



natural refrigerants

June 16 & 17, 2016 - Chicago

Vilter

Subcritical Low Temp CO₂ Compressors

Atmosphere America - Technomercial

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Agenda – Vilter Subcritical LT CO₂ Compressors

Section 1

Who?

Section 2

What?

Section 3

Why?

Section 4

Where?

Section 5

When?

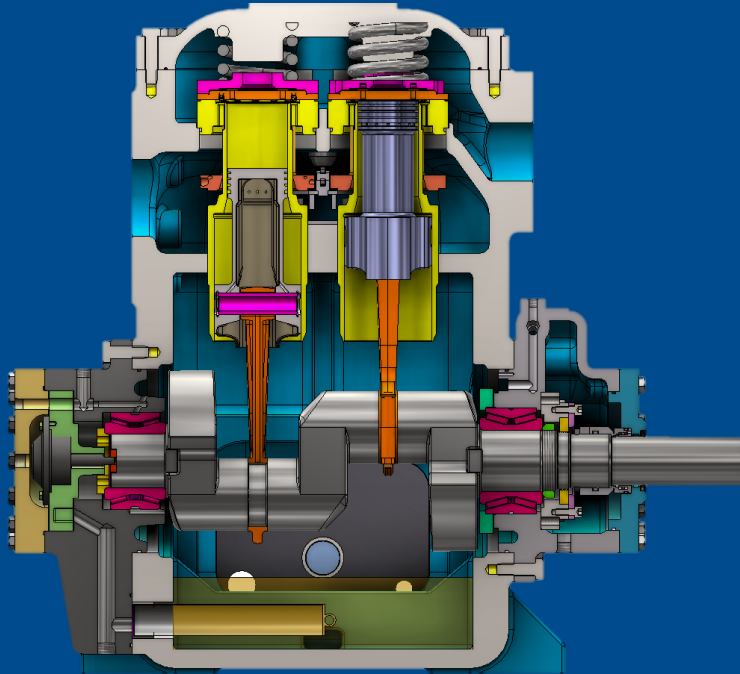
Who ?

What ?

Why ?

Where ?

When ?



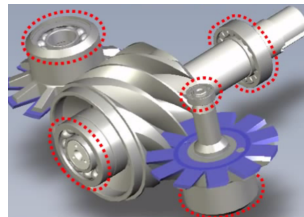
Subcritical Low Temp
CO₂ Compressors

Who is Designing and Manufacturing?

- **Vilter** – Division of Emerson Climate Technologies
- Founded in 1867 in Wisconsin
- Currently in Cudahy, WI
- Products include;
 - Recips, Single Screws, Packaged Systems for;
 - Refrigeration, Heat Pumps
 - Smart Vapor Management, Gas Compression for CHP



450XL



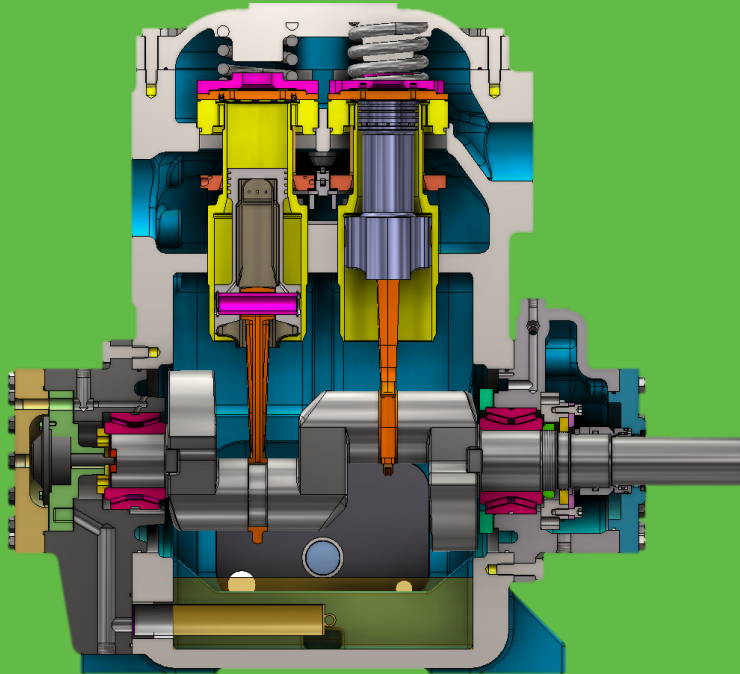
Single Screw



SVM Unit



Package Systems



Who ?

What ?

Why ?

Where ?

When ?

Subcritical Low Temp
CO₂ Compressors

What ? – Subcritical Open Drive LT CO₂ Compressor

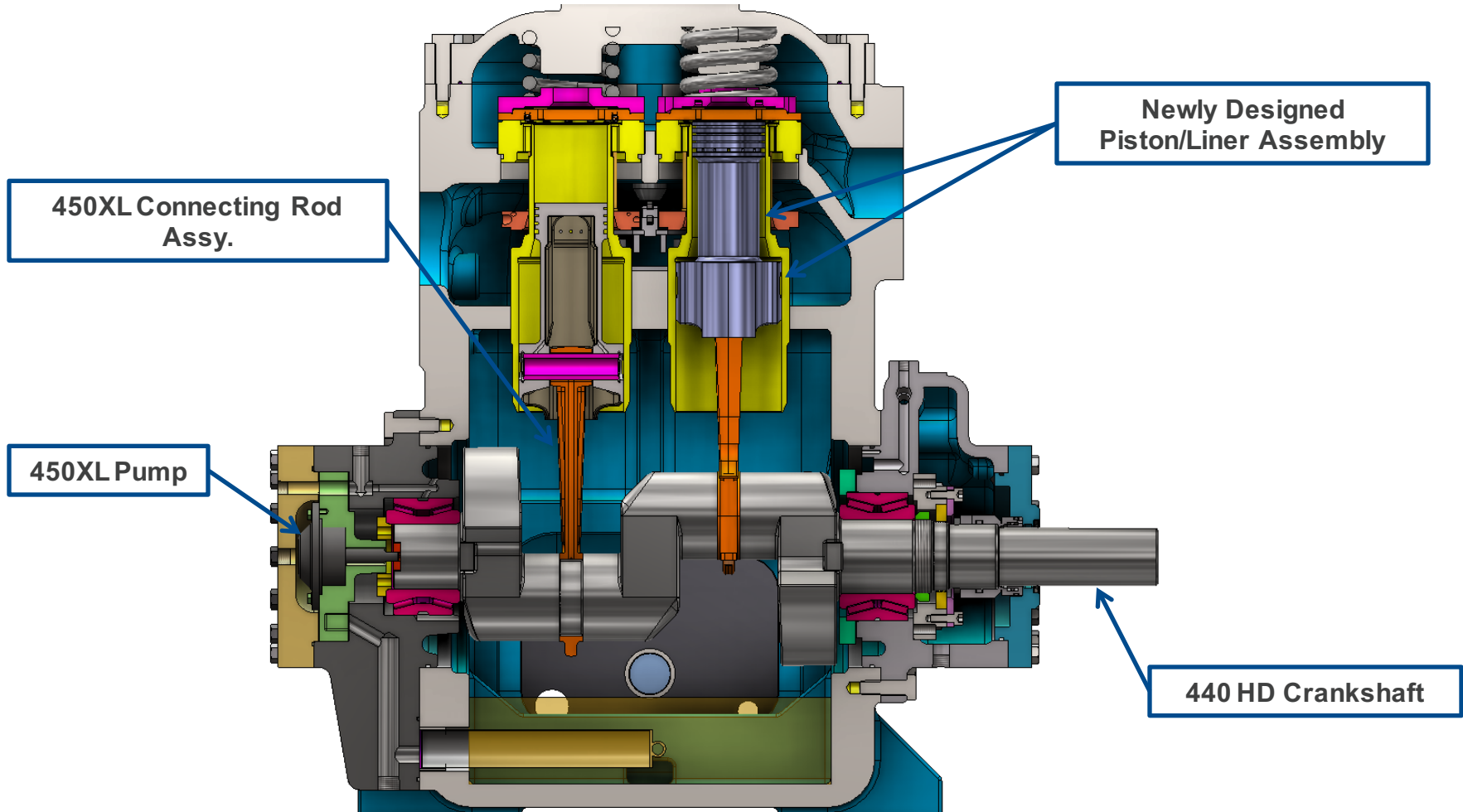


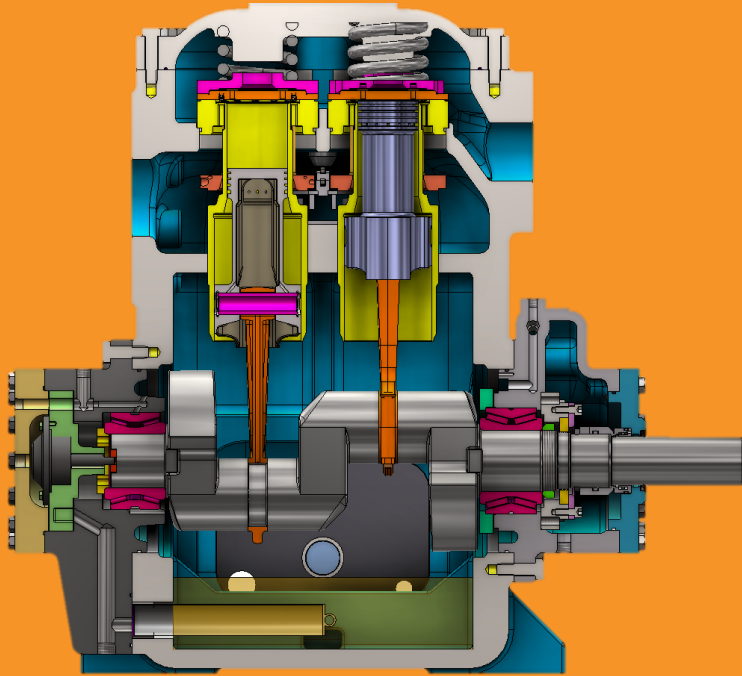
Vilter 550 Series CO₂ Subcritical

Vilter 550 Series Subcritical LT CO₂

- Built on Bullet Proof 400 VMC Platform
- Same Bottom End as 440 HD
- Redesigned Top End
- Same Bearing Loads to 440 HD
- Same Bearings as 440 HD
- Greatly Minimizes Risk of Bearing Issues
- 2 Cylinders Initial Design Sample
- 700 to 1800 RPM
- 50 tons CO₂ at -30°F SST / 25°F SDT
- 4,6,8 Cylinder models to follow up to 200 tons at -30°F SST / 25°F SDT

Vilter 550 Series Subcritical CO₂





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Subcritical Low Temp
CO₂ Compressors

Why did Vilter Develop the “550” Series?

Key Industrial Refrigeration Trends

➤ Safety and Environmental Requirements

- OSHA Requirements
- Low Charge Ammonia Systems
- Moving Ammonia out of Occupied Spaces
- Cascade Systems using CO₂ in the Low Stage
- Booster Transcritical CO₂ Architecture for MT and LT
- Increased Use of R744 (CO₂) and a Volatile Secondary Fluid

➤ Increase Emphasis on Total Cost of Ownership

- Equipment Cost
- Maintenance Costs
- Energy Cost (Improved Performance of CO₂ at LT such as -40°F)



Why did Vilter / Emerson Develop the “550” Series?

The Helix Innovation Centre Needed a 50 Ton LT CO₂ Load for Environmental Chambers

Options were;

Rack with 6 Copeland ZO(D)104 Scrolls parallel

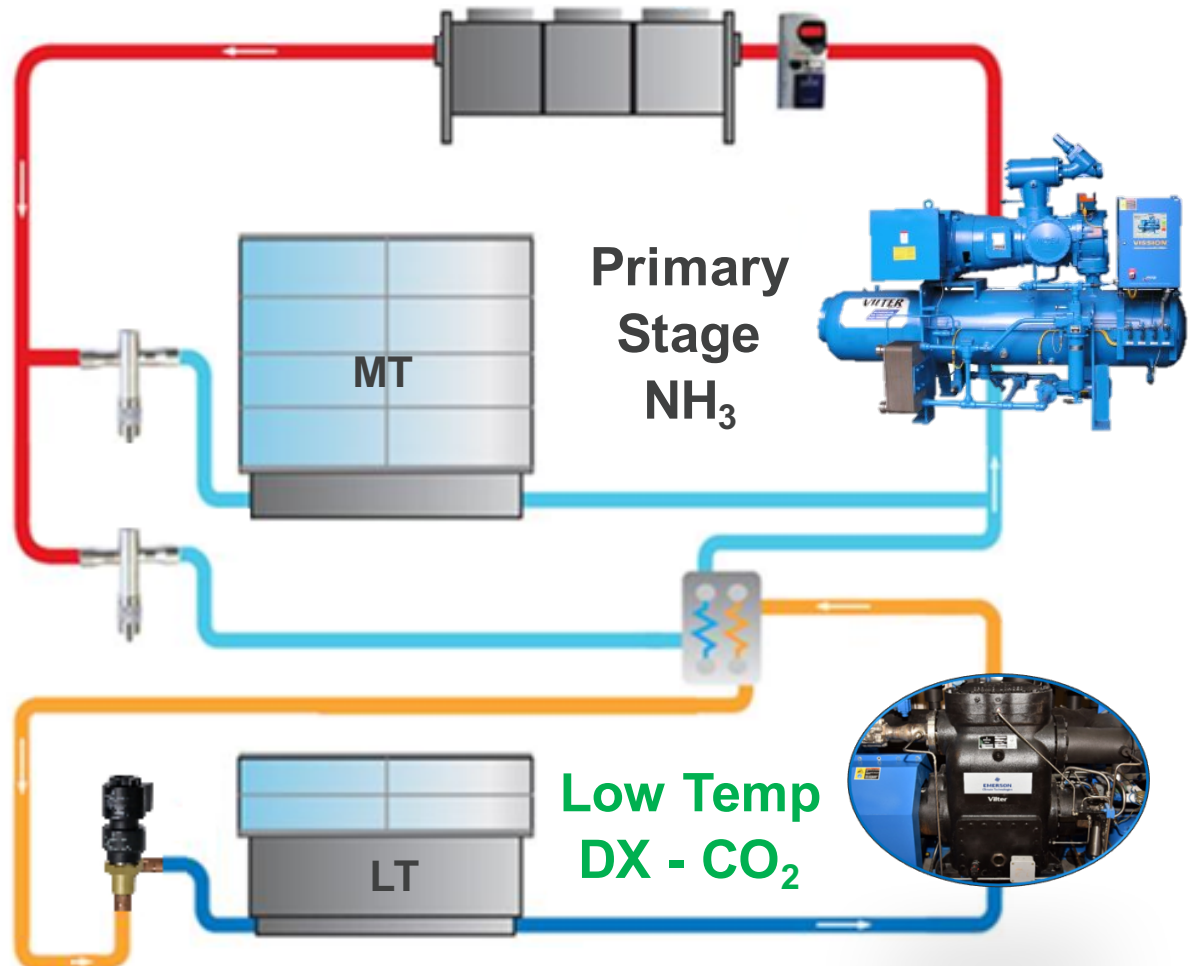
Rack with 5 Copeland 4MSL15 Semis in Parallel

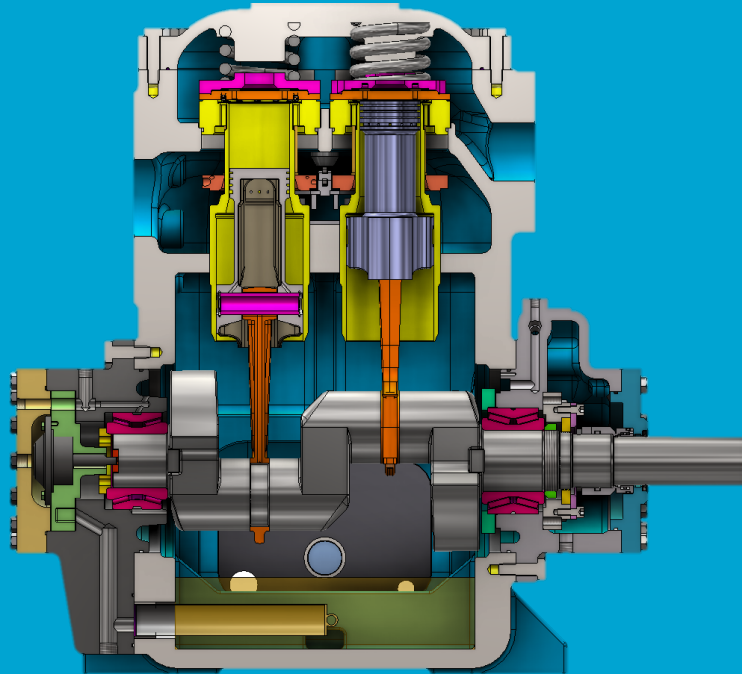
Single 550 Series Vilter
2 Cylinder Open Drive
Reciprocating Compressor



NH₃/CO₂ Cascade

- Move NH₃ out of Occupied Space
- Improved Efficiency
- Regulatory Compliance
- Natural Refrigerant





Who ?

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Subcritical Low Temp
CO₂ Compressors

552 Test Site; The Helix, Innovation Centre Dayton, OH (Start Up Sept/15)



Combined
Circuit on a
Common Skid
with 2 Cylinder
Compressors
Working in
Parallel to
Provide 50 Tons
at
-35°F SST
+25°F SCT

Ability to test at “Real” Conditions

Emerson Develop the “550” Series?

The Helix Site Provided a Real Life Testing Facility

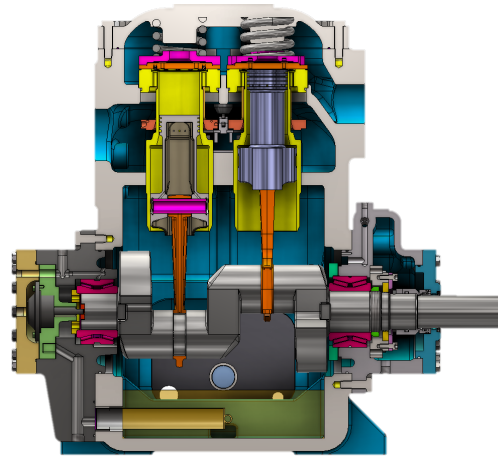
Advantages

- Emerson Facility Rather than our Customers
- Emerson Technicians on Site
- 100% Emerson Involvement
- Quick Design Modifications
- Faster to Market
- Can offer Customer Tours without Disrupting a Customer



Development of the HP Reciprocating Compressor

		<u>Vilter 552</u>	<u>Vilter 554</u>	<u>Vilter 556</u>	<u>Vilter 558</u>
		<u>1800 RPM</u>	<u>1800 RPM</u>	<u>1800 RPM</u>	<u>1800 RPM</u>
	CFM	56	112	168	224
-30°F SST / 23°F SDT	Capacity (Tons)	48	97	145	193
	BHP	56	112	167	223
-58°F SST / 23°F SDT	Capacity (Tons)	23	46	69	92
	BHP	48	96	145	193
Production Status		Testing Stage (Helix)	Design Stage	Design Stage	Design Stage



Thank You!

Questions?

**For Further Details, Contact
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