



**INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS**

**CLASS AS AGGREGATE
FOR USE IN SMA MIXTURE
ITM No. 220-15**

1.0 SCOPE.

- 1.1 This method covers the procedures to evaluate Class AS coarse aggregates for use in SMA mixture. The procedure includes determining the Micro-Deval abrasion value of the aggregate or aggregate blend and the aggregate degradation of the SMA mixture.
- 1.2 Coarse aggregates applicable to this ITM shall include steel furnace slag, sandstone, dolomite, or polish resistance aggregates from Certified Aggregate Producers in accordance with ITM 211.
- 1.3 This procedure 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 this ITM is responsible for establishing the appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

- T 30 Mechanical Analysis of Extracted Aggregate
- T 312 Preparing and Determining the Density of HMA Specimens by Means of the Superpave Gyratory Compactor
- T 327 Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
- R 46 Designing Stone Matrix Asphalt

2.2 ITM Standards.

- 207 Sampling Stockpiled Aggregates
- 211 Certified Aggregate Producer Program
- 571 Quantitative Extraction of Asphalt and Gradation of Extracted Aggregate from HMA Mixtures
- 586 Asphalt Content by Ignition

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 ITM shall be used to determine the Micro-Deval abrasion and the aggregate degradation of an aggregate or aggregate blend for use as Class AS aggregates in SMA mixtures.

5.0 APPARATUS. The apparatus shall be as required to compact gyratory specimens in accordance with AASHTO T 312, extract the asphalt in accordance with ITM 571 or ITM 586, and determine the gradation of the extracted aggregates in accordance with AASHTO T 30.

6.0 SAMPLING. Sampling of aggregates shall be in accordance with ITM 207.

7.0 PROCEDURES.

7.1 Micro-Deval Total Abrasion Loss.

7.1.1 Obtain the proposed SMA aggregate blend sheet or an aggregate blend sheet from a mix design prepared in accordance with AASHTO R 46

7.1.2 Determine the abrasion loss value for each coarse aggregate of the aggregate blend in accordance with AASHTO T 327. The coarse aggregate or blend of coarse aggregates shall have the total abrasion loss value determined by proportioning the individual coarse aggregate abrasion loss value with the blend percentage for each coarse aggregate.

7.1.3 The total abrasion loss value of the coarse aggregate or blend of coarse aggregates shall be determined as follows:

$$LV_{TOTAL} = \frac{(CA_1)(LV_1) + (CA_2)(LV_2) + \dots + (CA_N)(LV_N)}{(CA)_{TOTAL}}$$

where:

LV_{TOTAL} = total percent abrasion loss value for the coarse aggregate or blend of coarse aggregates

$CA_1, CA_2 \dots CA_N$ = the blend percentage for coarse aggregates 1, 2...N

$LV_1, LV_2 \dots LV_N$ = the percent abrasion loss value for coarse aggregates 1, 2...N

CA_{TOTAL} = total percentage by weight of all coarse aggregates in the blend

7.2 Aggregate Degradation Loss.

7.2.1 Prepare a mix design in accordance with AASHTO R 46

- 7.2.2** Compact two gyratory specimens at the optimum design binder content to Ndes gyrations in accordance with AASHTO T 312. Mixture conditioning is not required.
- 7.2.3** Prepare an uncompacted mixture sample at the optimum design binder content in accordance with AASHTO T 312. Mixture conditioning is not required.
- 7.2.4** Extract the uncompacted mixture and the two gyratory specimens separately in accordance with ITM 571 or ITM 586. Determine the aggregate gradation of each in accordance with AASHTO T 30.
- 7.2.5** The aggregate degradation loss value shall be determined as follows:

$$\text{Aggregate Degradation Loss, \%} = A - B$$

where:

A = average % passing the No. 8 sieve from the gyratory specimens

B = % passing the No. 8 sieve from the uncompacted mixture sample

8.0 ACCEPTANCE CRITERIA.

- 8.1** The total Micro-Deval Abrasion loss value for an acceptable coarse aggregate or blend of coarse aggregates shall be 18.0% or less.
- 8.2** The Aggregate Degradation loss value for an acceptable coarse aggregate or blend of coarse aggregates shall be 3.0% or less.

- 9.0 REPORT.** The total abrasion loss value as determined in 7.1.3 and the aggregate degradation loss value as determined in 7.2.5 shall be reported on the submitted DMF form.