



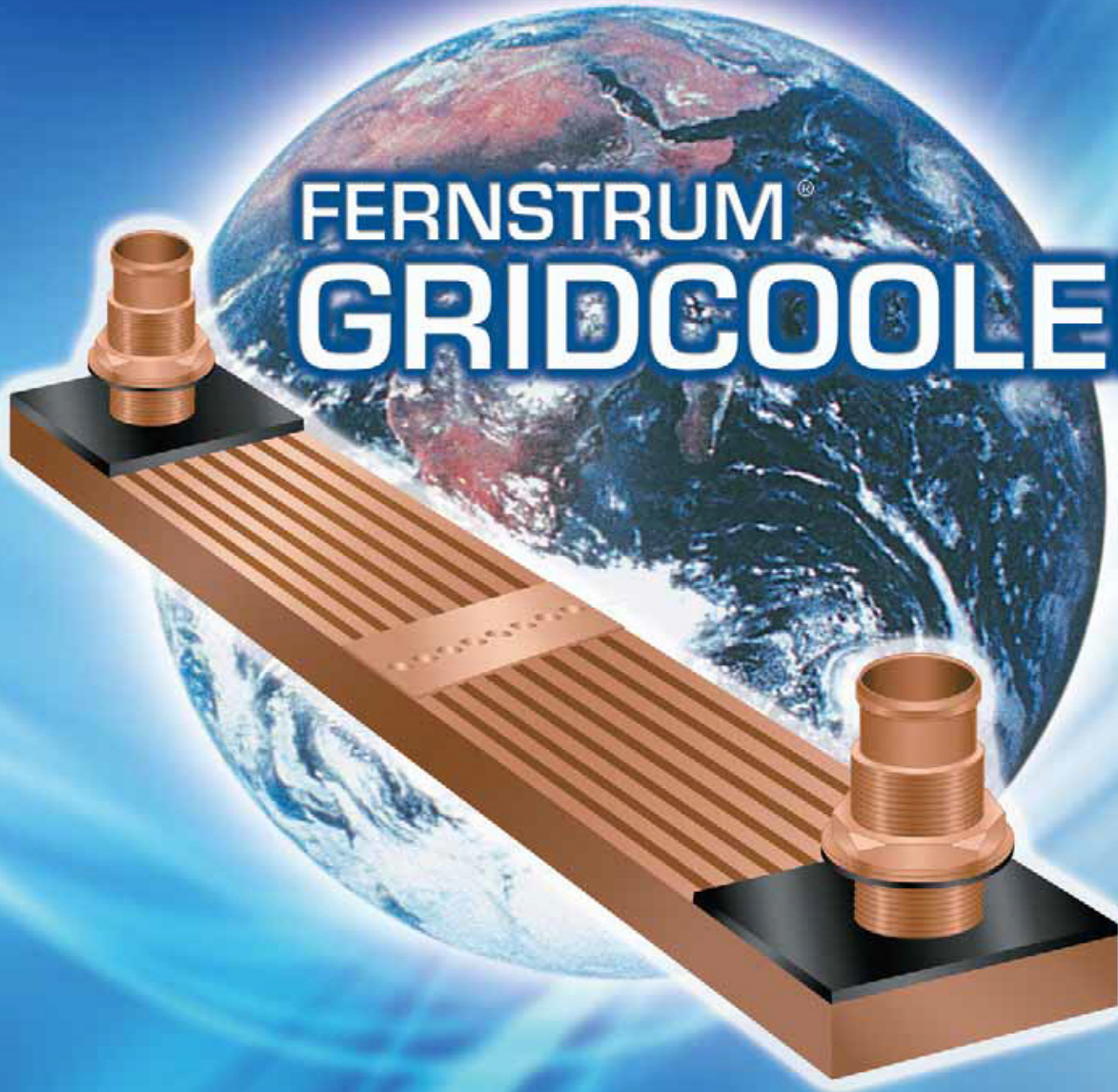
1074 Kenran Industrial Dr.
St. Louis, MO 63137
Phone: 1-800-381-9968

HUMCO ENGINE ROOM

Fernstrum Gridcooler

QUALITY • DURABILITY • EFFICIENCY

FERNSTRUM[®] GRIDCOOLER[®]



ENGINEERED KEEL COOLING

COMPUTER SELECTED • COMPLETELY ASSEMBLED • FACTORY TESTED



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THE KEEL COOLING CONCEPT

Keel cooling first appeared in the early 1800s when a copper tube was hung over the side of a boat to condense steam. This later evolved into pieces of channel welded onto the hull. These channel cooling systems offered important advantages over raw water cooling. They eliminated silt and sand buildup in engine jackets and protected engines against salt water corrosion. Unfortunately, their sheer bulk reduced a ship's capacity and increased its drag. They were also prone to external fouling. Today, keel coolers are closed circuit cooling units mounted to a vessel's hull beneath the waterline. This closed cooling system eliminated the need for an inboard heat exchanger, raw water pumps and strainers as well as high maintenance.

WHY BUY FERNSTRUM®

EFFICIENCY -

Our GRIDCOOLER® keel coolers are the smallest, most efficient keel coolers available. The rectangular tube design is more efficient and durable than grooved round tubing.

QUALITY -

Our 100% parts inspection process and rigorous testing procedures insure that all GRIDCOOLER keel coolers are built with the same exacting standards.

DURABILITY -

Decades long service life and our high customer satisfaction have proven our coolers' durability for over 60 years.

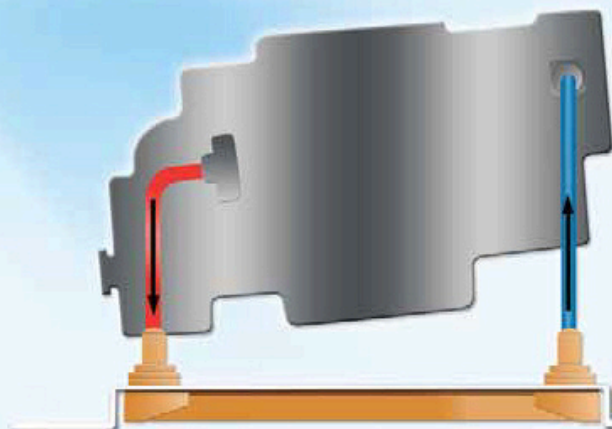
DESIGN FLEXIBILITY -

With a vast array of standard options and custom configurations available, we can recommend a cooling system that meets the unique needs of your engine on your vessel in your operating environment.

SUPPORT -

With decades of experience in the marine engine cooling market, our sales and engineering staff can give you advice on cooler placement, installation and service. Should you require an emergency replacement unit, we can have it shipped to you within three business days or less.

7



Engine jacket water is piped directly to the FERNSTRUM GRIDCOOLER keel cooler, which cools the water and then sends it back to the engine. The GRIDCOOLER keel cooler is in constant contact with the sea water for transfer of heat.

↑ Keel cooler mounted below the water line.

↔ Ship Hull



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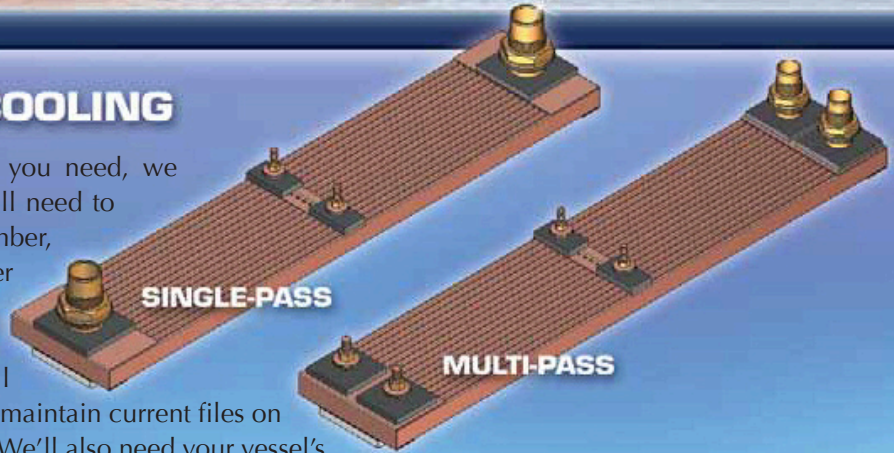
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ENGINEERED KEEL COOLING

To ensure that you get precisely what you need, we begin by asking a lot of questions. We'll need to know your engine make and model number, power rating, heat rejection, freshwater flow rate, and the temperature requirements of the water entering and leaving the cooler. If you don't have all this information, we'll get it for you - we maintain current files on all major marine engine manufacturers. We'll also need your vessel's hull design, it's minimum speed at full rated power, and the maximum water temperature in which it will operate. With this data, we can determine exactly what size GRIDCOOLER® keel coolers your vessel will need - under it's most severe operating conditions.

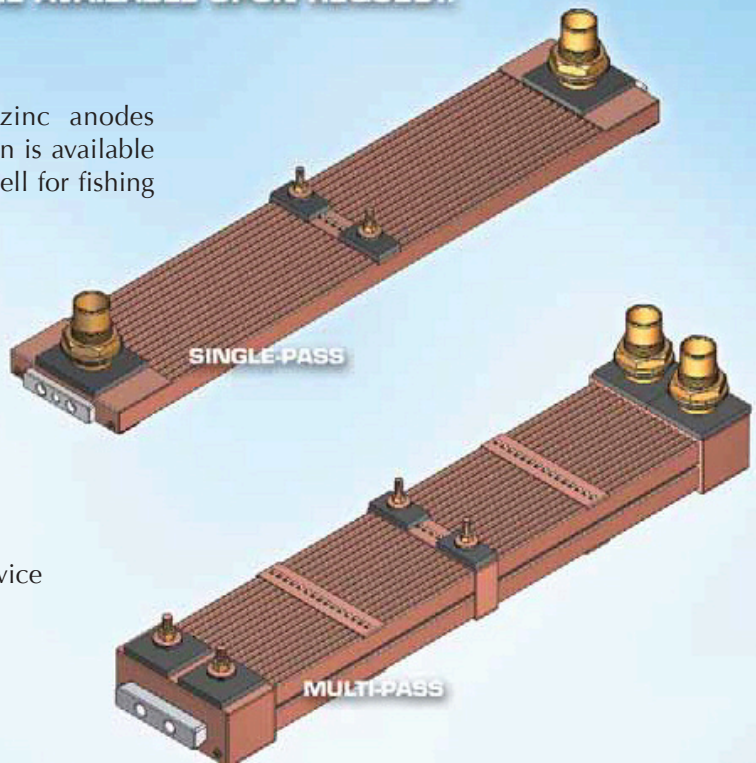


COMMON OPTIONAL CONFIGURATIONS

OPTIONS ARE AVAILABLE FOR SINGLE AND MULTI PASS CONFIGURATIONS. OTHER OPTIONAL CONFIGURATIONS ARE AVAILABLE UPON REQUEST.

E-OPTION

E-OPTION GRIDCOOLER keel coolers have zinc anodes mounted at the ends of the units. This modification is available upon request at no additional charge and works well for fishing vessels where entanglement of nets is a concern.



STACKED

STACKED GRIDCOOLER keel coolers produce twice the amount of cooling with less space required.



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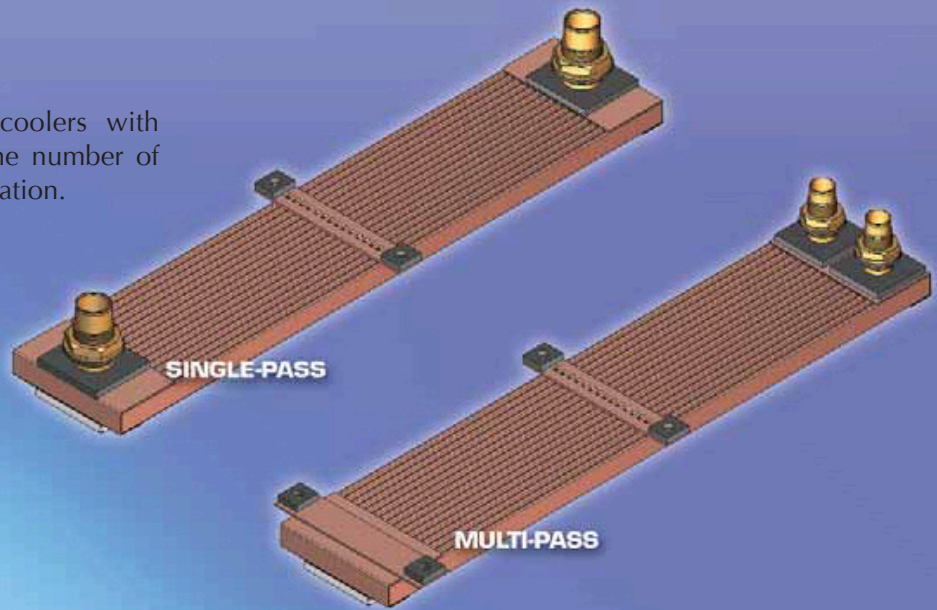
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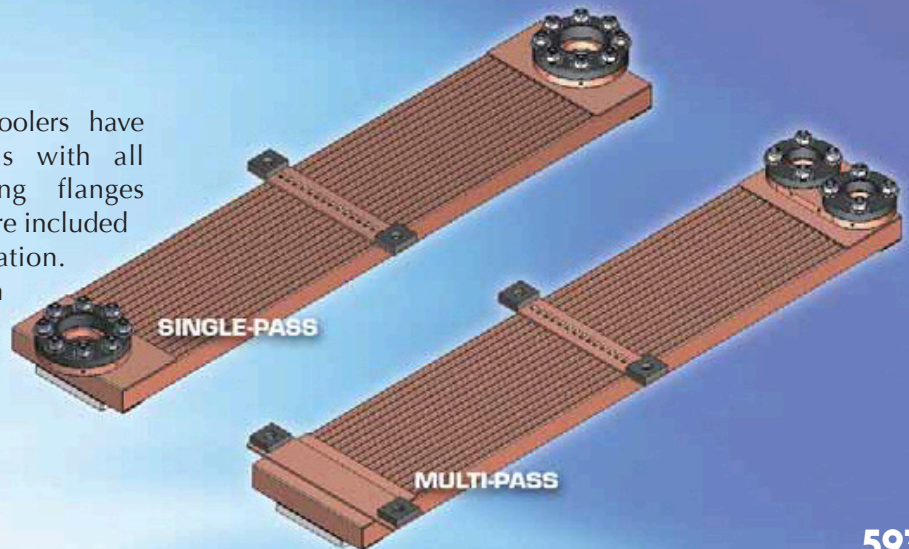
L-OPTION

L-OPTION GRIDCOOLER keel coolers with extended support plates reduce the number of hull penetrations needed for installation.



Z-OPTION

Z-OPTION GRIDCOOLER keel coolers have lower profile flange connections with all mounting hardware and mating flanges included. L-Option support plates are included as standard in this configuration. This design eases installation on double hulled vessels and may eliminate the need for cofferdams.





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THE FERNSTRUM GRIDCOOLER keel cooler is a unique heat exchanger that comes as a completely assembled unit, silver wire brazed and factory tested to assure dependability. It is not a kit that requires additional assembly before installation. The rectangular shaped tubing used in its construction is structurally strong and has a higher heat transfer rate than round tubing. The GRIDCOOLER keel cooler is a durable, compact unit designed to meet the engine manufacturer's cooling requirements and your operating conditions.

PARTIAL LIST OF APPLICATIONS

- | | | | |
|-----------------------|--------------------|--------------------------|--------------------|
| Amusement Park Rides | Commercial Fishing | Oil Spill Recovery Boats | Push Boats |
| ATB | Crab Boats | OSV | Recreational Boats |
| Barges | Dredges | Patrol Boats | Fishing Boats |
| Bridge Erection Boats | Ferries | Pilot Boats | Shrimp Boats |
| Buoys | Landing Craft | PSV | Submarines |
| Casino Boats | Life Boats | Pump Stations | Tug Boats |

PARTIAL LIST OF EQUIPMENT SERVICED

- | | | | |
|------------------------|----------------|--------------------|---------|
| Air Conditioning Units | Gears | Hydraulic Systems | Pumps |
| Bowthrusters | Generator Sets | Propulsion Engines | Winches |
| Electronics | | | |

WASHINGTON ISLAND FERRY

Washington Island Ferry Line, Washington Island in Door County, WI has been using Fernstrum GRIDCOOLER keel coolers on their vessels for over 30 years. They've held up year round through extensive winter service in Lake Michigan ice as well as may hours of summer operation and are still providing excellent daily service without incident.

When the Washington Island Ferry Line built their new ice breaking ferry boat, the Arni J. Richter, Fernstrum's quality, durability and excellent service made them the obvious choice.

"When you consider what a substandard keel cooler can cost in lost time and dollars, and maybe a dry docking, installing a Fernstrum GRIDCOOLER keel cooler is an easy decision."

Dick Purinton,
 President/General Manager
 Washington Island Ferry Line - Washington Island, Wisconsin



HERMASA

Hermasa have been using the Fernstrum Gridcoolers very successfully for over 10 years in their tugboats.

Alexandre Maciel,
 HERMASA
 South America