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# Polyimide Heaters

TUTCO Farnam's Polyimide heaters, also known as Kapton heaters, stand out as thin, flexible, and highly precise heating solutions. These advanced heaters offer rapid and efficient heat transfer. The flexibility of Polyimide heaters enables them to be customized into various shapes, sizes, and resistances, ensuring a tailored heating solution for diverse needs.

Our UL Listed Polyimide heaters are particularly advantageous in scenarios where space and weight play crucial roles. Their compact and lightweight design, paired with their exceptional heating performance, makes them an ideal choice for industries like medical, laboratory, aerospace, defense, and outdoor electronics. The dielectric strength of Polyimide heaters further enhances their suitability for applications that demand reliable and high-performance heating solutions.

Contact a TUTCO Farnam representative to help you design your next Polyimide Kapton heater. Polyimide heaters require a minimum order of 100 pieces.

## Industries and Applications

Industries and Applications In medical environments, Polyimide heaters are commonly utilized for patient warming systems, laboratory equipment heating, and medical device applications. Their ability to deliver precise and consistent heating makes them essential components in maintaining optimal conditions in critical healthcare settings. The aerospace industry benefits from Polyimide heaters due to their ability to provide efficient and reliable heating in aircraft components, avionics, and aerospace testing equipment. The flexibility of Polyimide heaters allows them to conform to complex shapes and tight spaces, ensuring uniform heating distribution in various aerospace applications.

Defense applications rely on Polyimide heaters for their durability, rapid heat-up times, and resistance to harsh environmental conditions. These heaters play a crucial role in military equipment, communications systems, and defense electronics where performance and reliability are paramount. In outdoor electronics, Polyimide heaters excel in providing consistent and reliable heating in exposed environments. Their resistance to moisture and chemicals, coupled with their fast heat transfer capabilities, make them a preferred choice for outdoor electronic devices, surveillance equipment, and instrumentation exposed to varying weather conditions.

TUTCO Farnam Polyimide heaters offer a superior heating solution that combines efficiency, precision, and versatility, making them a trusted choice in industries that demand top-tier performance and reliable heat transfer capabilities.

## Introduction to Polyimide Heaters

Kapton® is actually a brand name for a type of polyimide film developed by DuPont™. It has become so widely recognized that it's often used synonymously with polyimide film in many contexts, including in the construction of flexible heaters. However, the distinction between Kapton heaters and generic polyimide heaters primarily lies in the brand of the polyimide film used, rather than any fundamental technological or material differences. Polyimide heaters are versatile and efficient heating devices that find wide applications in various industries. These heaters are known for their flexibility, durability, and rapid heating capabilities. Utilizing advanced Polyimide materials, these heaters are designed to provide uniform and precise heating in challenging environments.

## Usage and Benefits of Polyimide Heaters

Polyimide heaters are commonly used in applications where traditional heating methods may not be suitable due to their unique properties. These heaters offer benefits such as fast heat-up times, excellent thermal stability, and resistance to chemicals and moisture. Additionally, their flexibility allows for easy integration into complex shapes and spaces, making them ideal for a wide range of heating requirements. With energy-efficient operation and customizable options, Polyimide heaters offer a reliable and cost-effective heating solution for various industrial and commercial applications.

## Specifications

**Watt Density** ..... up to 20W/sq. in. (7.8W/cm2) for certain applications
**Temperature Range** ..... -76ºF to 302ºF (-60ºC to 150ºC)
**Dielectric Strength** ..... 800 VAC
**Minimum Bend Radius** ..... 0.032 in. (0.8mm)
**Overall Thickness** ..... 0.006 in. (0.15mm), except at lead out
**Size** ..... up to 27.5 x 19.625 in. (700mm x 500mm)

## Resources

**BROCHURES**

Sales Sheet

**VIDEOS**

Flex Spec Tool Demo

# FLEX SPECS

Design & spec your flexible heater online in 5 easy steps. Save and revise your configurations and submit them for quoting. Check our Flex Specs Tool to view and configure your heater.

## Frequently Asked Questions

**HOW CUSTOMIZABLE ARE LEAD TERMINATIONS AND ELECTRICAL CONNECTIONS?** —

Lead configuration is highly customizable. Options include lead length, exit location, orientation, insulation type, and strain relief features. These details are often critical for assembly efficiency and reliability, and Farnam designs them to integrate cleanly with the customer's wiring and control systems.

**ARE POLYIMIDE HEATERS SUITABLE FOR CONTINUOUS OPERATION OR ONLY INTERMITTENT USE?** —

Polyimide heaters can be designed for either intermittent or continuous operation, depending on the application requirements. Power density, insulation stack-up, and heat dissipation must be carefully matched to the duty cycle. Farnam engineers design heaters to operate safely within thermal limits over the intended lifecycle.

**CAN POLYIMIDE HEATERS BE DESIGNED WITH UNEVEN OR ZONED HEATING PATTERNS?** —

Yes. Polyimide heaters can be engineered with variable watt densities across the surface to address uneven heat loss, thermal gradients, or localized heating requirements. This is especially useful when certain areas of an assembly require more heat than others or when compensating for non-uniform mounting surfaces.

**HOW DO I KNOW IF A POLYIMIDE HEATER IS THE RIGHT CHOICE VERSUS A SILICONE RUBBER HEATER?** —

Polyimide heaters are best suited for applications where space is limited, fast thermal response is required, and operating temperatures are moderate. Silicone rubber heaters are often preferred for higher mechanical durability, exposure to moisture, or larger surface areas. TUTCO Farnam evaluates mounting surface, operating environment, target temperature, and duty cycle to recommend the most appropriate heater technology.