## ITEM P-207 IN-PLACE FULL DEPTH RECLAMATION (FDR) RECYCLED ASPHALT AGGREGATE BASE COURSE

DESCRIPTION

**207-1.1** This item consists of a recycled asphalt aggregate base course resulting from the in-place full depth reclamation (FDR) of the existing pavement section (asphalt wearing surface and aggregate base), plus mechanical stabilization with additional aggregate or chemical stabilization with Portland cement, or asphalt emulsion, when shown on the plans.

MATERIALS

**207-2.1 AGGREGATE.**  The FDR shall consist of materials produced by recycling (pulverizing and mixing) the existing asphalt pavement, aggregate base, subgrade, and any additional aggregate as necessary. .

The FDR shall meet the gradation in Table 207-1, below.

TABLE 207-1. FDR GRADATION

| Sieve | Minimum Percentage by weight passing sieves |
| --- | --- |
| 1-1/2-inch | 100 |
| 1-inch | 90-100 |

1. **Deleterious substances.** Materials for aggregate base shall be kept free from weeds, sticks, grass, roots and other foreign matter.
2. **Uniformity**. The materials shall be thoroughly recycled (pulverized and mixed) to ensure a uniform gradation.

207-2.2 STABILIZATION.

1. **Mechanical stabilization.** Addition of corrective aggregate material to adjust gradation shall be equivalent to P-209 Crushed Aggregate Base Course.
2. **Chemical Stabilization**. Provide the specific chemical stabilization material designated in the Plans. Portland cement shall meet the requirements of AASHTO M 85. Emulsified asphalt cement shall meet the requirements of AASHTO M 140. Cationic emulsified asphalt shall meet the requirements of AASHTO M 208. Materials shall be handled, stored, and applied in accordance with all federal, state, and local requirements.

**207-2.3 WATER.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

**207-2.4 QUALITY CONTROL (QC) SAMPLING AND TESTING.**  The Contractor shall take at least two FDR samples per day of production in the presence of the Engineer to check the gradation. Sampling shall be per ATM 301. Material shall meet the requirements in paragraph 207-2.1. Samples shall be taken from the in-place, un-compacted material at random sampling locations according to ATM SP 4.

CONSTRUCTION METHODS

**207-3.1 MILLING**. The existing asphalt pavement shall be milled to the depth below surface grade shown on the plans.

**207-3.2 CONTROL STRIP.** The control strip shall be 12 feet in width and 300 feet in length. The Engineer will designate the location of control strips. The Contractor shall demonstrate, in the presence of the Engineer, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor’s expense. Full operations shall not begin until the control strip has been accepted by the Engineer. Upon acceptance of the control strip by the Engineer, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the Engineer.

**207-3.3 RECYCLING (PULVERIZATION AND MIXING)**. The asphalt pavement and aggregate base shall be recycled (pulverized and mixed) into a uniformly blended mixture to the depth shown on the plans. Add mechanical and chemical stabilization materials of the type(s) and in proportions shown on the plans to the mixture of asphalt pavement and aggregate base. All material over approximately 1-1/2 inches will be removed by the Contractor. The mixture shall be brought to the desired moisture content.

The maximum lift thickness of the recycled aggregate base course material to be compacted is shown on the plans.

**207-3.4 GRADING AND COMPACTION**. Immediately upon completion of recycling (pulverization and mixing), the material shall be shaped and graded in accordance with the project plans. The Engineer will use ATM 412 to determine the density standard from the control strip. The recycled asphalt aggregate base course shall be compacted within the same day to an in-place density of 98 percent as determined by ATM 411. Compact the remainder of the project to not less than 98 percent of the density standard, in accordance with ATM 411. The number, type and weight of rollers shall be sufficient to compact the material to the required density.

**207-3.5 FINISHING**. The surface of the aggregate base course shall be finished by blading or with automated equipment designed for this purpose. If the top layer is 1/2 inch or more below grade, the top layer shall be scarified to a depth of at least 3 inches, new material added, and the layer blended and re-compacted to bring it to grade. The addition of layers less than 3 inches shall not be allowed.

**207-3.6 PROOF ROLLING.** Compacted asphalt aggregate base course shall be proof rolled with a tandem axle dual wheel dump truck loaded to the legal limit with tires inflated to 80 psi in the presence of the Engineer. Soft areas that deflect greater than 0.5 inch or show permanent deformation greater than 0.5 inch shall be removed and reworked at the Contractor’s expense.

**207-3.7 WEATHER LIMITATIONS.** When weather conditions detrimentally affect the construction process and/or quality of the materials, the Contractor shall stop construction. Portland cement shall not be applied when wind conditions affect the distribution of the materials. Do not use any frozen material or compact on a frozen base. Constructionshall not be performed unless the atmospheric temperature is above 35°F and rising or approved by the Engineer. When the temperature falls below 35°F, protect all completed areas against detrimental effects of freezing by approved methods. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

**207-3.8 MAINTENANCE.** The asphalt aggregate base course shall be maintained in a satisfactory condition until the work is accepted by the Engineer. Equipment used in the construction of an adjoining section may be routed over completed sections of asphalt aggregate base course, provided that no damage results and equipment is routed over the full width of the completed asphalt aggregate base course. Any damage to the recycled asphalt aggregate base course shall be repaired by the Contractor at the Contractor’s expense.

**207-3.9 SURFACE TOLERANCES.** The finished surface shall be tested for smoothness and accuracy of grade. Any area failing smoothness or grade shall be scarified to a depth of at least 3 inches, reshaped and re-compacted by the Contractor at the Contractor’s expense.

1. **Smoothness.** The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.
2. **Grade.** The grade shall be measured on a 50-foot grid and shall be within +0 and ‑1/2 inch of the specified grade.

**207-3.10 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY.** FDR base course will be accepted for density and thickness on an area basis. One (1) test for density and thickness will be made for each 1200 square yds. Sampling locations will be determined on a random basis in accordance with ATM SP 4.

1. **Density**. The Engineer will perform all density tests.

Each area will be accepted for density when the field density is at least 98 percent of the density standard of the FDR base course in accordance with ATM 412. The in-place field density will be determined in accordance with ATM 411, and ATM 411 will be used to determine the moisture content of the material. The machine will be calibrated in accordance with ATM 411. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure will be followed until the specified density is reached.

1. **Thickness.** The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the Engineer for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material, and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

**207-4.1** See GCP Section 90, and the following:

1. FDR asphalt aggregate base course, by the area of the finished top surface.
2. Emulsified asphalt, by the ton.
3. Portland cement, by the ton**.**
4. FDR asphalt aggregate base course, by Lump Sum. Chemical stabilization is subsidiary.

BASIS OF PAYMENT

**207-5.1** Payment will be made at the contract unit price, per unit of measurement, accepted in place. Corrective aggregate material, if required, will be paid under Item P-209.

Payment will be made under:

P207.110.0000 FDR Asphalt Aggregate Base Course - per square yard

P207.120.0000 FDR Asphalt Aggregate Base Course - per lump sum

P207.130.0000 Emulsified Asphalt - per ton

P207.140.0000 Portland Cement - per ton

REFERENCES

AASHTO M 85 Portland Cement

AASHTO M 140 Emulsified Asphalt

AASHTO M 208 Cationic Emulsified Asphalt

ASTM C1602 Mixing Water Used in the Production of Hydraulic Cement Concrete

ATM 301 Sampling of Aggregates FOP for AASHTO T 2

ATM 411 WAQTC FOP for AASHTO T 355 In-Place Density of Asphalt Mixtures By Nuclear Methods

ATM 412 Relative Standard Density of Treated Mixtures by the Control Strip Method

ATM SP 4 Random Sampling