AMERICA ATMOsphere

Business Case for Natural Refrigerants

June 12-14, 2018 – Long Beach

Applying the Frick Low Charge Central System to a New Freezer/Cooler Facility

Applying the Frick® Low Charge Central System to a New Freezer/Cooler Facility

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Special thanks to Congebec project installation contractor CIMCO Refrigeration

Market Trends & Focus

Facility Owner/Operator – focused on mission, customer, business profits, operations, and growth

DRIVERS

Regulations – meeting Environmental (EPA-SNAP), Safety (OSHA), and Energy (EPA) regulations

Total Cost of Ownership (TCO) – equipment cost & life expectancy, efficiency, and maintenance costs

Corporate Responsibility – customer & employee engagement, safer products, and sustainable solutions

SOLUTION

Central Compressor/Engine Room

Distributed Localized Condensing

Frick INDUSTRIAL REFRIGERATION | Low Charge Central System

RESULTS

- Reduces the ammonia charge by 80%+
  - →1.5 to 3 lbs/TR is achievable
- Minimal liquid in occupied space
- Eases regulatory burden
- Efficiency & redundancy of centralized larger compressors
- Flexibility: Single and/or two stage, economized, side loads
- Retains familiar industry procedures and components
- Easy expansion and multiple heat recovery possibilities

Frick Low Charge Central System

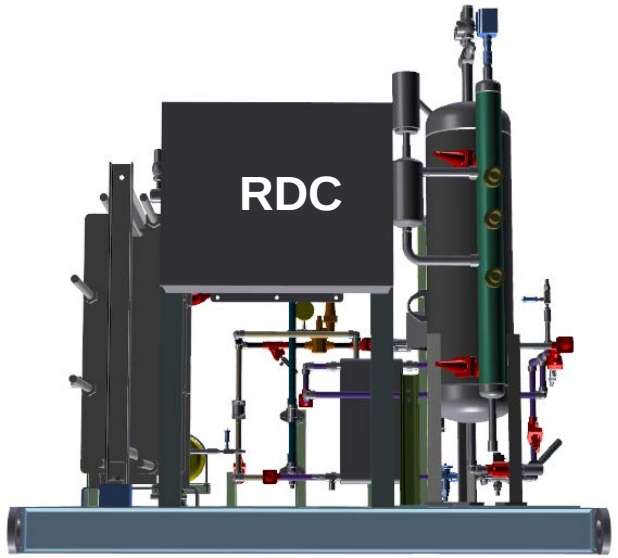
- Only vapor is distributed through the plant, not liquid.
- Condensing must be distributed to the point of liquid use.
- Small liquid supply / economizer vessel to feed multiple evaporators (at the evaporators) forms a remote “condenser/evaporator system” or Remote Distributed Condenser - the RDC

More Info

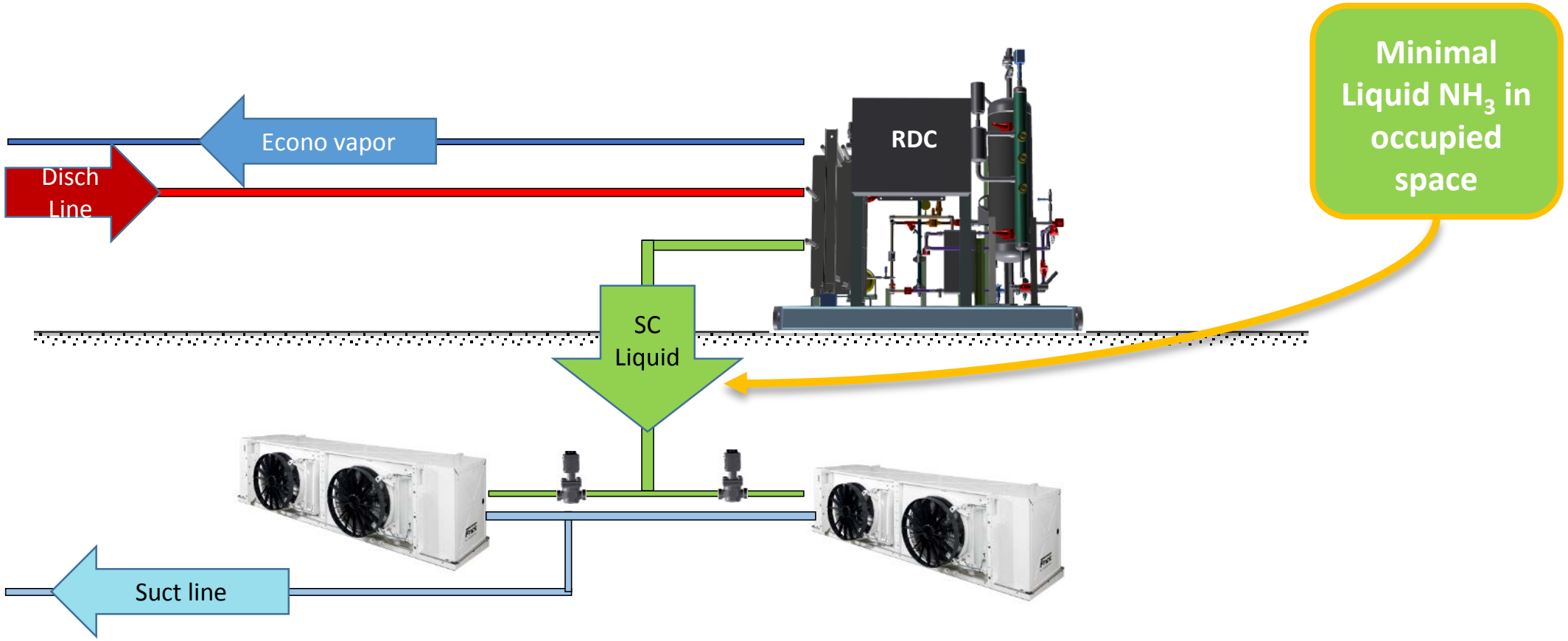
Product Web Page

Product Brochure

Video Overview



Frick Low Charge Central System –
Each RDC would feed DX evaporators in close proximity



Case Study - Introduction of Customer and Project

Congebec
Founded in 1974, Based in Quebec, Canada

Congebec is the largest refrigerated service provider in the province of Quebec. Leader in Canada and ranked in the 2018 IARW Top 25 report. With more than 400 employees, the company can count on 13 modern facilities totaling more than 50 million cubic feet located in; Quebec, Ontario, Manitoba, Saskatchewan and Alberta.

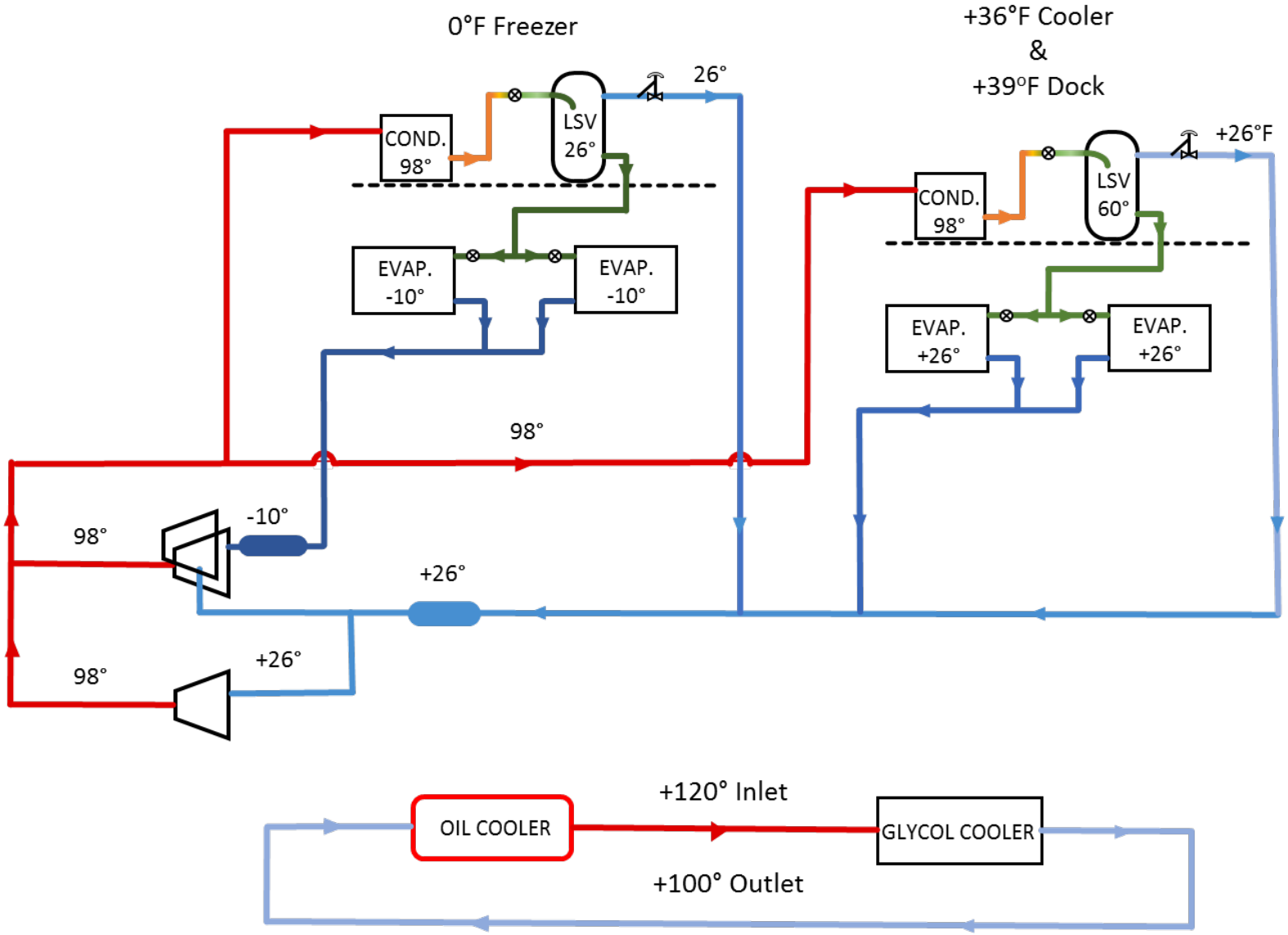
http://www.congebec.com

Why Frick LCCS? – Customer Decision Rational

Key Realities that Helped Make Decision to Apply the Frick LCCS:

- Proven Reputation of the Frick Brand
- The Efficiency of Ammonia
- Regulations - Low Refrigerant Charge
- Flexibility of the System
- Retention of the Compression Room for Service
- Product configuration allowed compressed construction schedule

Overview of the Specific System - LCCS



BUILDING SIZE
- 178,000 FT²

SPACES
- (2) FREEZER
- (2) FREEZER/COOLER
- (1) DOCK LOAD COOLER

Summary of System Equipment

Screws

(2) RWF II 177E Screw Compressors, (1) w/ VFD and (1) w/ SS Starter

(1) RXF 101H Screw Compressor w/ VFD

Vessels

(2) Horizontal Suction Line Accumulators

Controls

(1) PLC control system with patented liquid management logic

RDCs

(5) Frick Adiabatic Remote Distributed Condensing (RDC) Units

RTFs

(7) Frick Roof Top Freezer (RTF) Penthouse Evaporators

Dock Evaps

(8) S-AXGHN Ceiling Hung Dock Air Units

Adiabatic Fluid Cooler

(1) FAFS Adiabatic Fluid Cooler (oil cooler)

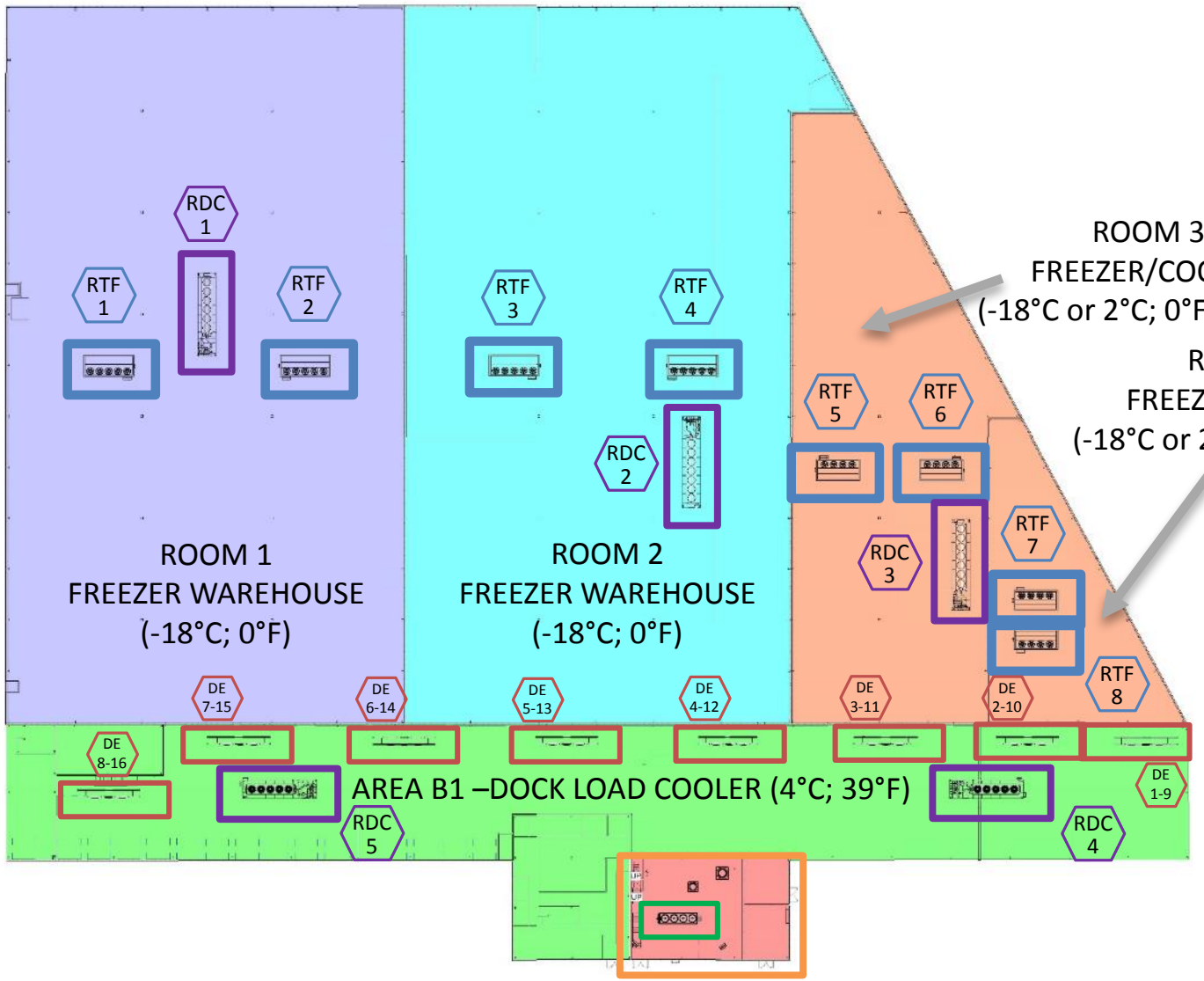
Overview of the Site Plan

RTF UNITS (8)

DOCK EVAPS (8)

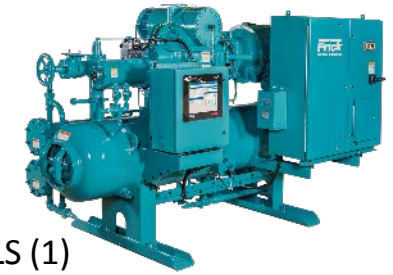
GLYCOL (OIL) COOLER (1)

RDC UNITS (5)



REF. ROOM

SCREWS (3)



CONTROLS (1)

VESSELS (2)

Site Pictures

Loading Dock Evaporator

RDC #4 Setting on Roof Curb
Servicing (4) Dock Evaporators

RDC #3 Servicing the Freezer/Cooler
#4 and ½ Freezer #3

430 TR
NH_3 – 2.3 LB/TR

PROJECT TYPE
- NEW FACILITY

APPLICATION
- COLD STORAGE

LOCATION
- ONTARIO, CANADA

CAPACITY
- 540 TR, 430 TR OPERATING

AMMONIA CHARGE
- 1000 LBS CURRENTLY

BUILDING SIZE
- 178,000 FT^2

SPACES
- (2) FREEZER
- (2) FREEZER/COOLER
- (1) DOCK LOAD COOLER

Frick LCCS Advantages

Frick INDUSTRIAL REFRIGERATION | Low Charge Central System

Low-Charge, Flexible, Efficient

- **Significantly reduces ammonia charge**
- **Lowest total cost of ownership of any low charge system**
- Minimal liquid in occupied space
- Eases regulatory burden
- Flexibility: Single and/or two stage, economized, side loads
- Easy expansion capabilities
- Highest efficiency possible
- Multiple heat recovery possibilities
- Compressor wiring, maintenance and oil cooling are in the engine room
- Retains familiar industry components

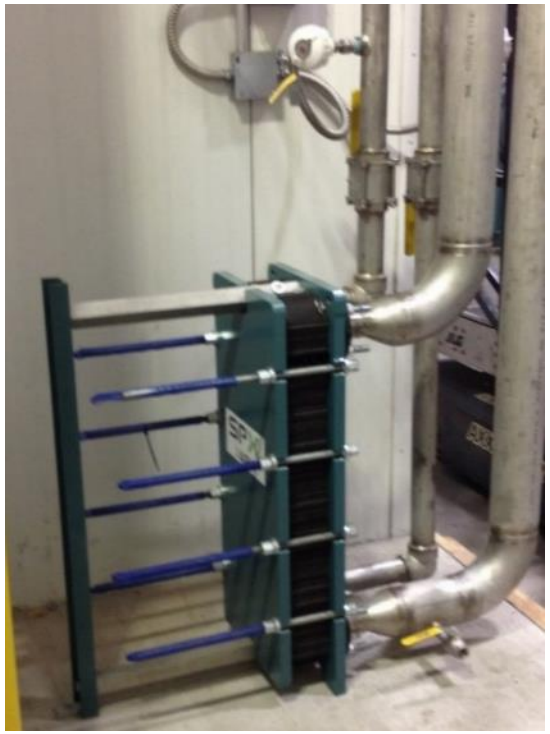
The LCCS is the only centralized system in the super-low charge NH_3 category (less than 5 lbs/TR)

Sample Job Feature Highlights

Year	Location	Project Type	Capacity	Ammonia Charge	Key Project Highlights
2016	Nebraska, US	Greenfield Phase I	660 TR	1268 lbs	Ceiling hung evaporators for loading dock, holding cooler & process room. **Process falling film** evaporator for process load. RDC units utilized PFHE condensers with closed circuit glycol fluid coolers. Glycol to Water PFHE for compressor oil **heat recovery**.
2017	Nebraska, US	Expansion Phase II	112 TR	202 lbs	**Expanded** system by adding (2) adiabatic condenser RDC modules in **parallel with plate condensing heat reclaim**
2018	Ontario, CAN	Greenfield	540 TR (430 TR operating)	1000 lbs operating	Penthouse RTF Evaporators for storage areas, and ceiling hung evaporators for dock cooler space. (2) rooms convertible for freezer or cooler. Glycol to Water PFHE for compressor oil **heat recovery**.
2018	Pennsylvania, US	Greenfield	250 TR	TBD	(3) Adiabatic RDC units feeding 6 **ceiling hung evaporators** in freezer and cooler rooms.
2018	Nebraska, US	Extension	40 TR	TBD	(1) Adiabatic RDC **added to existing** central ammonia system in remote location.

Sample Job Feature Pictures

Low Charge RDC Package for Process Falling Film Evaporator – Nebraska, Phase I



Glycol to Water PFHE Recovery from Compressor Oil Cooling – Nebraska, Phase I

Adiabatic RDC Package for Expansion – Nebraska, Phase II

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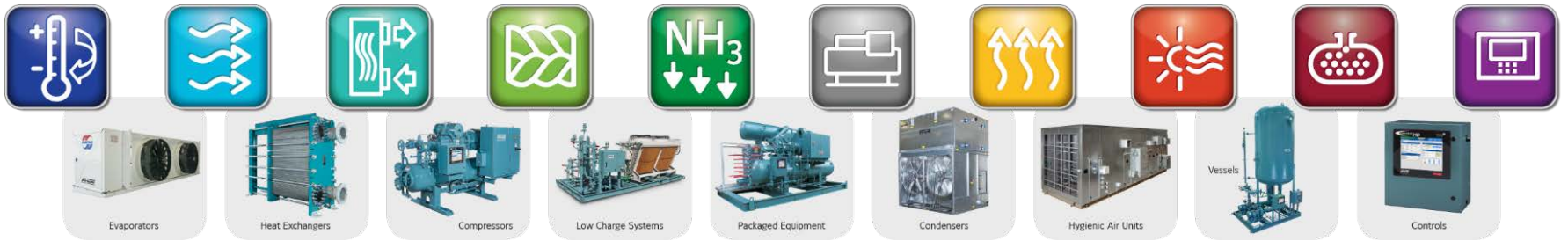
Frick® - The Single Source for All Your Industrial Refrigeration Needs



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Thank you very much!