

Energy Efficiency - System Design Strategies: Refrigeration Distributed Refrigeration

Strategy: Distributed Refrigeration consists of several compressor racks that are installed in close proximity to display cases/storage rooms. The refrigeration sides contain direct-expansion evaporators while heat rejection occurs with common secondary fluid loops containing an antifreeze mixture and an air-cooled or evaporative fluid cooler normally located on the roof. Multiple compressor racks are located in several independent cabinets distributed throughout the store, and all condensers are connected to a unique heat rejection closed loop containing an antifreeze mixture and an air-cooled or evaporative fluid cooler normally located on the roof.

Relevant Store Scale/Type: S,M,L/New, Adapted, Existing

Initial Cost:

1. Additional condensing units, pumps, and glycol.
2. Additional maintenance.

Return on Investment:

1. Energy Savings in the 11% range annually as compared to conventional multiplex systems.

Operator Benefits:

1. Energy savings of 11 – 12%
2. Reduction in the amount of refrigerant by 30% - 35%.
3. Reduction in CO2 emissions

Technical Considerations:

1. Water cooled systems will realize more savings than air cooled condensers and have a better ability at lowering environmental impacts or TEWI
2. Further savings can be recognized if evaporative heat rejection for the fluid loop is employed.
3. Water cooled systems use secondary coolants and pumps which require additional maintenance and energy; energy use can be offset if an evaporative fluid cooler is employed.
4. In order for distributed systems to perform as designed, condensing temperatures have to be lowered by rejecting a sufficient amount of heat from the water loop.

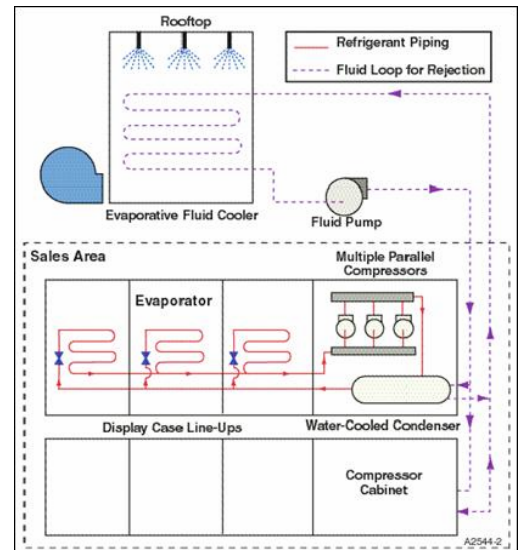
Product/Manufacturer Suggestions, Resources & Examples:

Hussman Corp. www.hussmann.com/

Refrigeration Technologies Studies:

http://findarticles.com/p/articles/mi_m0BPE/is_12_9/ai_68706789

http://www.arb.ca.gov/cc/commref/adv_supmkt_ref_syst.pdf



Source: International Energy Agency (IEA). 2003. "IEA Annex 26: Advanced Supermarket Refrigeration/Heat Recovery Systems, Final Report Volume 1-Executive Summary." See links below