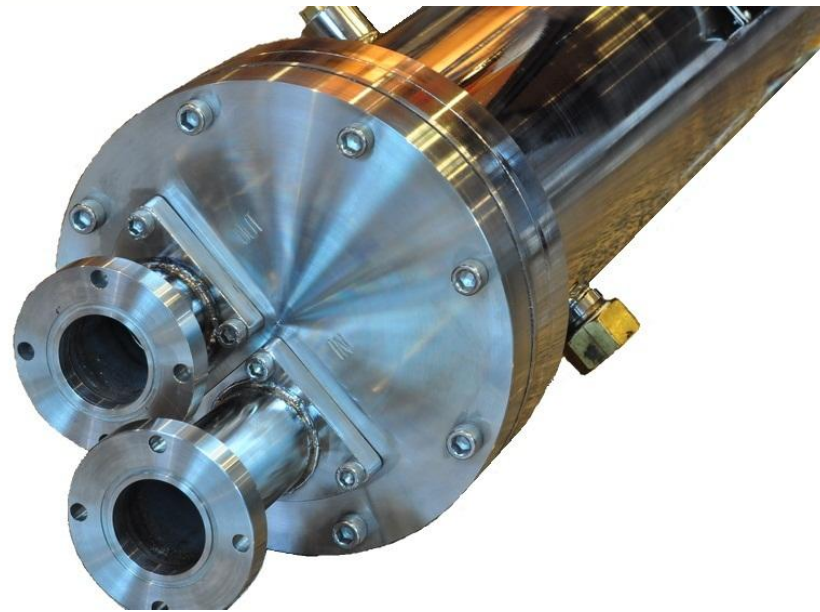


# TERMCDINAMICA

MARINE INVERTER AIR CONDITIONING



## TITANIUM HEAT EXCHANGER

Termodinamica is specialized in manufacturing and designing advanced heat exchangers for industrial and marine applications.

Base material is high purity Titanium full tig welded in Argon protective atmosphere.

Valuable experience gained in the welding and materials has enabled us to build exceptionally reliable heat exchangers for heavy duty application where quality and reliability is paramount.

Our titanium exchanger is totally corrosion proof and prevent fouling by vegetation and salt in marine industry, it means that exchanger offer for all working life maximum performance without derating. No compare with all other material !

**Products are following:**

Pharmaceutical process

Offshore Oil & Gas process

Food process

Pool Heat Exchanger

Titanium Heat Exchanger

Titanium Shell & Tube Heat Exchanger

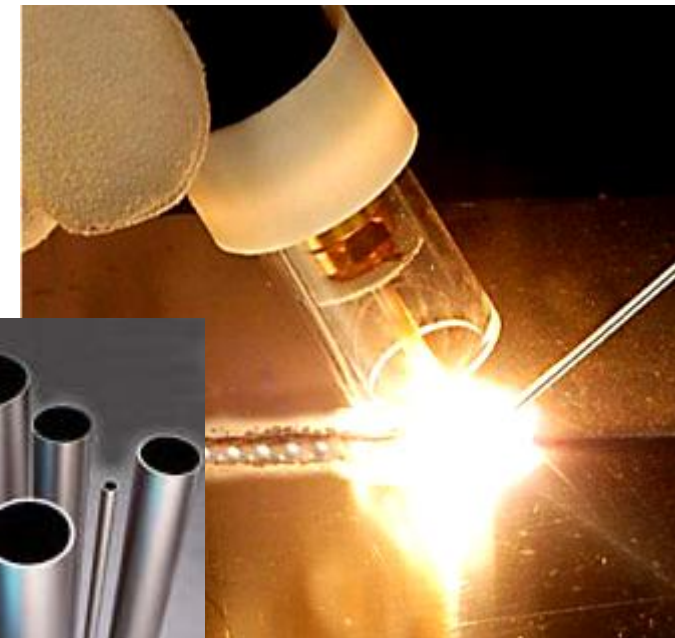
Titanium Condenser & Evaporator for HVAC

Engine Oil Cooler

Hydraulic Oil Cooler

Fuel Cooler

Plate Heat Exchanger



Core business is small series product and custom made solution. Provide us draw or heat transfer request and we will suggest better solution for you, our design office help you developing right product to satisfy your needs.

## Titanium Condenser & Evaporator – Chiller, Refrigeration, HVAC

After many time spent on research superior performance condenser for our AC marine system we decide to start by ourself design and manufacturing high quality product that can satisfy our passion for perfection. Results reached prompted many new clients ask our help in manufacturing tailor made heat exchanger.

Titanium used for marine exchanger is total corrosion and fouling proof.

Heat transfer will be not affected to salt and vegetation fouling in heavy duty work or after several years of function. Titanium allow high pressure and temperature work.

Marine Heat Exchangers are fabricated with the distinctive spiral corrugated tube design. This engineering allow high heat transfer coefficient with small size product. 10kw for 1 square meter.



Design Parameters	TUBES	SHELL
TEMPERATURE	406°F (208°C)	406°F (208°C)
PRESSURE	653 PSI (4.50MPa)	653 PSI (4.50MPa)

### Marine Condenser Nominal Performance

Model	Normal Capacity		Water flow	Width	Diameter	Weight
	kW	kBtu/Hr	Lt/min			
TIC-55	16	55	70			8
TIC-85	25	85	130			16
TIC-155	45	155	190			29
TIC-210	60	210	230	under	request	48
TIC-300	88	300	350			59
TIC-360	105	360	500			68
TIC-600	175	600	650			150
TIC-1200	352	1200	1400			230
TIC-4500	1310	4500	-			-
TIC-5000	1460	5000	-			-
TIC-6000	1760	6000	-			-

## Swimming Pool and SPA heat exchanger

Our swimming pool heat exchangers are designed by our special innovative tube designs, spiral twisted corrugation on the tubing surface, which were engineered to maximize the use of engine heat or boiler energy; thus increasing the overall thermal efficiency of the system.

These Swimming Pool models are perfect solution for pool, spa, and hot tub.

Fully constructed with pressurized shell and spiral corrugated inner tube. This ensures high velocities inside the unit making Swimming Pool heat exchanger a very reliable, efficient and cost effective way to transfer heat indirectly between any hot water circuit, steam circuit and any pool or spa circuit, besides other application.

We have a large range of heat exchangers well suited from 55,00 to up to 5,000,000BTU/H



Design Parameters	TUBES	SHELL
TEMPERATURE	406°F (208°C)	406°F (208°C)
PRESSURE	653 PSI (4.5MPa)	653 PSI (4.5MPa)

### Swimming Pool Heat Exchangers Nominal Performance

Model	Normal Capacity		Pool Capacity	
	kW	kBtu/Hr	Gallons@1°F/hr	M3@1°C/hr
SP-55	16	55	4700	32
SP-85	25	85	7300	49.7
SP-155	45	155	13300	90.6
SP-210	60	210	18000	122.6
SP-300	88	300	25800	175.8
SP-360	105	360	31500	214.6



## Titanium Heat Hexchanger – Custom made

Titanium Shell and Tube Heat Exchangers are suited for a vast range of chemical environments and conditions, due to a thin, invisible, but extremely protective, surface oxide film (primarily TiO<sub>2</sub>). Titanium is especially known for its elevated resistance to localized attack and stress corrosion in aqueous chlorides (e.g., brines, seawater) and other halides and wet halogens (e.g., wet Cl<sub>2</sub> or Cl<sub>2</sub>- sat, brines), and to hot, highly-oxidizing, acidic solutions (e.g., FeCl<sub>3</sub> and nitric acid solutions). Titanium is also recognized for its superior resistance to erosion, erosion-corrosion, cavitations, and impingement in flowing, turbulent fluids. Termodinamica Titanium Shell and Tube Heat Exchanger is fully constructed with pressurized shell and spiral corrugated or smooth inner tube. This ensures high velocities inside the unit making titanium shell and tube heat exchanger a very reliable, efficient and cost effective way on the heating, cooling, condensing or evaporation and so on.



### Features:

With high heat transferring coefficient heat exchanger tubes and smooth shell, it ensures high velocities inside of the unit making the heat exchanger a very reliable, efficient and cost effective way to transfer heat indirectly between hot circuit and cold circuit.

Exchangers has fully welded construction. It can endure high working pressure.

It avoids the replacement for gasket and saved more time and cost on maintain or clean.

### Advantages:

1. High efficiency, coefficient up to 10000 W/m<sup>2</sup>•°C, Heat exchanging capacity 3-7 times traditional equipments.
2. Compact configure, occupy small area, one tenth as the traditional equipments
3. Titanium material, endure high temperature, pressure and corruption.
4. Helix screw thread elasticity heat exchange bundle, eliminate the stress
5. Design flux speed is 5.5m/s, less dirt.
6. ASME standard VIII-1 – European PED
7. Easy clean and maintain
8. Big flow volume
9. Compactable
10. Easy installation and durable.

Design Parameters	TUBES	SHELL
TEMPERATURE	406°F (208°C)	406°F (208°C)
PRESSURE 1	650 PSI (4.50MPa)	500 PSI (3.50MPa)
PRESSURE 2	380 PSI (2.60MPa)	190 PSI (1.31MPa)
PRESSURE 3	190 PSI (1.31MPa)	87 PSI (0.60MPa)



## Titanium Oil cooler

Termodinamica Transmission & Engine Oil Coolers are completed welded heat exchangers. Are fabricated with the distinctive spiral corrugated tube design. Its compact structure is an integration of detailed engineering for effective use with high fluid velocities and low pressure drops.

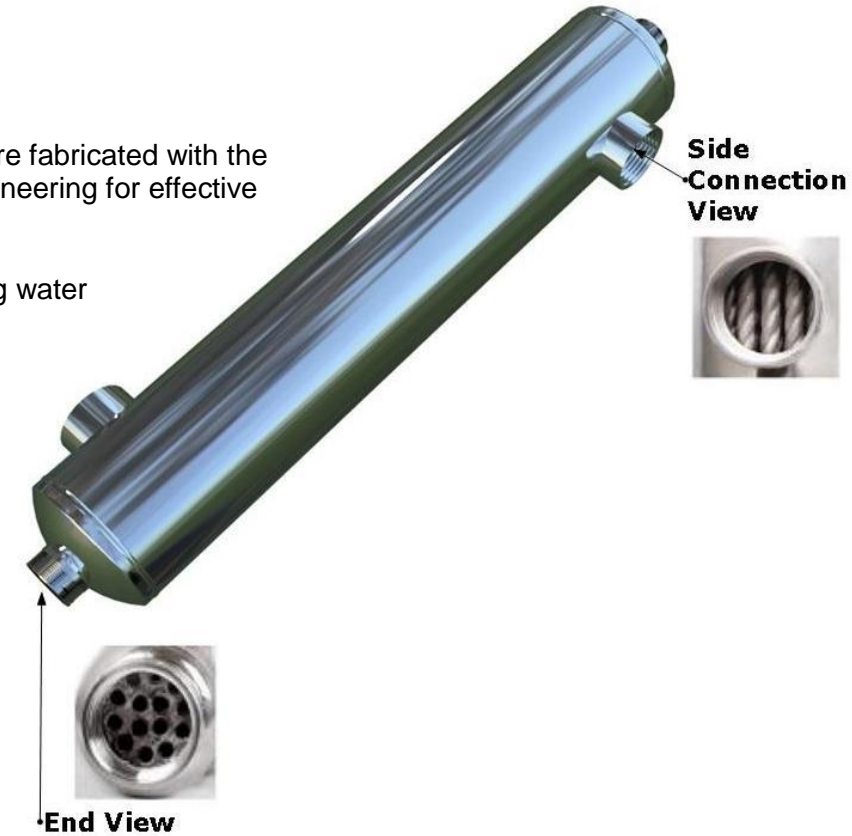
Are equally suitable for cooling torque converter, automatic transmission and engine oils. Being water cooled they have the advantage of freedom from accidental damage and also allow quicker warming up of the oil, a feature which is particularly valuable in cold climates.

The tube stack is fully floating so that thermal stresses are minimised and it can easily be removed and cleaned if necessary.

Below are Indicated approximate capabilities of the various coolers for torque converter applications.

Design Parameters	TUBES (Water)	SHELL (Oil)
TEMPERATURE	150°C(300°F)	150°C(300°F)
PRESSURE1	0.3MPa(45PSI)	2.5MPa(360PSI)
PRESSURE2	1.0MPa(145PSI)	2.5MPa(360PSI)
PRESSURE3	1.5MPa(218PSI)	2.5MPa(360PSI)

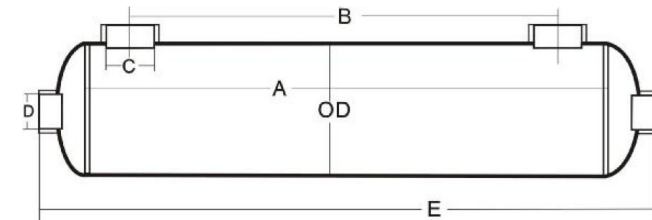
Cooler Type	Maximum oil flow	Maximum water flow	torque	Internal oil volume	Internal water volume
	Liter/min	Liter/min	kW	Liter	Liter
EC 80-E	30	200	45	0.26	0.31
FC100-E	100	300	90	1.10	0.84
FG100-E	150	400	120	2.40	1.56
GL240-E	220	700	240	6.30	4.60
GL400-E	220	700	360	10.00	6.60
GK400-E	350	1000	540	14.60	10.60
JK400-E	550	1600	780	20.30	14.70
JK480-E	550	1600	900	24.20	17.10



## Engine Fuel cooler

Termodinamica Fuel Coolers are completed welded heat exchangers. Fabricated with the distinctive spiral corrugated tube design, its compact structure is an integration of detailed engineering for effective use with high fluid velocities and low pressure drops. Fuel coolers are designed for cooling fuel on marine engines. They have corrugated titanium tubes like all heat exchangers which promotes long life expectancy. Modern engines designed to meet emissions regulations are often fitted with fuel coolers due to the high pressure fuel injection systems which increase the fuel temperature. Cool fuel first injection allow performance increasing and pollution reduction.

Design Parameters	TUBES	SHELL
TEMPERATURE	208°C(406°F)	208°C(406°F)
PRESSURE	1.31MPa(190 PSI)	1.31MPa(190 PSI)



Type	A (mm)	B (mm)	C (BSP)	D (BSP)	E (mm)	Max sea water flow L/M	Suitable for engine power	Outer diameter
DC 50	136	102	3/8"	1"	236	100	215HP/160kW	OD60mm
EC80-H	100	70	1/2"	1 1/2"	200	180	400HP/300kW	OD89mm
FC80-H	196	152	1"	2"	296	270	600HP/450kW	OD108mm
FG80-H	286	232	1 1/4"	2 1/2"	426	370	830HP/620kW	OD133mm

## Air/water intercooler (Turbo engine intercooler)

Intercoolers are ideal for cooling air from turbocharger in marine engines to increase performance. Additional Intercoolers designed for specific engines are also available; please see or contact the sales department, detail below for further information.

- Standard range for engines up to 650kW.
- Improve fuel efficiency and enhance engine performance by cooling turbo charged air.
- Readily available from stock through our global network of stockists.
- Available in materials suitable for cooling with fresh or salt water.



Design Parameters	TUBES (Water)	SHELL (Air)
<b>TEMPERATURE</b>	120°C(250°F), 150°C(300°F), 200°C(390°F)	
<b>PRESSURE1</b>	2.0MPa(290PSI)	2.0MPa(290PSI)
<b>PRESSURE2</b>	2.5MPa(360PSI)	2.5MPa(360PSI)
<b>PRESSURE3</b>	3.5MPa(508PSI)	3.5MPa(508PSI)

Type	Engine Power		Charge Air Flow Kg/min	Pressure Drop kPa	Water Flow Lit/min	Pressure drop kPa	Heat Rejection kW
	kW	HP					
EC140-C	65	86	2.5	12.5	60	25.3	8
FC100-C	110	146	6.7	7.5	100	24.3	15
FG100-C	190	253	11	9.3	130	25.6	25
GL140-C	240	320	14	9.4	160	13.9	32
GK190-C	370	493	21	12.6	180	9.7	48
JK190-C	650	866	35	15.0	220	8.2	85

# TERMODINAMICA

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