

WEST VIRGINIA DIVISION OF HIGHWAYS
WORKSHEET FOR CALCULATING
BULK SPECIFIC GRAVITIES OF AGGREGATE (G_{sb}),
APPARENT SPECIFIC GRAVITIES OF AGGREGATE (G_{sa})
AND PERCENT VMA IN COMPACTED PAVING MIXTURE

The bulk (G_{sb}) and apparent (G_{sa}) specific gravities of the total aggregate are calculated as follows:

$$G_{sb} = \frac{A_p}{\frac{P_1}{G_1} + \frac{P_2}{G_2} + \dots + \frac{P_n}{G_n}}$$

G_{sb} = bulk specific gravity for the total aggregate

A_p = total aggregate = 100 percent

P_1, P_2, P_n = percentage of total aggregate

G_1, G_2, G_n = bulk specific gravities of aggregates

Note: When using mineral filler use the apparent specific gravity

Component Aggregate Type	Percent of Total Aggregate	Bulk Specific Gravity	Apparent Specific Gravity	G_{sb}	G_{sa}
				$100 / [P_1/G_1 + P_2/G_2 + \dots + P_n/G_n]$	

$$VMA = 100 - [(G_{mb} \times P_s) / G_{sb}]$$

(VMA) voids in mineral aggregate (percent of bulk volume)

(G_{sb}) bulk specific gravity of aggregate

(G_{mb}) bulk specific gravity of compacted mixture (AASHTO T-245)

(P_s) aggregate, percent by total weight of mixture

G_{mb}	P_s	G_{sb}	VMA $100 - [(G_{mb} \times P_s) / G_{sb}]$

Note: Report the following values to the nearest thousandth (0.001):
 G_{sb} , G_{sa} , G_{mb} , bulk and apparent gravities of the aggregates
Report VMA to the nearest tenth (0.1)