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

 Source
 94-0091-01
 APC 111, Box 2

 Permit No.
 981691

 Batch Rate by volume
 100.00
 yd³ concrete/hr
 APC 111, Box 9

Batch Rate by weight 201.20 tons concrete/hr, based on the composition of one cubic yard of concrete described below

Maximum yearly production (assuming 8,760 hours) 876,000.00 yd³ concrete/yr

1,762,512.00 tons concrete/yr, based on the composition of one cubic yard of concrete described below

Voluntary Annual Limit(s)						
truck mix production		yd ³ concrete/yr, truck mix	APC 111, Box 6			
central mix production		ya concrete, yii centrar iink	APC 111, Box 6			
dry mix production ^a	100,000.00	yd ³ concrete/yr, dry mix	APC 111, Box 6			
Total production ^b	100,000.00	yd ³ concrete/yr, total				

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 simlar 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.

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

1,865							
_,000	pounas						
1,428	pounds						
491	pounds						
73	pounds						
Water [8.35 (lbs/gal)] x [20 (gal)] 167 pounds							
	1,428 491 73						

Total for 1 yd³ 4,024 pounds/yd³

Concrete materia	Concrete material content factors for converting lb/ton emission							
	factors to lb/yd ³ emission factors							
0.9325 (tons aggregate)/yd³ concrete								
0.7140 (tons sand)/yd ³ concrete								
0.2455 (tons cement)/yd ³ concrete								
0.0365 (tons supplement)/yd³ concrete								
1.6465	(tons aggregate + sand)/yd³ concrete							
0.2820	(tons cement + supplement)/yd³ concrete							

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

	Point or		Reference values	Reference values for use as %controlled					
% controlled	Fugitive ^a	Source	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%						
99.9000%	Point	Weigh hopper loading (3-05-011-08)							
99.9000%	Fugitive	Dry mix loading ^c							

^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 contol 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 simlar 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

Source 94-0091-01 Permit No. 981691

Batch Rate by volume 100.00 yd³ concrete/hr Batch Rate by weight 201.20 tons concrete/hr

Voluntary Annual Limit(s)								
dry mix production	100,000.00	yd3 concrete/yr, dry mix						
Total production	100,000.00	yd ³ concrete/yr, total						

Selected concrete composition values calculated from inputs in General tab.							
Coarse Aggregate 0.9325 (tons aggregate)/yd³ concrete							
Sand	0.7140	(tons sand)/yd ³ concrete					
Cement	0.2455	(tons cement)/yd³ concrete					
Cement Supplement	0.0365	(tons supplement)/yd³ concrete					
Coarse Aggregate + Sand	1.6465	(tons aggregate + sand)/yd³ concrete					
Cement + Cement Supplement	0.2820	(tons cement + supplement)/yd³ concrete					

Allowable Emissions

Allowable(s) for Fugitive Emissions - BASED ON TAPCR 1200-03-08-.01, 1200-03-08-.03, 1200-03-09-.03(8), and AP42 EMISSION FACTORS (See "Actual" tab)

		Fugitive PM		
Source		lb/hr	tpy 100,000 yd3/yr	
Aggregate and sand operations	2.3	-	1.19	
Dry mix loading for 100,000.00 yd3/yr	0.0)3	0.02	
	2.4	10	1.21	

Equations used in calculations:

Fugitive PM (lb/hr) - See "Actual" tab - Controlled emissions (lb/hr)

Fugitive PM (tpy - for 100,000 yd3 concrete/yr)- See "Actual" tab - Controlled emissions (ton/yr)

Allowable(s) for Stack (Point Source) Emissions based on PWR (New Process - beginning operation on or after April 3, 1972 (TABLE 2)) and dscf/min

For P <= 30, E = 3.59 (P)^0.62

For P > 30, E = 17.31 (P)^0.16

However:

(1) E shall not be required to be less than 0.02 gr/dscf of stack gases corrected to 70°F and 1 atmosphere

(2) E shall not be allowed to be more than 0.25 gr/dscf of stack gases corrected to 70°F and 1 atmosphe

	Units		APC 111					tack PM
WR	f Ur		Boxes 12 - 15	lb/hr		lb/hr		tpy
(ton/hr)	# of	Stack/Process ID	dscf/min	0.02 gr/dscfm	E from table 2	0.25 gr/dscfm	lb/hr	100,000 yd3/yr
12.275 (each)	2	(default) cement delivery to silo	900 (each)	0.30 lb/hr (total)	33.99 lb/hr (total)	3.86 lb/hr (total)	3.86 lb/hr	1.94 tpy
3.650 (each)	1	(default) cement supplement delivery to silo	900 (each)	0.15 lb/hr (total)	8.01 lb/hr (total)	1.93 lb/hr (total)	1.93 lb/hr	0.97 tpy
15.93	1	(default) Weigh hopper loading	64	0.01 lb/hr	19.97 lb/hr (total)	0.14 lb/hr	0.14 lb/hr	0.07 tpy
	1			0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
	1			0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
	1			0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
				0.00 lb/hr	0.00 lb/hr (total)	0.00 lb/hr	0.00 lb/hr	0.00 tpy
							5.93 lb/hr	2.98 tpy

Green shading shows the applicable basis (PWR or 0.02 gr/dscf or 0.25 gr/dscf) for each point source, BOTH a PWR and a dscf/min value must be input for each source. Shaded cells indicate the estimated actual emission values to be used in the template permit and the emission summary.

Equations used in calculations:

For P <= 30, E (based on PWR & Table 2) = 3.59 (P)^0.62

For P > 30, E (based on PWR & Table 2) = 17.31 (P)^0.16

Emissions in gr/dscf corresponding to E (based on PWR and Table 2) = E (based on PWR and Table 2) * (7,000 gr/lb) / (dscf/min * 60 min/hr)

Emissions in lb/hr at a concentration of 0.02 gr/dscf = (dscf/min * 60 min/hr) * (0.02 gr/dscf) / (7,000 gr/lb)

Emissions in lb/hr at a concentration of 0.25 gr/dscf = (dscf/min * 60 min/hr) * (0.25 gr/dscf) / (7,000 gr/lb)

Example: When P = 12.275 ton/hr (per silo) and dscf/min = 900.0 (per silo):

P (per silo) <= 30, therefore E (based on PWR and Table 2) = 3.59 (12.275)^0.62 = 16.99 lb/hr (per silo)

The corresponding gr/dscf value is (16.99 lb/hr) * (7,000 gr/lb) / (900.0 dscf/min * 60 min/hr) = 2.20 gr/dscf

Since 2.20 gr/dscf is greater than 0.25 gr/dscf, then the allowable, based on 0.25 gr/dscf, is 1.93 lb/hr (per silo)

- (2) * (1.93 lb/hr) * (100,000 yd3 concrete/yr) / (100 yd3 concrete/hr) / (2,000 lb/ton) = 1.94 tons/yr (tons/yr for 100,000 yd3 concrete/yr)
- (2) * (1.93 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 16.91 tons/yr (tons/yr for 8,760 hr/yr)

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

Source 94-0091-01 Permit No. 981691

Batch Rate by volume 100.00 yd³ concrete/hr
Batch Rate by weight 201.20 tons concrete/hr

Datch hate by Weight	t 201.20 tons concrete/iii							
Voluntary Annual Limit(s)								
dry mix production	100,000.00	yd3 concrete/yr, dry mix						
Total production	100,000.00	yd ³ concrete/yr, total						

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)/yd ³ concrete							
0.2455 (tons cement)/yd ³ concrete							
0.0365 (tons supplement)/yd³ concrete							
1.6465 (tons aggregate + sand)/yd3 concrete							
0.2820	(tons cement + supplement)/yd ³ concrete						

TOTALS

64.07

32.05

2.43

	EMISS	CALCULATION: SION FACTORS FOR	S BASED ON AP-42 CONCRETE BATCH			•	•				
Source (SCC) Point I			Uncontrolled e	mission factor		Controlled em	nission factor	Uncontrolled	demissions	Controlled emissions	
	or	(ton material/	PN	1	% controlled			PM	1	PM	
	Fugitive	yd ³ concrete)	(lb/ton)	(lb/yd³)	PM	(lb/ton)	(lb/yd³)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
Aggregate delivery to ground storage (3-05-011-21)	Fugitive	0.9325	0.0069	0.0064		0.0069	0.0064	0.6400	0.3200	0.6400	0.320
Sand delivery to ground storage (3-05-011-22)	Fugitive	0.7140	0.0021	0.0015		0.0021	0.0015	0.1500	0.0750	0.1500	0.075
Aggregate transfer to conveyor (3-05-011-23)	Fugitive	0.9325	0.0069	0.0064		0.0069	0.0064	0.6400	0.3200	0.6400	0.320
Sand transfer to conveyor (3-05-011-24)	Fugitive	0.7140	0.0021	0.0015		0.0021	0.0015	0.1500	0.0750	0.1500	0.0750
Aggregate transfer to elevated storage (3-05-011-04)	Fugitive	0.9325	0.0069	0.0064		0.0069	0.0064	0.6400	0.3200	0.6400	0.3200
Sand transfer to elevated storage (3-05-011-05)	Fugitive	0.7140	0.0021	0.0015		0.0021	0.0015	0.1500	0.0750	0.1500	0.0750
Cement delivery to Silo (3-05-011-07)	Point	0.2455	0.73	0.1792	99.9000%	0.0007300	0.0001792	17.9200	8.9600	0.0179	0.0090
Cement supplement delivery to Silo (3-05-011-17)	Point	0.0365	3.14	0.1146	99.9000%	0.0031400	0.0001146	11.4600	5.7300	0.0115	0.005
Weigh hopper loading (3-05-011-08)	Point	1.6465	0.0048	0.0079	99.9000%	0.0000048	0.0000079	0.7900	0.3950	0.0008	0.0004
Dry mix loading for 100,000.00 yd3/yr	Fugitive	0.2820	1.118	0.3153	99.9000%	0.00112	0.000315	31.5300	15.7650	0.0315	0.0158
			Point source emis	ssions			SUBTOTALS	30.17	15.09	0.03	0.0
			Fugitive source e								
			Fugitive source emissions (aggregate and sand) (S1-4.B(a)					2.37	1.19	2.37	1.19
			Fugitive source e		x loading) (S1-4(B)(c)		31.53	15.77	0.03	0.0
			Fugitive source e	missions (All)			SUBTOTALS	33.90	16.96	2.40	1.2

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.

1.23

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 (Ib/yd3 concrete)] = [Uncontrolled PM Emissions factor (Ib/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 = $[6.40E-03 \text{ (lb/yd3 concrete)}] \times [100.00 \text{ (yd3 concrete/hr)}] = [0.6400 \text{ (lb/hr)}]$ Uncontrolled PM Emissions = [0.6400 (lb/hr)] x [100,000 (yd3 concrete/yr)] / [100 (hr/yr)] / [2,000 (lb/ton)] = [0.3200 (ton/yr)] Controlled PM Emissions = [6.40E-03 (lb/yd3 concrete)] x [100.00 (yd3 concrete/hr)] = [0.6400 (lb/hr)] Controlled PM Emissions = [0.6400 (lb/hr)] x [0.00 (yd3 concrete/yr) / 100 (yd3 concrete/hr)] / [2,000 (lb/ton)] = [0.3200 (ton/yr)] Example: Truck 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)] = [0.00E+00 (lb/yd3 concrete)] Controlled PM Emissions factor = [0.000E+00 (lb/ton (cement + supplement)] x [1 - (0.0000 % /100)] = [0.00E+00 (lb/ton (cement + supplement)] Controlled PM Emissions factor = [0.00E+00 (lb/yd3 concrete)] x [1 - (0.0000 % /100)] = [0.00E+00 (lb/yd3 (concrete)] Uncontrolled PM Emissions = [0.00E+00 (lb/yd3)] x [0.00 (yd3 concrete/hr)] = 0.0000 lb/hr Uncontrolled PM Emissions = $[0.0000 (lb/hr)] \times [0.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/ton)] = <math>[0.0000 (ton/yr)]$ Controlled PM Emissions = [0.00E+00 (lb/vd3)] x [0.00 (vd3 concrete/hr)] = [0.0000 (lb/hr)] Controlled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/ton)] = [0.0000 (ton/yr)] Example: Central mix loading Uncontrolled PM Emissions factor, taken from AP42 Table 11.12-2 or the background document, = [0.00E+00 (lb/ton (cement + supplement)] Uncontrolled PM Emissions factor = [0.00E+00 (lb/ton (cement + supplement)] x [0.0000 (ton (cement + supplement)]/vd3 concrete)] = [0.00E+00 (lb/ton (cement + supplement)] x [0.0000 (ton (cement + supplement)]/vd3 concrete)] Controlled PM Emissions factor = $[0.00E+00 \text{ (lb/ton (cement + supplement)}] \times [1 - (0.0000 \% /100)] = [0.00E+00 \text{ (lb/ton (cement + supplement)}]$ Controlled PM Emissions factor = $[0.00E+00 \text{ (lb/yd3 concrete)}] \times [1 - (0.0000 \% /100)] = [0.00E+00 \text{ (lb/yd3 (concrete)}]$ Uncontrolled PM Emissions = $[0.00E+00 (lb/yd3)] \times [0.00 (yd3 concrete/hr)] = [0.0000 (lb/hr)]$ $\label{eq:uncontrolled PM Emissions = [0.0000 (lb/hr)] x [0.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/hr)] = [0.0000 (ton/yr)] / [2,000 (lb/hr)] = [0.0000 (ton/yr)] / [2,000 (lb/hr)] + [0.000 (lb/hr)] +$ Controlled PM Emissions = $[0.00E+00 (lb/yd3)] \times [0.00 (yd3 concrete/hr)] = [0.0000 (lb/hr)]$ Controlled PM Emissions = $[0.0000 (lb/hr)] \times [0.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/ton)] = <math>[0.0000 (ton/yr)]$ 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, = [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 - (99.9000 % /100)] = [1.12E-03 (lb/ton (cement + supplement)] Controlled PM Emissions factor = [3.15E-01 (lb/yd3 concrete)] x [1 - (99.9000 % /100)] = [3.15E-04 (lb/yd3 (concrete)] Uncontrolled PM Emissions = [3.15E-01 (lb/yd3)] x [100.00 (yd3 concrete/hr)] = [31.5300 (lb/hr)] Uncontrolled PM Emissions = [31.5300 (lb/hr)] x [100,000.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/ton)] = [15.7650 (ton/yr)] Controlled PM Emissions = $[3.15E-04 (lb/yd3)] \times [100.00 (yd3 concrete/hr)] = [0.0315 (lb/hr)]$

Controlled PM Emissions = $[0.0315 (lb/hr)] \times [100,000.00 (yd3 concrete/yr)] / [100.00 (yd3 concrete/hr)] / [2,000 (lb/ton)] = <math>[0.0158 (ton/yr)]$