



# Mayekawa Natural Five Solutions

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# **MAYEKAWA**

## About Mayekawa

- Mayekawa founded in 1924 in Tokyo, Japan to build compressors
- 1967 Mycom founded to facilitate sales in US market
- Over 70,000 screw and piston compressors operating in 100 countries
- Extensive experience in industrial refrigeration and food processing

Mayekawa - Japan



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# Refrigeration Solutions

- Improve system efficiency
- Reduce refrigerant charge
- Develop cost effective solutions
- Effectively manage risk of new technology and solutions
  - Adoption
  - Financial

# Obstacles

- First Cost
- Qualified service and installation
- Perceived business risk
- Safety concerns

# Natural Refrigerants

- Ammonia Refrigeration
- Heat Pump development with Japanese Government in 1970's
- Technology development in anticipation of Montreal and Kyoto protocol impacts



Natural Five 



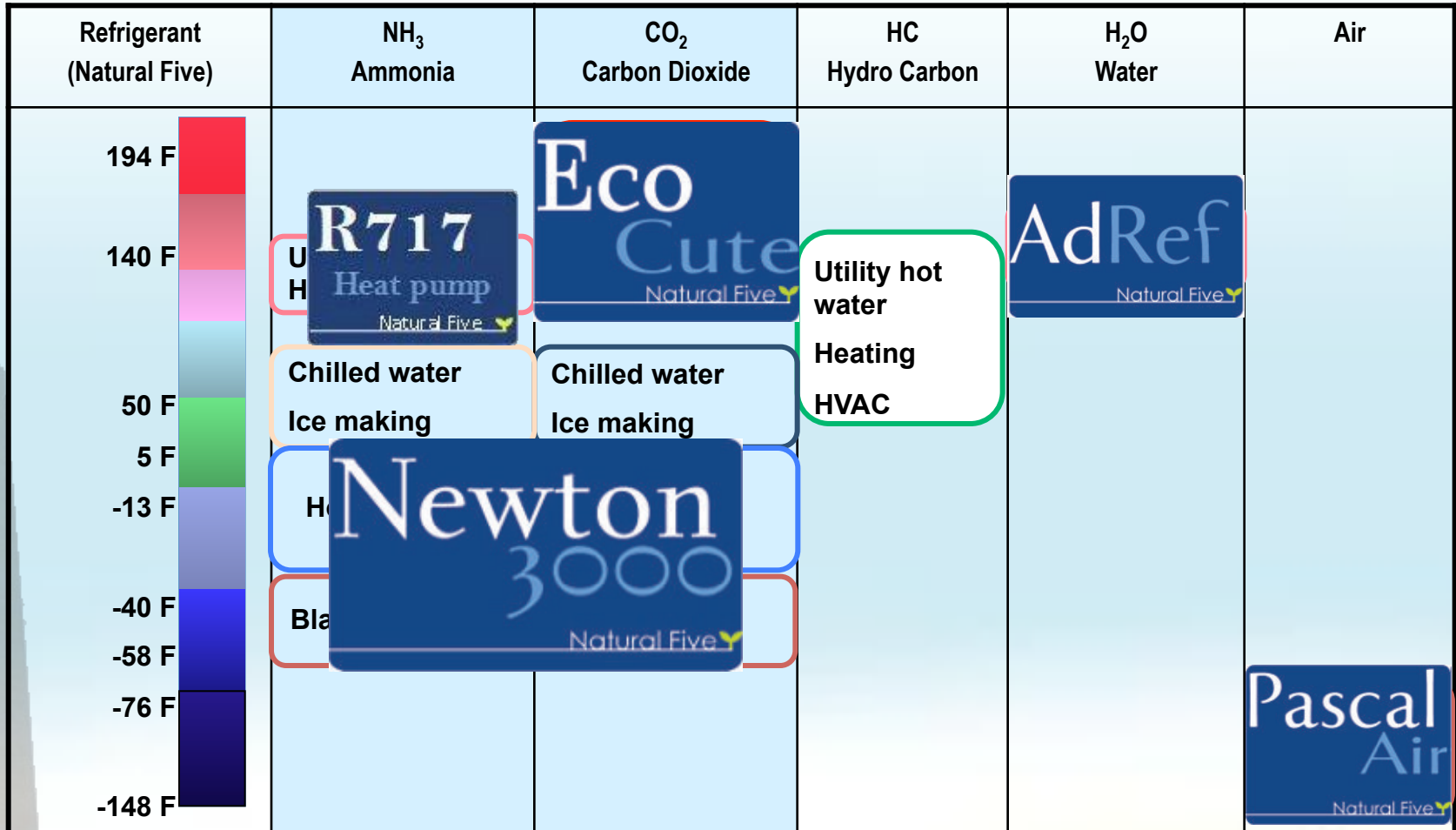
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ATMOsphere 2012

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# Application Chart



# Technology Development





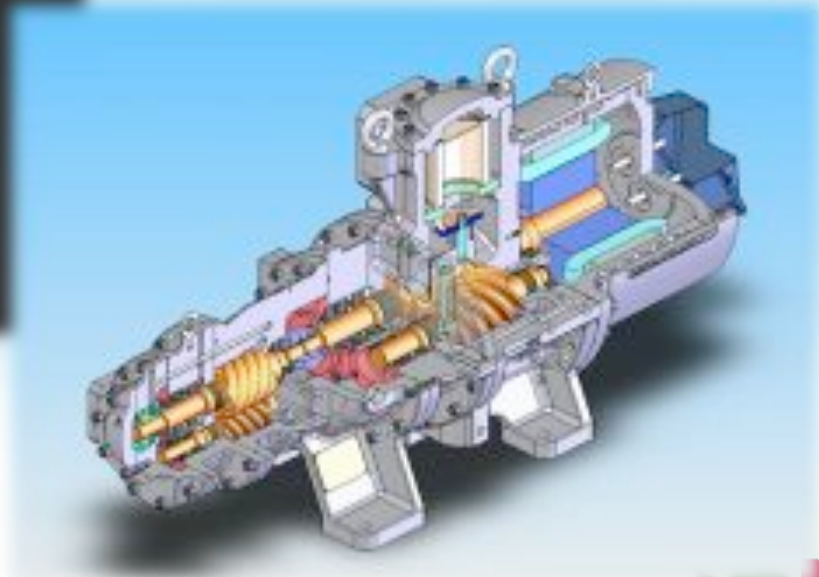
# Semi-hermetic Ammonia Compressors

- Reduced possibility of shaft seal leak
- Reduced shaft alignment problems
- More familiar to traditional Freon users

# Newton Compressors



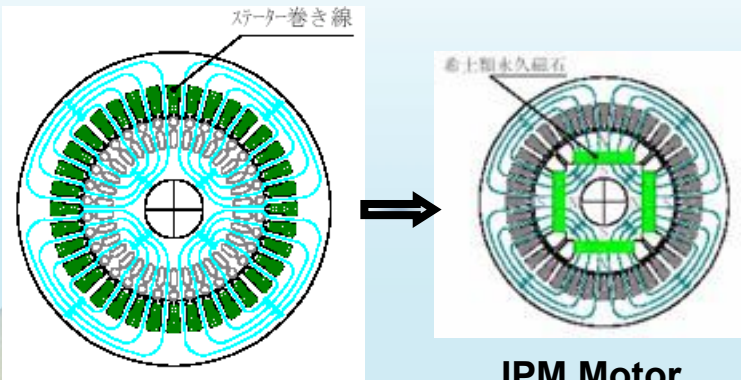
NewTon-C



NewTon

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# High Efficiency Motors (IPM)



Conventional Motor

IPM Motor

## Benefits of IPM motor

- 5-10% better in efficiency
- 40% smaller in size
- High speed is possible



Rotor



Stator

# Ammonia Scroll Compressor



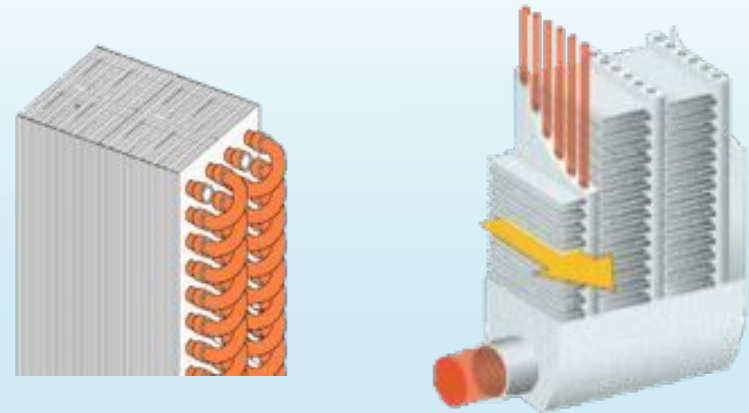
- No mechanical seal
- IPM motor for higher efficiency and smaller size
- Quieter compared to recip or screw compressors



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# Microchannel Technology

- Reduce ammonia charge for safety and non traditional applications
- Large capacity in small footprint
- High heat transfer coefficient



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# Recent Projects



# Refrigeration



- Natural Refrigerant Applications

- 85% of package sales are using natural refrigerants
- Predominantly Industrial systems



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# CO2 Heat Pump

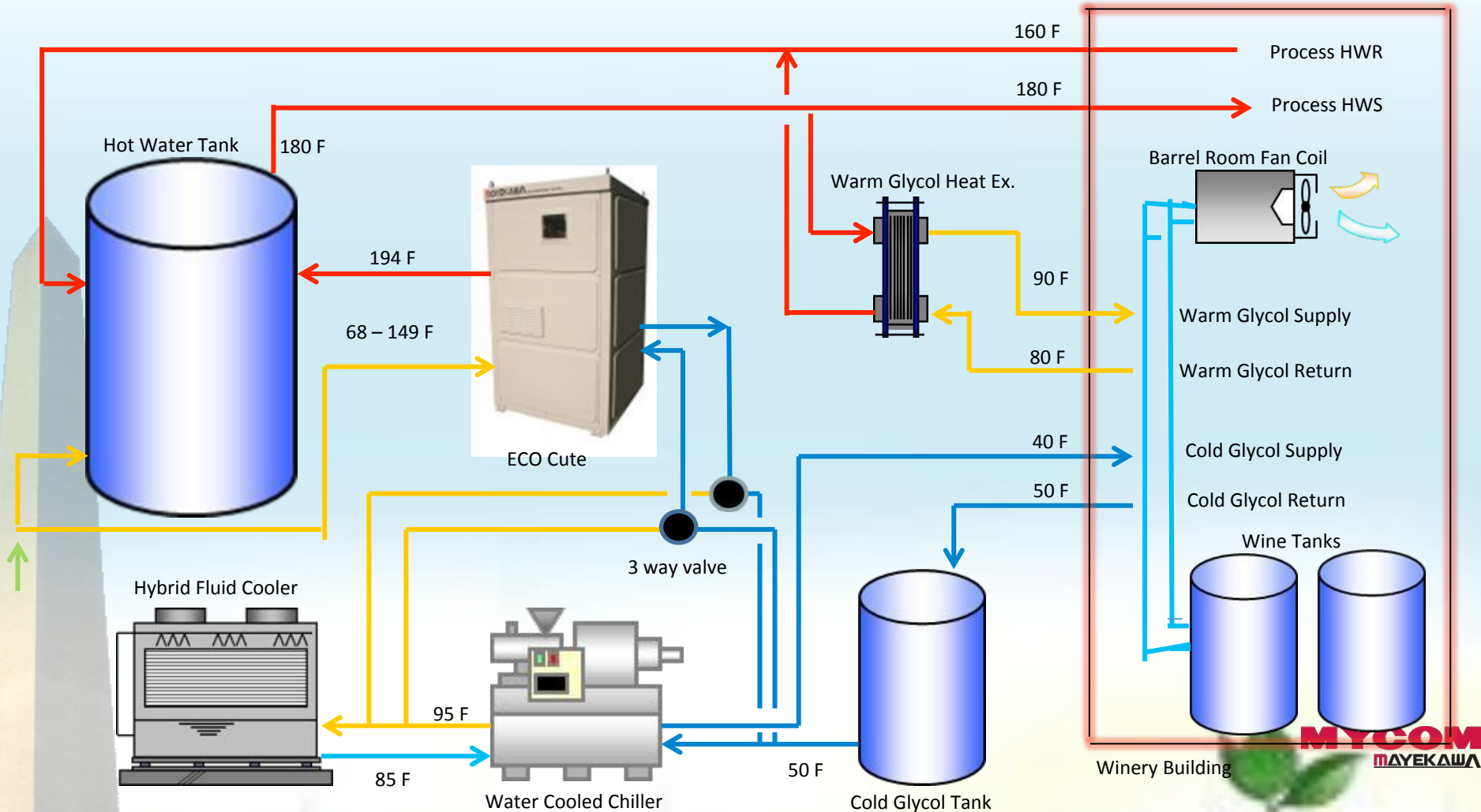


- Energy Efficient Winery
- Goal to be off grid for power
- Required 180F supply hot water
- Only expensive propane available to site





# EcoCute System



# Results

- High hot water supply eliminates the use for harsh chemical treatment in wash down
- Designed for off grid capability
- System ~1.35 cost of conventional refrigeration and boiler equipment
- Three year payback

# Garden City Ammonia Program

- Trained over 8,500 ammonia operators
- Hands on training equipment
- Includes safety programs

# Training the next generation



- Purchased due to an increased demand for education on natural refrigerant systems

# Other Notable Projects

## Haliburton International Foods

- Old plant consisted of 14 semi hermetic Freon compressors for cold storage
- 8 semi hermetic Freon compressors for water chilling
- New ammonia plant to replace all synthetic refrigerants
- Chose ammonia because of energy savings and environmental friendliness

## Automotive Parts Drying

- Air source heat pump
- Replaces electrical heating
- Supply up to 190F hot air
- Superior end product quality

# Future Goals

- Continue to promote natural refrigerant products to traditionally Freon based users
- Forge industry partnerships
- Dedicate resources to application engineering of natural refrigerant products

# Future Market Developments



- Targeted application of natural refrigerant technology
- Chief growth areas
  - Supermarket
  - R22 Chiller Replacement
  - Low Charge Ammonia System
- Plant Integration beyond refrigeration system

# Natural is What We Design For





# Thank you

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