

March 28, 2011

REVISION OF SECTION 401
RECLAIMED ASPHALT SHINGLES

NOTICE

This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT's Project Development Branch with formal instructions regarding its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies that use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

INSTRUCTIONS FOR USE ON CDOT CONSTRUCTION PROJECTS:

Use this project special provision on projects with voids acceptance of hot mix asphalt as determined by the Region Materials Engineer. This specification may also be used on other projects as determined by the Region Materials Engineer.

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Section 401 of the Standard Specifications is hereby revised for this project as follows:

Subsection 401.02(b) shall include the following:

Reclaimed Asphalt Shingles (RAS) are allowed in hot mix asphalt (HMA) up to a maximum of 5 percent for all lifts provided all specifications for HMA are met. Only RAS from manufactured shingle waste or post-consumer asphalt shingles as defined by AASHTO MP 15 shall be allowed.

The RAS shall not contain clay balls or vegetable matter. Deleterious materials such as metals, glass, rubber, soil, brick, tars, paper, wood, and plastic shall not exceed 3.0 percent by mass as determined by material retained on the #4 sieve. Lightweight materials such as paper, wood, and plastic shall not exceed 1.5 percent by mass as determined by material retained on the #4 sieve. Deleterious material will be determined by the amount retained on the #4 sieve from a 500g-700g RAS sample. The Contractor shall pick and weigh the amount retained on the #4 sieve.

The moisture content of the RAS shall not exceed 15% by mass.

The Contractor shall provide asbestos test results certifying compliance with the Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. The Contractor's Project Safety Management Plan shall include a hazard assessment and safety considerations for the RAS processing and construction operations.

RAS samples collected and analyzed, for the purpose of identifying properties of RAS as defined in this specification, shall be representative of the RAS that will be used in the HMA production for this project.

The Contractor/RAS Supplier shall allow CDOT to visit the RAS production and/or shipping site during normal business hours to perform an audit by observing the quality control activities, to inspect the facilities, and to obtain RAS samples for testing. Access to the site shall be provided within 24 hours of notice from the Engineer.

The Contractor shall submit a mix design in accordance with Section 403 and CP-52 for the amount of RAS to be used. The shingle aggregate gradation and specific gravity shall be determined in accordance with AASHTO PP 53. The AC content of the RAS utilized in the Contractor RAS mix design shall be determined in accordance with AASHTO T-164, Method A or B. The Contractor shall determine the percent contribution of binder from RAS and the percentage of virgin effective binder in the HMA in accordance with AASHTO PP 53 methods. At least 70% of blended binder content shall be virgin effective binder. When RAS is used along with Reclaimed Asphalt Pavement(RAP), the binder replaced by the RAP will be considered as a part of the maximum allowed content of replaced binder.

The Contractor may uniformly blend sand or fine aggregate with RAS in stockpiles if needed to keep the processed material workable. The sand or fine aggregate added must be considered in the final gradation of the new HMA.

HMA with RAS shall be tested for acceptance in accordance with subsections 105.05 and 106.05. HMA Project Verification Testing for asphalt content and gradation will be performed at the frequencies listed in the Field Materials Manual in accordance with CP-L 5120. If the Contractor elects to use RAS, the following additional conditions shall apply:

1. The Contractor shall have an approved Quality Control Plan (QCP) that details how the RAS will be processed and controlled. When the Contractor intends to use RAS from a RAS Supplier, that supplier's QCP shall be submitted by the Contractor. The Engineer will, in writing, suspend the work wholly or in part, for failure to comply with the approved QCP. The QCP shall be submitted with the Contractor's HMA mix design and shall address the following:

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- A. RAS Processing Techniques. This requires a schematic diagram and narrative that explains the processing (grinding, screening, and rejecting) and stockpile operation for this specific project. Hand sorting of deleterious material prior to grinding is required. In addition, this plan must address the control of agglomeration and moisture.
- B. Determination and Control of RAS Asphalt Binder Content (AASHTO T-164, Method A or B). RAS Asphalt Binder Content (AC) may also be determined in accordance with CP-L 5120, provided a RAS AC content correction factor is determined through correlation testing with AASHTO T-164, Method A or B. The correction factor shall be determined by performing correlation testing on the first five samples of the RAS AC content, then at a frequency of one for every five AC content tests thereafter. The correction factor shall be determined by calculating the average difference in AC content between CP-L 5120 and AASHTO T-164, Method A or B, and applying the correction to the AC content determined in accordance with CP-L 5120

Frequency: 1/250 tons of processed RAS material (minimum five tests).

- C. Control of RAS Gradation (CP31 or AASHTO T-30):

Frequency: 1/250 tons of processed RAS material (minimum three tests)

- D. Process Control Charts shall be maintained for RAS binder content and each screen listed in subsection 401.02(b)2., during addition of any RAS material to the stockpile. The Contractor shall maintain separate control charts for each RAS stockpile. The control charts shall be displayed and shall be made available to the Engineer upon request.

- E. Asbestos content of RAS:

Frequency: 1/1000 tons of processed RAS material (minimum three tests)

- F. Moisture content of RAS:

Frequency: 1/day

- G. Deleterious Material:

Frequency: 1/1000 tons of RAS material (minimum three tests)

- 2. The processed RAS shall be ground to meet the following requirements.

Sieve Size	Percent Passing by Mass
3/8 in	100
No.4	90-100

- 3. The aggregate and binder obtained from the processed RAS shall be uniform in all the measured parameters in accordance with the following:

UNIFORMITY*

Parameter	Standard Deviation
Binder Content	2.0
Percent Passing #200	6.0
*Uniformity is the Maximum allowable Standard Deviation of test results of processed RAP.	

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Subsection 401.22 shall be modified as follows:

Delete the fifth paragraph and replace with: When asphalt cement is a separate pay item, the amount of asphalt cement contained in reclaimed asphalt pavement (RAP) material and reclaimed asphalt shingles (RAS) material will not be measured or paid for but shall be included in the work.

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