

SECTION 00725 - HOT IN-PLACE RECYCLED ASPHALT CONCRETE PAVEMENT (HIR)

(Follow all instructions and make all edits with "Track Changes" turned on. This Section is not published in the Oregon Standard. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project, unless the item(s) that are included in the subsection, paragraph, sentence, or bullet are not required on the Project and then they should be deleted. In general do not re-number or re-letter subsections when item(s) are deleted. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Section 00725 is not a Standard Specification and is included in this Project by Special Provision.

Description

00725.00 Scope - This Work consists of constructing Hot In-place Recycled Asphalt Concrete Pavement (HIR) in reasonably close conformity to the lines, grades, thicknesses, and Cross Sections shown or established.

00725.01 Abbreviations:

HIR - Hot In-place Recycled Asphalt Concrete Pavement.

00725.02 Definitions:

Hot In-place Recycled Asphalt Concrete Pavement - HIR is a Mixture of RAP, that has been heated, mixed in place with new asphalt concrete Mixture (when specified) and Recycling Agent, then relaid and compacted in a continuous operation.

Mixture - Hot in-place recycled asphalt concrete after all Materials are combined and mixed.

Panel - The width of HIR Material being removed and placed by the recycling train.

Recycling Agent - Material added to RAP to soften and rejuvenate existing asphalt Material.

00725.05 Prepaving Conference - Meet with the Engineer, at a time mutually agreed upon, to discuss methods of accomplishing all phases of the recycle and paving Work. Provide all supervisory personnel of the Contractor and any Subcontractor who are to be involved in the recycle and paving Work at the meeting.

Materials

00725.11 Recycling Agent - Furnish RA 1, RA 5, RA 25, RA 75, RA 250, or RA 500 Recycling Agent that has been manufactured from new Material and meets the requirements of 00745.11.

00725.12 Asphalt Concrete Mixture - Furnish new asphalt concrete Mixture meeting the requirements of Section 00745.

00725.13 Job Mix Formula (JMF) - Furnish an HIR Mixture that consists of RAP from the existing Pavement, new asphalt concrete Mixture (when specified) and Recycling Agent combined in the proportions designated by the Engineer. Variability in the composition of the RAP Material may require changes in the proportions of the constituents, as directed. Furnish the Recycling Agent content between 0.2% and 1.0% by weight of mix.

00725.15 Process Control - Process control sampling and testing is performed by the Engineer.

00725.16 Acceptance of Mixture - The HIR Mixture will be accepted visually on the road following initial rolling. Correct any Mixture that is not acceptable as follows:

- Reprocess or replace any area showing an excess or a deficiency of asphalt with new asphalt concrete Pavement.
- If raveling occurs, provide immediate traffic control and additional rolling.

Provide traffic control for rerolling, reprocessing, or replacement according to the Engineer. If the Engineer determines the excesses, deficiencies, or raveling are not due to the Contractor's operations, the Work will be paid for under the appropriate bid items listed in the Schedule of Items. If the Engineer determines the excesses, deficiencies, or raveling are due to the Contractor's operations, the corrective Work is at no additional cost to the Agency.

Equipment

00725.23 Asphalt Concrete Pavers - Provide pavers that comply with the following:

(a) Power and Support - Self-contained, self-propelled, supported on tracks or wheels, that do not contact the Mixture being placed.

(b) Augers and Screed - Equipped with augers and screed or strike-off assembly, heated if necessary, that:

- Provide extensions used on travel lanes, with the same augering, screeding, and heating Equipment as the rest of the paver.
- Can spread and finish HIR to a uniform texture in the specified widths, thicknesses, lines, grades, and Cross Sections.
- Will not segregate, tear, shove, or gouge the HIR.

(c) Control System - Equipped with a paver control system that:

- Controls HIR placement to specified Slope and grade.
- Maintains the paver screed in proper position.

Provide specified results through mechanical sensors and sensor-directed devices actuated from independent line and grade control references.

(d) Illumination - Provide adequate lighting to illuminate the paver and the road in front of and behind the paver during the period from 30 minutes after sunset to 30 minutes before sunrise. Shield lighting from adjacent traffic as necessary. Provide a minimum light level of 10-foot candles as measured on the road surface at a distance of 16 feet from the edge of the paver.

00725.24 Compactors - Provide specified self-propelled rollers capable of reversing without backlash, as follows:

(a) Steel-Wheeled Rollers - Provide steel-wheeled rollers that have:

- A gross static weight of at least 8 Tons.
- A static weight on the drive wheel of at least 250 pounds per inch of width.

If used for finish rolling, provide rollers that have:

- A gross static weight of at least 6 Tons.
- No drive wheel static mass requirement.

(b) Vibratory Rollers - Provide vibratory rollers that are:

- Equipped with amplitude and frequency controls.
- Specifically designed to compact asphalt concrete.
- Capable of at least 2000 vibrations per minute.

If vibratory rollers are used for Pavement thickness less than 1 1/2 inches, provide rollers that:

- Have a gross static weight of at least 8 Tons.
- Have a static weight on the drive wheel of at least 250 pounds per inch of width.
- Not be operated in vibratory mode.

If vibratory rollers are used for finish rolling, provide rollers that:

- Have a gross static weight of at least 6 Tons.
- Not be operated in the vibratory mode.

(c) Pneumatic-tired Rollers - Provide pneumatic-tired rollers that:

- Be tandem, or multiple axle, multiple wheel type.
- Have smooth-tread, pneumatic tires of equal size.
- Have tires staggered on the axles, spaced and overlapped to provide uniform compacting pressure for the full compacting width.

- Have a minimum total load of 2,800 pounds per tire with tire inflation pressure of 45 psi and 90 psi.
- Be fully skirted to reduce tire heat loss and Mixture pick up.

00725.26 Heating and Scarifying Equipment:

(a) General - Indicate at the preconstruction conference the type of Equipment intended for use. Provide Equipment that is in good operating condition in sufficient time for evaluation prior to its use. Any Equipment the Engineer determines to be unsuitable for the purpose intended is rejected.

Prior to performing hot recycling Work on the Project, provide a written statement to the Engineer that contains the following:

- A current air contaminate discharge permit number for the plant being used.
- The expiration date of the permit.
- A copy of the statement advising DEQ of the location of the Project and when operations are intended to commence.

The name and address of the air pollution authority having jurisdiction over the area may be obtained from the Engineer.

(b) Equipment - Provide HIR Equipment that performs the following:

(1) Heater Scarification - Heat the existing asphalt surface from 4 inches to 8 inches wider than the width to be processed. Provide the temperature of the scarified Material such as not to unduly harden the asphalt cement, and generally not be over 290 °F, but capable of heating the asphalt mix so that the temperature behind the screed is a minimum of 230 °F before compaction.

No open flame directed on or at the Pavement surface is allowed.

Establish the number of heating units to be used. Provide multiple heaters, if used, in tandem.

Set the scarifying system to produce a fully recycled Mixture without lumps. Equip the heater scarifier with a milling head or mechanical device to loosen the heated Pavement to be reprocessed.

(2) Addition of Recycling Agent - Provide a means to add Recycling Agent homogeneously to the heated and scarified Mixture as follows:

- Positive feed and shut-off of the agent, linked to the movement of the machine.
- Control of the quantity of agent to ± 0.05 gallons per square yard of surface scarified, within an agent application range of from 0.1% to 2.0%, by weight of total Mixture.
- Measurement of the volume of agent used by means of a metering device capable of recording accumulated liters to an accuracy of $\pm 2\%$.

- Proportional interlinking of the agent application rates to the machine's Mixture processing rate.
- Heating of the agent to within ± 25 °F of the application temperature established by the Engineer.

(3) Addition of New Asphalt Concrete Mixture - Provide a means to add new asphalt concrete Mixture into the heated and scarified Mixture as follows:

- A hopper to receive the new Mixture directly from the hauling vehicle.
- Positive feed and shut-off of the Mixture, linked to the movement of the machine.
- Control of the new Mixture feed system to provide adequate proportional interlinking to insure that HIR meets the JMF.

(4) Mixing - Provide a means to uniformly mix the scarified mix (RAP), the new asphalt concrete Mixture (when specified), and the Recycling Agent in a chamber or mixing unit so that a homogeneous Mixture is produced.

Provide a means to convey the recycled mix directly to the hopper of the asphalt concrete paver.

Construction

00725.41 Test Strip - At the beginning of the hot recycling operations, construct a test strip on the Project of at least 500 feet but not more than 1,000 feet in length using the Equipment and methods to be used for the hot recycling Work on the Project. Do not perform any other hot recycling Work until the test strip is evaluated and approved.

00725.42 Cleaning Existing Surface - Clean the existing paved surface to be recycled of all dirt, oils, and other objectionables by brooming, flushing with water, or other approved methods prior to beginning heater-scarification operations.

00725.43 Heating and Scarifying - Evenly heat, scarify, and rework the Pavement surface to the widths and depths shown. Control heating to assure uniform heat penetration without causing differential softening of the surfaces. Charring of the asphalt will not be permitted. Uniformly apply the Recycling Agent to the scarified Material prior to remixing and Leveling unless otherwise approved. The rate of application is as determined by the Engineer based on laboratory tests on Pavement samples.

Furnish a heated and scarified Material at a temperature in a range between 230 °F and 290 °F as measured immediately behind the scarifier. The Engineer will select the temperature within these limitations. Stay within the above range and do not vary the Mixture from the selected temperature by more than 23 °F.

Do not burn or scorch trees, shrubs, or other items located adjacent to the Pavement. Be responsible for protecting the adjacent landscape from heat damage. The protection may consist of individual shielding, water spray, or other approved methods.

When a Pass is made adjacent to a previously placed mat, extend the longitudinal joint at least 52 inches horizontally into the previously placed mat, unless otherwise directed. Other approved methods may be used that insure a tight joint between the mats.

00725.44 Mixing and Relaying - Automatically feed the scarified and reclaimed Material into a mixing unit. Add new asphalt concrete Mixture and the Recycling Agent to the reclaimed Material at the mixer unit at the specified rate. Thoroughly mix the combined Material then automatically feed it into the asphalt concrete paver. Spread and strike off the Material to the required thickness, grade, and cross-section at a minimum temperature of 230 °F.

00725.49 Compaction - Compact the HIR as follows:

(a) **General** - Immediately after the HIR has been spread, struck off, and surface irregularities and other defects remedied, roll it uniformly until compacted as specified. Complete all rolling before the Mixture temperature drops below 135 °F unless the Engineer determines that a higher minimum temperature is required for proper compaction.

(b) **Rolling** - Compact HIR with rollers according to 00725.24. Provide sufficient rollers of types appropriate to compact the Mixture while it is in a workable condition. Operate rollers at a uniform speed not more than 3 mph, with the drive roll or wheels nearest the paver.

Begin rolling at the sides and proceed longitudinally, parallel to the road centerline, gradually progressing to the center, unless otherwise directed. On superelevated curves, begin rolling at the low side and progress to the high side. When paving in echelon, or when abutting a previously paved lane, roll the longitudinal joint first, followed by the regular rolling pattern.

Do not make sharp turns or park rollers on the HIR. Stop each Pass at least 5 feet longitudinally from preceding stops. Do not displace the line and grade of edges. Prevent HIR from sticking to the wheels and spotting or defacing the HIR by wetting them with a minimum of water or other approved Material.

(1) **Breakdown Rolling** - Use vibratory, steel-wheeled rollers. Make at least three complete roller Coverages.

(2) **Intermediate Rolling** - Use self-propelled, pneumatic-tired rollers. Make at least two complete roller Coverages with the pneumatic-tired roller immediately.

(3) **Finish Rolling** - Use nonvibratory, tandem-wheeled steel rollers, and continue until roller marks are eliminated.

Maintenance

00725.60 Surface Repair - At locations where heater scarification operations begin or end, ensure that the transition between the scarified and unscarified surface is smooth and has no irregularities .

Repair all irregularities that result from the heater scarification operations with a Leveling Course of hot mix asphalt concrete or as directed. Repair defects at no additional cost to the Agency.

Finishing and Cleaning Up

00725.70 Pavement Smoothness:

(a) Single Course CRP Construction - Test the top surface of HIR with a 12-foot straightedge parallel to and perpendicular to the centerline, as directed. Provide a Pavement surface that does not vary by more than 1/4 inch.

(b) Multiple Course CRP and EAC or ACP Construction - Test the top surface of the HIR Course where the EAC or ACP wearing Course is placed according to 00725.70(a) above.

Test the EAC or ACP wearing surface with the rolling straightedge in the designated wheel path of a 0.1-mile strip of each travel lane per mile where directed, and on each transverse joint throughout the Project. Operate the rolling straightedge parallel to the centerline. Provide a surface that does not vary more than 0.015 foot.

Also test the EAC or ACP wearing surface with a 12-foot straightedge placed perpendicular to the centerline at least once within the above mentioned 0.1-mile strip. Provide a surface that does not vary by more than 1/4 inch.

If the 0.01-mile testing strip meets the Specifications, no further testing of the mile represented by the testing strip is required, except at the transverse joints. If any part of the testing strip does not meet the Specifications, test both wheel paths of the entire mile.

Perform Pavement smoothness testing within 24 hours of paving and after corrections of Pavement roughness.

Measurement

00725.80 Measurement - The quantities of HIR will be measured on the area basis based of the finished surface of the completed Pavement within the Neat Lines shown or established.

The quantities of Recycling Agent in the HIR Mixture will be measured on the weight basis.

New asphalt concrete Mixture will be measured according to 00745.80.

Payment

00725.90 Payment - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Hot In-place Recycled Asphalt Concrete Pavement	Square Yard
(b) _____ Recycling Agent in HIR	Ton

In item (b), the type of recycling agent is inserted in the blank.

Payment will be payment in full furnishing and placing for all Materials, and for providing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

New asphalt concrete Mixture will be paid for according to 00745.90.

No separate or additional payment will be made for preparing the existing road surface that receives the HIR.