

Appendix 3-10

RSP/ TSP and FSP / RSP Ratios

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RSP / TSP Ratio

For calculation of TSP/ RSP emission factors, emission rates of the dusty activities given above were based on typical values and emission factors documented in Compilation of Air Pollutant Emission Factors (AP-42) 5th Edition published by USEPA. However, RSP emission rate for some of the emission source is not available in the said document. Both the TSP and RSP are suspended particles but referring to different range of diameters. Thus, for calculating the emission rate for RSP for these construction activities, a ratio of RSP/TSP has been applied to the TSP emission rate for the purpose of this air quality assessment.

A typical ratio of 0.3 for RSP/ TSP is reported in published literature document for estimating construction emissions¹. In addition, according to a study on construction site preparation, an average RSP/ TSP ratio measured in the field of construction activity for “top soil removal” and “earthmoving (cut and fill)” activities were reported to be 0.27 and 0.22, respectively². Thus, a ratio of 0.3 for RSP/ TSP would represent typical construction activities.

According to the generalized particle size distribution for uncontrolled processes provided in Appendix B.2 of the USEPA AP-42 (5th Edition), the cumulative percentage of particle size for RSP was reported to be 51% for handling and processing of aggregate and unprocessed ore by mechanical devices³. This is similar to that of construction activities where movement of excavated and fill materials are involved by construction plant.

As such, to be conservative, a RSP/ TSP ratio of 0.51 is adopted for the purpose of this construction air quality assessment.

¹ Midwest Research Institute (1999), “Estimating Particulate Matter Emissions From Construction Operations, Final Report”, 30 September 1999. (page 4-2). EPA Contract No. 68-D7-0068; ERG No. 0101-01-009.

² Midwest Research Institute (1988), “Gap Filling PM₁₀ Emission Factors for Selected Open Area Dust Sources”, February 1988. (page 24). EPA-450/4-88-003.

³ Appendix B.2, General Particle Size Distributions, page B.2-13, AP-42, 5th Edition published by USEPA.

FSP / RSP Ratio

According to the generalized particle size distribution for uncontrolled processes provided in Appendix B.2 of the USEPA AP-42 (5th Edition), the cumulative percentage of particle size for RSP and FSP was reported to be 51% and 15%, respectively, for handling and processing of aggregate and unprocessed ore by mechanical devices⁴. This is similar to that of construction activities where movement of excavated and fill materials are involved by construction plant.

As such, a FSP/ RSP ratio of 0.3 is adopted for calculating the FSP concentrations for the purpose of this construction air quality assessment.

⁴ Appendix B.2, General Particle Size Distributions, page B.2-13, AP-42, 5th Edition published by USEPA.