

ABOUT NICHROME ALLOYS

Patented in 1905, Nichrome is the oldest air-stable resistance-heating alloy (that is documented). Nichrome alloys consist of nickel, chromium, iron, and sometimes other elements. The Nichrome we use here at Union City Filament is an austenitic alloy that has the highest nickel content. This high-resistance **material** is typically used in applications that have a maximum operating temperature of up to 1,250°C (2,280°F).

PROPERTIES OF NICHROME WIRES

Nichrome alloys are known for their high mechanical strength, as well as their high creep strength. Learn some of the benefits of using this material below.

- **DUCTILITY AFTER USE**

Nichrome is known for remaining ductile, even after long usage.

- **HIGHER HOT AND CREEP STRENGTH**

Compared to other air-stable resistance alloys, Nichrome alloys have a higher hot and creep strength.

- **HIGHER EMISSIVITY**

When fully oxidized, Nichrome alloys have a higher emissivity compared to other air-stable resistance alloys. This means that at the same surface load, the element temperature of Nichrome is lower than other alloys.

- **NON-MAGNETIC**

In some low-temperature applications, a non-magnetic material is preferred. Nichrome is non-magnetic, making it the preferred choice over other air-stable resistance alloys, which are only non-magnetic above 600°C (1100°F).

- **WET CORROSION RESISTANCE**

RAI Strategic Holdings, Inc. Exhibit 2014 Philip Morris Products, S.A. v. RAI Strategic Holdings, Inc. IPR2020-01602

While there are some exceptions (such as atmospheres containing sulphur and certain controlled atmospheres), Nichrome alloys typically have a better corrosion resistance at room temperature compared to non-oxidized air-stable resistance alloys.

APPLICATIONS FOR NICHROME ALLOYS

While almost any conductive wire can be used for heating, most metals conduct electricity with great efficiency. This requires the metals to be formed into thin, delicate wires, so there is enough resistance to generate heat. When most metals are heated, they oxidize quickly, which makes them brittle and break when heated in air. Nichrome wire, however, develops an outer layer of chromium oxide, which makes the wire thermodynamically stable in air, mostly impervious to oxygen, and protects the heating element from further oxidation.

With its [high-temperature](#) strength and good workability, Nichrome is an ideal material to use for demanding applications in the electric appliance industry, such as hair dryers and heat guns. It is also commonly used in electronic cigarettes (e-cigarettes) and other vaping (vape) applications.

Some other common applications for Nichrome alloys include: ironing machines, water heaters, soldering irons, metal sheathed tubular elements, cartridge elements, quartz tube heaters, infrared emitters and other precision heating element (heater) applications.

NICHROME FILAMENT DESIGN

Wondering if Nichrome is the best material for your filament design? Our experts at [Union City Filament](#) can help design the best component to fit your product's needs. As industry leaders since 1950, we have perfected the best processes for winding and Nichrome, [tungsten](#), [rhenium](#) and other alloys to ensure our products maintain the tightest possible tolerances on dimensions and uniformity. For more information on our products, please [contact us](#) today.

