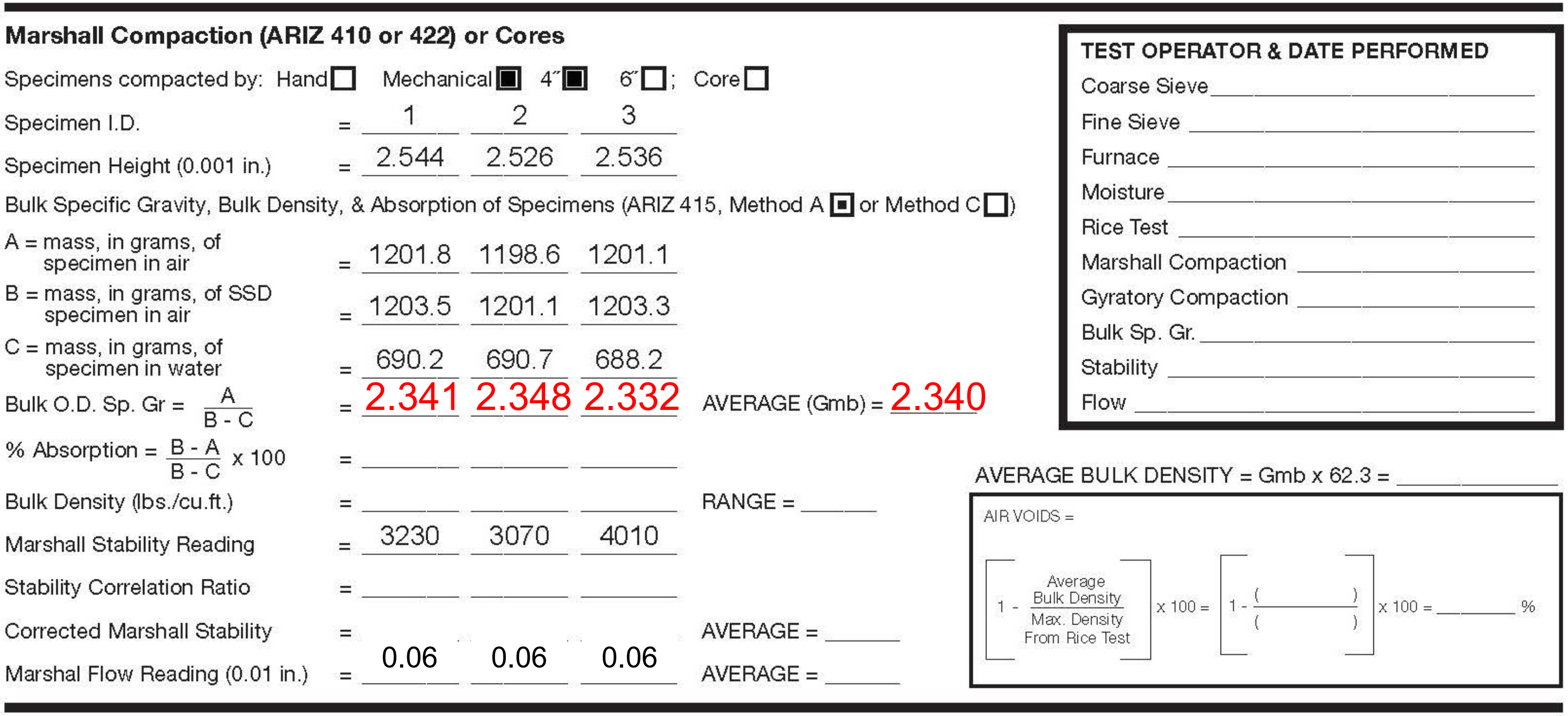
AVERAGE BULK DENSITY = Gmb x 62.3 = ______

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 =

Calculate the % Absorption, and record to the nearest 2 (0.00) decimal places. (B-A)/(B-C)



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

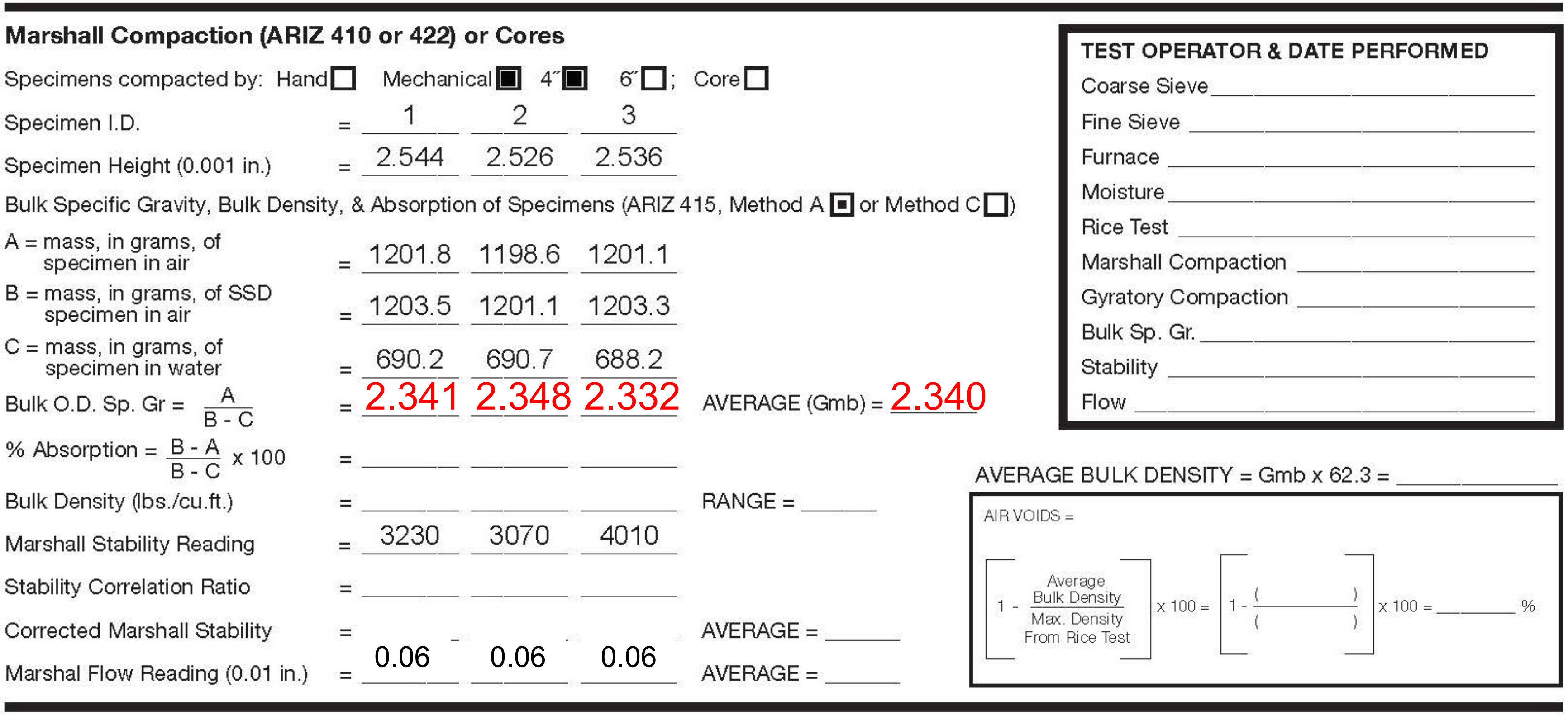
AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 =

(1.7) / (513.3) X 100 =



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |
| Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐) | | | | | |
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

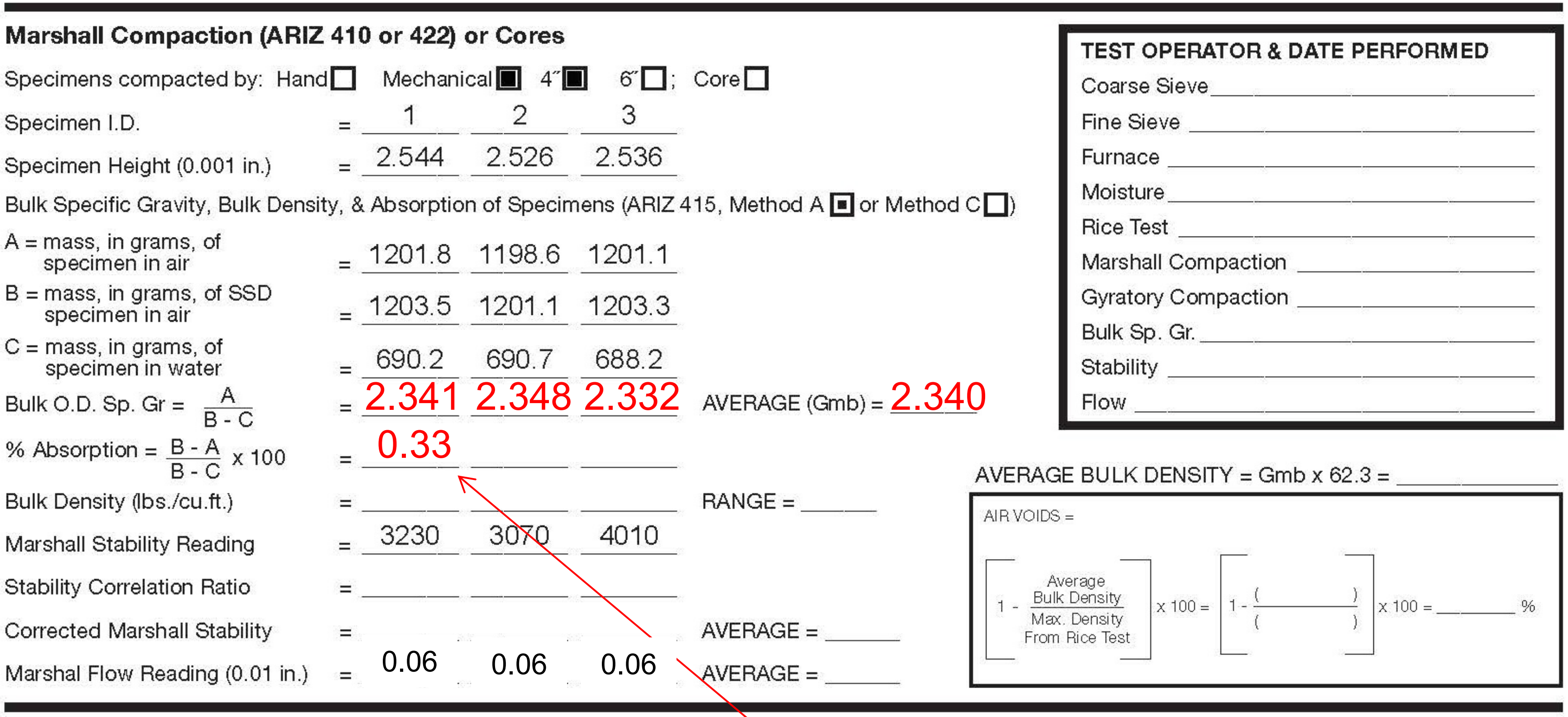
AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 =

(1.7) / (513.3) X 100 = 0.331190337



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = mass, in grams, of specimen in air = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 = | 0.33 | | | |
| Bulk Density (lbs./cu.ft.) = | | | | RANGE = ______ |
| Marshall Stability Reading = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio = | | | | |
| Corrected Marshall Stability = | | | | AVERAGE = ______ |
| Marshal Flow Reading (0.01 in.) = | 0.06 | 0.06 | 0.06 | AVERAGE = ______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

Stability ____________________

Flow ____________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 =

(1.7) / (513.3) X 100 = 0.331190337

Reported to 2 (0.00) decimal places, rounded.

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

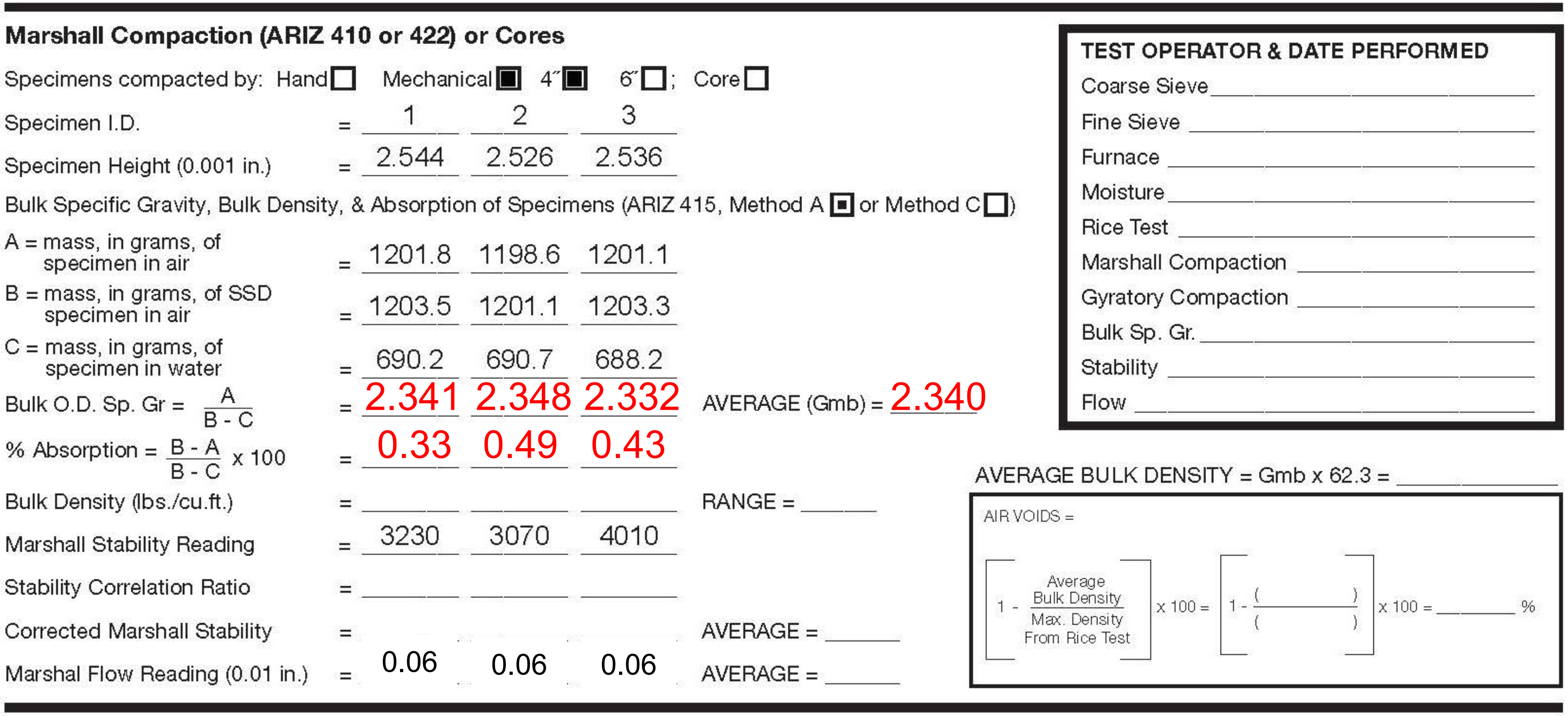
AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 = 0.331190337

(1201.1 – 1198.6) / (1201.1 – 690.7) X 100 = 0.489811912



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_ \%$$

(1203.5 – 1201.8) / (1203.5 – 690.2) X 100 = 0.331190337

(1201.1 – 1198.6) / (1201.1 – 690.7) X 100 = 0.489811912

(1203.3 – 1201.1) / (1203.3 – 688.2) X 100 = 0.427101534

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = ______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = ______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = ______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

Stability ____________________

Flow ____________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_\ \%$$

2.341 X 62.3 = 145.8443

Formula for Bulk Density is the Bulk Specific Gravity x 62.3. Recorded to 3 (0.000) decimal places, rounded.

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | | | RANGE = _______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = _______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

Stability ____________________

Flow ____________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

2.341 X 62.3 = 145.8443

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 |  |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 |  |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 |  |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 |  |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 |  |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | 0.33 | 0.49 | 0.43 |  |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 |  | RANGE = ______ |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 |  |
| Stability Correlation Ratio | = |  |  |  |  |
| Corrected Marshall Stability | = |  |  |  | AVERAGE = ______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = ______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

Stability ____________________

Flow ____________________

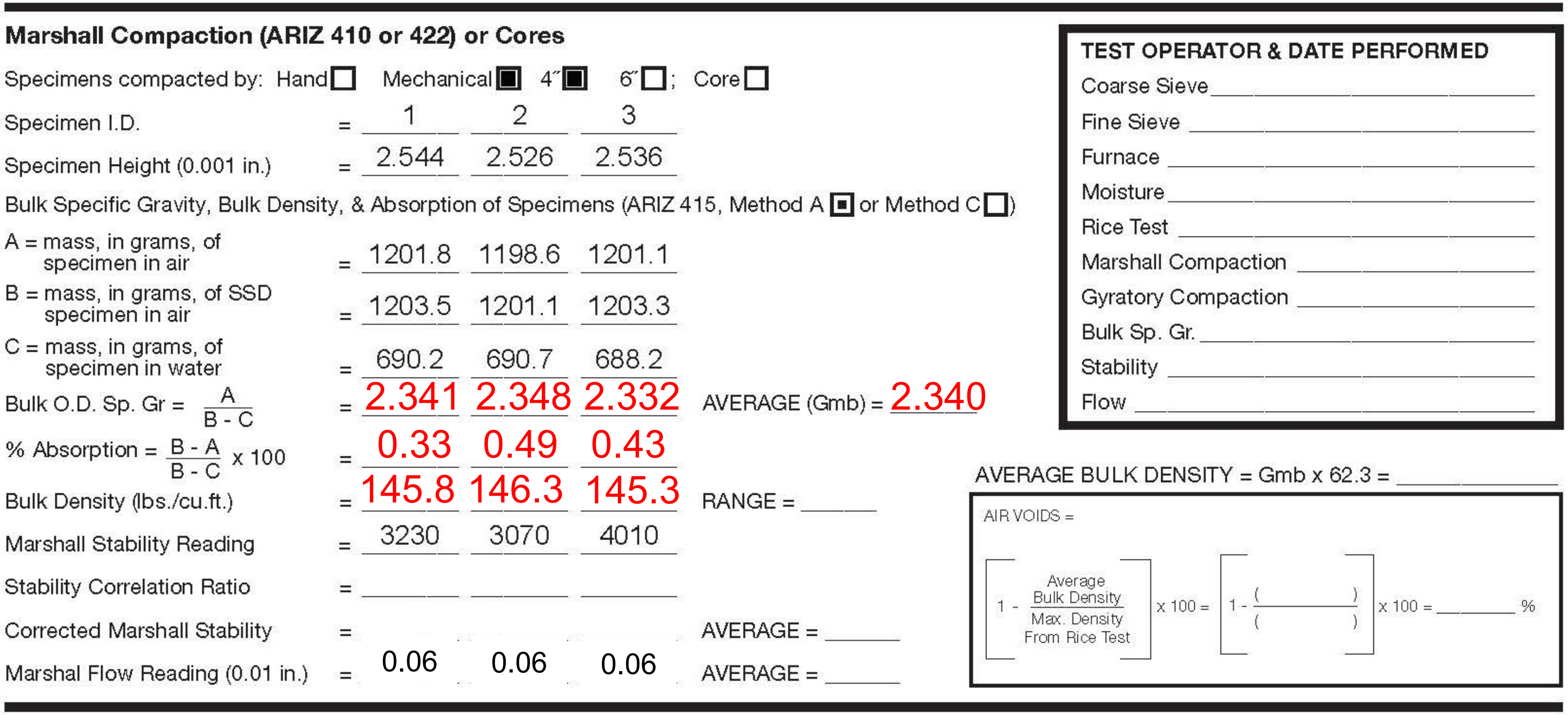
AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

2.341 X 62.3 = 145.8443

2.348 X 62.3 = 146.2804



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | 1 | 2 | 3 | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = | |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________

Fine Sieve ____________

Furnace ____________

Moisture ____________

Rice Test ____________

Marshall Compaction ____________

Gyratory Compaction ____________

Bulk Sp. Gr. ____________

Stability ____________

Flow ____________

AVERAGE BULK DENSITY = Gmb x 62.3 = ____________

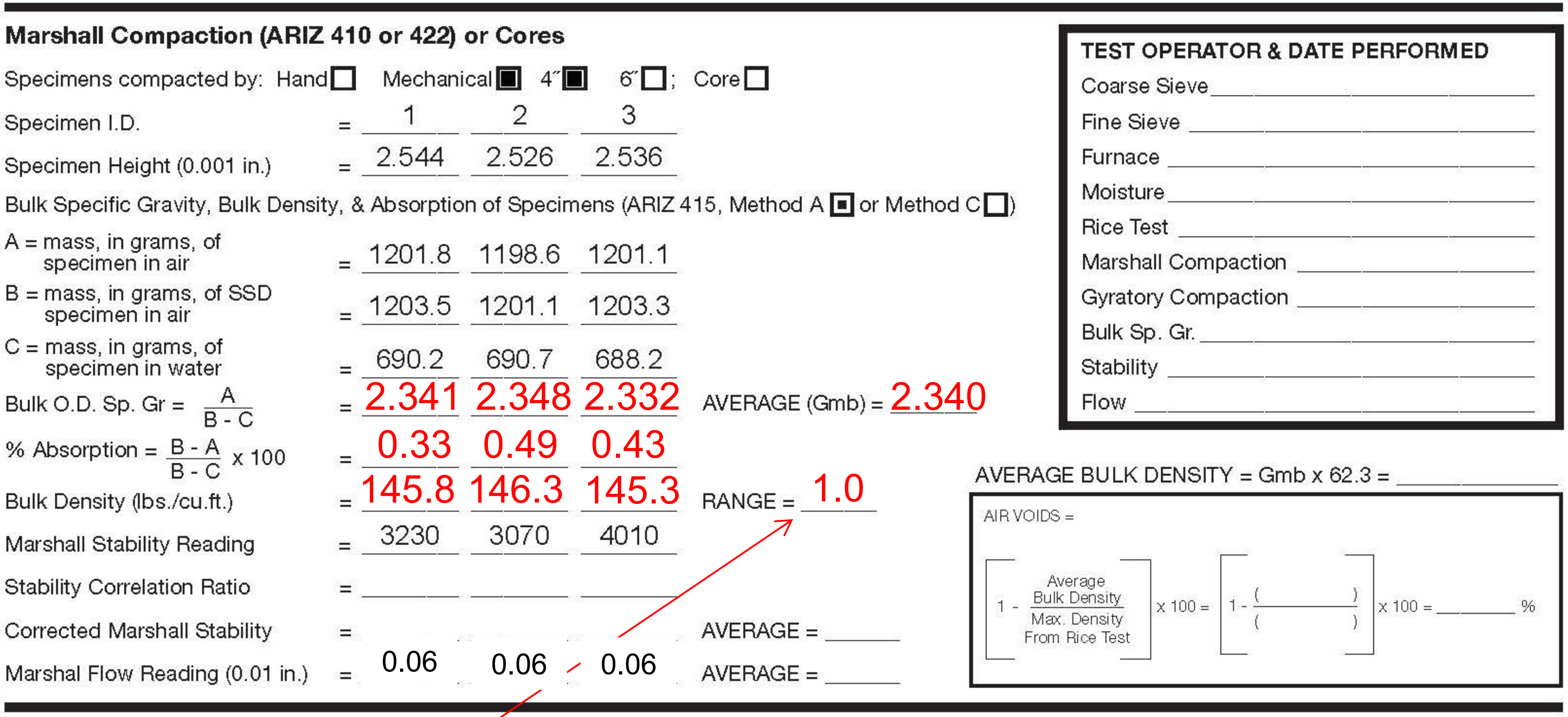
AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

2.341 X 62.3 = 145.8443

2.348 X 62.3 = 146.2804

2.332 X 62.3 = 145.2836



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = | |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____
Fine Sieve ____
Furnace ____
Moisture ____
Rice Test ____
Marshall Compaction ____
Gyratory Compaction ____
Bulk Sp. Gr. ____
Stability ____
Flow ____

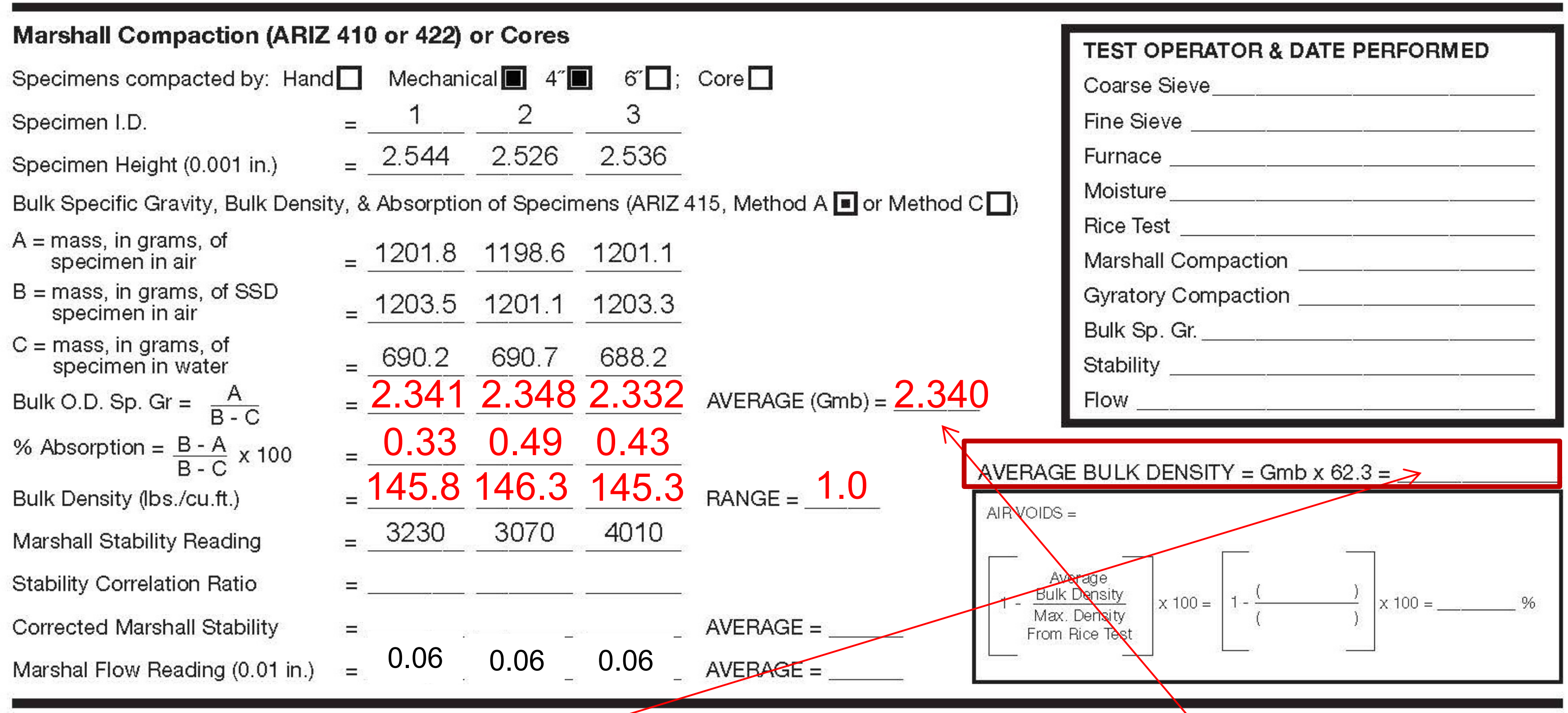
AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_ \%$$

146.3 – 145.3 = 1.0

Determine the range by finding the difference between the highest and lowest Bulk Density.



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | 1 | 2 | 3 | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = | |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____

Fine Sieve ____

Furnace ____

Moisture ____

Rice Test ____

Marshall Compaction ____

Gyratory Compaction ____

Bulk Sp. Gr. ____

Stability ____

Flow ____

AVERAGE BULK DENSITY = Gmb x 62.3 = ____

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_ \%$$

2.340 X 62.3 = 145.782

Determine the average Bulk Specific Gravity. Average the three Bulk Specific Gravities ( 2.341+2.348+2.332)/3 = 2.340.

Determine the Average Bulk Densities. Multiply the Average Bulk Specific Gravity x 62.3, record this to 2 (0.0) decimal places, rounded.

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | |
| Corrected Marshall Stability | = | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________

Fine Sieve ____________

Furnace ____________

Moisture ____________

Rice Test ____________

Marshall Compaction ____________

Gyratory Compaction ____________

Bulk Sp. Gr. ____________

Stability ____________

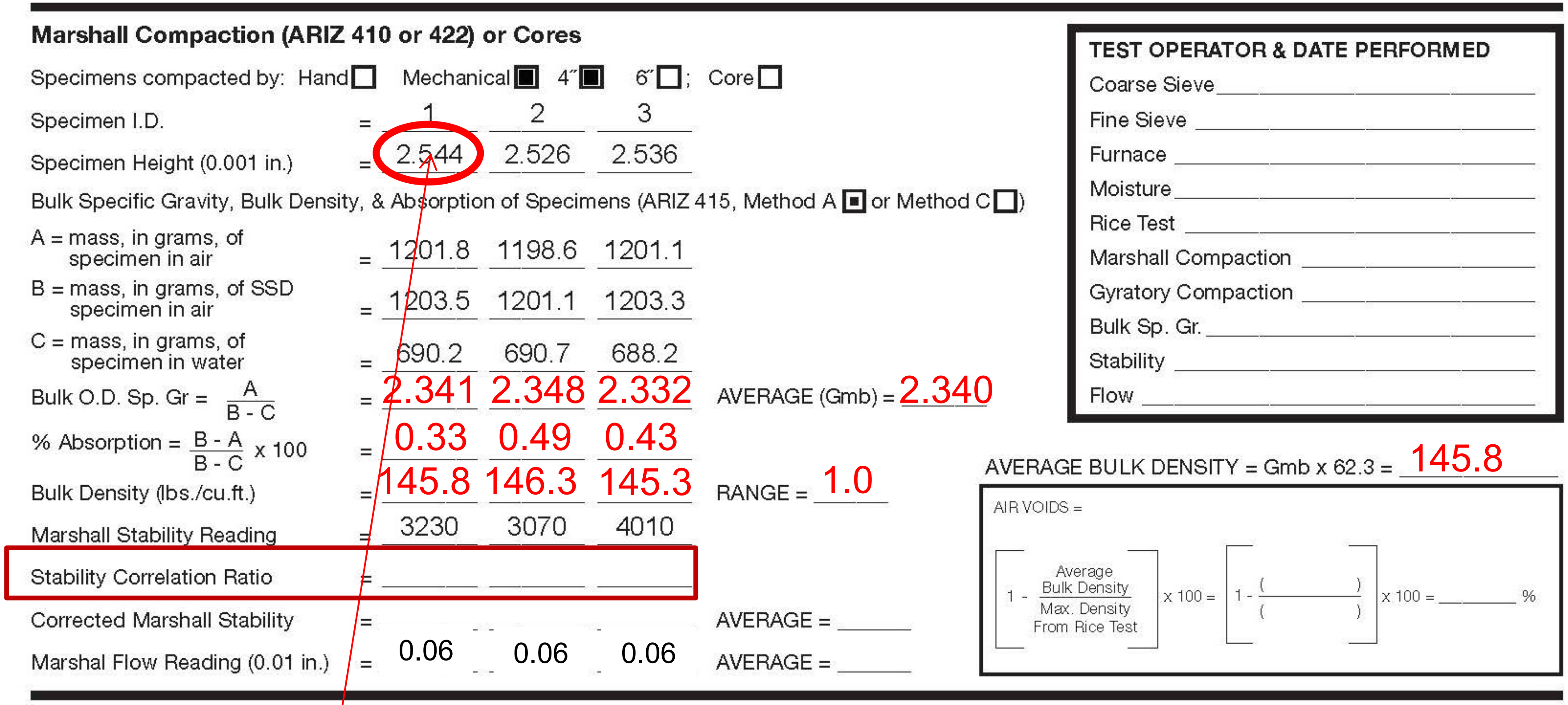
Flow ____________

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \underline{\qquad}\ \%$$

2.340 X 62.3 = 145.782



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ________

Fine Sieve ________

Furnace ________

Moisture ________

Rice Test ________

Marshall Compaction ________

Gyratory Compaction ________

Bulk Sp. Gr. ________

Stability ________

Flow ________

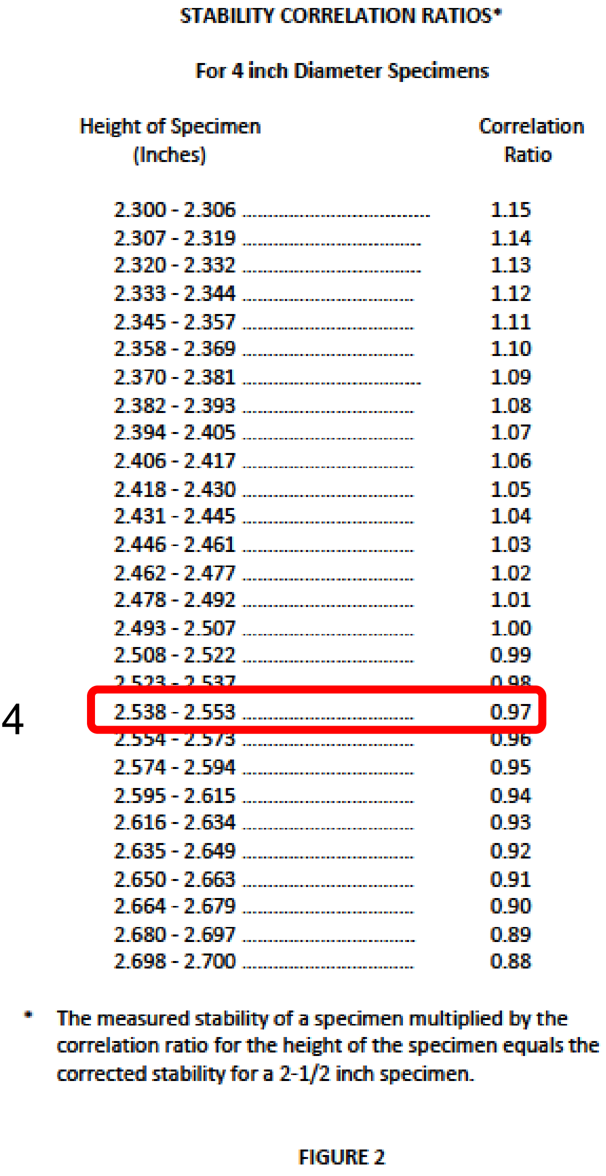
AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_ \%$$

Determine the Stability Correlation Ratio. Using the chart, find the Specimen Height. Then to the right of that height record the Correlation Ratio.

Height of Sample 1



### STABILITY CORRELATION RATIOS*

For 4 inch Diameter Specimens

| Height of Specimen (Inches) | Correlation Ratio |
|---|---|
| 2.300 - 2.306 | 1.15 |
| 2.307 - 2.319 | 1.14 |
| 2.320 - 2.332 | 1.13 |
| 2.333 - 2.344 | 1.12 |
| 2.345 - 2.357 | 1.11 |
| 2.358 - 2.369 | 1.10 |
| 2.370 - 2.381 | 1.09 |
| 2.382 - 2.393 | 1.08 |
| 2.394 - 2.405 | 1.07 |
| 2.406 - 2.417 | 1.06 |
| 2.418 - 2.430 | 1.05 |
| 2.431 - 2.445 | 1.04 |
| 2.446 - 2.461 | 1.03 |
| 2.462 - 2.477 | 1.02 |
| 2.478 - 2.492 | 1.01 |
| 2.493 - 2.507 | 1.00 |
| 2.508 - 2.522 | 0.99 |
| 2.523 - 2.537 | 0.98 |
| 2.538 - 2.553 | 0.97 |
| 2.554 - 2.573 | 0.96 |
| 2.574 - 2.594 | 0.95 |
| 2.595 - 2.615 | 0.94 |
| 2.616 - 2.634 | 0.93 |
| 2.635 - 2.649 | 0.92 |
| 2.650 - 2.663 | 0.91 |
| 2.664 - 2.679 | 0.90 |
| 2.680 - 2.697 | 0.89 |
| 2.698 - 2.700 | 0.88 |

* The measured stability of a specimen multiplied by the correlation ratio for the height of the specimen equals the corrected stability for a 2-1/2 inch specimen.

FIGURE 2

2.544

Height of Sample 1 = 2.544. It fits between 2.538 – 2.553. The Correlation Ratio is 0.97.

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ■ 4″ ■ 6″ ☐; Core ☐

| | | | | | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ▣ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | 0.97 | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = | |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______

Fine Sieve ______

Furnace ______

Moisture ______

Rice Test ______

Marshall Compaction ______

Gyratory Compaction ______

Bulk Sp. Gr. ______

Stability ______

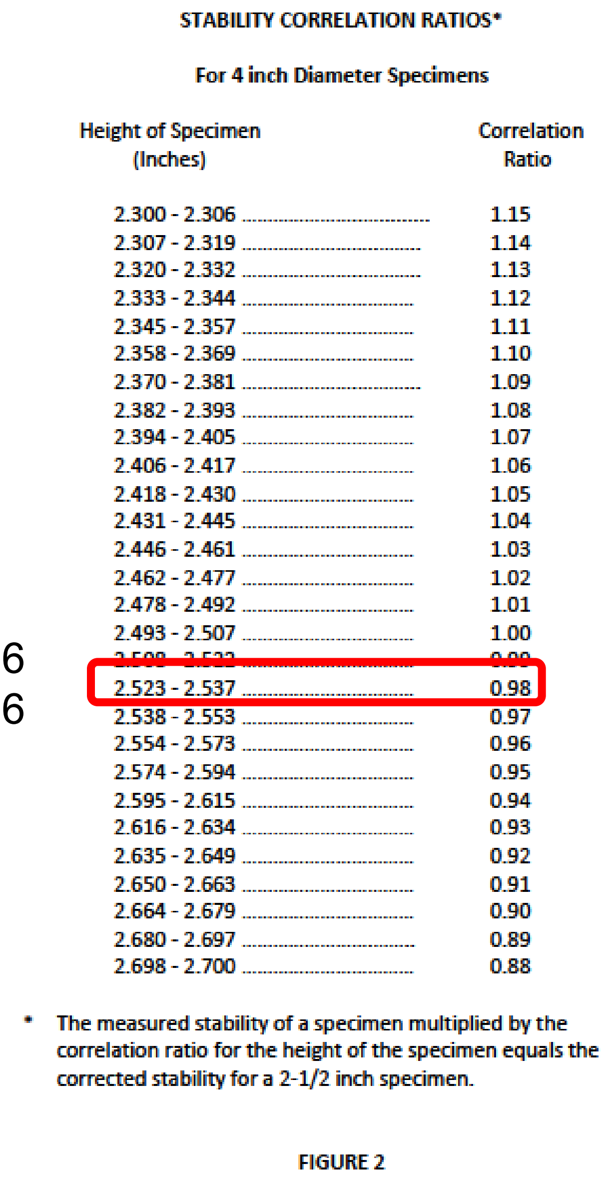
Flow ______

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_\_ \%$$

Continue to determine the Stability Correlation Ratio for Samples 2 & 3.



## STABILITY CORRELATION RATIOS*

For 4 inch Diameter Specimens

| Height of Specimen (Inches) | Correlation Ratio |
|---|---|
| 2.300 - 2.306 | 1.15 |
| 2.307 - 2.319 | 1.14 |
| 2.320 - 2.332 | 1.13 |
| 2.333 - 2.344 | 1.12 |
| 2.345 - 2.357 | 1.11 |
| 2.358 - 2.369 | 1.10 |
| 2.370 - 2.381 | 1.09 |
| 2.382 - 2.393 | 1.08 |
| 2.394 - 2.405 | 1.07 |
| 2.406 - 2.417 | 1.06 |
| 2.418 - 2.430 | 1.05 |
| 2.431 - 2.445 | 1.04 |
| 2.446 - 2.461 | 1.03 |
| 2.462 - 2.477 | 1.02 |
| 2.478 - 2.492 | 1.01 |
| 2.493 - 2.507 | 1.00 |
| 2.508 - 2.522 | 0.99 |
| 2.523 - 2.537 | 0.98 |
| 2.538 - 2.553 | 0.97 |
| 2.554 - 2.573 | 0.96 |
| 2.574 - 2.594 | 0.95 |
| 2.595 - 2.615 | 0.94 |
| 2.616 - 2.634 | 0.93 |
| 2.635 - 2.649 | 0.92 |
| 2.650 - 2.663 | 0.91 |
| 2.664 - 2.679 | 0.90 |
| 2.680 - 2.697 | 0.89 |
| 2.698 - 2.700 | 0.88 |

* The measured stability of a specimen multiplied by the correlation ratio for the height of the specimen equals the corrected stability for a 2-1/2 inch specimen.

FIGURE 2

2.526

2.536

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | |
| Corrected Marshall Stability | = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) | = | 6 | 6 | 7 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________________

Fine Sieve ____________________

Furnace ____________________

Moisture ____________________

Rice Test ____________________

Marshall Compaction ____________________

Gyratory Compaction ____________________

Bulk Sp. Gr. ____________________

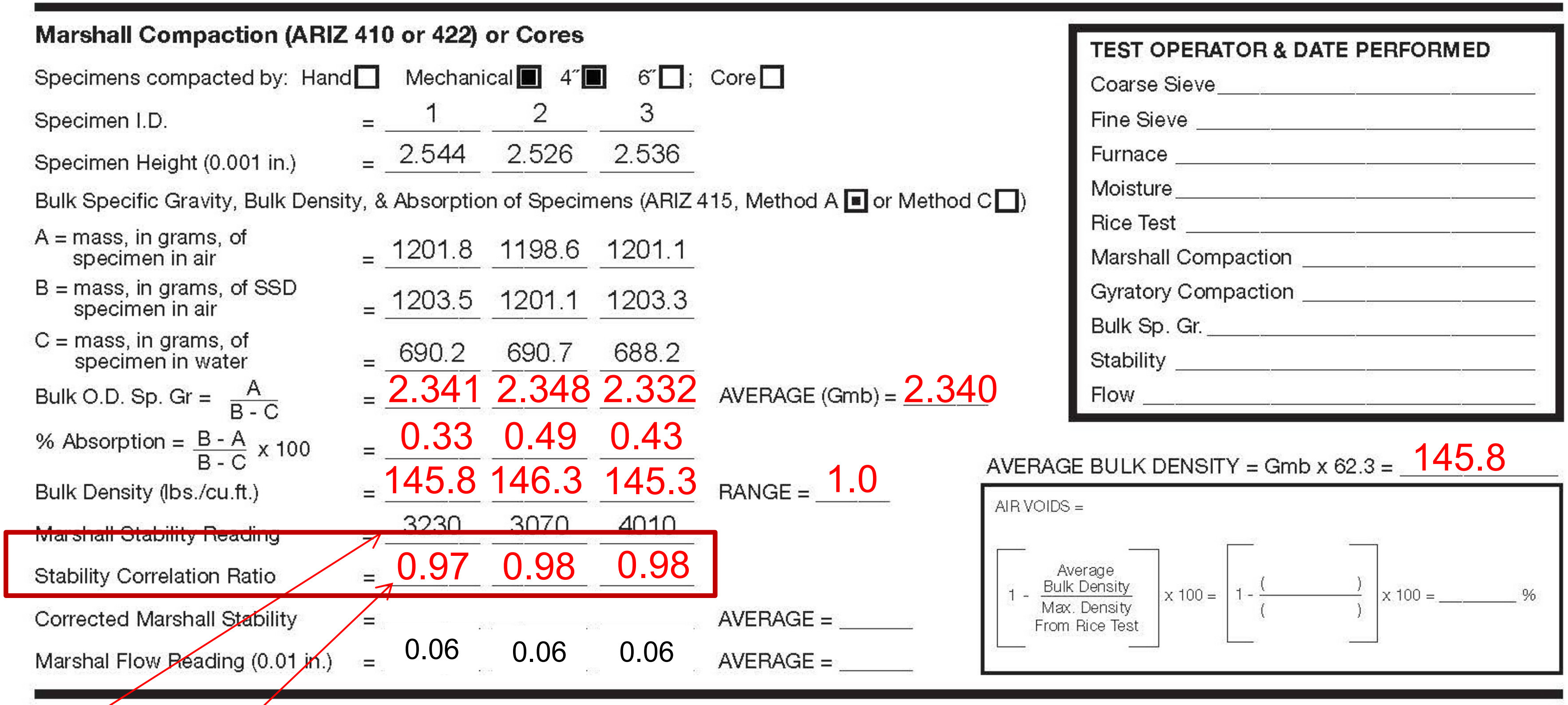
Stability ____________________

Flow ____________________

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | |
| Corrected Marshall Stability | = | | | | AVERAGE = ______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = ______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______

Fine Sieve ______

Furnace ______

Moisture ______

Rice Test ______

Marshall Compaction ______

Gyratory Compaction ______

Bulk Sp. Gr. ______

Stability ______

Flow ______

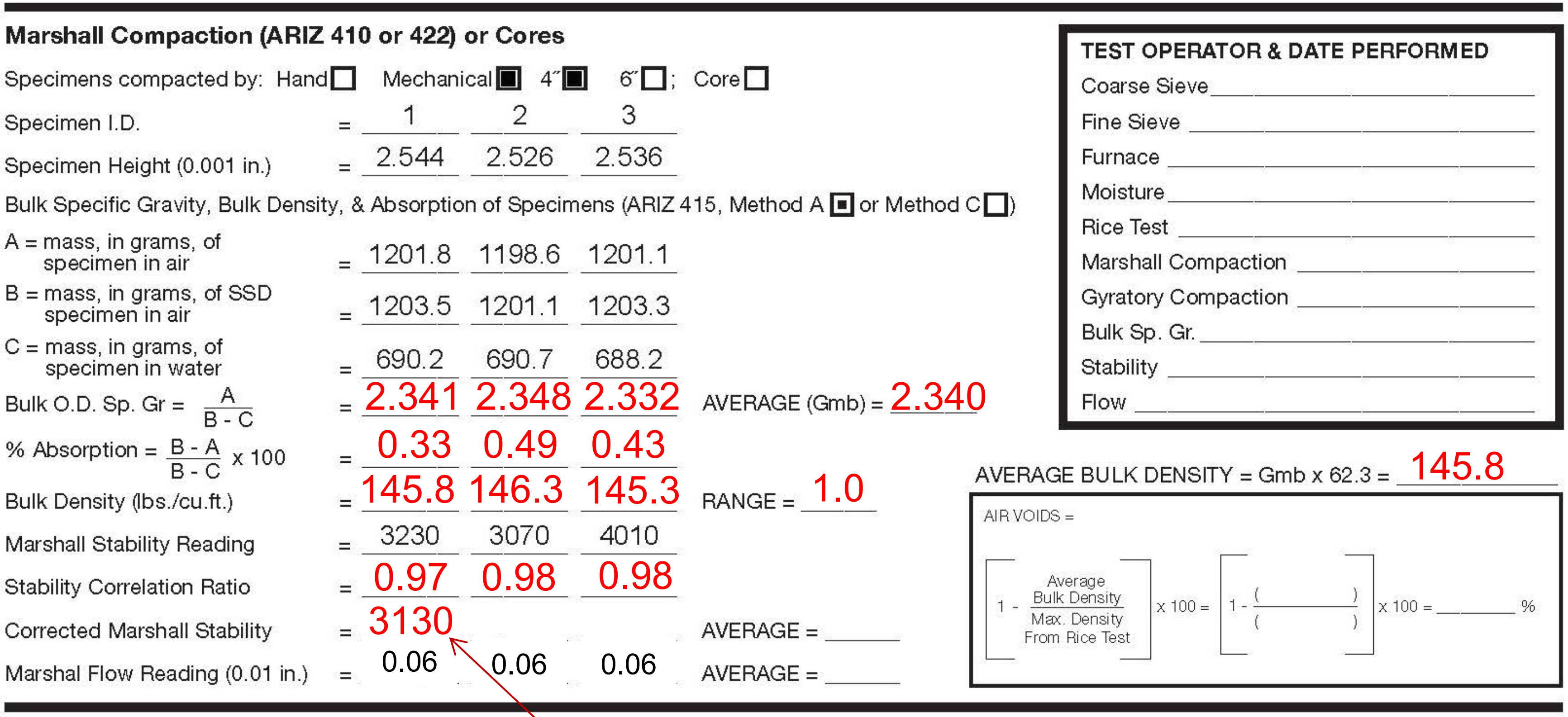
AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_\_ \%$$

3230 X 0.97 = 3133.1

Determine the Corrected Marshall Stability. Recorded to the 10 pounds force.



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 |  |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 |  |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 |  |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 |  |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 |  |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 |  |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 |  |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 |  |
| Corrected Marshall Stability | = | 3130 |  |  | AVERAGE = ______ |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = ______ |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______

Fine Sieve ______

Furnace ______

Moisture ______

Rice Test ______

Marshall Compaction ______

Gyratory Compaction ______

Bulk Sp. Gr. ______

Stability ______

Flow ______

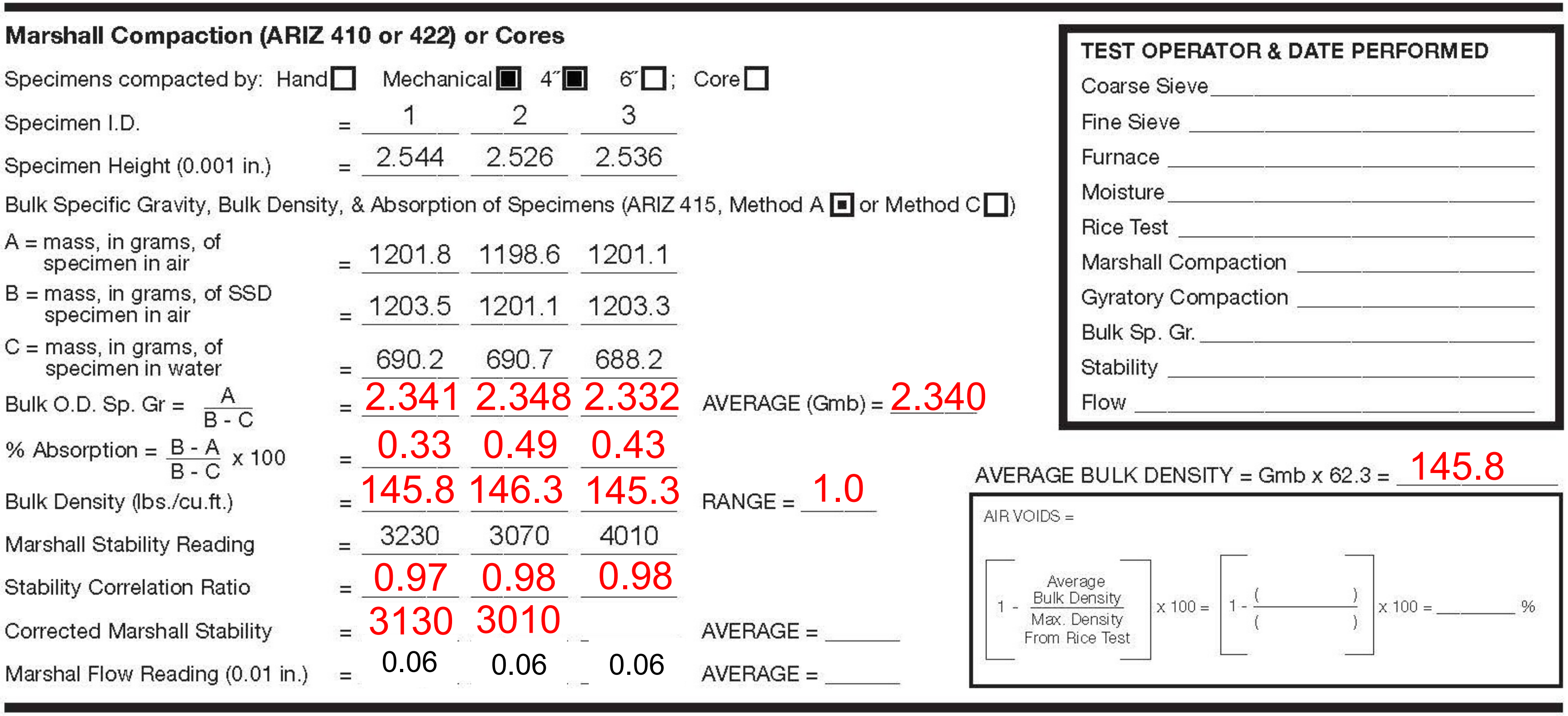
AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\quad)}{(\quad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

3230 X 0.97 = 3133.1

Nearest 10 Pounds Force.



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = mass, in grams, of specimen in air = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio = | 0.97 | 0.98 | 0.98 | |
| Corrected Marshall Stability = | 3130 | 3010 | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) = | 0.06 | 0.06 | 0.06 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve

Fine Sieve

Furnace

Moisture

Rice Test

Marshall Compaction

Gyratory Compaction

Bulk Sp. Gr.

Stability

Flow

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_ \%$$

3230 X 0.97 = 3133.1

3070 X 0.98 = 3008.6

## Marshall Compaction (ARIZ 410 or 422) or Cores

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | 1 | 2 | 3 | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C} \times 100$ | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | | |
| Corrected Marshall Stability | = | 3130 | 3010 | 3930 | AVERAGE = | |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________

Fine Sieve ____________

Furnace ____________

Moisture ____________

Rice Test ____________

Marshall Compaction ____________

Gyratory Compaction ____________

Bulk Sp. Gr. ____________

Stability ____________

Flow ____________

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

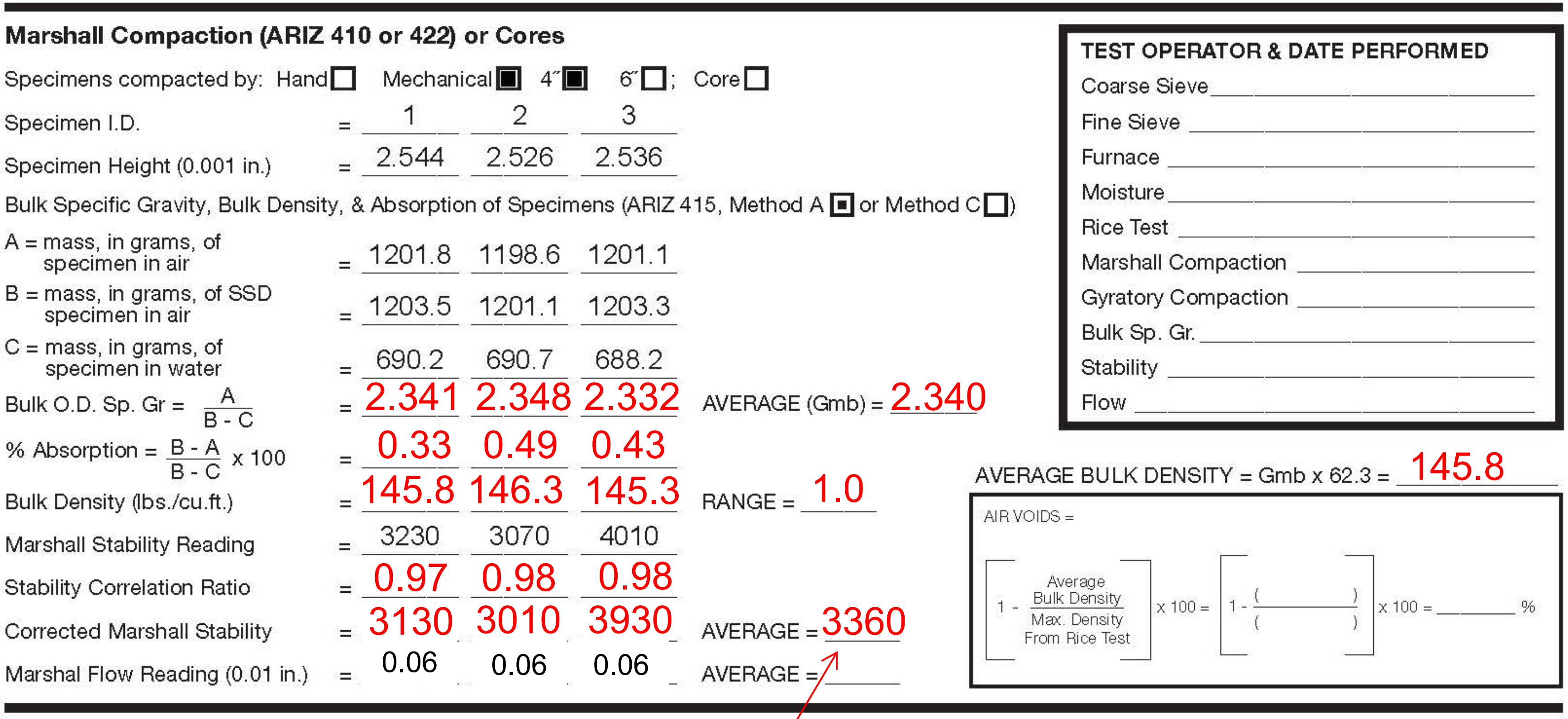
AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

3230 X 0.97 = 3133.1

3070 X 0.98 = 3008.6

4010 X 0.98 = 3929.8



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | | |
|---|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | | |
|---|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = | 2.340 |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | 0.33 | 0.49 | 0.43 | | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = | 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | | |
| Corrected Marshall Stability | = | 3130 | 3010 | 3930 | AVERAGE = | 3360 |
| Marshal Flow Reading (0.01 in.) | = | 0.06 | 0.06 | 0.06 | AVERAGE = | |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ________

Fine Sieve ________

Furnace ________

Moisture ________

Rice Test ________

Marshall Compaction ________

Gyratory Compaction ________

Bulk Sp. Gr. ________

Stability ________

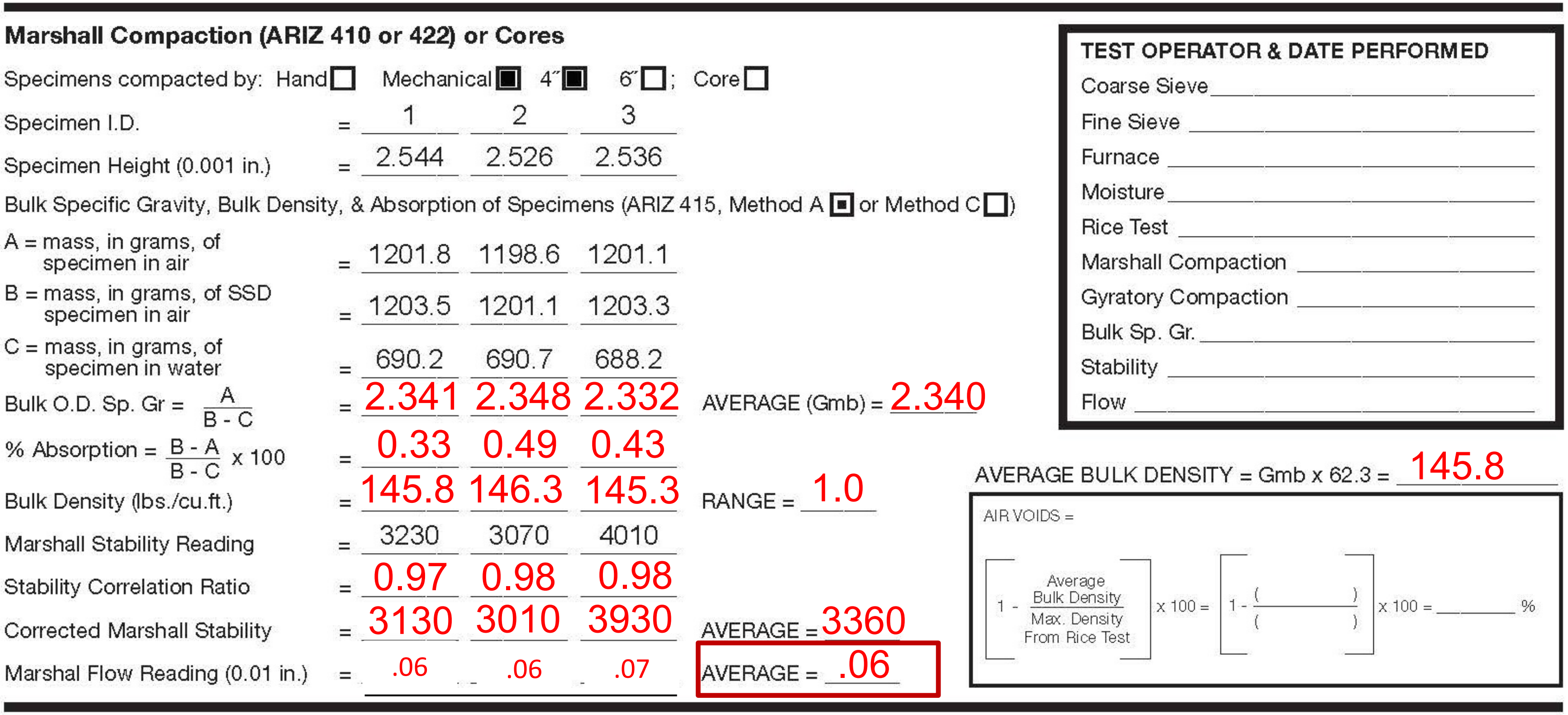
Flow ________

AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_ \%$$

Determine the Average Corrected Marshall Stability. Add all three Marshall Stability and divide by 3. (3130+3010+3930)/3=3360. This is reported to the nearest 10 pounds force.



**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.544 | 2.526 | 2.536 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☒ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1201.8 | 1198.6 | 1201.1 | |
| B = mass, in grams, of SSD specimen in air | = | 1203.5 | 1201.1 | 1203.3 | |
| C = mass, in grams, of specimen in water | = | 690.2 | 690.7 | 688.2 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B-C}$ | = | 2.341 | 2.348 | 2.332 | AVERAGE (Gmb) = 2.340 |
| % Absorption = $\frac{B-A}{B-C} \times 100$ | = | 0.33 | 0.49 | 0.43 | |
| Bulk Density (lbs./cu.ft.) | = | 145.8 | 146.3 | 145.3 | RANGE = 1.0 |
| Marshall Stability Reading | = | 3230 | 3070 | 4010 | |
| Stability Correlation Ratio | = | 0.97 | 0.98 | 0.98 | |
| Corrected Marshall Stability | = | 3130 | 3010 | 3930 | AVERAGE = 3360 |
| Marshal Flow Reading (0.01 in.) | = | .06 | .06 | .07 | AVERAGE = .06 |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ____________

Fine Sieve ____________

Furnace ____________

Moisture ____________

Rice Test ____________

Marshall Compaction ____________

Gyratory Compaction ____________

Bulk Sp. Gr. ____________

Stability ____________

Flow ____________

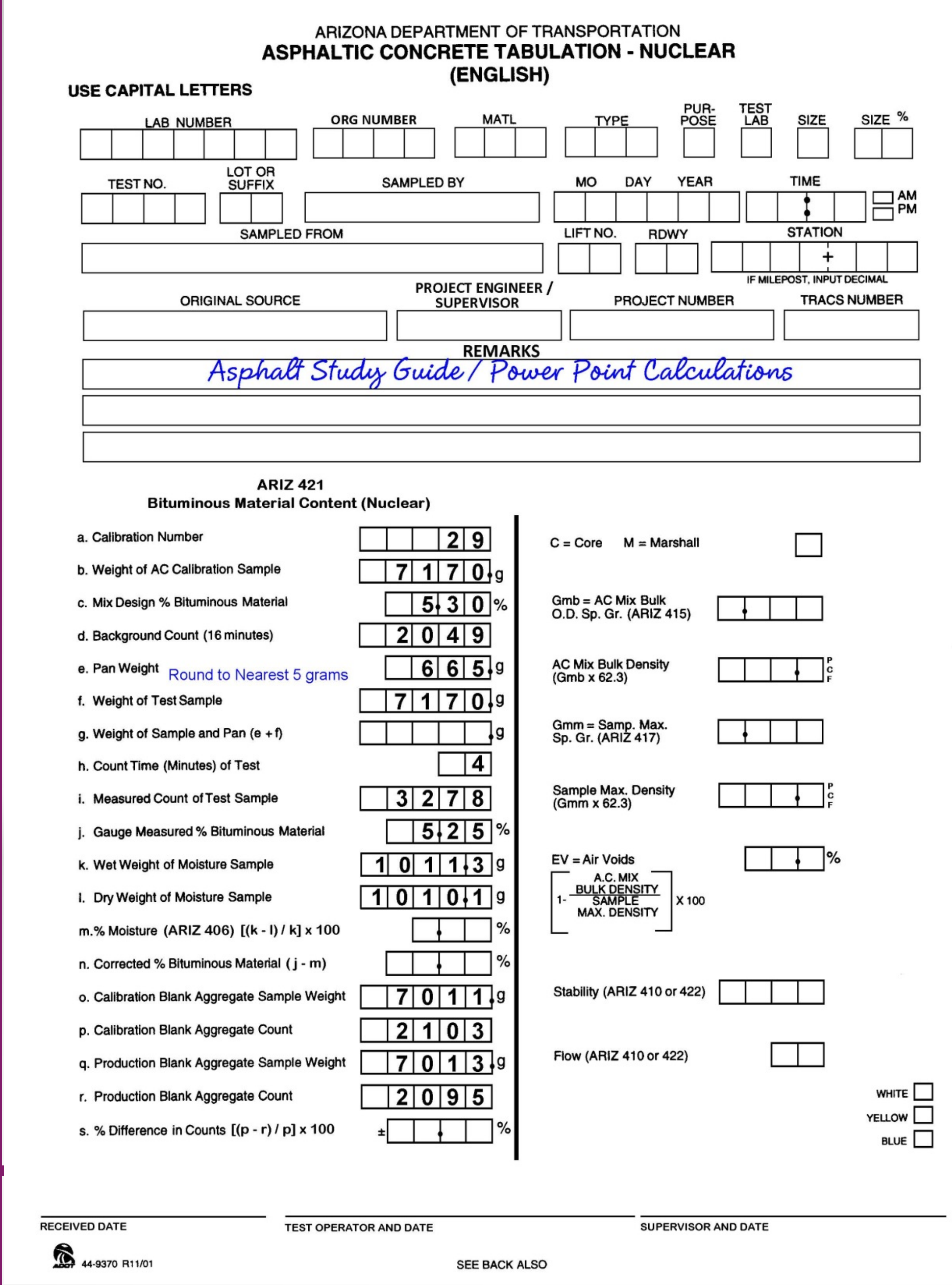
AVERAGE BULK DENSITY = Gmb x 62.3 = 145.8

AIR VOIDS =

$$\left[1-\frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1-\frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_ \%$$

Determine the Average Marshal Flow Reading. Add the three Marshal Flow Readings and divide by 3. (.06+.06+.07)/3=.06. Average the Flow to the nearest 0.01 inch.

# ARIZ 421 Asphalt Content by Nuclear Method



ARIZONA DEPARTMENT OF TRANSPORTATION

**ASPHALTIC CONCRETE TABULATION - NUCLEAR**

**(ENGLISH)**

**USE CAPITAL LETTERS**

LAB NUMBER ORG NUMBER MATL TYPE PURPOSE TEST LAB SIZE SIZE %

TEST NO. LOT OR SUFFIX SAMPLED BY MO DAY YEAR TIME ☐ AM ☐ PM

SAMPLED FROM LIFT NO. RDWY STATION +

IF MILEPOST, INPUT DECIMAL

ORIGINAL SOURCE PROJECT ENGINEER / SUPERVISOR PROJECT NUMBER TRACS NUMBER

REMARKS: Asphalt Study Guide / Power Point Calculations

**ARIZ 421**

**Bituminous Material Content (Nuclear)**

a. Calibration Number: 29

b. Weight of AC Calibration Sample: 7170. g

c. Mix Design % Bituminous Material: 5.30 %

d. Background Count (16 minutes): 2049

e. Pan Weight Round to Nearest 5 grams: 665. g

f. Weight of Test Sample: 7170. g

g. Weight of Sample and Pan (e + f): . g

h. Count Time (Minutes) of Test: 4

i. Measured Count of Test Sample: 3278

j. Gauge Measured % Bituminous Material: 5.25 %

k. Wet Weight of Moisture Sample: 1011.3 g

l. Dry Weight of Moisture Sample: 1010.1 g

m. % Moisture (ARIZ 406) [(k - l) / k] x 100: . %

n. Corrected % Bituminous Material ( j - m): . %

o. Calibration Blank Aggregate Sample Weight: 7011. g

p. Calibration Blank Aggregate Count: 2103

q. Production Blank Aggregate Sample Weight: 7013. g

r. Production Blank Aggregate Count: 2095

s. % Difference in Counts [(p - r) / p] x 100: ± . %

C = Core M = Marshall ☐

Gmb = AC Mix Bulk O.D. Sp. Gr. (ARIZ 415): .

AC Mix Bulk Density (Gmb x 62.3): . PCF

Gmm = Samp. Max. Sp. Gr. (ARIZ 417): .

Sample Max. Density (Gmm x 62.3): . PCF

EV = Air Voids: . %

$$\left[1-\frac{\text{A.C. MIX BULK DENSITY}}{\text{SAMPLE MAX. DENSITY}}\right] \times 100$$

Stability (ARIZ 410 or 422):

Flow (ARIZ 410 or 422):

WHITE ☐

YELLOW ☐

BLUE ☐

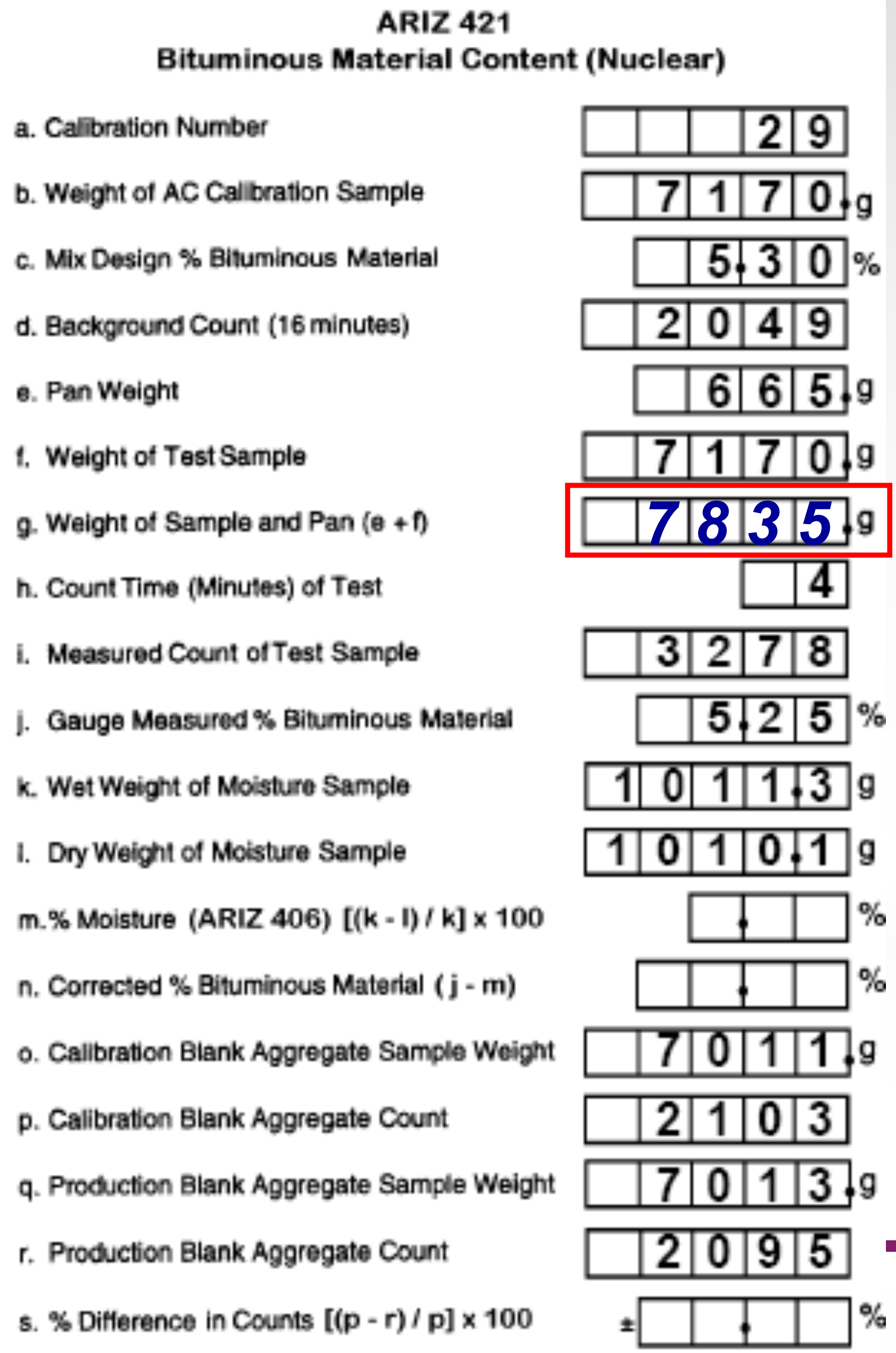
RECEIVED DATE

TEST OPERATOR AND DATE

SUPERVISOR AND DATE

44-9370 R11/01

SEE BACK ALSO



ARIZ 421
Bituminous Material Content (Nuclear)

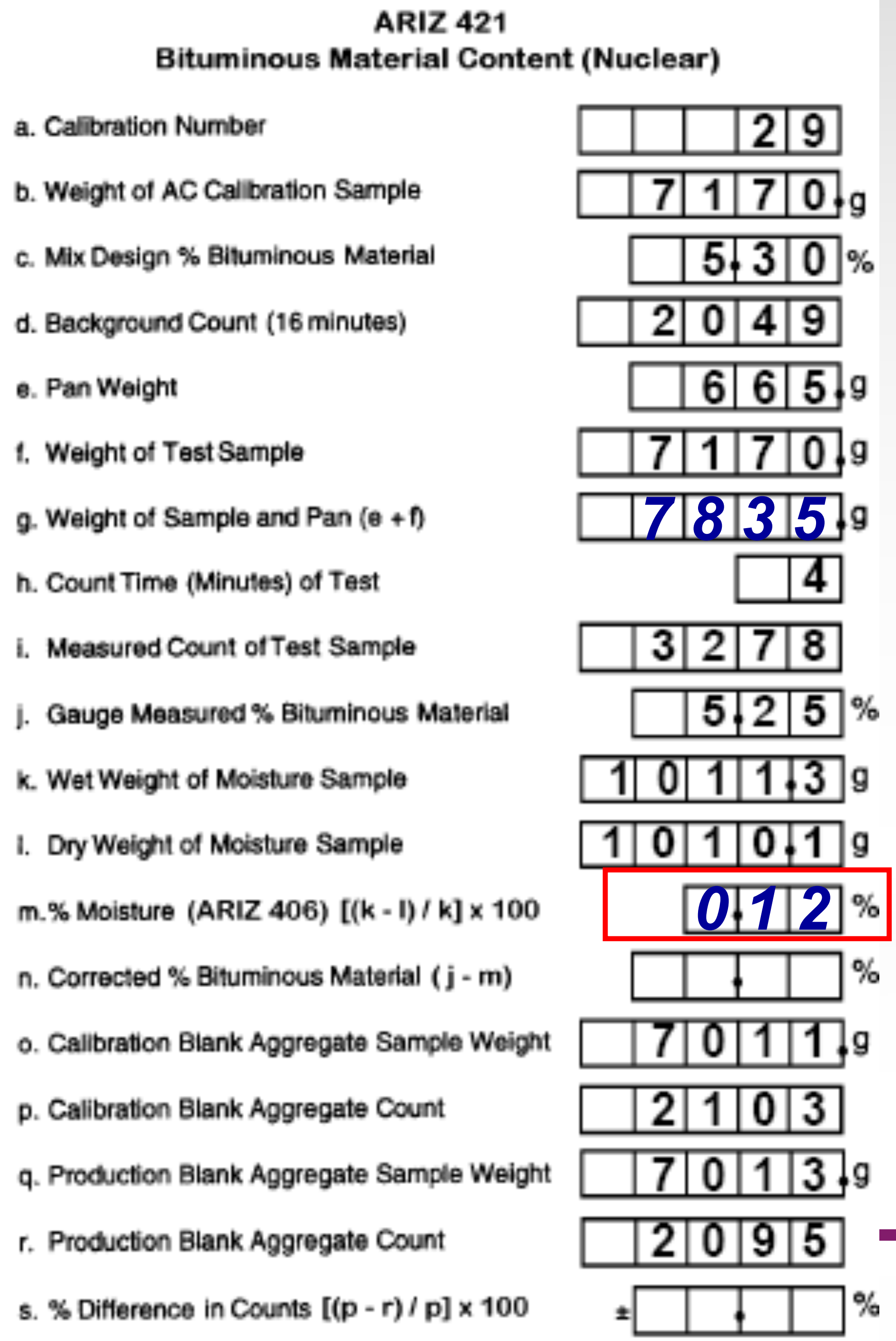
| | | |
|---|---|---|
| a. Calibration Number | 29 | |
| b. Weight of AC Calibration Sample | 7170. | g |
| c. Mix Design % Bituminous Material | 5.30 | % |
| d. Background Count (16 minutes) | 2049 | |
| e. Pan Weight | 665. | g |
| f. Weight of Test Sample | 7170. | g |
| g. Weight of Sample and Pan (e + f) | *7835*. | g |
| h. Count Time (Minutes) of Test | 4 | |
| i. Measured Count of Test Sample | 3278 | |
| j. Gauge Measured % Bituminous Material | 5.25 | % |
| k. Wet Weight of Moisture Sample | 1011.3 | g |
| l. Dry Weight of Moisture Sample | 1010.1 | g |
| m. % Moisture (ARIZ 406) [(k - l) / k] x 100 | . | % |
| n. Corrected % Bituminous Material ( j - m) | . | % |
| o. Calibration Blank Aggregate Sample Weight | 7011. | g |
| p. Calibration Blank Aggregate Count | 2103 | |
| q. Production Blank Aggregate Sample Weight | 7013. | g |
| r. Production Blank Aggregate Count | 2095 | |
| s. % Difference in Counts [(p - r) / p] x 100 | ± . | % |

# Weight of Sample + Pan

## (e + f ) =

**665 + 7170 = *7835***

Round to the Nearest 5 grams



ARIZ 421
Bituminous Material Content (Nuclear)

a. Calibration Number 29
b. Weight of AC Calibration Sample 7170. g
c. Mix Design % Bituminous Material 5.30 %
d. Background Count (16 minutes) 2049
e. Pan Weight 665. g
f. Weight of Test Sample 7170. g
g. Weight of Sample and Pan (e + f) *7835*. g
h. Count Time (Minutes) of Test 4
i. Measured Count of Test Sample 3278
j. Gauge Measured % Bituminous Material 5.25 %
k. Wet Weight of Moisture Sample 1011.3 g
l. Dry Weight of Moisture Sample 1010.1 g
m. % Moisture (ARIZ 406) [(k - l) / k] x 100 *0.12* %
n. Corrected % Bituminous Material ( j - m) . %
o. Calibration Blank Aggregate Sample Weight 7011. g
p. Calibration Blank Aggregate Count 2103
q. Production Blank Aggregate Sample Weight 7013. g
r. Production Blank Aggregate Count 2095
s. % Difference in Counts [(p - r) / p] x 100 ± . %

# Moisture Calculation

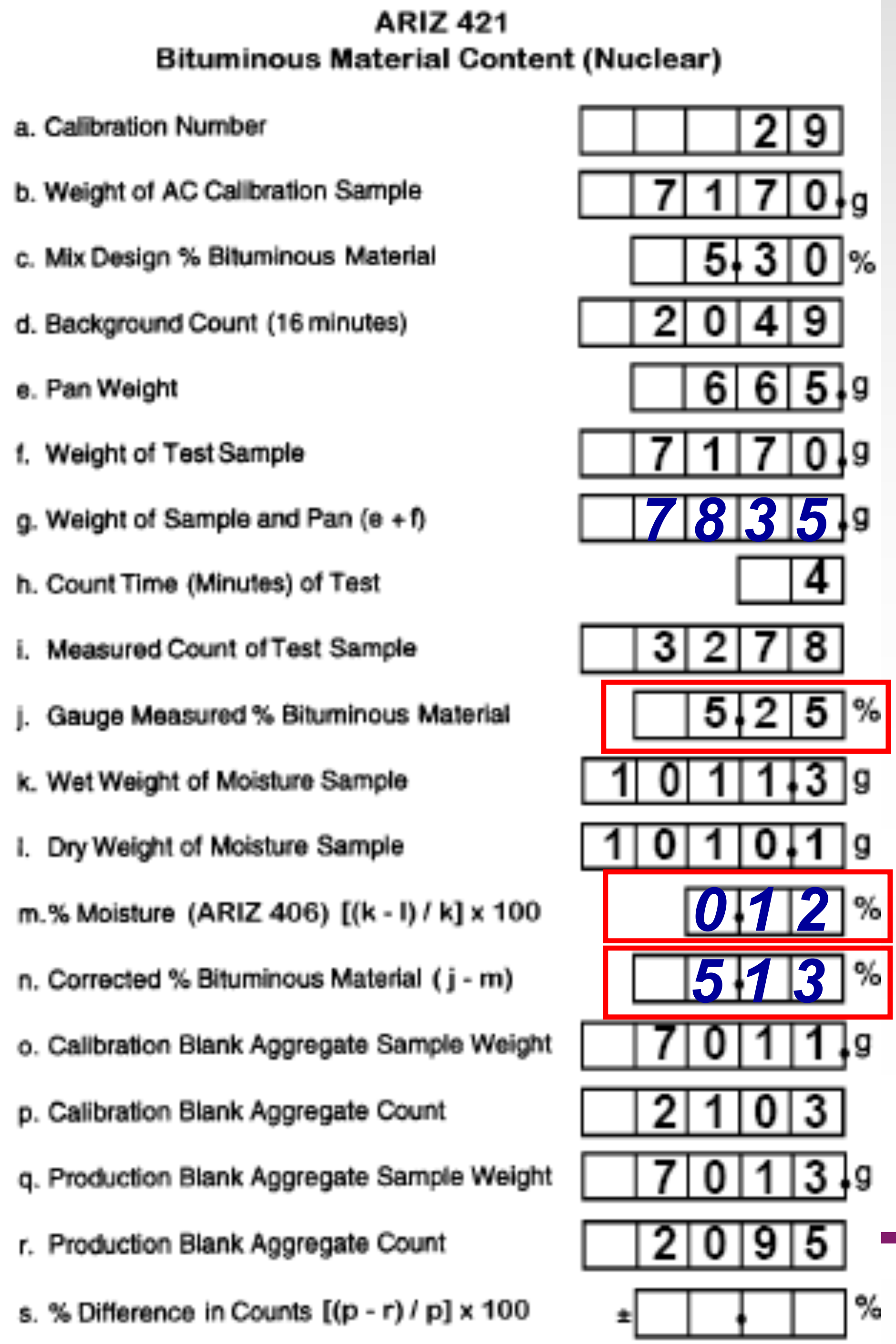
**[ (k – l) / k) ] x 100**

**1011.3 – 1010.1 =** ***1.2***

***1.2*** **/ 1011.3 =** ***0.0011865***

***0.0011865 x 100 =*** $0.11\underline{8}65$

# Corrected % Asphalt



ARIZ 421
Bituminous Material Content (Nuclear)

a. Calibration Number 29

b. Weight of AC Calibration Sample 7170. g

c. Mix Design % Bituminous Material 5.30 %

d. Background Count (16 minutes) 2049

e. Pan Weight 665. g

f. Weight of Test Sample 7170. g

g. Weight of Sample and Pan (e + f) *7835.* g

h. Count Time (Minutes) of Test 4

i. Measured Count of Test Sample 3278

j. Gauge Measured % Bituminous Material 5.25 %

k. Wet Weight of Moisture Sample 1011.3 g

l. Dry Weight of Moisture Sample 1010.1 g

m. % Moisture (ARIZ 406) [(k - l) / k] x 100 *0.12* %

n. Corrected % Bituminous Material ( j - m) *5.13* %

o. Calibration Blank Aggregate Sample Weight 7011. g

p. Calibration Blank Aggregate Count 2103

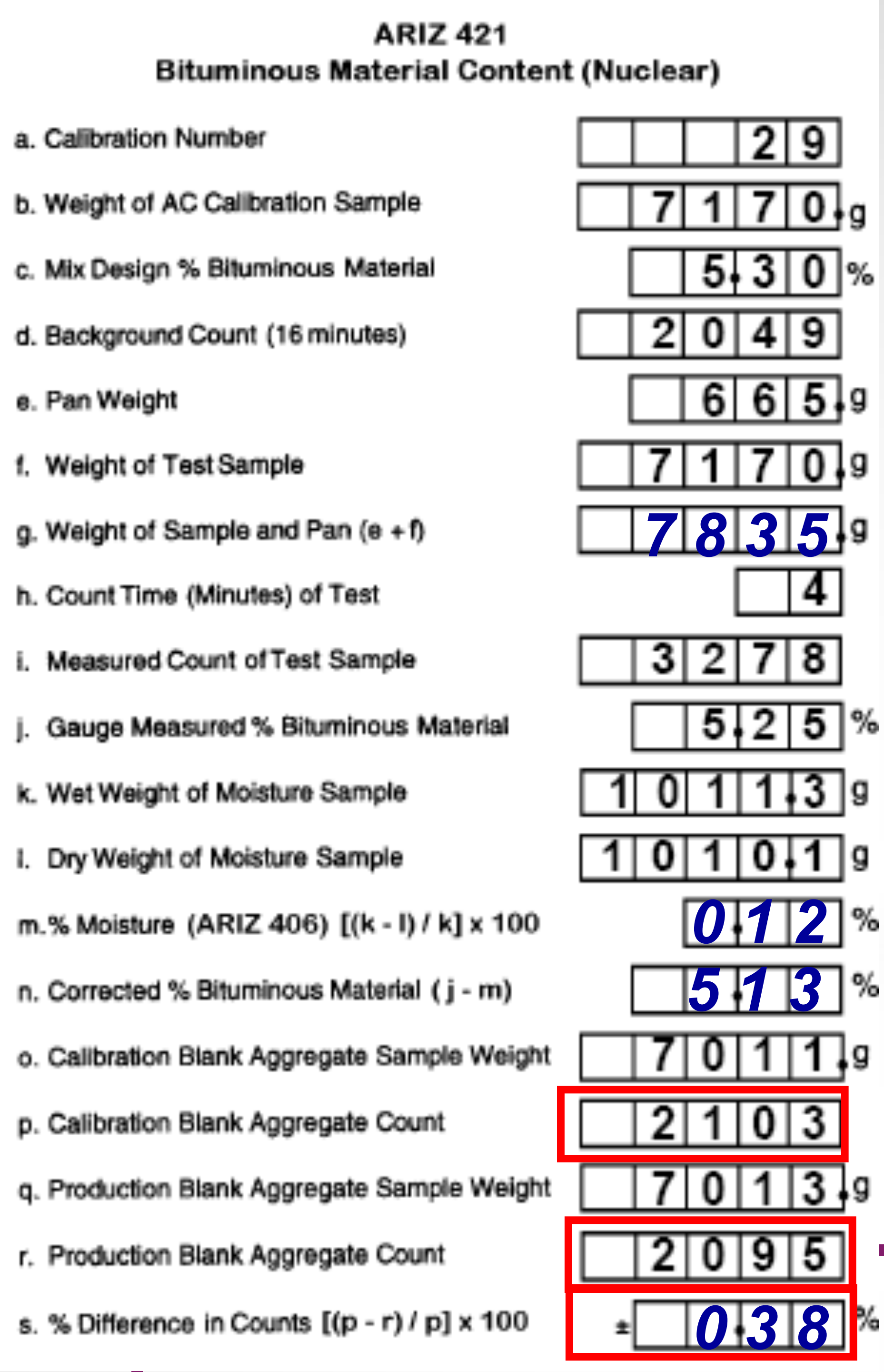
q. Production Blank Aggregate Sample Weight 7013. g

r. Production Blank Aggregate Count 2095

s. % Difference in Counts [(p - r) / p] x 100 ± . %

= (j – m)

5.25 – 0.12 = *5.13*



ARIZ 421
Bituminous Material Content (Nuclear)

| | | |
|---|---|---|
| a. Calibration Number | 29 | |
| b. Weight of AC Calibration Sample | 7170 | g |
| c. Mix Design % Bituminous Material | 5.30 | % |
| d. Background Count (16 minutes) | 2049 | |
| e. Pan Weight | 665 | g |
| f. Weight of Test Sample | 7170 | g |
| g. Weight of Sample and Pan (e + f) | *7835* | g |
| h. Count Time (Minutes) of Test | 4 | |
| i. Measured Count of Test Sample | 3278 | |
| j. Gauge Measured % Bituminous Material | 5.25 | % |
| k. Wet Weight of Moisture Sample | 1011.3 | g |
| l. Dry Weight of Moisture Sample | 1010.1 | g |
| m. % Moisture (ARIZ 406) [(k - l) / k] x 100 | *0.12* | % |
| n. Corrected % Bituminous Material ( j - m) | *5.13* | % |
| o. Calibration Blank Aggregate Sample Weight | 7011 | g |
| p. Calibration Blank Aggregate Count | 2103 | |
| q. Production Blank Aggregate Sample Weight | 7013 | g |
| r. Production Blank Aggregate Count | 2095 | |
| s. % Difference in Counts [(p - r) / p] x 100 | ± *0.38* | % |

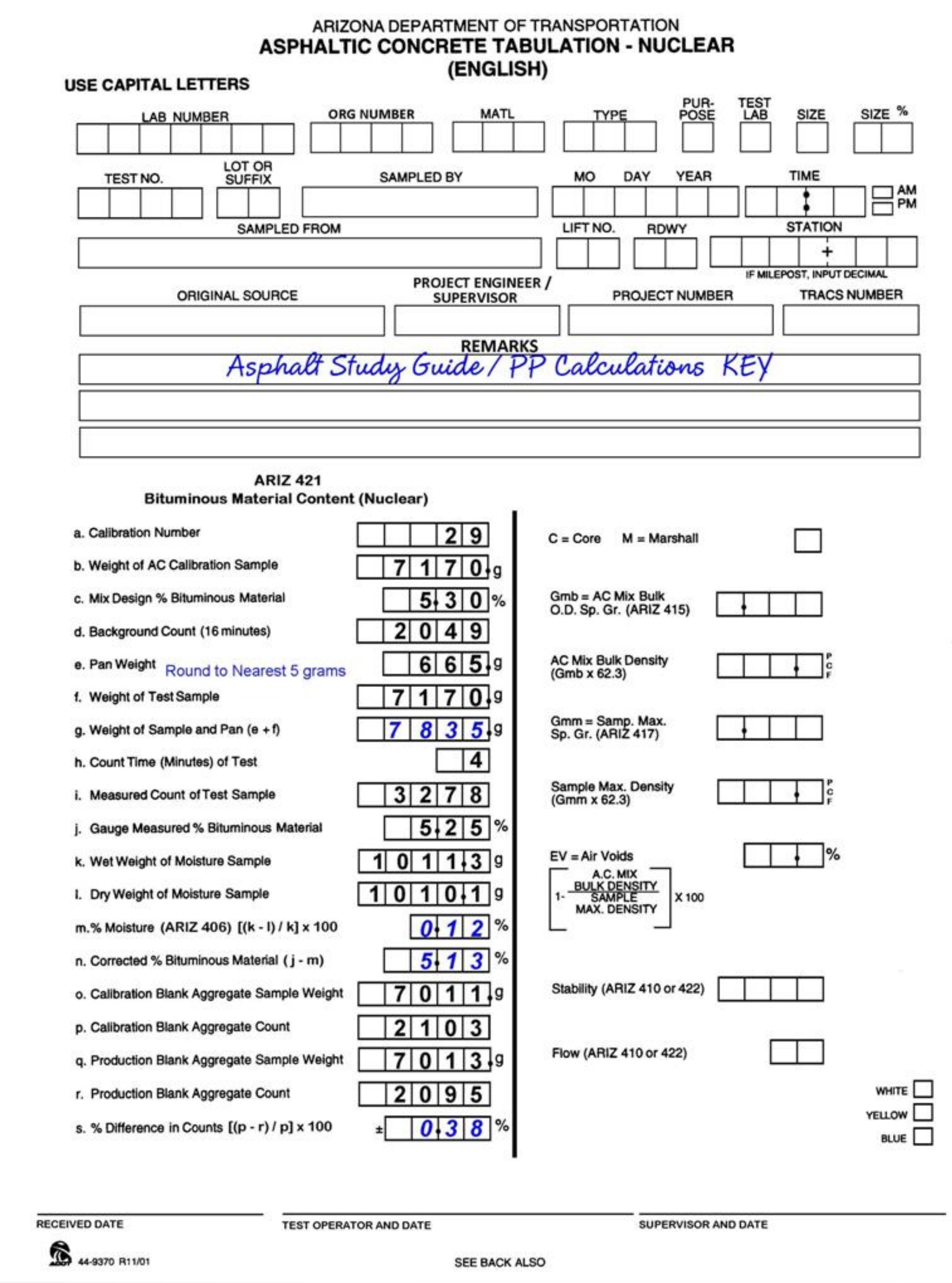
# Difference in Aggregate Counts

**[ (p – r) / p ] x 100**

**2103 – 2095 = *8***

***8* / 2103 = *0.003804***

***0.003804* x 100 = *0.38***



ARIZONA DEPARTMENT OF TRANSPORTATION

**ASPHALTIC CONCRETE TABULATION - NUCLEAR**

**(ENGLISH)**

**USE CAPITAL LETTERS**

LAB NUMBER | ORG NUMBER | MATL | TYPE | PUR-POSE | TEST LAB | SIZE | SIZE %

TEST NO. | LOT OR SUFFIX | SAMPLED BY | MO DAY YEAR | TIME ☐ AM ☐ PM

SAMPLED FROM | LIFT NO. | RDWY | STATION + (IF MILEPOST, INPUT DECIMAL)

ORIGINAL SOURCE | PROJECT ENGINEER / SUPERVISOR | PROJECT NUMBER | TRACS NUMBER

REMARKS

Asphalt Study Guide / PP Calculations KEY

**ARIZ 421**

**Bituminous Material Content (Nuclear)**

| | | |
|---|---|---|
| a. Calibration Number | 29 | |
| b. Weight of AC Calibration Sample | 7170. | g |
| c. Mix Design % Bituminous Material | 5.30 | % |
| d. Background Count (16 minutes) | 2049 | |
| e. Pan Weight Round to Nearest 5 grams | 665. | g |
| f. Weight of Test Sample | 7170. | g |
| g. Weight of Sample and Pan (e + f) | 7835. | g |
| h. Count Time (Minutes) of Test | 4 | |
| i. Measured Count of Test Sample | 3278 | |
| j. Gauge Measured % Bituminous Material | 5.25 | % |
| k. Wet Weight of Moisture Sample | 1011.3 | g |
| l. Dry Weight of Moisture Sample | 1010.1 | g |
| m. % Moisture (ARIZ 406) [(k - l) / k] x 100 | 0.12 | % |
| n. Corrected % Bituminous Material ( j - m) | 5.13 | % |
| o. Calibration Blank Aggregate Sample Weight | 7011. | g |
| p. Calibration Blank Aggregate Count | 2103 | |
| q. Production Blank Aggregate Sample Weight | 7013. | g |
| r. Production Blank Aggregate Count | 2095 | |
| s. % Difference in Counts [(p - r) / p] x 100 | ± 0.38 | % |

C = Core M = Marshall ☐

Gmb = AC Mix Bulk O.D. Sp. Gr. (ARIZ 415)

AC Mix Bulk Density (Gmb x 62.3) PCF

Gmm = Samp. Max. Sp. Gr. (ARIZ 417)

Sample Max. Density (Gmm x 62.3) PCF

EV = Air Voids %

$$\left[1 - \frac{\text{A.C. MIX BULK DENSITY}}{\text{SAMPLE MAX. DENSITY}}\right] \times 100$$

Stability (ARIZ 410 or 422)

Flow (ARIZ 410 or 422)

WHITE ☐
YELLOW ☐
BLUE ☐

RECEIVED DATE | TEST OPERATOR AND DATE | SUPERVISOR AND DATE

44-9370 R11/01

SEE BACK ALSO

ADOT

# *AASHTO T 312*
# *Gyratory Calculations*

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | | |
|---|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) | Gyratory Compactor: |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | | | ( ) | Make: |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | | | ( ) | Model: |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | | | ( ) | |

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| | | | | ( ) |
| | | | | ( ) |
| | | | | ( ) Average = |

Determine the height for sample 1 at 8, 100 and 160 gyrations from the Gyratory data sheet.

design) ] x 100

**Un-Rounded** ***Rounded***

x 100 = =

) x ( )

x 100 = =

**Air Voids Calculation:**

$$100 - \left[ \begin{array}{c} ^{**}\text{Average Relative} \\ \text{Density (\% Gmm)} \\ \text{at Ndesign} \end{array} \right] = 100 - (\_\_\_\_\_\_) = \_\_\_\_\_\_ \%$$

______ - ______ = ______ %

Sample ID: 1

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 148.8 | 146.6 | 143.4 | 140.3 | 138.3 | 136.7 | 135.5 | 134.4 | 133.5 | 132.7 |
| 10 | 132.0 | 131.4 | 130.8 | 130.3 | 129.8 | 129.4 | 129.0 | 128.6 | 128.2 | 127.9 |
| 20 | 127.6 | 127.3 | 127.1 | 126.8 | 126.5 | 126.3 | 126.1 | 125.9 | 125.7 | 125.5 |
| 30 | 125.3 | 125.1 | 124.9 | 124.8 | 124.6 | 124.5 | 124.3 | 124.2 | 124.0 | 123.9 |
| 40 | 123.8 | 123.7 | 123.6 | 123.4 | 123.3 | 123.2 | 123.1 | 123.0 | 122.8 | 122.8 |
| 50 | 122.7 | 122.6 | 122.5 | 122.4 | 122.3 | 122.2 | 122.1 | 122.1 | 122.0 | 121.9 |
| 60 | 121.8 | 121.7 | 121.7 | 121.6 | 121.5 | 121.5 | 121.4 | 121.3 | 121.3 | 121.2 |
| 70 | 121.1 | 121.1 | 121.0 | 121.0 | 120.9 | 120.8 | 120.8 | 120.7 | 120.7 | 120.6 |
| 80 | 120.6 | 120.5 | 120.5 | 120.4 | 120.4 | 120.3 | 120.3 | 120.2 | 120.2 | 120.1 |
| 90 | 120.1 | 120.1 | 120.0 | 120.0 | 119.9 | 119.9 | 119.9 | 119.8 | 119.8 | 119.7 |
| 100 | 119.7 | 119.7 | 119.6 | 119.6 | 119.6 | 119.5 | 119.5 | 119.4 | 119.4 | 119.4 |
| 110 | 119.3 | 119.3 | 119.3 | 119.2 | 119.2 | 119.2 | 119.2 | 119.1 | 119.1 | 119.1 |
| 120 | 119.0 | 119.0 | 119.0 | 118.9 | 118.9 | 118.9 | 118.9 | 118.8 | 118.8 | 118.8 |
| 130 | 118.8 | 118.7 | 118.7 | 118.7 | 118.6 | 118.6 | 118.6 | 118.6 | 118.5 | 118.5 |
| 140 | 118.5 | 118.4 | 118.4 | 118.4 | 118.4 | 118.4 | 118.3 | 118.3 | 118.3 | 118.3 |
| 150 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.1 | 118.1 | 118.1 | 118.1 |
| 160 | 118.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Sample ID: 2

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 148.9 | 146.3 | 143.0 | 140.5 | 138.4 | 136.7 | 135.3 | 134.0 | 133.1 | 132.3 |
| 10 | 131.5 | 130.9 | 130.3 | 129.7 | 129.3 | 128.8 | 128.4 | 128.0 | 127.7 | 127.3 |

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | |
|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | | ( ) |

Gyratory Compactor:

Make: ____________

Model: ____________

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |

Average = ______

Determine the height for sample 2 at 8, 100 and 160 gyrations from the Gyratory data sheet.

design) ] x 100

**Un-Rounded** **Rounded**

x 100 = ______ = ______

x 100 = ______ = ______

( ) x ( )

**Air Voids Calculation:**

$$100 - \left[\begin{array}{c}\text{Average Relative}^{**} \\ \text{Density (\% Gmm)} \\ \text{at Ndesign}\end{array}\right] = 100 - (\_\_\_\_\_\_) = \_\_\_\_\_\_ \%$$

______ - ______ = ______ %

Sample ID: 2

|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 148.9 | 146.3 | 143.0 | 140.5 | 138.4 | 136.7 | 135.3 | 134.0 | 133.1 | 132.3 |
| 10 | 131.5 | 130.9 | 130.3 | 129.7 | 129.3 | 128.8 | 128.4 | 128.0 | 127.7 | 127.3 |
| 20 | 127.0 | 126.8 | 126.5 | 126.2 | 126.0 | 125.8 | 125.5 | 125.3 | 125.1 | 124.9 |
| 30 | 124.7 | 124.6 | 124.4 | 124.2 | 124.1 | 123.9 | 123.7 | 123.6 | 123.5 | 123.3 |
| 40 | 123.2 | 123.1 | 123.2 | 122.8 | 122.7 | 122.6 | 122.5 | 122.4 | 122.3 | 122.2 |
| 50 | 122.1 | 122.0 | 131.9 | 121.8 | 121.7 | 121.6 | 121.6 | 121.5 | 121.4 | 121.3 |
| 60 | 121.2 | 121.1 | 121.1 | 121.0 | 120.9 | 120.9 | 120.8 | 120.7 | 120.7 | 120.6 |
| 70 | 120.6 | 120.5 | 120.4 | 120.4 | 120.3 | 120.2 | 120.2 | 120.1 | 120.1 | 120.0 |
| 80 | 120.0 | 119.9 | 119.9 | 119.8 | 119.8 | 119.7 | 119.7 | 119.6 | 119.6 | 119.5 |
| 90 | 119.5 | 119.4 | 119.4 | 119.3 | 119.3 | 119.3 | 119.2 | 119.2 | 119.1 | 119.1 |
| 100 | 119.1 | 119.0 | 119.0 | 119.0 | 118.9 | 118.9 | 118.8 | 118.8 | 118.8 | 118.7 |
| 110 | 118.7 | 118.7 | 118.6 | 118.6 | 118.6 | 118.5 | 118.5 | 118.5 | 118.4 | 118.4 |
| 120 | 118.4 | 118.3 | 118.3 | 118.3 | 118.3 | 118.2 | 118.2 | 118.2 | 118.2 | 118.1 |
| 130 | 118.1 | 118.1 | 118.0 | 118.0 | 118.0 | 118.0 | 117.9 | 117.9 | 117.9 | 117.8 |
| 140 | 117.8 | 117.8 | 117.8 | 117.7 | 117.7 | 117.7 | 117.7 | 117.7 | 117.6 | 117.6 |
| 150 | 117.6 | 117.6 | 117.6 | 117.5 | 117.5 | 117.5 | 117.5 | 117.5 | 117.4 | 117.4 |
| 160 | 117.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| Specimen I. D. | | | **1** | **2** | ( ) |
|---|---|---|---|---|---|
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) |

Gyratory Compactor:

Make: ______________________

Model: ______________________

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| $G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)] | = | | | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | | | ( ) |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | | | ( ) |

Average = __________

Maximum Specific Gravity [From Rice Test], $G_{mm}$ = ______________________

$$** \left[ \begin{array}{c} \text{Relative Density (\%Gmm)} \\ \text{of each specimen} \\ \text{at } N_{design} \end{array} \right] = \left[ \frac{(G_{mb} \text{ at } N_{max}) \times (\text{Height at } N_{max})}{(\text{Maximum Specific Gravity'' } G_{mm}\text{''}) \times (\text{Height at } N_{design})} \right] \times 100$$

**Un-Rounded** ***Rounded***

Specimen # 1 = $\frac{(\_\_\_\_\_\_\_\_) \times (\_\_\_\_\_\_\_\_)}{(\_\_\_\_\_\_\_\_) \times (\_\_\_\_\_\_\_\_)}$ = __________ x 100 = __________ = __________

Specimen # 2 = $\frac{(\_\_\_\_\_\_\_\_) \times (\_\_\_\_\_\_\_\_)}{(\_\_\_\_\_\_\_\_) \times (\_\_\_\_\_\_\_\_)}$ = __________ x 100 = __________ = __________

$$100 - \left[ \begin{array}{c} ** \\ \text{Average Relative} \\ \text{Density (\% Gmm)} \\ \text{at } N_{design} \end{array} \right] = 100 - (\_\_\_\_\_\_\_\_) = \_\_\_\_\_\_\_\_ \%$$

**Air Voids Calculation:**

__________ **-** __________ **=** __________ **%**

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | |
|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) |

Gyratory Compactor:

Make: ____________

Model: ____________

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| $G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)] | = | 2.353 | 2.351 | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | | | ( ) |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | | | ( ) |
| Maximum Specific Gravity [From Rice Test], $G_{mm}$ = | | | | |

Average = ____________

**

Sample 1

(4754.1) / (4769.2-2748.7) = 2.352932442

Round to 3 decimal places.

**Un-Rounded** **Rounded**

____________ = ____________

Specimen # 2 = ( ____________ ) x ( ____________ ) / ( ____________ ) x ( ____________ ) = ____________ x 100 = ____________ = ____________

**Air Voids Calculation:**

100 - [** Average Relative Density (% Gmm) at Ndesign] = 100 - (__________) = __________ %

____________ - ____________ = ____________ %

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | | |
|---|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) | Gyratory Compactor: |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) | Make: ______ |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) | Model: ______ |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) | |

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| Gmb = Bulk Specific Gravity of specimen at Nmax = [A / (B - C)] | = | 2.353 | 2.351 | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | 0.75 | | ( ) |

( ) Average = ______

Determine the % Absorption. Sample 1,

$$\left(\frac{\overset{15.1}{\cancel{4769.2 - 4754.1}}}{\underset{2020.5}{\cancel{4769.2 - 2748.7}}}\right)x100$$

.00747339767 x 100 = .747339767

Recorded to 2 (0.00) decimal places, rounded. Complete for Sample 2

| | Un-Rounded | | Rounded |
|---|---|---|---|
| x 100 = | ______ | = | ______ |
| x 100 = | ______ | = | ______ |

**oids Calculation:**

______ - ______ = ______ %

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | |
|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) |

Gyratory Compactor:

Make: ______________

Model: ______________

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| $G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)] | = | 2.353 | 2.351 | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | 0.75 | 0.55 | |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | ______ | ______ | |
| Maximum Specific Gravity [From Rice Test], $G_{mm}$ = | | ______________ | | |

$$\text{** Relative Density (\%Gmm) of each specimen at } N_{design} = \left[\frac{(G_{mb} \text{ at } N_{max}) \times (\text{Height at } N_{max})}{(\text{Maximum Specific Gravity'' } G_{mm}\text{''}) \times (\text{Height at } N_{design})}\right] \times 100$$

Specimen # 1 = $\frac{(\quad\quad) \times (\quad\quad)}{(\quad\quad) \times (\quad\quad)}$ = ______________

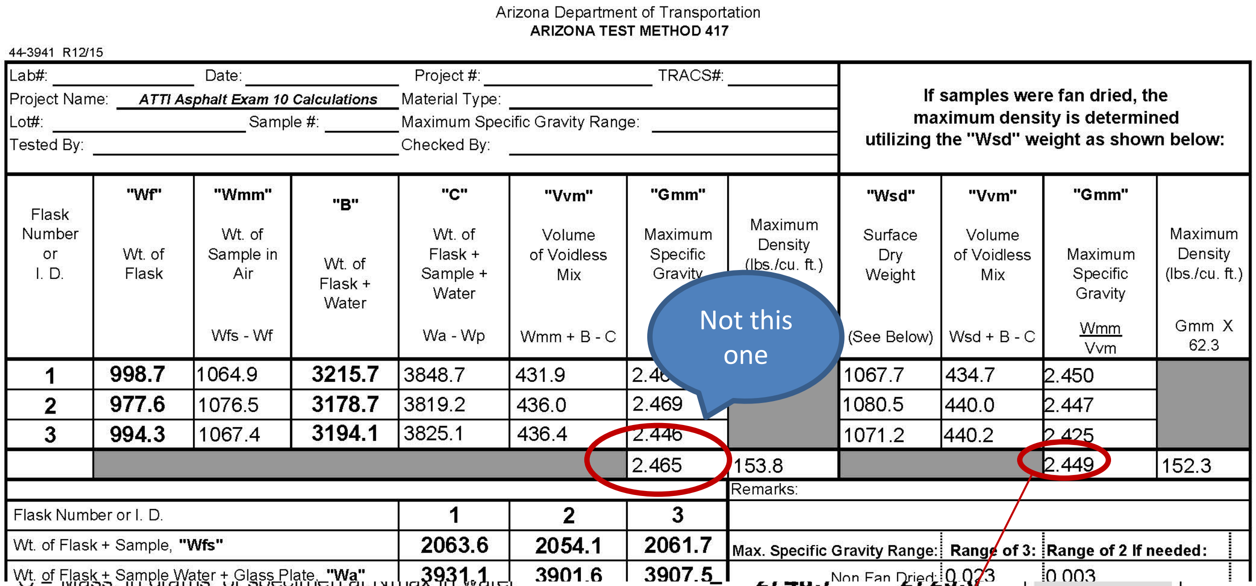
Specimen # 2 = $\frac{(\quad\quad) \times (\quad\quad)}{(\quad\quad) \times (\quad\quad)}$ = ______________

To Calculate Relative Density at $N_{design,}$ we need to transfer the Maximum Specific Gravity (Gmm), from the Rice Calculations. See next Slide.

**Air V**

$$100 - \left[\text{** Average Relative Density (\% Gmm) at } N_{design}\right] = 100 - (\_\_\_\_\_\_\_\_) = \_\_\_\_\_\_\_\_ \%$$

__________ - __________ = __________ %



Arizona Department of Transportation
ARIZONA TEST METHOD 417

44-3941 R12/15

Lab#: ______ Date: ______ Project #: ______ TRACS#: ______
Project Name: *ATTI Asphalt Exam 10 Calculations* Material Type: ______
Lot#: ______ Sample #: ______ Maximum Specific Gravity Range: ______
Tested By: ______ Checked By: ______

**If samples were fan dried, the maximum density is determined utilizing the "Wsd" weight as shown below:**

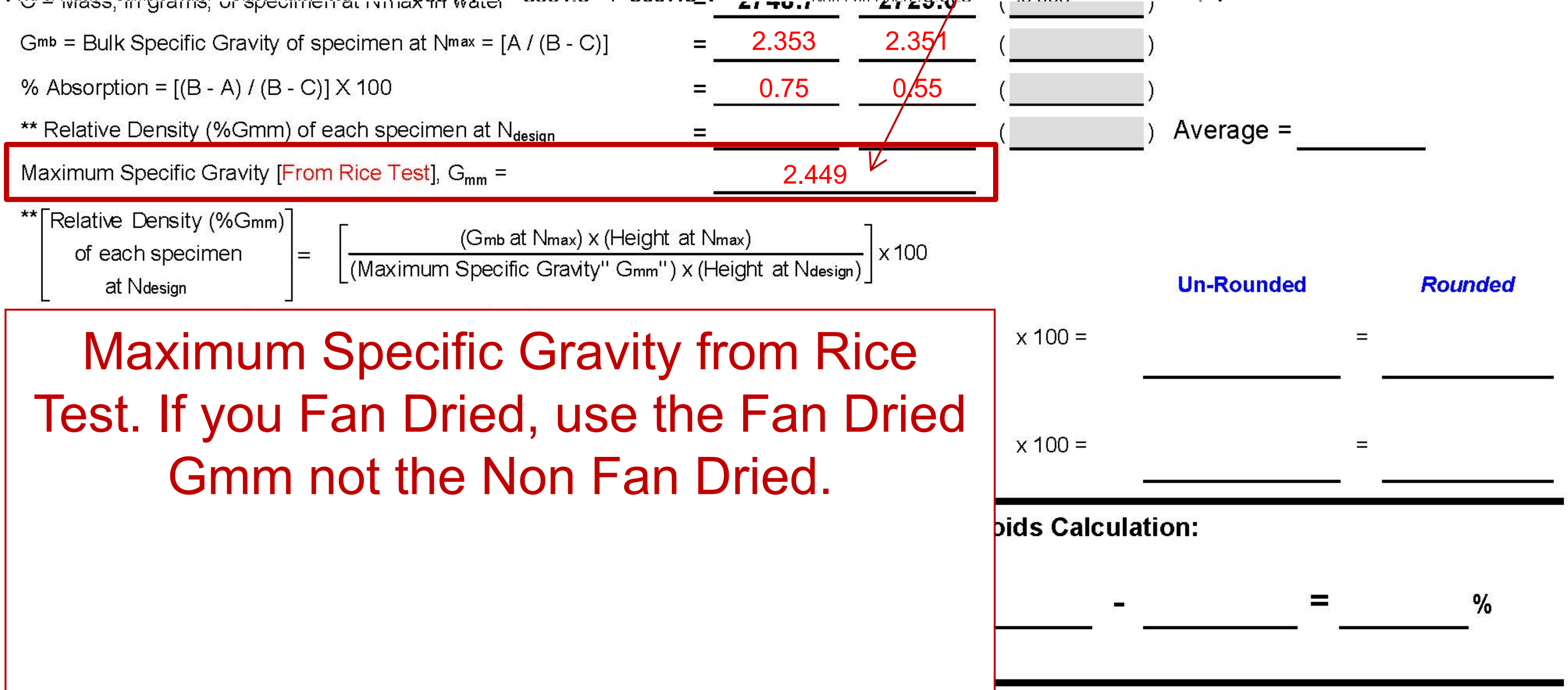
| Flask Number or I. D. | "Wf" Wt. of Flask | "Wmm" Wt. of Sample in Air Wfs - Wf | "B" Wt. of Flask + Water | "C" Wt. of Flask + Sample + Water Wa - Wp | "Vvm" Volume of Voidless Mix Wmm + B - C | "Gmm" Maximum Specific Gravity | Maximum Density (lbs./cu. ft.) | "Wsd" Surface Dry Weight (See Below) | "Vvm" Volume of Voidless Mix Wsd + B - C | "Gmm" Maximum Specific Gravity Wmm / Vvm | Maximum Density (lbs./cu. ft.) Gmm X 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **998.7** | 1064.9 | **3215.7** | 3848.7 | 431.9 | 2.46 | | 1067.7 | 434.7 | 2.450 | |
| **2** | **977.6** | 1076.5 | **3178.7** | 3819.2 | 436.0 | 2.469 | | 1080.5 | 440.0 | 2.447 | |
| **3** | **994.3** | 1067.4 | **3194.1** | 3825.1 | 436.4 | 2.446 | | 1071.2 | 440.2 | 2.425 | |
| | | | | | | 2.465 | 153.8 | | | 2.449 | 152.3 |

Remarks:

| Flask Number or I. D. | **1** | **2** | **3** |
|---|---|---|---|
| Wt. of Flask + Sample, **"Wfs"** | **2063.6** | **2054.1** | **2061.7** |
| Wt. of Flask + Sample Water + Glass Plate, **"Wa"** | **3931.1** | **3901.6** | **3907.5** |

**Max. Specific Gravity Range:** **Range of 3:** **Range of 2 If needed:**
Non Fan Dried: 0.023 0.003

Not this one



ory Compactor:
:
l:

| | | | | |
|---|---|---|---|---|
| Gmb = Bulk Specific Gravity of specimen at Nmax = [A / (B - C)] | = | 2.353 | 2.351 | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | 0.75 | 0.55 | ( ) |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | | | ( ) Average = ______ |

Maximum Specific Gravity [From Rice Test], $G_{mm}$ = 2.449

$$** \left[\text{Relative Density (\%Gmm) of each specimen at } N_{design}\right] = \left[\frac{(G_{mb} \text{ at } N_{max}) \times (\text{Height at } N_{max})}{(\text{Maximum Specific Gravity" } G_{mm}\text{"}) \times (\text{Height at } N_{design})}\right] \times 100$$

**Un-Rounded** ***Rounded***

x 100 = ______ = ______

x 100 = ______ = ______

**oids Calculation:**

______ - ______ = ______ %

Maximum Specific Gravity from Rice Test. If you Fan Dried, use the Fan Dried Gmm not the Non Fan Dried.

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| Specimen I. D. | | | **1** | **2** | ( ) |
|---|---|---|---|---|---|
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) |

Gyratory Compactor:

Make: ______________

Model: ______________

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | 1 | 2 |
|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** |
| $G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)] | = | 2.353 | 2.351 |
| % Absorption = [(B - A) / (B - C)] X 100 | = | 0.75 | 0.55 |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | | |
| Maximum Specific Gravity [From Rice Test], $G_{mm}$ = | | 2.449 | |

Use the formula to calculate Relative Density at $N_{design}$. Complete for Specimens 1 & 2.

$$** \left[\begin{array}{c}\text{Relative Density (\%Gmm)} \\ \text{of each specimen} \\ \text{at } N_{design}\end{array}\right] = \left[\frac{(G_{mb} \text{ at } N_{max}) \times (\text{Height at } N_{max})}{(\text{Maximum Specific Gravity "} G_{mm} \text{") } \times (\text{Height at } N_{design})}\right] \times 100$$

**Un-Rounded** *Rounded*

$$\text{Specimen \# 1} = \frac{(2.353) \times (118.0)}{(2.449) \times (119.7)} = \frac{277.654}{293.1453} \times 100 = 94.71548 = 94.7$$

$$\text{Specimen \# 2} = \frac{(2.351) \times (117.4)}{(2.449) \times (119.1)} = \frac{276.0074}{291.6759} \times 100 = 94.62811 = 94.6$$

$$100 - \left[\begin{array}{c}** \\ \text{Average Relative} \\ \text{Density (\% Gmm)} \\ \text{at } N_{design}\end{array}\right] = 100 - (\_\_\_\_\_\_\_\_) = \_\_\_\_\_\_\_\_ \%$$

**Air Voids Calculation:**

________ - ________ = ________ %

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

Specimen I. D. 1 2 ( ) Gyratory Compactor:

Height (0.01 mm), at $N_{initial}$ (# of gyrations) **8**

Height (0.01 mm), at $N_{design}$ (# of gyrations) **100**

Height (0.01 mm). at $N_{max}$ (# of gyrations) **160**

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens

A = Mass, in grams, of specimen at Nmax in air

B = Mass, in grams, of SSD specimen at Nmax in air

C = Mass, in grams, of specimen at Nmax in water

$G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)]

% Absorption = [(B - A) / (B - C)] X 100

Determine the Average Relative Density, add the two densities and divide by 2. Rounded to 1 (0.0) decimals.

94.7+94.6=188.9

188.9/2=94.45

** Relative Density (%Gmm) of each specimen at $N_{design}$ = 94.7 94.6 ( ) Average = 94.4

Maximum Specific Gravity [From Rice Test], $G_{mm}$ = 2.449

$$**\begin{bmatrix}\text{Relative Density (\%Gmm)}\\ \text{of each specimen}\\ \text{at } N_{design}\end{bmatrix} = \left[\frac{(G_{mb} \text{ at } N_{max}) \times (\text{Height at } N_{max})}{(\text{Maximum Specific Gravity'' } G_{mm}\text{''}) \times (\text{Height at } N_{design})}\right] \times 100$$

**Un-Rounded** **Rounded**

Specimen # 1 = $\frac{(2.353) \times (118.0)}{(2.449) \times (119.7)} = \frac{277.654}{293.1453} \times 100 =$ 94.71548 = 94.7

Specimen # 2 = $\frac{(2.351) \times (117.4)}{(2.449) \times (119.1)} = \frac{276.0074}{291.6759} \times 100 =$ 94.62811 = 94.6

$$100 - {}^{**}\begin{bmatrix}\text{Average Relative}\\ \text{Density (\% Gmm)}\\ \text{at } N_{design}\end{bmatrix} = 100 - (\_\_\_\_\_\_) = \_\_\_\_\_\_\ \%$$

**Air Voids Calculation:**

______ - ______ = ______ %

**Gyratory Compaction (AASHTO T 312)**

**Three specimens are used when referee testing is performed**

| | | | | | |
|---|---|---|---|---|---|
| Specimen I. D. | | | **1** | **2** | ( ) |
| Height (0.01 mm), at $N_{initial}$ (# of gyrations) | **8** | = | 133.5 | 133.1 | ( ) |
| Height (0.01 mm), at $N_{design}$ (# of gyrations) | **100** | = | 119.7 | 119.1 | ( ) |
| Height (0.01 mm). at $N_{max}$ (# of gyrations) | **160** | = | 118.0 | 117.4 | ( ) |

Gyratory Compactor:

Make: ______

Model: ______

Bulk Specific Gravity, Bulk Density, and Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = Mass, in grams, of specimen at Nmax in air | = | **4754.1** | **4729.1** | ( ) |
| B = Mass, in grams, of SSD specimen at Nmax in air | = | **4769.2** | **4740.2** | ( ) |
| C = Mass, in grams, of specimen at Nmax in water | = | **2748.7** | **2729.0** | ( ) |
| $G_{mb}$ = Bulk Specific Gravity of specimen at $N_{max}$ = [A / (B - C)] | = | 2.353 | 2.351 | ( ) |
| % Absorption = [(B - A) / (B - C)] X 100 | = | 0.75 | 0.55 | ( ) |
| ** Relative Density (%Gmm) of each specimen at $N_{design}$ | = | 94.7 | 94.6 | ( ) |

Average = 94.4

Maximum Sp

** Relative D
of each
at N

Determine the Air Voids using the formula. Record to 1 (0.0) decimal places.

| | | Un-Rounded | | Rounded |
|---|---|---|---|---|
| Specim | ) = | 94.71548 | = | 94.7 |
| Specim | ) = | 94.62811 | = | 94.6 |

**Air Voids Calculation:**

$$100 - \begin{bmatrix} \text{Average Relative} \\ \text{Density (\% Gmm)} \\ \text{at } N_{design} \end{bmatrix}^{**} = 100 - (\_\_\_\_\_\_) = \_\_\_\_\_\_ \%$$

100 - 94.4 = 5.6 %

**Gyratory Compaction (AASHTO T 312)**

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | |
| Height, (0.01 mm), at Ninitial ( 8 gyrations) | = | 133.5 | 133.1 | |
| Height, (0.01 mm), at Ndesign ( 100 gyrations) | = | 119.7 | 119.1 | |
| Height, (0.01 mm), at Nimax ( 160 gyrations) | = | 118.0 | 117.4 | |
| A = Mass in grams of specimen at Nmax in Air | = | 4754.1 | 4729.1 | |
| B = Mass in grams of SSD specimen at Nmax in Air | = | 4769.2 | 4740.2 | |
| C = Mass in grams of specimen at Nmax in Water | = | 2748.7 | 2729.0 | |
| Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C | = | 2.353 | 2.351 | |
| % Absorption = ( B – A ) / ( B – C ) X 100 | = | 0.75 | 0.55 | |
| **Relative Density (%Gmm) of each specimen at Ndesign | = | 94.7 | 94.6 | Average = 94.7 |
| Maximum Specific Gravity "Gmm" | = | 2.449 | | |

$$** \left[\begin{array}{c}\text{Relative Density (\%Gmm)}\\ \text{of each specimen}\\ \text{at Ndesign}\end{array}\right] = \left[\frac{(\text{Gmb at Nmax}) \times (\text{Height at Nmax})}{(\text{Maximum Specific Gravity "Gmm"}) \times (\text{Height at Ndesign})}\right] \times 100$$

277.654

94.71548751

$$\text{Specimen \#1} \left[\frac{(\ 2.353\ ) \times (\ 118.0\ )}{(\ 2.449\ ) \times (\ 119.7\ )}\right] \times 100 = \underline{\ 94.7\ }$$

293.1453

276.0074

94.62811292

$$\text{Specimen \#2} \left[\frac{(\ 2.351\ ) \times (\ 117.4\ )}{(\ 2.449\ ) \times (\ 119.1\ )}\right] \times 100 = \underline{\ 94.6\ }$$

291.6459

AIR VOIDS =

$$100 - \left[\begin{array}{c}\text{Average Relative}\\ \text{Density (\% Gmm)}\\ \text{at Ndesign}\end{array}\right] = 100 - \underline{(\ 94.7\ )} = \underline{\qquad\qquad}\%$$

# ARIZ 247 Uncompacted Voids Calculations

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 2 0 3.3 g. Sample Number: ______

**B** Weight of Empty Measure: 1 6 7.5 g. Date: ______

**C** Measure, glass plate, and water: 3 0 2.4 g. Tested By: ______

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.6 3 5

**w** Net Weight of water: **(C - A)** = ___ . _ g.

**V** Volume of measure: ___ . __ $cm^3$

$$V = \frac{w}{0.997}$$

Where:
V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

***Test Sample Calculations***

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| 1st Trial | 305.9 | - | | = | . g. |
| 2nd Trial | 303.6 | - | | = | . g. |
| 3rd Trial | 304.2 | - | | = | . g. |
| 4th Trial | 303.5 | - | | = | . g. |
| | (W) = | | Average Sample Net Weight | = | . g. |

$$U = \frac{V - (W / G)}{V}$$

**U =** ______ - ( ______ / ______ ) x 100 = __ . _ %

**Where:**
U = Uncompacted void content %
V = Volume of measure in $cm^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ______

**B** Weight of Empty Measure: 167.5 g.

Date: ______

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ______

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g.

**V** Volume of measure: ____ cm$^3$

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in cm$^3$
w = net weight of water in grams

Determine the Net weight of water.
302.4-203.3=99.1

---

### *Test Sample Calculations*

| **Trials** | **Total Weight of Sample & Measure** | - | **Empty Measure Weight** | = | **Weight of Sample** |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | | = | . g. |
| **2nd Trial** | 303.6 | - | | = | . g. |
| **3rd Trial** | 304.2 | - | | = | . g. |
| **4th Trial** | 303.5 | - | | = | . g. |
| **(W) =** | | | **Average Sample Net Weight** | = | . **g.** |

$$U = \frac{V - (W / G)}{V}$$

**U =** ______ - ( ______ / ______ ) x 100 = ____ . %

**Where:** U = Uncompacted void content %
V = Volume of measure in cm$^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g.

Date: ____________

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g.

**V** Volume of measure: ____ cm$^3$

Determine the Volume of measure,
99.1/0.997=99.39819
Record to 2 (0.00) decimal places, rounded.

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in cm$^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

| **Trials** | **Total Weight of Sample & Measure** | - | **Empty Measure Weight** | = | **Weight of Sample** |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | | = | g. |
| **2nd Trial** | 303.6 | - | | = | g. |
| **3rd Trial** | 304.2 | - | | = | g. |
| **4th Trial** | 303.5 | - | | = | g. |
| **(W) =** | | | **Average Sample Net Weight** | = | **g.** |

$$U = \frac{V - (W / G)}{V}$$

**U =** ____ - ( ____ / ____ ) x 100 = ____ %

**Where:** U = Uncompacted void content %
V = Volume of measure in cm$^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 203.3 g. Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g. Date: ____________

**C** Measure, glass plate, and water: 302.4 g. Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 cm³ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in cm³

w = net weight of water in grams

---

### *Test Sample Calculations*

| **Trials** | **Total Weight of Sample & Measure** | - | **Empty Measure Weight** | = | **Weight of Sample** |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | | = | . g. |
| **2nd Trial** | 303.6 | - | | = | . g. |
| **3rd Trial** | 304.2 | - | | = | . g. |
| **4th Trial** | 303.5 | - | | = | . g. |
| **(W) =** | | | **<u>Average</u> Sample Net Weight** | = | . **g.** |

$$U = \frac{V - (W / G)}{V}$$

**U =** ______ - ( / ) x 100 = . %

Record the Empty Measure Weight

**Where:** U = Uncompacted void content %

V = Volume of measure in cm³

W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ______

**B** Weight of Empty Measure: 167.5 g.

Date: ______

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ______

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 cm³ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

| **Trials** | **Total Weight of Sample & Measure** | - | **Empty Measure Weight** | = | **Weight of Sample** |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | . g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | . g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | . g. |
| **4th Trial** | 303.5 | - | 167.5 | = | . g. |
| | **(W) =** | | **Average Sample Net Weight** | = | . **g.** |

$$U = \frac{V - (W / G)}{V}$$

**U =** $\frac{\quad - ( \quad / \quad )}{\quad}$ x 100 = . %

**Where:** U = Uncompacted void content %
V = Volume of measure in $cm^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)
***Calibration information***

**A** Empty measure and glass plate: 203.3 g. Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g. Date: ____________

**C** Measure, glass plate, and water: 302.4 g. Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 cm³ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in cm$^3$
w = net weight of water in grams

---

***Test Sample Calculations***

| **Trials** | **Total Weight of Sample & Measure** | - | **Empty Measure Weight** | = | **Weight of Sample** |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | 138.4 g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | g. |
| **4th Trial** | 303.5 | - | 167.5 | = | g. |
| **(W) =** | | | **Average Sample Net Weight** | = | **g.** |

Determine the Weight of the Sample.

$$U = \frac{V - (W / G)}{V}$$

**U =** ____________ - ( ____________ / ____________ ) x 100 = ______ %

**Where:** U = Uncompacted void content %
V = Volume of measure in cm$^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

## UNCOMPACTED VOIDS (AZ 247)

***Calibration information***

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g.

Date: ____________

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 cm³ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: $V$ = volume of cylinder in $cm^3$
$w$ = net weight of water in grams

---

***Test Sample Calculations***

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| 1st Trial | 305.9 | - | 167.5 | = | 138.4 g. |
| 2nd Trial | 303.6 | - | 167.5 | = | 136.1 g. |
| 3rd Trial | 304.2 | - | 167.5 | = | 136.7 g. |
| 4th Trial | 303.5 | - | 167.5 | = | 136.0 g. |
| | **(W) =** | | **Average Sample Net Weight** | = | . g. |

$$U = \frac{V - (W / G)}{V}$$

**U =** ________ - ( ________ / ________ ) x 100 = . %

**Where:** $U$ = Uncompacted void content %
$V$ = Volume of measure in $cm^3$
$W$ = Average weight of fine aggregate
$G$ = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# UNCOMPACTED VOIDS (AZ 247)

## *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g.

Date: ____________

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 $cm^3$ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| 1st Trial | 305.9 | - | 167.5 | = | 138.4 g. |
| 2nd Trial | 303.6 | - | 167.5 | = | 136.1 g. |
| 3rd Trial | 304.2 | - | 167.5 | = | 136.7 g. |
| 4th Trial | 303.5 | - | 167.5 | = | 136.0 g. |

**(W) =** **Average Sample Net Weight =** ____ g.

$$U = \frac{V - (W / G)}{V}$$

**U =** ______ - ( ______ / ______ ) x 100 = ____ %

**Where:** U = Uncompacted void content %
V = Volume of measure in $cm^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

Average the two weights that are within 0.5 grams of each other.
136.1+136.0=272.1
272.1/2=136.05
rounded to the1(0.0) decimal.

## UNCOMPACTED VOIDS (AZ 247)

### *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ____________

**B** Weight of Empty Measure: 167.5 g.

Date: ____________

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 $cm^3$ 99.1 / 0.997 = 99.39819458

$$V = \frac{w}{0.997}$$

Where: V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | 138.4 g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | 136.1 g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | 136.7 g. |
| **4th Trial** | 303.5 | - | 167.5 | = | 136.0 g. |
| **(W) =** | | | **Average Sample Net Weight** | **=** | **136.1 g.** |

$$U = \frac{V - (W / G)}{V}$$

**U =** $\frac{\quad - ( \quad / \quad )}{\quad}$ x 100 = ☐☐.☐ %

**Where:** U = Uncompacted void content %
V = Volume of measure in $cm^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

## UNCOMPACTED VOIDS (AZ 247)

### *Calibration information*

**A** Empty measure and glass plate: 203.3 g.

Sample Number: ______________

**B** Weight of Empty Measure: 167.5 g.

Date: ______________

**C** Measure, glass plate, and water: 302.4 g.

Tested By: ______________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2.635

**w** Net Weight of water: **(C - A)** = 99.1 g. 302.4 – 203.3 = 99.1

**V** Volume of measure: 99.40 cm³ 99.1 / 0.997 = 99.39819458

$$\mathbf{V} = \frac{w}{0.997}$$

Where: V = volume of cylinder in $cm^3$

w = net weight of water in grams

---

### *Test Sample Calculations*

| **Trials** | **Total Weight of Sample & Measure** | **-** | **Empty Measure Weight** | **=** | **Weight of Sample** |
|---|---|---|---|---|---|
| | | | | | 138.4 g. |
| | | | | | 136.1 g. |
| | | | | | 136.7 g. |
| | | | | | 136.0 g. |

Determine the Uncompacted void content %, use the formula.

**(W)** = **Average Sample Net Weight** = 136.1 **g.**

$$U = \frac{V - (W / G)}{V}$$

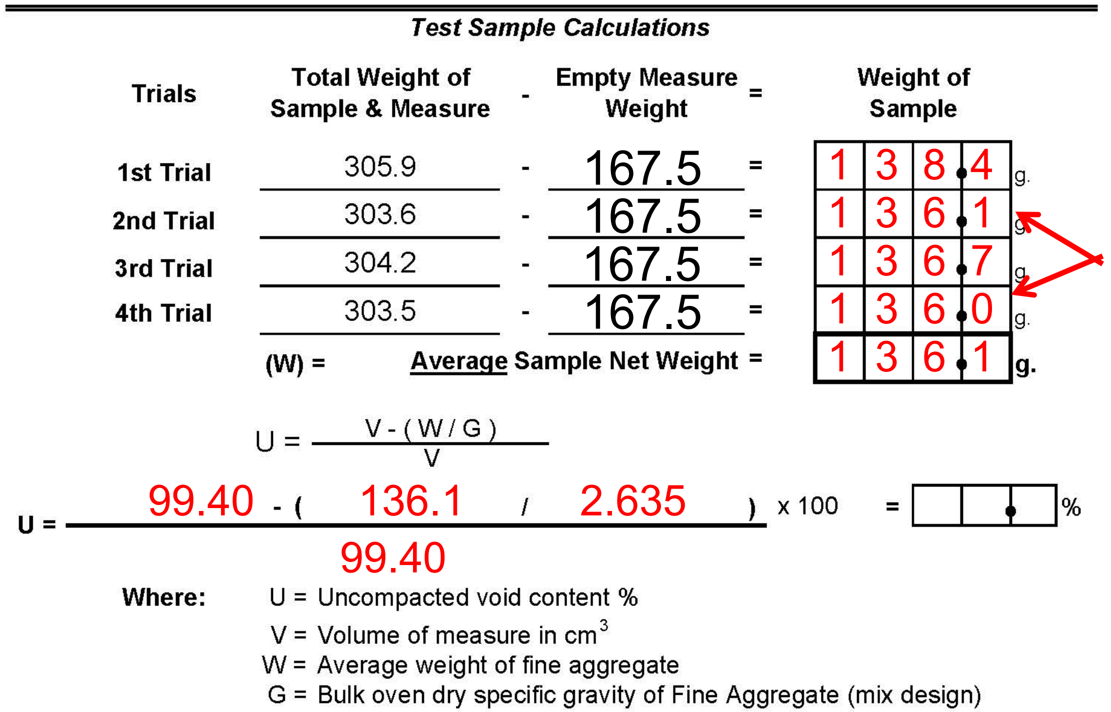
$$\mathbf{U} = \frac{99.40 - (136.1 / 2.635)}{99.40} \times 100 = \_\_\_.\_\ \%$$

**Where:** U = Uncompacted void content %

V = Volume of measure in $cm^3$

W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)



### *Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | 138.4 g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | 136.1 g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | 136.7 g. |
| **4th Trial** | 303.5 | - | 167.5 | = | 136.0 g. |
| | **(W) =** | | **Average Sample Net Weight** | = | 136.1 **g.** |

$$U = \frac{V - (W / G)}{V}$$

$$U = \frac{99.40 - (136.1 / 2.635) \times 100}{99.40} = \boxed{\quad\quad.\quad} \%$$

**Where:**

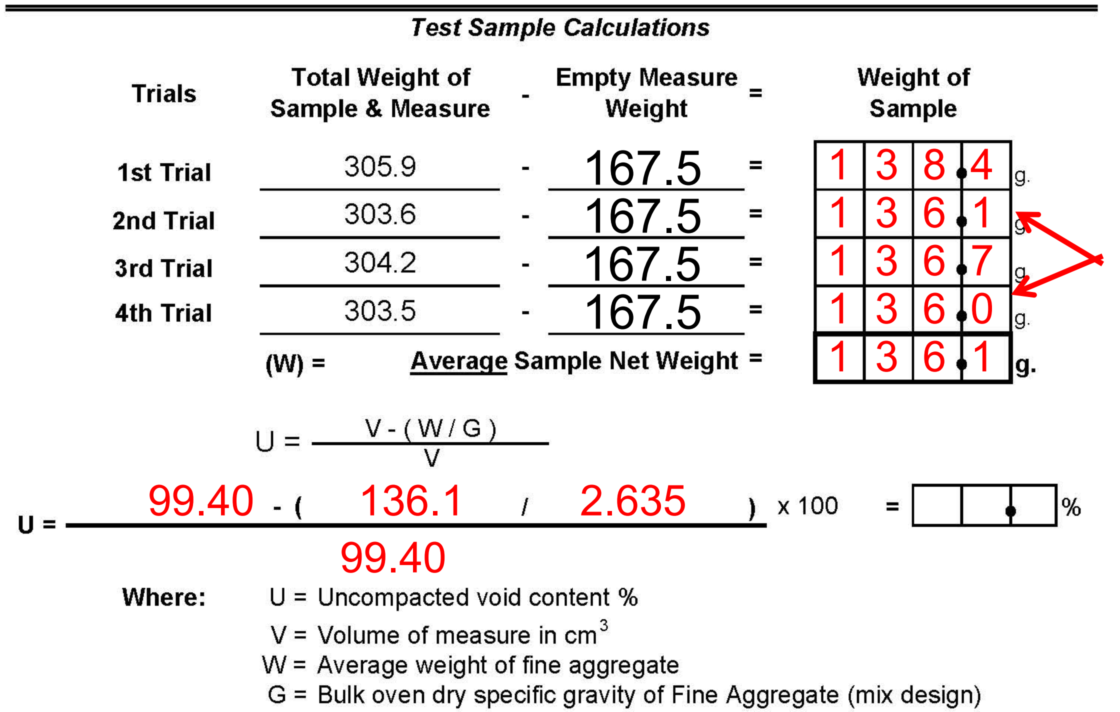
U = Uncompacted void content %

V = Volume of measure in $cm^3$

W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

136.1 / 2.635 = 51.65085389



***Test Sample Calculations***

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | 138.4 g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | 136.1 g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | 136.7 g. |
| **4th Trial** | 303.5 | - | 167.5 | = | 136.0 g. |
|  | **(W) =** |  | **Average Sample Net Weight** | = | **136.1 g.** |

$$U = \frac{V - (W / G)}{V}$$

$$U = \frac{99.40 - (136.1 / 2.635)}{99.40} \times 100 = \boxed{\phantom{0}}\boxed{\phantom{0}}.\boxed{\phantom{0}}\ \%$$

**Where:**

U = Uncompacted void content %

V = Volume of measure in $cm^3$

W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

136.1 / 2.635 = 51.65085389

99.40 - 51.65085389 = 47.74914611

***Test Sample Calculations***

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| **1st Trial** | 305.9 | - | 167.5 | = | 138.4 g. |
| **2nd Trial** | 303.6 | - | 167.5 | = | 136.1 g. |
| **3rd Trial** | 304.2 | - | 167.5 | = | 136.7 g. |
| **4th Trial** | 303.5 | - | 167.5 | = | 136.0 g. |
| | **(W) =** | | **Average Sample Net Weight** | **=** | **136.1 g.** |

$$U = \frac{V - (W / G)}{V}$$

$$U = \frac{99.40 - (136.1 / 2.635)}{99.40} \times 100 = \boxed{\quad\;.\;\quad}\%$$

**Where:**

U = Uncompacted void content %

V = Volume of measure in $cm^3$

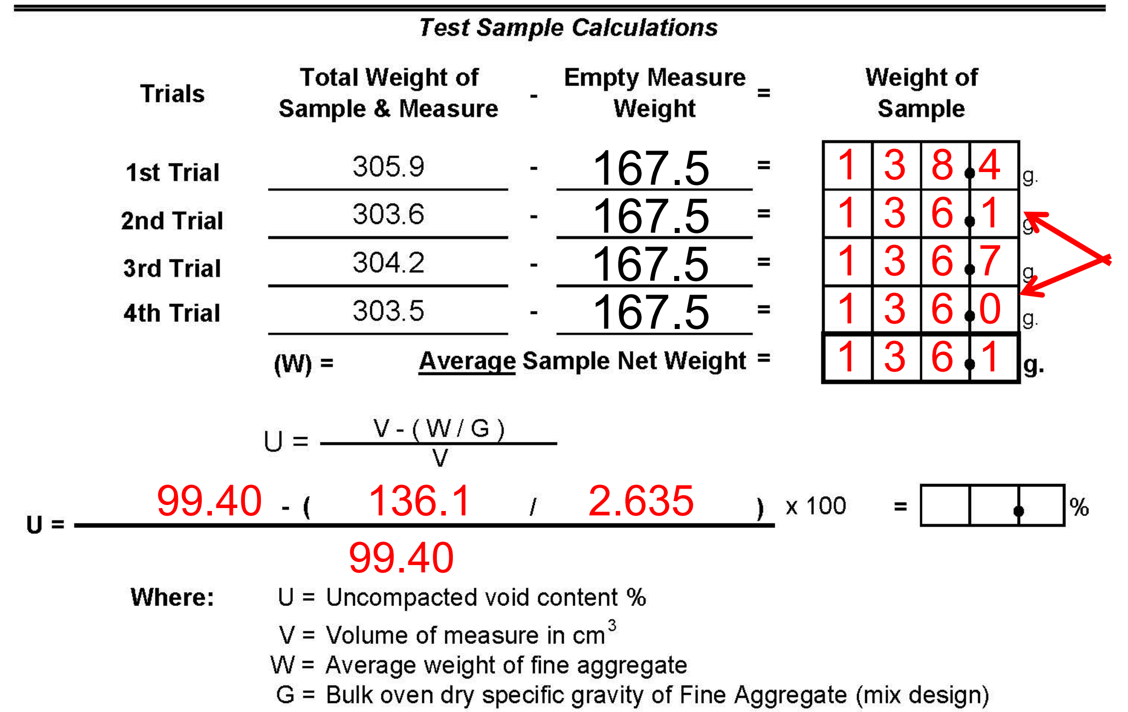
W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

136.1 / 2.635 = 51.65085389

99.40 - 51.65085389 = 47.74914611

47.74914611 / 99.40 = 0.480373703



### *Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| 1st Trial | 305.9 | - | 167.5 | = | 138.4 g. |
| 2nd Trial | 303.6 | - | 167.5 | = | 136.1 g. |
| 3rd Trial | 304.2 | - | 167.5 | = | 136.7 g. |
| 4th Trial | 303.5 | - | 167.5 | = | 136.0 g. |
| | (W) = | | Average Sample Net Weight | = | 136.1 g. |

$$U = \frac{V - (W / G)}{V}$$

$$U = \frac{99.40 - (136.1 / 2.635)}{99.40} \times 100 = \boxed{\phantom{0}}\boxed{\phantom{0}}.\boxed{\phantom{0}}\ \%$$

**Where:**

U = Uncompacted void content %

V = Volume of measure in $cm^3$

W = Average weight of fine aggregate

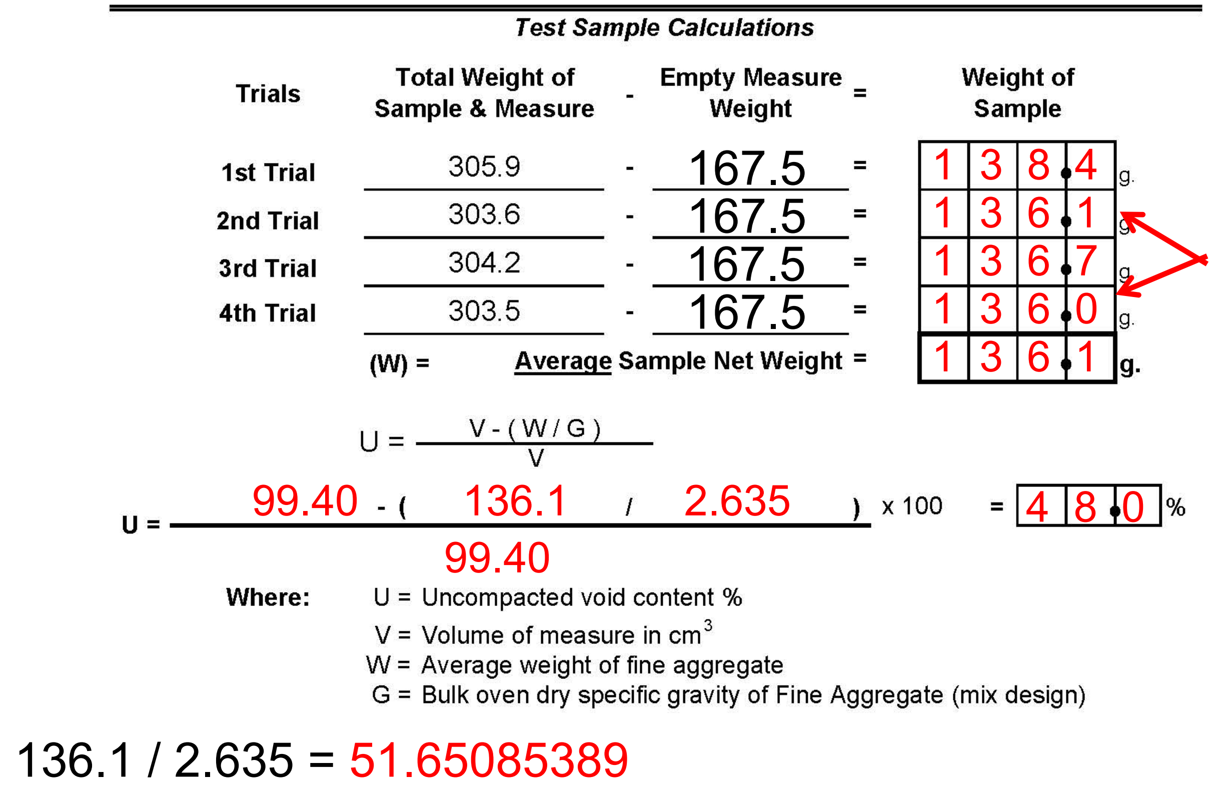
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

136.1 / 2.635 = 51.65085389

99.40 - 51.65085389 = 47.74914611

47.74914611 / 99.40 = 0.480373703

0.480373703 X 100 = 48.03737033



*Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample | |
|---|---|---|---|---|---|---|
| 1st Trial | 305.9 | - | 167.5 | = | 138.4 | g. |
| 2nd Trial | 303.6 | - | 167.5 | = | 136.1 | g. |
| 3rd Trial | 304.2 | - | 167.5 | = | 136.7 | g. |
| 4th Trial | 303.5 | - | 167.5 | = | 136.0 | g. |
| | (W) = | | Average Sample Net Weight | = | 136.1 | g. |

$$U = \frac{V - (W / G)}{V}$$

$$U = \frac{99.40 - (136.1 / 2.635)}{99.40} \times 100 = 48.0 \%$$

**Where:**

U = Uncompacted void content %

V = Volume of measure in $cm^3$

W = Average weight of fine aggregate

G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

136.1 / 2.635 = 51.65085389

99.40 - 51.65085389 = 47.74914611

47.74914611 / 99.40 = 0.480373703

0.480373703 X 100 = 48.03737033

TEST NO.

LOT OR SUFFIX

SAMPLED BY

MO DAY YEAR

TIME : MILITARY TIME

SAMPLED FROM

LIFT NO.

RDWY

STATION +

IF MILEPOST, INPUT DECIMAL

ORIGINAL SOURCE

PROJECT ENGINEER / SUPERVISOR

PROJECT NUMBER

TRACS NUMBER

REMARKS

CONTACT NUMBER

COARSE FACTOR = 100 / COARSE SIEVE TOTAL

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| 3" | | | | |
| 2 1/2" | | | | |
| 2" | | | | |
| 1 1/2" | | | | |
| 1" | | | | |
| 3/4" | | | | |
| 1/2" | 157 | | | |
| 3/8" | 334 | | | |
| 1/4" | 389 | | | |
| #4 | 183 | | | |
| #8 | 432 | | | |
| - #8 | 730 | | | |
| Total | = I (Rounded) | | | |

Weight of Pass # 8 Split 730 = p

FINE FACTOR = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| #10 | 71 | | | |
| #16 | 179 | | | |
| #30 | 159 | | | |
| #40 | 60 | | | |
| #50 | 47 | | | |
| #100 | 66 | | | |
| #200 | 43 | | | |

## IGNITION FURNACE

ARIZ. 427 ☑ ARIZ. 428 ☐

| | | | |
|---|---|---|---|
| a. Wet Mass of Moisture Sample | | 1002.8 | g |
| b. Dry Mass of Moisture Sample | | 1002.5 | g |
| c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 | | . | % |
| d. Mass of Basket Assembly | | 3109.0 | g |
| e. Mass of Sample and Basket Assembly | | 5460.6 | g |
| f. Initial Mass of Sample (e - d) | | . | g |
| g. Ignition Furnace Set Temperature | | 538 | °C |
| h. Mass of Sample and Basket Assembly After Ignition | | 5333.2 | g |
| i. Mass of Sample After Ignition (h - d) | | . | g |
| j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 | | . | % |
| k. Asphalt Binder Content Calibration Factor | (±) | 0.10 | % |
| l. Ignition Furnace Correction (Tank Slab Correction) | (±) | 0.00 | % |
| m. Corrected Asphalt Binder Content (j - k - c - l) | | . | % |

TEST NO.

LOT OR SUFFIX

SAMPLED BY

MO DAY YEAR

TIME

MILITARY TIME

SAMPLED FROM

LIFT NO.

RDWY

STATION

IF MILEPOST, INPUT DECIMAL

ORIGINAL SOURCE

PROJECT ENGINEER / SUPERVISOR

PROJECT NUMBER

TRACS NUMBER

REMARKS

CONTACT NUMBER

COARSE FACTOR = $\frac{100}{\text{COARSE SIEVE TOTAL}}$

|  | WEIGHTS RETAINED | % RET | % PASS | SPECS |
|---|---|---|---|---|
| 3" |  |  |  |  |
| 2 1/2" |  |  |  |  |
| 2" |  |  |  |  |
| 1 1/2" |  |  |  |  |
| 1" |  |  |  |  |
| 3/4" |  |  |  |  |
| 1/2" | 157 |  |  |  |
| 3/8" | 334 |  |  |  |
| 1/4" | 389 |  |  |  |
| #4 | 183 |  |  |  |
| #8 | 432 |  |  |  |
| - #8 | 730 |  |  |  |
| Total |  | = I (Rounded) |  |  |

Weight of Pass # 8 Split 730 = p

FINE FACTOR = $\frac{\text{\% Pass \#8}}{\text{Wt. of Pass \#8 Split}}$

|  | WEIGHTS RETAINED | % RET | % PASS | SPECS |
|---|---|---|---|---|
| #10 | 71 |  |  |  |
| #16 | 179 |  |  |  |
| #30 | 159 |  |  |  |
| #40 | 60 |  |  |  |
| #50 | 47 |  |  |  |
| #100 | 66 |  |  |  |
| #200 | 43 |  |  |  |

## IGNITION FURNACE

ARIZ. 427 ☑ ARIZ. 428 ☐

a. Wet Mass of Moisture Sample 1002.8 g

b. Dry Mass of Moisture Sample 1002.5 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100 0.03 %

d. Mass of Basket Assembly 3109.0 g

e. Mass of Sample and Basket Assembly 5460.6 g

f. Initial Mass of Sample (e - d) 2351.6 g

g. Ignition Furnace Set Temperature 538 °C

h. Mass of Sample and Basket Assembly After Ignition 5333.2 g

i. Mass of Sample After Ignition (h - d) 2224.2 g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100 5.42 %

k. Asphalt Binder Content Calibration Factor (±) 0.10 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l) 5.29 %

= 100 / COARSE SIEVE TOTAL

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| 3" | | | | |
| 2 1/2" | | | | |
| 2" | | | | |
| 1 1/2" | | | | |
| 1" | | | | |
| 3/4" | | | | |
| 1/2" | 157 | | | |
| 3/8" | 334 | | | |
| 1/4" | 389 | | | |
| #4 | 183 | | | |
| #8 | 432 | | | |
| - #8 | 730 | | | |
| Total | = I (Rounded) | | | |

Weight of Pass # 8 Split: 730 = p

FINE FACTOR = % Pass #8 / Wt. of Pass #8 Split

| WEIGHTS RETAINED | | % RET | % PASS | SPECS |
|---|---|---|---|---|
| #10 | 71 | | | |
| #16 | 179 | | | |
| #30 | 159 | | | |
| #40 | 60 | | | |
| #50 | 47 | | | |
| #100 | 66 | | | |
| #200 | 43 | | | |
| -#200 | 2 | | r . | |
| Total | 625 q = Dry Weight | | | |
| Elutri-ation | = p - q | | | |

r - s: . Corrected % Pass No. 200

% Pass No. 200 Correction Factor (±) . s

## IGNITION FURNACE

ARIZ. 427 ☑ ARIZ. 428 ☐

a. Wet Mass of Moisture Sample: 1002.8 g

b. Dry Mass of Moisture Sample: 1002.5 g

c. Moisture Content (ARIZ 406) [(a - b) / a] x 100: 0.03 %

d. Mass of Basket Assembly: 3109.0 g

e. Mass of Sample and Basket Assembly: 5460.6 g

f. Initial Mass of Sample (e - d): 2351.6 g

g. Ignition Furnace Set Temperature: 538 °C

h. Mass of Sample and Basket Assembly After Ignition: 5333.2 g

i. Mass of Sample After Ignition (h - d): 2224.2 g

j. Uncorrected Asphalt Binder Content [(f - i) /f] x 100: 5.42 %

k. Asphalt Binder Content Calibration Factor (±) 0.10 %

l. Ignition Furnace Correction (Tank Slab Correction) (±) 0.00 %

m. Corrected Asphalt Binder Content (j - k - c - l): 5.29 %

n. Design Asphalt Binder Content: 5.30 %

o. Elapsed Time of Test (minutes): 69

RECEIVED DATE

TEST OPERATOR AND DATE

SUPERVISOR AND DATE

SEE BACK ALSO

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing “Wsd” weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | “Wf” WT. OF FLASK | “Wmm” WT. OF SAMPLE IN AIR Wfs - Wf | “B” WT. OF FLASK + WATER | “C” WT. OF FLASK + SAMPLE + WATER Wa - Wp | “Vvm” VOLUME OF VOIDLESS MIX Wmm + B - C | “Gmm” MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | “Wsd” SURFACE DRY WEIGHT | “Vvm” VOLUME OF VOIDLESS MIX Wsd + B - C | “Gmm” MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1101.6 | | 3215.7 | | | | | | | | |
| 2 | 1139.0 | | 3178.7 | | | | | | | | |
| 3 | 1151.9 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **“Wfs”** | 2158.2 | 2195.4 | 2206.5 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **“Wa”** | 3997.7 | 3959.8 | 3975.9 |
| WT. OF GLASS PLATE, **“Wp”** | 163.4 | 163.4 | 163.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

| | | | | |
|---|---|---|---|---|
| WT. OF GLASS PLATE, **“Wp”** | 163.4 | 163.4 | 163.4 | |

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) = | 2.468 | 2.444 | 2.514 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = mass, in grams, of specimen in air = | 1168.3 | 1165.9 | 1169.9 | |
| B = mass, in grams, of SSD specimen in air = | 1171.5 | 1170.5 | 1172.7 | |
| C = mass, in grams, of specimen in water = | 660.9 | 661.0 | 661.9 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ = | | | | AVERAGE (Gmb) = |
| % Absorption = $\frac{B - A}{B - C}$ x 100 = | | | | |
| Bulk Density (lbs./cu.ft.) = | | | | RANGE = |
| Marshall Stability Reading = | 3350 | 3260 | 3280 | |
| Stability Correlation Ratio = | | | | |
| Corrected Marshall Stability = | | | | AVERAGE = |
| Marshal Flow Reading (0.01 in.) = | 7 | 8 | 10 | AVERAGE = |

**TEST OPERATOR & DATE PERFORMED**

Coarse Sieve ______________________

Fine Sieve ______________________

Furnace ______________________

Moisture ______________________

Rice Test ______________________

Marshall Compaction ______________________

Gyratory Compaction ______________________

Bulk Sp. Gr. ______________________

Stability ______________________

Flow ______________________

AVERAGE BULK DENSITY = Gmb x 62.3 = ______________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_\_\ \%$$

## Fan Dry Weights

| | 1 | 2 | 3 |
|---|---|---|---|
| Weight of Pan | 461.1 | 500.6 | 525.3 |
| Pan and Sample | 1522.9 | 1561.1 | 1586.2 |
| Pan and Sample | 1521.7 | 1560.4 | 1584.9 |
| Pan and Sample | 1520.6 | 1559.4 | 1584.0 |
| Pan and Sample | 1520.1 | 1559.3 | 1583.7 |
| Surface Dry Weight (WSD) | | | |

44-9372 R03/16 (BACK)

If samples were fan dried, the maximum density is determined utilizing "Wsd" weights shown below:

**Rice Test (ARIZ 417)**

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1101.6 | | 3215.7 | | | | | | | | |
| 2 | 1139.0 | | 3178.7 | | | | | | | | |
| 3 | 1151.9 | | 3194.1 | | | | | | | | |
| AVERAGE | | | | | | | | | | | |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, **"Wfs"** | 2158.2 | 2195.4 | 2206.5 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, **"Wa"** | 3997.7 | 3959.8 | 3975.9 |
| WT. OF GLASS PLATE, **"Wp"** | 163.4 | 163.4 | 163.4 |

REMARKS:

Max Specific Gravity Range: Range of 3: Range of 2 if needed:

Non Fan Dried:

Fan Dried:

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1101.6 | 1056.6 | 3215.7 | 3834.3 | 438.0 | 2.412 | | 1059.0 | 440.4 | 2.399 | |
| 2 | 1139.0 | 1056.4 | 3178.7 | 3796.4 | 438.7 | 2.408 | | 1058.7 | 441.0 | 2.395 | |
| 3 | 1151.9 | 1054.6 | 3194.1 | 3812.5 | 436.2 | 2.418 | | 1058.4 | 440.0 | 2.397 | |
| AVERAGE | | | | | | 2.413 | 150.3 | | | 2.397 | 149.3 |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2158.2 | 2195.4 | 2206.5 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3997.7 | 3959.8 | 3975.9 |
| WT. OF GLASS PLATE, "**Wp**" | 163.4 | 163.4 | 163.4 |

REMARKS:

| | | |
|---|---|---|
| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
| Non Fan Dried: | .010 | |
| Fan Dried: | .004 | |

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | |
|---|---|---|---|---|
| Specimen I.D. = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) = | 2.468 | 2.444 | 2.514 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | |
|---|---|---|---|---|
| A = mass, in grams, of specimen in air = | 1168.3 | 1165.9 | 1169.9 | |
| B = mass, in grams, of SSD specimen in air = | 1171.5 | 1170.5 | 1172.7 | |
| C = mass, in grams, of specimen in water = | 660.9 | 661.0 | 661.9 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ = | | | | AVERAGE (Gmb) = ________ |
| % Absorption = $\frac{B - A}{B - C}$ x 100 = | | | | |
| Bulk Density (lbs./cu.ft.) = | | | | RANGE = _______ |
| Marshall Stability Reading = | 3350 | 3260 | 3280 | |
| Stability Correlation Ratio = | | | | |
| Corrected Marshall Stability = | | | | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) = | 7 | 8 | 10 | AVERAGE = _______ |

AVERAGE BULK DENSITY = Gmb x 62.3 = ______________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \times 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \times 100 = \_\_\_\_\_\_\_\_ \%$$

## STABILITY CORRELATION RATIOS*

### For 4 inch Diameter Specimens

| Height of Specimen (Inches) | Correlation Ratio |
|---|---|
| 2.300 - 2.306 | 1.15 |
| 2.307 - 2.319 | 1.14 |
| 2.320 - 2.332 | 1.13 |
| 2.333 - 2.344 | 1.12 |
| 2.345 - 2.357 | 1.11 |
| 2.358 - 2.369 | 1.10 |
| 2.370 - 2.381 | 1.09 |
| 2.382 - 2.393 | 1.08 |
| 2.394 - 2.405 | 1.07 |
| 2.406 - 2.417 | 1.06 |
| 2.418 - 2.430 | 1.05 |
| 2.431 - 2.445 | 1.04 |
| 2.446 - 2.461 | 1.03 |
| 2.462 - 2.477 | 1.02 |
| 2.478 - 2.492 | 1.01 |
| 2.493 - 2.507 | 1.00 |
| 2.508 - 2.522 | 0.99 |
| 2.523 - 2.537 | 0.98 |
| 2.538 - 2.553 | 0.97 |
| 2.554 - 2.573 | 0.96 |
| 2.574 - 2.594 | 0.95 |
| 2.595 - 2.615 | 0.94 |
| 2.616 - 2.634 | 0.93 |
| 2.635 - 2.649 | 0.92 |
| 2.650 - 2.663 | 0.91 |
| 2.664 - 2.679 | 0.90 |
| 2.680 - 2.697 | 0.89 |
| 2.698 - 2.700 | 0.88 |

---

* The measured stability of a specimen multiplied by the

| FLASK NUMBER OR I.D. | "Wf" WT. OF FLASK | "Wmm" WT. OF SAMPLE IN AIR Wfs - Wf | "B" WT. OF FLASK + WATER | "C" WT. OF FLASK + SAMPLE + WATER Wa - Wp | "Vvm" VOLUME OF VOIDLESS MIX Wmm + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 | "Wsd" SURFACE DRY WEIGHT | "Vvm" VOLUME OF VOIDLESS MIX Wsd + B - C | "Gmm" MAXIMUM SPECIFIC GRAVITY $\frac{Wmm}{Vvm}$ | MAXIMUM DENSITY (lbs./cu. ft.) Gmm x 62.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1101.6 | 1056.6 | 3215.7 | 3834.3 | 438.0 | 2.412 | | 1059.0 | 440.4 | 2.399 | |
| 2 | 1139.0 | 1056.4 | 3178.7 | 3796.4 | 438.7 | 2.408 | | 1058.7 | 441.0 | 2.395 | |
| 3 | 1151.9 | 1054.6 | 3194.1 | 3812.5 | 436.2 | 2.418 | | 1058.4 | 440.0 | 2.397 | |
| AVERAGE | | | | | | 2.413 | 150.3 | | | 2.397 | 149.3 |

| FLASK SAMPLE OR I.D. | 1 | 2 | 3 |
|---|---|---|---|
| WT. OF FLASK + SAMPLE, "**Wfs**" | 2158.2 | 2195.4 | 2206.5 |
| WT. OF FLASK + SAMPLE + WATER + GLASS PLATE, "**Wa**" | 3997.7 | 3959.8 | 3975.9 |
| WT. OF GLASS PLATE, "**Wp**" | 163.4 | 163.4 | 163.4 |

REMARKS:

| | | |
|---|---|---|
| Max Specific Gravity Range: | Range of 3: | Range of 2 if needed: |
| Non Fan Dried: | .010 | |
| Fan Dried: | .004 | |

**Marshall Compaction (ARIZ 410 or 422) or Cores**

Specimens compacted by: Hand ☐ Mechanical ☒ 4″ ☒ 6″ ☐; Core ☐

| | | | | | |
|---|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | 3 | |
| Specimen Height (0.001 in.) | = | 2.468 | 2.444 | 2.514 | |

Bulk Specific Gravity, Bulk Density, & Absorption of Specimens (ARIZ 415, Method A ☐ or Method C ☐)

| | | | | | |
|---|---|---|---|---|---|
| A = mass, in grams, of specimen in air | = | 1168.3 | 1165.9 | 1169.9 | |
| B = mass, in grams, of SSD specimen in air | = | 1171.5 | 1170.5 | 1172.7 | |
| C = mass, in grams, of specimen in water | = | 660.9 | 661.0 | 661.9 | |
| Bulk O.D. Sp. Gr = $\frac{A}{B - C}$ | = | | | | AVERAGE (Gmb) = ________ |
| % Absorption = $\frac{B - A}{B - C}$ x 100 | = | | | | |
| Bulk Density (lbs./cu.ft.) | = | | | | RANGE = _______ |
| Marshall Stability Reading | = | 3350 | 3260 | 3280 | |
| Stability Correlation Ratio | = | | | | |
| Corrected Marshall Stability | = | | | | AVERAGE = _______ |
| Marshal Flow Reading (0.01 in.) | = | 7 | 8 | 10 | AVERAGE = _______ |

AVERAGE BULK DENSITY = Gmb x 62.3 = ______________

AIR VOIDS =

$$\left[1 - \frac{\text{Average Bulk Density}}{\text{Max. Density From Rice Test}}\right] \text{x } 100 = \left[1 - \frac{(\qquad)}{(\qquad)}\right] \text{x } 100 = \_\_\_\_\_\_\_\_ \%$$

IF MILEPOST, INPUT DECIMAL

ORIGINAL SOURCE

PROJECT ENGINEER / SUPERVISOR

PROJECT NUMBER

TRACS NUMBER

**REMARKS**

CONTACT PHONE NO. - (   ) -

## ARIZ 421
## Bituminous Material Content (Nuclear)

a. Calibration Number 1482

b. Weight of AC Calibration Sample 7155. g

c. Mix Design % Bituminous Material 5.30 %

d. Background Count (16 minutes) 2023

e. Pan Weight 670. g

f. Weight of Test Sample 7155. g

g. Weight of Sample and Pan (e + f) . g

h. Count Time (Minutes) of Test 4

i. Measured Count of Test Sample 3263

j. Gauge Measured % Bituminous Material 5.28 %

k. Wet Weight of Moisture Sample 996.9 g

l. Dry Weight of Moisture Sample 996.6 g

m. % Moisture (ARIZ 406) [(k - l) / k] x 100 . %

n. Corrected % Bituminous Material ( j - m) . %

o. Calibration Blank Aggregate Sample Weight 6655. g

p. Calibration Blank Aggregate Count 2093

q. Production Blank Aggregate Sample Weight 6650. g

r. Production Blank Aggregate Count 2078

s. % Difference in Counts [(p - r) / p] x 100 ± . %

C = Core M = Marshall ☐

Gmb = AC Mix Bulk O.D. Sp. Gr. (ARIZ 415) .

AC Mix Bulk Density (Gmb x 62.3) . PCF

Gmm = Samp. Max. Sp. Gr. (ARIZ 417) .

Sample Max. Density (Gmm x 62.3) . PCF

EV = Air Voids . %

$$\left[1-\frac{\text{A.C. MIX BULK DENSITY}}{\text{SAMPLE MAX. DENSITY}}\right] \text{X 100}$$

Stability (ARIZ 410 or 422)

Flow (ARIZ 410 or 422)

WHITE ☐

YELLOW ☐

BLUE ☐

**Gyratory Compaction (AASHTO T 312)**

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | |
| Height, (0.01 mm), at Ninitial ( 8 gyrations) | = | | | |
| Height, (0.01 mm), at Ndesign ( 100 gyrations) | = | | | |
| Height, (0.01 mm), at Nimax ( 160 gyrations) | = | | | |
| A = Mass in grams of specimen at Nmax in Air | = | 4607.2 | 4633.8 | |
| B = Mass in grams of SSD specimen at Nmax in Air | = | 4614.3 | 4640.2 | |
| C = Mass in grams of specimen at Nmax in Water | = | 2681.9 | 2690.9 | |
| Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C | = | | | |
| % Absorption = ( B – A ) / ( B – C ) X 100 | = | | | |
| **Relative Density (%Gmm) of each specimen at Ndesign | = | | | Average = |

Sample ID: 1

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 148.8 | 143.2 | 143.4 | 140.3 | 138.3 | 136.7 | 135.5 | 134.4 | 133.5 | 132.7 |
| 10 | 132.0 | 131.4 | 130.8 | 130.3 | 129.8 | 129.4 | 129.0 | 128.6 | 128.2 | 127.9 |
| 20 | 127.6 | 127.3 | 127.1 | 126.8 | 126.5 | 126.3 | 126.1 | 125.9 | 125.7 | 125.5 |
| 30 | 125.3 | 125.1 | 124.9 | 124.8 | 124.6 | 124.5 | 124.3 | 124.2 | 124.0 | 123.9 |
| 40 | 123.8 | 123.7 | 123.8 | 123.4 | 123.3 | 123.2 | 123.1 | 123.0 | 122.8 | 122.8 |
| 50 | 122.7 | 122.6 | 122.5 | 122.4 | 122.3 | 122.2 | 122.1 | 122.1 | 122.0 | 121.9 |
| 60 | 121.8 | 121.7 | 121.7 | 121.6 | 121.5 | 121.5 | 121.4 | 121.3 | 121.3 | 121.2 |
| 70 | 121.1 | 121.1 | 121.0 | 121.0 | 120.9 | 120.8 | 120.8 | 120.7 | 120.7 | 120.6 |
| 80 | 120.6 | 120.5 | 120.5 | 120.4 | 120.4 | 120.3 | 120.3 | 120.2 | 120.2 | 120.1 |
| 90 | 120.1 | 120.1 | 120.0 | 120.0 | 119.9 | 119.9 | 119.9 | 119.8 | 119.8 | 119.7 |
| 100 | 119.7 | 119.7 | 119.6 | 119.6 | 119.6 | 119.5 | 119.5 | 119.4 | 119.4 | 119.4 |
| 110 | 119.3 | 119.3 | 119.3 | 119.2 | 119.2 | 119.2 | 119.2 | 119.1 | 119.1 | 119.1 |
| 120 | 119.0 | 119.0 | 119.0 | 118.9 | 118.9 | 118.9 | 118.9 | 118.8 | 118.8 | 118.8 |
| 130 | 118.8 | 118.7 | 118.7 | 118.7 | 118.6 | 118.6 | 118.6 | 118.6 | 118.5 | 118.5 |
| 140 | 118.5 | 118.4 | 118.4 | 118.4 | 118.4 | 118.4 | 118.3 | 118.3 | 118.3 | 118.3 |
| 150 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.1 | 118.1 | 118.1 | 118.1 |
| 160 | 118.0 | | | | | | | | | |

**Gyratory Compaction (AASHTO T 312)**

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | |
| Height, (0.01 mm), at Ninitial ( 8 gyrations) | = | | | |
| Height, (0.01 mm), at Ndesign ( 100 gyrations) | = | | | |
| Height, (0.01 mm), at Nimax ( 160 gyrations) | = | | | |
| A = Mass in grams of specimen at Nmax in Air | = | 4607.2 | 4633.8 | |
| B = Mass in grams of SSD specimen at Nmax in Air | = | 4614.3 | 4640.2 | |
| C = Mass in grams of specimen at Nmax in Water | = | 2681.9 | 2690.9 | |
| Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C | = | | | |
| % Absorption = ( B – A ) / ( B – C ) X 100 | = | | | |
| **Relative Density (%Gmm) of each specimen at Ndesign | = | | | Average = |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 121.8 | 121.7 | 121.7 | 121.6 | 121.5 | 121.5 | 121.4 | 121.3 | 121.3 | 121.2 |
| 70 | 121.1 | 121.1 | 121.0 | 121.0 | 120.9 | 120.8 | 120.8 | 120.7 | 120.7 | 120.6 |
| 80 | 120.6 | 120.5 | 120.5 | 120.4 | 120.4 | 120.3 | 120.3 | 120.2 | 120.2 | 120.1 |
| 90 | 120.1 | 120.1 | 120.0 | 120.0 | 119.9 | 119.9 | 119.9 | 119.8 | 119.8 | 119.7 |
| 100 | 119.7 | 119.7 | 119.6 | 119.6 | 119.6 | 119.5 | 119.5 | 119.4 | 119.4 | 119.4 |
| 110 | 119.3 | 119.3 | 119.3 | 119.2 | 119.2 | 119.2 | 119.2 | 119.1 | 119.1 | 119.1 |
| 120 | 119.0 | 119.0 | 119.0 | 118.9 | 118.9 | 118.9 | 118.9 | 118.8 | 118.8 | 118.8 |
| 130 | 118.8 | 118.7 | 118.7 | 118.7 | 118.6 | 118.6 | 118.6 | 118.6 | 118.5 | 118.5 |
| 140 | 118.5 | 118.4 | 118.4 | 118.4 | 118.4 | 118.4 | 118.3 | 118.3 | 118.3 | 118.3 |
| 150 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.2 | 118.1 | 118.1 | 118.1 | 118.1 |
| 160 | 118.0 | | | | | | | | | |

Sample ID: 2

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 148.9 | 146.3 | 143.0 | 140.5 | 138.4 | 136.7 | 135.3 | 134.0 | 133.1 | 132.3 |
| 10 | 131.5 | 130.9 | 130.3 | 129.7 | 129.3 | 128.8 | 128.4 | 128.0 | 127.7 | 127.3 |
| 20 | 127.1 | 126.8 | 126.5 | 126.2 | 126.0 | 125.8 | 125.5 | 125.3 | 125.1 | 124.9 |
| 30 | 124.7 | 124.6 | 124.4 | 124.2 | 124.1 | 123.9 | 123.7 | 123.6 | 123.5 | 123.3 |
| 40 | 123.2 | 123.1 | 123.2 | 122.8 | 122.7 | 122.6 | 122.5 | 122.4 | 122.3 | 122.2 |
| 50 | 122.1 | 122.0 | 121.9 | 121.8 | 121.7 | 121.6 | 121.6 | 121.5 | 121.4 | 121.3 |
| 60 | 121.2 | 121.1 | 121.1 | 121.0 | 120.9 | 120.9 | 120.8 | 120.7 | 120.7 | 120.6 |
| 70 | 120.6 | 120.5 | 120.4 | 120.4 | 120.3 | 120.2 | 120.2 | 120.1 | 120.1 | 120.0 |
| 80 | 120.0 | 119.9 | 119.9 | 119.8 | 119.8 | 119.7 | 119.7 | 119.6 | 119.6 | 119.5 |
| 90 | 119.5 | 119.4 | 119.4 | 119.3 | 119.3 | 119.3 | 119.2 | 119.2 | 119.1 | 119.1 |
| 100 | 119.1 | 119.0 | 119.0 | 119.0 | 118.9 | 118.9 | 118.8 | 118.8 | 118.8 | 118.7 |
| 110 | 118.7 | 118.7 | 118.6 | 118.6 | 118.6 | 118.5 | 118.5 | 118.5 | 118.4 | 118.4 |
| 120 | 118.4 | 118.3 | 118.3 | 118.3 | 118.3 | 118.2 | 118.2 | 118.2 | 118.2 | 118.1 |
| 130 | 118.1 | 118.1 | 118.0 | 118.0 | 118.0 | 118.0 | 117.9 | 116.8 | 116.8 | 116.8 |
| 140 | 117.8 | 117.8 | 117.8 | 117.7 | 117.7 | 117.7 | 117.7 | 117.7 | 117.6 | 117.6 |
| 150 | 117.6 | 117.6 | 117.6 | 117.5 | 117.5 | 117.5 | 117.5 | 117.5 | 117.4 | 117.4 |
| 160 | 117.4 | | | | | | | | | |

**Gyratory Compaction (AASHTO T 312)**

| | | | | |
|---|---|---|---|---|
| Specimen I.D. | = | 1 | 2 | |
| Height, (0.01 mm), at Ninitial ( 8 gyrations) | = | | | |
| Height, (0.01 mm), at Ndesign ( 100 gyrations) | = | | | |
| Height, (0.01 mm), at Nimax ( 160 gyrations) | = | | | |
| A = Mass in grams of specimen at Nmax in Air | = | 4607.2 | 4633.8 | |
| B = Mass in grams of SSD specimen at Nmax in Air | = | 4614.3 | 4640.2 | |
| C = Mass in grams of specimen at Nmax in Water | = | 2681.9 | 2690.9 | |
| Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C | = | | | |
| % Absorption = ( B – A ) / ( B – C ) X 100 | = | | | |
| **Relative Density (%Gmm) of each specimen at Ndesign | = | | | Average = |

## Gyratory Compaction (AASHTO T 312)

| Specimen I.D. | = | 1 | 2 | | |
|---|---|---|---|---|---|
| Height, (0.01 mm), at Ninitial ( 8 gyrations) | = | 133.5 | 133.1 | | |
| Height, (0.01 mm), at Ndesign ( 100 gyrations) | = | 119.7 | 119.1 | | |
| Height, (0.01 mm), at Nimax ( 160 gyrations) | = | 118.0 | 117.4 | | |
| A = Mass in grams of specimen at Nmax in Air | = | 4607.2 | 4633.8 | | |
| B = Mass in grams of SSD specimen at Nmax in Air | = | 4614.3 | 4640.2 | | |
| C = Mass in grams of specimen at Nmax in Water | = | 2681.9 | 2690.9 | | |
| Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C | = | | | | |
| % Absorption = ( B – A ) / ( B – C ) X 100 | = | | | | |
| **Relative Density (%Gmm) of each specimen at Ndesign | = | | | Average = | |
| Maximum Specific Gravity "Gmm" | = | | | | |

$$** \left[ \begin{array}{c} \text{Relative Density (\%Gmm)} \\ \text{of each specimen} \\ \text{at Ndesign} \end{array} \right] = \left[ \frac{(\text{Gmb at Nmax}) \times (\text{Height at Nmax})}{(\text{Maximum Specific Gravity “Gmm”}) \times (\text{Height at Ndesign})} \right] \times 100$$

Height, (0.01 mm), at Ndesign ( 100 gyrations) = 119.7 119.1

Height, (0.01 mm), at Nimax ( 160 gyrations) = 118.0 117.4

A = Mass in grams of specimen at Nmax in Air = 4607.2 4633.8

B = Mass in grams of SSD specimen at Nmax in Air = 4614.3 4640.2

C = Mass in grams of specimen at Nmax in Water = 2681.9 2690.9

Gmb = Bulk Specific Gravity Of specimen at Nmax = A / B-C = 2.384 2.377

% Absorption = ( B – A ) / ( B – C ) X 100 = .37 .33

**Relative Density (%Gmm) of each specimen at Ndesign = ________ ________ Average = ________

Maximum Specific Gravity "Gmm" = 2.397

$$** \left[\begin{array}{c}\text{Relative Density (\%Gmm)}\\ \text{of each specimen}\\ \text{at Ndesign}\end{array}\right] = \left[\frac{(\text{Gmb at Nmax}) \times (\text{Height at Nmax})}{(\text{Maximum Specific Gravity "Gmm"}) \times (\text{Height at Ndesign})}\right] \times 100$$

$$\textbf{Specimen \#1} \left[\frac{(\qquad) \times (\qquad)}{(\qquad) \times (\qquad)}\right] \times 100 = \underline{\qquad\qquad}$$

$$\textbf{Specimen \#2} \left[\frac{(\qquad) \times (\qquad)}{(\qquad) \times (\qquad)}\right] \times 100 = \underline{\qquad\qquad}$$

Gmb = Bulk Specific Gravity
Of specimen at Nmax = A / B-C = 2.384 2.377

% Absorption = ( B – A ) / ( B – C ) X 100 = .37 .33

**Relative Density (%Gmm) of each specimen at Ndesign = 98.0 97.8 Average = 97.9

Maximum Specific Gravity “Gmm” = 2.397

$$** \left[ \begin{array}{c} \text{Relative Density (\%Gmm)} \\ \text{of each specimen} \\ \text{at Ndesign} \end{array} \right] = \left[ \frac{\text{(Gmb at Nmax)} \times \text{(Height at Nmax)}}{\text{(Maximum Specific Gravity “Gmm”)} \times \text{(Height at Ndesign)}} \right] \times 100$$

$$\text{Specimen \#1} \left[ \frac{(\ 2.384\ ) \times (\ 118.0\ )}{(\ 2.397\ ) \times (\ 119.7\ )} \right] \times 100 = 98.0$$

$$\text{Specimen \#2} \left[ \frac{(\ 2.377\ ) \times (\ 117.4\ )}{(\ 2.397\ ) \times (\ 119.1\ )} \right] \times 100 = 97.8$$

AIR VOIDS =

$$100 - \left[ \begin{array}{c} \text{Average Relative} \\ \text{Density (\% Gmm)} \\ \text{at Ndesign} \end{array} \right] = 100 - \frac{(\qquad)}{} = \underline{\qquad\qquad} \%$$

## UNCOMPACTED VOIDS (AZ 247)

### *Calibration information*

**A** Empty measure and glass plate: 2 0 3 . 3 g. Sample Number: ____________

**B** Weight of Empty Measure: 1 6 7 . 5 g. Date: ____________

**C** Measure, glass plate, and water: 3 0 2 . 2 g. Tested By: ____________

**G** Bulk oven dry specific gravity of Fine Aggregate (mix design) 2 . 6 3 5

**w** Net Weight of water: **(C - A)** = ___ ___ ___ . ___ g.

**V** Volume of measure: ___ ___ ___ . ___ ___ $cm^3$

$$\mathbf{V} = \frac{\mathbf{w}}{0.997}$$

Where: V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

**w** Net Weight of water: **(C - A)** = 98.9 g.

**V** Volume of measure: 99.20 $cm^3$

$$V = \frac{w}{0.997}$$

Where:
V = volume of cylinder in $cm^3$
w = net weight of water in grams

---

### *Test Sample Calculations*

| Trials | Total Weight of Sample & Measure | - | Empty Measure Weight | = | Weight of Sample |
|---|---|---|---|---|---|
| **1st Trial** | 306.2 | - | | = | . g. |
| **2nd Trial** | 307.3 | - | | = | . g. |
| **3rd Trial** | 305.9 | - | | = | . g. |
| **4th Trial** | | - | | = | . g. |
| | **(W) =** | | **<u>Average</u> Sample Net Weight** | = | . **g.** |

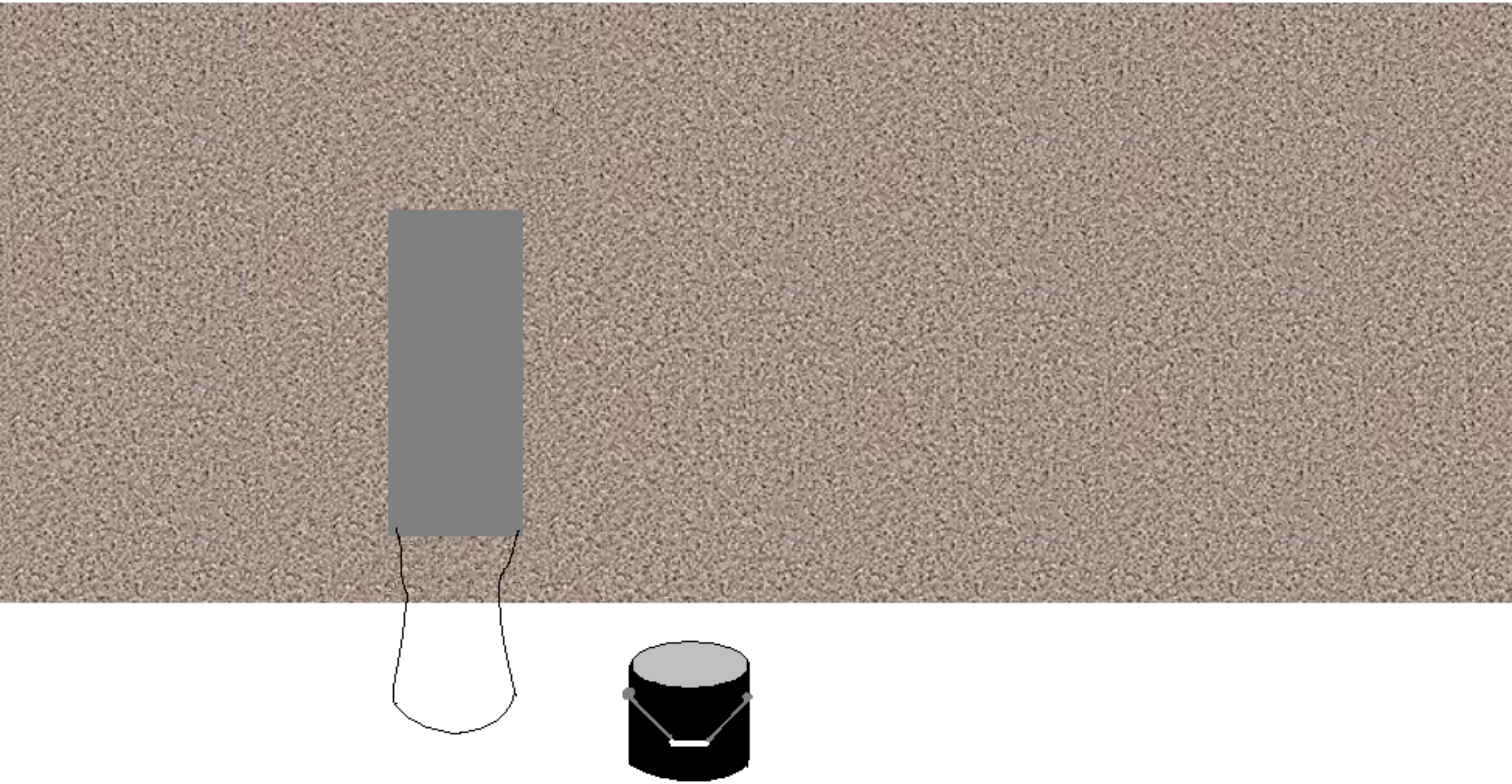
$$U = \frac{V - ( W / G )}{V}$$

$$U = \frac{\quad - ( \quad / \quad )}{\quad} \times 100 = \quad . \quad \%$$

**Where:**
U = Uncompacted void content %
V = Volume of measure in $cm^3$
W = Average weight of fine aggregate
G = Bulk oven dry specific gravity of Fine Aggregate (mix design)

# Sampling Asphaltic Concrete

# Placement of Plate



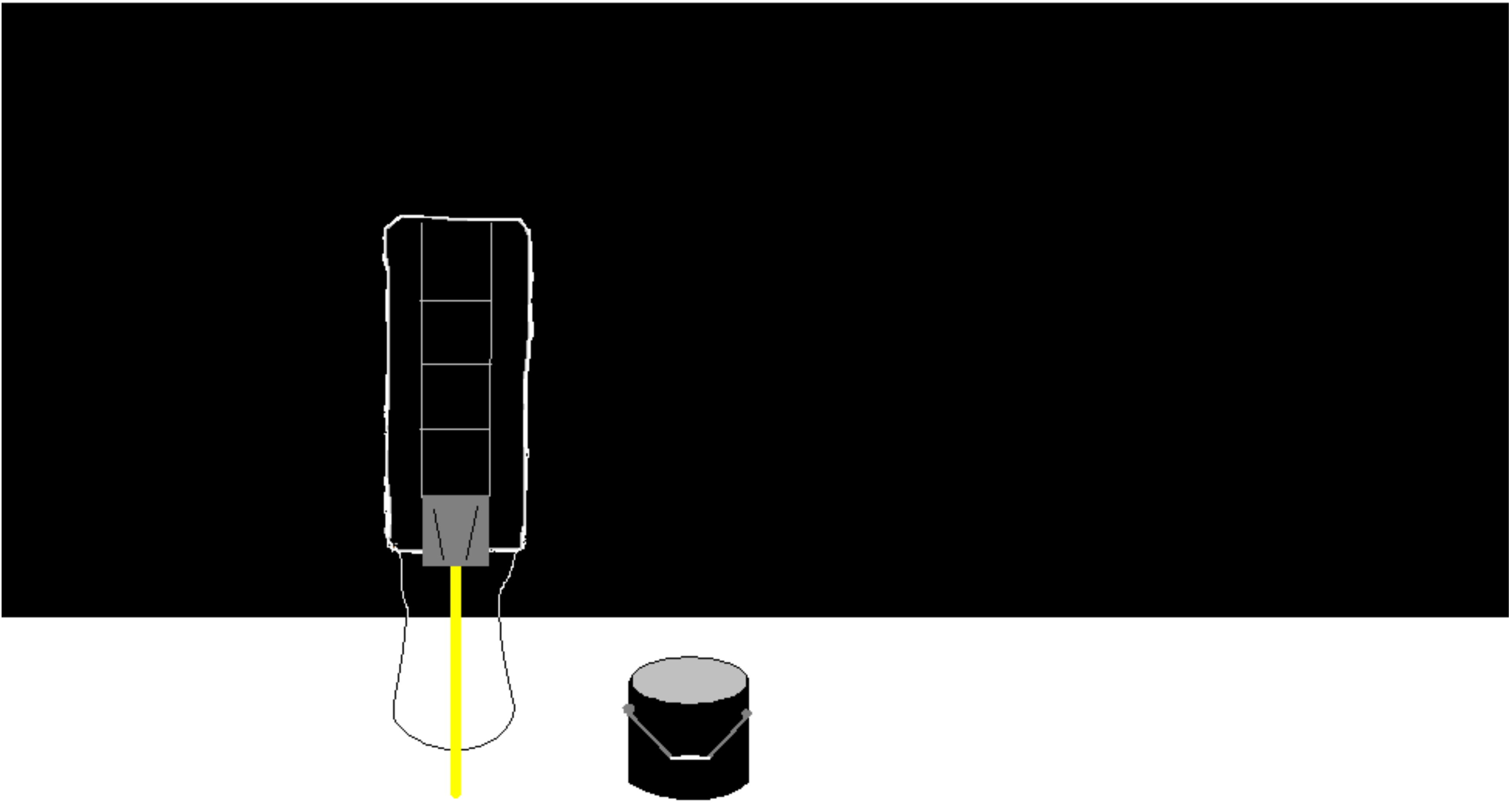
One foot in from edge of mat

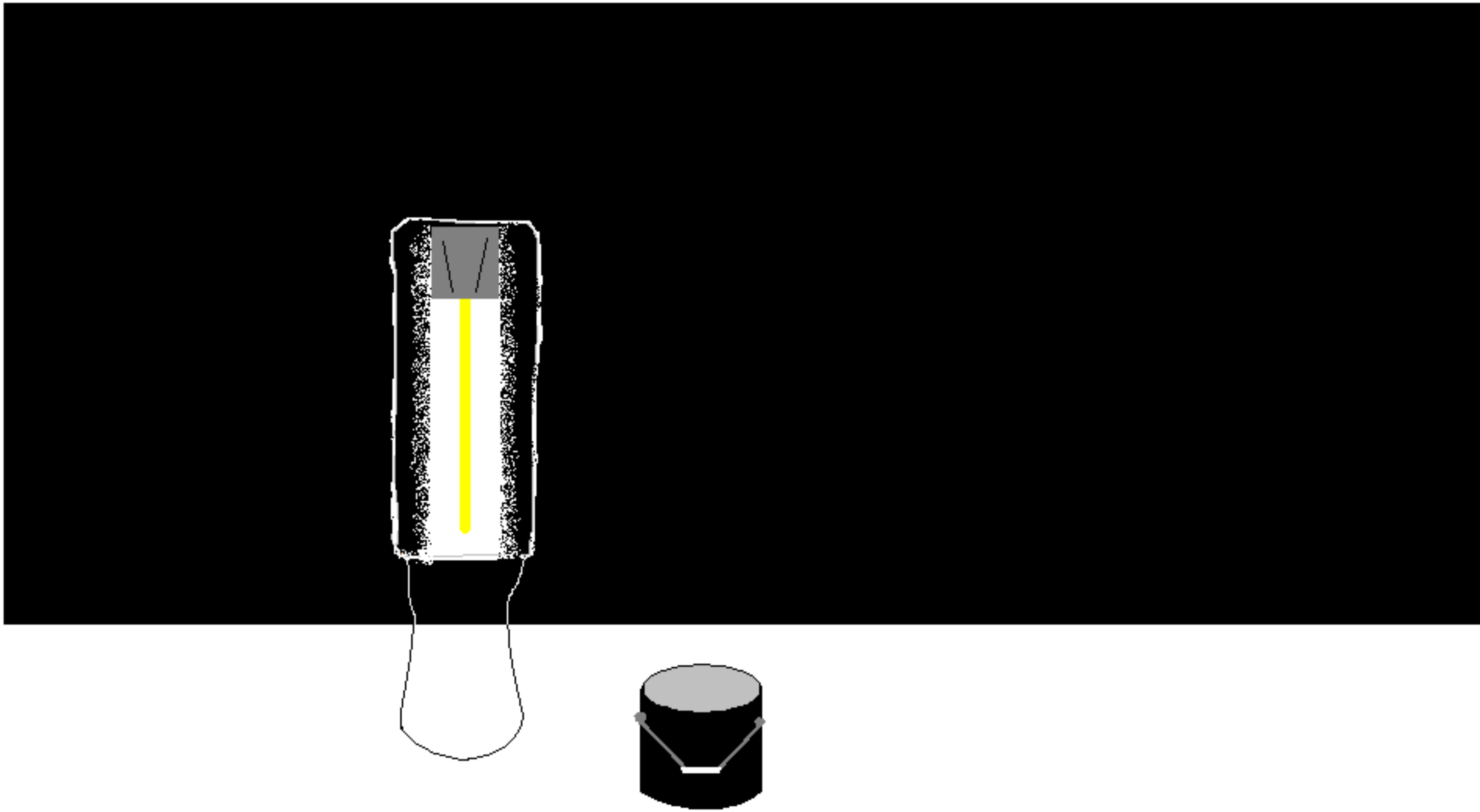

The paving ski without the

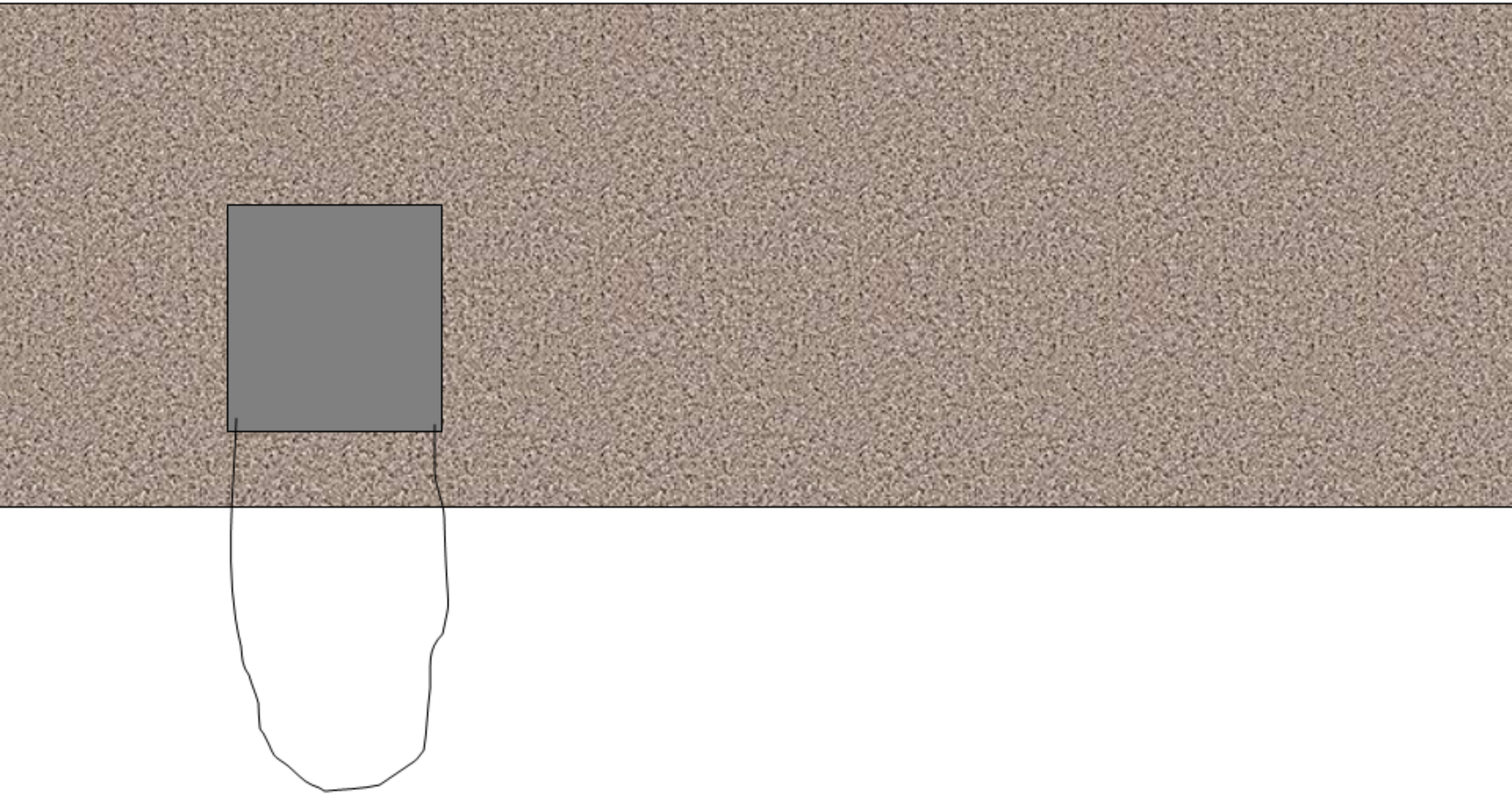

Combs Equipment Inc.
Glendale, Arizona

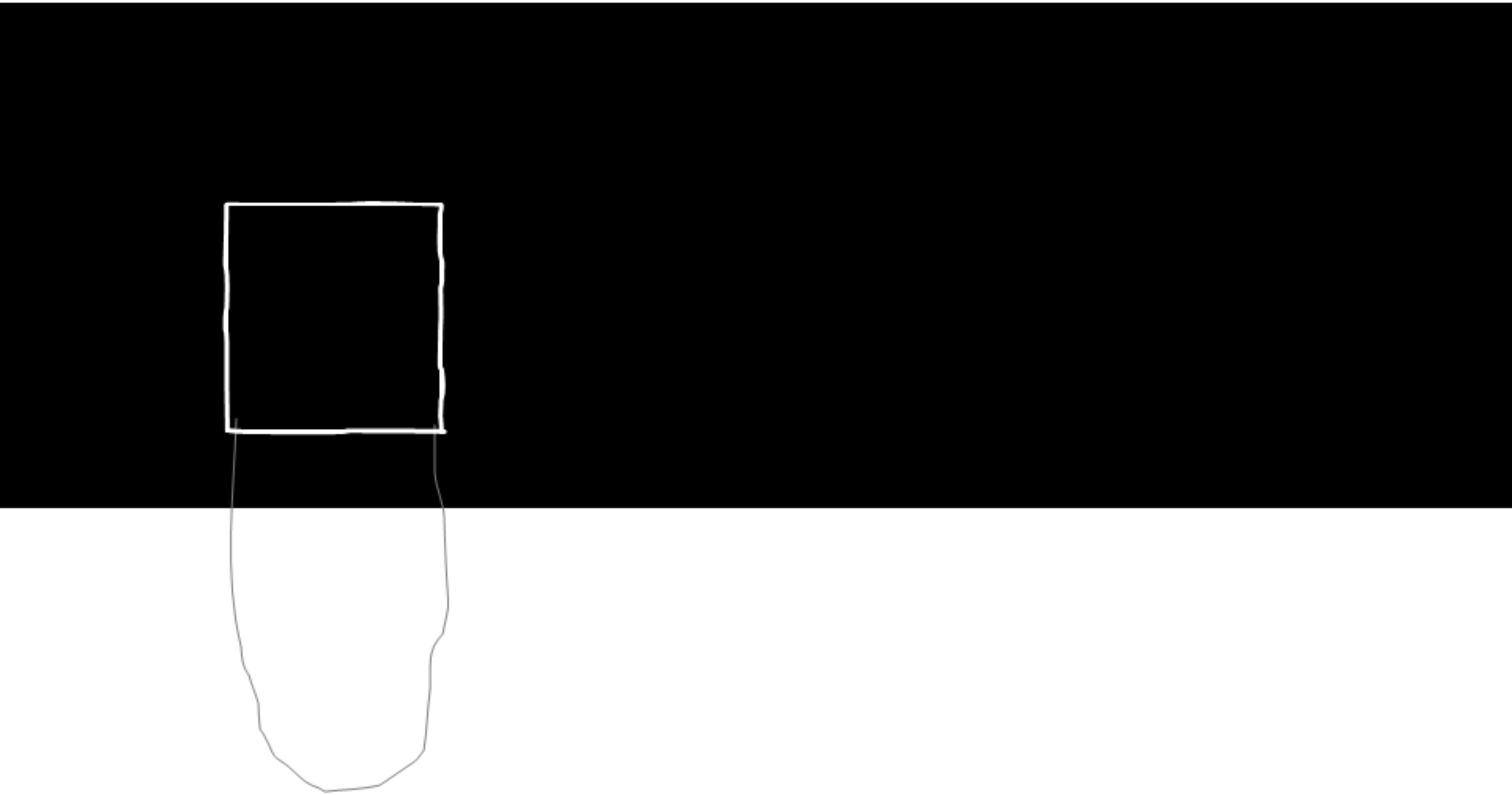

CAT
EXTEND-A-MAT
10-20B

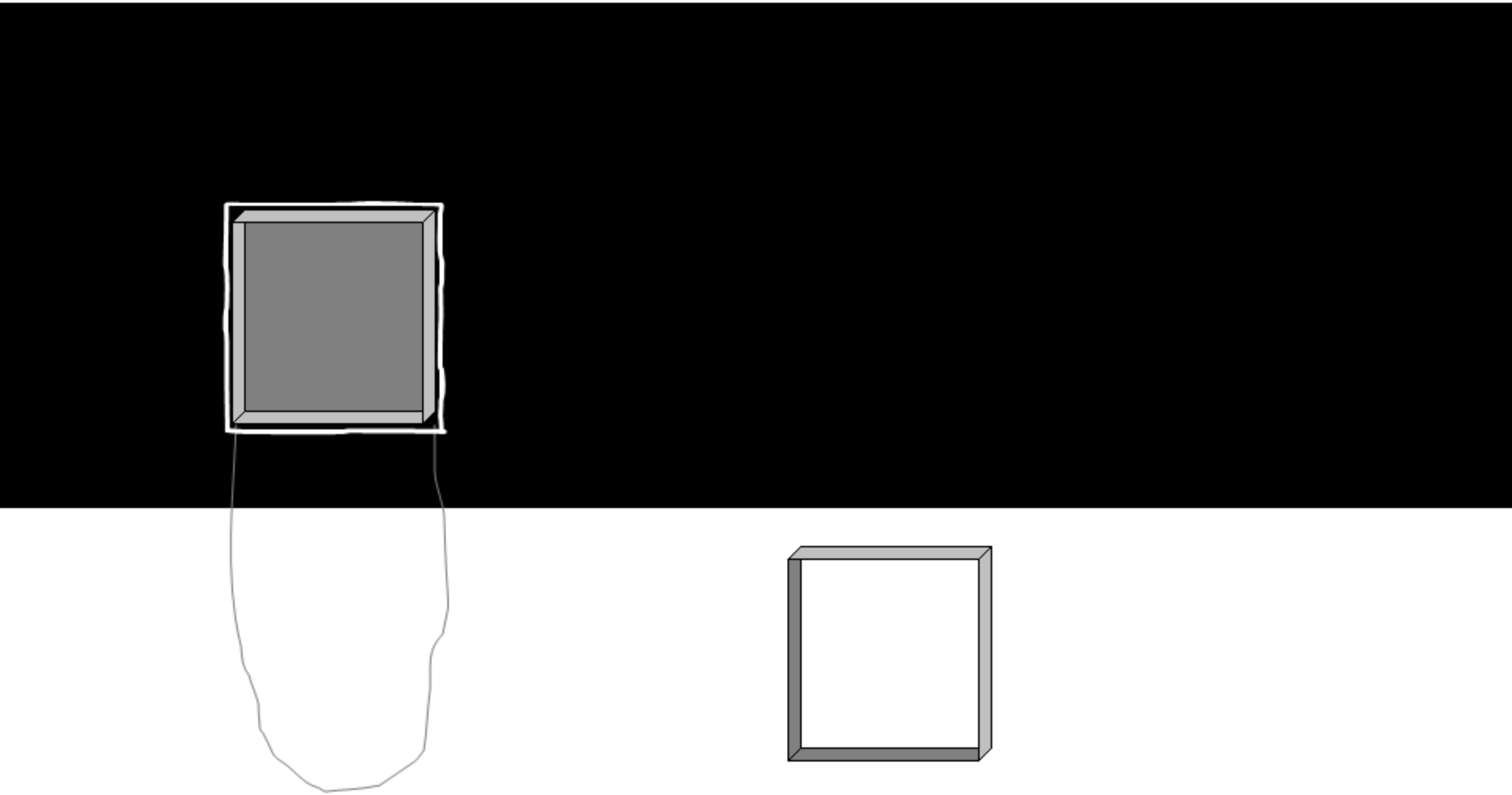

SPEEDIE AND ASSOCIATES











ACFC = Asphaltic Concrete Friction Course
ACFCAR = Asphaltic Concrete Friction Course (Asphalt Rubber)

From the truck at the plant
Within five minutes of loading the truck
At least three random locations
Approximately 12” below the surface

# SAMPLING FINISHED ASPHALT PAVEMENT

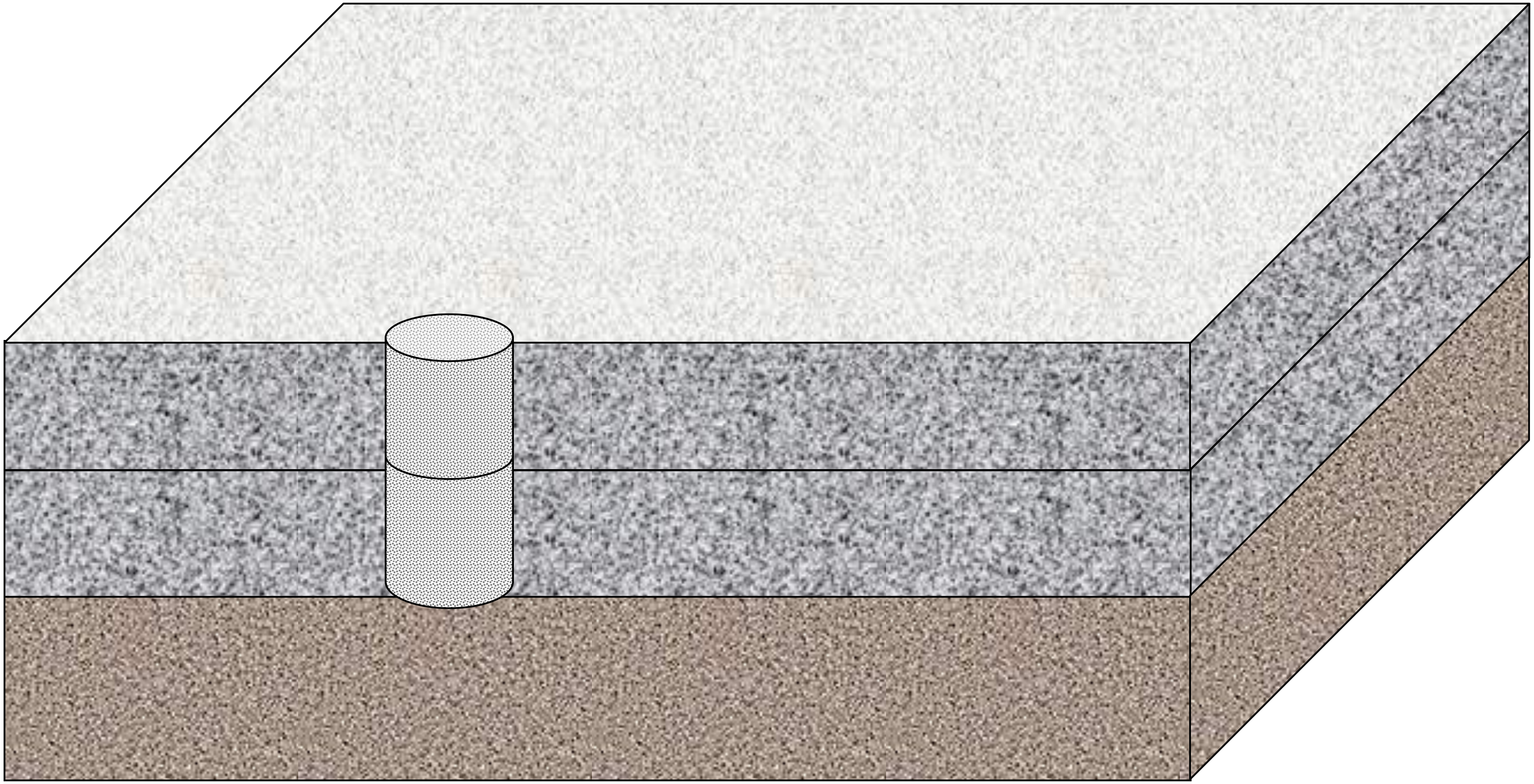
Sample is taken through the complete thickness of the lift by Coring (preferred)

Or by use of

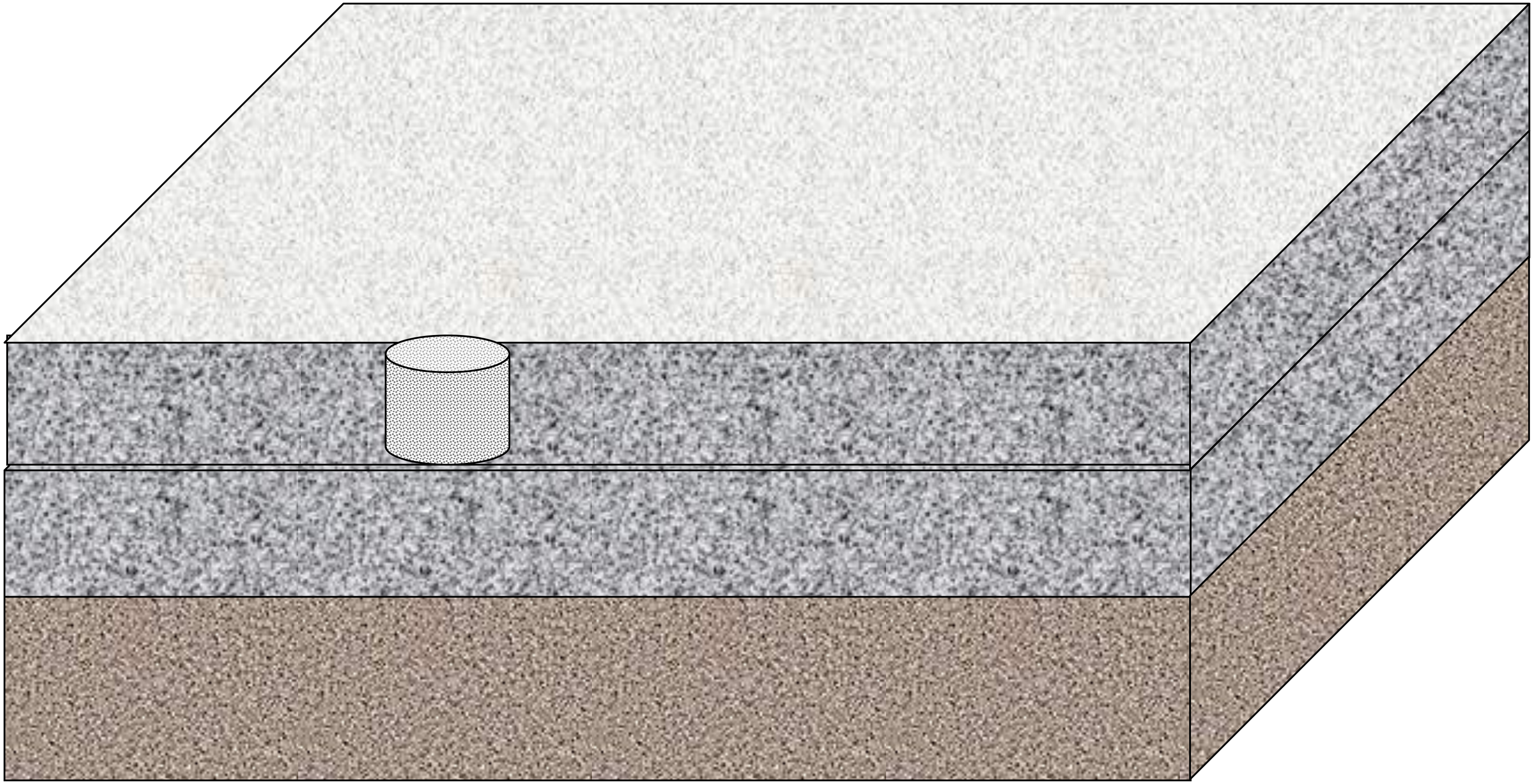
Saw, Pick, or Jackhammer (make sure to remove a big enough area so that the portion to be tested is not disturbed)

Transport on a relatively flat surface ((Protected to preserve shape and prevent fracture)

# SAMPLING a Core through two thickness of lifts



# SAMPLING a Core one lift thickness



**Do Not take core from areas marked with paint.**

**It could effect the specific gravity and density.**

# SAMPLING FINISHED ASPHALT PAVEMENT

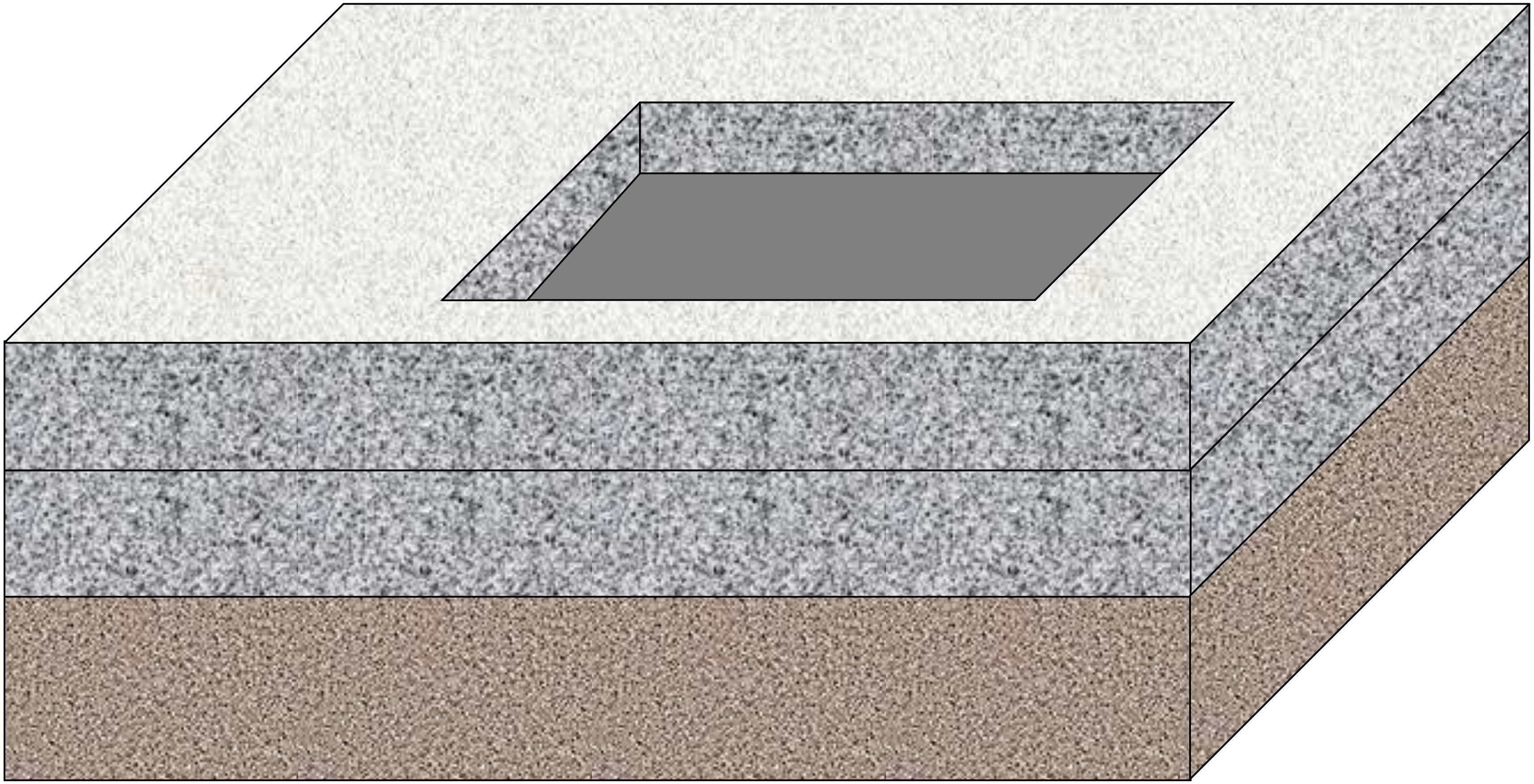
- Or if coring device is not available you can use;
- Saw, Pick, or Jackhammer (make sure to remove a big enough area so that the portion to be tested is not disturbed)
- Transport on a relatively flat surface ((Protected to preserve shape and prevent fracture) (Shall be contained in their Briquette form)
- Use of Ice may be used to keep sample in original shape while cutting and transporting.

**Saw**

**Pick**

**Jackhammer**

# SAMPLING FINISHED ASPHALT PAVEMENT



# SAMPLING

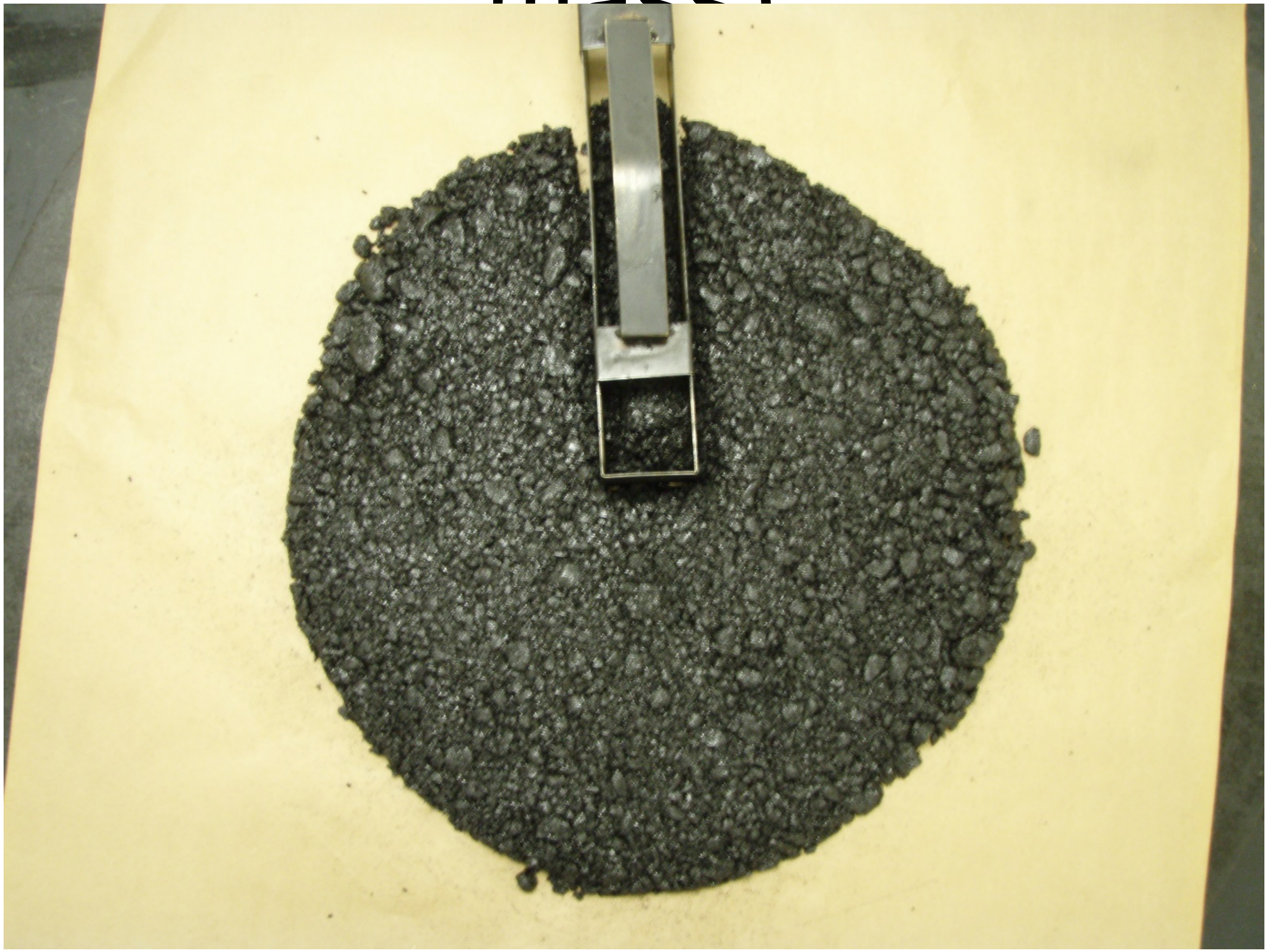
# MISCELLANEOUS ASPHALT

Shall be obtained from locations and by means to provide appropriate representation of the AC mix being placed.

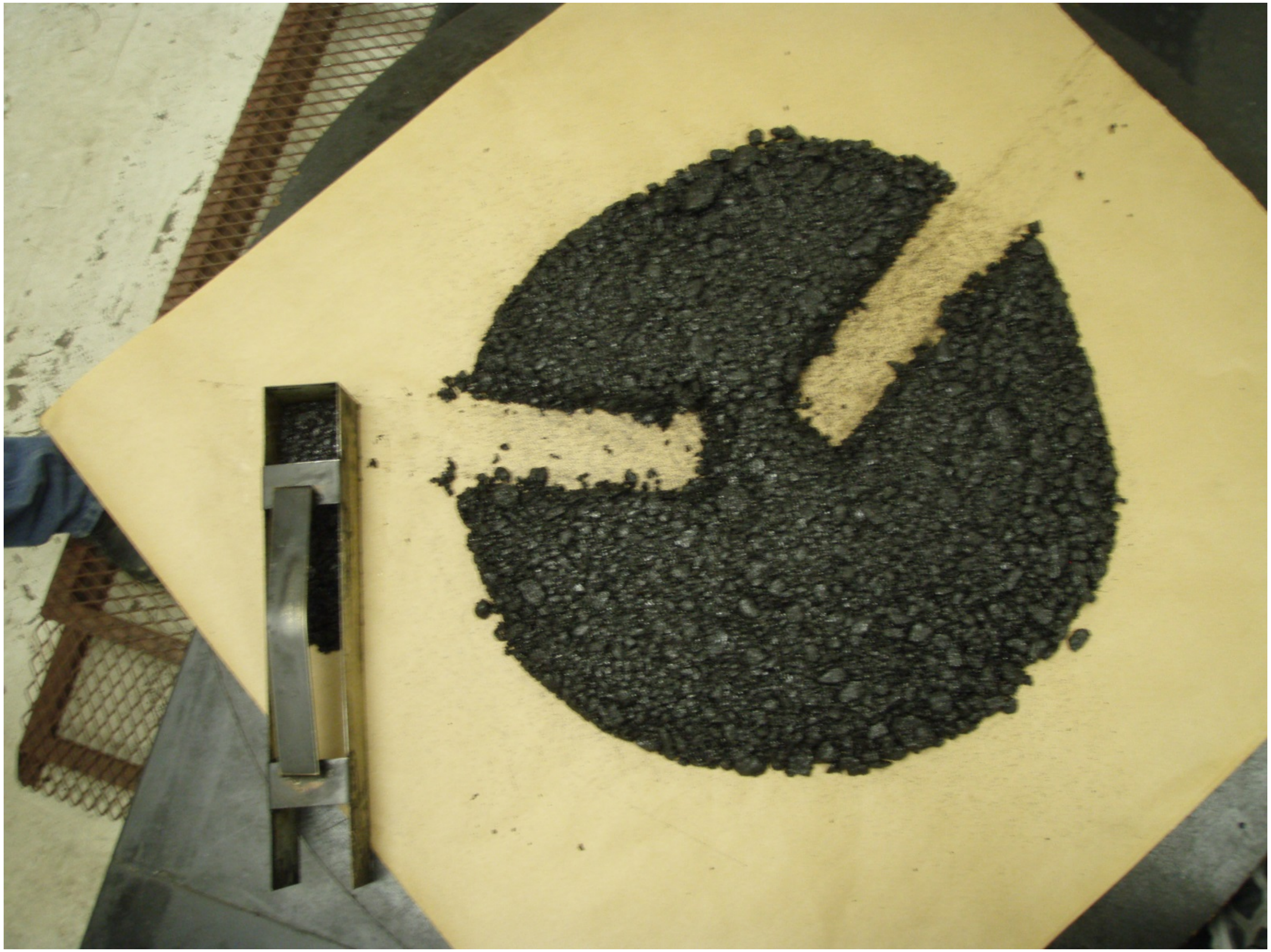
# Splitting Asphaltic Concrete

# Roll and flatten to a uniform mass

# First cut (near center of the mass)



# Obtaining extra material



# Obtaining Small Amount