

## FLEXIBLE PAVEMENT DESIGN USING SOIL FACTORS<sup>1,5</sup>

Required Gravel Equivalency (G.E. in inches) for various Soil Factors (S.F.)

For new construction or reconstruction use projected ADT or HCADT; for reconditioning projects use present ADT or HCADT

| 7 TON : LESS THAN 400 ADT |                      |                  | 9 TON : 151 TO 300 HCADT |                      |               | 9 TON :1101 - 1500 HCADT <sup>2</sup> |                      |               |
|---------------------------|----------------------|------------------|--------------------------|----------------------|---------------|---------------------------------------|----------------------|---------------|
| S.F.                      | Minimum Bit.<br>G.E. | Total<br>G.E.    | S.F.                     | Minimum Bit.<br>G.E. | Total<br>G.E. | S.F.                                  | Minimum<br>Bit. G.E. | Total<br>G.E. |
| 50                        | 7                    | 7.3 <sup>6</sup> | 50                       | 7                    | 14            | 50                                    | 8                    | 20.3          |
| 75                        | 7                    | 9.4 <sup>6</sup> | 75                       | 7                    | 17.5          | 75                                    | 8                    | 26.4          |
| 100                       | 7                    | 11.5             | 100                      | 7                    | 21            | 100                                   | 8                    | 32.5          |
| 110                       | 7                    | 12.4             | 110                      | 7                    | 22.4          | 110                                   | 8                    | 35            |
| 120                       | 7                    | 13.2             | 120                      | 7                    | 23.8          | 120                                   | 8                    | 37.4          |
| 130                       | 7                    | 14               | 130                      | 7                    | 25.2          | 130                                   | 8                    | 39.8          |

  

| 7 TON : 400 to 1000 ADT |                      |                | 9 TON : 301 TO 600 HCADT |                      |               | <u>TYPE OF MAT'L</u> <sup>3</sup> | <u>SPECIFICATION</u> | <u>G.E. FACTOR</u> |
|-------------------------|----------------------|----------------|--------------------------|----------------------|---------------|-----------------------------------|----------------------|--------------------|
| S.F.                    | Minimum Bit.<br>G.E. | Total<br>G.E.  | S.F.                     | Minimum Bit.<br>G.E. | Total<br>G.E. |                                   |                      |                    |
| 50                      | 7                    | 9 <sup>6</sup> | 50                       | 7                    | 16            | Bituminous Pavement               | 2360                 | 2.25               |
| 75                      | 7                    | 12             | 75                       | 7                    | 20.5          | Cold-Inplace Recycling (CIR)      | 2331                 | 1.5                |
| 100                     | 7                    | 15             | 100                      | 7                    | 25            | Rubblized Concrete                | 2231                 | 1.5                |
| 110                     | 7                    | 16.2           | 110                      | 7                    | 26.8          | Full-Depth Reclamation            | 2331                 | 1.0                |
| 120                     | 7                    | 17.4           | 120                      | 7                    | 28.6          | Stabilized Full-Depth Reclamation | 2331                 | 1.5                |
| 130                     | 7                    | 18.6           | 130                      | 7                    | 30.4          | Aggregate Base class 5 & 6        | 3138                 | 1.0                |
|                         |                      |                |                          |                      |               | Aggregate Sub-Base class 3 & 4    | 3138                 | 0.75               |
|                         |                      |                |                          |                      |               | Select Granular Mat'l             | 3149.2B2             | 0.5                |

  

| 9 TON : LESS THAN 150 HCADT |                      |                   | 9 TON : 601 TO 1100 HCADT |                      |               | <u>AASHTO<br/>SOIL CLASS</u> | <u>SOIL FACTOR<br/>(S.F.)</u> | <u>ASSUMED<br/>R-VALUE</u> | <u>GENERAL <sup>4</sup><br/>PLASTICITY</u> |
|-----------------------------|----------------------|-------------------|---------------------------|----------------------|---------------|------------------------------|-------------------------------|----------------------------|--|
| S.F.                        | Minimum Bit.<br>G.E. | Total<br>G.E.     | S.F.                      | Minimum Bit.<br>G.E. | Total<br>G.E. |                              |                               |                            |  |
| 50                          | 7                    | 10.3 <sup>6</sup> | 50                        | 8                    | 18.5          | A - 1                        | 50 - 75                       | 70 - 75                    | NP   |
| 75                          | 7                    | 13.9              | 75                        | 8                    | 23.7          | A - 2                        | 50 - 75                       | 30 - 70                    | SP   |
| 100                         | 7                    | 17.5              | 100                       | 8                    | 29            | A - 3                        | 50                            | 70                         | NP   |
| 110                         | 7                    | 19                | 110                       | 8                    | 31.1          | A - 4                        | 100 - 130                     | 20                         | SP   |
| 120                         | 7                    | 20.5              | 120                       | 8                    | 33.2          | A-5                          | 130+                          | na                         | na   |
| 130                         | 7                    | 22                | 130                       | 8                    | 35.3          | A - 6                        | 100                           | 12                         | P  |
|                             |                      |                   |                           |                      |               | A - 7 - 5                    | 120                           | 12                         | P  |
|                             |                      |                   |                           |                      |               | A - 7 - 6                    | 130                           | 10                         | P  |

Values may not be exact due to rounding

**Notes:**

<sup>1</sup>For 10 Ton design see page 31 in Mn/DOT Pavement Manual, July 2007, Chapter 5, Section 3, Figure 5-3-7. Bituminous Pavement Design Chart (Aggregate Base)

<sup>2</sup>For HCADT over 1500 more advanced design procedures should be used; please contact Mn/DOT's Pavement Design Unit

<sup>3</sup>See page 32 in Mn/DOT Pavement Manual, July 2007, Chapter 5, Section 3, Table 5-3.4 - Granular Equivalent (G.E.) factors

<sup>4</sup>General Plasticity: NP = nonplastic; SP= semi-plastic; P = plastic; na = not applicable (An A-5 soil rarely occurs in Minnesota)

<sup>5</sup> Safety edge (30° to 35° wedge) are recommended to minimize edge dropoff. See [www.dot.state.mn.us/stateaid/sa\\_safety\\_edge.html](http://www.dot.state.mn.us/stateaid/sa_safety_edge.html)

<sup>6</sup> These GE values are for the finished pavement section. During construction additional GE may be warranted for a construction platform.