INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS

TOTAL AGGREGATE BULK SPECIFIC GRAVITY DETERMINATION FROM EXTRACTED HMA OR SMA MIXTURE ITM No. 590-18

1.0 SCOPE.

1.1 This test method covers the procedure to determine the total aggregate bulk specific gravity value from extracted HMA mixture.

1.2 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCED DOCUMENTS.

2.1 AASHTO Standards.

R 76 Reducing Samples of Aggregate to Testing Size
T 30 Mechanical Analysis of Extracted Aggregate
T 84 Specific Gravity and Absorption of Fine Aggregate
T 85 Specific Gravity and Absorption of Coarse Aggregate
T 164 Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

2.2 ITM Standards.

571 Quantitative Extraction of Asphalt and Gradation of Extracted Aggregate from HMA Mixtures
580 Sampling HMA
587 Reducing HMA Samples to Testing Size

2.3 Other References.

Design Mix Formula Cover Sheet

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101.

4.0 SIGNIFICANCE AND USE. This test method covers the procedure to determine the total aggregate bulk specific gravity value from extracted HMA mixture.

5.0 APPARATUS. The apparatus shall be as stated in the referenced test methods.

6.0 SAMPLING. Sampling shall be as stated in the referenced test methods.

7.0 PROCEDURE.

7.1 Determine the minimum mass of coarse aggregate required based on the mixture designation as follows:

Mixture Designation, mm	Minimum mass of coarse aggregate, g
12.5 or less	2000*
19.0	3000
25.0	4000

**The minimum mass of coarse aggregate will be waived if at least two extractions are performed and if the HMA sample size in each extraction is between 2800g and 3000g.*

7.2 Reduce the HMA sample in accordance with ITM 587, section 7.0, to the mass of HMA needed to adequately fill the centrifuge bowl.

7.3 Extract the HMA sample in accordance with ITM 571, Method A.

Note 1: Multiple extractions may be necessary to achieve the minimum mass of coarse aggregate required in 7.1. ITM 571 specifies minimum HMA sample sizes. The HMA sample size may be increased to the capacity of the centrifuge bowl.

7.4 Perform a gradation in accordance with AASHTO T 30.

7.4.1 Combine all coarse aggregate material retained on the 4.75 mm sieve and above.

7.4.2 Combine all fine aggregate material passing the 4.75 mm sieve

7.5 Determine the bulk specific gravity, $(Gsb)_{CA}$, of the coarse aggregate sample in accordance with AASHTO T 85 except as follows:

7.5.1 The in-water mass shall be determined following the 15 h soaking period prior to determining the SSD mass.

7.6 Reduce the fine aggregate material in accordance with AASHTO R 76, Method A, to a minimum 1200g sample size.

Determine the bulk specific gravity, $(Gsb)_{FA}$, of two fine aggregate samples in accordance with AASHTO T 84 except as follows:

7.6.1 Prior to the 15 hr soaking period, the immersed sample shall be manually stirred to ensure the water will adequately permeate and saturate the aggregate.

7.6.2 Excess water shall be poured over a No. 200 sieve and fines retained on the sieve should be washed back into the sample.

7.7 Determine the $(Gsb)_{FA}$ by averaging the two fine aggregate sample results.

7.8 Combine the $(Gsb)_{CA}$ determined in 7.5 and the $(Gsb)_{FA}$ determined in 7.7 to achieve the $(Gsb)_{TOTAL}$ of the aggregate blend as follows:

7.8.1
$$(Gsb)_{TOTAL} = \frac{100}{\left[\frac{(100 - A)}{(Gsb)_{CA}}\right] + \left[\frac{(A)}{(Gsb)_{FA}}\right]}$$

Where:

A = % passing the 4.75 mm sieve as determined in 7.5.

8.0 REPORT. The $(Gsb)_{TOTAL}$ is reported to the nearest 0.001.