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**\*\*\*GENERAL REWRITE - PLEASE READ CAREFULLY.\*\*\***

## **INSTRUCTIONS FOR RAP IN HMA MIXTURES**

### **GENERAL**

This IM describes requirements for processing, storing, documenting, and sampling & testing of RAP intended for use in HMA mixtures.

All notifications and documentation shall be submitted to the District Materials Engineer based on the District responsible for the location of the initial RAP stockpile.

### **PROCESSING**

RAP suitable for HMA shall be processed by milling and/or crushing to a maximum particle size of 1.5 inches (37.5 mm). The Contractor shall notify the Engineer and District Materials Engineer 48 hours before processing begins.

Additional screening or blending may be done to achieve a more uniform stockpile. This processing may be done as the stockpile is built or as part of the HMA plant production. Additional actions that may improve the consistency of the RAP include further crushing to reduce top size, screening into coarse and fine fractions, or blending by proportioning through a two-bin cold feed.

### **STORAGE**

Placed stockpiles on a base with adequate drainage, constructed in layers to minimize RAP segregation and ensure a workable face.

To meet Classified RAP criteria, separate stockpiles shall be constructed for each source of RAP based on the quality of aggregate, type and quantity of asphalt binder, and size of processed material. Notify the Engineer and District Materials Engineer 48 hours prior to blending Classified or Certified RAP materials of the same source, type and quantity of asphalt binder, and size of processed material to retain Classified or Certified status.

All RAP stockpiles shall be identified by maps of stockpile areas and signs placed in or near each stockpile.

### **DOCUMENTATION OF CERTIFIED RAP STOCKPILES**

Stockpiled RAP material will only retain its Classified or Certified status when the following documentation requirements are met. No documentation is required when the RAP is used on the project it came from, or a tied project.

- Form 820009r (see [Appendix A](#)) is completed by the RAP owner and a copy is forwarded

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- to the District Materials Engineer within 10 calendar days of completing the stockpile.
  - Any special handling, treatment or conditions of the RAP or its use should be described on this form.
  - Maps shall provide details that depict the stockpile site, including adjacent stockpiles of RAP or aggregates, permanent plant equipment, and landmarks.
  - Maps and signs shall identify the stockpile by RAP Identification Number.

The District Materials Engineer will review for accuracy. Portions of the form including assigning the RAP identification number, aggregate quality type, crushed particle and friction type credit, average values for extracted aggregate gradation, aggregate bulk specific gravity, aggregate absorption and asphalt binder content will be completed by the District Materials Engineer.

Notify the District Materials Engineer at least 48 hours before relocating or reprocessing a Classified RAP or Certified RAP stockpile for future use (not intended for a specific project). The notification shall include the estimated quantity of RAP being relocated or reprocessed and the new location of the stockpile. Relocation of RAP shall be reported on the appropriate Form (820009r) and submitted to the District Materials Engineer within 10 calendar days of completing the relocation. Reprocessing a Classified RAP or Certified RAP stockpile may require additional sampling, testing, and a new Form (820009r) with reassignment of a RAP Identification Number.

Before January 1st of each year, the Contractor shall update Form 820009r on the status of each Classified RAP and Certified RAP stockpile. Report the estimated quantity of RAP removed for the construction season completed and the available RAP in each stockpile for future use.

## **SAMPLING & TESTING**

### **Mix Design**

A certified Level I Aggregate Technician shall obtain the samples. Samples for mix design testing shall be obtained from at least 3 locations. Significant mixture differences in the pavement to be recycled may require separate stockpiles and samples. A sampling plan shall be developed by the Contractor and approved by the District Materials Engineer prior to sampling.

Samples for mix design obtained from the RAP stockpile are the most representative, but not always possible when the mix designs are performed. When stockpile samples are not available, RAP samples shall be obtained by milling a minimum of 50 feet (15 m) of project length at each sample location. Other methods of sampling for mix design, including coring or air-hammer patch areas, may only be used with the approval of the District Materials Engineer.

Obtain sufficient material for contractor mix design testing and owner agency RAP extraction testing as recommended in [Materials I.M. 510](#). A representative 30 pound (15 kg) sample split from the total sample shall be delivered to the District Materials Laboratory for extraction testing. Results of the extraction test will be provided to the Contractor within 4 weeks of sample delivery.

### **Classified RAP Quality Control**

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When RAP quality control is required, use one of the following quality control sampling programs. A certified Level I Aggregate Technician shall obtain the samples.

- Stockpiles – The Contractor shall obtain a representative sample of RAP from the stockpile for each 1000 tons of RAP placed in the stockpile.
- HMA Plant – The Contractor shall obtain a representative sample of RAP from the HMA plant RAP feed belt for each lot of HMA produced.

The Contractor shall use the ignition oven ([Materials IM 338](#)) or chemical extraction (AASHTO T 164) to extract the aggregate from the RAP sample. Calibration of the asphalt binder content from the ignition oven extraction is not required for the RAP quality control program. The gradation of the extracted RAP aggregate and the un-calibrated asphalt binder content shall be logged and charted within 24 hours of sampling. Report results to the District Materials Engineer upon completion of testing.

To retain Certified RAP status, the stockpile shall be uniform in gradation and binder content. Perform ignition oven ([Materials IM 338](#)) or chemical extraction (AASHTO T164) testing for aggregate gradation and binder content at 1/1000 tons as the stockpile is built or during processing of the stockpile. Regardless of tonnage, a minimum of three tests shall be required. Interior samples from the stockpile cross section shall be included in quality control testing. Use a consistent test procedure for obtaining binder content and gradation. Perform and report aggregate specific gravity and absorption testing at the above frequencies. Retain a split portion of each sample for testing by the Iowa DOT. The Iowa DOT will select a sample to test for verification. Log, chart, and report all test results to the DME.

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Gradation and asphalt content uniformity will be based on the following standard deviation requirements:

Property	Maximum Standard Deviation
1 ½ (% Passing)	6.5
1 (% Passing)	6.5
¾ (% Passing)	6.5
(% Passing)	6.5
#4 (% Passing)	6.5
#8 (% Passing)	6.5
#30 (% Passing)	4.5
#200 (% Passing)	2.2
Asphalt Content (%)	0.70

The DME will provide notification of Certified status when the above requirements are satisfied.