



Successful Installations of R-1270 Liquid Chillers

*Presented By Eric MacGregor
Versatile Refrigeration International Inc.*

Who we are

2010 Versatile Refrigeration Ltd.

2014 Versatile Refrigeration International Inc.

2014 Versatile Refrigeration USA Inc.

- Design
- Installation
- Support

What we do

- Secondary refrigeration systems for the controlled atmosphere (CA) market.
- Land based aquaculture operations for brood stock, egg stasis and grow-out.
- We use Frigadon packaged chillers in HFC R-404a and HC R-1270.



Frigadon Fluid Chillers 16 Years of Hydrocarbon!

Frigadon chillers are build specifically for the use of HCs. They include leak detection and ventilation. Self contained refrigeration circuits.

-Packaged Hydrocarbon Chillers have been installing in the UK, Ireland, Germany, Sweden, Denmark, Israel, Canada and the USA

Nestles, Co-op Banks, ASDA Wal-Mart, Novo Pharmaceuticals, Brixham and Grimsby Fish Markets, F.W Mansfields Fruit Farms, Roche Pharmaceuticals, Sainsburys, St Pauls Academy, NHS Trust, Dunnes Stores, Braehead Foods, Meadowhall Shopping Centre, Liverpool Produce Terminal, and more...



Meadowhall Shopping Centre, UK

- Total of 34 Frigadon chillers using R-1270
- Total cooling capacity 3,930kW, 1117 Tr.
- Installed in 2007
- Comfort cooling for 1M shoppers per week
- This would be unheard of in North America.



Auvil Fruit Co, Washington, USA

- Twin 260kW Frigadon Chillers
 - Primary Refrigerant R-1270 26.4kg (4 * 6.6kg) per Chiller
- Used to cool 15.4 million pounds of fresh apples worth \$9,000,000
 - 11 controlled atmosphere rooms and cold storage area.
 - Single secondary loop using 7000 liters Hycool 30.
- The building is loaded in 10 days with 30°C apples, pulled down in seven days to 1°C. Maintained at 1°C for up to ten months.



Varying COP by ambient air temperatures.

Compressor power COP at

2.73 at 30°C

4.90 at 10°C

Total chiller COP

2.12 at 30°C

3.84 at 10°C

Auvil Fruit Co, Washington, USA

Updates after the first year!

- Data reports show exacting pull down and that all rooms and cold storage areas maintained temperature throughout the year.
- Building operators report the system is simple to operate and requires less maintenance than NH3 systems at Auvil's other plants.

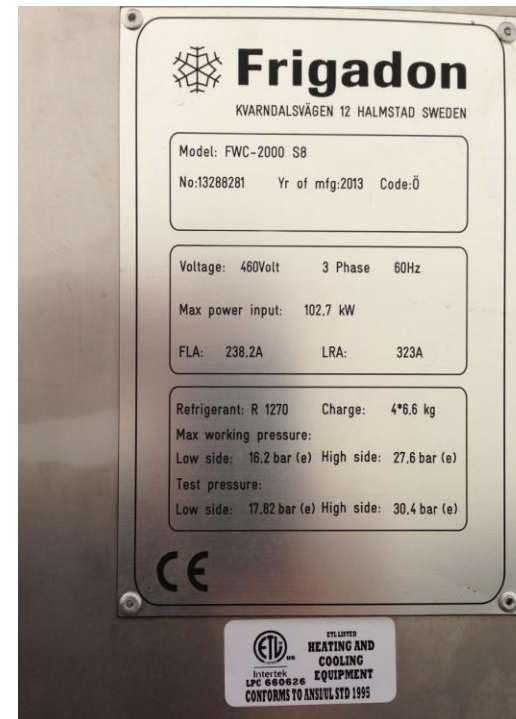


- Excellent product quality retained, little water loss from the fruit.
- First years power use will be analyzed after the building is emptied but appears to be the most efficient refrigeration at Auvil Fruit.

Project Challenges

1. Ensuring regulation compliance Federal, State and local authorities.
2. Concerns of underwriters for building and product insurance.
3. Operating engineers, a resistance to change.

1. Worked with local partners and Auvil Fruit who acted as the General Contractor for the project.
2. Retained Intertek testing agency in order to obtain UL 1995 certification for the chillers.
3. Worked with Zurich as the underwriter and their local assessor to prove the safety and track record of the Frigadon equipment in many installations.
4. We provided training directly to the operating engineers responsible for the building to build their confidence in the chillers. We have completely won them over!





business case

natural refrigerants

June 18-19, 2014 - San Francisco

Thank you very much!