Washington State Department of Transportation

Rice Density

AASHTO T 209 - Flask Determination

Contract Number	SR Number	Project Engineer	Mix ID Number	Pit Number	Date

Section	Contractor	
		☐ English Units ☐ Metric Units

	Jar 1	Jar 2 Sample greater than 1500g.	
A = Sample Mass (wt)	[1]	[3]	grams
D = Mass (wt) - Pyncometer Jar, Water and Cover			grams
E = Mass (wt) - Pycnometer Jar, Sample, Water and Cover			grams
T - Water Temperature			^{o}F (^{o}C)
R - Temperature Correction Factor (From Table 2)			
F = Rice Specific Gravity $\frac{A}{A + D - E} \times R$	[2]	[4]	

Note: When a constant temperature water bath is used to maintain the water temperature at 77° F $\pm$ 1 (25° C $\pm$ 0.5) the temperature correction "R" should be 1. For all other water temperatures refer to table for the appropriate value for "R".

Rice Specific Gravity (Weighted Average)

$$\frac{([1] \times [2] + [3] \times [4])}{([1] + [3])} \quad \frac{([____ \times ____] + [____ \times ____])}{(____ + ____)} = ____$$

Note: Calculate the Rice Specific Gravity "F" to 3 decimal places.

Rice Density (*English Units*) F x 62.24 lb/ft^3 _____ x 62.24 lb/ft^3 = _____ lb/ft^3

Rice Density (*Metric Units*) F x 997 kg/m^3 _____ x 997 kg/m^3 = _____ kg/m^3

Note: Calculate the Rice Density in Metric Units to the nearest whole number.
Calculate the Rice Density in English Units to the nearest 0.1 lb/ft^3.

Average Rice Density Determination

The average of the five (5) most recent Rice Densities from a given JMF should be used for compaction control.

If less than 5 Rice Densities are available, the averages will be based on the number of Rice Densities available, excluding mix design data. See test procedure for additional information.

	Test Date	Rice Density	
(1)			lb/ft^3 (kg/m^3)
(2)			lb/ft^3 (kg/m^3)
(3)			lb/ft^3 (kg/m^3)
(4)			lb/ft^3 (kg/m^3)
(5)			lb/ft^3 (kg/m^3)
Running Average			lb/ft^3 (kg/m^3)

Note: Metric - Round to whole number. English - Round to 0.1 lb/ft^3.

Tested By	Date

Distribution: Copies to Project Engineer; Region Materials

Table 2 - Temperature Correction Factor

NOTE: Water temperatures should be maintained within the limits shown in bold type.

C°	F°	"R"
10.0	50.0	1.00266
10.6	51.1	1.00261
11.1	52.0	1.00256
11.7	53.1	1.00249
12.2	54.0	1.00244
12.8	55.0	1.00236
13.3	55.9	1.00230
13.9	57.0	1.00222
14.4	57.9	1.00215
15.0	59.0	1.00206
15.6	60.1	1.00197
16.1	61.0	1.00189
16.7	62.1	1.00179
17.2	63.0	1.00170
17.7	63.9	1.00161
18.3	64.9	1.00150
18.9	66.0	1.00138
19.4	66.9	1.00128
20.0	68.0	1.00116
20.6	69.1	1.00104
21.1	70.0	1.00093
21.7	71.1	1.00080
22.2	**72.0**	**1.00068**
22.4	**72.3**	**1.00064**
22.6	**72.7**	**1.00059**
22.8	**73.0**	**1.00054**
23.0	**73.4**	**1.00050**
23.2	**73.8**	**1.00045**
23.3	**73.9**	**1.00042**
23.4	**74.1**	**1.00040**
23.6	**74.5**	**1.00035**
23.8	**74.8**	**1.00030**
23.9	**75.0**	**1.00028**
24.0	**75.2**	**1.00025**
24.2	**75.6**	**1.00020**
24.4	**75.9**	**1.00015**
24.6	**76.3**	**1.00010**

C°	F°	"R"
24.8	**76.6**	**1.00005**
25.0	**77.0**	**1.00000**
25.2	**77.4**	**0.99995**
25.4	**77.7**	**0.99990**
25.6	**78.1**	**0.99984**
25.8	**78.4**	**0.99979**
26.0	**78.8**	**0.99974**
26.1	**79.0**	**0.99971**
26.2	**79.2**	**0.99968**
26.4	**79.5**	**0.99963**
26.6	**79.9**	**0.99958**
26.7	**80.1**	**0.99955**
27.2	81.0	0.99941
27.3	81.1	0.99938
27.8	82.0	0.99924
28.3	82.9	0.99910
28.9	84.0	0.99893
29.4	84.9	0.99878
30.0	86.0	0.99860
30.6	87.1	0.99842
31.1	88.0	0.99826
31.7	89.1	0.99807
32.2	90.0	0.99791
32.8	91.0	0.99771
33.3	91.9	0.99755
33.9	93.0	0.99735
34.4	93.9	0.99716
35.0	95.0	0.99698
35.6	96.1	0.99677
36.1	97.0	0.99659
36.7	98.1	0.99638
37.2	99.0	0.99621
37.8	100.0	0.99598
38.3	100.9	0.99579
38.9	102.0	0.99558
39.4	102.9	0.99539
40.0	104.0	0.99516

Table 2 Correction Factor is extracted from the Materials Manual (M 46-01), AASHTO T 209, last revised March 2001