Granular Equivalence (G.E.) Values for Various Materials

Material Description	MnDOT Specification	Total G.E. (per inch)
Superpave HMA[1]	2360	1.5 - 2.25[1]
Plant Mix HMA[1]	2350 (HV & MV)	1.5 - 2.25[1]
Plant Mix HMA[2]	2350 (LV)	1.25 - 2.00[2]
Plant Mix HMA[1]	2341 & 2361	1.5 - 2.25[1]
Plant Mix HMA[2]	2331	1.25 - 2.00[2]
Cold In-place Recycling (CIR)	2390	1.50
Rubblized Concrete	2231	1.50
Stabilized Full Depth Reclamation (SFDR)[4]	2215	1.50
Stabilized Full Depth Reclamation (SFDR)[5]	2215	1.25
Full Depth Reclamation (FDR)[3]	2215	1.00
Road Mix Bituminous	2321	1.50
Stabilized Aggregate Base[6]	2204	1.50
Modified Aggregate Base[7]	n/a	1.00
Open Graded Drainable Base (OGAB)	3136	1.00
Drainable Aggregate Base (DSB)	3136	1.00
Aggregate Base	3138 (Class 5, 5Q & 6)	1.00
Aggregate Subbase	3138 (Class 3 & 4)	0.75
Select Granular	3149.2B2	0.50
Multiaxial Geogrid[8]	TM 15-SA-02	2.00
Thinlay HMA	2360	2.25
Ultra-Thin Bonded Wearing Course (UTBWC)	2353	2.25

NOTES:

[1] GE values shown are for HMA mix when new. If HMA is left in-place, GE values should be reduced as follows for pavement condition: Existing HMA Good GE = 2.00, Existing HMA Average GE = 1.75, Existing HMA Poor = 1.5

[2] GE values shown are for HMA mix when new. If HMA is left in-place, GE values should be reduced as follows for pavement condition: Existing HMA Good GE = 1.75, Existing HMA Average GE = 1.5, Existing HMA Poor = 1.25

HMA Good = Moderate longitudinal and transverse cracking, HMA pavement is sound.

HMA Average = Severe longitudinal and transverse cracking, HMA pavement is sound.

HMA Poor = Severe longitudinal and transverse cracking or alligator cracking, HMA pavement is raveling and stripping.

[3] Full Depth Reclamation (FDR) is a mixture of reclaimed asphalt pavement and aggregate base.

[4] Stabilized FDR (SFDR) is FDR containing a minimum of 50% Recycled Asphalt Pavement (RAP) stabilized with a cementitious chemical, bituminous or other product and supported with a mix design.

[5] Stabilized FDR (SFDR) is FDR stabilized with an alternative additive (i.e. Base One®).

[6] Stabilized Aggregate Base is Aggregate Base stabilized with either a cementitious chemical or bituminous and supported by a mix design. No GE credit is allowed for alternative additives.

[7] Modified Aggregate Base is Aggregate Base modified with a product to improve its stability.

[8] Maximum allowed GE from biaxial geogrid is 2.0. Minimum strength values shall be established in a project specific specification.

SOURCES:

1 Flexible Pavement Design Using Soil Factors, Figure B 5-892.201, State Aid Manual, December 28, 1992

2 Granular Equivalent Factor, MnDOT Technical Memorandum 98-02-MRR-01

3 Flexible Pavement Design Using Soil Factors, Figure B 5-892.210, State Aid Manual, August 16, 2000

4 Granular Equivalent Factors, Table 5-3.4, Section 3, Chapter 5, MnDOT Pavement Manual, July 2007

5 Ultimate 10 Ton Staged Flexible Pavement Design Using Soil Factors, Flexible Pavement Design, State Aid Pavement web page.

6 LRRB Research Report 2012-36, Structural Analysis of Asphalt Pavements with Full-depth Reclaimed Base.