

## TECHNICAL PROTOCOL 2003/01: Fe/Ni

### Scope

The scope of this Technical Protocol includes industrial, service and consumer goods and components consisting of a metallic structure made of iron or carbon steel the surface of which has been electroplated with a protective and/or decorative coating of nickel or nickel coated with a layer of chrome and/or a protective layer of cathaphoretic varnish (like Electrolac by MacDermid). This document focuses on the surface treatments of steel known by the following commercial names.

- **Bright Nickel**  
Single coat of bright nickel
- **Bright Nickel + Electrolac**  
Coat of bright nickel + transparent protective varnish of type Electrolac
- **Nickel Satin**  
Coat of bright nickel + coat of nickel satin
- **Nickel Satin + Electrolac**  
As above + the protective varnish quoted
- **Black Nickel**  
Coat of bright nickel + flash of black nickel
- **Black Nickel + Electrolac**  
As above + the protective varnish quoted
- **Black Nickel Satin**  
Coat of bright nickel + coat of nickel satin + flash of black nickel
- **Black Nickel Satin + Electrolac**  
As above + the protective varnish quoted
- **Bright Chrome**  
Coat of bright nickel + flash of chrome
- **Chrome Satin**  
Coat of bright nickel + coat of nickel satin + flash of chrome
- **Threchromium®**
- **Threesatin®**
- **Ruthenyum®**
- **Thytanium®**

### Recycling method

The recycling method most fitting with the scope of the project is the melting of metallic scraps plated with nickel or nickel + chrome and their finishes without separating the coating from the substrate and subsequent thermal treatment of the obtained alloy.

This recycling method saves money, because no pre-treatments are necessary, and allows the production of an iron steel alloy suitable to be used in several industrial productions. Besides, it may be repeated infinitely without a significant deterioration in the physical properties of the materials.

### Tests

The steel alloy obtained from tests carried out melting together a representative sample of products has the following characteristics.

Caratteristica Characteristics	Valore / Value	Norma / Standard
Carico di rottura Tensile strenght	321 MPa	UNI EN 10002-1/92
Carico di snervamento Yield strenght	173 MPa	UNI EN 10002-1/92
Allungamento Elongation	39,60%	UNI EN 10002-1/92
Prova di piega (fino a) Bend test (up to)	180°	UNI 564-60
Prova di resilienza (media) Impact test (mean)	10 J	UNI EN 10045-1/92 UNI 4714/69

### Composizione chimica (in peso %) - Chemical composition (as weight %)

C0,03	Mn0,22	S0,012	Mo0,006	Cu0,02	Sn< 0,001
Si0,03	P0,015	Cr10,7	Ni0,7	Al0,066	Pb< 0,001

The analyses of the alloy show that it has the typical characteristics of steel for drawing or cold-rolling standard EN 10130 high quality FeP04 - FeP05.

It is recommended that the electroplated metallic scraps treated with the types of coatings concerned by this protocol, and added during the melting phase do not exceed the 30% of total weight.

### Technical control

Products made by an electroplating firm asking for the license of the label Infinitely Recyclable ® according to this Technical Protocol 2003/01 must meet the following requirements:

1. products must be of the type described in the Scope. Specifically, the substratum must be solely of iron or carbon steel and the coating must be solely of nickel, or of nickel + chrome, with or without cathaphoretic varnish;
2. the average weighted thickness of the electroplated coating, calculated from the various types of treatments, may not exceed 40 microns;
3. both substratum and electroplated coating must be free from those elements or compounds identified as hazardous by the European list of hazardous substances.