

## Overcoming Your Challenges: Turn Your Air Compressor Into A Flowmeter

Written by The Compressed Air Challenge  
Friday, 19 August 2011 10:49

---



What's your leakage level? How efficient are your air compressors? You can answer these questions with some quick and inexpensive tests involving a calculator and a stopwatch. The answers could surprise you.

For compressors that use load/unload controls, there's an easy way to estimate the amount of flow the compressor is contributing to a system. The unit will load and unload at a specific duty cycle corresponding to the percent loading necessary for maintaining the pressure to within its control band. Total flow (percentage) can be calculated as follows:

**Air demand on the compressor (%) =  $[(T \times 100)/(T+t)]$**

**where:**

**T = loaded time (seconds)**

**t = unloaded time (seconds)**

Flow will be expressed in terms of the percentage of compressor capacity. If obtaining the estimated volume flow per minute is your goal in the test, it can be roughly calculated by taking the rated compressor capacity in cubic feet per minute (from the model specifications) and multiplying by the percentage derived.

To use this formula for calculating leak levels, start your compressor during a production shutdown (when there are no demands on the system) and bring it to normal operating pressure. All air-operated end-use equipment should be in the normal "as-left" position. If you don't want to include open blowing applications, they should be isolated with shutoff valves.

What leakage level did you find? In a well-maintained system, the leakage percentage should be less than 10%. Poorly maintained systems can have losses from 20-40% of air capacity and power. Higher than this... well, you've got some work to do!

## Overcoming Your Challenges: Turn Your Air Compressor Into A Flowmeter

Written by The Compressed Air Challenge  
Friday, 19 August 2011 10:49

---

### Other control strategies?

Leakage and other flow can be estimated in systems with other compressor control strategies. For instructions on how to do such tests, see the [Compressed Air Challenge \(CAC\) Fact Sheet 7](#).

If you own compressors that run in load/unload control strategy, you can do a quick system-efficiency test by looking at the ratio of total-loaded versus running hours in a given time period. For rotary-screw compressors, the loaded position is the only time when the compressor is actually producing compressed air efficiently. In unloaded running position, the unit will be consuming 20 to 35% of full load power, but producing no useful flow.

A quick estimate of compressor efficiency can be done by taking the ratio of the total loaded hours divided by the total run-time hours. If the ratio is very low—say 50%—too many of the compressor hours are spent running unloaded. That's costly and wasteful, and further investigation is warranted. On well-performing systems, with adequate installed storage receiver capacity and good compressor control, the target for this ratio should be in the range of 90% or above.

The CAC offers a wealth of free, downloadable information on leaks and related issues through the Library on our Website (see below). You'll also find our manual, Best Practices for Compressed Air Systems, available for purchase in the site's Bookstore. **MT**

*The Compressed Air Challenge® is a partner of the U.S. Department of Energy's Industrial Technology programs. To learn more about its many offerings, log on to [www.compressedairchallenge.org](http://www.compressedairchallenge.org), or email:*

[info@co](mailto:info@compressedairchallenge.org)

[mpressedairchallenge.org](http://compressedairchallenge.org)

For more info, enter 12 at [www.MT-freeinfo.com](http://www.MT-freeinfo.com)