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") [6]: PG 58-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 58-28/ PG 64-28[1,7] Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28[7]/ PG 70-28[1] Below 100mm (4"): PG 58-28
Overlay -- Slow Traffic[2]	Top 100mm (4") [6]: PG 58-28 Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28[7] Below 100mm (4"): PG 58-28	Top 100mm (4"): PG 64-28[7]/ PG 70-28[1] Below 100mm (4"): PG 58-28
New Construction -- Fast Traffic[2]	Top 100mm (4") [6]: 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 70-28[1] Below 100mm (4"): PG 58-28
New Construction -- Slow Traffic[2]	Top 100mm (4") [6]: PG 58-34 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 70-28[1] Below 100mm (4"): PG 58-28

Recommended Binder Grade for Shoulders With Traffic[3]	Recommended Binder Grade for Shoulders With No Traffic[3]
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: When varying from these guidelines or for further clarification, consult the Mn/DOT Bituminous Office.

1. Selecting a higher PG grade and/or mixture type (traffic level), for higher ESALs within the category, will provide better resistance to rutting. Contact the Bituminous Engineer for guidance.
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 less than 70 km/h (45 mph), metro and urban TH and interstate, stop and go traffic, and intersections.
3. Use PG xx-28 for shoulders or pavement adjacent to concrete mainline and concrete curb and gutter.
4. New construction includes: reconstruction, rubbilization, CIR, reclaiming (FDR)
5. See specifications for binder adjustment in recycled mixtures. No adjustment required when < 20% RAP in mixture.
6. For Non-Trunk Highway with traffic levels <3 million ESAL, consider modifying the "top 100mm (4")" criteria to top 75mm (3").
7. With concurrence of the Bituminous Office the designer may allow, by Special Provision, the Contractor's option to use PG 64-22 on overlay construction when both of the following conditions are met:
   a. Overlay thickness 3" or less and,
   b. Average inplace crack/joint spacing 30ft. or less

The Special Provision shall limit the allowable RAP usage to 15% for mixtures specifying PG 64-22.

Rules of Thumb

- Minimize the number of PG grades on any one project .
- The top 100mm (4") should be the same PG grade. Typically, specify PG xx-34 for new construction. Typically, specify PG xx-28 for overlay construction.
- Below 100mm (4") from the surface should be the same PG grade, typically, specify PG 58-28.

Considerations

- For non-trunk highway with traffic levels < 3 million ESAL, consider modifying the top 100mm (4") criteria described under "Rules of Thumb" to top 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
New Construction (Wear)	98% minimum	98% minimum[1]
New Construction (Non-Wear)	98% minimum	98% minimum

[1] Certain areas of Districts 1, 2, and 3 where 98% reliability would require PG xx-40. Use PG xx-34.

Asphalt Binder Reliability for Selected Grades

New Construction (Wear)	High Temperature Reliability (Rutting)		Low Temperature Reliability (Thermal Cracking)
PG 58-34	Fast Traffic	Slow Traffic	79%[1], 98%[2]
≤ 1 Million ESAL's	98%	98%	
1 – 3 Million ESAL's	98%	98%	
3 – 5 Million ESAL's	98%	<98%	
5 – 10 Million ESAL's	<98%	50%	
> 10 Million ESAL's	<50%	<50%	
PG 64-34	Fast Traffic	Slow Traffic	79%[1], 98%[2]
≤ 1 Million ESAL's	98%	98%	
1 – 3 Million ESAL's	98%	98%	
3 – 10 Million ESAL's	98%	98%	
> 10 Million ESAL's	≤98%	≤98%	

Wear is considered the mixture in the top 100mm (4") from the surface.
Non-wear is considered mixture below 100mm (4") from the surface.
[1] Minimum of 79% reliability in those areas of Districts 1, 2, and 3 where 98% reliability would require PG xx-40.
[2] District 3 (other than exclusions covered in footnote 1 above) and Districts 4 through 8 and Metro.

Overlay and Shoulder	High Temperature Reliability (Rutting)		Low Temperature Reliability (Thermal Cracking)
PG 58-28	Fast Traffic	Slow Traffic	<98%
≤ 1 Million ESAL's	98%	98%	
1 – 3 Million ESAL's	98%	98%	
3 – 5 Million ESAL's	98%	<98%	
5 – 10 Million ESAL's	<98%	50%	
> 10 Million ESAL's	<50%	<50%	
PG 64-28	Fast Traffic	Slow Traffic	<98%
≤ 1 Million ESAL's	98%	98%	
1 – 3 Million ESAL's	98%	98%	
3 – 10 Million ESAL's	98%	98%	
> 10 Million ESAL's	≤98%	≤98%	
PG 70-28	Fast Traffic	Slow Traffic	<98%
≤ 1 Million ESAL's	98%	98%	
1 – 3 Million ESAL's	98%	98%	
3 – 10 Million ESAL's	98%	98%	
> 10 Million ESAL's	98%	98%	

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:

Standard Grades	**Specialty Grades**
B = PG 58-28	**A** = PG 52-34
C = PG 58-34	**H** = PG 70-28
E = PG 64-28	
F = PG 64-34	
L = PG 64-22	