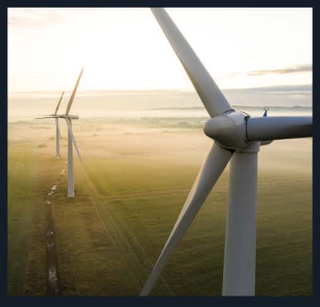
ADVANCED COOLING TECHNOLOGIES





**DESIGN | ANALYSIS | MANUFACTURING | TESTING**

THE THERMAL MANAGEMENT EXPERTS | WWW.1-ACT.COM

# THERMAL MANAGEMENT EXPERTS

## ADVANCED COOLING TECHNOLOGIES, INC. IS A PREMIER THERMAL MANAGEMENT SOLUTIONS COMPANY

Our mission: Helping solve our customers' most challenging problems with the best value engineered products and the most innovative technologies through a highly engaged workforce.

# TABLE OF CONTENTS



**200+** EMPLOYEES

**200+K** SQUARE FOOTAGE

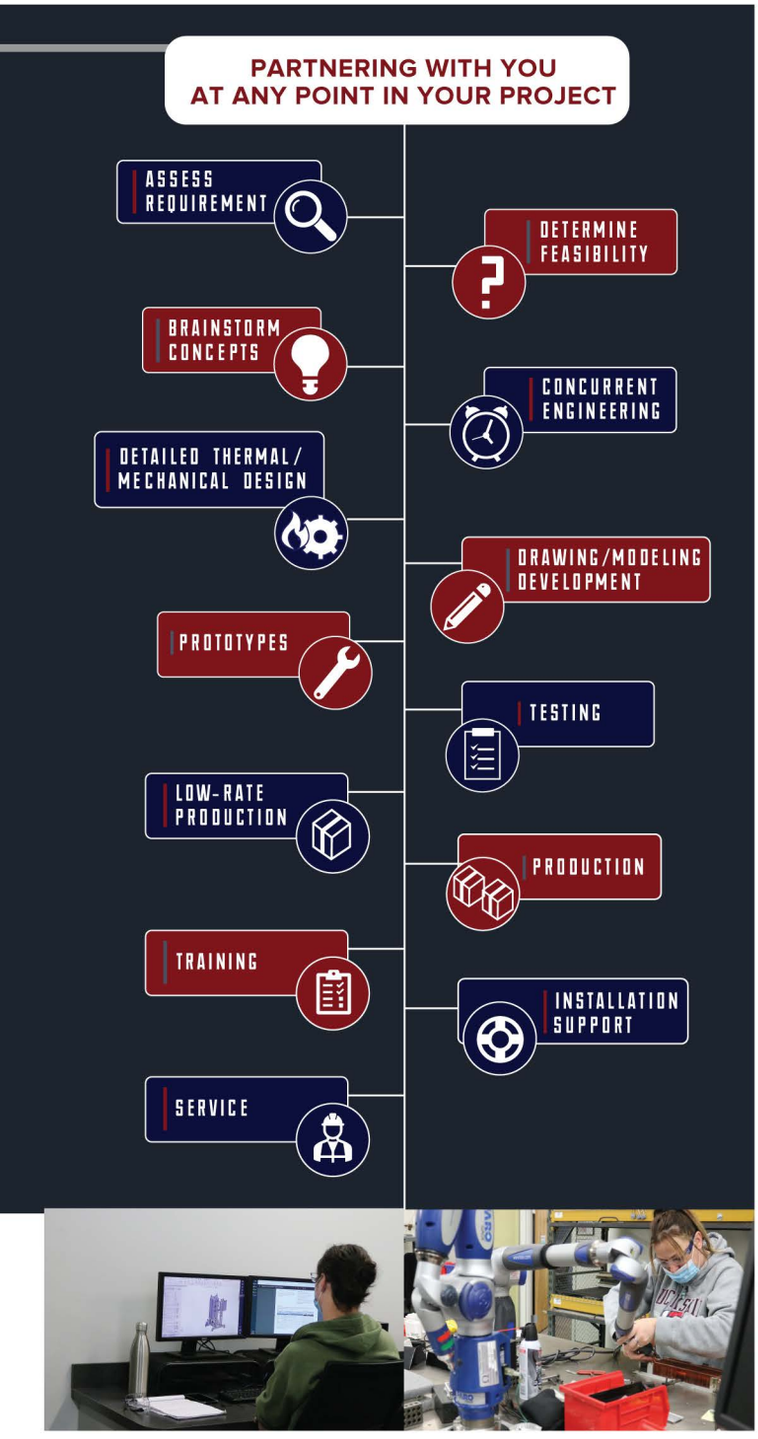
**2** FACILITIES IN CENTRAL PA

## CORE VALUES

- INNOVATION
- TEAMWORK
- CUSTOMER CARE

# QUALITY
## & CONTINUOUS IMPROVEMENT

The overarching goal for ACT is to provide a superior standard of service to our customers through responsiveness, competitive pricing and most importantly, the quality of our products and services.
ACT continues to improve our quality assurance capabilities through new techniques and technology. It is ACT's commitment to achieve the highest quality standard in the industry thus, providing our customers with exceptional products and solutions. ACT is certified to ISO9001 and AS:9100D Quality Standards.






### DESIGN AND ANALYSIS

ACT's engineering staff has a wealth of knowledge in CFD and heat transfer analysis. We use commercial software to create or modify computational codes as required.

### THERMAL MANAGEMENT CONSULTING

Save time and avoid costly delays by identifying the correct thermal solution before prototyping

- Feasibility & trade studies
- Early conceptual design
- System-level architecture

### PROTOTYPING & LOW VOLUME PRODUCTION

ACT routinely builds first article prototypes, Engineering Demonstration Units (EDUs) and Low Rate Initial Production (LRIP) builds to prove manufacturing details and drive out recurring costs.

### PRODUCT TESTING

Qualification and Acceptance Testing protocols are flown down or jointly developed during engineering phases. ACT has in-house test equipment to simulate performance and environmental requirements.

### VOLUME MANUFACTURING

ACT scales up manufacturing to meet customer demand, providing turnkey system and sub-system thermal solutions in mid to high volumes.

### SPARES, SERVICE & REPAIRS

Our customers are always top of mind, so even after our products leave our facility our job is not over! We offer field servicing as well as a robust spare and repair department to provide responsiveness and results to customers extending the life of their parts.

# SOLUTIONS
## FOR ANY TEMPERATURE, ANY POWER

## HEAT PIPE LEARNING CENTER

**HEAT PIPES** are one of the most efficient ways to move heat from one point to another. First developed by Los Alamos National Laboratory for high temperature energy conversion systems in the 1960s, heat pipes are used today in a variety of applications from satellite thermal control to microprocessor-cooling to industrial waste heat recovery. Copper water heat pipes are the most common variant and typically operate in the range of 20-150°C.

## BENEFITS

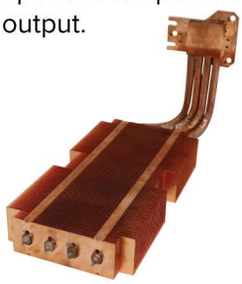
**High Effective Thermal Conductivity:** Transfer heat over long distances, with minimal temperature drop (i.e. near isothermal operation)

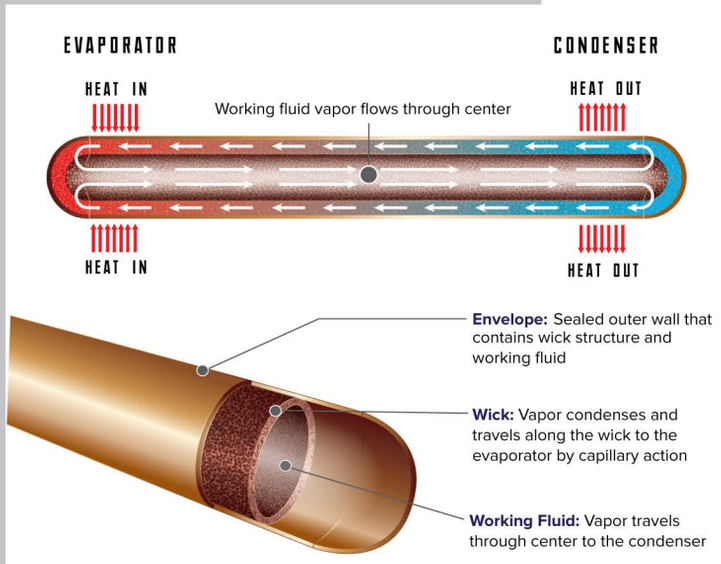
**Passive Operation:** No moving parts or mechanical or electrical energy input for operation, resulting in long term reliability

**Lowers Costs:** Cost of ownership is inherently low because of the high reliability and system simplicity

## WHEN ARE HEAT PIPES USED?

They are used for cooling discrete components by moving heat from the heat generating source to a remote heat sink. The primary use of spot-cooling heat pipes is to decrease component temperature to increase maximum power output.






*ACT is the only U.S. manufacturer that routinely ships heat pipe products for terrestrial, spacecraft and high temperature applications.*

## HEAT PIPE INTEGRATIONS

### HEAT PIPE ASSEMBLIES

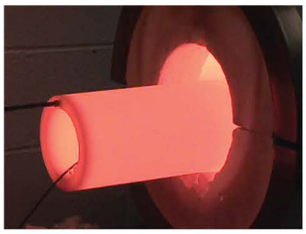
are typically integrated into assemblies in order to fully dissipate critical components' waste heat. Whether the ultimate heat sink is air or liquid cooled, heat pipes can efficiently transport heat and improve overall heat sink efficiency.

**HiK™ PLATES (HIGH CONDUCTIVITY PLATES)** are heat spreaders with embedded heat pipes. They are particularly useful for cooling multiple high power components. They collect and move heat from discrete heat sources to a liquid-cooled edge or an air-cooled heat sink with minimal temperature gradients.

**VAPOR CHAMBERS** are planar heat pipes used for cooling extremely high heat flux electronics. A vapor chamber can accept heat from one or more sources and transfer the heat to an integated air-cooled heat sink or liquid-cooled edge rails.

# HEAT PIPE VARIANTS

*ACT has delivered products with over 20 different working fluids.*



**HIGH TEMPERATURE HEAT PIPES** (also known as alkali metal heat pipes) are typically defined as heat pipes that operate between 400 and 1100°C. They are often used to provide precise temperature uniformity or provide high-temperature heat transfer.

**ISOTHERMAL FURNACE LINERS (IFLS) & HEAT PIPE BLACKBODY CAVITIES** are annular heat pipe-based products that provide a highly stable and uniform temperature work zone. IFLs enable this work zone when inserted into a tubular furnace; and Blackbodies use a hemispherical end cap to form an isothermal blackbody cavity.

**PRESSURE CONTROLLED HEAT PIPE FURNACES (PCHP)** provide significantly improved temperature stability and temperature control.

**HEAT PIPE FAQ**

# THERMAL STORAGE

**PHASE CHANGE MATERIAL (PCM) HEAT SINKS** can absorb thermal energy (heat) with minimal temperature rise during the solid to liquid phase transition. During this phase transition, the latent heat (J/kg) is able to maintain component temperatures, providing a siple, highly reliable thermal damper.

## BENEFITS

- The latent heat of the phase change is at least an order of magnitude higher than the sensible heat that can be stored.
- Controls temperature for pulsed power applications; rapid on/off cyclying benefits from thermal storage technology.
- Prevents overheating by providing temporary heat storage during the transient peaks of heat generation, or loss of primary cooling system.

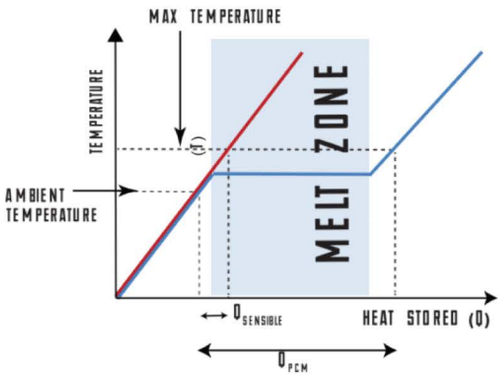


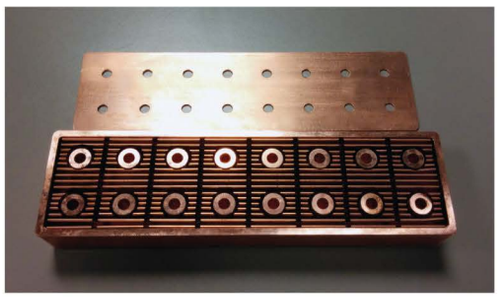

Figure 1. Temperature Rise vs Time. Temperature is maintained during phase transition.

## APPLICATIONS

Industrial
- Medical
- Transportation
- High duty-cycle electronics

Military & Aerospace
- Missiles
- LEO satellites
- Directed energy weapons

**PCM HEAT SINK CALCULATOR**



*PCM HEAT SINKS CAN ALSO INCORPORATE HEAT PIPES TO ADD A HIGH $K_{EFF}$ ELEMENT TO THE PCM*

> "It was a real pleasure to work with ACT due to their technical capability, product performance, and professionalism."
>
> - LEADING AEROSPACE COMPANY

# EMBEDDED COMPUTING SOLUTIONS

## SYSTEM AND SUB-SYSTEM LEVEL COOLING

Embedded Computing is an important aspect of defense electronics systems, routinely fielded in aerospace, ground and naval applications. Many critical functions such as data processing, Electronic Warfare (EW), imaging and communications are made possible by specially designed embedded computing systems.

Defense systems require significant computing functionality and speed, leading to high levels of waste heat, which must be managed without affecting the systems' durability or form factor. Complicating the thermal design, embedded computing systems are trending harshly towards higher power and smaller footprint electronics. ACT's team of engineers are well versed on the system and component level challenges and provide a variety of solutions for these types of systems.

ONLINE ORDERING

**ICE-LOK® WEDGELOCK** is a thermally enhanced wedgelock for conduction cooled embedded computing systems. Compared to a conventional wedgelock, an ACT ICE-Lok® provides additional heat transfer paths between the card and the chassis, allowing heat to avoid traveling through numerous high resistance metal-to-metal interfaces. This allows for longer life and higher reliability for critical components, without costly board or chassis redesigns.

2021 Military & Aerospace Electronics Innovators Awards PLATINUM HONOREE

*The form factors are compatible with standard VITA systems.*

**>30% LOWER THERMAL RESISTANCE**

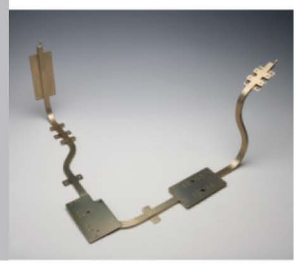
**HIK™ CARD FRAMES** increase thermal conductivity. In conduction systems it's paramount to get heat efficiently to the edge, and spread heat along the edge to lower heat flux into the chassis. Heat pipes can be strategically placed to accomplish both goals simultaneously. On air cooled boards, the increased thermal conductivity will isothermalize the fin stack base and reduce hot spots, optimizing fin efficiency.

**HIK™ CHASSIS OR CARD GUIDES** include heat pipes implemented into the sidewalls to enhance thermal conductivity and reduce conduction gradients. These are particularly effective when the ultimate heat sink is a located at the base of the chassis.

**CUSTOM LIQUID COLD PLATES** drive performance when implemented at the board, chassis sidewalls, or chassis base level. For a system level design, there are often significant manufacturing and packaging considerations to work through in parallel.

# SPACECRAFT THERMAL CONTROL

## INDUSTRY LEADING INNOVATION



With trusted expertise in engineering and manufacturing aerospace thermal control systems, ACT consistently delivers innovative solutions to meet the most demanding performance requirements.

**SYSTEM-LEVEL SPACECRAFT DESIGN**

- SATELLITES
- ROVER & EXPLORATORY MISSIONS
- LANDERS & PAYLOADS
- GROUND STATION COOLING

### CONSTANT CONDUCTANCE HEAT PIPES (CCHP)

use miniature grooves as the wick structure and ammonia or other low freezing temperature fluids as the working fluid to efficiently transfer heat in microgravity. ACT has in house qualified aerospace welding and x-ray capabilities to help you meet your tight launch schedule.

### SPACEVPX

solutions from ACT solve the thermal challenges at the chip level. Utilizing ICE-Lok® and the technologies below for in space flight applications, allows customers to manage high heat flux of the electronics.

2021 Military & Aerospace Electronics Innovators Awards

GOLD HONOREE

### SPACE COPPER-WATER HEAT PIPES (SCWHP)

are uniquely manufactured to survive the severities of spaceflight operation. ACT has developed precision processing and sealing techniques in order to pass numerous space qualification programs.

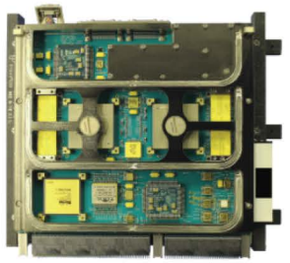


Photo courtesy of BAE systems, showing ACT SCWHP embedded in a SpaceVPX Reconfigurable Computing Module (RCM)

### HiK™ PLATES FOR SPACE

are utilized to increase the effective thermal conductivity of card guides. The heat pipe layout is tailored to most efficiently conduct heat from the electronics to the area where the plate is cooled.

### PHASE CHANGE MATERIAL HEAT SINKS

- Thermal storage for smoothing temperature swings during cyclic operation
- Smaller footprint: radiators can be designed for the average heat load rather than the peak load

### VARIABLE CONDUCTANCE HEAT PIPES (VCHP)

- Passive operation in micro gravity
- Ensure consistent payload temperature

### LOOP HEAT PIPES (LHP)

- Passive operation in micro gravity
- Sophisticated control options
- 3D printing has enabled lower price points

**SPACE INDUSTRY HOME PAGE**

### LIQUID COOLING

high power satellites, lunar missions and habitat modules may require active cooling. ACT has system-level analytical and manufacturing capabilities for single and two-phase pumped liquid loops with TRL 9 flight hardware including cold plates and fluid accumulators.

"ACT designed and produced an excellent product that met our strict performance demands and ambitious size constraints. The entire team at ACT was great to work with, everyone communicated effectively and made sure we were satisfied with the process and product from start to finish. Thank you ACT!"

- Leading Defense Contractor

# POWER ELECTRONICS COOLING

## NEXT GENERATION COOLING TECHNOLOGY

VIEW ONLINE

At ACT, we do much more than provide components for power electronics cooling. Our team can design, qualify and manufacture a complete system sized and developed for your unique needs. With in-house code coupled with commercial FEA and CFD packages, ACT can support quick designs and validation to give you confidence in a given solution. No matter if the thermal solution is air, liquid or two-phase, ACT has engineering expertise to support your program.

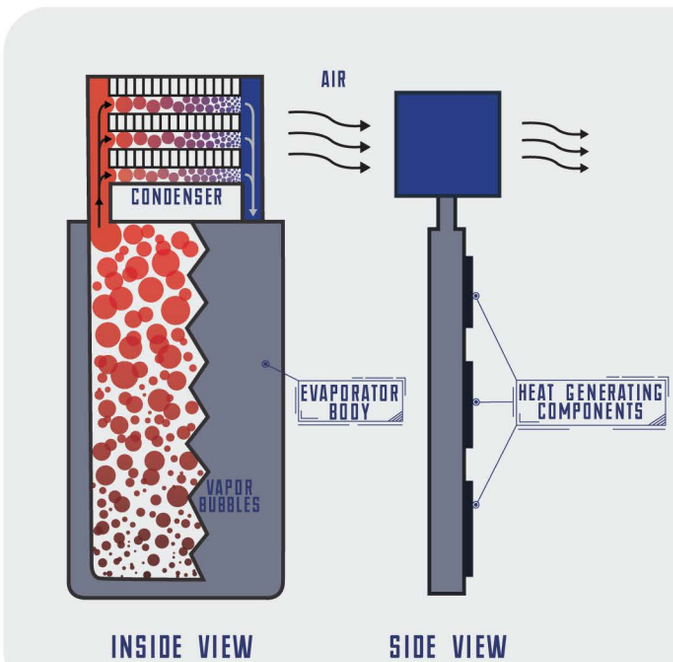
| POWER ELECTRONICS COOLING STRATEGIES | | | |
|---|---|---|---|
| ENCLOSURE COOLER | HEAT PIPE ASSEMBLY | LOOP THERMOSYPHON | PUMPED TWO-PHASE |
| Cabinet Cooling | Direct Cooling | | |
| Up to 5kW | Low Power Up to 2kW | Medium Power Up to 75kW | High Power Up to 500kW |

**LOOP THERMOSYPHONS** use passive heat transfer technology to move large amounts of waste heat; this scalable technology has been demonstrated from less than 1kW to up to over 100kW.

Heat generated by power electronics causes liquid within the loop thermosyphon evaporator to evaporate. The resulting vapor travels in the vapor line to the condenser, which is cooled by airflow. The condensed liquid then returns to the evaporator through a separate liquid line, completing the two-phase loop. This results in an extremely high performance cooler that requires no moving parts or external power for its operation.

### BENEFITS

- Passive Operation
- Di-Electric Fluid Options
- High-Performance
- Geometric Design Flexibility
- Ability to Move Heat Very Large Distances



**PUMPED TWO-PHASE (P2P) COOLING SYSTEMS** transfer heat by the evaporation and condensation of a portion (or all) of the working fluid.

Typically, a liquid (generally a di-electric fluid) near saturation is pumped into the cold plate (evaporator), where it starts to boil, cooling the electronics. The two phase (liquid and vapor) fluid then flows to the condenser, where the heat is dissipated using a heat exchanger, causing the vapor to condense. The system pressure forces the single phase (liquid) to exit the condenser and the cycle repeats.

ACT WINS

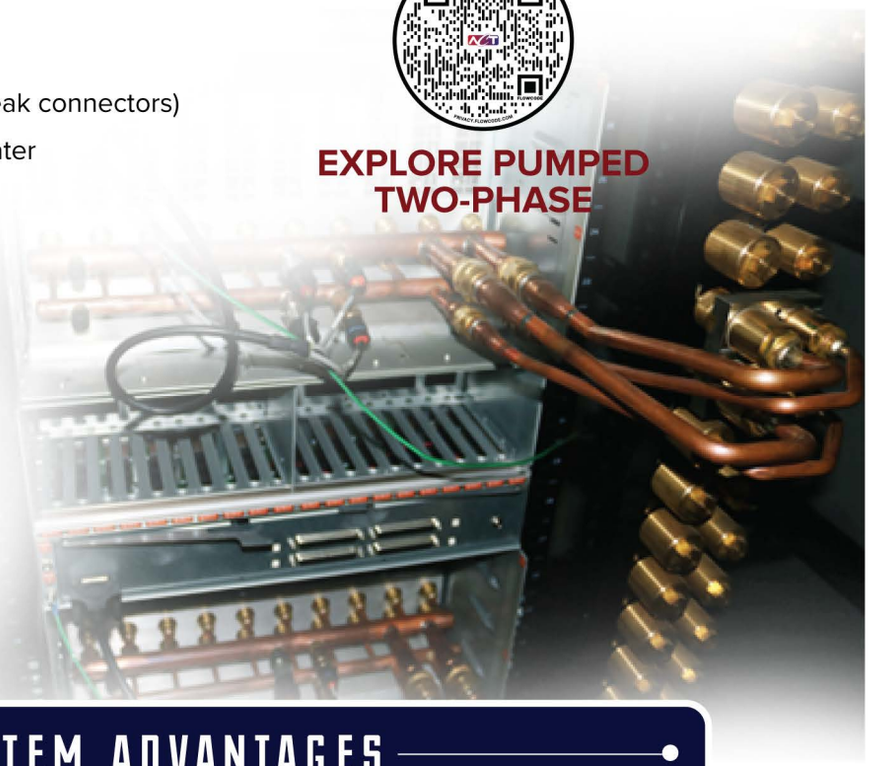
2020 Military & Aerospace Electronics INNOVATORS AWARDS

GOLD HONOREE

## CONSIDER PUMPED TWO-PHASE COOLING FOR APPLICATIONS THAT REQUIRE:

- Critical packaging constraints
- A propensity for high cyclical loads
- Low energy consumption
- A modular and easy field service (quick-dry break connectors)
- Medium or high-voltage and use de-ionized water
- Elimination of the chiller
- Extreme temperature uniformity requirements

**EXPLORE PUMPED TWO-PHASE**



## PUMPED TWO PHASE SYSTEM ADVANTAGES

- Increased power density
- Reduced weight
- Smaller enclosures
- 2 to 4 times better heat transfer
- Lower flow rates - 85% less than that of EG water systems
- Increased system reliability and MTBF
- Safer - no risk of electrical shorting

- Modular; scalable; hot swappable
- No altitude or hot climate de-rating
- Isothermal, increasing silicon life and simplifying plumbing
- Smaller pumps with 50,000 L10 life
- Opportunity for reduced wiring, switchgear, magnetics

- Ability to free cool - reduced HVAC system heat load
- 85% reduced energy consumption
- Shorter commissioning time
- Maintenance-free; no set-up, biocides, filters, tear downs
- Less thermal cycling for increased electronics life

# SEALED ENCLOSURE COOLING

## KEEPING YOUR POWER ELECTRONICS CLEAN, COOL AND OPERATIONAL

We understand your need for quick and cost-effective solutions available with easy online ordering. For help selecting the right enclosure cooler for your cabinet, our design selection tool leverages background engineering logic for the perfect fit.

### HSC SERIES

HEAT SINK COOLER
HEAT EXCHANGER

*ECONOMIC*

| Part Number | Thermal Capacity W @ 20°C ΔT |
|---|---|
| **ACT-HSC-22:** | 440 |
| **ACT-HSC-45:** | 900 |
| **ACT-HSC-68:** | 1,360 |

### HPC SERIES

HEAT PIPE COOLER
HEAT EXCHANGER

*COMPACT*

| Part Number | Thermal Capacity W @ 20°C ΔT |
|---|---|
| **ACT-HPC-15:** | 300 |
| **ACT-HPC-40:** | 800 |
| **ACT-HPC-50:** | 1,000 |
| **ACT-HPC-80:** | 1,600 |

### TEC SERIES

THERMOELECTRIC COOLER
AIR CONDITIONER

*ENVIRONMENTALLY FRIENDLY*

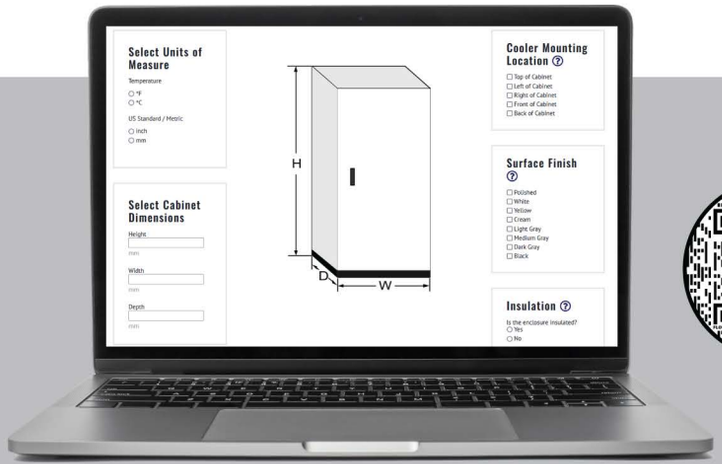
| Part Number | Cooling Capacity (Watts) at 0° C ΔT |
|---|---|
| **ACT-TEC-90:** | 90 |
| **ACT-TEC-300:** | 300 |

### VCC SERIES

VAPOR COMPRESSION
COOLER
AIR CONDITIONER

*HIGH POWER*

| Part Number | Cooling Capacity (Watts) at 0° C ΔT |
|---|---|
| **ACT-VCC-1000-DC:** | 1000 |
| **ACT-VCC-2000-AC:** | 2,000 |
| **ACT-VCC-3000-DC:** | 3,000 |
| **ACT-VCC-5000-AC:** | 5,000 |




## ONLINE SELECTION TOOL

This tool was designed by our engineering team to help you quickly and easily select the appropriate cooler for your application.

# ENERGY RECOVERY SOLUTIONS

## HVAC HEAT PIPE HEAT EXCHANGERS

**EXPLORE HVAC SOLUTIONS**

ACT's HVAC solutions provide effective and affordable energy recovery during the hot summer and cold winter months as well as throughout the year. Compared to traditional energy wheel technology, heat pipe heat exchangers require less maintenance as they have no moving parts, and the passive systems require no external energy for their operation.

### WRAP-AROUND SYSTEMS
*(Enhanced Dehumidification)*

- Energy Savings
- Passive System
- Enhanced Dehumidification
- Pipe to pipe WAHX
- Split Loop & Pump Assisted Split Loop WAHX

### AIR-TO-AIR ENERGY RECOVERY SYSTEMS

- Maintains zero cross-contamination between air streams
- Energy Savings
- Passive System

### CUSTOMIZATION OPTIONS FOR CONTROL

- Capacity Control
- Frost Control
- Reheat Control

ENERGY RECOVERY

NO CROSS-AIR CONTAMINATION

ENERGY COST SAVINGS

## PUMP ASSISTED SPLIT LOOP THERMOSYPHON HVAC HEAT EXCHANGER

### BENEFITS

- Compatible with large systems or long distance
- Energy efficient
- Optional temperature control (without the need for bypass dampers)
- Compact packaging
- Design flexibility
- High reliability, low maintenance needs

AHR EXPO INNOVATION AWARDS 2021 WINNER

# INNOVATIVE SOLUTIONS FOR EXTREME ENVIRONMENTS

**ENVIRONMENTAL CONTROL UNITS (ECUS)** are machines that are responsible for taking in the ambient air, cooling (or heating) it, and returning the conditioned air to the controlled space, which may include shelters, base camp facilities, or command centers. This keeps the equipment at optimum temperature and humidity, as well as keeping personnel safe and comfortable during deployment.

Unlike commercial air conditioners, Tekgard® ECUs are designed to be rugged. They must survive the rough terrain that the military encounters daily and they need to remain in operation at the extreme temperatures and conditions to which they will be exposed. Tekgard® ECUs are mobile, capable, durable, and proven solutions for environmental control needs.

## ECU CONFIGURATIONS

**HORIZONTAL**

**UNITARY**

**VERTICAL**

**LIQUID COOLERS AND CHILLERS** keep mission-critical equipment at optimum operating temperatures, Tekgard® liquid chillers and heat exchangers are proven, with fielded heritage in dozens of deployed operations. These units deliver superior results for high-intensity workloads. Radar and missile defense programs rely on our chillers to keep their systems cool and their personnel safe. Thanks to their rugged design and build quality, Tekgard® chillers can support operations anywhere in the world.

**LIQUID-TO-AIR SYSTEMS** rejects heat to the ambient air and provides cooling fluid at a maximum specified increase over the ambient temperature.

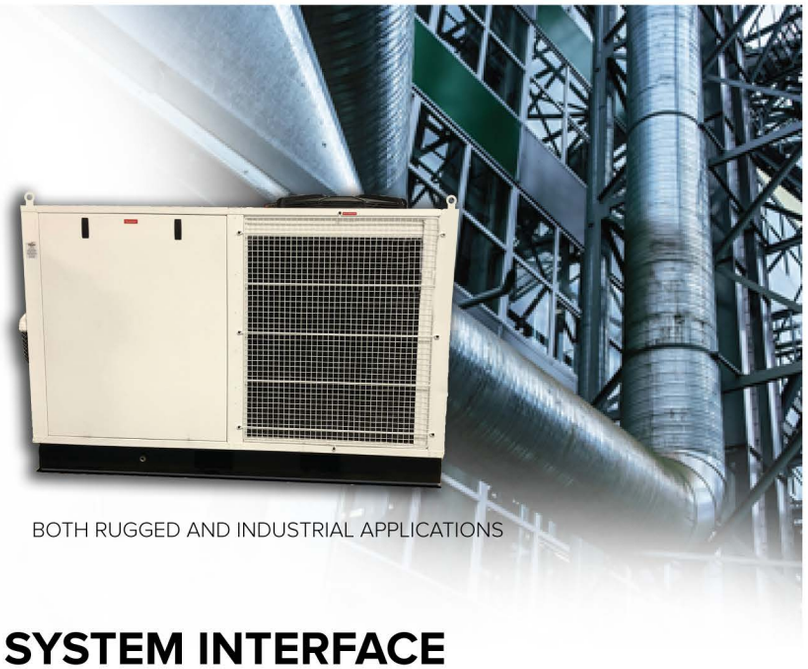
**CHILLER SYSTEMS** are utilized where cooling fluid below ambient temperature is needed. These include a vapor-compression cycle to provide cold coolant even when ambient temperatures reach 60°C +(140°F).

**TEKGARD® ECUS**

**TEKGARD® CHILLERS**

# CUSTOM UNITS DESIGNED TO YOUR SPECS

- Rugged, user-friendly ECUs
- Multiple size packages and control strategies
- Mil-Std-810 and Mil-Std-461 tested
- Max/Rating Temperatures up to 140°F (60°C)
- 120 / 208 / 230 / 270 / 380 / 460 Volts
- Single and 3 Phase, 50 / 60 / 400 Hz Power
- MIL-STD-810G qualification testing
- Quiet fan technology <70dbs
- Active Dehumidification
- EMI compatibility
- Soft Start & Load Shedding capability
- Remote Control options
- Customizable ducts (diameter, length, and color)
- Variable Speed Fans available for many sizes
- Plus many more (if you do not see your spec, call us!)



BOTH RUGGED AND INDUSTRIAL APPLICATIONS

## SYSTEM INTERFACE

**INPUT POWER:** 120-480 Voltages, single or 3 phase, 50 HZ, 60 HZ, 400 HZ or DC power options

**POWER AND CONTROL CONNECTIONS:**

Hard-wired or with your preferred MIL-STD connector

## WE'RE ALWAYS THERE FOR OUR CUSTOMERS

- Field service technicians ready to travel
- 18 month warranty
- Dedicated spares and replacement department

## FIELDED EXAMPLES

### HOWLER COUNTER-DRONE SYSTEM

This program combines the Coyote Block 2 Unmanned Aerial System (UAS) with the Ku-band Radio Frequency System (KuRFS). The KuRFS radar system tracks incoming enemy drones and other aerial threats, simultaneously guiding the Coyote UAS to safely destroy these dangerous targets. The Tekgard® chiller functions as a key part of the system, ensuring the equipment remains at the optimum temperature for reliable operation.

### PATRIOT AIR AND MISSILE DEFENSE SYSTEM FMS CASES

As a subcontractor to Tyonek: ACT developed custom Tekgard® ECU systems for the shelters of the Patriot Missile Defense system. This MIL-STD-qualified equipment proved to be reliable in some of the harshest weather conditions on the planet.

**RESEARCH AND DEVELOPMENT HAS BEEN A CORE COMPETENCY OF ACT SINCE ITS INCEPTION** and continues to lead our product and market diversification efforts. ACT's research focus areas include a variety of topics.

## EMERGING TECHNOLOGIES

### SPACECRAFT THERMAL CONTROL

- Deployable Radiators
- Lunar Mining
- Lunar Night Survival - Thermal Switch

### OTHER/INDUSTRIAL

- Swiss-Roll Advanced Combustor
- Advanced P2P Evaporator
- High Temperature - High Power Heat Pipes

### VAPOR VENTING

### PLASMA STERILIZATION - MEDICAL EQUIPMENT

### PUMPED TWO-PHASE QUALITY SENSOR

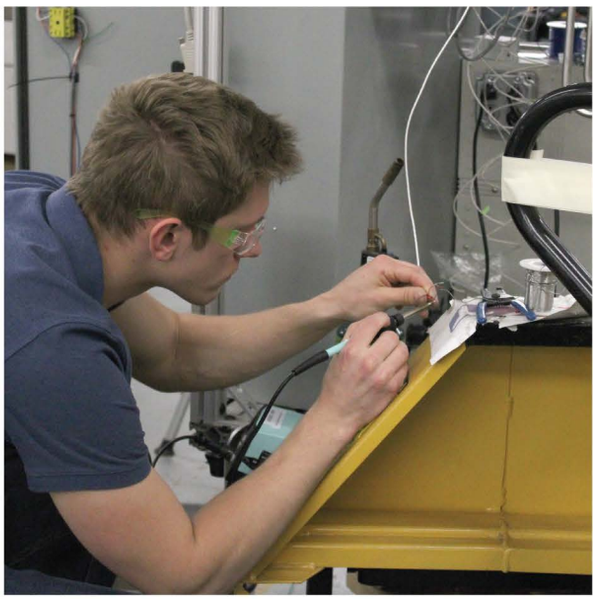
### PLASMA POWDER DE-OXIDATION

### CO2 CAPTURE

### ADVANCED MODELING

- Peridynamics-Based Meshless Modeling
- Corrosion Damage and Corrosion Fatigue
- Molecular Dynamics for Nano-scale Phenomena
- Electro-Thermal for Semiconductors
- Reactive Molecular Dynamics and Accelerated Techniques for Computational Chemistry
- Smooth Particle Hydrodynamics for Process Modeling

**EXPLORE R&D**



# ONLINE TOOLS & RESOURCES

**HEAT PIPE CALCULATOR** This program will give a performance curve of a copper-water heat pipe with the given input values. This curve is a guide for ACT's standard heat pipes; custom solutions are readily available to meet a large variety of design specific requirements.

**THERMAL STORAGE CALCULATOR** This program can be used to determine the approximate size and mass of a Phase Change Material (PCM) heat sink required for thermal storage applications.

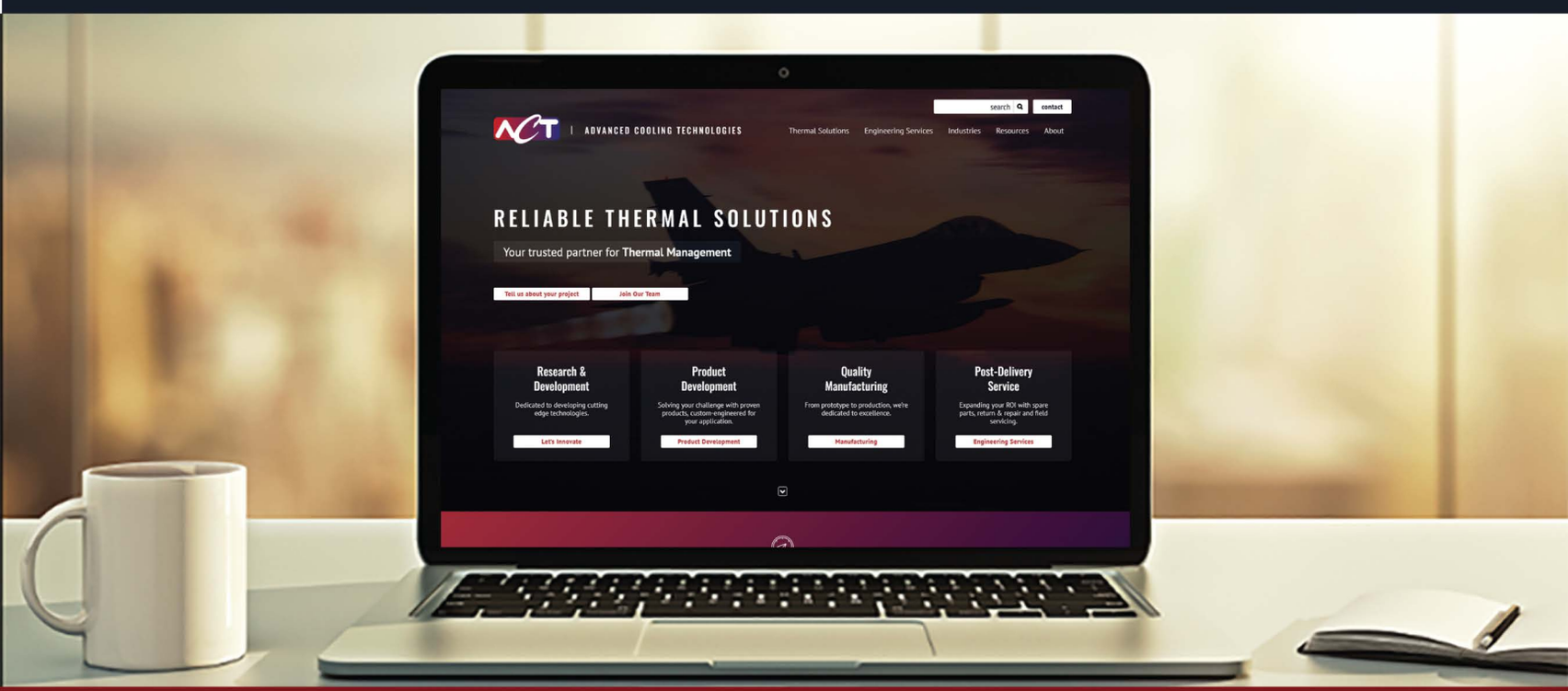
**HVAC ONLINE SELECTION TOOLS** will assist the HVAC design engineer in the proper selection of an Air-to-Air Heat Pipe Heat Exchanger (AAHX) or a Wrap-Around Heat Pipe Heat Exchanger (WAHX) and provide energy savings estimates. The tool provides the designer with the capability to perform a preliminary design selection and to evaluate and rate the AAHX or WAHX performance at various design conditions. It is also intended as a tool to communicate engineering requirements to ACT for additional evaluation.

**ENCLOSURE COOLING ONLINE SELECTION TOOL** This program will assist end users in the proper selection of an enclosure cooler. The tool will select the best Enclosure Cooler products based on user inputs, allowing for easy online purchase.

**ONLINE ORDERING** ACT offers online ordering for it's line of Sealed Enclosure Coolers and ICE-Lok° products. Choose your product and preferred options and conveniently pay online.

**WEBINARS** Our library of webinars cover a wide variety of thermal management topics and discuss industry trends, the latest technology, and more.

**HEAT PIPE RESOURCES PAGE** contains the most extensive information on heat pipes and related technology available anywhere on the web, including Fundamentals, Limits, Wicks, Working Fluids and Envelopes, Different Kinds of Heat Pipes, and Advanced Developments.



## INDUSTRIES

Avionics/Aircraft
Electronics Cooling
Enclosure Cooling
HVAC Energy Recovery
Materials Processing
Medical
Military
Photonics
Power Electronics
Energy
Spacecraft Thermal Control
Temperature Calibration & Control
Transportation


**Lancaster, Pennsylvania USA (HQ)**
1046 New Holland Avenue
Lancaster, PA 17601

Phone: 717.295.6061

**York, Pennsylvania USA**
3390 Farmtrail Road
York, PA 17406

Phone: 717.854.0005

Email: Solutions@1-ACT.com

**www.1-ACT.com**


ISO 9001 & AS9100 Certified
ITAR Registered