

Resistant Alloys

Alloys for high temperature Electric Resistances



1. Chemical composition and brand names

Those are alloys of chemical composition Ni + Cr + Fe with some additional elements such as silicium (Si) and Manganese (Mn) in order to confer them an excellent behaviour when hot, and an addition of rare earth in order to increase their life time.

Alloys in question are:

Resistohm® 80 – 70 – 60 – 40 – 30 – 20

2. Properties

Their metallurgical structure confers them a very good plasticity when cold.

There is a growth of the grain under heat during utilisation of the element without inducing embrittlement of it when cold.

In addition to a relatively high specific resistance, Ni-Cr alloys join all the necessary properties for good performances in use of furnaces:

- Resistance to oxidation (they are not sensitive to aggressions of humid air)
- Low embrittlement at high temperature
- Good plasticity – Easier to give them a shape compared with FeCrAl (lower mechanical characteristics allow indeed a good control of elasticity of the product during shaping (coiling, folding, drawing))

- Good resistance to creeping (more than ferritic alloys) which is important during conception of a resistance presenting big heights of waves.

Maximal temperature recommended in the furnace: 1050 / 1100 °C in order to obtain a reasonable life time of the elements.

3. Typical Applications

They are used for the manufacture of electric resistances for appliances (insulated elements type tubular resistances or for example opened elements on micanit plate) or for application of industrial furnaces.

4. Constraints

Nevertheless, it is to be rejected in presence of a sulphurous or chlorinated atmosphere. The sulphur causes indeed breaking on nickel alloys at higher temperatures than 650 °C (“green rot” phenomenon).

In carbonaceous atmospheres, at some temperatures between 600 and 900 °C, Ni-Cr may be less resistant than Iron-Cr-Al alloys.



April 2012 - The data enclosed in this document are only given as indicative values and correspond to our standard products. Different specific requirements are subject to discussion and formal approval by Aperam Alloys Rescal. For further information or special request, please contact us.