TRANE

Water Cooled Screw Chillers And Water/Water Heat Pumps

Ingersoll Rand

TRANE

YOUR EXPECTATIONS IN ONE PRODUCT

- Sustainability
- Capacity
- Efficiency
- Versatility
- Reliability

TRANE

READY FOR A SUSTAINABLE FUTURE

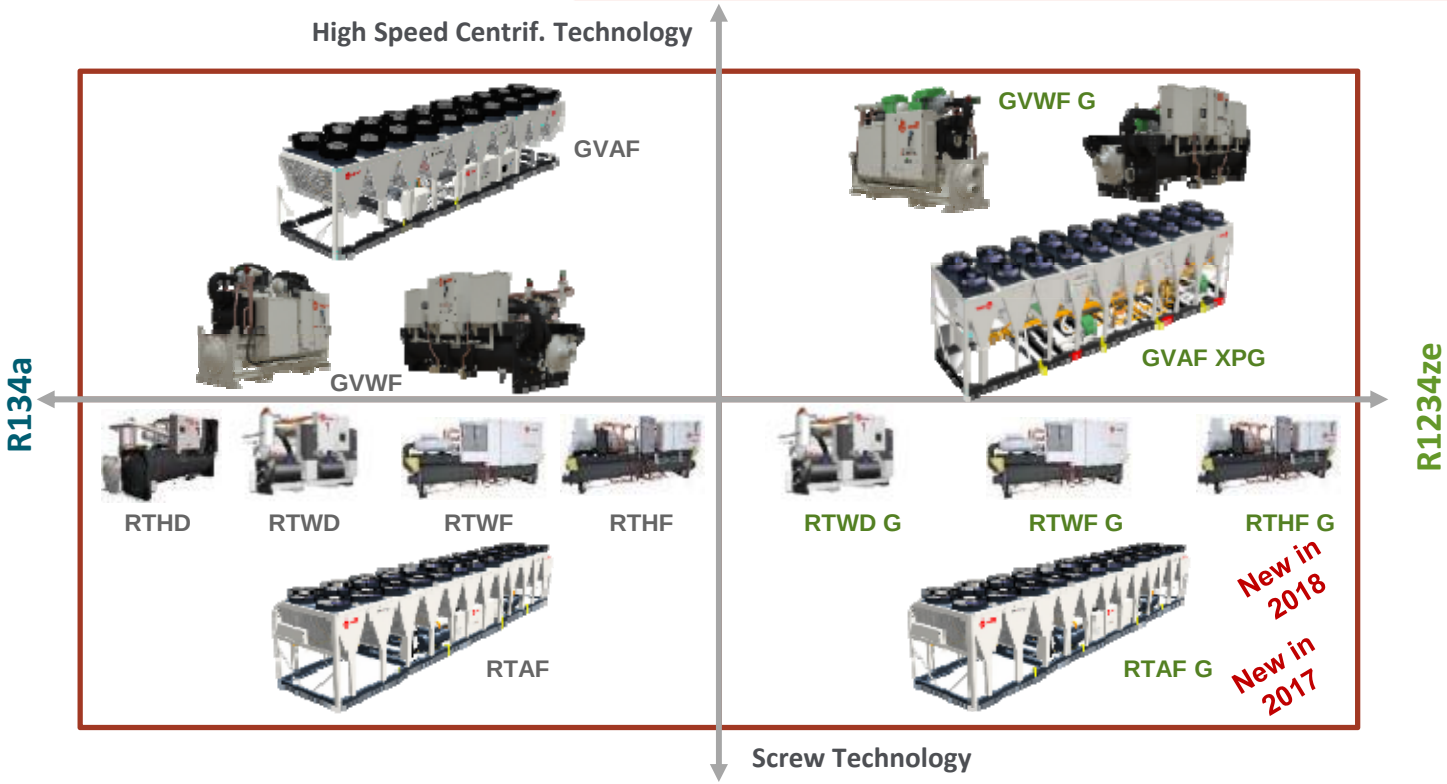
R1234ze

0 ODP
Near Zero GWP (<1)

EcoWise™

XStream™ chillers with near zero GWP refrigerants are part of the Ingersoll Rand EcoWise™ portfolio of products that are designed to lower their environmental impact with next-generation, low global warming potential (GWP) refrigerants and high-efficiency operation.

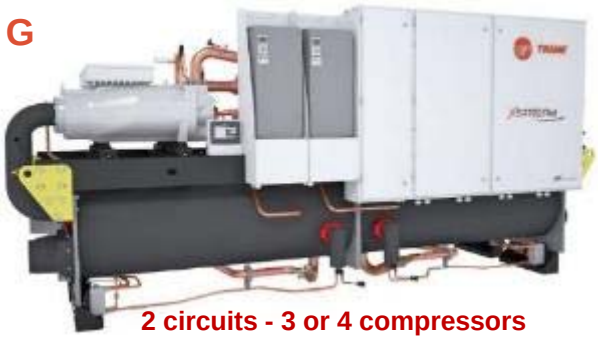
A UNIQUE PORTFOLIO FOR YOUR NEEDS



LARGEST CAPACITIES IN THE INDUSTRY

CAPACITY | EFFICIENCY | RELIABILITY | VERSATILITY

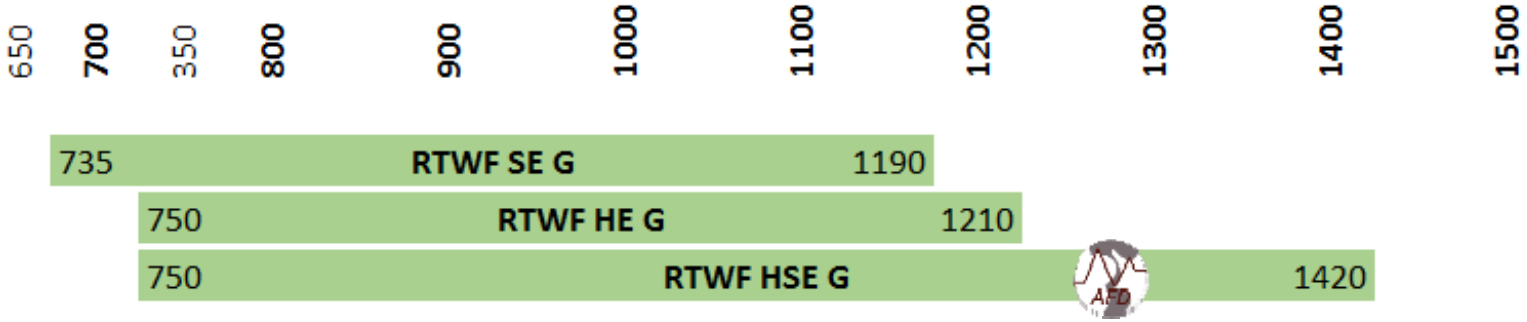
RTWF G



R1234ze

2 circuits - 3 or 4 compressors

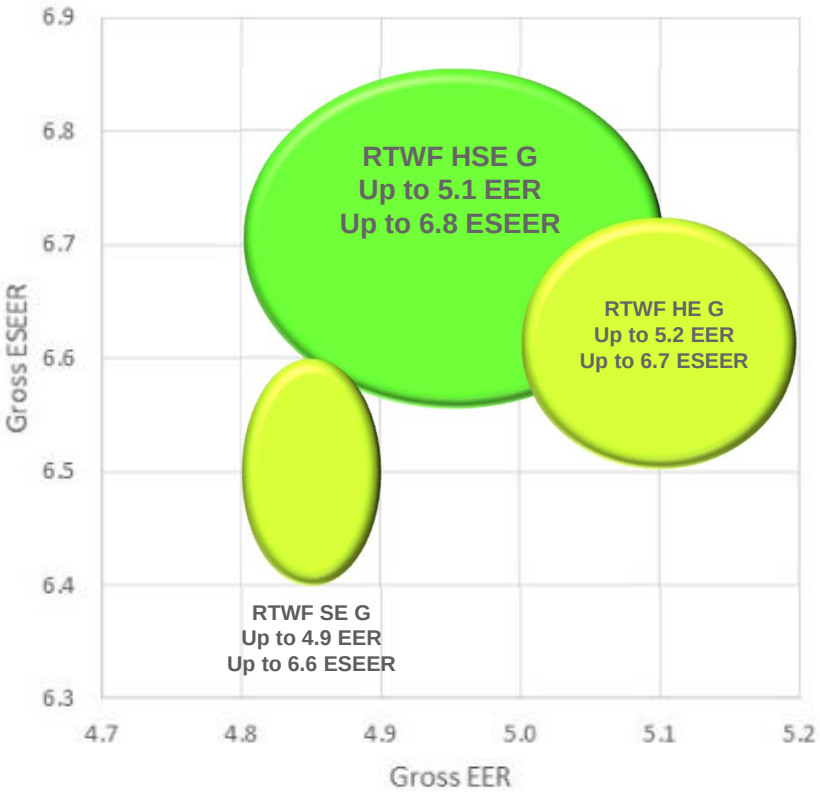
Cooling Capacity (kW)

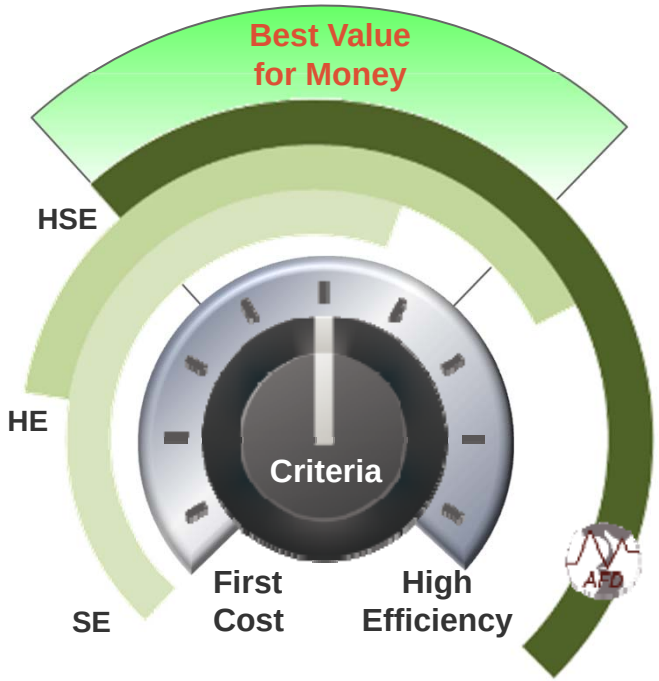


Cooling capacities: 12/7° C Entering/Leaving evaporator - 30/35° C Entering/Leaving Condenser

ONE PLATFORM, FLEXIBLE DESIGN

CAPACITY | **EFFICIENCY** | RELIABILITY | VERSATILITY





UNIT DESIGN

CAPACITY | **EFFICIENCY** | RELIABILITY | VERSATILITY

1 Compressor

- Direct drive, low speed
- Load matching down to 15% of full load

2 Heat Exchangers

- Cross Flow Serial Heat Exchangers design
- Trane patented evaporator design
- New condenser design
- Designed to convert Trane compressor design into premium performance at all applications

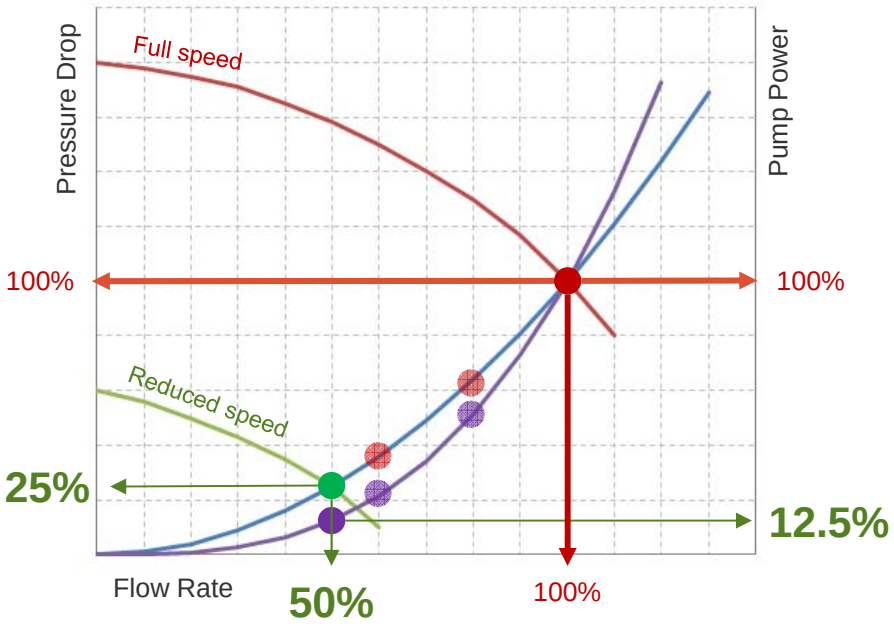
3 Controls

- Fastest controls of the industry
  - Safe VPF
  - No nuisance trips (Adaptive controls)
  - Temperature control within 0.3C

4 Adaptive Frequency™ Drive

- Industry leading Seasonal Efficiency
- Eliminates inrush current

VARIABLE FLOW FOR PREMIER SYSTEM EFFICIENCY



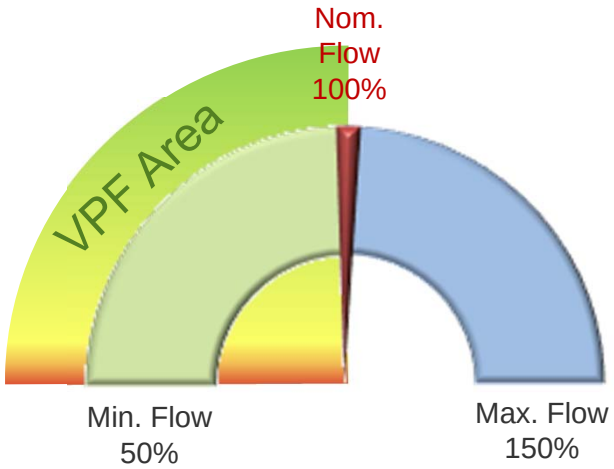
Benefits

- **Less pump power for more system efficiency**
  - ➔ 80% part load = 51% pump power
    - ➔ 60% part load = 22% pump power
      - ➔ **50% part load = 12.5% pump power**
- Constant temperatures
  - ➔ Accurate stable controls
- Lower speed:
  - Lower pump wear
  - Less noise in piping and valves
  - Capacity increase of existing infrastructure

VARIABLE FLOW COMPATIBILITY

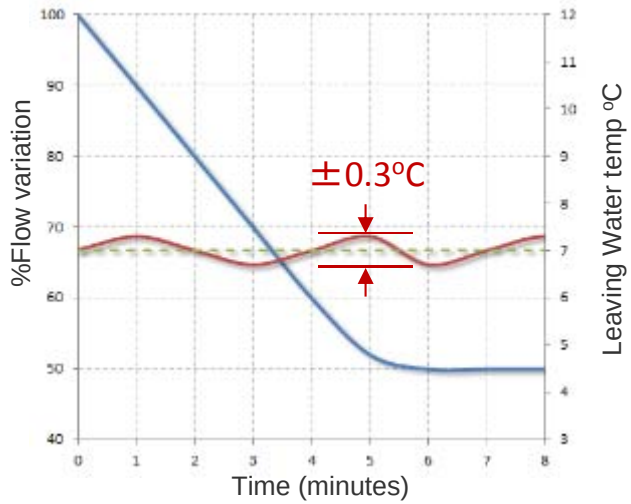
Evaporator

- Designed to manage VPF*



SmartFlow Control

- Algorithm designed to handle variations of 10% per minute
- Maintains water temperature within ±0.3ºC
- Ability to deliver a signal to control variable speed pump

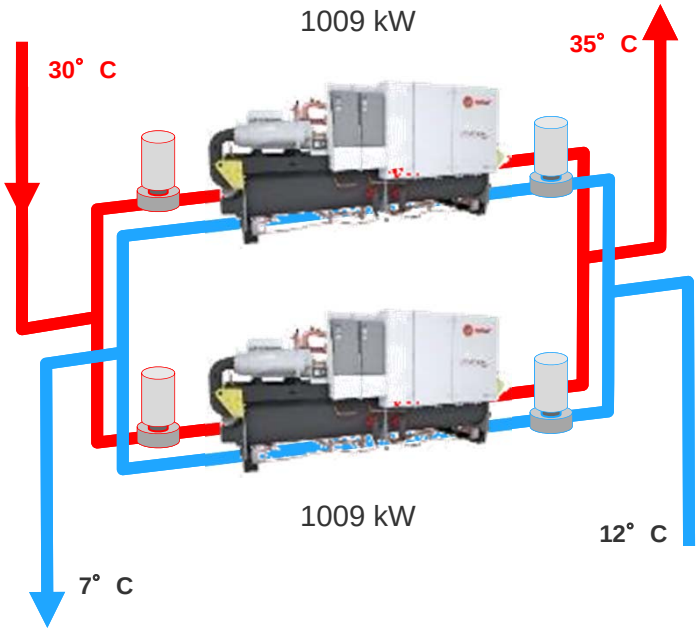


*Variable Primary Flow

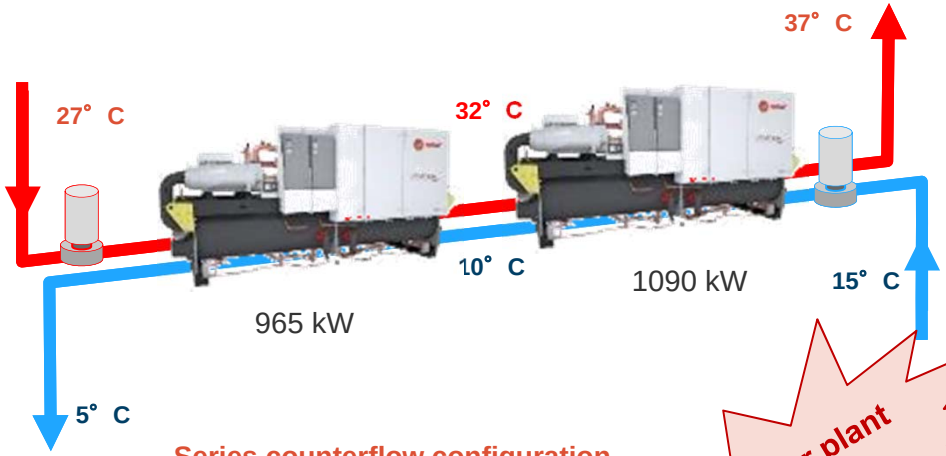
SERIES COUNTERFLOW CONFIGURATION

CAPACITY | **EFFICIENCY** | RELIABILITY | VERSATILITY

Traditional Parallel piped chillers configuration



Series Series Configuration



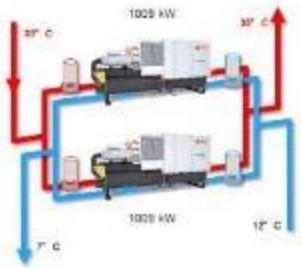
Series counterflow configuration

- Improves system efficiency
- Saves installation cost
  - → Smaller diameter piping
  - → Fewer pumps
  - → Smaller pumps
- Great opportunity for Free Cooling on first Chiller (if appropriate)
- VPF operation further enhances system efficiency

Chiller plant EER improved

SERIES COUNTERFLOW CONFIGURATION

CAPACITY | **EFFICIENCY** | RELIABILITY | VERSATILITY

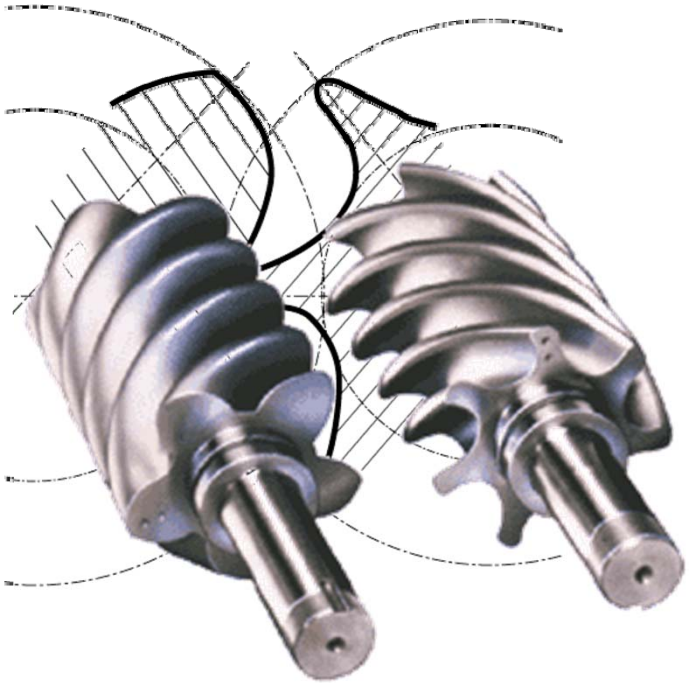


Example

	Parallel Piped Chillers	Series Series Configuration	Benefits
Total Cooling Capacity	2018 kW	2055 kW	
Chillers EER	100%	103%	**Enhanced efficiency**
Necessary Pump Power (Chillers only)	5.6 kW 4 pumps	6.2 kW 2 pumps	**Lower installation Cost**
Pipe run	Cooling Side : 1000 m Rejection side: 1000 m		-
Pipe Diameter	Cooling Side : 10” Rejection side: 10”	Cooling Side : 8” Rejection side: 8”	**Reduced cost of piping**
Total System Pump Power	42 kW	31 kW	**Reduced System Pump Power**

More than 30 years of experience

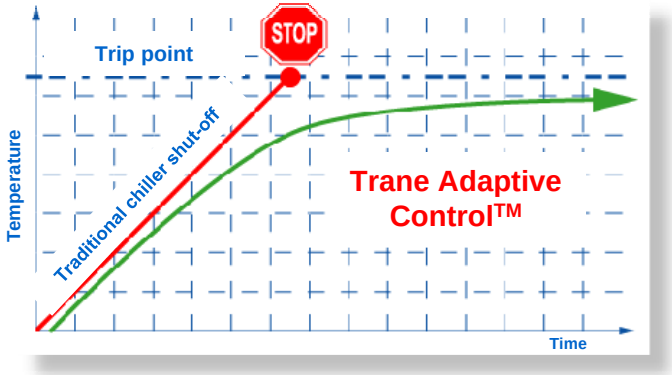
- Designed, built and tested according to the highest demanding and rugged standards
- Proven track record
  - ➔ More than 300 000 compressors worldwide
  - ➔ Industry leading reliability: rate greater than **99.5%**
- Stable operation with no surge
- Fewer moving parts
- Direct drive low speed
- Suction gas cooled
- No oil pump needed
- Resistance to liquid slugging
- Field serviceable
- Wider operating map in the industry



Intuitive Display in Local Language

Trend Charts

Diagnostics



Trane Adaptive Control™

- Patented Industry leading algorithms
- Takes actions to prevent shutdown due to abnormal operating conditions:
  - Flow failure
  - Cooling tower or Dry cooler malfunction
  - Extreme operating conditions
- Clear visibility of operation through graphics:
  - Trend monitoring
  - Performance follow-up
  - Preventive maintenance anticipation
- More than 100 diagnostics made when a fault is detected
- Display indicates fault, time and date of diagnostic
  - Quick localization of problem
  - Faster action
- Allows problem fixing without shutting off
  - Downtime minimized

Extended testing

- Operation in extreme operating conditions leading to World Class reliability
  - Ambient Air: from -25°C to 55°C
  - Leaving Water: from -12°C to 85°C
- Pressure vessels resistance
- Electro-Magnetic compatibility (CE compliance)
- Finite element analysis for structure and components design resistance and robustness
- Acoustics and vibrations testing

QUALITY STANDARDS

CE compliance

- Pressure Equipment Directive (PED) 97/23/CE
- Machinery Directive (MD) 2006/42/CE
- Low Voltage Directive (LV) 2006/95/CE
- Electromagnetic Compatibility Directive (EMC) 2004/108/CE
- Electrical Machinery Safety Standard EN 60204-1
- Electromagnetic Emission and Immunity Standard EN 61800-3 category C3

Quality Insurance processes

- ISO9001
- ISO14001

3rd Party certifications

- Eurovent for units up to 1500 kW
- AHRI for units above 700 kW

Guaranteed performance of the investment

DESIGNED FOR MULTIPLE APPLICATIONS IN COOLING OR HEATING

Office buildings

Healthcare

Data Centers

Automotive Industry

Pharmaceutical Industry

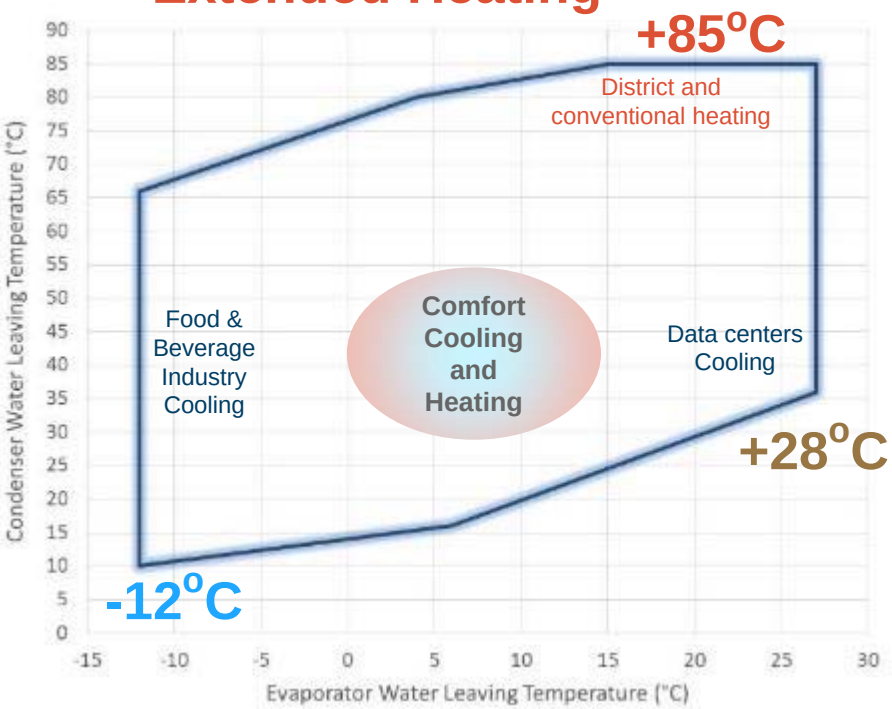
Food and Beverage Industry

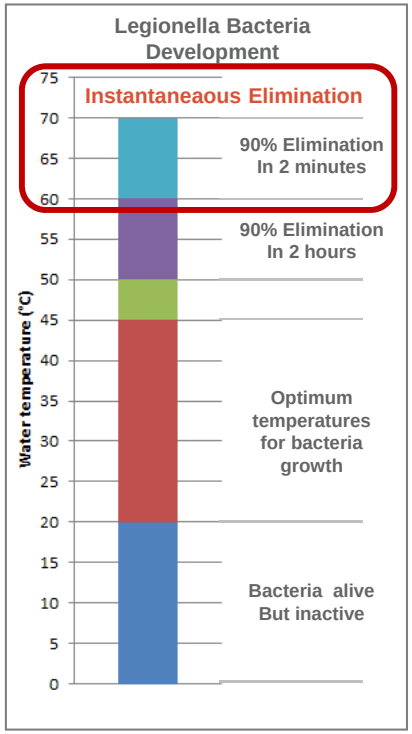
Hospitality Industry

District Cooling
District Heating

OPERATING TEMPERATURE RANGE

Extended Heating

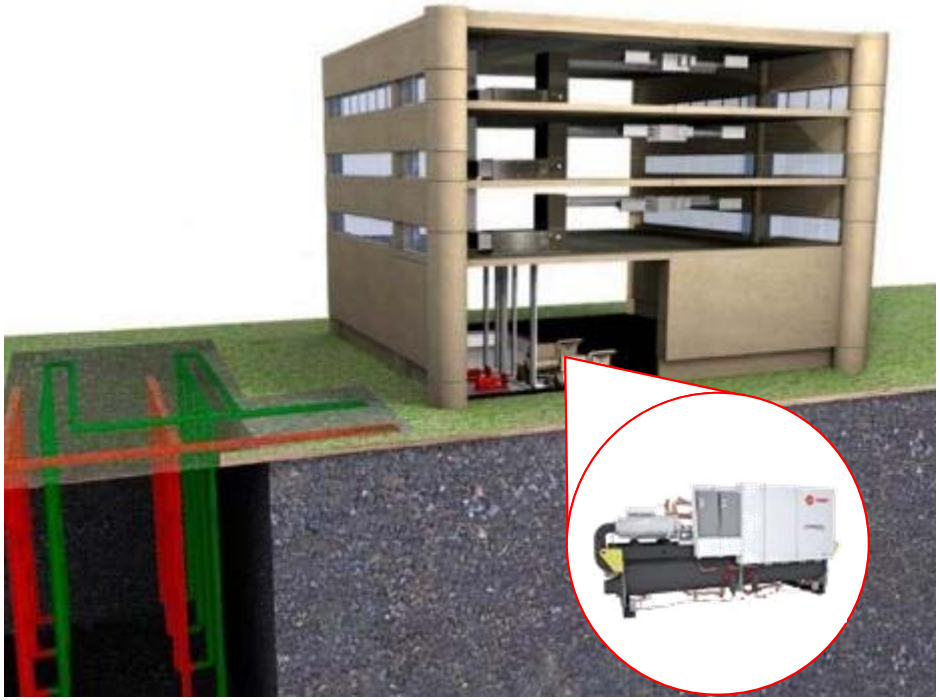




HEAT PUMP OPERATION

CAPACITY | EFFICIENCY | RELIABILITY | **VERSATILITY**

- High leaving water temperature
  - ➔ Up to 85°C
- High capacity water/water heat pump
  - ➔ Up to 1.6 MW at 40/45°C*
  - ➔ Up to 1.5 MW at 47/55°C*
  - ➔ Up to 1.4 MW at 55/65°C*
- High COP**
  - ➔ Up to 4.8 at 40/45°C*
  - ➔ Up to 4.0 at 47/55°C*
  - ➔ Up to 3.2 at 55/65°C*
- Dedicated and optimized compressor for heating applications



* Entering/Leaving evaporator : 10/7°C
** Net COP Calculated according to EN14511-2013 standard

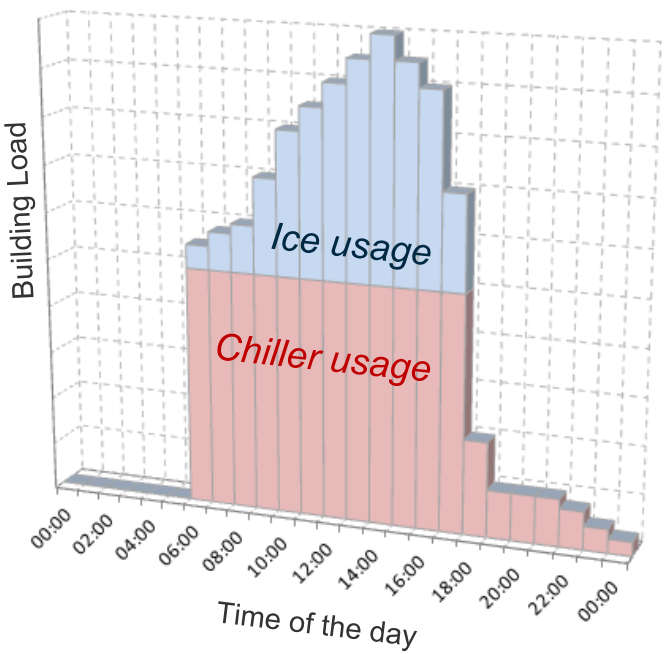
BRINE PROCESS APPLICATIONS

CAPACITY | EFFICIENCY | RELIABILITY | **VERSATILITY**

- Compliant with Med Temp industrial process application minimum efficiency requirements (SEPR)
  - European regulation (EU) 2015/1095
  - Entry into force on 2016, July 1st
- Operation from 4 down to -12ºC leaving water temp
- Dedicated compressor for efficiency and reliability
- Operation with various brines:
  - Ethylene Glycol
  - Propylene Glycol
  - Ethanol
- Value of standardized design, capable to meet special requirements

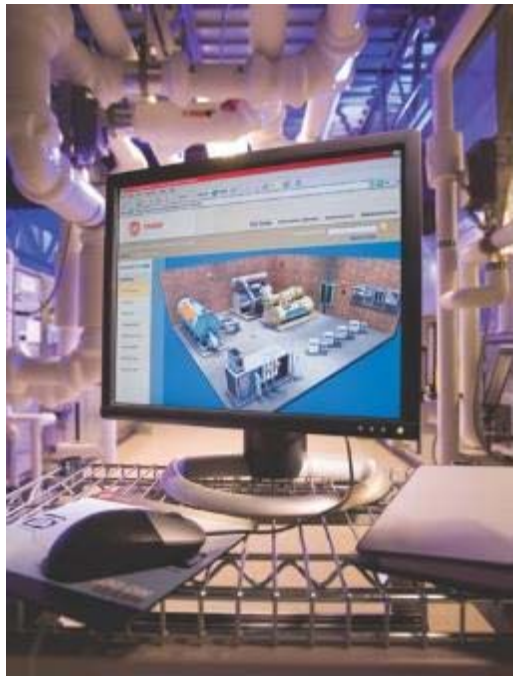
ICE STORAGE

Typical ice storage application



- Energy storage application
- Chiller builds ice when utility rates are lower, or when heating requirement overtakes cooling requirement
- Chiller smartly balances the contribution of ice melting and chiller operation to meet the cooling load with the best system efficiency
- Controls takes charge of:
  - controlling set points,
  - actuating chiller and or ice pump and other accessories

COMMUNICATION



- Compatible with all Trane Building Management Systems and chiller plant controls
- Communication interfaces
  - BACnet™ IP
  - BACnet™ MSTP
  - ModBus™ RTU
  - LonTalk™ (LCI-C)

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- Capacity
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