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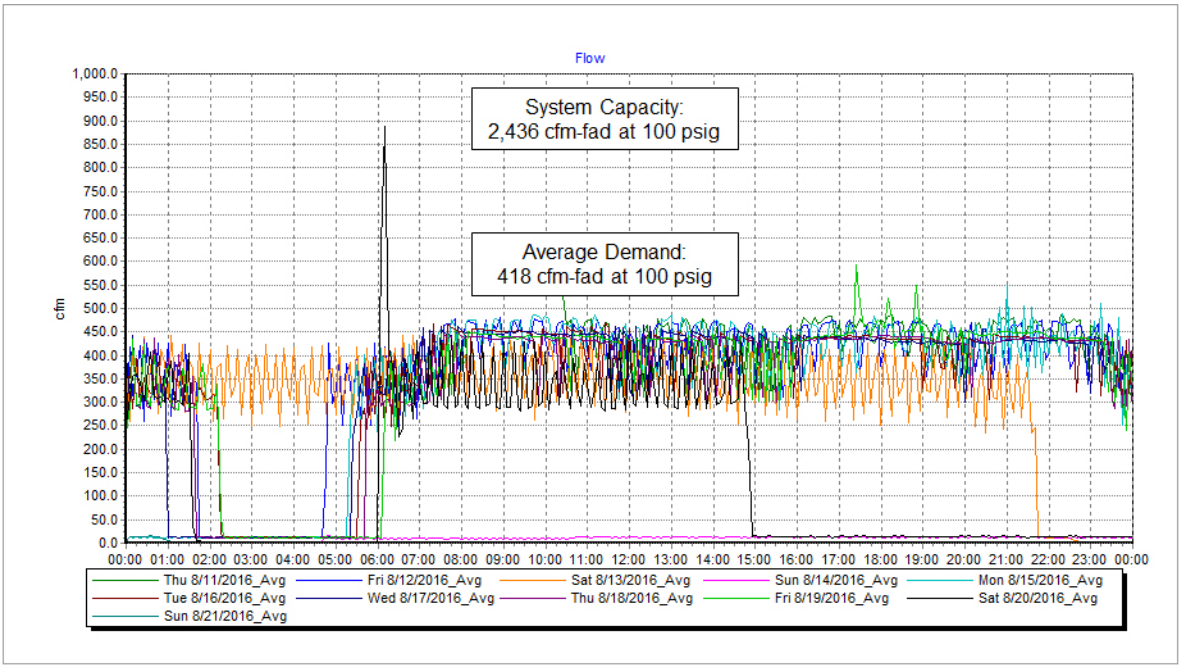
CAGI
Compressed Air & Gas Institute

CASE STUDY

Case Study - Sizing

SITUATION: A video media processing center was interested in replacing their aging and unreliable compressed air equipment. Frequent unscheduled compressor shutdowns would interrupt production and maintenance costs of the old equipment were increasing significantly. The compressed air system consisted of two 250 hp compressors to supply the air needed to run conveying and packaging processes. The total capacity of these two compressors was 2,436 cfm and annual energy costs were $83,263.

SOLUTION: Rather than simply replace the existing equipment with newer versions of the same gear, the company decided to research new technology in hopes of achieving system reliability, energy savings, and a local power company rebate. The end-user worked with a compressed air manufacturer to have a thorough compressed air assessment conducted. Based on the findings of the audit, they discovered their average flow was only 418 cfm. Peak flow (excluding start-up) was 535 cfm. The specific power of their system was very high and inefficient at 33.28 kW/100 cfm. Additionally, the 2400 cfm refrigerated dryer was oversized and the 1040-gallon receiver tank was undersized.



Averaged over 5 minutes. This chart highlights the cumulative flow throughout the test as measured via the installed flow meter before the dryer.

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OUTCOME: Based upon the data generated from the system assessment, the compressed air manufacturer offered two solutions for the customer to consider, each of which delivered the customer's desired outcomes.

Solution one: a single 100 hp variable frequency drive compressor rated at 545 acfm/FAD and additional storage. This would reduce the specific power down to 16.83 kW/100 cfm and offer $41,159 in annual energy cost savings.

Solution two: two 60 hp compressors rated at 266 acfm/FAD each, a master controller to efficiently control the units, and additional storage. This would reduce the specific power to 17.73 kW/100 cfm, yield $38,892 in annual energy savings, and offer some system redundancy.

Energy Cost ($/kWh): $0.090 **Interval of Calculation:** 5 Minutes		**Existing System as Measured**	**Proposal 1: 100 hp VFD + Storage**	**Proposal 2: 2 x 60 hp + master controller + Storage**
Totals	Total Energy Cost ($/yr)	$83,263	$42,104	$44,371
	Total Energy Consumption (kWh/yr)	925,146	467,823	493,008
	Maximum Power Consumption (kW)	225.6	91.7	94.3
	Specific Power (kW / 100 CFM)	33.28	16.83	17.73
Savings Potential	Annual Energy Cost Savings ($/yr)	-	$41,159	$38,892
	Annual Energy Consumption Savings (kWh/yr)	-	457,323	432,138
	Power Consumption Reduction (kW)	-	133.9	131.3

Working with a compressed air expert offers opportunities to thoroughly analyze needs and find lasting, energy efficient solutions that properly apply the right technology for the right application. Sizing the proper equipment up-front is a critical step toward designing, installing, maintaining, and operating a compressed air system that delivers reliability, efficiency, and sustainability now and for the future.