



25-26 June 2015 — Atlanta, Georgia

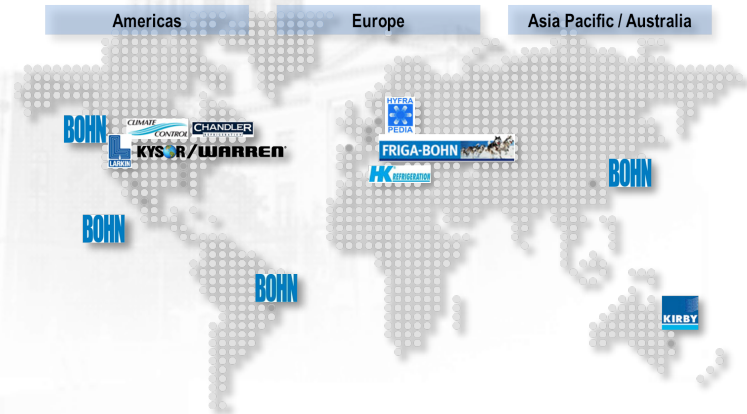
Heatcraft Worldwide Refrigeration
An Industry in Transition
Dustan Atkinson



Company overview

- *Operations in North America, South America, Europe, Asia and Australia*
- *# of Alternative Systems Applications*
 - *138 HFC/CO₂ Hybrid Systems and counting*
 - *50 in Europe*
 - *55 in Australia*
 - *33 in North America*
 - *3 Transcritical CO₂ System (additional in process)*
 - *1 in France*
 - *1 in Canada*
 - *1 in USA (GA)*
 - *1 NH₃/CO₂ installed in USA*

Heatcraft Global Footprint



Future plans

Likely Refrigerant Direction

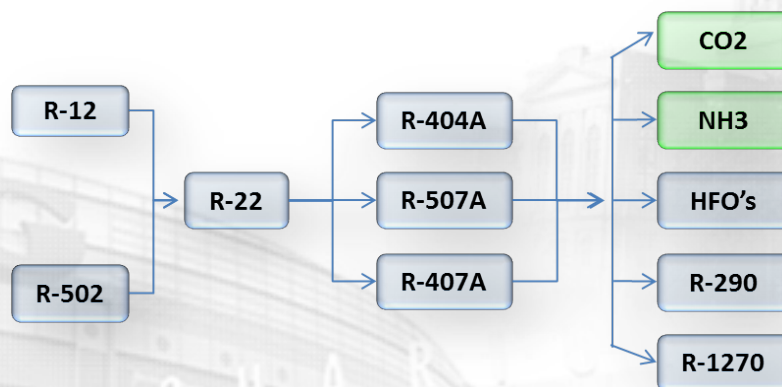
- High GWP refrigerants on chopping block short term
- Mid GWP refrigerants unlikely to persist long term
- Natural and other low GWP refrigerants gaining share

	Refrigerant	GWP
High GWP	R-507A	3985
	R-404A	3922
Mid GWP	R-407A	2107
	R-407C	1774
	R-134a	1430
Low or Zero GWP	HFO Variants	TBD
	R-744 (CO ₂)	1
	R-717 (NH ₃)	0
	R-290	3.3

Future plans

Path Forward

- *Anticipate multiple platforms/solutions to meet customer needs*
 - *Must consider retailer strategy, priorities and total cost of ownership*



- *Increased system complexity*
 - *Increased focus on education*
 - *Drive toward repeatability*

Latest NR projects

NH₃/CO₂ Application

- Ammonia (NH₃) Top Cycle
- CO₂ Low Temperature DX
- CO₂ Medium Temperature Liquid Overfeed

Benefits

Optimized LCCP

- HFC-free system
- Low NH₃ Charge
 - Typically 1lb/TR or 70-100lbs per store
- Up to 20% reduction in TCO
- Store Opening Sept 2015



Lessons learned

Alternate Systems Lessons Learned

- *Main Challenges*

- *Technician skill level/education*
- *Local regulatory codes*
- *Component supplier/Cost reduction*

- *Necessary Next Steps*

- *Technician Skillset*

- *Work with NATE (North American Technician Excellence) to include CO2 Systems in their certification*
- *Work with AHRI to emphasize the need for an industry-wide educational program*
- *Continue to develop and promote our own training courses*
- *Leverage Global presence to promote training and spread best practices to and from around the globe.*

- *Regulations*

- *Heatcraft has been and will continue to be active in the regulatory standard committees (ASHRAE, UL) to promote and push for global harmonization of standards*

Example: Heatcraft proposed changes to UL 1995 mechanical strength requirements to be harmonized with European Standards and successfully passed it on the ballot phase. New standard expected to be published soon.

- *We will continue to work with the DOE and EPA to promote energy efficiency and environmental responsibility in commercial refrigeration.*

- *Component Supplier base*

- *Heatcraft is continuously looking for and qualifying new suppliers for alternative systems to improve system cost and payback*



business case

natural refrigerants

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