

## ITEM 860 THINLAY ASPHALT CONCRETE

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- 860.01 Description**
- 860.02 Composition**
- 860.03 Materials**
- 860.04 Mixing**
- 860.05 Weather Limitations**
- 860.06 Spreading, Compacting and Finishing**
- 860.07 Surface Tolerances**
- 860.08 Acceptance**
- 860.09 Basis of Payment**

### What's new in this specification revision?

The primary change is the inclusion of a recycling agents for the purpose of improving THINLAY cracking resistance. Asphalt recycling agents have the effect of breaking down stiffness in mixes using reclaimed asphalt pavement (RAP). This reduces cracking susceptibility, supports sustainability and economy.

**860.01 Description.** This work consists of constructing a surface course of aggregate and asphalt binder mixed in a central plant and spread and compacted on a prepared surface. The requirements of 401, 441, and 448 apply, except as modified by this specification.

**860.02 Composition.** Establish a Job Mix Formula (JMF) to meet the mixture composition requirements of the mix types shown in **Table 860.02-1**.

For Type MED and Type LT Thinlay Asphalt Concrete include a recycling agent blended to provide a mixture with a target binder equivalent to the Asphalt Binder Grade Final listed in Table 860.02-1.

**TABLE 860.02-1 – MIXTURE COMPOSITION**

Property	Type MED <sup>[1]</sup>	Type LT
Fine Aggregate (703.05A)	50% Mech. Crush / 50% Natural Sand <sup>[2]</sup>	≥ 50% Natural Sand
RAP (max. %)	25	25
Total binder content min. (% by weight of mix)	6.4	6.6
Virgin binder min. (% by weight of mix)	5.2	5.2
Virgin Binder Grade (PG)	64-22	58-28
Asphalt Binder Grade (PG) Final [3]	64-22	58-28
F/A Ratio, max	1.2	1.2
Blows	50	50
Stability, min., pounds (N)	1200 (5338)	750 (3336)
Flow, 0.25mm	8 to 16	8 to 18
Design Air Voids	3.5	3.5
VMA, min.	16	16
<b>Sieve Size</b>	<b>Total Percent Passing <sup>[4]</sup></b>	
1/2 inch (12.5 mm)	100	
3/8 inch (9.5 mm)	95 to 100	
No. 4 (4.75 mm)	72	
No. 8 (2.36 mm)	42 to 60	
No. 16 (1.18 mm)	27 to 45	
No. 50 (300 μm)	10 to 22	
No. 200 (75 μm)	0 to 8	

- [1] Provide Coarse Aggregate with a minimum of 90 percent fractured (two or more faces) according to ASTM D5821
- [2] Provide fine aggregate as a 50% crushed/50% nat. sand blend. Ensure crushed fine aggregate meets FAA of 44 or is crushed carbonate stone, trap rock or air cooled blast furnace slag.
- [3] Blended Asphalt Binder Grade will be achieved utilizing a recycling agent as described in 860.03. Use a between 1.0% to 7.0% recycling agent by weight of virgin PG binder.
- [4] Gradation includes any mineral filler and is specified in percent passing.

**860.03 Materials.** Furnish clean, uncoated aggregate conforming to the applicable requirements of Table 860.02-1 and quality requirements of 703.05. Provide mineral filler conforming to 703.07. Provide binders conforming to 702.01. Process RAP according to Method 2 (extended) RAP, Table 401.04-2. Only incorporate RAP passing the 9/16 inch sieve into the mix. Do not use RAS.

Utilize a recycling agent to give the final blended asphalt (recovered RAP binder, virgin binder, recycling agent) an equivalent PG grade which meets the requirements of Table 860.02-1. Provide the brand name, percentage to the tenth by weight of the virgin binder and gpm rate for the mix plant in the mix design submittal. Allowable recycling agents are EvoFlex CA and SYLVAROAD. Meter the recycling agent into the mixing plant in accordance with manufacturer requirements at the dosage rate specified in the mix design. If the recycling agent is metered directly into the asphalt binder line, also comply with the requirements of 402.03. If the RAP source or RAP blend percentage changes, a new mix design is required.

**860.04 Mixing.** Ensure the mixing plant conforms to 402.

**860.05 Weather Limitations.** Do not place the asphalt concrete when the surface of the existing pavement is less than 60 °F (15 °C) or the air temperature is less than 60 °F (15 °C).

**860.06 Spreading Compacting and Finishing.** Only use static (non-vibratory) compaction methods. Use a minimum of two rollers. Compact mixes conforming to 401.13 and 401.16. Three wheel rollers per 401.16 will not be required. Double the maximum capacity square yards per hour provided in Table 401.13-1 for course thickness one inch or less.

Ensure that the mix temperature immediately before rolling is not less than 260 °F (127 °C). Complete rolling, with full coverage of the roller train, before the mix temperature reaches 175 °F (80 °C). Provide an analysis to the Engineer using PaveCool software (available from Minnesota Department of Transportation) to determine the asphalt cooling time (time available for compaction) under actual placement conditions at the start of each paving day. Ensure the placement rate and roller coverage are coordinated to allow full roller train coverage in the available rolling time determined by PaveCool. Do not allow traffic on the compacted mixture until it has cooled sufficiently to prevent damage.

**860.07 Surface Tolerances.** Ensure the completed surface course conforms to 401.19. Remove raised pavement markers according to 621.08. Prior to placing asphalt concrete, prefill the depression caused by the removal of the casting with material meeting this specification.

**860.08 Acceptance.** Comply with all requirements of 448 except 448.02 Density. Do not conduct density gauge quality control testing per Supplement 1055.

**860.09 Basis of Payment.** The Department will pay for removal of existing raised pavement markers according to Item 621 Raised Pavement Markers Removed.

The Department will make payment for accepted quantities, completed in place, at the contract price as follows:

Item	Unit	Description
860	Cubic Yard (Cubic Meter)	Thinlay Asphalt Concrete, Type MED
860	Cubic Yard (Cubic Meter)	Thinlay Asphalt Concrete, Type LT

**Designer Note:**

**Use of this item requires prior approval from the Office of Pavement Engineering.**

- This item is for use on General or Urban System routes only.
- Minimum lift thickness is 0.75 inches (19 mm) and maximum is 1.25 inches (32 mm).
- Type LT is restricted to routes with less than 2500 ADT and less than 250 trucks.
- Type MED is restricted to routes with less than 1500 trucks.
- Use of non-tracking tack coat is preferred.
- The weather restrictions of this specification may limit opportunities for late season paving. This should be taken into account when determining project completion dates.