illinois blower, inc.

THE COMPLETE LIST OF **FAN LAWS**

VARIABLE	CONSTANT	NO	LAW	FORMULA
Speed	Air Density Fan Size Distribution System	1	With Constant Air Density, Fan Size, and Distrubution System, Fan Capacity varies proportionally to the Fan Speed.	$Q_2 = Q_1\left(\frac{N_2}{N_1}\right)$
		2	With Constant Air Density, Fan Size, and Distrubution System, Fan Pressure varies as the square of the Fan Speed.	$P_2 = P_1\left(\frac{N_2}{N_1}\right)^2$
		3	With Constant Air Density, Fan Size, and Distribution System, Fan Horsepower varies as the cube of the Fan Speed.	$Hp_2 = Hp_1\left(\frac{N_2}{N_1}\right)^3$
Fan Size	Air Density Tip Speed	4	With Constant Tip Speed and Density, the Capacity and Horsepower vary as the square of the Fan Size.	$Q_2 = Q_1\left(\frac{D_2}{D_1}\right)^2$ or $Hp_2 = Hp_1\left(\frac{D_2}{D_1}\right)^2$
		5	With Constant Air Density and Tip Speed, the Fan Speed required varies inversely as the Fan Size.	$N_2 = N_1\left(\frac{D_1}{D_2}\right)$
		6	With Constant Air Density and Tip Speed, the Fan Pressure remains constant.	$P_1 = P_2$
	Air Density Speed (Fan RPM)	7	With Constant Air Density and Fan Speed (RPM), Fan Capacity varies as the cube of the Fan Size.	$Q_2 = Q_1\left(\frac{D_2}{D_1}\right)^3$
		8	With Constant Air Density and Fan Speed (RPM), Fan Pressure varies as the square of the Fan Size.	$P_2 = P_1\left(\frac{D_2}{D_1}\right)^2$
		9	With Constant Air Density and Fan Speed (RPM), Fan Horsepower varies as the fifth power of the Fan Size.	$Hp_2 = Hp_1\left(\frac{D_2}{D_1}\right)^5$
Air Density	Fan Pressure Fan Size Distribution System	10	With Constant Fan Pressure, Fan Size, and Distribution System, the Fan Speed, Capacity and Horsepower vary inversely as the square root of Density	$N_2 = N_1\left(\frac{P_1}{P_2}\right)^{1/2}$ or $Q_2 = Q_1\left(\frac{P_1}{P_2}\right)^{1/2}$ or $Hp_2 = Hp_1\left(\frac{P_1}{P_2}\right)^{1/2}$
	Capacity Fan Size Distribution System	11	With Constant Capacity, Fan Size, and Distribution Systm, the Fan Pressure and Horsepower vary proportionally with the Density.	$P_2 = P_1\left(\frac{P_2}{P_1}\right)$ or $Hp_2 = Hp_1\left(\frac{P_2}{P_1}\right)$
		12	With Constant Capacity, Fan Size, and Distribution System, the Fan Speed remains constant.	$N_1 = N_2$

750 Industrial Dr., Ste. E, Cary, IL 60013
847.639.5500 | SalesEngineering@IllinoisBlower.com

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