

Mel+Care

Presented by:
EMSCO
An Inductotherm Group Company

A Technical Review of Common Induction Furnace Maintenance Issues

Coil Insulation: An Overview

The integrity of your furnace insulation is a crucial factor when it comes to the efficiency of your melting. Misoperation, poor maintenance practices, and overuse all contribute to the decay of electrical insulation. When insulation breaks down, it can cause a short, arc, or leak in the inductor, which in turn leads to inefficient melting, furnace failure, and costly downtime for both you and your customers.

What Insulations Are In Your Furnace?

Insulations typically fall into five general material categories — glass based, mica based, ceramic based, epoxy based, and cement board. These insulations come in the form of rigid materials, flexible materials, and paint/coating.

Electrical & Mechanical Considerations

Electrically: an insulation must withstand the current potential between turns and the operating environment of the application. Both vacuum and high voltage air melt applications place unusually high demands on an insulation.

Mechanically: expansion, operating temperature, vibration, operating frequency, lining material, and whether or not the environment is highly corrosive (chlorine applications) all affect the performance of the coil insulation.

How are Insulations Rated?

Insulations are rated by their dielectric strength. Dielectric strength is defined as the maximum potential that can be applied to a given material without causing it to breakdown. Dielectric strength is expressed in a unit of resistance, generally volts per mil (a mil is approximately the thickness of one human hair). The more a material can withstand potential without failing, the better an insulator it is. Thus, the higher the volts per mil rating, the better the material as an insulator. Dielectric strength is used as a safety coefficient and can help determine the required material thickness.

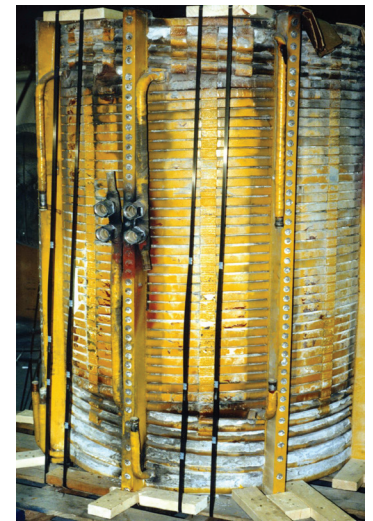
Temperature Resistance

Insulation materials have a maximum temperature resistance. Typically, temperature resistance is defined by the temperature

the insulation material is able to withstand for 20,000 hours without losing half of its mechanical strength.

A Tip From The Melting Industry's First Responder:

In following the OEM schedule for furnace housekeeping, it is important to keep foundry dirt and dust from accumulating on your furnace coil. Foundry dirt is conductive and causes localized heating — leading to premature deterioration of the insulation.



The coil on the left has been factory rebuilt and reinsulated with EMSCOAT Heat Reactive Insulation. The darker areas on the coil on the right show where the EMSCOAT has changed color to indicate overheating.

Heat Reactive Insulations

EMSCO provides a range of insulation to meet the demands of all types induction melting coils. EMSCO's signature insulation, EMSCOAT, possesses high dielectric strength, high temperature resistance, and high resistance to mechanical wear. As temperatures rise, EMSCOAT changes color to indicate the extent of any overheating that is occurring or has occurred. In some cases, EMSCOAT may enable an operator to take corrective action to prevent total furnace failure.

For more information, or to schedule a consultation and service, call us today at **877.77.EMSCO.**