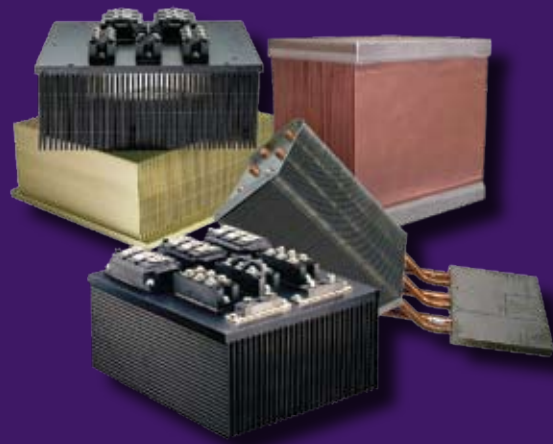


Thermal Management Products



Air and liquid cooled heatsinks and cooling solutions for power electronics



Solutions to Meet Every Application

Ferraz Shawmut is able to exploit a number of cooling technologies (air, phase change, and liquid) enabling us to meet every need from 40 to 25,000 W/m²x°C. This is complimented by our cooling unit offering that covers the entire thermal loop.

OUR  SOLUTIONS

A leader in power electronics protection and cooling solutions.

“...the innovative Fabfin® heatsink offers patented glueless technology.”

Ferraz Shawmut (formerly R-Theta Thermal Solutions) offers thermal management products and cooling solutions that play a crucial role in protecting semiconductor and power electronic systems by offering patented technology that absorbs and dissipates heat from critical components.

About heatsink cooling technology

Heatsinks quickly convert heat from an object that is hot to a second object that is cooler but has a much greater heat capacity. The rapid transfer of heat swiftly brings the first object into thermal equilibrium. The typical design of a heatsink is a metal device with many fins. The high thermal conductivity of the metal combined with its large surface area due to the numerous fins results in the rapid transfer of heat to the surrounding, cooler ambient. This cools the heatsink and whatever it is in direct thermal contact with.

Patented technology

Ferraz Shawmut brings to market revolutionary, patented heatsink technology. The innovative Fabfin® and Hollowfin heatsinks lead the way in our air cooled product line. The Fabfin heatsink offers patented, “glueless technology” for high performance, high ratio cooling solutions. Our liquid cooled technology, offers the leading-edge Aquasink®, Aquasurf®, and Aquamax® heatsinks.

Customized solutions

Ferraz Shawmut is a company that is easy to do business with. Our leading engineers will work with you to develop tailored solutions for removing damaging heat from your electronic systems. Our ongoing commitment to critical research in thermal management, means you'll benefit from new products and processes that meet the operating requirements of high heat flux power semiconductor modules. Using a combination of in-house modeling techniques and third-party labs for design verification, Ferraz Shawmut is committed to being your number one resource for cooling solutions.

Email	thermal@ferrazshawmut.com
Manufacturing	905-795-0077
Applications Support	905-795-0077 x258 or x340



Your global supplier of thermal management products, with three modern facilities in:

- North America
- Asia
- Europe

OUR  GLOBAL REACH

Industries & Applications

Ferraz Shawmut is a global manufacturing company offering the widest range of circuit protection and thermal management solutions. Our heatsinks and cooling solutions serve the needs of many industries, including:

- Aerospace
- Industrial controls
- Medical
- Power conversion & quality
- Renewable energy
- Motor drives
- Telecommunications
- Transportation
- Signal processing (RF amplifiers)

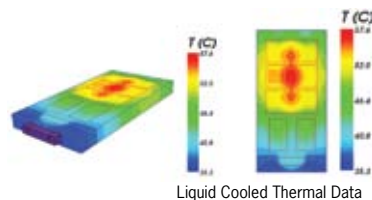
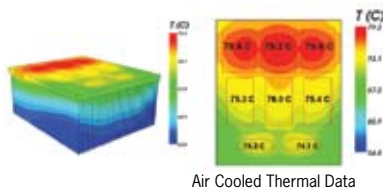
Manufacturing Excellence

Ferraz Shawmut heatsinks are manufactured in three modern facilities, totaling 200,000 square feet, with locations in North America, Asia, and Europe. ISO 9001-2000 registered, the facilities operate on a continuous improvement philosophy and a “pull” manufacturing strategy.

Our manufacturing capabilities are cutting-edge. We offer state-of-the-art CNC machining equipment, a setup reduction program, kanban support and a CMM machine. The machine systems include four standard fin spacing units, several swaging heads, two high capacity non-ferrous saws, nineteen CNC machines and a flexible machining system (FMS). We also offer numerous finishes including, anodizing, hexavalent and trivalent chromate. Need precision machining capabilities? We deliver and cater to your need for tight tolerance, complex machined heatsinks for RF, laser, aerospace and military applications using the Fabfin process.

Powerful Thermal Modeling Software **R-TOOLS**

Ferraz Shawmut makes it easy and convenient to quickly and accurately model various heatsink configurations using the R-Tools online thermal modeling software program. R-Tools is completely interactive. It uses analytically based design tools allowing you to perform the thermal design of the heatsink concurrent with the optimization of the electrical and manufacturing elements prior to any prototype builds and testing. This invaluable resource reduces your design time and increase the reliability in your finished product. But don't take our word for it, visit R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm and experience the benefits.



Toronto, Canada



Shanghai, China



La Mure, France

Air Cooled Heatsinks



About Our Swaging Process
Developed and patented by Ferraz Shawmut to boost the efficiency of air cooled heatsinks, our swaging process offers thinner, longer fins on dense centers or mixed metals to get maximum thermal conductivity while keeping weight down.

OUR  THE SWAGING PROCESS

Fabfin®

Fabfin is a fabricated heatsink with a height to fin spacing ratio greater than an extruded section. Fabfin can be supplied essentially of any size where a multitude of aluminum fins of varying heights and thickness are attached by a swaging process to an aluminum base plate of variable thickness, length and width, on four standard fin spacings. These standard spacing are designated as an FF (8.51 mm), DF (6.86 mm), AF (5.49 mm), or MF (3.43 mm) series. Typical alloy is 6063 for both fins and base plate. Finishes are numerous. No glue is used in the process. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.html.



Hollowfin

The Hollowfin heatsink is characterized by the shape of its fins which when mounted on the DF (6.86 mm) base plate effectively duplicates the high fin density MF (3.43 mm) series, but with taller fins. A height to space ratio equivalent to 46:1 occurs when the fin height is 118 mm. The Hollowfin is an ideal candidate to be attached to a copper base plate to maximize performance. No glue is used in the process. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.



Mixed Metals

The combination Fabfin heatsinks are available with copper baseplates for concentrated heat sources and aluminum baseplates with copper fins for large area heat sources. Optimization is possible by mixing both aluminum and copper fins. The heatsink was developed to enhance heat spreading for those semi-conductors developing high heat flux and limited allowable temperature rise. The combination heatsink is offered on MF and AF fin spacing as a standard configurable assembly. However, we do supply copper baseplates with DF (6.86 mm) spacing using a Hollowfin which effectively provides MF fin spacing with fins up to 118 mm high. No glue is used in the process Contact the Applications Department for Modeling Assistance at 905-795-0077 x258 or x340.



Integrated Modules

Typically power modules and amplifiers are attached to a heatsink with a multitude of screws together with some form of TIM. The high thermal barrier at the interface can be eliminated by swaging a multitude of fins into a thick base plate and then machining the module features and requirements into the base plate. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.





Services to Support Your Development

Ferraz Shawmut assists customers throughout all stages of development - from the earliest stages of identifying needs right through to production and logistics at the end of the process. Our engineers are involved in your development project from the beginning and even help draw up the bills of requirements.

OUR  DEVELOPMENT SUPPORT



Copper

An all copper Fabfin heatsink provides maximum forced air cooling performance. The fabrication process is the same as that for an aluminum Fabfin heatsink and is offered on MF and AF fin spacing (3.43 mm and 5.49 mm respectively). While copper provides outstanding performance, the overall cost is high. Other fin spacing can be provided when fins are silver soldered into slots. No glue is used in the process. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.



Dual Base Plate

Dual Base Plate Heatsinks (Patented) increase fin efficiency with all aluminum or copper/aluminum assemblies. Mixed metal fin arrangements as well as dissimilar baseplates are available. Standard fin height, thickness and spacing are available but few mechanical constraints limit height, width, spacing or thickness of assembly. No glue is used in the process. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.



Extrusion

Aluminum Extrusion heatsinks are the mainstay for cooling medium power semi-conductors. Many shapes are available to fit diverse applications. Thousands of shapes exist in the marketplace. If you do not find your needs amid our existing offerings, we will tool a new shape to meet your needs with minimum order quantities. Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.

Air Cooled Heatsinks



About Our Vacuum Brazing

Power electronics components (IGBTs, thyristors) need a cooling system that is both efficient and reliable, especially when they're installed in a confined space. Liquid cooling systems work perfectly. We've mastered the brazing technology to achieve guaranteed watertightness with no seams, robustness, no corrosion, excellent thermal performance - and a product sure to last 20 years!

OUR  VACUUM BRAZING

Liquid Cooled Heatsinks

Aquasink®

Aquasink employs an aluminum body and copper tubes. These tubes are embedded in the aluminum body using a mandreling process that expands the copper tube into intimate contact with the aluminum body creating a very robust construction. A smear of specialty grease at the interface of copper and aluminum prevents the possibility of dissimilar metal corrosion. Heat transfer is equal from both mounting surfaces.

Performance can be modeled within R-Tools at us.ferrazshawmut.com/thermal/r-tools_front.cfm.



Aquasurf®

Copper tubes are embedded in the surface of an aluminum plate to provide the lowest thermal resistance between the semiconductor mounting surface and the cooling liquid. Tubes can be bent into complex arrays to ensure the copper surface is directly under the semiconductor chips. Contact the Applications Department for Modeling Assistance at 905-795-0077 x258 or x340.



Aquamax® (Aluminum)

Aquamax provides maximum thermal performance in aluminum by employing proprietary channeling techniques to optimize coolant velocity at low head loss while providing uniform temperature across the mounting surface. Precision machining techniques used at the vacuum braze, flux free, interface ensure leak and corrosion free construction. Typical external finish is RoHS compliant trivalent chrome. Contact the Applications Department for Modeling Assistance at 905-795-0077 x258 or x340.



Aquamax® (Copper)

Aquamax copper provides additional performance over aluminum using the same proprietary channeling techniques as aluminum. The vacuum brazed, flux free joint ensures leak and corrosion free construction. Typical external finish is RoHS compliant electroless nickel. Contact the Applications Department for Modeling Assistance at 905-795-0077 x258 or x340.





About Our Stand-Alone Unit

Our heat pipe solutions significantly reduce the footprint of power conversion systems thanks to performances that approach those of liquid cooling technology. That means the unit is stand-alone, requires less space, is lighter weight, easier to maintain, and provides optimized power dissipation.

OUR  STAND-ALONE UNIT



Press-Pack Coolers

Patented technology provides the highest performance vacuum brazed, flux free Press Pack Coolers in both aluminum and copper construction. Full specifications can be found at: <http://www.fs-thermalmanagement.com/html/productsResult.php>.



Embedded Heatpipes

Typical applications combine the high performance of Fabfin and the heat spreading of heatpipes. High heat flux in concentrated areas can be spread across a heatsink by placing the hot spot over one end of the heatpipe which becomes the “evaporator” and the heat is transferred to the cooler part of the heatsink where it condenses releasing the heat to the heatsink. Contact the Applications Department for Modeling Assistance at 905-795-0077 x258 or x340.



Heatpipes

High heat losses from Press-Pack and IGBT power devices can be spread to large area cooling banks via heatpipes. Typical construction employs copper heatpipes and aluminum or copper “Evaporator” and “Condenser” sections. If electrical insulation is required ceramic insulators can be built into the heatpipes. Working fluids are chosen to suit the application. Full specifications can be found at: http://www.fs-thermalmanagement.com/html/products_transcal.htm.



Cooling Systems

To cool the hot fluid exiting a liquid cooled heatsink so that it may be recirculated requires a liquid to air heat exchanger working in conjunction with pumps and associated systems. Full specifications at: http://www.fs-thermalmanagement.com/html/products_syscal.htm.

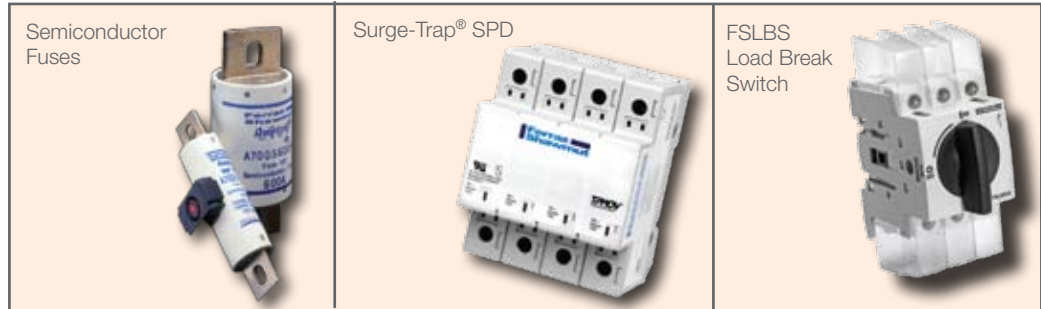
Heatpipes & Cooling

A relentless pursuit of protection for electrical components, systems - and the people who use them.

Ferraz Shawmut is an international company manufacturing the widest range of circuit protection solutions in the electrical and power electronics industry. Drawing on a century of experience - and an ongoing commitment to critical research in electrical safety - we provide industrial, commercial, and OEM customers with innovative products and technical support teams to increase effectiveness, simplify applications, and enhance productivity. Learn more about our circuit protection solutions at us.ferrazshawmut.com.

Other circuit protection products from Ferraz Shawmut:

A wide range of circuit protection products are available including:



How to Contact a Heatsink Specialist:

We invite you to contact a cooling and heatsink specialists at:

USA Direct Line:

800-388-5428

Canada Direct Line:

905-795-0077

Applications Support

905-795-0077 x258 or x340

Email

thermal@ferrazshawmut.com

For more on thermal management products, visit our website at us.ferrazshawmut.com/thermal

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