



State of Oregon
Department of
Environmental
Quality

EMISSION FACTORS GRAIN ELEVATORS, SEED CLEANING & ANIMAL FEED MILLS

AQ-EF01

Grain Elevators and Seed Cleaners:

Emission Source	Type of Control	PM ⁽²⁾ (lb/ton) ⁽¹⁾	PM ₁₀ (lb/ton) ⁽¹⁾	PM _{2.5} (lb/ton) ⁽¹⁾
Grain receiving: straight truck	none	0.18	0.059	0.010
hopper truck	none	0.035	0.0078	0.0013
railcar	none	0.032	0.0078	0.0013
continuous barge unloader	none	0.029	0.0073	0.0019
barge – marine leg	none	0.15	0.038	0.0050
ship	none	0.15	0.038	0.0050
Grain cleaning:	none	0.5 ⁽⁴⁾	0.125 ⁽³⁾	0.0083 ⁽⁵⁾
	cyclone	0.075	0.019	0.0032
Grain drying: column dryer	none	0.22	0.055	0.0094
rack dryer	none	3.0	0.75	0.13
	self-cleaning screens (<50 mesh)	0.47	0.12	0.020
Headhouse/internal handling	none	0.061	0.034	0.0058
Grain shipping: truck	none	0.086	0.029	0.0049
railcar	none	0.027	0.0022	0.00037
barge	none	0.016	0.0040	0.00055
ship	none	0.048	0.012	0.0022
Screen bunker unloading	none	0.5 ⁽⁶⁾	0.125 ⁽⁶⁾	0.0083 ⁽⁵⁾

Animal Feed Mills:

Emission Source	Type of Control	PM ⁽²⁾ (lb/ton) ⁽¹⁾	PM ₁₀ (lb/ton) ⁽¹⁾	PM _{2.5} (lb/ton) ⁽¹⁾
Grain receiving	none	0.017	0.0025	0.00017 ⁽⁵⁾
Grain cleaning	none	0.5 ⁽⁴⁾	0.125 ⁽³⁾	0.0083 ⁽⁵⁾
	cyclone	0.075	0.019	0.0032
Grain shipping: Hammermill	cyclone	0.067	0.033 ⁽⁷⁾	0.012 ⁽⁵⁾
	baghouse	0.012	0.012 ⁽⁸⁾	0.0072 ⁽⁵⁾
Flaker	none	1.0 ⁽⁴⁾	0.5 ⁽⁷⁾	0.189 ⁽⁵⁾
	cyclone	0.15	0.075 ⁽⁷⁾	0.045 ⁽⁵⁾
Grain cracker	none	0.16 ⁽⁴⁾	0.08 ⁽⁷⁾	0.0053 ⁽⁵⁾
	cyclone	0.024	0.012 ⁽⁷⁾	0.0019 ⁽⁷⁾
Pelletizing - pellet cooler	none	2.8 ⁽⁴⁾	1.4 ⁽⁷⁾	0.14 ⁽⁵⁾
	cyclone	0.419 ⁽⁹⁾	0.21 ⁽⁷⁾	0.045 ⁽⁵⁾
	high efficiency cyclone ⁽¹⁰⁾	0.15	0.075 ⁽⁷⁾	0.016 ⁽⁵⁾
Feed shipping (bulk feed)	none	0.0033	0.0008	0.00005 ⁽⁵⁾

(1) Factors are in units of pound per ton (lb/ton) of grain/seed handled or processed.

(2) Unless otherwise noted, emission factors for particulate from grain elevators and seed cleaning operations are from AP-42 (3/03), Table 9.9.1-1, Grain Elevators.

(3) PM₁₀ test data are not available. PM₁₀ emission factor was estimated by taking 25 percent of the filterable PM emission factor. AP-42 (3/03) Table 9.9.1-1, Grain Elevators.

(4) Emission factor calculated by using the given control efficiency for a cyclone (85%) and back calculating.

(5) PM_{2.5} emission factors developed using cumulative mass percent of PM₁₀ and PM_{2.5} data from tables provided by EPA to DEQ after the discontinuation of EPA's PM calculator.

(6) Emission factor for grain cleaning is used for total particulate and PM₁₀ emission factors for screenings bunker unloading. DEQ estimate.

(7) PM-10 test data are not available. PM-10 emission factor was estimated by taking 50 percent of the filterable PM emission factor. AP-42 (3/03) Table 9.9.1-2, Animal Feed Mills

(8) PM-10 test data are not available. PM-10 emission factor was estimated by taking 100 percent of the filterable PM emission factor. AP-AP-42 (3/03) Table 9.9.1-2, Animal Feed Mills

(9) Includes condensable PM from AP-42 (3/03) Table 9.9.1-2, Animal Feed Mills

(10) Equivalent to a triple cyclone or modern high efficiency cyclone.