

Commonly used metals in packaging

1 Steel

Steel is used in the form of a low-carbon steel which is initially produced as blackplate. This is then converted into tinfoil or tin-free steel (TFS) for container and closure manufacture.

Tinfoil is created by electrolytically coating blackplate with a thin layer of tin. The tin is coated on both sides of the plate in thickness to suit the internally packed product and the external environment. Different thicknesses of tin may be applied to each side of the plate. Tin, plated in sufficient thickness, provides good corrosion-resisting properties to steel, and is suitable for direct contact with many products including specific foodstuffs such as *white* fruits (e.g. peaches, apricots, pineapple and pears) and certain tomato-based products

(e.g. tomatoes in brine and beans in tomato sauce). However, for most foods and drinks it is necessary to apply an organic coating to the inside surfaces of the tinfoil container to provide an inert barrier between the metal and the product packed. This barrier acts to prevent chemical action between the product and container and to prevent taint or staining of the product by direct contact with the metal (see later). The tin surface assists in providing good electrical current flow during welding processes. Being a very soft metal, it also acts as a solid lubricant during the wall ironing process of forming twopiece thin wall cans.

TFS, also referred to as electrolytic chromium/chrome oxide coated steel (ECCS), is created by electrolytically coating blackplate with a thin layer of chrome/chrome oxide. This must then be coated with an organic material to provide a complete corrosion-resistant surface. The metallic layer of ECCS provides an excellent key for adhesion of liquid coatings or laminates to the surface. ECCS is usually marginally less expensive than tinfoil. However, being a matt surface, after coating with clear lacquer it does not provide a reflective surface like tinfoil. ECCS in its standard form is not suitable for welding without prior removal of the chrome/chrome oxide layer. The Japanese steel makers have developed modified tin-free metallic coatings for steel that do permit satisfactory welding of this material.

2 Aluminium

Aluminium for light metal packaging is used in a relatively pure form, with manganese and magnesium added to improve the strength properties. This material cannot be welded by can-

making systems and can only be used for seamless (two-piece) containers. The internal surfaces of aluminium containers are always coated with an organic lacquer because of the products normally packed.

3. Recycling of packaging metal

Both aluminium- and steel-based packaging materials are readily re-melted by the metal manufacturers. Waste materials arising during the can-making processes may be returned for recycling through third party merchants. Postconsumer metal packaging waste is collected and, after automatic separation from other waste materials, is ultimately returned to the metal manufacturers for re-melting. Aluminium and steel suffer no loss of quality during the re-melting process so may be reused an unlimited number of times for the production of first-quality packaging material. Certain recycling processes permit the tin to be separated from the steel base prior to re-melting.