

SUDAS Revision Submittal Form

Status Date: As of 5/12/2017 Topic: Asphalt binder and grade
Manual: Design Manual Location: Section 5D-1, C, 6

Requested Revision:

C. Design Checklist

6. **Select the HMA Mixture Criteria for Each Pavement Layer:** Using the information developed in steps 1 through 5, select the PG binder grade, mixture size, mix design level, and aggregate properties.

- a. **PG Asphalt Binder Grade:** Engineers should evaluate the initial costs, traffic loadings, historical experience, and potential maintenance costs when selecting the appropriate binder for a project. The designer should select a binder that nominally satisfies 98% temperature reliability for both the 7-day high pavement temperature and the 1-day low pavement temperature (see 5D-1, C, 3). The 98% reliability level described by LTPP Bind designates the areas that are covered to the most extreme high and low temperatures in Iowa. When evaluating the binder to select, the engineer should balance initial costs for the binder and the likelihood of maintenance requirements caused by rutting/shoving for high pavement temperatures and low temperature cracking during the 1-day cold temperatures. In the central and southern counties of Iowa, PG 58-28S binders will provide full 98% reliability. For the northern three tiers of counties about 87% of the weather stations report temperatures that provide a 97% or 98% reliability using a PG 58-28S binder. The majority of the weather stations in that northern area reporting a reliability less than 98% for the PG 58-28S binder are located east of I-35 in far northeast Iowa. The Iowa DOT has chosen to use PG 58-34S binders on their Primary and Interstate projects in order to ensure a 98% reliability related to low temperature cracking in that northern portion of the state.

For local residential and collector roadway projects in some sections of the northern tier of counties, designers should consider use of PG 58-28S binders in lieu of the PG 58-34S binder due to increased binder cost. If the project area does not meet the 98% reliability with PG 58-28S binders, the increased cost of the PG 58-34S binder should be evaluated against the possibility of an increase in maintenance costs as a result of the potential incremental thermal cracking. The designer should also include the size of the project and the availability of the alternate binder (PG 58-34S) in the binder selection analysis. The use of a binder with lower reliability against low temperature cracking could result in lower initial binder cost which could offset the potential additional maintenance costs over the life of the pavement. Also in that northern area, designers should closely evaluate the use of PG 58-28H and PG 58-34H binders for projects involving higher volume arterial roadways.


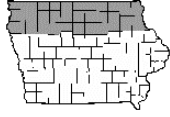
Engineers may designate an "H" binder, such as PG58-28H or PG 58-34H, to accommodate higher truck traffic and/or slower stop and go traffic. For the very highest volume roadways, a PG-58-28V or a PG 58-34V should be considered.

For all base and intermediate layers that are 3 to 4 inches below the surface, PG 58-28S is the recommended binder. The surface binders will insulate the lower layers from the severe one day low temperature event. For projects in the central and southern parts of the state that involve overlays, it may be appropriate to use PG 64-22S. If no method is used to

retard the reflective cracking, such as an interlayer, rubblization or crack and seat, the resistance to low temperature cracking is not critical. If there are methods employed to retard the reflective cracking, a PG 58-28S or PG 58-28H should be used.

The designer should first evaluate use of a conventional binder that best satisfies the project conditions. The conventional binder in Iowa is a PG 58-28S. Agencies in the central and southern part of the state who have had historical success using PG 64-22S may continue use of that binder grade.

Table 5D-1.01: Asphalt Binder for Local Agencies

Asphalt Mixture		PG Binder			
Design Traffic (1 x 10 ⁶ ESALs)	Mix Designation	Design Traffic (1 x 10 ⁶ ESALs)	Design Speed (MPH)		
≤ 0.3 M	LT	≤ 0.3 M	and ≤ 45	58-28S	58-28S
0.3 M to 1 M	ST	0.3 M to 1 M	and > 45	58-28S	58-28S or 58-34S ¹
0.3 M to 1 M	ST	0.3 M to 1 M	and 15 to 45	58-28S ²	58-28S ² or 58-34S ^{1,3}
1 to 10 M	HT	1 to 10 M	and 15 to 45	58-28H	58-34H
Overlays	LT/ST/HT	≤ 10M	and 15 to 45	64-22S ⁴ or 58-28S or H	58-28S or H

L = Low S = Standard H = High

¹ Use of PG 58-34 binder should consider the low temperature reliability in the project area, the availability and cost of different binders, and the ability of the contracting agency to provide on-going maintenance activities.

² Use of PG 58-28H should be considered if heavy truck or bus traffic is present.

³ For high traffic roadways use 58-34H binders.

⁴ If methods are used to retard reflective cracking, PG 58-28S or H is recommended.

Reason for Revision: Updating information on binder selection for northern tiers of counties, intermediate and base layers, and for overlays.

Comments: None.

District:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	
District:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	
District:	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	
District:	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	
District:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	
District:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input checked="" type="checkbox"/> 5	<input type="checkbox"/> 6
Comments:	None.					
Action:	<input type="checkbox"/> Deferred		<input type="checkbox"/> Not Approved		<input checked="" type="checkbox"/> Approved	

Final District Action Summary: All 6 districts approved.

Board of Directors Action: Approved.