

# 2023 ASPHALT BINDER AND MIXTURE REFERENCE GUIDE FOR COUNTIES

The Asphalt Paving Association of Iowa recently developed Asphalt Binder and Mixture Guides for the Iowa DOT and Local Agencies. Neither of these guides clearly addressed guidance for counties. This reference guide has been developed to provide guidance specifically for counties. Counties normally use Iowa DOT specifications for their construction projects. (Released December 2023)

## PG BINDER GUIDANCE

DESIGN TRAFFIC (1X10 <sup>6</sup> ESALS)	DESIGN SPEED (MPH)	PG BINDER GRADE
≤ 0.3 M	AND ANY	58-28S
0.3-1.0 M	AND > 45	58-28S
0.3-1.0 M	AND 15-45	58-28S <sup>1</sup>
1.0-10 M	AND 15-45	58-28H
OVERLAYS (LT/ST/HT)		58-28S or H or 64-22S

PG 64-22 may be used south of I-80 if methods to retard reflective cracking are not used.

<sup>1</sup> Use of PG 58-28H should be considered if heavy truck or bus traffic is present.

## IOWA DOT ASPHALT MIXTURE DESIGN CRITERIA

DESIGN TRAFFIC (1X10 <sup>6</sup> ESALS)	MIX DESIGNATION	GYRATORY DENSITY		FILM THICKNESS	AGGREGATE <sup>1</sup>			
		N <sub>des</sub>	Design (Target) % G <sub>mm</sub>		QUALITY TYPE	CRUSH (MIN)	FAA	SAND EQUIVALENT
≤ 1.0 M	ST	Surface	50	96.0	8.0-15.0	A	60	40
		Intermediate				B	45	
		Base					--	
1.0 - 10.0 M	HT	Surface	75	96.0	8.0-15.0	A	75	45
		Intermediate				B	60	
		Base					40	
> 10 M	VT	Surface	95	96.0	8.0-15.0	A	85	45
		Intermediate				B	75	
		Base					40	
	HMA Interlayer <sup>1</sup>	50	98.0	≥ 8.0	A	45	40	50
	HMA Thin Lift <sup>1</sup>	50	≥ 98.0	≥ 8.0	A	50	40	50

<sup>1</sup> Flat & Elongated 10% maximum at a 5:1 ratio.

<sup>2</sup> Table 3 on reverse side for additional requirements.

<sup>3</sup> See Table 4 on reverse side for additional requirements.

When PWL applies, the minimum pay factor for lab voids shall be 1.0 when the following changes are made via plan note or special provision: 1. Decreasing the target lab voids from the limits published in IM 510, OR 2. Increasing the minimum asphalt film thickness from the limits published in IM 510. If the above changes are made, the field voids pay factor shall be per current Iowa DOT specifications.

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## STEP-BY-STEP BID ITEM CONSTRUCTION

### STEP 1: Select Nominal Maximum Aggregate Size

- 3/8" = Thin lifts, trails, athletic facilities
- 1/2" = General surface and intermediate mix
- 3/4" = General base mix

### STEP 2: Determine Traffic Level

- Standard Traffic (ST) ≤ 1M ESALS
- High Traffic (HT) 1M-10M ESALS
- Very High Traffic (VT) > 10M ESALS

### STEP 3: Choose Lift Designation

- Base
  - Intermediate
  - Surface
  - Shoulder
- (Minimum lift thickness = 3 X NMA size)

### STEP 4: Choose the Appropriate Binder

- Determine location and type of work.
- Use binder selection guide above to select recommended binder.

### BID ITEM EXAMPLE

- HMA Standard Traffic (ST) surface, 1/2" Asphalt binder, PG 58-28S

## EXAMPLE BINDER GRADE COMPARISON

(Approximate equivalents)

PREVIOUS PG	CURRENT PG	BINDER BUMP FOR RAP*
PG 58-28	PG 58-28S	PG 52-34S
PG 64-28	PG 58-28H	PG 52-34H
PG 70-28	PG 58-28V	PG 52-34V
PG 76-28	PG 58-28E	PG 52-34E

\*Binder bump required when > 20% of binder is from RAP

TABLE 3: Performance Requirements for HMA Interlayer<sup>(1)</sup>

TEST	REQUIREMENT	NOTES
AASHTO T-321	Minimum 100,000 cycles to failure	1
(1) Failure criterion at 2,000 microstrain shall be 50% of the initial flexural stress measured at the 200th load cycle.		
(2) Use a PG 58-34E binder. (Hint: Past experience indicates at least 80%-90% recovery is needed for successful test results) Testing may be verified by the Engineer on field produced mix. Do not open to traffic until mat has cooled to below 150°F.		

TABLE 4: Performance Requirements for High Performance Thin Lift<sup>(1)</sup>

TEST	REQUIREMENT	NOTES
AASHTO T-324	Minimum passes to 4 mm rut depth > 8,000	1
(1) Use a PG 64-34E+ binder with a minimum 90% MSCR recovery. Do not open to traffic until mat has cooled to below 150°F.		

## ADDITIONAL INFORMATION

### FULL DEPTH PAYEMENTS

- Use "5" binder at depths > 3' or 4' from the surface

### TYPICALLY AVAILABLE BINDERS

- PG 58-28S, PG 58-28H, AND PG 64-22S

### NON-TYPICAL BINDERS

- Small quantities of specialized binders (<25 tons of binder) may not be available or have a high cost.

### HMA INTERLAYER BID ITEMS (IOWA DOT 55-23005)

- Mix = HMA interlayer base course, 1/2"
- Binder = PG 58-34E

### HIGH-PERFORMANCE THIN LIFT BID ITEMS (IOWA DOT 05-23038)

- Mix = HMA thin lift surface course, 1/2"
- Binder = PG 64-34E+

### WIDENING (IOWA DOT 2215.02)

- Mix = HMA ST Base, 1/2" or 3/4"
- Binder = PG 58-28S

### SHOULDERS PAVED SEPARATELY (IOWA DOT 2122.02)

- Mix = HMA ST base, 1/2" or 3/4"
- Binder = PG 58-28S, 3% air voids, Class II Compaction

### PATCHING (IOWA DOT 2529)

- Same mix as intermediate lift. If there is not an intermediate lift, same mix as surface lift. Otherwise:
  - Mix = Any 1/2" or 3/4" mix
  - Binder = PG 58-28S or PG 64-22S

### DETOUR PAVING (IOWA DOT 2304)

- ST mixture, PG 58-28S binder

### LEVELING AND GRADE CORRECTION (IOWA DOT 2303.03.C.7)

- Use the same mix specified for the base or intermediate course.

### COLD-IN-PLACE RECYCLING (IOWA DOT 2518)

- Foamed asphalt: PG 52-34S
- Asphalt emulsion: HFMS-2s, CSS-1