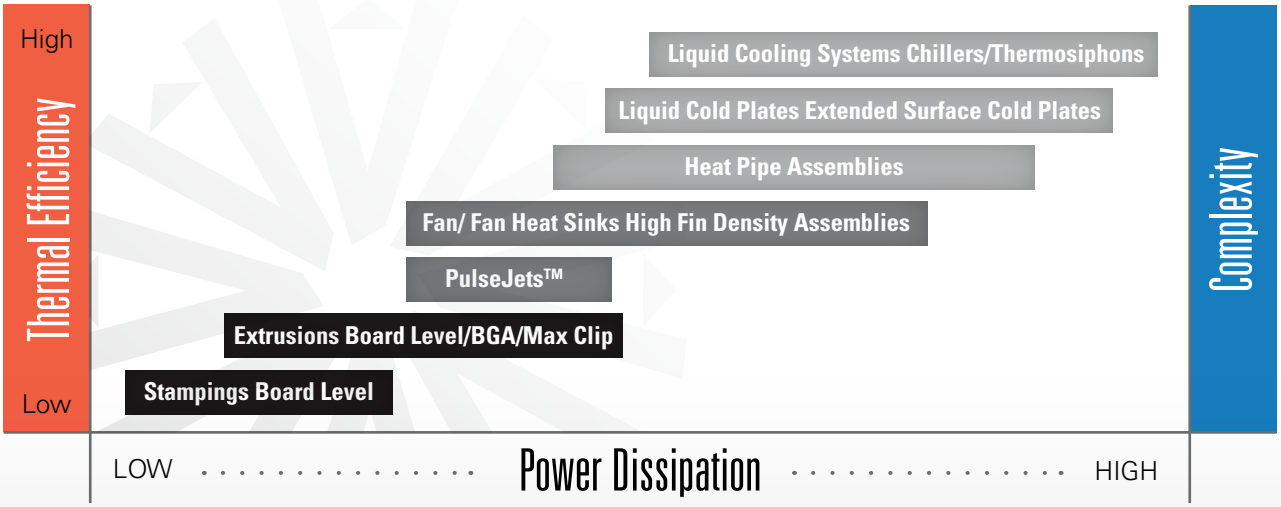
AAVID THERMALLOY

Capabilities for Systems Thermal Management

Technology Selection Guide



Thermal Interface Materials, High Pressure Die Casting and High Density Die Casting vary in thermal efficiency and power based upon application

CHOOSING YOUR THERMAL SOLUTION

Aavid Thermalloy has the world's largest breadth of available thermal solutions, technologies and services that can be used or adapted for any application in any industry. Our products are built to your requirements and allow you to surpass your competition inpower, speed and performance. Our design engineers understand that Aavid products must integrate well with each other as well as your design objectives.

Product Line Basics

STAMPINGS	Typically used at the board level, stampings are an extremely low cost solution for dissipating low heat levels.
EXTRUSIONS	Aluminum extrusions offer both natural and forced convection cooling that can be utilized alone, or integrated into more complex, higher performing solutions.
PULSEJETS™	These unique air movers utilize turbulent air for cooling and allow for smaller solutions with more flexibility in design and feature frictionless parts that increase reliability and durability.
FAN / FAN COMBOS	Fans provide forced convection cooling that can increase the thermal efficiency of passive solutions.
LIQUID COOLING	Liquid Cooling Products, such as Cold Plates, utilize liquid to transfer heat and deliver higher thermal performance than air cooling especially in applications that can contain high heat flux density.
HEAT PIPE ASSEMBLIES	Heat Pipes can be manipulated to accommodate more flexibility in design while offering the high thermal performance of fluid phase change cooling.
HIGH PRESSURE DIE CASTING	This process enables engineers to design and create workable near net shape parts that would be cost prohibitive otherwise.
HIGH DENSITY DIE CASTING	This Die Casting process can utilize various metals and alloys to manufacture near net shape parts with highly optimized mechanical and thermal properties.
THERMAL INTERFACE MATERIALS	Thermal Interface Materials (TIMs) are used in most thermal management solutions and can have a noticeable impact on the thermal efficacy and durability of your device.

Design Services

Aavid understands thermal management and how it influences the world around us better than anyone. Our engineers are equipped with decades' worth of industry knowledge and the top equipment so they may create new and innovative solutions to meet any need.

Design centers around the globe utilize this expertise to provide engineering services from expert thermal reviews to fully integrated custom solutions designed for your product.

DESIGNING YOUR THERMAL SOLUTION

STEP 1

Aavid determines the needs of a customer based on the evaluation of six key factors affecting your product:

USABILITY
Surface Temperatures
Feature Set

MATERIAL SELECTION
Metals or Plastics
Manufacturing Processes

AESTHETICS
Texture
Finish
Venting
Perforations

PERFORMANCE
Acoustic
EMI/Radio
Power
Environment

COST
BOM Cost
Assembly Cost

FORM
Size
Weight
Architecture
Footprint

STEP 2

Based on your specific needs, Aavid Design will provide the best solution in one of three ways:

1. **SELECTING THE BEST EXISTING OPTION**
   from our catalog of standard thermal solutions
2. **DESIGNING A CUSTOM COMPONENT SOLUTION**
3. **DEVELOPING A CUSTOM SYSTEM UTILIZING AAVID'S INTEGRATED DESIGN SOLUTIONS**
   Thermal Design
   Mechanical Design
   Electrical Design
   Industrial Design
   Prototyping
   Testing & Verification

Quick Turn / Prototype Services

Aavid's unique position as the world leader in thermal management enables us to offer effective solutions quickly anywhere around the globe. Our massive inventory of raw materials, engineering knowledge, in-house machining, finishing and assembly combined with over 50 years of consistently employing state of the art modeling and design allow us to efficiently create or modify any product to suit any needs.

While the prime focus for Aavid's Prototyping Services is innovation, our main goal for our Quick Turn Services is speed.

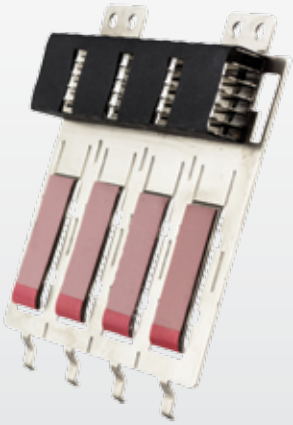
Aavid Quick Turn and Prototyping Services offer full ITAR compliance and are based out of Laconia, New Hampshire.

WE OFFER:

- *Fast Response Time to Quote Requests*
- *Fast Delivery to meet our customers' needs*
- *Hands on Customer Service with constant clear communication*

Stamped Heat Sinks / Board Level

Stamped heat sinks are an economical, natural convection solution for lower power density thermal issues. Aavid utilizes stamping manufacturing techniques to create a high volume of low cost copper or aluminum heat sinks that can be produced quickly in a vast number of shapes and forms with multiple offerings for any low power device.



WHY STAMPED HEAT SINKS?

- *Low cost and available at high volumes*
- *Ideal for tight component spacing such as with Printed Circuit Boards*
- *Readily available for immediate delivery worldwide through Aavid Thermalloy and Aavid Thermalloy Distribution Partners*
- *Wide variety of attachment methods – most of which Aavid can pre-attach to save assembly costs*
- *Multiple Finish Options*
- *Multiple Mounting Options*
- *Multiple product options for every low power device*

Aluminum Extrusions

Aavid hosts the widest array of extruded natural convection solutions for higher power, board level and systems level cooling. The extrusion method, forcing raw aluminum through an extrusion die, lowers cost and time when compared to machining a product in the same shape. Aavid Thermalloy offers over 5,000 shapes tooled worldwide including high fin density heat sinks capable of providing twice the performance and surface area with no additional volume. In addition to standard products, we sell our solutions in bar form, cut to length or custom machined to precise specifications to ensure that you can get the best extruded part for your design.

WHY EXTRUDED HEAT SINKS?

- *Greater efficiency over stamped heat sinks*
- *Lower cost than machined assemblies*
- *Huge stock to ensure availability in a large variety of sizes and shapes*
- *Easily customized with time and cost saving features*
- *When combined with Aavid MaxClip systems, they have no need for mounting hardware or tooling*

Fans & Fan/Heat Sink Combos

Aavid Thermalloy offers several core lines of DC brushless fans that provide a range of solutions based on a matrix of requirements such as bearing type, function, protection and other features. These fans can be integrated with many other Aavid products to create complex, dynamic and space saving solutions. Aavid also offers a key product line of Fan/Heat Sink Combos that come as one part to provide optimum cooling efficiency in smaller spaces while lowering assembly costs. Any Aavid fan can be utilized to create or modify a fan/heat sink combination part.

WHY FANS OR FAN COMBOS?

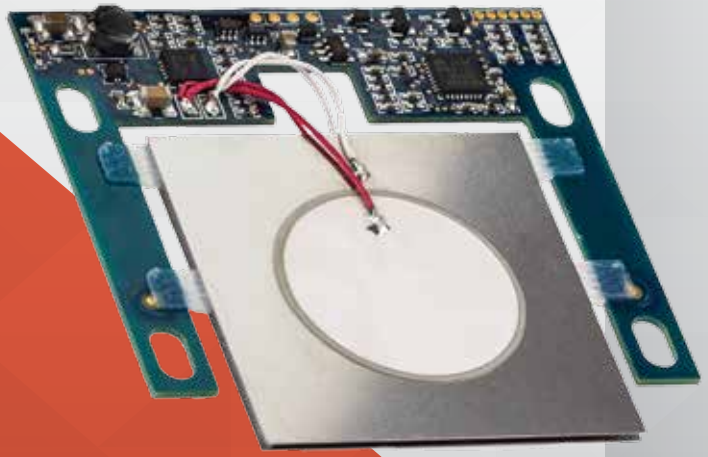
- *Enhanced cooling performance in less space*
- *Increased life and reliability of critical high power components*
- *Impingement design to cool adjacent components*
- *Optimized air flow due to Aavid's use of the latest in Computation Fluid Dynamics design software*

PulseJets™

Aavid PulseJets™ are a new family of innovative products that deliver high performance forced convection cooling in a new way. These air movers are not fans, but rather blowers that utilize turbulent airflow and entrainment to draw air in and push it out quickly through the same opening. Due to their unique design, PulseJets™ offer more flexibility within the design and can be used to create smaller, lighter cooling solutions.

WHY PULSEJETS™?

- *No rotating bearings result in higher reliability and durability as well as less noise over time*
- *Pulsed flow delivers superior heat transfer with lower flow noise than standard forced convection solutions*
- *Can easily adapt passive thermal solutions into active with minimal compromise in design and reliability*
- *Design flexibility allows for full integration with other cooling designs and final products*



Heat Pipe Assemblies

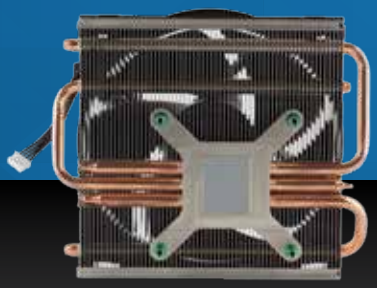
This fluid phase change product line allows for greater thermal efficiency by embedding heat pipes into an assembly to transfer heat from a concentrated source. Integrating heat pipe assemblies with other thermal solutions creates more even heat dissipation, reduces overall weight, improves conduction paths and raises thermal performance without increasing volume. Aavid heat pipes typically range from 3mm to 25mm in both round and flat form. This range allows flexibility in use and design, enabling our assemblies to cool anything from a 2W tablet to a 300W IGBT transportation application.

Aavid Thermalloy offers Heat Pipe Assembly Kits to allow customers to explore and discover this intriguing and versatile cooling technology.

HEAT PIPE ASSEMBLY KIT ▸

WHY HEAT PIPE ASSEMBLIES?

- *Heat Pipes are the most effective passive cooling systems available*
- *Extends the thermal range of both natural and forced convection solutions*
- *Heat Pipe Assemblies can be customized to maximize performance by altering wick structure, fluid type, fluid volume, construction method or other features*
- *Aavid Thermalloy's HiContact™ embedded machining process improves thermal transfer*
- *Aavid employs top heat pipe experts in the industry and has a proven track record*

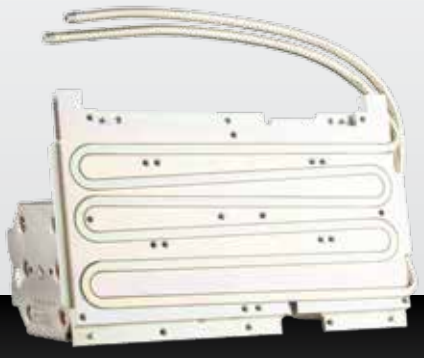


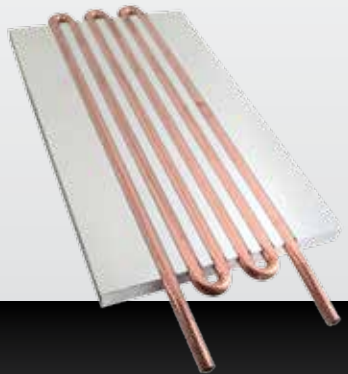
Liquid Cooling

Aavid Thermalloy is the industry leader in liquid cooling solutions at the device, enclosure and facility level. Aavid's leak--free designs and manufactured liquid cooling solutions provide increased efficiency, utilization, energy recovery and reliability across all system levels. Additionally, Aavid offers the broadest array of liquid cold plate technologies, using fine channel, micro channel, and tube geometries that are brazed, welded, soldered and epoxied. We also offer liquid cooling systems with smart instrumentation controls for flow, pressure and temperature, along with pump assisted assemblies for single and two phase flow, especially for isothermal spreading requirements.

WHY LIQUID COOLING?

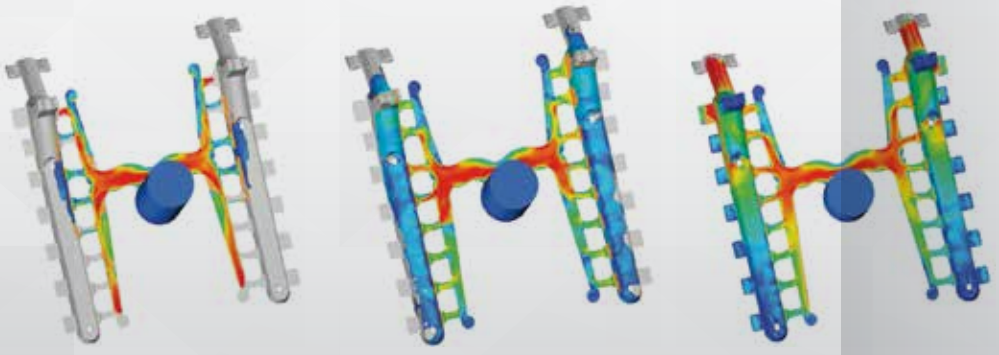
- *Most compact and efficient cooling method on the market*
- *Aavid's HiContact™ machining process improves thermal transfer*
- *Aavid offers "Worry-free" liquid cooling with certification procedures that ensure quiet, leak-free, reliable solutions*
- *Compatible designs that handle any cooling fluid*
- *Aavid offers smart instrumentation capability along with pump assisted assemblies*





High Pressure Die Casting

High Pressure Die Casting (HPDC) is a process used to make near net shape parts from aluminum alloy by utilizing sophisticated simulation software and meticulously crafted steelmolds or dies. HPDC is highly cost effective in creating solutions that are light weight with excellent dimensional accuracy and mechanical properties. Additionally the process enables superior cosmetic surface quality and dependable product performance.



WHY HPDC?

- *Parts come out in almost final shape, eliminating the need for costly machining and finishing*
- *Can create complex and 3D shapes that require little to no assembly*
- *Aavid employs an ISO Certified Quality System that ensures high quality and consistency*
- *Cost effective solution that can be easily adapted depending on specifications or applications*

DEMONSTRATION OF THE DIE CASTING PROCESS

High Density Die Casting

High Density Die Casting (HDDC) is a unique new method developed by Aavid to manufacture complex designs with extremely high thermal performance. This innovative casting-like process enables applications where higher conductivity, additional embedded technologies or similar augmentations are required. In addition to allowing the use of high thermal conductivity alloys, HDDC also generates much higher thermal transfer due to its porosity free process.

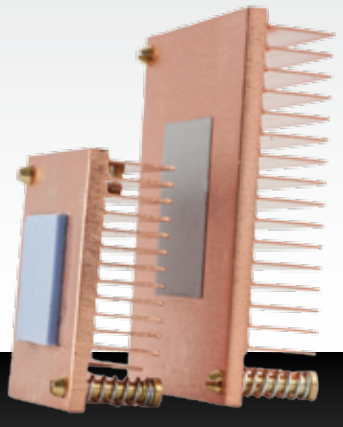
WHY HDDC?

- *Ideal for complicated designs where precision and conductivity are essential*
- *Capacity for very high thermal performance*
- *Enables integration of various other cooling technologies and features*
- *Leak tight parts suitable for liquid cold plates and other liquid cooling*

Thermal Interface Materials

Aavid offers the highest thermal conductivity products in a wide breadth of Thermal Interface Material (TIM) solutions, thermal accessories and attachments, each with their own significant advantages. TIMs range from thermal greases, tapes and films to our innovative new line of highly conductive gap fillers.

At Aavid, we understand that the attachment type or TIM material that you choose can make a dramatic impact on the efficiency and durability of your design. We constantly engineer new interfaces and attachments to improve the performance of our thermal accessories. Many of Aavid's TIMs and attachments can be ordered pre-applied to save time and assembly costs.



Worldwide Sales, Design, & Manufacturing

North America

North America // 1.855.322.2843

LACONIA, NEW HAMPSHIRE

Aavid Thermalloy Corporate HQ
1 Aavid Circle, Laconia NH 03246 USA
t)+1--603--528--3400
f) 1--603--223--1738
info@aavid.com

SAN JOSE, CALIFORNIA

Aavid California Design Center
150 S 1st Street, Suite 200
San Jose, CA 95113
+1--408--522--8730
CADC@aavid.com

AUSTIN, TEXAS

Aavid Austin Design Center
1909 W. Braker Ln., Bldg E, Ste 100
Austin, TX 78758
t) +1 512 382 8100
f) 1--512 382--8101
TXDC@aavid.com

ALLENTON, WISCONSIN

Aavid Thermalloy Die Casting
217 Weis St., Allenton, WI 53002
t) +1--262--629--5566
f) 1--262.629.9157
khealy@allcastinc.com

Europe

Europe // 39.051.764002

BOLOGNA, ITALY

Aavid Thermalloy, S.r.l.
Via Del Fonditore 4, 40138 Bologna, Italy
t) +39--051--764011
f) 39--051--764092
sales@eu.aavid.com

APAC

APAC // 86.21.6115.2000 x 8122

HONG KONG

Aavid Thermalloy Asia HQ
Suite 3110, 31st Floor, Tower 6,
The Gateway, Harbour City,
Kowloon, Hong Kong
t) +852 36282636
sales.china@aavid.com

SINGAPORE

Aavid Thermalloy (S) Pte. Ltd.
Block 5014, #04--08, TECHplace 2, Ang Mo Kio
Ave 5, Singapore 569881
t) +65--6362--8388
f) 65--6362--8588
sales.sg@aavid.com

SHANGHAI, CHINA

Aavid (Shanghai) Systems Co., Ltd.
No.1199 XinFei RD, SongJiang, Shanghai China
201611
t) +886--2--2698--9808
400--611--5978 (China toll free only)
SHDC@aavid.com

SHENZHEN, CHINA

Aavid (Shenzhen) Thermal
Systems Co., Ltd.
No. 116, Hua Ning Road, Dalang Town,
Longhua New District,
Shenzhen City Guangdong China 518060
t) +86--755-27778122
400--611--5978 (China toll free only)
sales.china@aavid.com

TAIWAN, CHINA

Aavid Thermalloy Taiwan, Inc.
1-79-20F-6 (C-)
20F--6, No. 79, Sec.1 , Xintai 5th Rd., Xizhi
Dist.
New Taipei City 221, Taiwan
(R.O.C.)
t) +886--7--841--9339
KSDC@aavid.com

DONG GUAN

YuNing Industrial District, Heng Li Town,
Dong Guan City, Guang Dong, China, 523477
t) +86--769--83377651--616
sales.china@aavid.com

VADODARA, INDIA

Aavid Thermalloy India Private Limited
7,Manjusar Gidc, Savli, Vadodara--391775,
Gujarat, India
t) +91--2667 264781/82/83
f) 91--2667 264784
sales.in@aavid.com

www.aavid.com

WHY AAVID?

- *Local Service, Global Support – Distribution, Design Centers and Manufacturing Plants are located around the world*
- *Largest catalog of standard and customizable solutions for all applications*
- *Innovative Design and Engineering Services in dedicated Design Centers available to solve unique issues or develop custom designs and provide full System Integration*
- *World Class Manufacturing facilities that continue to grow in capabilities, technology and efficiency*
- *Global Logistics Support and Development*
- *Superior Quality Systems Management*
- *Long time track record of reliable, durable, cost--effective solutions*

ABOUT AAVID

Founded in 1964 as Aavid Engineering, Aavid Thermalloy is the oldest and largest design engineering and manufacturing corporation focused on thermal management solutions in the world. For over 50 years we have consistently brought the most innovative new cooling solutions to market while also improving the efficiency and availability of conventional cooling technologies. In doing so, we have developed the widest array of cooling products and services in the industry. Aavid Thermalloy provides thermal solutions across all industries and for any application on a global level. Decades of experience and expertise combined with an unwavering dedication to unique problem solving allows us to meet any requirements and resolve any thermal challenges.

AAVID THERMALLOY