

Metals and alloys used in food contact materials and articles

The Council of Europe Guidelines in a nutshell

Executive summary



The *Technical guide on metals and alloys used in food contact materials and articles* is intended to assist national policy-makers. The Council of Europe resolution is not legally binding for member states, but serves as a reference for the implementation of Article 3 paragraph 1 of Regulation (EC) No. 1935/2004.

Added/not in previous version

- Metals and alloy components – antimony (Sb), cobalt (Co), magnesium (Mg), molybdenum (Mo), vanadium (V)
- Metals contaminants and impurities – arsenic (As), barium (Ba), beryllium (Be), lead (Pb), lithium (Li), thallium (Tl)

New specific release limits (SRLs)

<i>Symbol</i>	<i>Name</i>	<i>SRL [mg/kg food]</i>
Cr	Chromium	0.250
Fe	Iron	40
Mo	Molybdenum	0.12
Ni	Nickel	0.14

General provisions



Photo: Guy Bouchet/Photononstop/Corbis

The provisions apply to the unintentional release of metal ions from materials and articles at the end-use level, whether coated or uncoated, partly and fully made of metals and alloys. The requirements do not differentiate between goods imported and manufactured in Europe when they are used as food contact materials.

Specific labelling can be used in order to minimize possible corrosion, when appropriate, for instance when used for the storage and processing of strongly acidic, alkaline or salted foodstuffs.

Appropriate cleaning instructions before the first use should be provided.

The release from metal is given as a specific release limit. It describes the maximum permitted amount of a metal ion or metalloid

ion (in mg) when released from a material or article of defined surface area into food (in kg) or food simulants.

The specific release limits for elements most relevant for stainless steel are:

Specific release limits (SRLs)

<i>Symbol</i>	<i>Name</i>	<i>SRL [mg/kg food]</i>
Cr	Chromium	0.250
Fe	Iron	40
Mo	Molybdenum	0.12
Ni	Nickel	0.14

Some deviations from these limits are tolerated due to analytical limitations for elements like chromium, molybdenum and nickel.

Chromium (Cr) in metallic food contact materials



Chromium as a natural ingredient is mostly found in cereals, meat, vegetables, white fish and vegetable oil. It is an essential element to man, but is available in low levels in biological materials.

As a possible food contact material, chromium is used in the production of stainless steel and in alloys containing iron, nickel and cobalt.

Chromium-plated food contact articles should be tested for nickel release.

The specific release limit for chromium is 0.250 mg/kg. The intake (as trivalent chromium) should not exceed 250 µg/day.

Iron (Fe) in metallic food contact materials



Iron is present in a variety of foodstuffs. Liver, kidney, beef, ham, egg yolk, and soybeans are particularly high in iron. In several countries, iron is added to specific food (cereal), because modern diets tend to be iron-deficient.

Iron is used in a great variety of kitchen utensils. It is found in steel

cans, lids and closures for glass bottles and jars. Cast iron is also used for pots and pans.

The specific release limit for iron is 40 mg/kg.

Molybdenum (Mo) in metallic food contact materials



Molybdenum can be naturally found in liver, peas, beans, spinach, wheat germ, tomatoes and lemons.

Molybdenum is used in the production of steel and provides hardness. It is also a constituent of some stainless steels.

Currently no release data are available. The specific release limit for molybdenum is set at 0.12 mg/kg.

Nickel (Ni) in metallic food contact materials



Nickel is naturally found in higher concentrations in foodstuffs such as grains, nuts, cocoa products and seeds.

In manufacturing, 85 % of the worldwide production of nickel is used for alloys, among others stainless steel. Most nickel-containing food contact materials are stainless steels.

Even though the dietary intake of nickel through natural ingredients can be quite high, it does not cause problems for the majority of consumers. A small subgroup of the population (approximately 10 %, mainly women) has contact allergies to nickel, which is caused by absorption of the nickel through the skin.

The Guideline classifies nickel in Class 1C, metals of significant safety concern, which also includes molybdenum, chromium and vanadium.

The specific release limit for nickel is set at 0.14 mg/kg and is based on human data from nickel sensitised individuals.

What is also new in the latest version of the Guideline is that nickel-plated objects are not suitable for direct contact with foodstuffs.

Stainless steels



Photo: Jacky Naegelen/Reuters/Corbis

Stainless steels are not limited to a specific chemical composition or specific stainless steel family. All stainless steel families can be used as food contact materials. Some countries as France and Italy have their specific legislative requirements.

In France, stainless steels for food contact products must contain at least 13 % of chromium and can contain nickel and manganese. Maximum limits are imposed for certain other alloying elements (4 % for Mo, Ti, Al and Cu; 1 % for Ta, Nb and Zr).

In Italy, there is a positive list of approved stainless steel grades for food contact materials. These grades must pass tests for corrosion in distilled water, olive oil, an aqueous solution of ethanol and 3 % acetic acid in water, under specified conditions. New grades can be added to the positive list if they pass the test.

Some other countries like Germany and UK also have specific legislation for a wide range of food contact applications. The requirements should be checked on national level.

There are also European standards for certain types of stainless steel applications. The composition limits of stainless steel for table cutlery are specified in EN ISO 8442-2.

The release from stainless steels should be in compliance with the specific release limits for all constituent elements not only chromium, nickel, iron, molybdenum.

No particular health concerns have been raised, in terms of excessive intakes of nickel or chromium, by studies of corrosion in various media and of uptake of metals by food cooked in stainless steel pans.

© Euro Inox 2014

**The publication Metals and alloys used in food contact materials and articles can be ordered from: www.edqm.eu/store
ISBN: 978-92-871-7703-2**