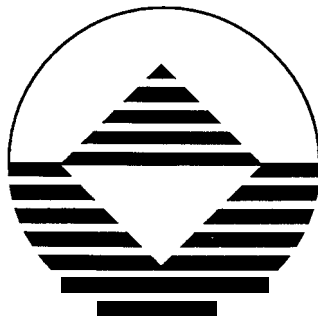


# AIR CALCULATIONS AND CONVERSIONS GUIDE



AIR & WASTE MANAGEMENT  
A S S O C I A T I O N



IOWA  
CHAPTER

January 6, 1994

## PARTICULATE EMISSIONS

DEFINITIONS:

ACFM	=	Actual cubic feet per minute
DSCFM	=	Dry cubic feet per minute at standard conditions
gr	=	grains (7000 grains per pound)
ft <sup>3</sup>	=	cubic feet
P	=	pressure (usually in pounds per square inch (psi))
hr	=	hour
yr	=	year
R	=	Rankine (temperature)
F	=	Fahrenheit (temperature)
min	=	minute
lb	=	pound
B <sub>wo</sub>	=	volumetric fraction of water vapor

STANDARD CONDITIONS

Pressure	=	14.7 psi or 29.92 inches mercury
Temperature	=	70 degrees F (regulatory standard temperature)

TO CONVERT ACFM TO DSCFM

$$\text{DSCFM} = \text{ACFM} \times \frac{(460^\circ\text{R} + 70)}{(460^\circ\text{R} + \text{temp})} \times \frac{\text{actual P}}{14.7} \times (1 - B_{wo})$$

TO CONVERT GRAINS PER STANDARD CUBIC FOOT TO POUNDS/HOUR (at Y dscfm)

$$\text{lbs/hr} = \text{gr/SCF} \times \frac{\text{lb}}{7000 \text{ gr}} \times \frac{\text{Y dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}}$$

TO CONVERT POUNDS PER HOUR TO TONS PER YEAR

$$\text{tons/yr} = \text{lbs/hr} \times \frac{24 \text{ hr}}{\text{day}} \times \frac{\text{ton}}{2000 \text{ lb}} \times \frac{\text{\# days}}{\text{yr}}$$

## SULFUR DIOXIDE EMISSIONS

**DEFINITIONS:**

mw	=	molecular weight (air = 29.95, SO <sub>2</sub> = 64)
ppm	=	parts per million
DSCFM	=	Dry cubic feet per minute at standard conditions
mg	=	milligrams
m <sup>3</sup>	=	cubic meter
ft <sup>3</sup>	=	cubic feet
SO <sub>2</sub>	=	sulfur dioxide
P	=	pressure (usually in pounds per square inch (psi))
hr	=	hour
R	=	Rankine (temperature)
F	=	Fahrenheit (temperature)
min	=	minute
lb	=	pound
density air	=	0.0749 @ 70 degrees F.
B <sub>wo</sub>	=	volumetric fraction of water vapor

**STANDARD CONDITIONS**

Pressure	=	14.7 psi or 29.92 inches mercury
Temperature	=	70 degrees F (regulatory standard temperature)

**TO CONVERT ACFM TO DSCFM**

$$\text{DSCFM} = \text{ACFM} \times \frac{(460^\circ\text{R} + 70)}{(460^\circ\text{R} + \text{temp})} \times \frac{\text{actual P}}{\text{std P}} \times (1 - B_{wo})$$

**TO CONVERT PPM SO<sub>2</sub> TO POUNDS PER HOUR (at Y dscfm)**

$$\text{lbs/hr} = \text{PPM} \times \frac{.0749 \text{ lb}}{\text{ft}^3} \times \frac{Y \text{ dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times \frac{64}{29.95}$$

**TO CONVERT MILLIGRAM PER CUBIC METER TO POUNDS PER HOUR (at Y dscfm)**

$$\text{lbs/hr} = \text{mg/m}^3 \times \frac{\text{m}^3}{35.32 \text{ ft}^3} \times \frac{Y \text{ dscf}}{\text{min}} \times \frac{\text{g}}{1000 \text{ mg}} \times \frac{\text{lb}}{453.6 \text{ g}} \times \frac{60 \text{ min}}{\text{hr}}$$

**TO CONVERT POUNDS PER HOUR TO TONS PER YEAR**

$$\text{tons/yr} = \text{lbs/hr} \times \frac{24 \text{ hr}}{\text{day}} \times \frac{\text{ton}}{2000 \text{ lb}} \times \frac{\text{\# days}}{\text{yr}}$$

## NITROGEN DIOXIDE EMISSIONS

**DEFINITIONS:**

mw	=	molecular weight (air = 29.95, NO <sub>2</sub> = 50)
ppm	=	parts per million
DSCFM	=	Dry cubic feet per minute at standard conditions
mg	=	milligrams
m <sup>3</sup>	=	cubic meter
ft <sup>3</sup>	=	cubic feet
NO <sub>2</sub> *	=	nitrogen dioxide
P	=	pressure (usually in pounds per square inch (psi))
hr	=	hour
R	=	Rankine (temperature)
F	=	Fahrenheit (temperature)
min	=	minute
lb	=	pound
density air	=	0.0749 @ 70 degrees F.
B <sub>wo</sub>	=	volumetric fraction of water vapor

**STANDARD CONDITIONS**

Pressure	=	14.7 psi or 29.92 inches mercury
Temperature	=	70 degrees F (regulatory standard temperature)

**TO CONVERT ACFM TO DSCFM**

$$DSCFM = ACFM \times \frac{(460^\circ R + 70)}{(460^\circ R + \text{temp})} \times \frac{\text{actual P}}{14.7} \times (1 - B_{wo})$$

**TO CONVERT PPM NO<sub>2</sub> TO POUNDS PER HOUR (at Y dscfm)**

$$lbs/hr = PPM \times \frac{.0749 \text{ lb}}{\text{ft}^3} \times \frac{Y \text{ dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times \frac{50}{29.95}$$

**TO CONVERT MILLIGRAM PER CUBIC METER TO POUNDS PER HOUR (at Y dscfm)**

$$lbs/hr = mg/m^3 \times \frac{\text{m}^3}{35.32 \text{ ft}^3} \times \frac{Y \text{ dscf}}{\text{min}} \times \frac{\text{g}}{1000 \text{ mg}} \times \frac{\text{lb}}{453.6 \text{ g}} \times \frac{60}{\text{hr}}$$

**TO CONVERT POUNDS PER HOUR TO TONS PER YEAR**

$$\text{tons/yr} = lbs/hr \times \frac{24 \text{ hr}}{\text{day}} \times \frac{\text{ton}}{2000 \text{ lb}} \times \frac{\# \text{ days}}{\text{yr}}$$