

History of induction heating

United Induction Heating Machine Limited

UIHM is experienced in Induction Heating Machine and Induction Heating Power Supply, induction heating equipments can be used in induction heating service, induction heat treatment, induction brazing, induction hardening, induction welding, induction forging, induction quenching, induction soldering induction melting and induction surface treatment applications
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Induction heating is the process of heating conductors, (usually metals), by inducing an electric current to flow in the object to be heated. Current is induced into the object in the same manner that current is induced into the secondary of a transformer.

In induction heating, a coil of copper is wound around an object to be heated. The coil of copper can be compared to the transformer primary, and the object to be heated can be compared to the secondary of the transformer.

The object to be heated acts like a single turn secondary in a transformer. Additionally, the object acts as if the single turn secondary were short circuited.

An alternating current is applied to the primary of a transformer, which creates an alternating magnetic field. The secondary of the transformer is located within the magnetic field. Faraday's Law shows that an electric current will be induced into the secondary of the transformer.

Thus, applying an alternating current to the induction coil induces a current into the object to be heated. Imagine how a short circuit secondary on a transformer would heat up if you connected power to the primary!

So, you can heat metals without flames and without touching the object to be heated. You can even heat the metal underwater.

Practical induction heating has been used since the 1920's. Growth in the induction heating industry expanded very rapidly during World War II.

Surface hardening, or case hardening, was one of the main growth areas during WWII. Military vehicles and weaponry using case hardening on axles and engine components could outlast those without case hardening.

After the war, the technology improvements moved rapidly into the civilian sector as the demand for reliable automobiles increased.

Induction heating equipment must create alternating currents at frequencies from 60 Hz to over 1 MHz. In the beginning, spark gap oscillators, motor driven generators and vacuum tubes were used to create the alternating current. Technology advanced and soon SCR, (Silicon Controlled Rectifier), based power supplies were used to replace older generators. Very large and powerful transistors are now used in power supplies for induction heating.

An induction heating system is comprised of several major components.

- . Power Supply (generates the high frequency current)
- . Load Matching Station (matches the impedance of the coil to the power supply)
- . Induction Coil (copper coil wrapped around object to be heated)
- . Water Cooling (high power systems are water cooled to remove waste heat)





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