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ARi Industries Inc

A DIVISION OF



OKAZAKI
MANUFACTURING COMPANY

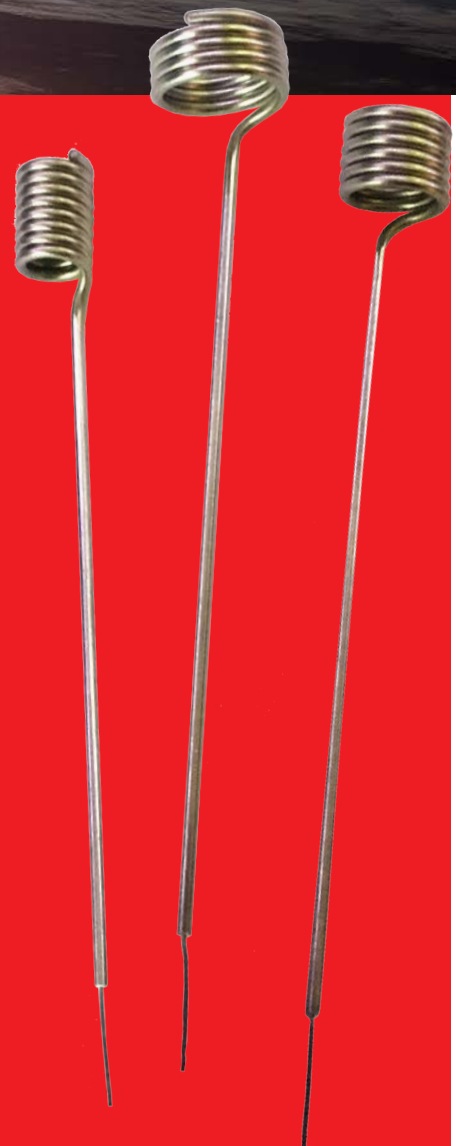


Heaters for Ion Thrusters

Aerospace Heaters, the spark plug of Ion Thrusters.

For efficiency within satellites and deep space probes,
Ion Thrusters have become the ultimate technology.

Advances in thruster technology have provided the tools to
give us unparalleled levels of thrust which can now last for
months compared with the older generation of thrusters
which could only last seconds.



Ion Thrusters - the dream of yesterday, the reality today

At the heart of each Ion thruster is the chamber that holds the cathodes. The cathodes are part of the plasma generating system which give the thrusters their long life. Typical plasma thrusters have a heater to generate the heat needed to allow the plasma to start flowing in the Ion thrusters. At ARi Industries we have developed heaters to be used in these extreme environments.

Ion Thruster systems rely heavily on the lifetime and durability of our heaters along with their ability to reach temperatures that base metal heaters are unable to attain. Development of our heating solutions required researching the latest materials and technologies. ARi has

been successful in producing heaters able to reach the high temperatures required by our customers, yet still provide the long-life reliability needed.

ARi, located near Chicago, Illinois in the USA, offers specialty heater cable which can be used to reach the extreme temperatures required to ignite the plasma within Ion Thrusters. Our product offering goes beyond what any normal base metal heaters can obtain. There are many different solutions for Ion Thrusters, but with our custom solutions designed around your requirements, ARi Industries are the only heater supplier you will need.

When looking at your heater design, here are some options you may want to consider:



Specifications

Heater O.D.	Minimum O.D	Maximum O.D.
	0.062 inch (1.57mm) Nominal	0.150 inch (3.81mm) Nominal
Number of Wires	1 to 4 wire designs are possible	
Resistance	Design dependent.	
Outer Sheath Material	Typically Tantalum, but others are possible.	
Insulation materials offered	Compacted Magnesium Oxide	Compacted Alumina Oxide
Typical Conductors	Typically Tantalum, but others are possible.	

Out of this World Temperatures

From our facility in Addison, Illinois, our engineers have developed a product which can reach out of this world temperatures, primarily with the use of refractory metals that allow us to reach the required temperatures needed in Ion Thrusters.

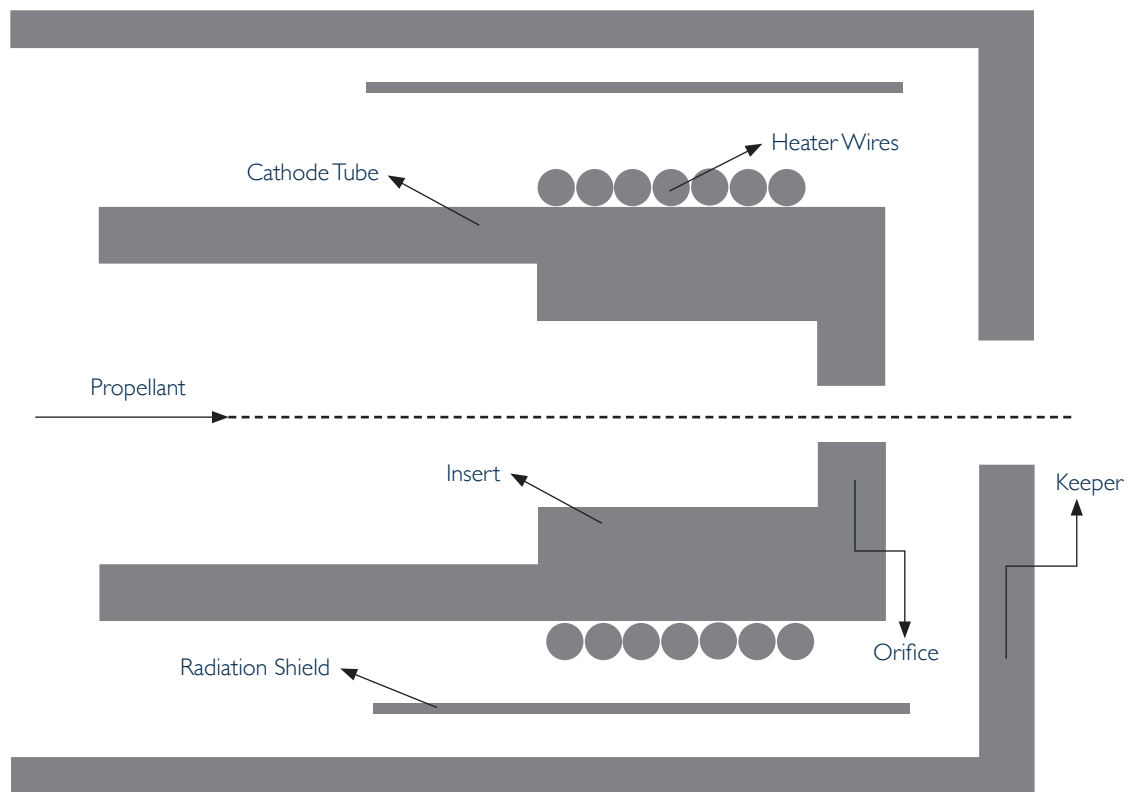
Our product is capable of reaching temperatures over 1400°C when used within a properly designed Thruster/Cathode assembly.

How much higher the temperature will reach is up to the application parameters in which the heater will be used.

What temperature is needed to kick in the plasma? The temperature will depend on the design and efficiency of the Ion Thruster: Using the heaters correctly can be hard and does not always work with the normal way we use heaters here in our atmosphere.

Fig 1.

One example of Ion Thruster with Cathode Tube heater shown.



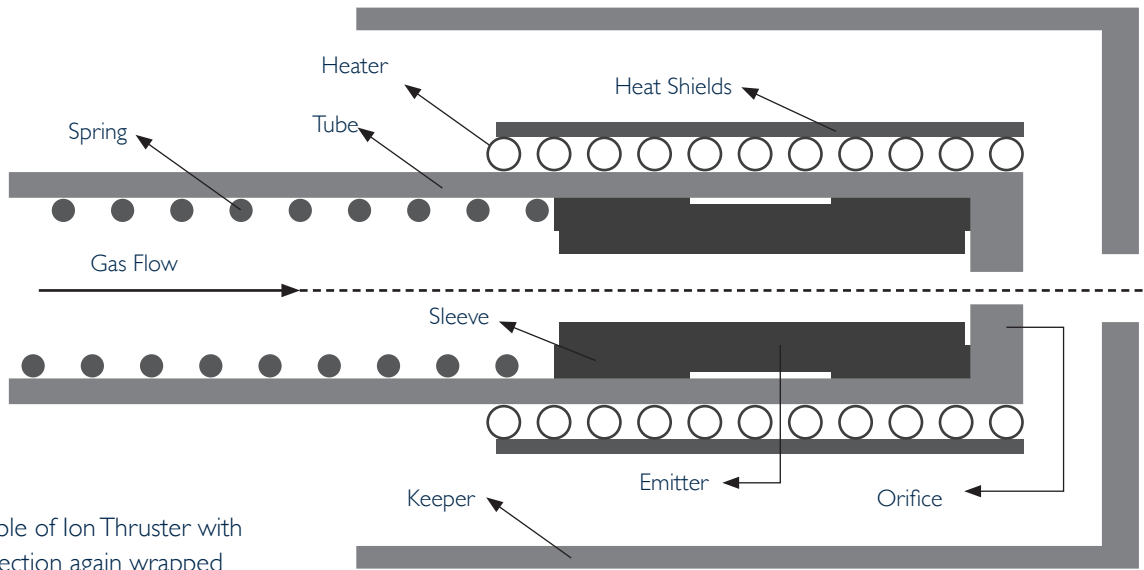
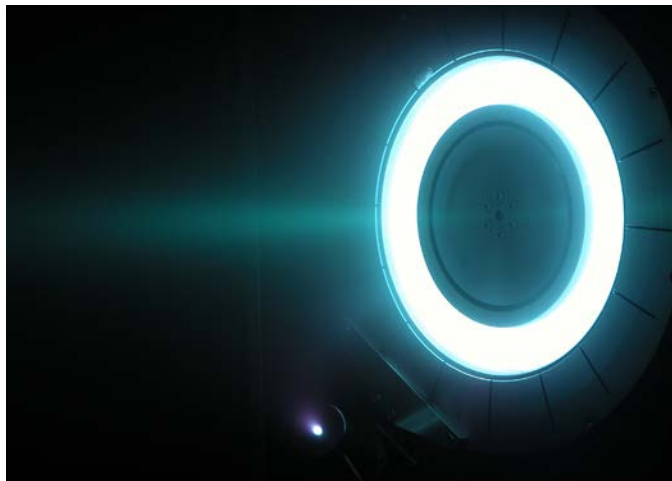


Fig 2.

Second example of Ion Thruster with heater cross section again wrapped around cathode for pre heating.

Fig 3.

Ion thrusters in operation



At ARI we manufacture the specialty cable/heater assemblies that produce the solutions needed for Ion Thrusters.