Toyesi

Energy Efficient Commercial Heat Pumps and Chillers

Trident

Farm Fresh Heat Pumps & Chillers

Aquaculture, Horticulture & Aquaponics

Australian Designed & Built

Heat Pumps & Chillers

Trident Farm Fresh Range

For Aquaculture, Horticulture and Farming needs

Australian Owned

Australian Designed

Australian Manufactured

Aquatic Temperature Control

Aquaculture water temperature management.

Why use Aquatic heaters & chillers?

Aquatic animals respond to water conditions, environmental factors, temperature and seasons. Fish, Shellfish and Crustaceans rely on these conditions for healthy living and breading. From hatcheries to aquatic research centers also rely on these environmental factors to produce successful breeding stock and grow out ponds.

Using heaters and chillers in an aquaculture environment can help either control breading times, prolong breading cycles and even help boost growth parameters of the livestock. When handled correctly will increase the farms success and profits.

Many methods can be adopted for this control. Electric elements, gas boilers, chillers as well as heat pumps. Heat pumps provide the most versatile and can significantly reduce running costs compared to other methods.

However, standard pool heat pumps lack the technology to manage aquaculture temperature control as they are usually single operation and deigned just for heating. A reverse cycle heat pump will allow you to both heat and chill the water to maintain the ideal water temperature and manage seasonal changes effectively.

You will find the Toyesi Heat Pump Trident Farm Fresh Range exceptional for this challenge.

Trident
Farm Fresh Heat Pumps & Chillers
Aquaculture, Horticulture & Aquaponics

Aquatic Projects

Aquaculture water temperature management.

Aquaculture Projects

In Australia there are many species of seafood that are now grown and produced in farms. Most, if not all, of these species start their life in a hatchery. Using Toyesi's Trident heat pumps during the breeding and grow out stages can really make the difference. Some species can really benefit from continued environmental and temperature control right through the farming to customer process.

Some of these species include but not limited to:

- Freshwater Fish & Saltwater Fish - Murray Cod, Silver Perch, Golden Perch, Bass, Eels, Trout, Barramundi, Tuna, Salmon, and many others
- Prawns, Yabbies, Red Claw, Marron, Lobsters, Buggs
- Abalone, Mussels, Oysters and other Shellfish.
- Octopus, Squid, Crocodiles, and other interesting species.
- From very large commercial projects to Zoos, Aquariums, Research Projects and many home-grown projects, We even have a system on board a research boat.

Trident
Farm Fresh Heat Pumps & Chillers
Aquaculture, Horticulture & Aquaponics

Aquaculture HEATER - CHILLER

Example Projects
A small sample

LIVE OYSTER PROJECT – SOUTH AUSTRALIA

CLIENT ISSUE

- To maintain 25°C in winter and 26°C in summer.
- 1-phase power restrictions
- Out-door heat pump solution
- Located on the coast with high salty air environment
- Repeat client with expansion project

SOLUTION

- Installed a **TCL175SSDs-Ti in 2011 & TCL250SSDs-Ti in 2016** Toyesi Trident Aquaculture heater/chiller heat pump with Titanium heat exchanger into the system.
- Special 316 marine grade chassis upgrade and baked epoxy coil coating to prevent environmental corrosion.
- Special extended surface, Manual cleanable, titanium heat exchanger.
- "Shellfish Happy" = "Client Happy"

LIVE TROUT GROW OUT POND PROJECT – WESTERN AUSTRALIA

CLIENT ISSUE

- To maintain 20°C in winter and 26°C in summer.
- Out-door heat pump solution
- 2 x 12,500L Polyethylene tanks & 1 x 11,500 bio filter tank.
- 1% of water lost as waste each day (1% make up water)
- Required around 9kW chilling in summer and 14kW heating in winter

SOLUTION

- Installed a **TAC300SSD Ti** Toyesi Trident Aquaculture heater/chiller heat pump with Titanium heat exchanger into the system. Rated at 14kW heating & 10kW chilling.
- The heat pump was fitted in line with filter system with no issue – problem solved
- "Fish Happy" = "Client Happy"

LIVE BARRAMUNDI PROJECT – NSW SOUTH COAST

CLIENT ISSUE

- Looking primary to control winter water temp at around 24°C.
- Outside ambient temperature down to -2°C at night
- Insulated enclosure (shed) around 19°C ambient
- Over 150,000 Liters of water in system
- 5% of water lost as waste each day (5% make up water)
- Required around 50kW of heating

SOLUTION

- Installed a "**TAC1200 SSD Ti**" Toyesi Trident Aquaculture heat pump with Titanium heat exchanger into the system. Rated at 58kW heating at 15°C
- When in line with filter system the pressure drop was too great for the require tank water flow in this project.
- The fix was to operate the heat pump directly with the water sump – problem solved
- "Fish Happy" = "Client Happy"

Why Toyesi

A Quick Overview

Toyesi Farm Fresh Range.

Has been designed and built in Australia for Australia, with over 30 years hands on experience. We do not just sell off the shelf products, Toyesi designs and builds the system for our clients' needs.

We use superior craftmanship, components and designs unique to Toyesi.

Some areas where we dominate the industry

- Longevity of our systems with units in service 10, 15 and 20 plus years.
- Customisability – Most flexible system designs in the industry.
- Both outdoor and indoor plant room systems
- Reverse cycle heater chillers.
- High COPs and efficiencies, due to cleaver design.
- Evaporator/Condenser & Corrosion resistance
- Heat Exchangers
- Separated compartments to reduce corrosion
- Sound attenuated options.
- Heat loads calculations using full mathematical thermal formulae
- Free over the phone support for the life of our systems.
- Direct communication to Engineers for all support enquiries.
- Advanced defrost and other safeties.
- Multi-Function & Transthermal systems

- And more.

Other Trident Equipment Includes:

- PAS – Process air handling. Wet area & cool room temperature control system – True Reverse Cycle Environment Control.
- PCVER – Passive Cooling, Dehumidification, Ventilation & energy Recovery.
- Transthermal – Energy saving and multi-function heat pumps & chillers.

Why Toyesi

A Quick Technical Guide

Nominal Technical Data

Model	Cooling kW	Heating kW	Input kW	COP	Phase (1 or 3)
TAC 250	7.7	11.0	2.8	3.9	1 Phase
TAC 300	9.8	14.0	3.0	4.7	1 or 3 Phase
TAC 400	12.6	18.0	3.8	4.7	1 or 3 Phase
TAC 500	14.0	20.0	4.5	4.4	1 or 3 Phase
TAC 600	18.2	26.0	4.9	5.3	1 or 3 Phase
TAC 800	26.6	38.0	7.1	5.4	3 Phase
TAC 1000	33.6	48.0	7.9	6.1	3 Phase
TAC 1200	40.6	58.0	10.9	5.3	3 Phase

Heating	Based on 27oC Water & 15oC Ambient
Cooling	Based on 15oC Water & 25oC Ambient

Mini Heater Chillers Nominal Technical Data

Model	Cooling kW	Heating kW	HP	Litres of Water	Phase (1 or 3)
TAC -W25	2.5	2.7	1.0	1000	1 Phase
TAC - W35	3.5	4.0	1.5	1500	1 Phase
TAC - W50	5.0	5.4	2.0	2000	1 Phase
TAC - W72	7.2	8.1	3.0	3000	1 Phase
TAC - W120	12.5	13.5	5.0	5000	3 Phase

Highest Quality Coils
Best Corrosion Protection

Superior Coil Corrosion Protection.

There are many pre & post coating protection for evaporator/Condenser coils used in the HVAC & Heat Pump markets. They all provide a degree of protection covering different potential uses. The most common coatings used in today's heat pump systems standard gloss cover and the blue coating (also known as Blue Fin Coating). However more advanced heat pumps now use hydrophilic coatings or Epoxy coatings (sprayed on or for best performance dipped and baked on).

Toyesi heat pumps have used the "Baked on Dipped Epoxy Coating" as its preferred coating for over 20 years now. Best suited to any project where saltwater spray may be common, such as by the ocean, or for projects that use saltwater such as in aquaculture.

Coil Coating	Corrosion Protection	Salt Spray Resistance	UV Resistance	Acidic Resistance	Impact Resistance
Natural / Standard	Low	-	-	-	-
Blue-Fin Coating	Moderate	✓	✓	✓	✓
Hydrophilic Coating	Good	✓✓	✓✓	✓	✓✓
Epoxy Coating	Excellent	✓✓✓	✓✓✓	✓✓	✓✓✓✓
E-Coating	Best	✓✓✓✓	✓✓	✓✓✓	✓✓

Table ~ Based on industry reports, tests and feedback

Coil brochure available on request

Toyesi's New E-Coated Coil.
Advanced Hydrophobic Coating Technology

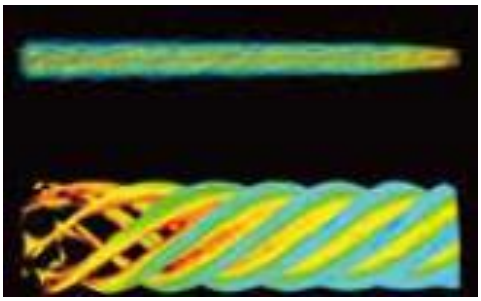
E-Coat: The E-Coat provides superior protection against many corrosive environments. The coils have an extremely durable and flexible epoxy coating uniformly applied all over the coils' surface for complete isolation from the contaminated environment and is one of the most effective means of corrosion protection available and is considered the benchmark for corrosion resistance.

Highest Quality Heat Exchangers
Superior Performance

Full Metal Jacket Titanium Heat Exchangers

***We do not use* the pool heat exchanger industry standard of having titanium in plastic shells.** Although they considerably reduce the cost of manufacture of a heat pump, we have found that they are prone to premature failure due to excessive pressures, temperatures, heat stress elongation, distortion and the melting of plastic fittings as well as suffering from water turbulent vibration stress cracks & fracturing causing leaks and failure. Often this is not from the titanium failing, but the PVC outer shell.

Our refrigerant-to-water heat exchangers are made of full lengths all metal titanium inner tube and stainless steel outer tube type heat exchangers that are fully welded or braised and have been produced for many years, and are specifically made for refrigeration, air conditioning and marine industry applications with known and predictable lifetime for fresh, chlorinated water and most importantly, for marine saltwater conditions. They have easy to silver-braze connections for refrigerant and water connections.



- Water Circuit in the inner coil and gas in between the inner and outer coils to enhance turbulence to intensify the heat transfer coefficient.
- Spiral corrugated tubes to increase heat transfer area.
- Continuous tubing and less welding points increases the reliability even under pressure.
- Anti-freezing and self-cleaning properties.
- Outer insulation for chilling projects.

Heat exchanger brochure available on request

Trident Farm Fresh Range

For fresh and saltwater applications

Built durable for Farming Needs.

Designed with the help of industry experts the Trident Farm Fresh range of heat pumps and chillers has been built to endure the long hours and harsh conditions of both fresh and saltwater projects.

Our unique full metal jacket titanium heat exchangers are built with extra thick walls and efficient heat energy transfer. Give them superior performance and longevity.

Key Features

- ✓ Extremely energy efficient with C.O.P from 4 to 8 depending ambient conditions.
- ✓ Available in 10+ models from 4kW to 58kW
- ✓ Customisable for both outdoor and indoor installations.
- ✓ Low ambient air performance
- ✓ 304 Stainless steel chassis – upgradable to 316 marine grade stainless steel
- ✓ Advanced system protect features including: Flow switch-, low- and high-pressure cut-out switches.
- ✓ Horizontal air flow
- ✓ Full metal jacketed titanium heat exchanger.
- ✓ Advanced Defrost intelligence
- ✓ Heat, Chill or dead-band-controlled temperature management system.
- ✓ Unique Toyesi water balance kit & COP Gauge for increased efficiencies year-round.

Trident
Farm Fresh Heat Pumps & Chillers
Aquaculture, Horticulture & Aquaponics

Toyesi

Energy Efficient Commercial Heat Pumps and Chillers

The Toyesi Difference

Proudly an Australian company since it's creation in 1989.
•Australian Manufactured Heat Pumps
•30+ Years of industry experience
•Immense Tacit Knowledge
•Designed, Manufacture, Tested & Supported Right Here in Australia
•Local supplier, Local Support, Local Knowledge

Eco-Friendly Energy Efficient Design
•Industry leader in efficient heat pumps since 1989
•Typical COPs of 5 to 10 or more achievable, pending set up
•Up to 1000% more efficient than other heating technologies
•Water Balance Kits & COP Gauges as standard for tweaking performance
•R407C Refrigerant Used

Unmatched Design Flexibility
•Because we manufacture our own equipment, we have this unmatched flexibility.
•Customisable Chassis – Low-line, Slim-line, stackable, 304 or 316 Stainless Steel & Coatings.
•Heat Exchanger Options – Copper-Nickle & Titanium options
•Standard outdoor designs, Dedicated In-plant systems
•Sound Attenuation, Ducting and more.
•New Transthermal Technology offering amazing multi-function heat pumps.

True Green Solution
•Energy Efficient
•Long life-cycle design
•Serviceable for life
•Minimum plastics used
•Design to be as close to 100% recyclable as possible.
•Being an Australian Manufacture means we build to Australian standards.
•Multi-function Transthermal Technology unique to Toyesi

We've been making efficient commercial heat pump and chiller projects easy since 1989

Trident
Farm Fresh Heat Pumps & Chillers
Aquaculture, Horticulture & Aquaponics

The Specialists in Water Heating and Chilling
Trident – is a division of Toyesi.

Toyesi Pty Ltd.
2 / 27 Binney Road, Kings Park NSW 2148
P – 02 9679 9400
E – info@toyesi.com.au W- www.toyesi.com.au

ABN:33 003 133328 ARC Licence RTA AU02886