Evolution of Blowers

Paul Mosher – Territory Sales Manager
Topics

- Blower Technologies – Two basic categories

- Dynamic
  - Centrifugal Blowers
  - Regenerative Blowers

- Positive Displacement
  - Twin Lobe
  - Tri-Lobe
  - Helical Tri-Lobe
  - Helical Screw
  - Variable Helix

- Advantages / Disadvantages
- Limitations
- System Interaction
- Thermodynamics
- Maintenance
Blower Technologies
Positive Displacement – Twin Lobe
Blower Technologies
Positive Displacement – Twin Lobe

- Two symmetrical two-lobed rotors
- Timing gears to prevent any contact
- Minimal clearances
- No internal compression
- Pressure is created by a restriction downstream – external to blower

<table>
<thead>
<tr>
<th>Technology</th>
<th>Specifications</th>
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<tbody>
<tr>
<td>Bi-Lobe</td>
<td></td>
</tr>
<tr>
<td>UP TO</td>
<td></td>
</tr>
<tr>
<td>26,000 CFM</td>
<td></td>
</tr>
<tr>
<td>15 PSI</td>
<td></td>
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<tr>
<td>24 inHg</td>
<td>Wet</td>
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Blower Technologies
Positive Displacement – Quiet Case
Blower Technologies
Positive Displacement – Tri-Lobe

- 6 pulses / revolution means pulsations are reduced.
- Must run faster for same flow = higher frequency noise.
- Enclosures attenuate higher frequency noise effectively

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<tr>
<td>Tri-Lobe</td>
<td></td>
</tr>
<tr>
<td>UP TO</td>
<td>CFM</td>
</tr>
<tr>
<td>14,570</td>
<td></td>
</tr>
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<td>15</td>
<td>PSI</td>
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Blower Technologies
Positive Displacement – Twisted Tri-Lobe

REDUCED PULSE = LOWER NOISE = QUIETER OPERATION

Rotation Angle – Degrees

- Bi-Lobe
- Tri-Lobe
- HeliFlow

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Blower Technologies
Positive Displacement – Twisted Tri-Lobe

- Helical Rotor
- Triangular tuned ports reduce noise.
- Noise reduced by 4-7 dBa
Blower Technologies
Positive Displacement – Rotary Screw
2x4 Fixed Helical Rotor Profile
Blower Technologies
Positive Displacement – Rotary Screw
2x4 Fixed Helical Rotor Profile
Blower Technologies

Positive Displacement – Rotary Screw

2x4 – Fixed Helical Rotor Profile

- Since 1958
- 2x4 rotor
- Less pulsation = lower noise
- 8-10% More efficient than straight lobe machine
- Helical gears
- Dual splash lubricated.
Blower Technologies
Positive Displacement – Rotary Screw
3x5 – Fixed Helical Rotor Profile

- Higher Efficiencies vs 2x4
- Food grade PTFE Teflon coating.
- Pressure capabilities up to 36 psig, 22Hg
- Flow rates up to 6200 cfm
Blower Technologies
Positive Displacement – Rotary Screw
3x5 – Fixed Helical Rotor Profile

• Large shafts
• Inpro Oil seals
• 5 ring piston rings
• Oring housing seals
• Dual splash lubrication
• Helical gears
• Different cylinders for pressures (discharger port geometry)
Evolution of Blowers

- **1930's**
  - Twin Lobe

- **1950's**
  - 2x4 Helical Screw
  - Solid Bi-Lobe
  - Integral Shaft

- **1990's**
  - Tri-Lobe
  - Robust

- **2008**
  - Helical Tri-Lobe

- **2015**
  - 3x5 Fixed Helical Screw
  - Higher Efficiency, 36 psig

- **2018**
By adding a variable helix to our helical screw rotor design, unmatched levels of blower efficiency are achieved.

Why Variable Helix?

- Faster Internal Compression
- Significantly Larger Discharge Port
  - Eliminates Air Losses
  - Higher Efficiencies
  - More Efficient Turndown
  - Patent-Pending Design

- SAVE UP TO 35% on Energy Costs
It’s all about….the **Variable Helix**

**Variable vs. Fixed Helix**

- **Variable Helix Rotor Geometry**
  - Allows Discharge Port to Open 41° Earlier than Fixed Helix Design
- **Lowering Flow Loss**
- **Increasing Efficiency**

Highlighted Area = Port Exposure
It’s all about...the **Energy Savings**

**HORSEPOWER SAVINGS**

Save up to 35% on Your Energy Costs
100CDL300 Performance Capability

- Operating Pressure Limits
  - Discharge Pressure = 20 psig (1375 mbar)
  - Inlet Vacuum = 18“ Hg (600 mbar)
  - Air Flow up to 775 cfm

- Max RPM = 4500

- Operating Temperature Limits
  - Discharge Max = 350°F (176°C)
  - Delta Max = 250°F (139°C)
The Result = the Most Extensive & Innovative Blower Line in the Industry to Meet Customer-Specific Needs
Package Product Offering

**IQ-RB**  
*Simple*  
Straight Tri-Lobe  
Fixed Speed  
Mechanical Gauges  
Pressure up to 15 psig  
Vacuum up to 15” Hg  
Flows up to 5,500 cfm  
3-500 HP

**IQ**  
*Smart*  
Twisted Tri-Lobe  
Fixed Speed or VFD  
AirSmart Controller  
Pressure up to 15 psig  
Vacuum up to 17” Hg  
Flows up to 1,500 cfm  
7.5-100 HP

**IQ-HE**  
*Efficient*  
3x5 Helical Screw  
Fixed Speed  
AirSmart Controller  
Pressure up to 36 psig  
Flows up to 5,625 cfm  
7.5-500 HP
Better Service

We’re Where You Need Us

It’s all about... the Network

Extensive Distributor Network:

- Gives you local relationships, fast response and service
- Reliable and trusted distributors with factory-trained technicians
- Parts, lubricants and other operating supplies are available locally
Thank You!
Paul Mosher – Territory Sales Manager