



June 18-19, 2014 - San Francisco

Installation Considerations



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Chris has worked for Neelands Refrigeration in a number of capacities since 1989. In 2012 he was named Controls manager, responsible for application engineering, estimating, project planning, commissioning and measurement and verification.

Chris' is experienced in the commercial supermarket, big box, warehouse and food processing markets. Chris is completely intimate with the unique challenges associated with effective integration of control methodology in Co2 applications.

He also brings significant experience creating custom field programming for the Micro Thermo Technologies and Reliable control systems for end customers and contractors.

Agenda

- Introduction
- Interpretation & Application of Specifications
- HFC/ Co2 Installation Differences
- Control Differences & Considerations
- Service Considerations



In our over 50 years of providing design, installation and service, Neelands Refrigeration has grown to become the Province of Ontario's leading service provider to the commercial refrigeration market.

Today we are grateful for the opportunity to share with you some of our Co2 installation and service experiences, technical continuity concerns and lessons learned for your consideration.

Our objective – to provide insight and provoke dialogue within your team towards the safe and cost effective adoption and implementation of Co2 in your facilities and to work with other value driven service providers to share experiences and build best practices.

Installation Considerations

Interpretation & Application Of Specifications

Piping Material – Real Example

- System manufacturer pressure & material requirements;
- Copper pipe of 7/8" for 870 psig and 1 1/8" @ 580psig

however....

- Pipe manufacturer rates their 7/8"/ & 1 1/8" pipe at 700psig

What About Braising and De Rating?

Copper & Brass Development Association (CBDA) lowers pressure rating on 7/8" to 582psig and 1 1/8 to 494psig.

Current Project Example Requiring Braised Pipe

2 5/8" (as specified by rack manufacturer) pipe type L rated by pipe manufacturer at 700psig **BUT** CBDA rates this braised at 336psig.

As an end user, owners' engineer, installing contractor or regulatory body – are all aligned to ensure technical continuity?

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Of Specifications*

Certified for Local Regulations?

As an end user, owners' engineer or installing contractor, and constructing or retrofitting in a new jurisdiction, are you knowledgeable about the technology application conditions in advance?

This should be part of your proactive project risk mitigation. Effective upfront de-risking will minimize delays, cost over runs and time spent managing the situation.

- Safety Codes Act
- CSA B51 Code
- ASME Code
- Canadian Registration Number
- UL/CSA

- Co2 installed in Region?
- Local authorities proactive?
- Slow to evolve?
- Are you the trailblazer?
- Ability for out of region workers to be engaged?

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Power Loss Considerations

Generator and/or back up supply of refrigerant.

An auxiliary condensing unit on a backup generator to cool the Co₂ storage tank on power loss. Without this the Co₂ will build pressure and vent in a burping action releasing refrigerant slowly. Co₂ must be readily available to fill the system. Co₂ is inexpensive however overtime labor, product unavailability or product loss is not.

Auxiliary Equipment

Evaporator coils, heat reclaim coils, valves etc must be rated for the application.

They must also be certified to local codes

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HFC to Co2

Installation Differences

HFC

- Piping material- type L(ACR)
- Piping practices-typical
- Purging – important
- Leak detection-methods
- Pressure test-175/333#
- Charging-liquid
- Local codes & regulation
- Equipment
- Training
- Controls-
Mechanical/electronic

Co2

- Type K and steel
- High side welded steel
- Critical
- Less accurate
- 660/2000#
- Vapor to 75# then liquid to
avoid dry ice
- New to some jurisdictions
- Rated equipment
- Extra training required
- Full electronic new systems
and programing

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Control Differences

- Full electronic
- New control interfaces for rack systems
- Contractors will be unfamiliar with systems
- Electronic expansion valves
- Each evaporator will have EEV and controller to program and set up
- Training for Refrigeration installer and controls installer.
- Training for service provider

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Service Considerations

- Service departments ensure operational effectiveness and efficiencies
- More than any participant in the CO₂ process the service provider must be trained, certified and knowledgeable in system operation.
- Training as an “event” is not enough.
- Service departments must implement training and development programs including resource identification and commitments.

Refrigerant

- Readily available supply
- Insure there is a readily available stock of the correct grade of CO₂. It is not widely used in this application in all areas yet and in an emergency it is difficult to procure.

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Service Considerations

Back up parts

- Specify a list of critical parts that will not be readily available
- List should be supplied by manufacturer

Tools

- Separate Gauges, charging hoses
- For safety concerns should be kept on site to prevent use of unrated equipment Also to avoid introduction of system contaminants.



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Thank you very much!