

# Selecting Appropriate Blower Control Strategies

---

Tom Jenkins, P.E.  
JenTech, Inc.  
*Keynote Speaker*

Sponsored by

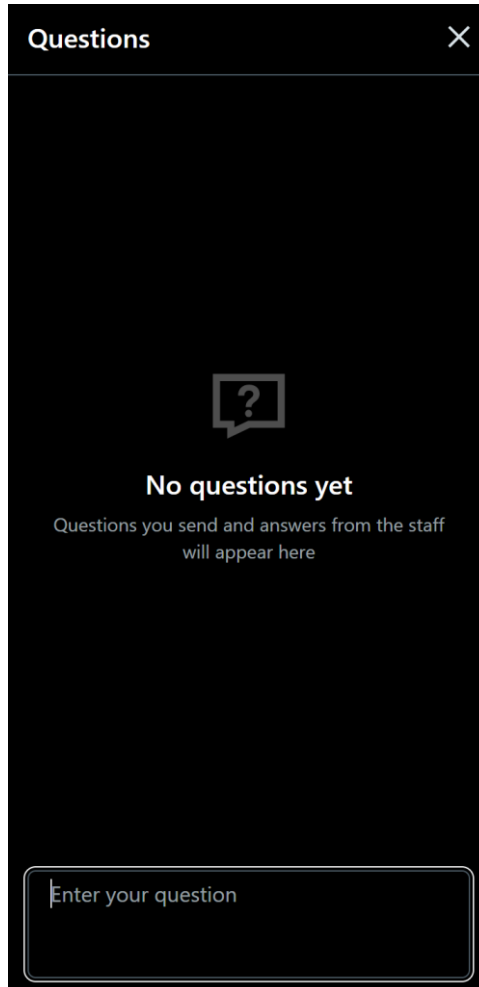


*Built for a lifetime.*

The recording and slides of this webinar will be made available to attendees via email later today.

PDH Certificates will be e-mailed to attendees within 2 days.

# Q&A Format



- Panelists will answer your questions during the Q&A session at the end of the Webinar.
- Please post your questions in the Questions Window in your GoToWebinar interface.
- Direct all questions to Blower & Vacuum Best Practices® Magazine

Sponsored by



# Handouts



**JenTech Inc.**  
 Tom Jenkins  
 414-952-5713  
[info@jentechnic.com](mailto:info@jentechnic.com)

**THOMAS E. JENKINS, P.E.**  
 PRESIDENT AND FOUNDER OF JENTECH INC.

It is often difficult to bridge the gap between theory and practice. For a project to be successful, though, that is exactly what is required. Theoretical engineering analysis must be combined with "real world" considerations. There is no substitute for hands-on experience to anticipate problems and eliminate them in the design stage of a project.

As president of JenTech Inc., Tom Jenkins has made the combination of theory and real world experience the company's fundamental philosophy. He combines expert analysis and field experience into efficient and workable systems. Creative engineering and practical experience are used to develop solutions. Analysis validates the function and cost effectiveness. Consultation with operators verifies that the technology appropriately addresses their needs. Solutions are coordinated with manufacturers, contractors, and operators from concept to installation and commissioning.

Tom is enthusiastic about sharing his expertise and experience with other professionals. He has taught classes covering a variety of topics across the country. The venues have included wastewater operator conferences, universities, manufacturers, and consultant's offices.

JenTech has unique expertise in designing and implementing instrumentation, control, and energy consumption for aeration and blower systems. The technology developed by JenTech has been proven to optimize process performance while reducing energy consumption.

**KAESER COMPRESSORS**  
 Built for a lifetime.

## Selecting the optimal blower for the water industry

Qualified quotation comparison



**KAESER COMPRESSORS**  
 Built for a lifetime.



## Rotary Screw Blower Packages

**CBS-HBS Series**  
 Capacities from: 190 to 5650 cfm  
 Pressures from: 4.4 to 15 psig

[kaeser.com](http://kaeser.com)

**BEST PRACTICES**  
 2025 EXPO OCTOBER 21-23 MANASSAS CITY

**Train Your Team at Best Practices 2025 EXPO & Conference**

With an EXPO Pass, your team can get access to Five NEW EXPO Pavilions featuring hands-on learning experiences and educational seminars – and even the opportunity to win up to \$20,000 in compressed air equipment! Seminars include: C3 Instrumentation, LeakCare 500/50 and 20V, on-site Aluminum Piping Kits. The Conference Pass includes Four NEW Conference Workshops focusing on compressed air maintenance, industrial cooling water, blower engineering and sales training. Group discounts are available! Reach out to Kimberly Hill at [kimberly@bestpractices.com](mailto:kimberly@bestpractices.com) for more information.

**Five NEW EXPO Pavilions**

- Leak Detection
- Piping
- Food Safety
- Technology - Maintenance

**Three NEW Conference Workshops**

- Hard Hat Compressed Air Maintenance
- Industrial Cooling Water
- Sales Engineering

**Training & Certification**

- Compressed Air Challenge - Level 1: Fundamentals of Compressed Air Systems
- Compressed Air & Gas Institute's Certified Compressed Air System Specialist (CCASS) Exam

**REGISTER TODAY!** [CABPEXPO.COM/KS-2025](http://CABPEXPO.COM/KS-2025)  
 Early Bird Rate: \$25 (US)

**PLATINUM SPONSORS:** BEKO, mikropor, Kaeser Compressors, Star Compressors USA, CUMMINS, SIBURTY, TRAMER, GVI, SMC, C-INSTRUMENTS, prevost, Salsomonte Jule.

**SOLE SPONSORS:** FALCON, EBOGE, SVO, WALKER, South-Tek, ICSI, UNIPipe.

The Magazine for Quality & Reliability in Energy-Efficient Blower & Vacuum Systems

## BLOWER & VACUUM BEST PRACTICES

[blowervacuumbestpractices.com](http://blowervacuumbestpractices.com)



### Aeration Blower Control

**INDUSTRIAL VACUUM & BLOWER SYSTEMS**

- 7 Blow-off Savings at Casting Plant
- 14 Vacuum Generation and Robotic Gripping Systems

**ARATION BLOWER SYSTEMS**

- 10 Implementing Most-Open-Valve Blower Control

August 2025

# Disclaimer

---

**All rights are reserved. The contents of this publication may not be reproduced in whole or in part without consent of Smith Onandia Communications LLC. Smith Onandia Communications LLC does not assume and hereby disclaims any liability to any person for any loss or damage caused by errors or omissions in the material contained herein, regardless of whether such errors result from negligence, accident, or any other cause whatsoever.**

**All materials presented are educational. Each system is unique and must be evaluated on its own merits.**

# Registration Now Open for Best Practices 2025!

## Blower Engineering Workshop

**Wednesday October 22**

**10:30 AM – 3:30 PM** (*Lunch break: 12:30 – 1:30 PM*)

Join us for this workshop designed to equip attendees with foundational and advanced insights into blower engineering. Topics span core principles, selection criteria, performance control, testing standards, maintenance strategies, and piping best practices.

Workshop is included with your conference pass

<https://cabpexpo.com/blower-engineering-workshop/>



*Julie Gass, P. E., Lead  
Process Mechanical  
Engineer, Black &  
Veatch*



Stick around after the webinar for a chance to win a \$675 conference pass in our fun contest!



# Selecting Appropriate Blower Control Strategies

Introduction

Blower & Vacuum Best Practices Magazine



Sponsored by



*Built for a lifetime.*



# About the Speaker



**Tom Jenkins, P.E.**  
JenTech, Inc.

- President, JenTech Inc.
- Over 40 years of experience with aeration blowers and blower controls
- Chairman of ASME PTC 13 committee

Sponsored by



*Built for a lifetime.*

# Agenda

---

- Understand the Process
- Understand the Blower
- Establish Objectives
- Develop a Strategy
- Select Control Hardware
- Implement the Strategy
- Test, Tune, and Improve

# Understand the Process

---

## Process objective: what does it do?

- May be simple like an air lift pump to move a fluid
- May be complex like an activated sludge biological process

## Process mechanism: how does it do it?

- Physical
- Chemical
- Biological

# Understand the Process

---

## Process flows

- Inputs
- Outputs
- Sidestreams
- Air flows
  - Constant or variable flow rate
  - Constant or variable pressure
  - Mass flow or volumetric flow
  - Upper and lower limits of flow, pressure power, etc.

# Understand the Process

---

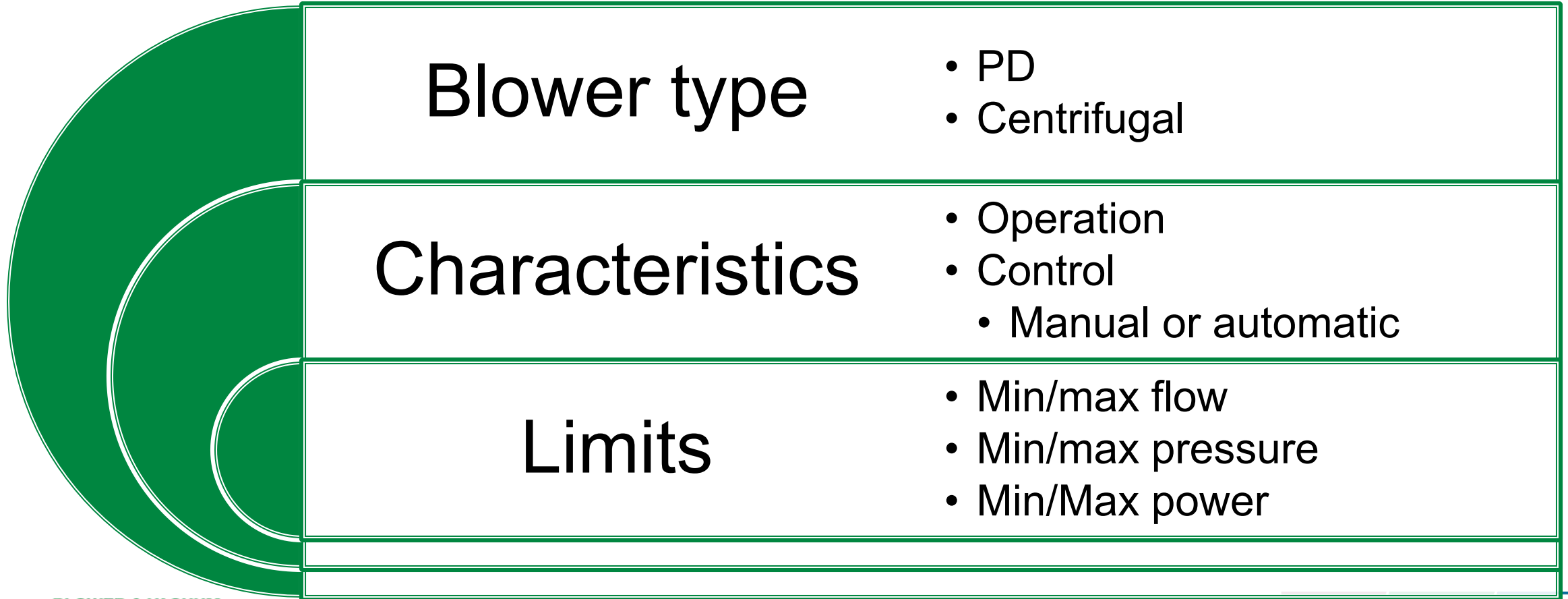
## Process equipment

- Existing
- Proposed

## Process Problems

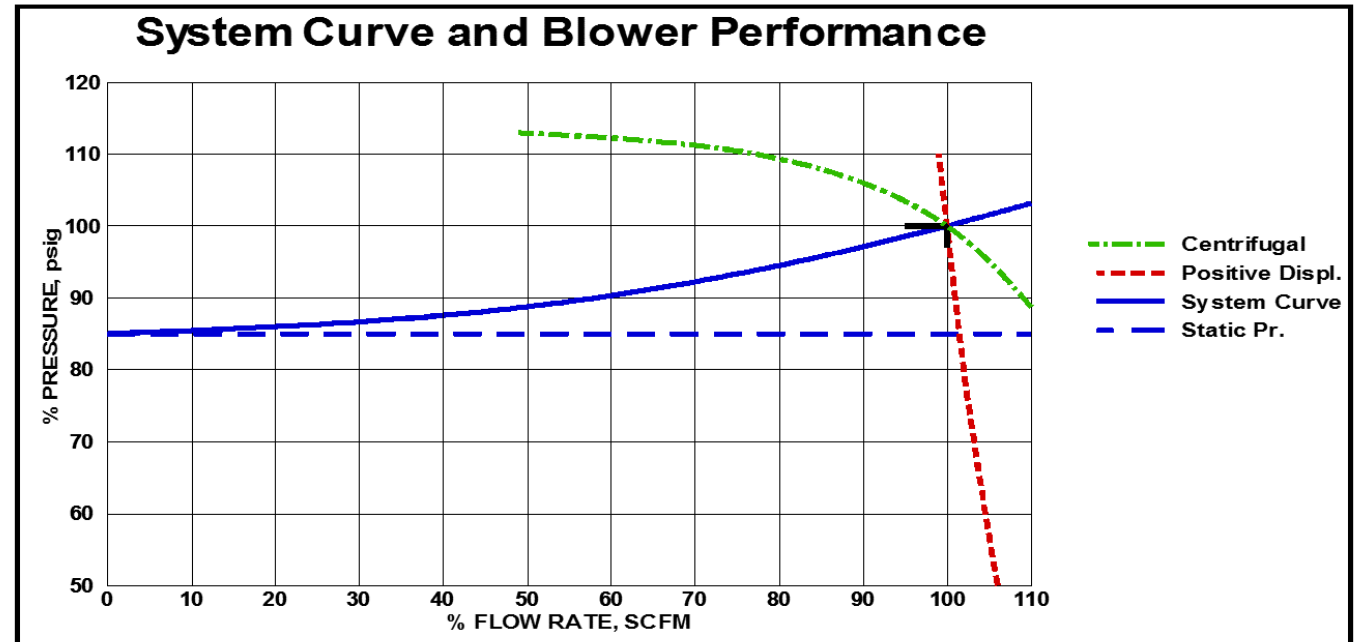
- Critical problems
- Optimization opportunities

# Understand the Blower



# Understand the Blower

- PDs and centrifugals operate differently
- PDs are controlled by variable speed
- Centrifugals can be controlled by:
  - Throttling
  - Guide vanes
  - Variable speed
  - Combinations
- For both types the control modulates the flow and the system dictates the pressure



# Understand the Blower

---

## Flow limits

- Upper flow limit set by motor power, speed limit, performance curve, etc.
- Lower limit set by temperature, surge, etc.

## Pressure limits

- Upper limit set by mechanical constraints like bearings, case strength, performance curve, etc.
- Lower limit set by performance curve for centrifugals, none for PDs

The control system should ensure limits are maintained

# Establish Objectives

---

What is the main concern driving the control changes?

Process  
Improvements

Energy  
Reduction

Improved  
Reliability

Safety

# Establish Objectives

What additional benefits can be incorporated into the new system?

Data Logging

Process Optimization

Operator Convenience

Improved Alarming and Diagnostics

# Establish Objectives

---

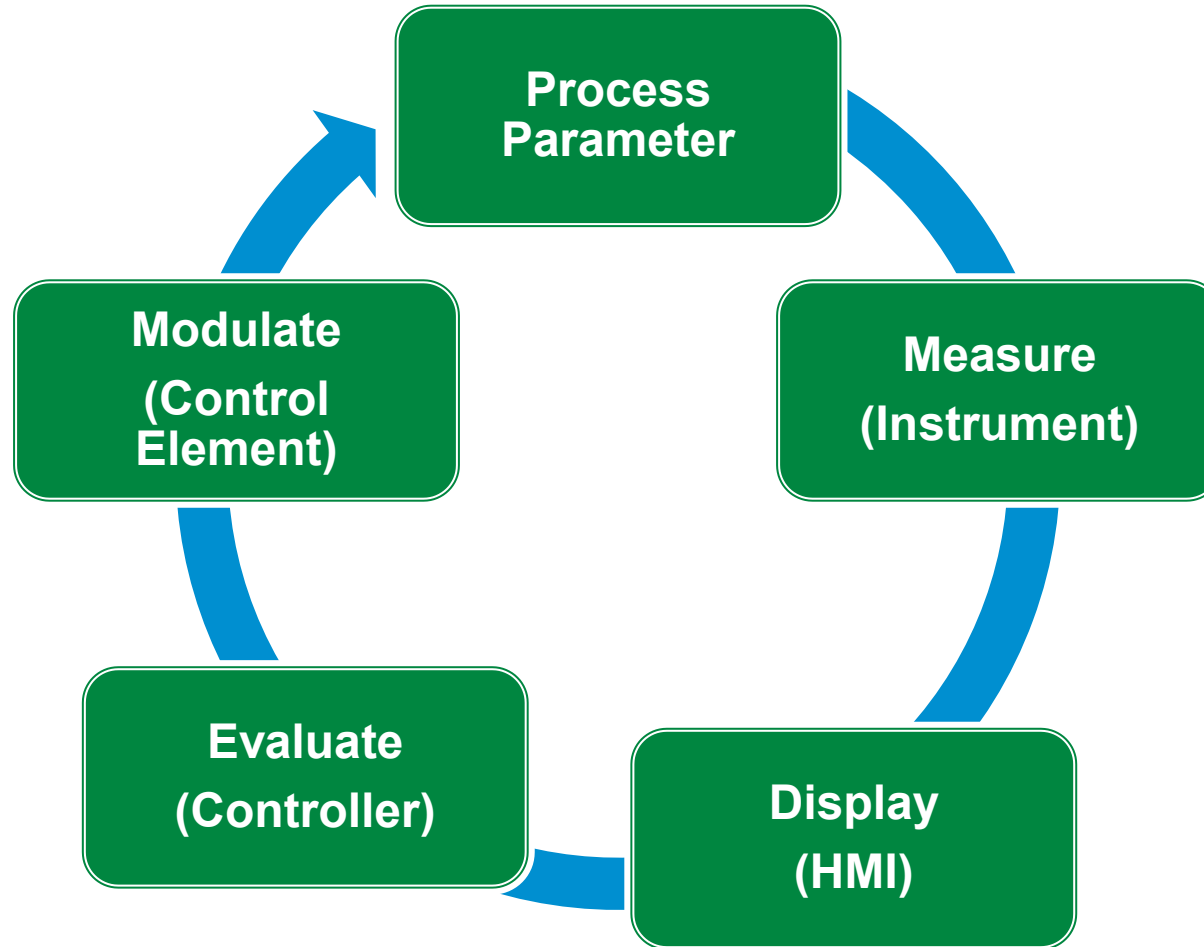
“When you are up to your ass in alligators, it’s hard to remember that the original objective was to drain the swamp.”

Anonymous

- Keep the original goals in mind. They are the top priority for time and attention!
- Avoid mission creep

# Develop a Strategy

- The fundamental control cycle:



# Develop a Strategy

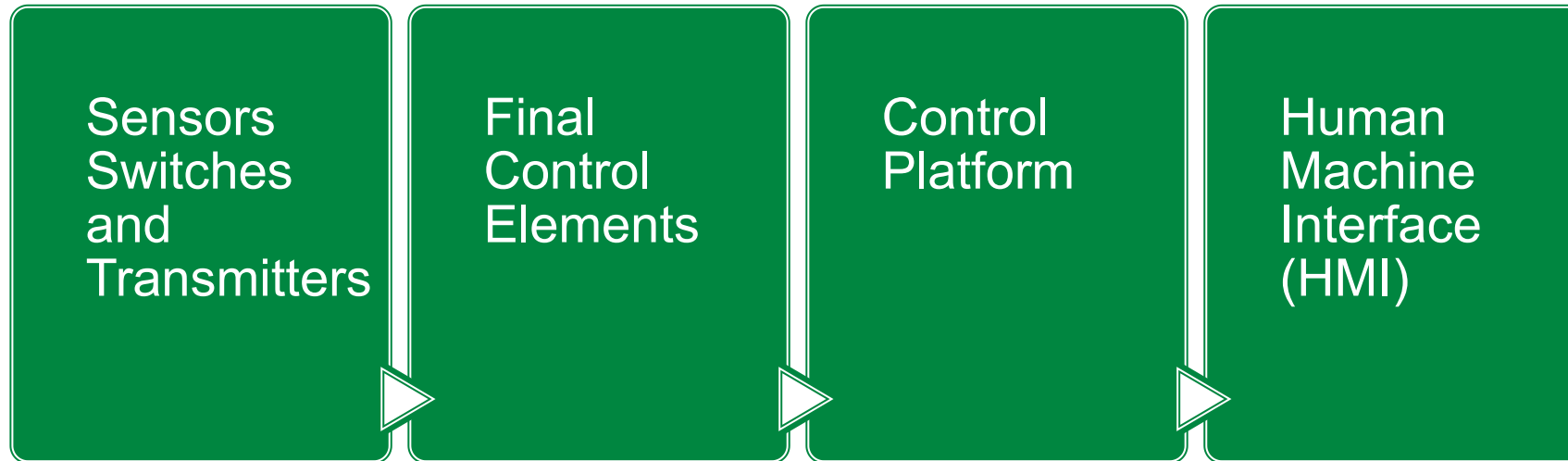
---

There are many algorithms to choose from:

- Simple alarming
  - With or without equipment shutdown
- Deadband control
- Floating control
- Proportional-Integral-Derivative (PID)
  - Most common analog control algorithm
  - Tuning and stability issues are also common
- Cascade control
- Machine learning and AI

# Select Control Hardware

---



# Implement the Strategy

---

Must coordinate process equipment from multiple suppliers into coherent control and monitoring system for the entire plant. Options include:

Have single supplier provide all controls and programming

Have all manufacturers provide identical instrumentation, control brands and models for plant staff to program

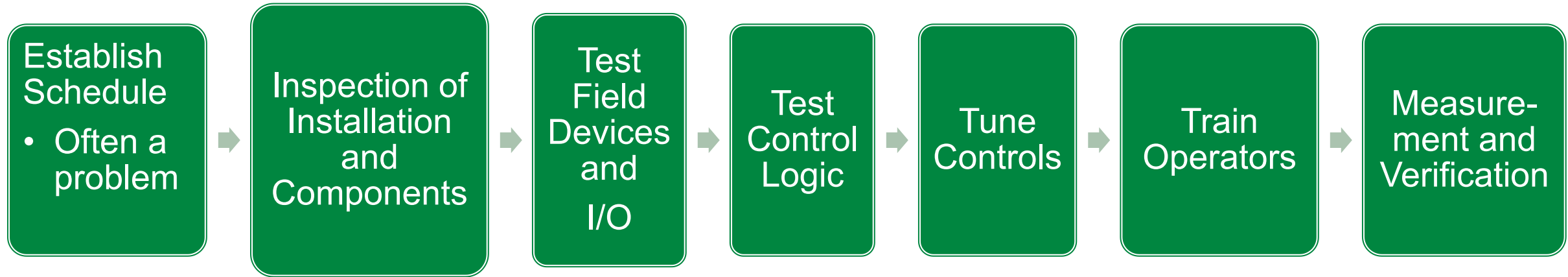
Hardware identical, programming by manufacturers

Have manufacturers provide their standard instrumentation and controls with communications compatibility with plant systems

# Implement the Strategy

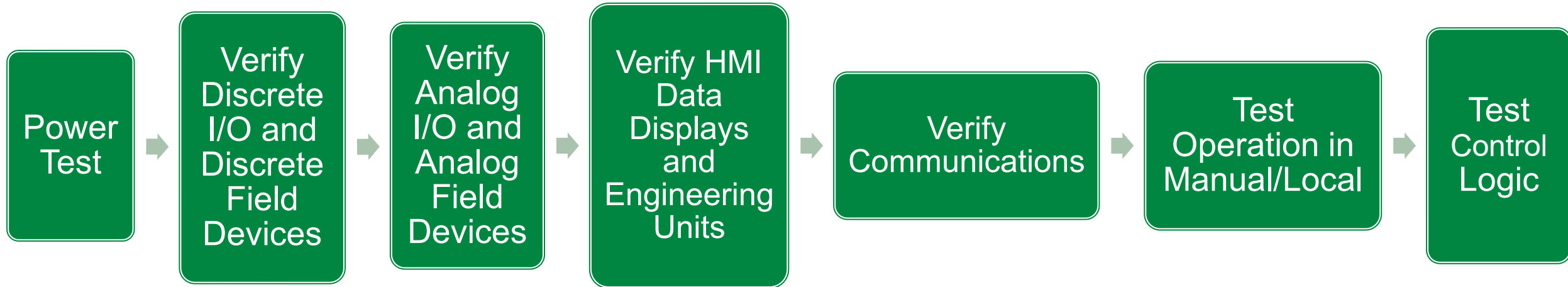
---

- Commissioning sequence:



# Test, Tune, and Improve

- Testing requires a methodical approach and patience:



# Test, Tune, and Improve

---

- Tuning must also be done **METHODICALLY**:
- Tuning is often performed interactively with testing
- Work with operators for setpoints
- Work with manufacturers for alarms, performance limits
- Some perturbation of process is inevitable during tuning
  - Minimize disruptions as much as possible
  - Warn operators before upsetting the process!
- Use patience – only change one parameter at a time if possible
- Trends are helpful in tuning

# Test, Tune, and Improve

---

Observe process performance

Observe operator interaction

Identify opportunities for improving the process and the controls

Identify opportunities for energy optimization

Prioritize and implement as time permits

Questions will be answered at the end of the session

---



# About the Speaker



**Stephen Horne**  
Kaeser Compressors

- Blower Product Manager at Kaeser Compressors
- Over 20 years of experience in the design and function of blower systems in wastewater aeration applications
- Plays an active role in the Compressed Air and Gas Institute's (CAGI) Blower and Vacuum section, which is working on developing performance testing and reporting standards for blowers and low-pressure compressors.

Sponsored by



# Selecting Appropriate Blower Control Strategies: Station Performance Planning

Stephen Horne | Blower Product Manager, KAESER Compressors  
*Blower & Vacuum Best Practices Webinar*  
August 21, 2025



*Built for a lifetime.*

- **Objectives**

- **Review of Blower Control Modes**
- **What is Efficiency**
- **n + 1 Blower Evaluations**
- **Technology Comparison**

- **Blower Control Modes**

- **Flow Control**

- Common with dynamic blowers...Multistage, Gear Turbo, & High Speed Turbo
- Historically ACFM , however, newer control systems with temperature probes able to calculate SCFM
- Now available on more advanced positive displacement blowers....Rotary Lobe & Rotary Screw

- **Pressure Control**

- Blower output altered or varied to maintain a constant discharge or header pressure
- Reactive control
- Safe with positive displacement, but dangerous with dynamic (surge)

- **Blower Control Modes**

- **Speed Control**

- Basic control method used on VFD machines
- Motor speed (or Hz) altered with VFD
- Safe with positive displacement, but dangerous with dynamic (surge)

- **On/Off Control**

- Single speed units cycled from running state to off state
- Offers one flow rate
- Flow rates can be altered on some technologies with pulley changes

- Efficiency

- Isentropic Efficiency

- Isentropic efficiency in air compressors, as defined by the Compressed Air and Gas Institute (CAGI), is a measure of how efficiently a compressor converts electrical energy into compressed air potential energy, compared to an ideal, isentropic process. It's a ratio that helps compare the energy consumption of different compressors, regardless of their specific technology or operating pressure

$$\eta_{isen} = \frac{16.52 \times \left( \left( \frac{p_2 + 14.5}{14.5} \right)^{0.2857} - 1 \right)}{P_{spec}}$$

$\eta$  IS FOR EFFICIENCY  
"ISEN" IS AN ABBREVIATION  
FOR ISENTROPIC

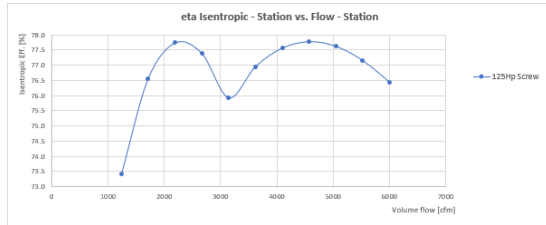
COMPRESSOR  
SPECIFIC  
POWER =  $\frac{\text{KW}}{\text{CFM}}$

- **n + 1 Blower Stations**

- **n = the number of operation blowers**
- **+1 = standby blowers**
- **Therefore, a 2 + 1 station has 2 running blowers and 1 backup for a total of 3 blowers**
- **In general, the more blowers you have.....the greater your station control range and more choices you have to satisfy the demand**
- **More blowers offer more consistent system efficiency, however, requires more attention to blower selection during station operation**
- **Investment cost can also be a factor. Fewer larger blowers could be more expensive, but increasing the blower count can encounter room size concerns in addition to increase installation cost and control philosophy headaches**
- **Evaluate your options case by case to find the best solution for your project**

- **Let's start with a comparison of VFD screw blowers**
  - **2+1 – 125 Hp \$\$**
  - **3+1 – 100Hp \$**
  - **4+1 – 75 Hp \$\$\$**
- **Station Requirements**
  - **1230 CFM to 6000 cfm**
  - **Sea Level**
  - **8 psig**

**KAESER KOMPRESSOREN**

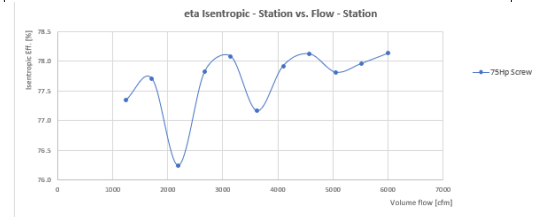


	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station	
Flow	cfm	876	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6395
Blower in operation		1	1	1	1	1	2	2	2	2	2	2	2	0
Flow per blower	cfm	876	1236	1713	2190	2666	3143	1810	2048	2287	2525	2763	3002	3457
P blower shaft	hp	36	49	66	84	103	124	70	79	88	97	106	118	175
P overall	kW	30.1	40.0	53.2	67.0	81.9	98.5	56.0	62.8	70.0	77.4	85.2	93.4	140.3
eta isentropic	%	69.3	73.4	76.6	77.7	77.4	75.9	77.0	77.6	77.8	77.6	77.2	76.5	58.6
Discharge Temp.	F	160.9	159.1	157.5	156.9	157.6	159.4	157.3	157.1	157.1	157.3	157.6	158.7	158.0

	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow - Station	cfm	876	1236	1713	2190	2666	3143	3620	4097	4	4	4	4
Blower in operation		1	1	1	1	1	1	2	2	2	2	2	0
P blower shaft - Station	hp	36	49	66	84	103	124	139	157				
P overall - Station	kW	30.1	40.0	53.2	67.0	81.9	98.5	112.0	125.6				
eta isentropic - Station	%	69.3	73.4	76.6	77.7	77.4	75.9	77.0	77.6				
Discharge Temp.	F	160.9	159.1	157.5	156.9	157.6	159.4	157.3	157.1				

2+1

**KAESER KOMPRESSOREN**

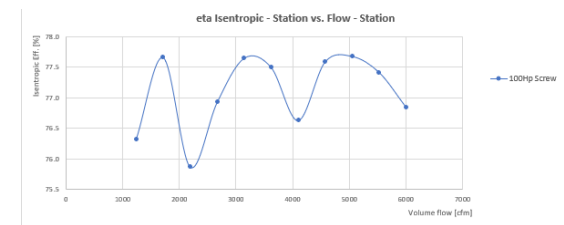


	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station	
Flow	cfm	537	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	7755
Blower in operation		1	1	1	2	2	3	3	3	3	4	4	4	0
Flow per blower	cfm	537	1236	1713	1095	1333	1572	1207	1366	1524	1683	1382	1501	1833
P blower shaft	hp	24	47	65	42	50	59	46	51	57	64	52	56	74
P overall	kW	21.0	38.0	52.4	34.2	40.8	47.3	37.2	41.7	46.4	51.5	42.1	45.7	60.4
eta isentropic	%	67.7	77.3	77.7	76.2	77.8	78.1	77.2	77.9	78.1	77.8	78.0	78.1	76.4
Discharge Temp.	F	160.9	157.3	156.9	157.6	156.9	156.7	157.3	156.9	156.7	156.9	156.9	156.7	157.5

	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station	
Flow - Station	cfm	537	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	7755
Blower in operation		1	1	1	2	2	3	3	3	3	4	4	4	0
P blower shaft - Station	hp	24	47	65	83	100	119	137	154	172	191	208	226	298
P overall - Station	kW	21.0	38.0	52.4	68.4	81.6	95.8	111.6	125.1	139.2	154.5	168.4	182.8	241.6
eta isentropic - Station	%	67.7	77.3	77.7	76.2	77.8	78.1	77.2	77.9	78.1	77.8	78.0	78.1	76.4
Discharge Temp.	F	160.9	157.3	156.9	157.6	156.9	156.7	157.3	156.9	156.7	156.9	156.9	156.7	157.5

4+1

**KAESER KOMPRESSOREN**

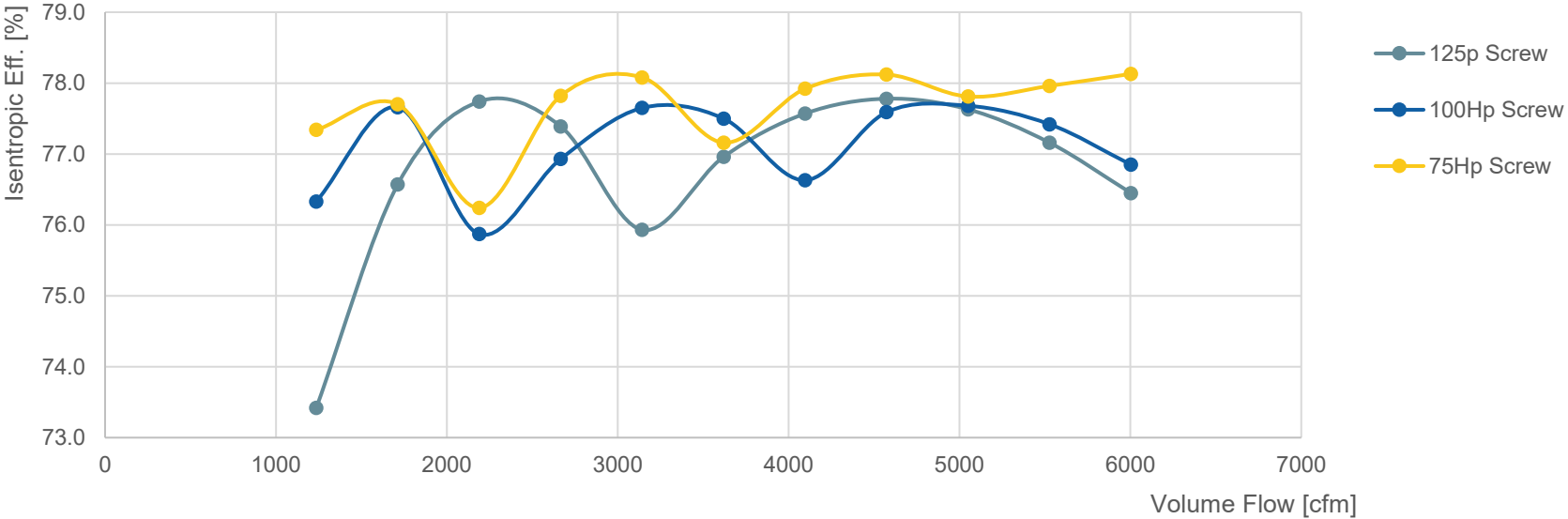


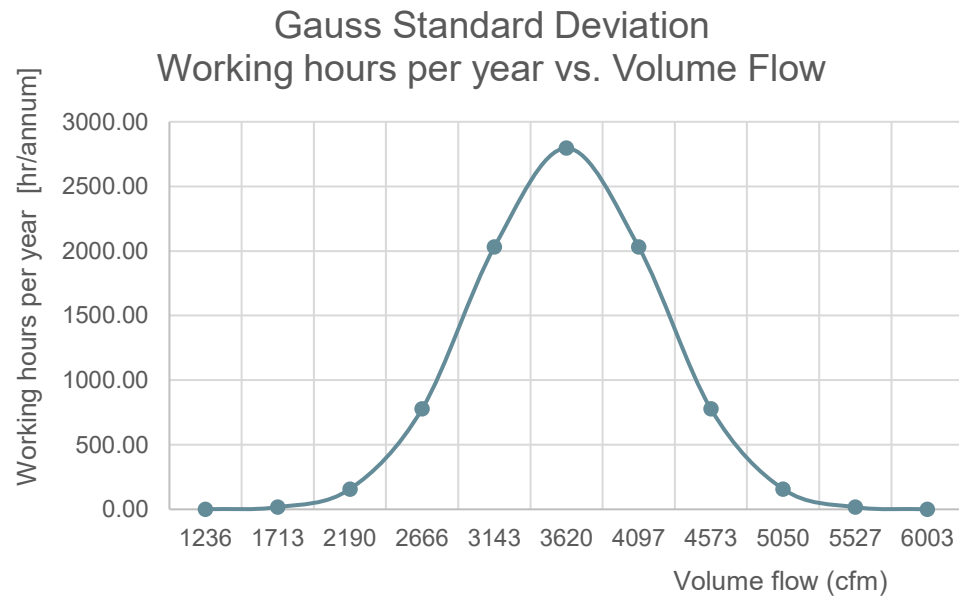
	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station	
Flow	cfm	537	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	7628
Blower in operation		1	1	1	2	2	2	2	3	3	3	3	3	0
Flow per blower	cfm	537	1236	1713	2190	1333	1572	1810	2048	1524	1683	1842	2001	2543
P blower shaft	hp	24	47	65	96	50	59	69	79	57	64	70	77	102
P overall	kW	21.2	38.5	52.5	68.6	41.3	48.1	55.6	63.6	46.8	51.6	56.6	62.0	82.2
eta isentropic	%	66.9	76.3	77.7	75.9	76.9	77.7	77.5	76.6	77.6	77.7	77.4	76.9	73.6
Discharge Temp.	F	160.9	157.3	156.9	158.7	156.9	156.7	157.1	158.0	156.7	156.9	157.1	157.8	161.6

	Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station	
Flow - Station	cfm	537	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	7628
Blower in operation		1	1	1	2	2	2	2	3	3	3	3	3	0
P blower shaft - Station	hp	24	47	65	83	100	119	138	158	172	191	211	231	306
P overall - Station	kW	21.2	38.5	52.5	68.6	82.6	96.2	111.2	127.2	140.4	154.6	169.8	186.0	246.6
eta isentropic - Station	%	66.9	76.3	77.7	75.9	76.9	77.7	77.5	76.6	77.6	77.7	77.4	76.9	73.6
Discharge Temp.	F	160.9	157.3	156.9	158.7	156.9	156.7	157.1	158.0	156.7	156.9	157.1	157.8	161.6

3+1

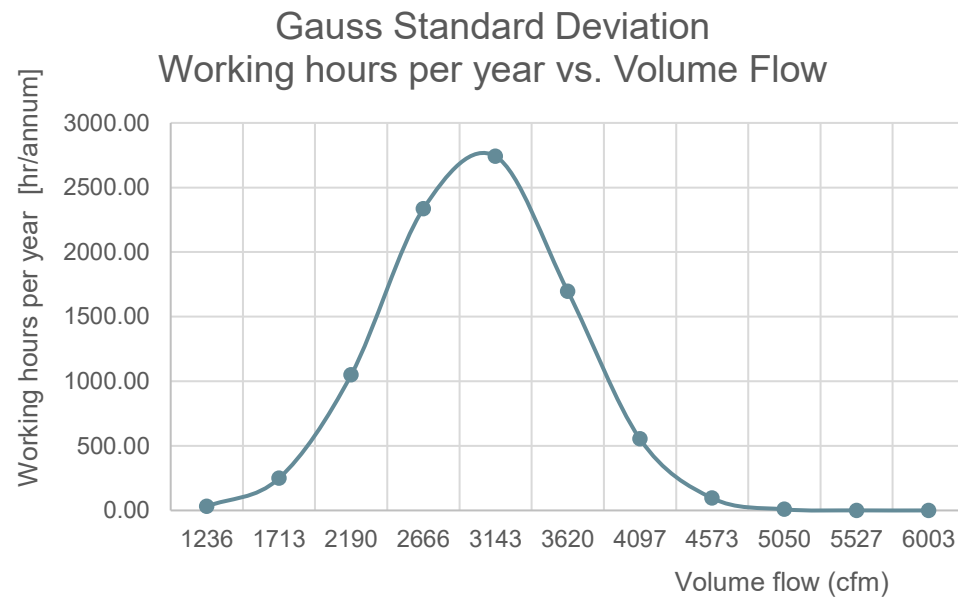
eta Isentropic - Station vs. Flow - Station





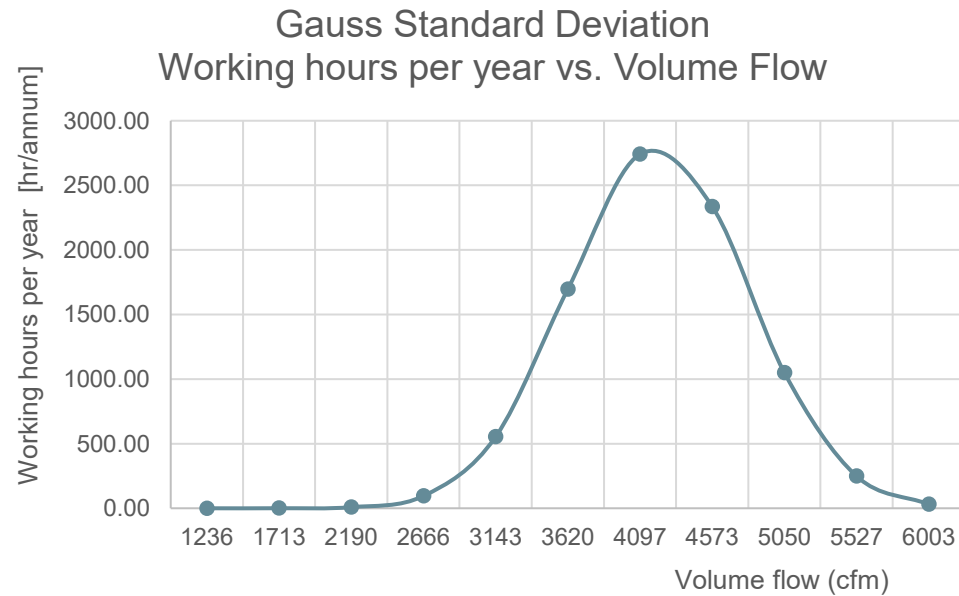
## Annual Operation Cost

- $\$/kWh = 0.07$
- **2+1 = \$68,553**
- **3+1 = \$68,373**
- **4+1 = \$67,969**
  
- **How will units be controlled?**
- **What are the investment and installation cost?**



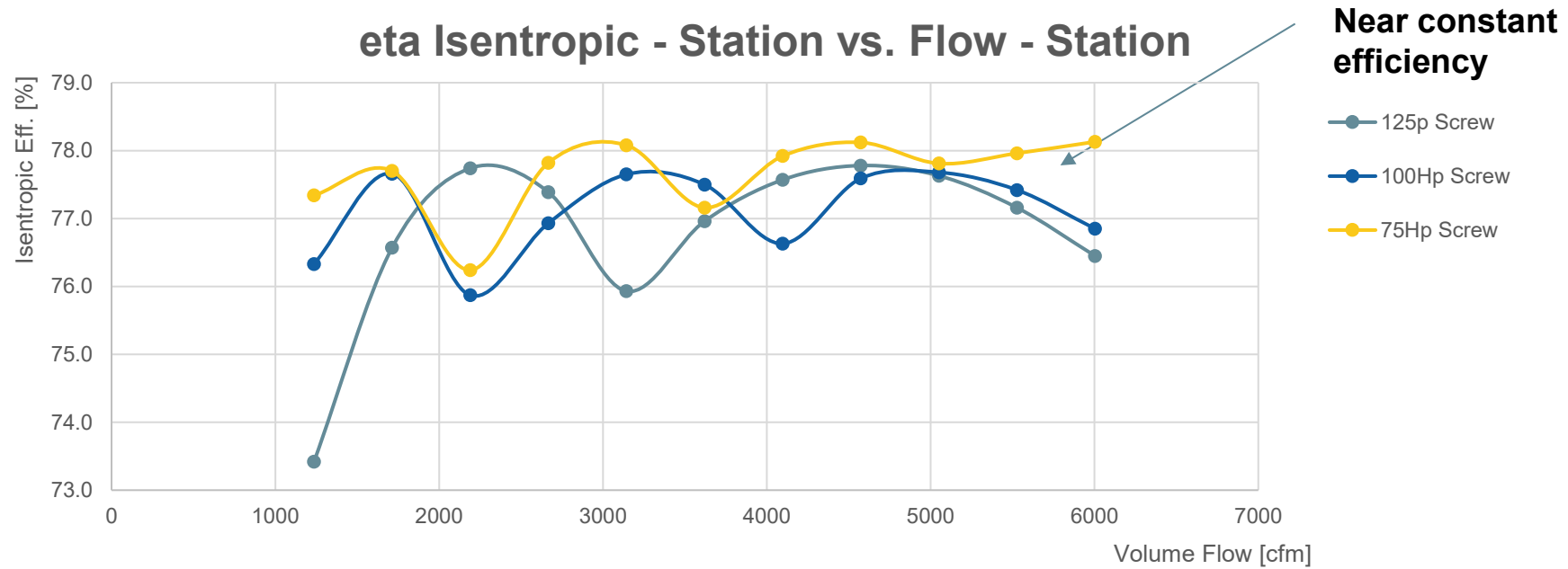
### Annual Operation Cost

- **\$/kWh = 0.07**
- **2+1 = \$57,421**
- **3+1 = \$57,166**
- **4+1 = \$67,969**

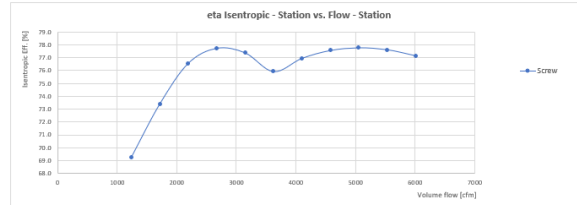


### Annual Operation Cost

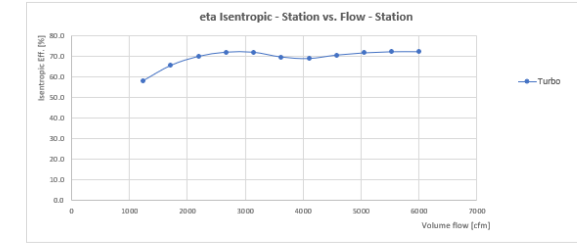
- **\$/kWh = 0.07**
- **2+1 = \$79,437**
- **3+1 = \$79,618**
- **4+1 = \$67,969**



- **Let's compare technologies (2+1)**
  - **Screw**
  - **Turbo**
  - **Lobe**
- **Station Requirements**
  - **1230 CFM to 6000 cfm**
  - **Sea Level**
  - **8 psig**

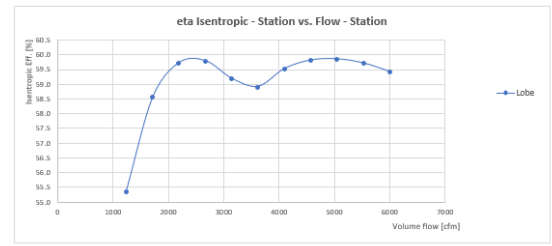


		Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow	cfm	876	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915
Blower in operation		1	1	1	1	1	1	2	2	2	2	2	2	2
Flow per blower														
P blower shaft	cfm	876	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915
P blower shaft	hp	36	45	56	64	73	81	90	99	108	117	126	135	144
P overall	kW	30.1	40.0	53.2	67.0	81.9	98.5	116.0	134.8	154.0	173.6	193.6	214.0	234.8
eta Isentropic	%	65.3	73.4	76.6	77.7	77.4	76.9	77.0	77.6	77.9	77.6	77.2	76.5	58.6
Discharge Temp.	F	160.9	153.1	157.5	156.9	157.6	153.4	157.3	157.1	157.3	157.6	158.7	158.0	152.0



		Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow	cfm	1211	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	8440
Blower in operation		1	1	1	1	1	1	1	2	2	2	2	2	2
Flow per blower														
P blower shaft	cfm	1211	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	8440
P blower shaft	hp	61	62	76	92	108	129	154	181	210	241	274	310	350
P overall	kW	49.9	50.5	62.0	74.2	87.1	103.4	123.1	146.5	173.6	204.2	238.2	275.0	316.0
eta Isentropic	%	57.7	58.2	65.7	70.2	72.3	72.3	69.9	69.2	70.8	71.9	72.5	72.5	62.8
Discharge Temp.	F	186.1	185.2	172.8	166.6	164.3	164.7	168.1	168.1	165.9	164.7	163.9	164.1	173.8

		Min Flow Station	Min Flow Req.	10%	20%	30%	40%
Flow - Station	cfm	876	1236	1713	2190	2666	3143
Blower in operation		1	1	1	1	1	1
P blower shaft - Station	hp	36	45	56	64	73	81
P overall - Station	kW	30.1	40.0	53.2	67.0	81.9	98.5
eta Isentropic - Station	%	65.3	73.4	76.6	77.7	77.4	76.9
Discharge Temp.	F	160.9	153.1	157.5	156.9	157.6	153.4



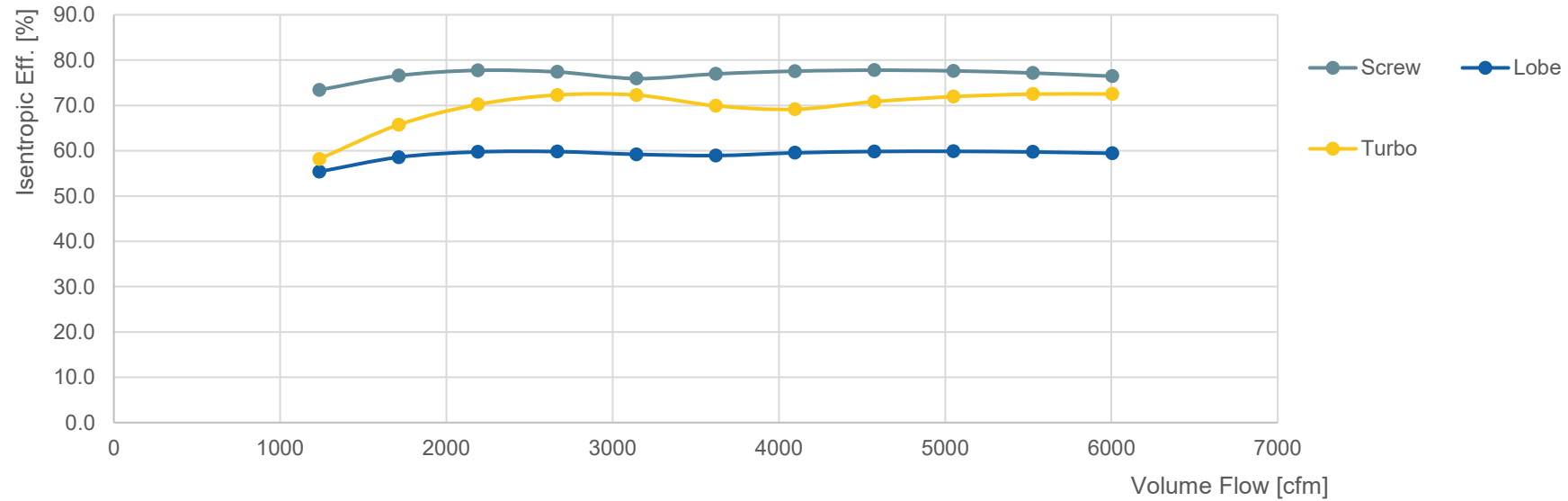
		Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow	cfm	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915	8440	
Blower in operation		1	1	1	1	1	1	2	2	2	2	2	2	
Flow per blower														
P blower shaft	cfm	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915	8440	
P blower shaft	hp	76	92	108	129	154	181	210	241	274	310	350	402	
P overall	kW	62.0	74.2	87.1	103.4	123.1	146.5	173.6	204.2	238.2	275.0	316.0	360.0	
eta Isentropic	%	65.7	70.2	72.3	72.3	69.9	69.2	70.8	71.9	72.5	72.5	62.8	62.8	
Discharge Temp.	F	172.8	166.6	164.3	164.7	168.1	168.1	165.9	164.7	163.9	164.1	173.8	173.8	

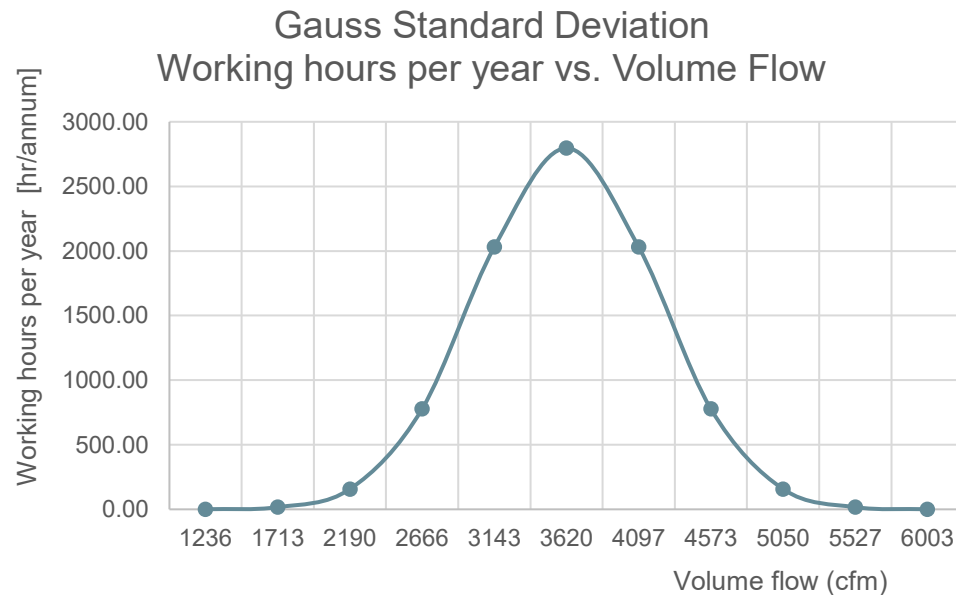
		Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow	cfm	752	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915
Blower in operation		1	1	1	1	1	1	2	2	2	2	2	2	2
Flow per blower														
P blower shaft	cfm	752	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915
P blower shaft	hp	54	66	87	109	132	158	191	227	267	310	357	407	475
P overall	kW	43.6	53.1	69.6	87.2	106.0	126.3	148.2	173.6	202.2	234.2	269.6	308.0	350.0
eta Isentropic	%	51.6	55.4	58.6	59.7	59.8	59.2	58.9	59.5	59.8	59.9	59.7	59.4	58.6
Discharge Temp.	F	203.4	194.2	187.3	185.0	184.8	185.9	186.4	185.4	184.8	184.6	185.0	185.5	187.2

		Min Flow Station	Min Flow Req.	10%	20%	30%	40%	50%	60%	70%	80%	90%	Max Flow Req.	Max Flow Station
Flow - Station	cfm	752	1236	1713	2190	2666	3143	3620	4097	4573	5050	5527	6003	6915
Blower in operation		1	1	1	1	1	1	2	2	2	2	2	2	2
P blower shaft - Station	hp	54	66	87	109	132	158	191	227	267	310	357	407	475
P overall - Station	kW	43.6	53.1	69.6	87.2	106.0	126.3	148.2	173.6	202.2	234.2	269.6	308.0	350.0
eta Isentropic - Station	%	51.6	55.4	58.6	59.7	59.8	59.2	58.9	59.5	59.8	59.9	59.7	59.4	58.6
Discharge Temp.	F	203.4	194.2	187.3	185.0	184.8	185.9	186.4	185.4	184.8	184.6	185.0	185.5	187.2



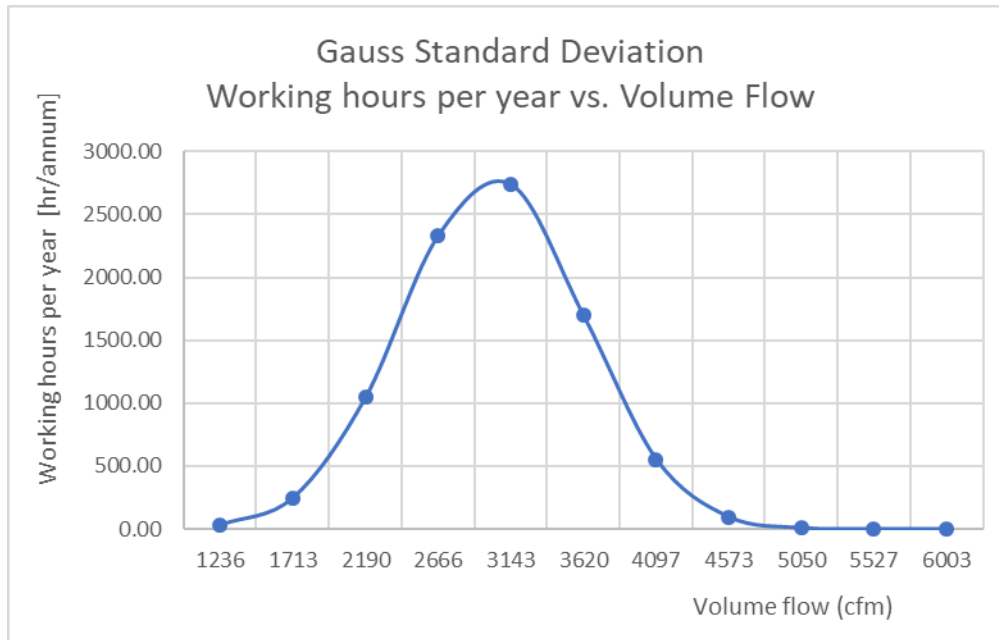
### eta Isentropic - Station vs. Flow - Station





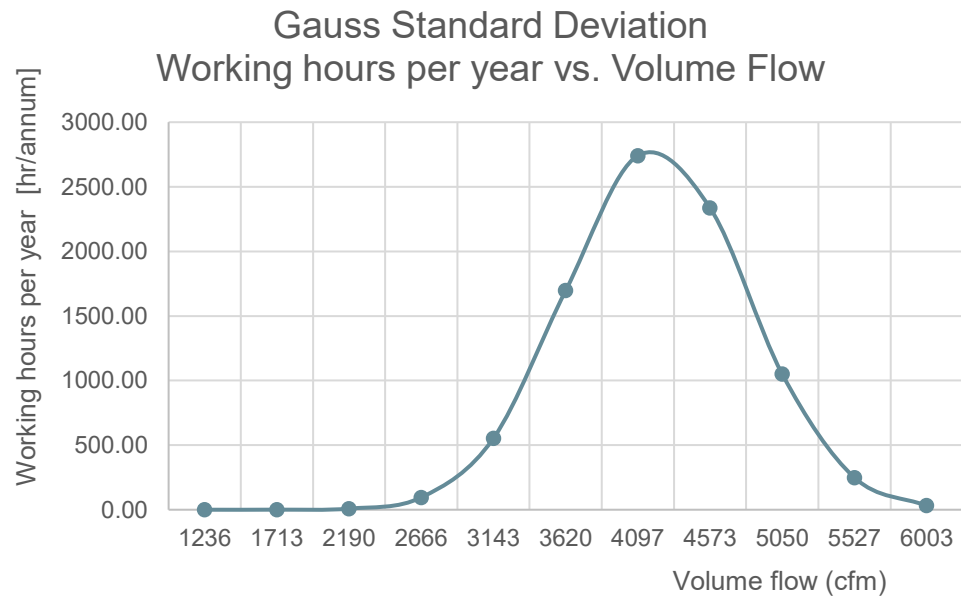
### Annual Operation Cost

- **\$/kWh = 0.07**
- **Screw = \$68,553**
- **Turbo = \$74,872**
- **Lobe = \$89,001**
  
- **Screw certainly looks the best under these conditions**
- **Will everything fit into the room?**
- **How much do these machines cost?**



### Annual Operation Cost

- **\$/kWh = 0.07**
  - **Screw = \$57,422**
  - **Turbo = \$61,929**
  - **Lobe = \$89,001**
- 
- **Screw certainly looks the best under these conditions**
  - **Turbo and Lobe look to suffer from efficiency loss at lower flows**

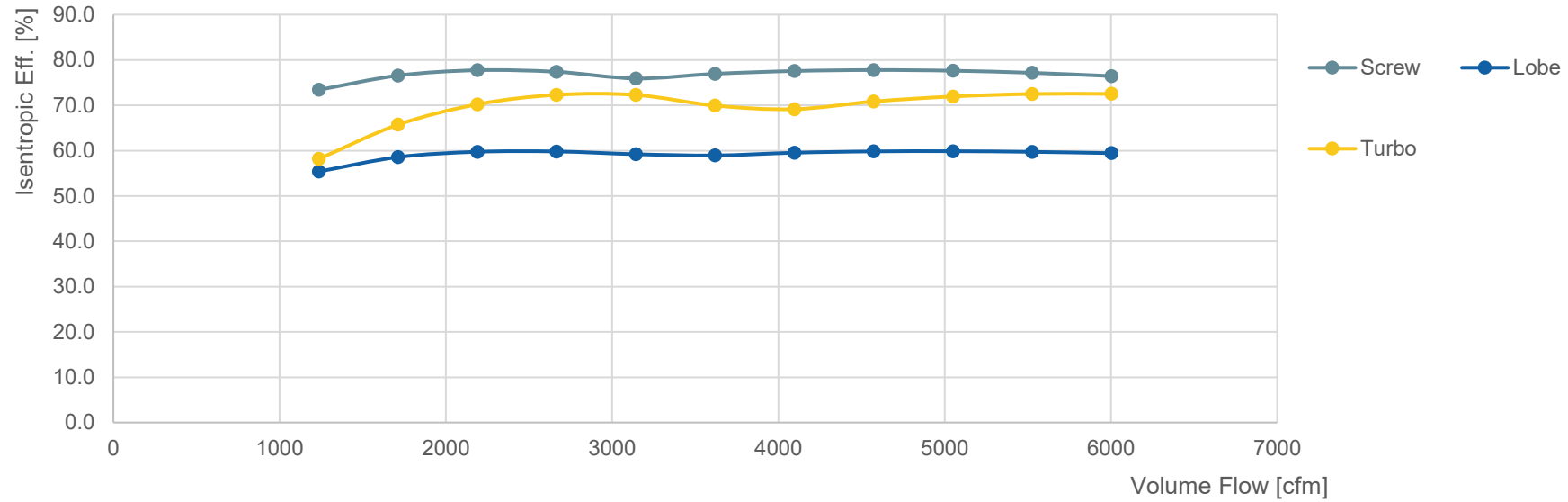


### Annual Operation Cost

- $\$/\text{kWh} = 0.07$
  - **Screw = \$79,437**
  - **Turbo = \$87,272**
  - **Lobe = \$89,001**
- 
- **Screw once more certainly looks the best under these conditions**
  - **Turbo and Lobe look again suffer from efficiency losses at the higher flows**



### eta Isentropic - Station vs. Flow - Station



- **Conclusions**

- **Blowers are available in various control modes.**
- **Understand your blower technology before deciding on which mode is best**
- **Isentropic Efficiency can be utilized to evaluate both blower technology performance, as well as, blower station performance**
- **Newer blower technologies offer significant savings across the operating range of the station**
- **When examining your n + 1 options, consider your station control method as well as your installation and investment cost options**
- **The more complete your evaluation, the better decisions we can make in the end**

# Thank You.

When you're ready to add, update, or better understand your blower system, consider us your partner.

**[us.kaeser.com/blowers](https://us.kaeser.com/blowers)**

# Best Practices EXPO Contest

Win a FREE \$675 Full Conference Pass!

## Best Practices 2025 Expo & Conference

Open to factory personnel, manufacturers' reps, distributors, utility programs, mechanical contractors, and engineers

Submit your poll answer to qualify.  
Winners notified tomorrow!

Which component displays the measured process parameter in the control cycle?

A

• Instrument

B

• Controller

C

• HMI

---

# Selecting Appropriate Blower Control Strategies

## Q&A

Please submit any questions through the Question Window on your GoToWebinar interface, directing them to Blower & Vacuum Best Practices Magazine. Our panelists will do their best to address your questions and will follow up with you on anything that goes unanswered during this session.

**Thank you for attending!**

Sponsored by



*Built for a lifetime.*

# Thank you for attending!

---

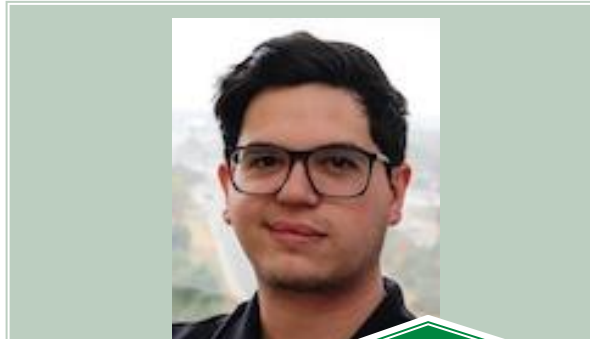
The recording and slides of this webinar will be made available to attendees via email later today.

PDH Certificates will be e-mailed to Attendees by within 2 days

---

## September 2025 Webinar

# Compressed Air Purity: Meeting Plant and Process Air Requirements



**Francisco Lara**  
Airtec Global LLC.  
*Keynote Speaker*

Sponsored by



**Thursday, September 11, 2025 – 2:00 PM EST**

Register for free at

[www.airbestpractices.com/webinars](http://www.airbestpractices.com/webinars)