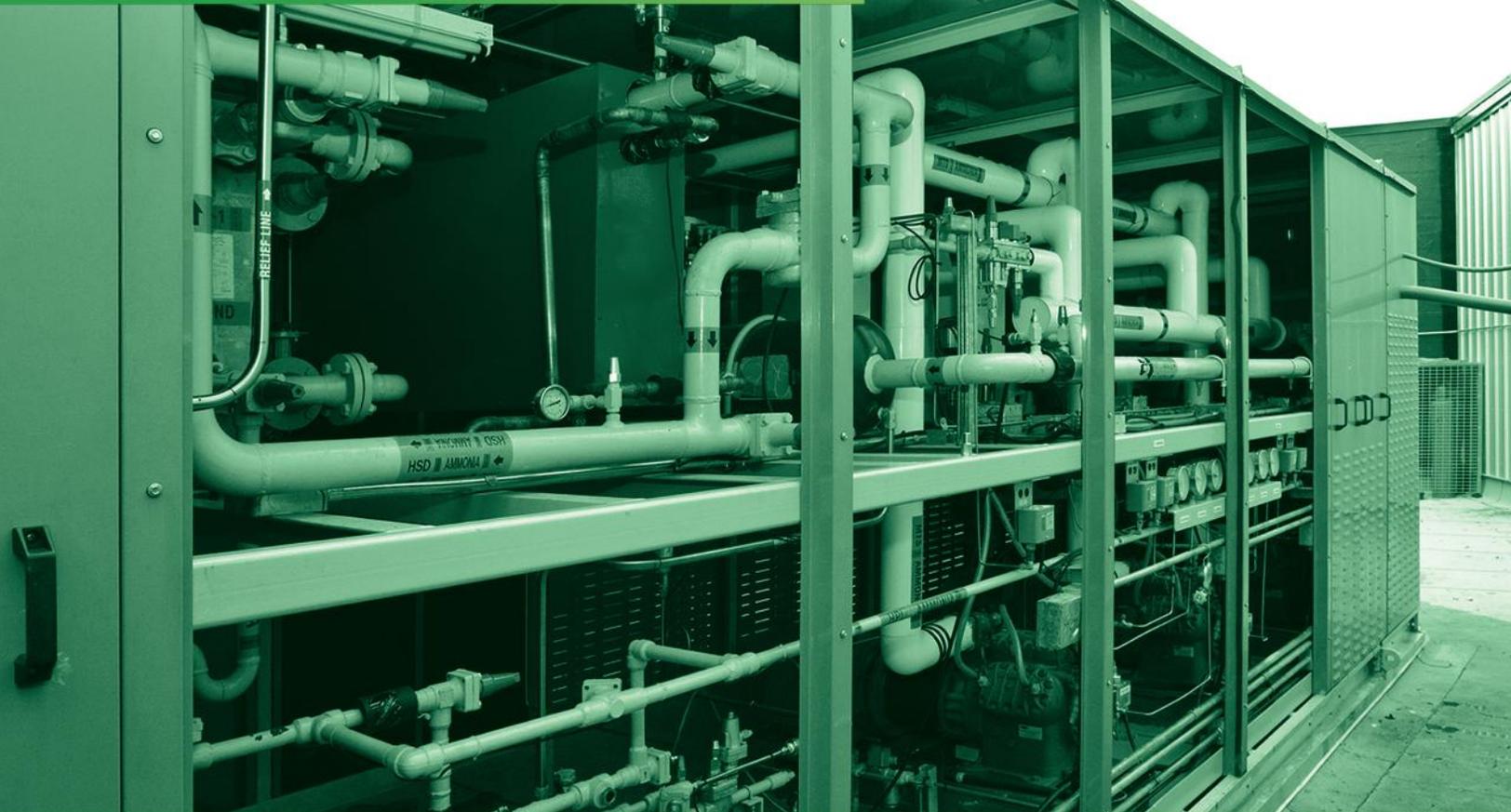




NH3 CO2

REFRIGERATION SYSTEM



KYSOR WARREN
eptarefrigeration

NH₃ CO₂

REFRIGERATION SYSTEM

The Kysor Warren NH₃/CO₂ Cascade refrigeration system provides the ultimate solution for sustainable refrigeration system design. This system provides an HFC-free supermarket refrigeration solution while providing significant life-cycle cost savings for retailers.

Benefits:

- Completely HFC-free system (uses only NH₃ and CO₂)
- Naturally occurring refrigerants
- CO₂ ozone depletion potential (ODP) of 0 & global warming potential (GWP) of 1
- NH₃ ozone depletion potential (ODP) of 0 & global warming potential (GWP) of 0
- For comparison, R-404A (common HFC refrigerant) has GWP of approximately 3800
- NH₃ and CO₂ are both very well established refrigerants
- Most energy efficient refrigeration system design available
- NH₃ charge of only 1lb per ton of refrigeration vs typical industry charge of 4 lbs per ton of refrigeration



Advantages:

- Commitment to innovation and quality
- Proven history with CO₂ cascade and liquid overfeed systems
- Extensive qualification and testing protocols

TYPICAL PERFORMANCE VS. TRADITIONAL HFC SYSTEM

| | TRADITIONAL HFC | NH ₃ /CO ₂ |
|-----------------------|-----------------|----------------------------------|
| GLOBAL WARMING IMPACT | Baseline | ↓99% |
| ENERGY COST | Baseline | ↓15% - 23% |

ABOUT KYSOR WARREN

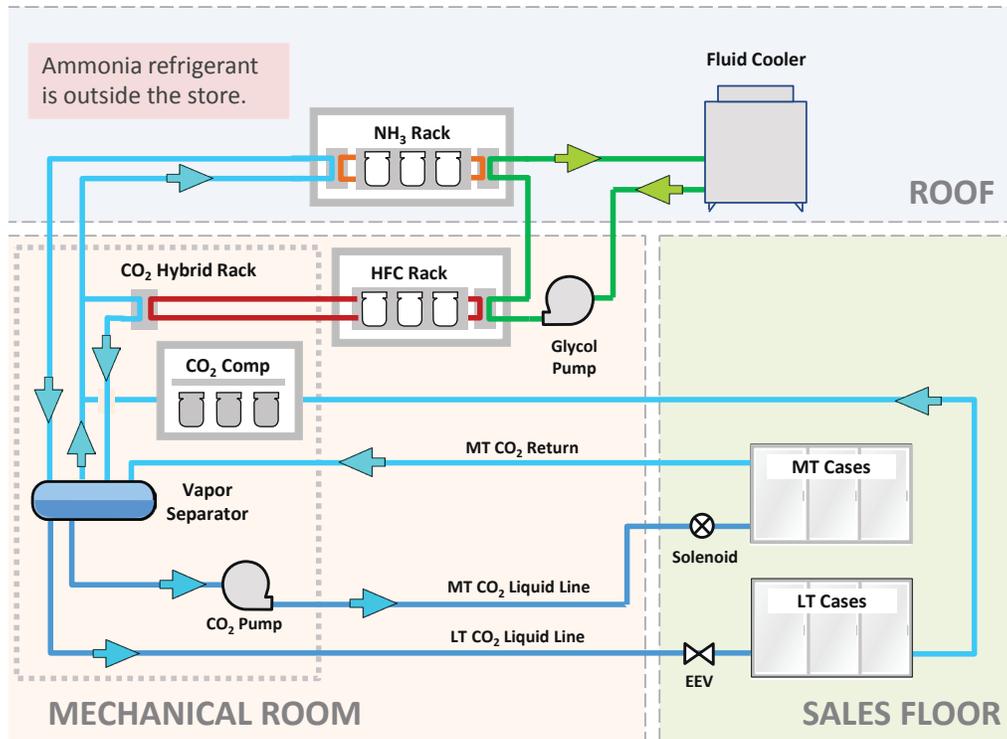
Kysor Warren is a leading manufacturer of refrigerated display cases and refrigeration systems, partnering with customers to bring complete commercial refrigeration solutions to supermarkets, grocers and other retailers across North America.

Warren Refrigeration was founded in 1882, providing refrigeration solutions to food retailers. Warren Refrigeration later joined with Sherer Brothers Company which was the first to patent counters featuring glass panels in order to feature and display merchandise. They continued innovating by adding cold-air flow to the cases, so that perishable foods could be showcased in retailer shops. You can trust that our highly experienced personnel will provide you with the customer, engineering and technical support services that you need.

Our case and system solutions are known for their durability, efficiency, and quality in design. Our firsthand experience and knowledge of refrigeration system operations are unparalleled, getting you the exact results you are looking for.

Kysor Warren is an Epta Refrigeration company headquartered in Columbus, Georgia.

SYSTEM LAYOUT



SYSTEM OPERATION

The Kysor Warren NH₃/CO₂ refrigeration system is a completely HFC-free refrigeration system designed to provide superior performance for food retail applications.

In this system, liquid carbon dioxide is distributed throughout the store to provide cooling to each refrigerated case or walk-in box. Medium temperature cases are supplied with Carbon Dioxide (CO₂) refrigerant by a liquid overfeed pump. Low temperature cases are serviced by a cascade vapor compression cycle to enable the cases to operate at the appropriate temperatures. Upon leaving the cases, the CO₂ refrigerant is taken to the primary Ammonia (NH₃) Cooling system. The CO₂ is then chilled by the primary NH₃ system via a brazed plate heat exchanger (BPHX) inside the NH₃ system enclosure.

In the NH₃ portion of the system, the ammonia is completely contained within a mechanical enclosure. No ammonia is found outside this self-contained package. Heat is rejected to an evaporative water/glycol cooler to obtain very high levels of efficiency. It also ensures that NH₃ refrigerant does not leave the enclosure. This design allows the charge of NH₃ refrigerant to be substantially reduced; therefore, allowing the system to fall below regulatory thresholds for enhanced monitoring or reporting. In the very unlikely event of a system leak, the ammonia refrigerant is contained and absorbed in water (to a harmless concentration level) to ensure a safe environment.

DESIGN

| STANDARD FEATURES | OPTIONS |
|--|---|
| <ul style="list-style-type: none"> ■ Evaporative fluid cooler ■ Leak detection and purge ventilation ■ Automatic oil recovery ■ Self-contained NH₃ rack package | <ul style="list-style-type: none"> ■ Ammonia diffusion system ■ Emergency pressure control system ■ Heat reclaim |



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