

MnDOT PG Binder Guidelines

Type of Construction	Recommended Asphalt Binder for < 3 Million ESALs (20 yr)	Recommended Asphalt Binder for 3 - 10 Million ESALs (20 yr)	Recommended Asphalt Binder for > 10 Million ESALs (20 yr)
Overlay -- Fast Traffic ²	Top 100mm (4"): PG 58-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 58-28/ PG 64-28 ¹ Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28/ PG 70-28 ¹ Below 100mm (4"): PG 58-28
Overlay -- Slow Traffic ²	Top 100mm (4"): PG 58-28/ PG 64-28 ¹ Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28/ PG 70-28 ¹ Below 100mm (4"): PG 58-28
Overlay -- Standing Traffic ²	Top 100mm (4"): PG 64-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 70-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 70-28 Below 100mm (4"): PG 58-28
New Construction -- Fast Traffic ²	Top 100mm (4"): PG 58-34 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 58-34/ PG 64-34 ¹ Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-34/ PG 70-34 ¹ Below 100mm (4"): PG 58-28
New Construction -- Slow Traffic ²	Top 100mm (4"): PG 58-34/ PG 64-34 ¹ Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-34 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-34/ PG 70-34 ¹ Below 100mm (4"): PG 58-28
New Construction -- Standing Traffic ²	Top 100mm (4"): PG 64-34 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 70-34 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 70-34 Below 100mm (4"): PG 58-28

Recommended Binder Grade for Shoulders With Traffic	Recommended Binder Grade for Shoulders With No Traffic
Generally, use the same binder grade as the mainline, but, not to exceed PG 64-xx.	PG 58-28 or PG 52-34 (match the mainline low PG number)

NOTES: These guidelines are intended for bituminous highway paving projects. When varying from these guidelines or for further clarification, consult the Mn/DOT Bituminous Office.

1. Selecting the higher PG grade, for higher ESALs within the category, will provide better resistance to rutting. See note 4.
2. Traffic levels are defined as:
 - fast traffic -- average speeds of greater than 70 km/h (45 mph), rural TH and interstate with sustained speeds;
 - slow traffic -- average speeds of between 20 km/h (15 mph) and 70 km/h (45 mph), metro and urban TH and interstate, stop and go traffic conditions;
 - standing traffic -- average speeds of less than 20 km/h (15 mph) and intersections.
3. New construction includes: reconstruction, rubbilization, CIR, reclaiming (FDR)
4. See specifications for binder adjustment in recycled mixtures. No adjustment required when < 20% RAP in mixture.

5. To determine reliability for PG Binders at the nearest weather station to your location download LTPPBind software and instructions at: www.tfrc.gov/pavement/ltp/bind/download.htm.

Rules of Thumb

- Minimize the number of PG grades on any one project .
- The top 100mm (4”) should be the same PG grade.
- Below 100mm (4”) from the surface should be the same PG grade, typically, specify PG 58-28.

Considerations

- For traffic levels < 3 million ESAL, consider modifying the 100mm (4”) criteria described under “Rules of Thumb” to 75mm (3”) criteria.
- For temporary construction (2 years or less) consider using PG 64-22 when PG 64-28 or PG 64-34 is otherwise recommended.
- For special or unique design considerations contact the Bituminous Office.

Goals for Asphalt Binder Reliability

	High Temp Reliability (Rutting)	Low Temp Reliability (Thermal Cracking)
Overlay	98% minimum	50% minimum
Shoulder	98% Minimum	50% minimum
New Construction (Wear)	98% minimum	79% minimum
New Construction (Non-Wear)	98% minimum	50% minimum

Asphalt Binder Reliability for Selected Grades

New Construction (Wear)	High Temperature Reliability (Rutting)	Low Temperature Reliability (Thermal Cracking)										
PG 58-34 ≤ 1 Million ESAL's 1 – 3 Million ESAL's 3 – 10 Million ESAL's > 10 Million ESAL's	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><u>Fast Traffic</u></td> <td style="text-align: center;"><u>Slow Traffic</u></td> </tr> <tr> <td style="text-align: center;">98%</td> <td style="text-align: center;">50%</td> </tr> <tr> <td style="text-align: center;">50%</td> <td style="text-align: center;"><50%</td> </tr> <tr> <td style="text-align: center;">50%</td> <td style="text-align: center;"><50%</td> </tr> <tr> <td style="text-align: center;"><50%</td> <td style="text-align: center;"><50%</td> </tr> </table>	<u>Fast Traffic</u>	<u>Slow Traffic</u>	98%	50%	50%	<50%	50%	<50%	<50%	<50%	79% ¹ , 98% ²
<u>Fast Traffic</u>	<u>Slow Traffic</u>											
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Note: This reliability data is from **Ltppbind software (1999)**, software and instructions at:
www.tfrc.gov/pavement/ltp/bind/download.htm.

Wear is considered the mixture in the top 100mm (4") from the surface.

Non-wear is considered mixture below 100mm (4") from the surface.

¹Districts 1 and 2

²Districts 3 through 8

Asphalt Binder Reliability for Selected Grades

Overlay and Shoulder	High Temperature Reliability (Rutting)		Low Temperature Reliability (Thermal Cracking)
PG 58-28 ≤ 1 Million ESAL's 1 – 3 Million ESAL's 3 – 10 Million ESAL's > 10 Million ESAL's	<u>Fast Traffic</u>	<u>Slow Traffic</u>	<50%
	98%	50%	
	50%	<50%	
	50%	<50%	
	<50%	<50%	
PG 64-28 ≤ 1 Million ESAL's 1 – 3 Million ESAL's 3 – 10 Million ESAL's > 10 Million ESAL's	<u>Fast Traffic</u>	<u>Slow Traffic</u>	<50%
	98%	98%	
	98%	50%	
	98%	50%	
	50%	<50%	
PG 70-28 ≤ 1 Million ESAL's 1 – 3 Million ESAL's 3 – 10 Million ESAL's > 10 Million ESAL's	<u>Fast Traffic</u>	<u>Slow Traffic</u>	<50%
	98%	98%	
	98%	98%	
	98%	98%	
	98%	50%	
PG 76-28 ≤ 1 Million ESAL's 1 – 3 Million ESAL's 3 – 10 Million ESAL's > 10 Million ESAL's	<u>Fast Traffic</u>	<u>Slow Traffic</u>	<50%
	98%	98%	
	98%	98%	
	98%	98%	
	98%	98%	

Note: This reliability data is from **Ltppbind software (1999)**, software and instructions at:
www.tfhrc.gov/pavement/ltp/bind/download.htm.

Wear is considered the mixture in the top 100mm (4") from the surface.

Non-wear is considered mixture below 100mm (4") from the surface.

Asphalt Binder Reliability for Selected Grades

New Construction (Non-Wear)	High Temperature Reliability (Rutting)	Low Temperature Reliability (Thermal Cracking)						
PG 58-28 < 10 Million ESAL's > 10 Million ESAL's	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><u>Fast Traffic</u></td> <td style="text-align: center; width: 50%;"><u>Slow Traffic</u></td> </tr> <tr> <td style="text-align: center;">98%</td> <td style="text-align: center;">50%</td> </tr> <tr> <td style="text-align: center;">50%</td> <td style="text-align: center;"><50%</td> </tr> </table>	<u>Fast Traffic</u>	<u>Slow Traffic</u>	98%	50%	50%	<50%	58% ¹ , 87% ²
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50%	<50%							
PG 58-34 < 10 Million ESAL's > 10 Million ESAL's	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><u>Fast Traffic</u></td> <td style="text-align: center; width: 50%;"><u>Slow Traffic</u></td> </tr> <tr> <td style="text-align: center;">98%</td> <td style="text-align: center;">50%</td> </tr> <tr> <td style="text-align: center;">50%</td> <td style="text-align: center;"><50%</td> </tr> </table>	<u>Fast Traffic</u>	<u>Slow Traffic</u>	98%	50%	50%	<50%	98%
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Wear is considered the mixture in the top 100mm (4") from the surface.

Non-wear is considered mixture below 100mm (4") from the surface.

¹Districts 1 and 2

Asphalt Binder Grade Designation

The PG Binder Grade letters should be used in all bituminous mixture designations, regardless of the specification number. These letters and PG Grade are listed below:

<u>Mixture Designation Letter</u>		<u>Asphalt Binder Grade</u>
A	=	PG 52-34
B	=	PG 58-28
C	=	PG 58-34
D	=	PG 58-40
E	=	PG 64-28
F	=	PG 64-34
G	=	PG 64-40
H	=	PG 70-28
I	=	PG 70-34
L	=	PG 64-22