London
BAA Stansted

Appendix 2

On-Site Construction Emissions – Assumptions for Dust and Exhaust Calculations

Generation2

On Site Construction Emissions – Assumptions for Dust and Exhaust Calculations

Dust Emissions from Unpaved Roads[5]:

$$E = \frac{k(s/12)^a (W/3)^b}{(M/0.2)^c} \times \frac{(365-p)}{365} \times \frac{S}{15}$$

Dust Emissions from Paved Roads:

$$E = \left[k \left(\frac{sL}{2} \right)^{0.65} \times \left(\frac{W}{3} \right)^{1.5} - C \right] \left[1 - \left(\frac{P}{4N} \right) \right]$$

Dust Emissions for Bulldozer Operations:

$$E = \frac{2.6(s)^{1.2}}{(M)^{1.4}}$$

Dust Emissions for Grading Operations:

$$E = 0.0034(S)^{2.5}$$

Dust Emissions for Scrapers Removing Topsoil:

$$0.0057\, g/VKT$$

Dust Emissions for Excavators (kg/Mg):

$$E = k(0.0016) \frac{(U/22)^{1.3}}{(M/2)^{1.4}}$$

E	=	Size specific emission (lb/VMT) (1lb/VMT = 281.9 g/VKT)
s	=	Surface material silt content (11.7%)
S	=	Mean vehicle speed (10 mph)
W	=	Mean vehicle weight (Tons)
M	=	Surface material moisture content (18 %)
k	=	Particle size multiplier for PM_{30} (dimensionless)
a	=	Constant for PM_{30} (dimensionless)
b	=	Constant for PM_{30} (dimensionless)
c	=	Constant for PM_{30} (dimensionless)
d	=	Constant for PM_{30} (dimensionless)
C	=	Emission factor for vehicle fleet exhaust, brake wear and tyre wear
U	=	Average windspeed (3 m/s)
sL	=	Road surface silt loading (7.4 g/m^2)
p	=	Number of days in the year with more than 0.254mm of rain (128 days)
N	=	Number of days in the averaging period (30 days)
P	=	Number of days in 30 day period with more than 0.254mm of rain (2 days)

Emissions are based on an assumption of 80% efficiency of dust reduction measures on unpaved haul roads and a 50% efficiency associated with all other earthmoving activity. No reduction has been applied to paved haul roads.

[5] Compilation of Air Pollution Emission Factors. Volume II. AP42 US EPA 1998-2006