

ALL FLEX HAS THE UNIQUE CAPABILITY TO MANUFACTURE HEATERS AND ASSEMBLE COMPONENTS

All Flex can design, fabricate, and reverse engineer flexible heaters to meet customer's exact requirements. Flexible polyimide and silicone rubber heaters and heater component assemblies are fabricated with a variety of metal alloys to deliver custom solutions for heating capacity, watt density, and other application specific customer needs. Typical lead times 2 – 3 weeks upon customer approval.

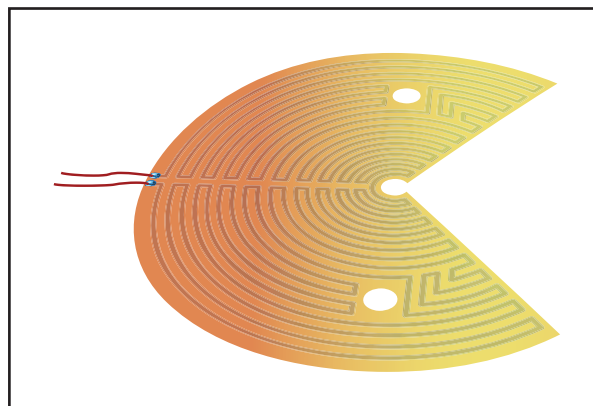
FLEXIBLE HEATER FEATURES:

- Temperatures up to:
 - 120°C Polyimide
 - 232°C Silicone Rubber
- Circuit size up to 22" x 30" (558mm x 762mm)
- Resistant to most chemicals
- Engineered to meet specified output
- Flexible Heaters can be supplied as thin as .004"
- Component and connector assembly
- Soldered wire assembly for connections
- Epoxy reinforced soldered wires
- Bifilar Heater – A heater that consists of two parallel traces of differing resistance. User can heat one, the other, or both traces essentially making three heaters in one. Bifilar heaters can be advantageous if the user wants to keep control logic to a minimum.

OTHER CONSIDERATIONS/ADD ONS:

- Thermistor assembly
- Heater can be built with multiple heating zones
- Quick turn available
- Any volume quantities
- Assembly expertise
- Epoxy coated solder joints provide strain relief and insulation and environmental protection
- UL Recognized
 - (File #E338387)
 - (Category KSOT2)

- PSA – Pressure Sensitive Adhesive can be applied to either surface for a peel and stick application
- Heat spreaders of aluminum can be applied to the heater to reduce the incidence of hot spots
- Designs can be manufactured to reduce or eliminate heat in certain positions of the heater
- Heaters can be designed/manufactured into virtually any size or shape, with or without clearance holes
- All heaters are custom designed and manufactured to customer specifications
- Special marking of part number or image



Heaters can be designed and manufactured into virtually any size and shape.

All Flex can
REVERSE ENGINEER
to meet exact requirements

Flexibility to meet customers needs

CUSTOM HEATERS

POLYIMIDE & SILICONE RUBBER

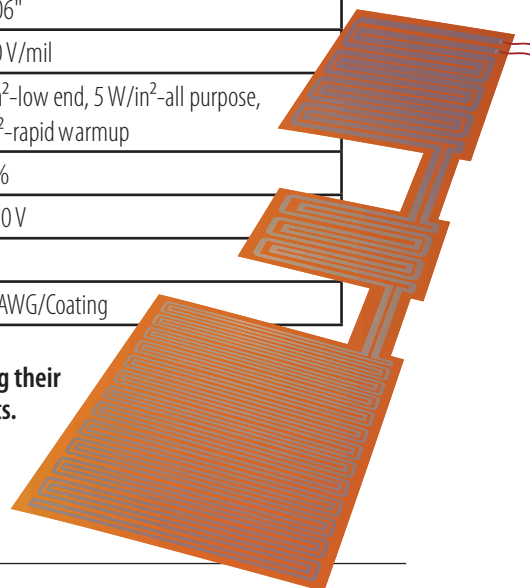
HYBRID

All Flex engineering will work closely with you to ensure the proper design and layout. The following are typical characteristics and parameters of our heater circuit products.

DESIGN PARAMETERS

CHARACTERISTICS	TYPICAL PARAMETERS - POLYIMIDE	TYPICAL PARAMETERS - SILICONE
	<i>* Note - these are standard parameters inquire within for requirements beyond this range</i>	
Size Range*	Less than ½" square up to 10"x22"	Less than ½" square up to 24"x30"
Temperature Range	Up to 248° F (120° C)	Up to 450° F (232° C)
Resistance Range	Up to 250 Ω per sq in	Up to 250 Ω per sq in
Metal Thickness Range*	.0005" - .002"	.0005" - .002"
Total Thickness Range*	.0045" - .01"	.03" - .06"
Dielectric Range/ Insulation Resistance	4000-5000 V/mil	400-600 V/mil
Example Power Densities	2.5 W/in ² -low end, 5 W/in ² -all purpose, 10 W/in ² -rapid warmup	2.5 W/in ² -low end, 5 W/in ² -all purpose, 10 W/in ² -rapid warmup
Resistance Tolerance*	+/- 10%	+/- 10%
Maximum Voltage	Up to 115 V	Up to 220 V
Standard Coverlay Thickness	.001", .002", .003" and .005"	.015"
Leads (if required)	Length/AWG/Coating	Length/AWG/Coating

Multi-zone heaters give customers full flexibility in managing their processes while offering uniform and easy to install elements. Available in both polyimide and silicone rubber.



HYBRID HEATERS

Now your single or double sided circuit assembly can have built-in heaters.

All Flex can take your electronic circuitry requirements and your heat requirements and create a hybrid product. Typically the heater function is on one side of the base film and the electronics function is on the opposite side. By combining a copper layer for the electronics with a layer of resistive metal for the heater, a hybrid circuit can be designed. Top to bottom electrical connection can be done with plated thru holes. All Flex has unique process and materials that can accommodate even the most challenging hybrid requirements.

ADVANTAGES OF A HYBRID HEATER

- Thinner overall profile
- Reduces overall assembly weight
- More robust functionality
- Lower over all costs

HEATER APPLICATIONS

MEDICAL

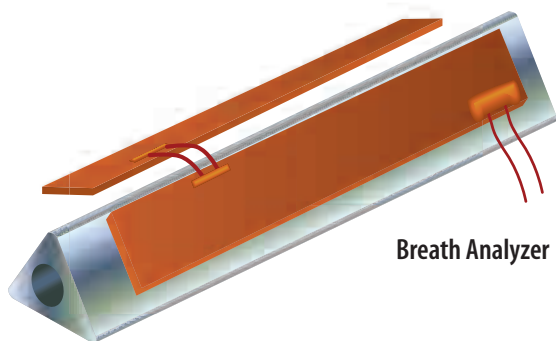
All Flex heaters provide precise heating and thermal control in applications where thermal management is extremely important.

All Flex Understands:

- Medical quality requirements
- FDA traceability expectations
- Medical device qualification procedures
- Clean room/precision assembly needs of medical customers
- Medical device product development cycles
- Small and medium volume delivery needs

Some Applications:

- Incubator
- Operating room equipment
- Surgical tools
- Defibrillator
- Dialysis equipment
- Blood analysis equipment
- Medical instrumentation and laboratory equipment



Breath Analyzer

AERONAUTICS/AEROSPACE

All Flex is AS9100, ISO 9001:2008 Certified, ITAR Registered, Mil-P-50884E Compliant.

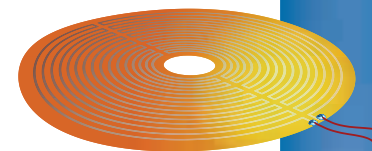
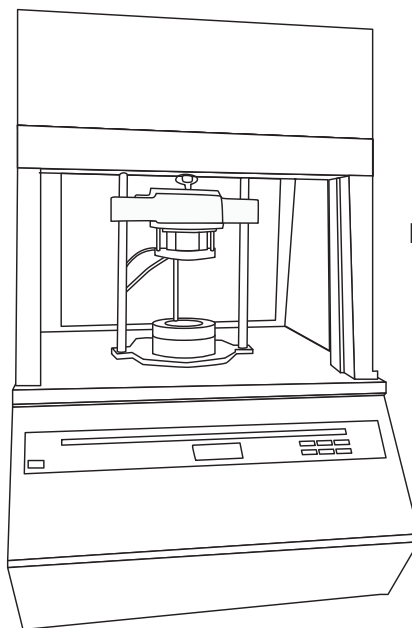
Heating technology is used extensively in the Aeronautics and Aerospace industry due to the temperature extremes and the need for reduced weight and compact electronics. All Flex heaters help to maintain high reliability of electrical components by limiting exposure to high degrees of thermal contraction/expansion cycles.

All Flex Heaters also keep non-electrical components at constant temperatures for both functional and convenience purposes.

The typical application for heaters in this industry is not to heat devices to high temperatures, but to keep devices from getting cold. Our technology enables us to fabricate heaters that remain flexible and compliant at -55 degrees C (-67 degrees F) while heating to slightly above freezing.

Some Applications:

- Helicopter controls
- Aircraft controls
- De-icing systems
- Satellite hardware
- Cockpit systems



Lab Analysis Heater

MILITARY/DEFENSE

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All Flex Heaters provide an excellent solution for high performance, densely packed electronics where space is a premium yet heating of components are needed. Numerous All Flex Flexible Circuits are used by prime contractors, NASA, developmental laboratories, and government agencies.

Some Applications:

- Aircraft equipment
- Night vision
- Sighting systems
- Ruggedized computers

Flexibility to meet customers needs

HEATER APPLICATIONS & STOCK HEATERS

OUTDOOR ELECTRONICS

Devices and equipment that are exposed to cold temperatures creates design challenges for manufacturers. Typical thermal cycling introduces molecular expansion issues that can impact electronics, cause mechanical wear, introduce moisture variation, restrict moving parts, and other functional and operational problems.

Some Applications:

- Automated Teller Machines
- Outdoor LED and Canister Lighting
- Outdoor LCD Screen
- Ruggedized electronic and computer devices made to operate in extreme weather conditions

GENERAL & INDUSTRIAL ELECTRONICS

All Flex Heaters are used in a wide variety of electronic applications to assist in the performance of our customers' end products.

Some Applications:

- Food service equipment
- Storage tanks
- Battery heaters to enhance battery performance
- Photo processing
- Outdoor antenna
- Hand-held scanners

STOCK HEATERS:

(for production products or test/evaluation)

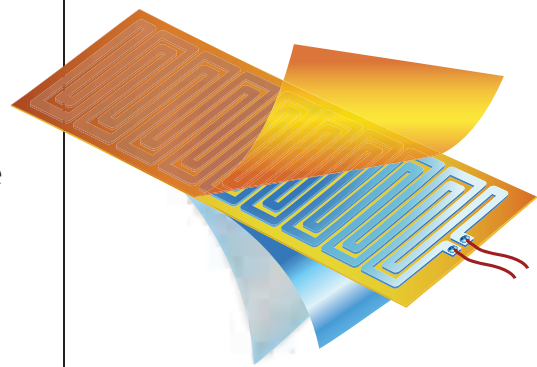
Generally our customers have unique design requirements that necessitate customization for their particular device or application, however one of our standard heaters may meet your needs. All Flex offers standard, non-custom flexible heaters. These heaters are classified as either Stocked or Build to Order (BTO) and are available without a tooling or set-up charge.

Select size/shape, resistance, or watt density (watts per square inch) to determine if a particular stock product meets your needs then assess the additional options below that may be required.

Stocked heaters options:

- Each stocked heater is available with a pressure sensitive back-piece cut to the same size as the heater.
- Aluminum heat-dissipation shield, cut to the same size as the heater.
- Custom marking is available as specified and desired by the customer.
- The addition of wires and associated wire characteristics
- UL Recognition

Visit: WWW.ALLFLEXHEATERS.COM for a complete listing of all standard stock heaters, technical detail, lead times, pricing, option pricing, etc.



All Flex heaters can be supplied with PSA (Pressure Sensitive Adhesive) on the back of the heater with a release liner for easy peel and stick, the PSA makes installation quick and easy.

Our Vision...
is to be your
PREFERRED SUPPLIER
for flex...