



September 2018

Gardner
Denver

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

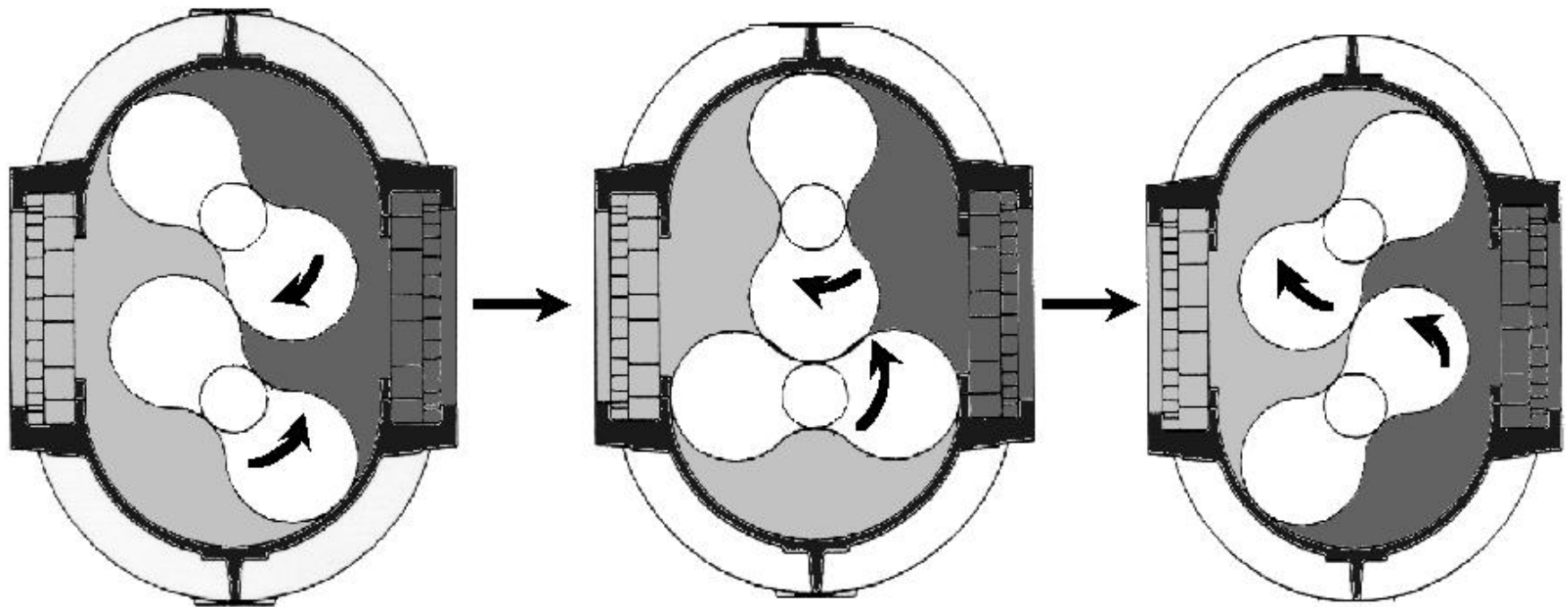


- Advantages / Disadvantages
- Limitations
- System Interaction
- Thermodynamics
- Maintenance



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

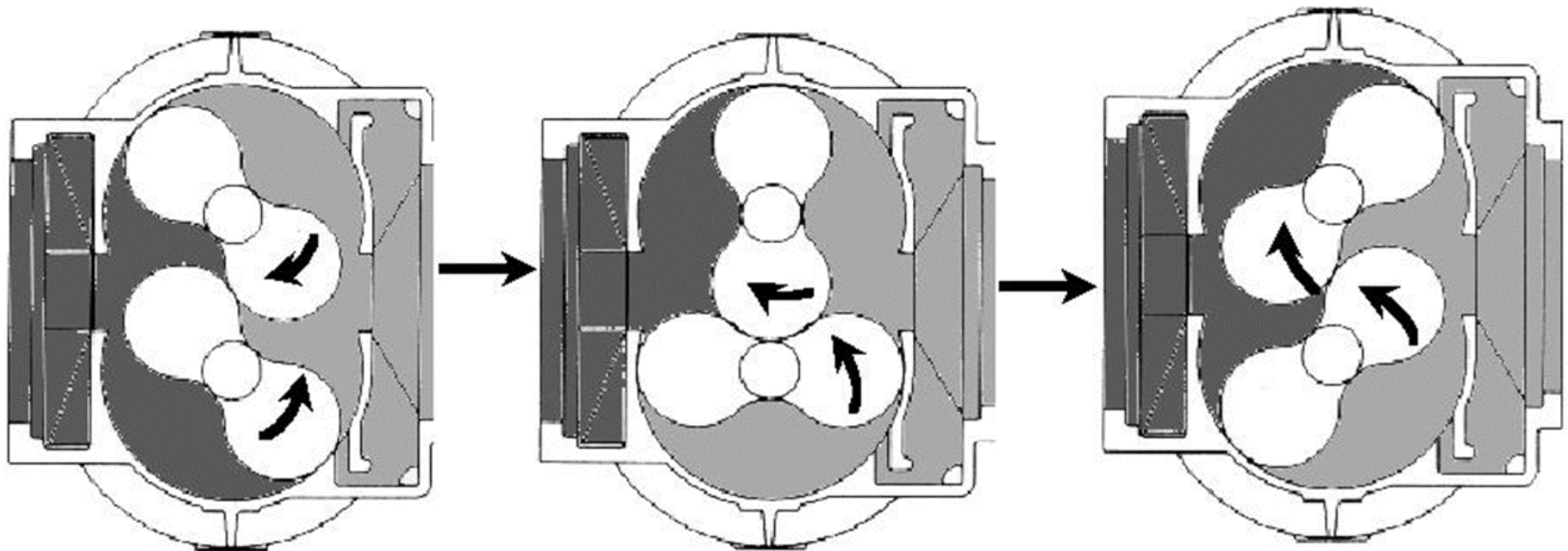


| Technology | Specifications | | |
|------------|----------------|------|--|
| Bi-Lobe | UP TO | | |
| | 26,000 | CFM |  |
| | 15 | PSI |  |
| | 24 | inHg |  |



Blower Technologies

Positive Displacement – Quiet Case

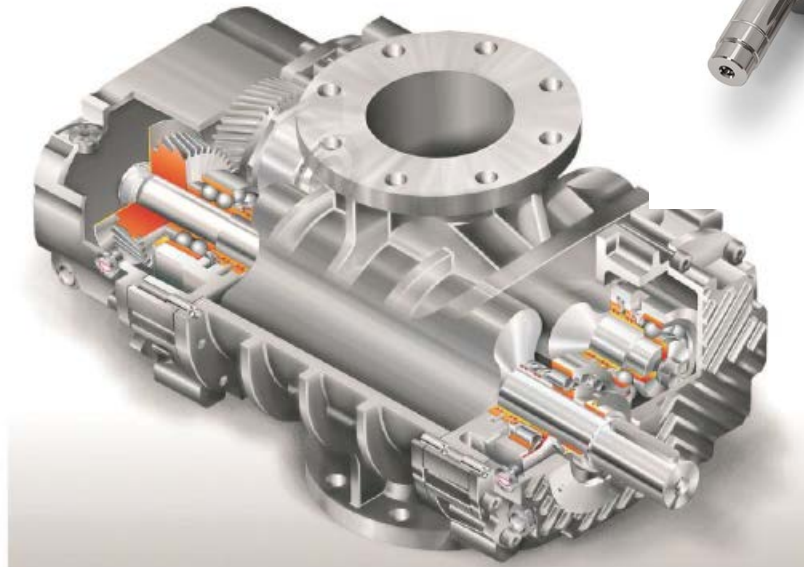




Blower Technologies

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



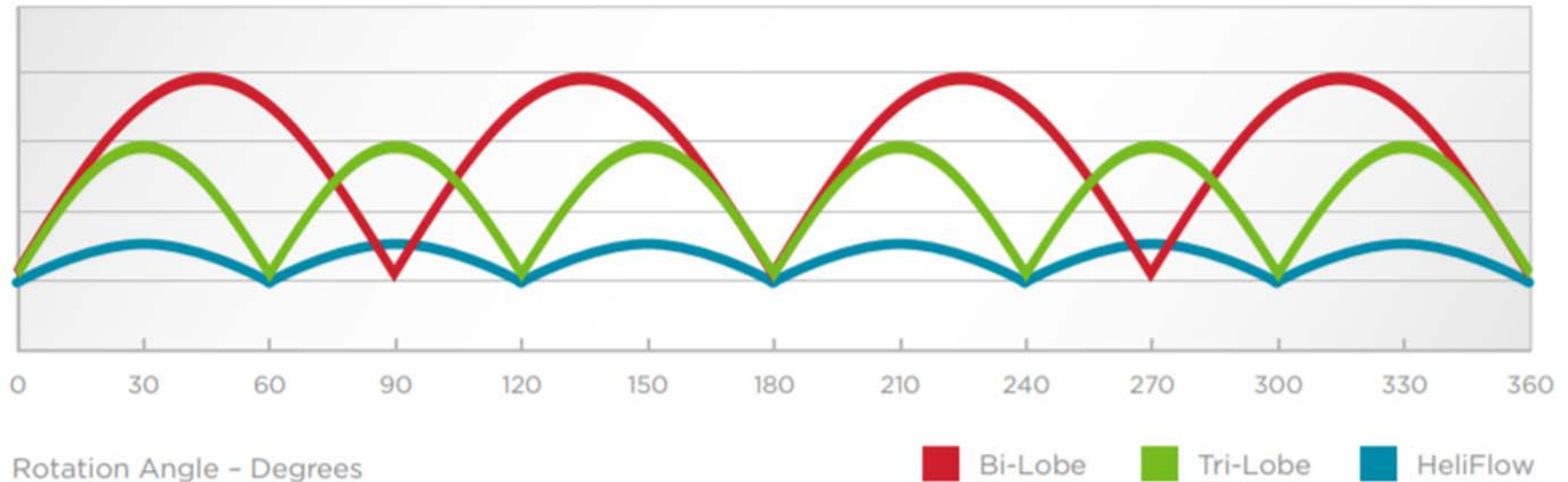
| Technology | Specifications | | |
|------------|----------------|------|--|
| Tri-Lobe | UP TO | | |
| | 14,570 | CFM | |
| | 15 | PSI | |
| | 15 | inHg | |

Blower Technologies

Positive Displacement – Twisted Tri-Lobe



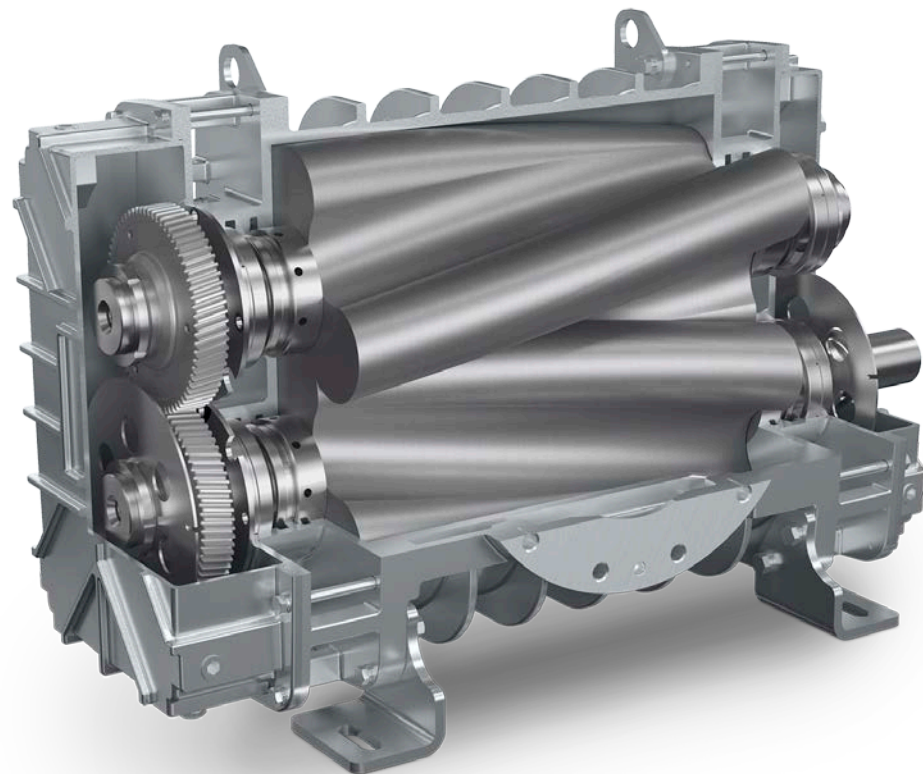
REDUCED PULSE = LOWER NOISE = QUIETER OPERATION



Blower Technologies

Positive Displacement – Twisted Tri-Lobe

- Helical Rotor
- Triangular tuned ports reduce noise.
- Noise reduced by 4-7 dBa

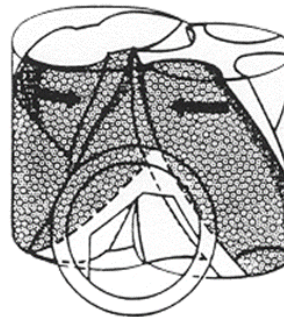
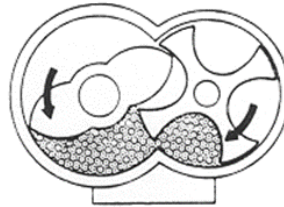
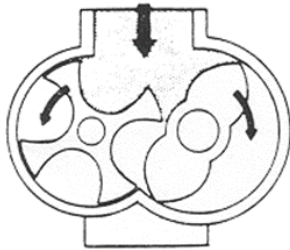


| Technology | Specifications | | |
|------------------|-----------------------|------|--|
| Twisted Tri-Lobe | UP TO 4,800 | CFM |  |
| | 15 | PSI |  |
| | 17 | inHg |  |



Blower Technologies

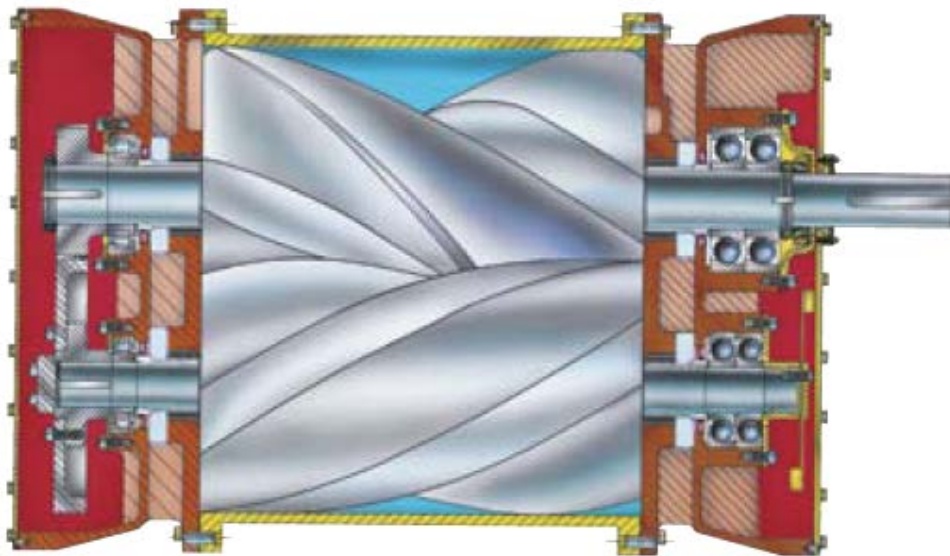
Positive Displacement – Rotary Screw 2x4 Fixed Helical Rotor Profile



Blower Technologies

Positive Displacement – Rotary Screw

2x4 Fixed Helical Rotor Profile



2x4
HELICAL SCREW

UP TO

6,700

CFM

20

PSI

24

inHg





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.

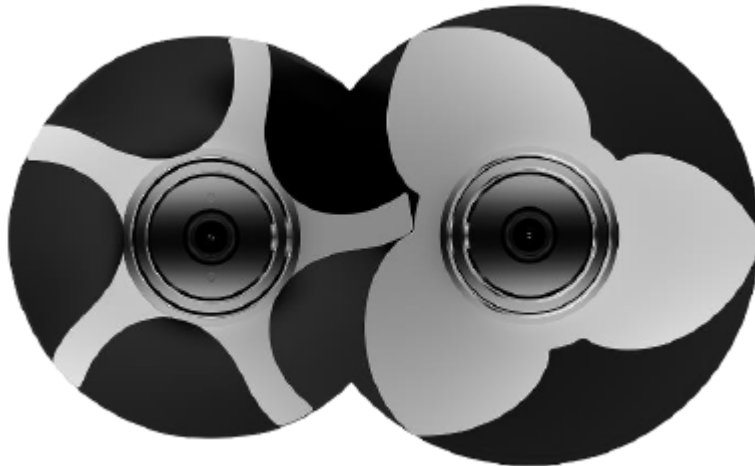




Blower Technologies

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





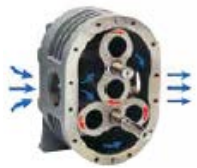
Blower Technologies

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 cyclinders for pressures (discharger port geometry)



Evolution of Blowers



1930's
Twin Lobe



1950's
2x4 Helical Screw



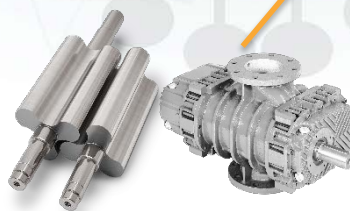
2008
Helical Tri-Lobe



2018




1950's
Solid Bi-Lobe
Integral Shaft



1990's
Tri-Lobe
Robust



2015
3x5 Fixed Helical Screw
Higher Efficiency, 36 psig



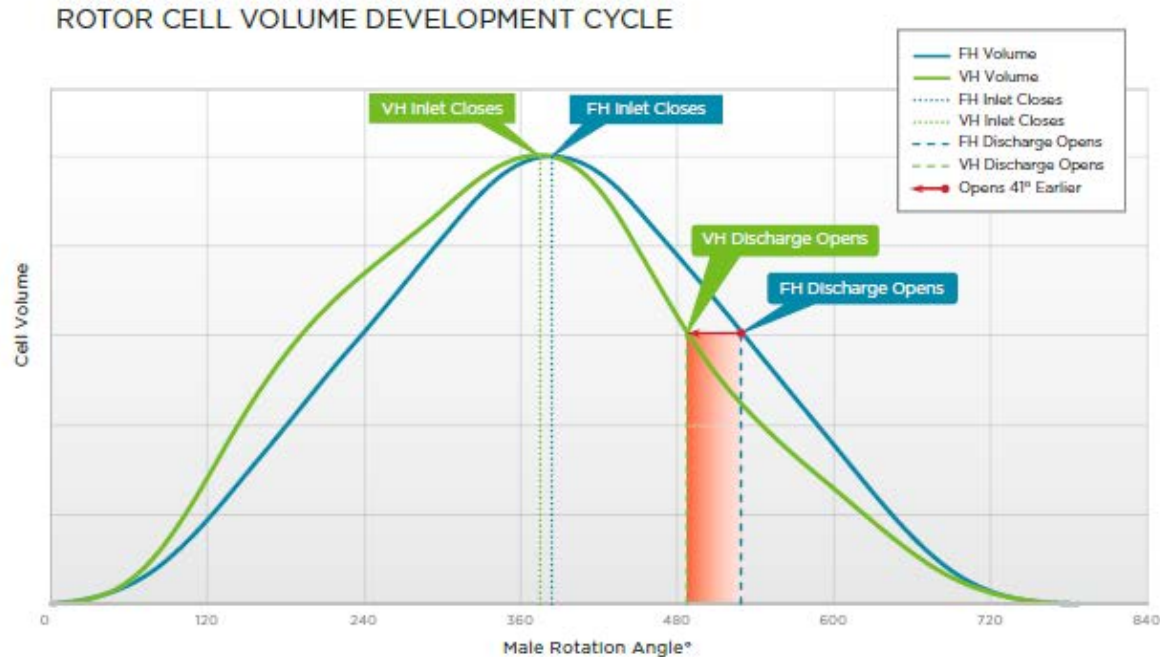
By adding a variable helix to our helical screw rotor design, unmatched levels of blower efficiency are achieved

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

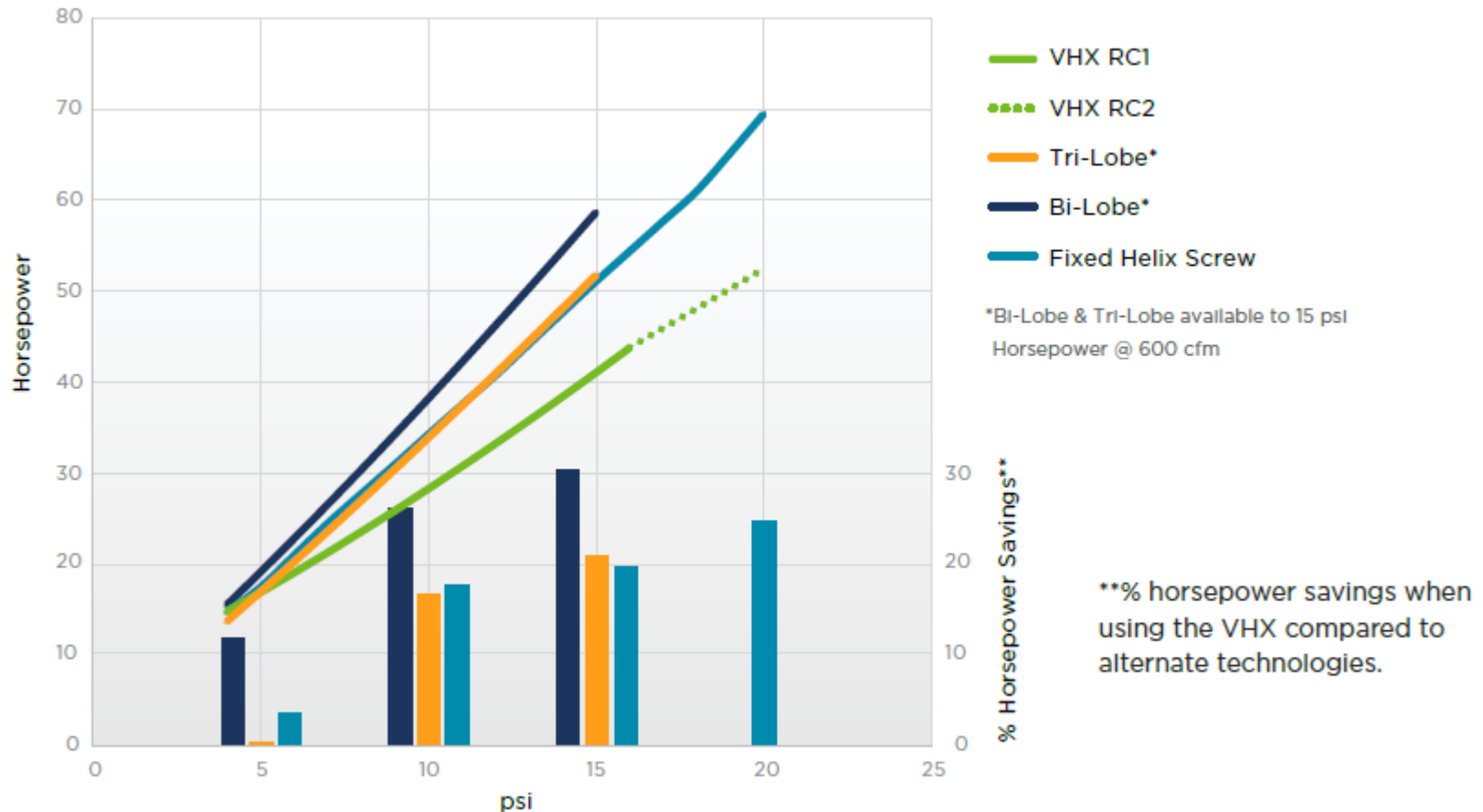
- Variable Helix Rotor Geometry Allows Discharge Port to Open 41° Earlier than Fixed Helix Design
- Lowering Flow Loss
- Increasing Efficiency

Highlighted Area = Port Exposure



It's all about...the Energy Savings

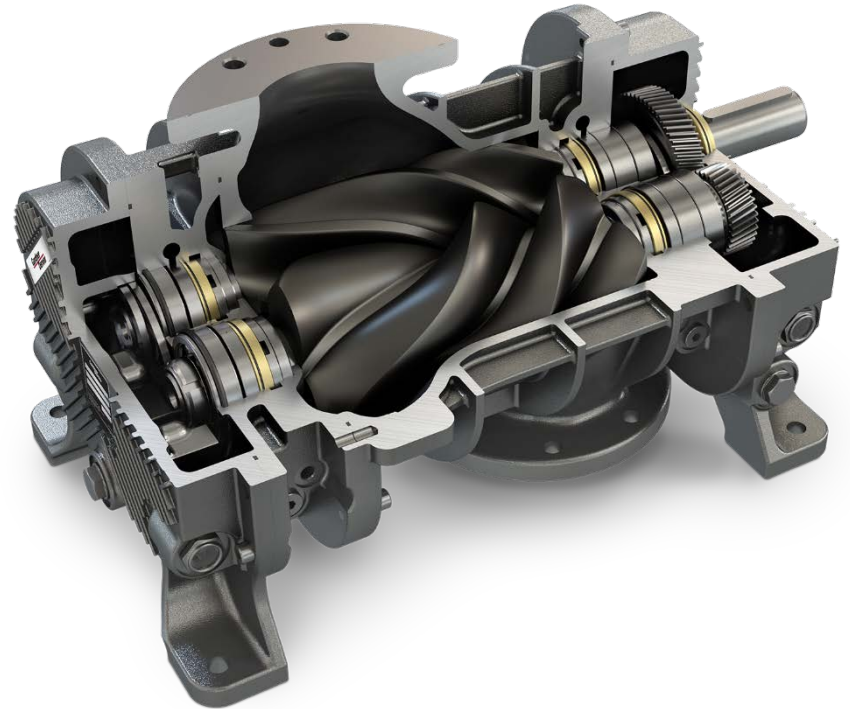
HORSEPOWER SAVINGS



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



GOOD

BETTER

BEST

**Gardner
Denver**

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



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Gardner
Denver

Thank You!

Paul Mosher – Territory Sales Manager

