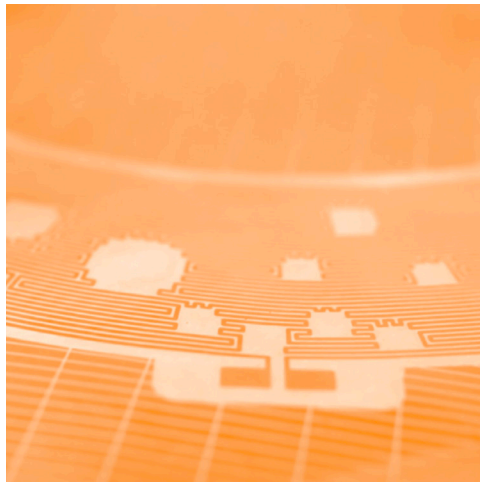
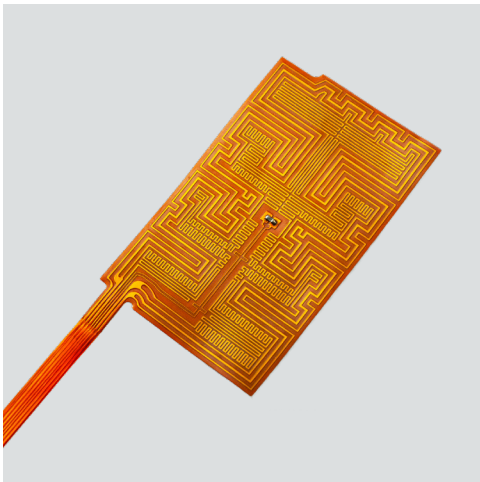


Birk Manufacturing, Inc.

# Aerospace & Defense Applications Guide

Thermal Solutions for Environmental Control in Critical Applications



AS9100 | ISO 9001 | ISO 13485 | ITAR, UL and CSA Certified



**BIRK**

Engineering Thermal Solutions

# Mission Critical Applications

At Birk Manufacturing, we specialize in cutting-edge flexible heaters tailored to meet the stringent demands of the aerospace and defense industries. Our commitment to innovation, precision, and reliability makes us the preferred choice for companies seeking optimal heating solutions in extreme environments.

## Key Features & Benefits

### Operation in Extreme Low Temperatures

Maintain heat in challenging conditions, ensuring peak performance in high-altitude, low-temperature, and harsh space environments.

### Low Outgassing in Vacuum Environments

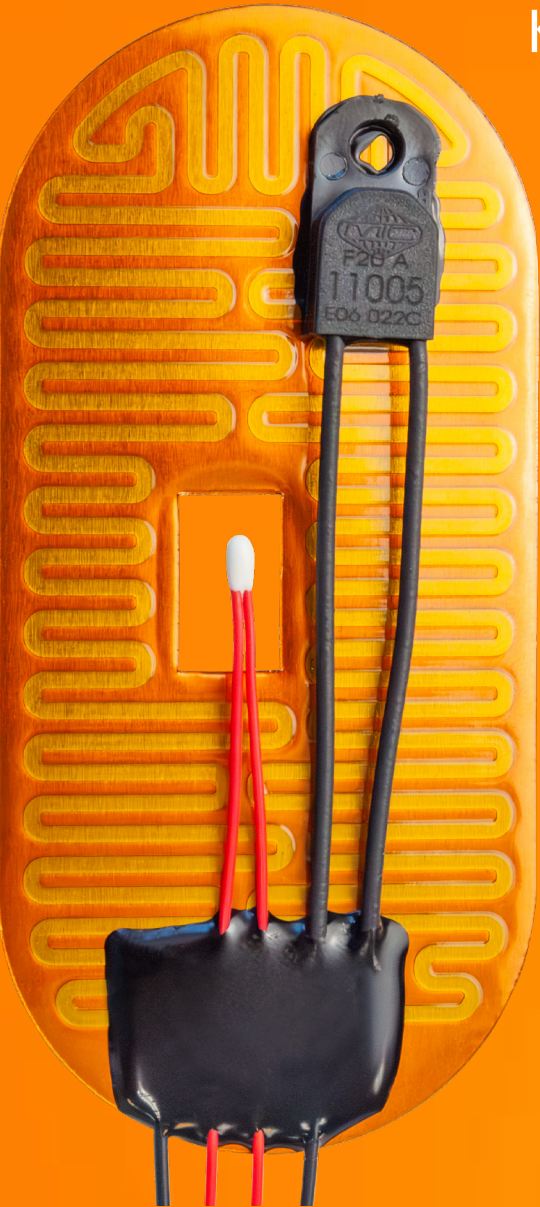
Exhibit minimal outgassing in vacuum environments and safeguard the integrity of your aerospace systems, preventing contamination and ensuring the reliability of your mission-critical equipment.

### Lightweight Construction for Flight Efficiency

Lightweight design not only contributes to the overall weight efficiency of aircraft and space vehicles, but also allows for increased payload capacity. Our thermal solutions strike the optimal balance between performance and weight, meeting the demands of modern aerospace engineering.

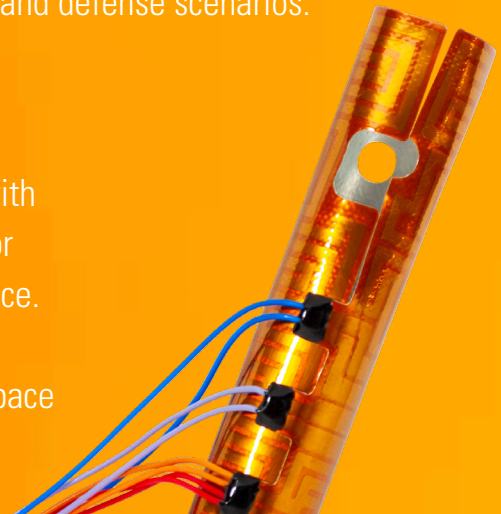
### Dual Redundant Circuits for Fail-Safe Applications

Incorporate dual redundant circuits, utilizing two heaters running simultaneously, ensuring a fail-safe application for uninterrupted operation. This advanced feature enhances reliability in critical aerospace and defense scenarios.



## In-House Testing for Space Endurance

Commitment to excellence extends to in-house testing facilities equipped with state-of-the-art thermal chambers, power supplies and testing equipment for voltage conditioning, thermal shock, thermal cycling, and insulation resistance. Designed and performed by our knowledgeable and experienced electrical engineering staff, our testing procedures simulate the harsh conditions of space and meet or exceed all NASA testing requirements.



# Flexible Heaters: Applications in Focus

## Avionics

Ensure the optimal functionality of navigation, communication and instrumentation systems in both civilian and military aircraft.

## Satellites

Safeguard critical electronics, batteries and propulsion systems utilizing heaters with advanced shielding layers to protect materials from ultra-violet light and radiation degradation and electrical 'noise' interference.

## Drones and UAVs (Unmanned Aerial Vehicles)

Enhance the reliability of UAVs in reconnaissance, surveillance, and logistics support missions.

## Military Vehicles

Provide reliable temperature control for electronics, optics, and on-board systems in diverse operational environments.

## Spacecraft

Maintain optimal operating temperatures for sensitive instruments, propulsion systems, and life support equipment in outer space.

## C4ISR Systems

Enhance the overall reliability and performance of critical information and communication networks in intelligence, surveillance and reconnaissance missions.



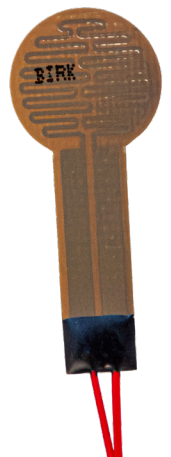
## Defogging and Deicing

Instrument panels, lenses, and other aerospace components are prone to moisture and humidity buildup, impacting their functionality. The risk intensifies in lower temperatures, leading to frozen moisture that can cause irreversible damage. Birk's solution lies in the application of robust Kapton® flexible heaters. Specially designed for deicing and defogging, these heaters efficiently direct controlled heat to sensors, lenses, and electronics, preventing moisture-related issues without causing harm to the equipment.

## Component Integration

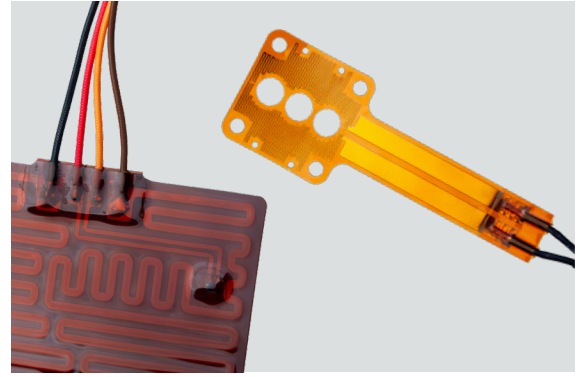
Ensuring reliable heat is imperative for the seamless operation of critical components:

- Displays
- Instrumentation
- Battery Packs
- Fuel Delivery Systems
- Actuators
- Camera Lenses
- Hatches
- Rugged Computers
- Circuit Boards



## Strategic Engineering for Minimal Material

We offer lead wires and components encapsulated within the Kapton® laminate, a cutting-edge feature that significantly reduces the material content with the elimination of epoxy, coatings and RTV. This not only optimizes the overall design but also minimizes the likelihood of chemical adverse effects. Our commitment to innovative solutions ensures that our thermal products not only meet but exceed industry standards, providing a streamlined and efficient solution for your aerospace and defense applications.



## Customized Solutions with Certified Excellence

We understand the specific challenges faced by aerospace and defense companies, and we excel in delivering solutions tailored to your precise requirements. Direct collaboration with our engineers ensures that each solution is crafted to optimize performance in your unique applications. Birk proudly holds **AS9100**, **NIST SP 800-171** and **IPC J-STD-001HS** space and military addendum certifications, along with **ITAR** registration, demonstrating our dedication to unmatched standards and reliability in aerospace and defense manufacturing. Birk has the ability, experience and knowledge to perform in-house testing to meet **NASA S-311-P-079** & **NASA S-311-P-841** requirements.



*Discover how Birk's flexible heaters elevate performance and reliability across a wide range of aerospace and defense applications. From avionics to missile systems, our innovative heating solutions are engineered to excel in the most demanding environments.*



For more information visit [www.birkmfg.com](http://www.birkmfg.com)  
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