Units of Measure and Conversions

Air Flow

1 CFM = 0.0283 m^3/min (CMM)	1 CFM = 1.699 m^3/hr
1 m^3/min = 35.31 CFM	1 m^3/min = 60 m^3/hr
1 m^3/min = 16.67 Liter/sec	1 Liter/sec = 0.06 m^3/ min
1 m^3/hr = 0.589 CFM	1 m^3/ hr = 0.0167 m^3/min

CFM	m^3/min(CMM)	m^3/hr
1	0.0283	1.699
35.31	1	60
0.589	0.0167	1

Static Pressure

1 Pa = 0.102 mmH_2O	1 Pa = 0.004 inchH_2O
1 mmH_2O = 0.0394 inchH_2O	1 mmH_2O = 9.81 Pa
1 inchH_2O = 249 Pa	1 inchH_2O = 25.4 mmH_2O

Inch H_2O	mm H_2O	Pa
1	25.4	249
0.0394	1	9.81
0.004	0.102	1

- *The basic theory of acoustic*

Sound pressure level: SPL (dBA)

$$L_P = 20\log \frac{P}{P_0} \text{(dBA)} \ldots\ldots\ldots \text{(a)} \qquad P_0 = 20\mu\text{Pa}$$

P_0 the reference sound pressure of human hearing system

L_P sound pressure level

Similarity algorithm of fan noise

$$N_2 = 50\log \frac{rpm_2}{rpm_1} - N_1 \ldots\ldots\ldots \text{(b)}$$

N_1 noise level measured at rpm 1

N_2 noise level calculated by equation (b) at rpm 2

The equations for the relationship between distance and noise level measured at anechoic room.

$$Lp = Lw - 20\log(r) - 11\,[\text{dBA}] \ldots\ldots\ldots \text{(c)}$$

$$Lw = 10\log\left(\frac{p^2}{p_0^2}\right) + 10\log(4\pi r^2) \ldots\ldots\ldots \text{(d)}$$

Lp sound pressure level

Lw sound intensity level

r distance in meter

According to equations (c) and (d), it's very clear the noise level will reduce 6 dBA when the distance doubled.

Comparatively, the noise level will also increase 6 dBA when distance shorten by half.