

INSTRUCTIONS: FILL IN ONLY THE YELLOW HIGHLIGHTED CELLS IN THE *General* and *Allowable* TABS AS NEEDED

Source 03-0039-01 APC 111, Box 2
 Permit No. 982122
 Batch Rate by volume 60.00 yd³ concrete/hr APC 111, Box 9
 Batch Rate by weight 120.72 tons concrete/hr, based on the composition of one cubic yard of concrete described below
 Maximum yearly production (assuming 8,760 hours) 525,600.00 yd³ concrete/yr
 1,057,507.20 tons concrete/yr, based on the composition of one cubic yard of concrete described below

Voluntary Annual Limit(s)		
truck mix production	60,000.00	yd ³ concrete/yr, truck mix
central mix production	0.00	yd ³ concrete/yr, central mix
dry mix production ^a	0.00	yd ³ concrete/yr, dry mix
Total production ^b	60,000.00	yd ³ concrete/yr, total

^a Dry mix loading calculations in this workbook use the same emission factors as truck mix loading since AP42 does not have a separate factor for dry mix loading. Be aware that emissions from dry mix may possibly be higher due to factors such as a longer fall of dry materials, etc. , and using the control efficiency values similar to those for truck mix may not be adequate. If necessary, the permit writer should request additional information from the applicant to evaluate the emissions from dry mix loading.

^b Total production cannot add up to more than the value for maximum yearly production (assuming 8,760 hours) shown above

Total facility emissions based upon the following AP42 default composition of one cubic yard of concrete .		
Coarse Aggregate	1,865	pounds
Sand	1,428	pounds
Cement	491	pounds
Cement Supplement	73	pounds
Water [8.35 (lbs/gal)] x [20 (gal)]	167	pounds
Total for 1 yd³	4,024	pounds/yd³

Concrete material content factors for converting lb/ton emission factors to lb/yd ³ emission factors	
0.9325	(tons aggregate)/yd ³ concrete
0.7140	(tons sand)/yd ³ concrete
0.2455	(tons cement)/yd ³ concrete
0.0365	(tons supplement)/yd ³ concrete
1.6465	(tons aggregate + sand)/yd ³ concrete
0.2820	(tons cement + supplement)/yd ³ concrete

Control efficiencies, reference values, and point/fugitive source classification

% controlled	Point or Fugitive ^a	Source	Reference values for use as %controlled							
			AP42 ^b	Boot	Chute	Tube	Shroud	Enclosure	Wet suppression	
	Fugitive	Aggregate delivery to ground storage (3-05-011-21)								
	Fugitive	Sand delivery to ground storage (3-05-011-22)								
	Fugitive	Aggregate transfer to conveyor (3-05-011-23)								
	Fugitive	Sand transfer to conveyor (3-05-011-24)								
	Fugitive	Aggregate transfer to elevated storage (3-05-011-04)								
	Fugitive	Sand transfer to elevated storage (3-05-011-05)								
99.9000%	Point	Cement delivery to Silo (3-05-011-07)	99.8631%							
99.9000%	Point	Cement supplement delivery to Silo (3-05-011-17)	99.7153%							
95.0000%	Fugitive	Weigh hopper loading (3-05-011-08)								
95.0000%	Fugitive	Truck mix loading (3-05-011-10)	91.2343%	10.0000%	10.0000%	10.0000%	20.0000%	40.0000%	75.0000%	

^a The Point or Fugitive classification can only be changed for Weigh hopper loading, Truck mix loading, Central Mix loading, and Dry mix loading sources. The Point classification should be used **only** if these sources are fitted with capture and control systems.

^b Values are based on AP42 Table 11.12-2 (6/06 on footer) Uncontrolled and Controlled Emission Factors.

^c Dry mix loading calculations in this workbook use the same emission factors as truck mix loading since AP42 does not have a separate factor for dry mix loading. Be aware that emissions from dry mix may possibly be higher due to factors such as a longer fall of dry materials, etc. , and using the control efficiency values similar to those for truck mix may not be adequate. If necessary, the permit writer should request additional information from the applicant to evaluate the emissions from dry mix loading.

INSTRUCTIONS: FILL IN ONLY THE YELLOW HIGHLIGHTED CELLS IN THE General and Allowable TABS AS NEEDED. DO NOT FILL OR MODIFY THIS TAB.

Table with permit information: Source 03-0039-01, Permit No. 982122, Batch Rate by volume 60.00 yd³ concrete/hr, Batch Rate by weight 120.72 tons concrete/hr, Voluntary Annual Limit(s) truck mix production 60,000.00 yd³ concrete/yr, truck mix, Total production 60,000.00 yd³ concrete/yr, total.

Table with concrete material content factors for converting lb/ton emission factors to lb/yd³ emission factors: 0.9325 (tons aggregate)/yd³ concrete, 0.7140 (tons sand)/yd³ concrete, 0.2455 (tons cement)/yd³ concrete, 0.0365 (tons supplement)/yd³ concrete, 1.6465 (tons aggregate + sand)/yd³ concrete, 0.2820 (tons cement + supplement)/yd³ concrete.

Large table titled 'CALCULATIONS BASED ON AP-42 TABLES 11.12-2, 11.12-5 and 11.12-6 (ENGLISH UNITS) EMISSION FACTORS FOR CONCRETE BATCHING / PLANT WIDE EMISSION FACTORS PER YARD OF CONCRETE'. It lists various sources like 'Aggregate delivery to ground storage' and 'Truck mix loading' with columns for Uncontrolled and Controlled emissions in lb/ton and ton/yr.

Where material, based on AP42 11.12, is:

- Aggregate for the aggregate delivery and transfer operations.
Sand for the sand delivery and transfer operations.
Cement for the cement delivery and discharge operations.
Cement supplement for the cement supplement delivery and discharge operations.
Aggregate + sand for the weigh hopper loading operation; and
Cement + cement supplement for the Truck mix loading, and Central mix loading operations.
Cement + cement supplement is also used for the Dry mix loading operations.

Shaded cells indicate the estimated actual emission values to be used in the template permit and the emission summary.

Equations used in calculations for PM emissions:

- Uncontrolled PM Emissions factor (lb/ton material) is taken from AP42 Table 11.12-2 or the background document
Uncontrolled PM Emissions factor (lb/yd³) = [Uncontrolled PM Emissions factor (lb/ton material)] x [concrete material content (ton material/yd³ concrete)] Note: This will match the value(s) in Tables 11.12-5 and 11.12-6
Controlled PM Emissions factor (lb/ton material) = [Uncontrolled PM Emissions factor (lb/ton material)] x [1 - (%controlled PM/100)]
Controlled PM Emissions factor (lb/yd³ concrete) = [Uncontrolled PM Emissions factor (lb/yd³ concrete)] x [1 - (%controlled PM/100)]
Uncontrolled PM Emissions (lb/hr) = [Uncontrolled PM emissions factor (lb/yd³ concrete)] x [Batch Rate (yd³ concrete/hr)]
Uncontrolled PM Emissions (ton/yr) = [Uncontrolled PM Emissions (lb/hr)] x [Total production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) not for Truck mix loading or Central Mix loading
Uncontrolled PM Emissions (ton/yr) = [Uncontrolled PM Emissions (lb/hr)] x [truck mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Truck mix loading only
Uncontrolled PM Emissions (ton/yr) = [Uncontrolled PM Emissions (lb/hr)] x [central mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Central mix loading only
Uncontrolled PM Emissions (ton/yr) = [Uncontrolled PM Emissions (lb/hr)] x [dry mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Dry mix loading only
Controlled PM Emissions (lb/hr) = [Controlled PM emissions factor (lb/ton material)] x [Batch Rate (yd³ concrete/hr)] x [concrete material content (ton material/yd³ concrete)]
Controlled PM Emissions (ton/yr) = [Controlled PM Emissions (lb/hr)] x [Total production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) not for Truck mix loading or Central Mix loading
Controlled PM Emissions (ton/yr) = [Controlled PM Emissions (lb/hr)] x [truck mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Truck mix loading only
Controlled PM Emissions (ton/yr) = [Controlled PM Emissions (lb/hr)] x [central mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Central mix loading only
Controlled PM Emissions (ton/yr) = [Controlled PM Emissions (lb/hr)] x [dry mix production (yd³ concrete/yr)] / [Batch Rate (yd³ concrete/hr)] / (2,000 (lb/ton)) for Dry mix loading only

Example: Aggregate delivery to ground storage

- Uncontrolled PM Emissions factor, taken from AP42 Table 11.12-2 or the background document, = [6.90E-03 (lb/ton aggregate)]
Uncontrolled PM Emissions factor = [6.90E-03 (lb/ton aggregate)] x [0.9325 (ton aggregate/yd³ concrete)] = [6.40E-03 (lb/yd³ concrete)]
Controlled PM Emissions factor = [6.90E-03 (lb/ton aggregate)] x [1 - (0.0000 % /100)] = [6.90E-03 (lb/ton aggregate)]
Controlled PM Emissions factor = [6.40E-03 (lb/yd³ concrete)] x [1 - (0.0000 % /100)] = [6.40E-03 (lb/yd³ concrete)]
Uncontrolled PM Emissions = [6.40E-03 (lb/yd³ concrete)] x [60.00 (yd³ concrete/hr)] = [0.3840 (lb/hr)]
Uncontrolled PM Emissions = [0.3840 (lb/hr)] x [60,000 (yd³ concrete/yr)] / [60 (hr/yr)] / (2,000 (lb/ton)) = [0.1920 (ton/yr)]
Controlled PM Emissions = [6.40E-03 (lb/yd³ concrete)] x [60.00 (yd³ concrete/hr)] = [0.3840 (lb/hr)]
Controlled PM Emissions = [0.3840 (lb/hr)] x [60,000.00 (yd³ concrete/yr)] / [60 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.1920 (ton/yr)]

Example: Truck mix loading

- Uncontrolled PM Emissions factor, taken from AP42 Table 11.12-2 or the background document, = [1.118E+00 (lb/ton (cement + supplement))]
Uncontrolled PM Emissions factor = [1.118E+00 (lb/ton (cement + supplement))] x [0.2820 (ton (cement + supplement)/yd³ concrete)] = [3.15E-01 (lb/yd³ concrete)]
Controlled PM Emissions factor = [1.118E+00 (lb/ton (cement + supplement))] x [1 - (95.0000 % /100)] = [5.55E-02 (lb/ton (cement + supplement))]
Controlled PM Emissions factor = [3.15E-01 (lb/yd³ concrete)] x [1 - (95.0000 % /100)] = [1.58E-02 (lb/yd³ concrete)]
Uncontrolled PM Emissions = [3.15E-01 (lb/yd³)] x [60.00 (yd³ concrete/hr)] = 19.9180 lb/hr
Uncontrolled PM Emissions = [19.9180 (lb/hr)] x [60,000.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [9.4590 (ton/yr)]
Controlled PM Emissions = [1.58E-02 (lb/yd³)] x [60.00 (yd³ concrete/hr)] = [0.9459 (lb/hr)]
Controlled PM Emissions = [0.9459 (lb/hr)] x [60,000.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.4730 (ton/yr)]

Example: Central mix loading

- Uncontrolled PM Emissions factor, taken from AP42 Table 11.12-2 or the background document, = [0.000E+00 (lb/ton (cement + supplement))]
Uncontrolled PM Emissions factor = [0.000E+00 (lb/ton (cement + supplement))] x [0.0000 (ton (cement + supplement)/yd³ concrete)] = [0.000E+00 (lb/yd³ concrete)]
Controlled PM Emissions factor = [0.000E+00 (lb/ton (cement + supplement))] x [1 - (0.0000 % /100)] = [0.000E+00 (lb/ton (cement + supplement))]
Controlled PM Emissions factor = [0.000E+00 (lb/yd³ concrete)] x [1 - (0.0000 % /100)] = [0.000E+00 (lb/yd³ concrete)]
Uncontrolled PM Emissions = [0.000E+00 (lb/yd³)] x [0.00 (yd³ concrete/hr)] = [0.0000 (lb/hr)]
Uncontrolled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.0000 (ton/yr)]
Controlled PM Emissions = [0.000E+00 (lb/yd³)] x [0.00 (yd³ concrete/hr)] = [0.0000 (lb/hr)]
Controlled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.0000 (ton/yr)]

Example: Dry mix loading

- Uncontrolled PM Emissions factor for truck mix loading used as estimate, taken from AP42 Table 11.12-2 or the background document, = [0.000E+00 (lb/ton (cement + supplement))]
Uncontrolled PM Emissions factor = [0.000E+00 (lb/ton (cement + supplement))] x [0.0000 (ton (cement + supplement)/yd³ concrete)] = [0.000E+00 (lb/yd³ concrete)]
Controlled PM Emissions factor = [0.000E+00 (lb/ton (cement + supplement))] x [1 - (0.0000 % /100)] = [0.000E+00 (lb/ton (cement + supplement))]
Controlled PM Emissions factor = [0.000E+00 (lb/yd³ concrete)] x [1 - (0.0000 % /100)] = [0.000E+00 (lb/yd³ concrete)]
Uncontrolled PM Emissions = [0.000E+00 (lb/yd³)] x [0.00 (yd³ concrete/hr)] = [0.0000 (lb/hr)]
Uncontrolled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.0000 (ton/yr)]
Controlled PM Emissions = [0.000E+00 (lb/yd³)] x [0.00 (yd³ concrete/hr)] = [0.0000 (lb/hr)]
Controlled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd³ concrete/yr)] / [60.00 (yd³ concrete/hr)] / (2,000 (lb/ton)) = [0.0000 (ton/yr)]