

Steel and stainless steel with metallic coating (unpackaged)

1. Scope

This section deals with steel ¹⁾ with metallic coating and objects made entirely of steel with metallic coating which as finished products are intended to be in direct contact with foodstuffs, food products and beverages for human and animals consumption.

It does not involve materials and objects which are not intended, under normal term of use or other generally expected conditions, to be in contact with foodstuffs.

The products mentioned in sheets "Steel for packaging" and "Stainless Steel" are nor concerned.

The main examples of metallic coating for steel are : gold, silver, tin, aluminium, aluminium-silicon, nickel, chromium, quasi-crystal deposits, zinc or zinc alloys. Furthermore these materials may have a copper bonding intended to have coating

The main examples of metallic coating for stainless steel are :

gold, silver, chromium, quasi-crystal.

The main application examples are the following:

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- Household articles: Inner rotisseries, baking sheets, dripping pans, chip fryer vapour barriers etc.;

 - Equipment for agri-food industry: Tanks, grain silos etc.

2. Restrictions of use

Steel objects with zinc- or zinc alloy-based metallic coating shall not be used in direct contact with drinks and foodstuffs excepted for manufacturing operations or operations of conservation of chocolate and confectionary products without acid substances, for distillery operations, for roots, tubas, bulbs fruits with dry covering, seeds, dry vegetables and green vegetables and for quasi-crystal-based coatings.

To avoid incorrect conditions of use, the temperature limit for use must be specified on the labelling of the objects. For example, zinc- or zinc-alloy-based coatings shall not be used at temperatures up to 100°C (particulary chip fryers).

¹⁾ Definition according to NF EN 10020 "Definition and classification of grades of steel"

3. Definitions of performance criteria for food contact

3.1 Texts to be used

3.1.1 Regulatory texts

- *Order of 27 August 1987* relating to materials and objects in aluminium and aluminium alloys in contact with foodstuffs (food and drink products).
- *Order of 13th January 1976* relating to materials and objects in stainless steel in contact with foodstuffs.
- *Order of 15th November 1945* setting the list of materials likely to be used without adverse effect on public health in the manufacturing of measuring instruments.
- *Order of 28th June 1912* relating to coloration, conservation and packaging of foodstuffs and drinks

3.1.2 Other texts

- Circular letter of 14 March 1931 "Chromium-metallic coating utensils"
- Guidelines of the Council of Europe relating to metals
- *NF EN 610* "Tin and tin alloys - Ingot tin"
- *NF A 36,712-1* "unpackaged Steel – metallic coated flat steel products with intended for contact with foodstuffs, food products and beverages for human and animals consumption Part 1: zinc or zinc alloy coated (non-stainless) Steels".
- *NF A 36,712-2* "unpackaged Steel – metallic coated flat steel products with intended for contact with foodstuffs, food products and beverages for human and animals consumption Part 2: Aluminium coated or aluminium-silicium alloy coated (non stainless) steels".
- *NF A 36,712-3* "unpackaged Steel – metallic coated flat steel products with intended for contact with foodstuffs, food products and beverages for human and animals consumption Part 3:Chromium coated (non stainless) steels"
- *NF A 36,712-5* "unpackaged Steel – metallic coated flat steel products with intended for contact with foodstuffs, food products and beverages for human and animals consumptions Part 5: Tin-coated (non-stainless) steels"

3.2 Criteria to be used

3.2.1 Composition of the steel

The steel making up the support must satisfy the inertia requirements specified in the sheets "Steel (unpackaged)" and "Stainless Steel".

3.2.3 Contents of the coating in undesirable elements

Looking for the presence of lead, cadmium and arsenic.

3.2.3 Specific migration

Specific migration of Ni, Cr or Zn when the coating is based on Ni or Cr or Zn.

4. Acceptability limits

4.1 Maximum content of undesirable elements

Pb < 0.050 %
 Cd < 0.010 %
 As < 0.030 %

4.2 Specific Migration Limits

Specific migration of Ni: 0.5 mg/kg (waiting evaluation by AFSSA). Specific migration of Cr (metal): Specific migration of Zn: 10 mg/kg

5. Rules to check the criteria defined in paragraph 3.

- Test conditions according to directives 82/711/CEE (lastly amended by directive 97/48/CEE) and 85/572/CEE:
 - Temperature and contact duration;
 - Simulator liquids chosen according to the use:

Type of coating	Foodstuff	Simulator Liquid	Period
Ni, Cr, Zn	Aqueous food (pH>4.5)	Distilled water or water of equivalent quality	
Ni, Cr	Acid food (pH≤4.5)	Citric acid at 0.5% (p/v) on two different samples	
Ni, Cr, Zn	Alcoholic food	Ethanol at 10% (v/v). This concentration should be adapted according to the alcoholic content of the food if it exceeds 10% (v/v).	
Ni, Cr	Fatty food	Oil at 175°C	2 hours
Ni, Cr, Zn	Dry food	No migration test	
	Fatty food	Oil or substitute simulator at 100°C	2 hours

For all objects cannot be filled, the surface/volume ratio adopted by convention is 6 dm² for 1 kg or 1 L of simulator.