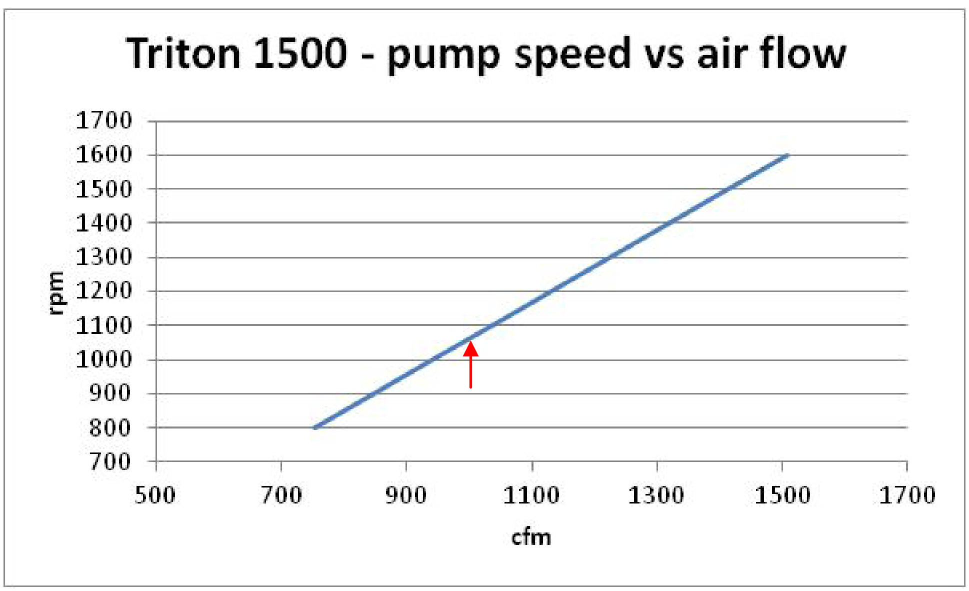
Triton® White Paper

What is the Effect of Pump Speed (rpm) on Airflow (cfm)?

Sometimes a client may just be interested in moving air, and not creating a lot of vacuum. The amount of airflow in cubic feet per minute (cfm) can be varied by the speed of the pump. Higher speeds, as expected, produce more airflow. And the pump speed is controlled by the speed of the driver – either the electric motor with a VFD, or the diesel engine – and the ratio of the pulley (sheave) sizes between the two.

In this whitepaper, we will use our Triton 1500 system as an example, though the same principles apply to our whole product range. Generally, though, when this question is asked, a client doesn't need all the airflow the pump is capable of producing….he would rather throttle it back, saving on energy, noise, etc.

Here is a chart of pump speed **(not engine speed)** vs airflow for our Triton 1500 system, under free air flow (no vacuum). (Continue reading to determine what engine speed is needed).



Let's say for example, that a client wants to target 1000 cfm airflow. This chart says that he'd need to turn the pump at ~1050 rpm to obtain that volume of air. (As mentioned, this is under

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free air flow….if the system is under vacuum, then obviously not as much air is moving, so airflow goes down).

But you can't just set the speed of the pump directly….it is controlled by the speed of the engine, and the ratio of the pulley sizes between the engine and the pump. But we want to know what speed to turn the engine to make the pump give the desired airflow. Here's how to calculate:

In an example Triton system, the power driven pulley (on the engine) is 10.3" diameter, while the driven pulley is 13.2" diameter. Since the two are connected by a belt, that means the engine pulley turns faster than the pump pulley. How much faster is determined by the ratio of the diameters. In this case, the ratio is 13.2 divided by 10.3, or 1.28….meaning that the engine pulley turns 1.28 times faster than the pump does. So, in this example, for the targeted pump speed of 1050 rpm, the engine would need to be set at roughly 1350 rpm….and the resulting airflow should be approximately 1000 cfm.

It's hard to be exact in the "real world", but this math should get you in the range of desired airflow.

Please contact Triton for more information.

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