Air compressor run time calculation

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Duty cycle is another one of those compressor world terms that is thrown around constantly when discussing your compressed air system and its capabilities. While you may hear it often from compressed air experts, you may find yourself asking if you truly know what "duty cycle" really means. Read the below article to become an expert on duty cycle and to fully understand what your compressed air experts are talking about when discussing it.

To find this percentage you take the compressor"s time running and divide it by the total cycle time. Total cycle time can be defined as the compressor"s run time plus its cool down time.

For example: if a compressor"s total cycle time is 10 minutes, but it only ran for 8 minutes of this time, it would have an 80% duty cycle. This means, those remaining 2 minutes were used as cool down time until the next cycle.

In the above example, the 80% duty cycle is dictating that the compressor will deliver pressurized air for a combined 8 minutes and must be off for 2 minutes before it can run again.

While most compressors have automatic shutoffs, it is important to pay attention to your compressor"s duty cycle to ensure it is not being overworked and received the proper amount of rest time necessary to deliver optimal performance.

An air compressor with a 25% duty cycle runs for 1/4 of the entire cycle time. Because of this, small, light-duty operations that need occasional air power are best suited for compressors with 25% duty cycle. These generally are in-home or small shop units, not ones used in large manufacturing facilities.

Compressors with 30% duty cycle will run for 1/3 the total cycle time, meaning it spends more time resting or cooling down, than it does providing air. These compressors are used in situations where air is required frequently, but not continuously.

An air compressor with 50% duty cycle means that it will operate half the cycle-time while cooling down and resting the other half of the cycle-time. These types of compressors are generally used for medium-grade applications that require only occasional air power such as pneumatic hand tools.

75% duty cycle means the air compressor will be running 3/4 of the total cycle time. A compressor running at 75% duty cycle is best suited for jobs where applications require brief intervals of run time. An example would be auto bodies or repair shops that use pneumatic hand tools such as nailers, drills, or wrenches. These types of tools don"t require continuous air supply, but they have brief resting periods between uses.

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Air compressors with 100% duty cycle means they can run continuously without needing to rest and cool down. They will deliver pressurized air throughout their entire cycle time. Because of this, compressors with 100% duty cycle are best used in processes that require continuous airflow for long periods of time such as conveying systems or pneumatic sanders. A risk for air compressors running at 100% duty cycle is the engine overheating. These compressors should have a cooling component to mitigate this risk.

Duty cycle also refers to the PSI (pressure) and CFM (flow) provided for that percentage of total cycle time. Because of this, a compressor advertised at a 100% duty cycle could provide 125 PSI and 25 CFM for the entire cycle time. But that same compressor could also be advertised at a 50% duty cycle by providing a higher PSI at a lower CFM. Duty cycle depends completely upon the applications and the PSI and CFM necessary to complete them.

A compressor"s efficiency is largely dependent on the number of times it cycles. The quicker a compressor cycles, the more energy it consumes. Because of this, it is better to have longer cycle times that occur fewer times per hour. This preserves energy and thus the compressor"s lifespan. Using a larger storage tank, trying a wider pressure band, and dropping the pressure between the main storage tank and the compressor are three ways to lengthen your cycle time.