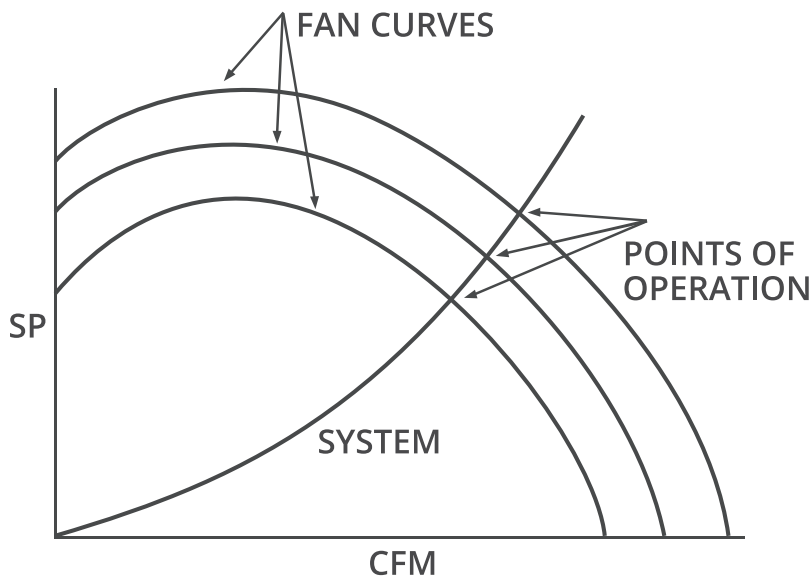


BEGINNER'S GUIDE

FAN LAWS



CFM varies in direct proportion to change in RPM

$$\text{CFM (new)} = \frac{\text{RPM (new)}}{\text{RPM (old)}} \times \text{CFM (old)}$$

SP varies in proportion to the change in (RPM)²

$$\text{SP (new)} = \left(\frac{\text{RPM (new)}}{\text{RPM (old)}} \right)^2 \times \text{SP (old)}$$

BHP varies in proportion to the change in (RPM)³

$$\text{BHP (new)} = \left(\frac{\text{RPM (new)}}{\text{RPM (old)}} \right)^3 \times \text{BHP (old)}$$

Example 1

A fan has been selected to deliver 35,530 CFM at 8" SP. The fan runs at 1230 RPM and requires 61.0 BHP.

After installation, it is desired to increase the output 20%. At what RPM must the fan run? What SP will be developed? What BHP is required?

CFM varies as RPM

$$(1230)(1.20)=1476 \text{ RPM}$$

SP varies as (RPM)²

$$(1476/1230)^2 (8)=11.52" \text{ SP}$$

BHP varies as (RPM)³

$$(1476/1230)^3 (61.0)=105.4 \text{ BHP}$$

Example 2

A fan was originally installed to deliver 10,300 CFM at 2 1/4" SP and to run at 877 RPM, requiring 5.20 BHP.

After installation, it is found that the system only delivers 9,150 CFM at 2 1/4" SP and uses 4.70 BHP. This indicates the original calculations were in error, or that the system was not installed according to plan. What fan RPM and BHP will be necessary to develop the desired 10,300 CFM? What SP should have been figured?

CFM varies as RPM

$$(10,300/9,150)(877)=987 \text{ RPM}$$

SP varies as (RPM)²

$$(987/877)^2 (2.50)=3.17" \text{ SP}$$

BHP varies as (RPM)³

$$(987/877)^3 (4.70)=6.70 \text{ BHP}$$



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