ALUMINIUM PACKAGING

Introduction

At 8% aluminium is the third most common element in the earth's crust; only oxygen and silicon are present in greater proportions.

Aluminium is found in nature as Bauxite. A complex extraction and electrolytic smelting process allow the production of aluminium in its metallic form. Then, when suitably alloyed and with various semi-fabrication processes such as rolling, extruding and forging, a whole spectrum of physical and mechanical properties become available. These properties have led to the extensive use of aluminium in various end markets including packaging. Most of the aluminium used in packaging is in the form of rolled products, either as flexible packaging, such as foil laminates, or as rigid packaging, such as the beverage can.

These attractive properties of rolled aluminium used in packaging can be summarised:

Durability and Strength

- Aluminium foil is commonly produced using either 1000 series alloys, which are more than 99% pure aluminium or 8000 series alloys where the iron level can be up to 1.3 wt%. These alloys work harden when subject to cold deformation. The thickness (gauge), alloy and temper can be chosen so that the specific mechanical properties required can be achieved. Stamped foil containers retain their shape and rigidity.

- Lightness
  The low density and thinner sections of aluminium compared with some competing packaging materials means a reduced weight, saving energy in transport and carrying in a shopping bag!

- Thermal Conductivity
  Aluminium is an excellent conductor of heat and therefore the chilling and heating of the contents of aluminium packaging can take place quickly, with minimal thermal gradients.

- Heat Resistance
  Aluminium packaging resists a very wide range of temperature, from the very cold to the very hot. There is no risk of cracking, melting or burning. Aluminium packaging products can be stored in the coldest deep freeze and heated in the hottest oven.

- Barrier Properties
  Aluminium foil acts as a total barrier to light, gases and liquids and can extend the useful life of foodstuffs for long periods of time, measured in years, adding value far beyond the cost of the packaging material.

  Total barrier to ultraviolet light

- Barrier to air
  Aluminium is totally impervious to air

- Beverage and soft drink Cans

The majority of foods and drinks have no adverse effects on uncoated aluminium, so there is no contamination. With very acid or alkali ingredients a wide range of food-contact coatings are available affording full protection to the contents of the foil packaging or the can.

- Decorative Potential
  Aluminium foil and can stock are compatible with all printing processes so that the contents of the foil or the can can be attractively presented.

- Foil Laminates
  Aluminium foil can be laminated to produce tough packaging systems that withstand rough handling in the distribution chain.

- Odourless
  Aluminium is totally odourless and will not taint food

Aluminium Foil, Applications and Properties

Properties	Applications								
	Food compatibility & Hygiene	Thermal conductivity	Heat resistance	Impervious to air	Durability	Multi-mode cooking	Decorative potential	Lightness and space Economy	Sustainability
'Ready-to-roast' and in-store packaging of fresh products	■	■	■	■	■	■	□	□	■
Smooth wall containers for processed meats etc.	■	■	■	■	■		■	■	■
Sterilized pouches and sachets	■	■	□	■			□	■	■
Peel-off closures for alu, plastic or tinplate containers	■	□	□	■	□		□	□	■

Essential Property	■
Desirable Property	□

Examples of Aluminium Packaging

- Aluminium foil used with meat, poultry and fish aluminium foil is widely used in the packaging of fresh and processed meat, poultry and fish. The customer requires and gets convenience, coupled with dependable quality and complete hygiene. Retailers have discovered the advantages of ready-to-cook packs containing trimmed fresh meat and poultry cuts and fish in sealed aluminium foil containers. Aluminium foil is successfully used for processing and marketing pâtés and other prepared meat recipes.

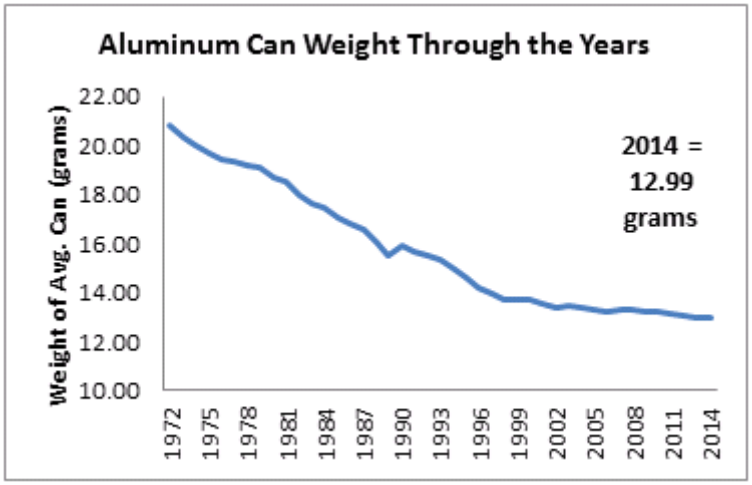
- Preserved Foods
  Extending the viability of seasonal foodstuffs has a long history. Techniques of food preservation have evolved conserving the nutritional value and flavour of the food concerned and the investment of labour and energy. While traditional packaging materials such as glass jars and metal cans are still used, light weight pouches, foil containers and laminated cartons offer the same performance with much less weight.

- Dehydrated and Dry Foods
  Drying as a technique for food preservation is a very old process that is still widely used today. Once the foodstuff is protected from light and gases the dried food retains its nutritional value and texture until re-hydrated. Aluminium foil provides the essential barrier to completely and reliably prevent ingress of moisture and the escape of subtle flavours. It also prevents UV light, present in most forms of lighting, from causing photo-oxidation leading to a rancid taste from fat and oil components in dried food products.

  Aluminium foil in the form of sachets is widely used to pack such food items as milk and soup powders, herbs and spices, instant beverages and vegetables.

- Aluminium Beverage Cans
  The aluminium beverage can is now the popular choice for carbonated and still soft drinks, mineral waters, beers and lagers. It competes successfully against drinks containers of glass, plastic and steel, and is the only drinks container for which closed loop recycling applies; a used aluminium drinks can is recycled back into aluminium can sheet for the manufacture of another aluminium drinks can.

  The good thermal properties of aluminium mean that the drinks can is quickly chilled. It has good rigidity and strength without the grave disadvantages of a glass bottle, of being fragile and dangerous when broken and much heavier than an aluminium can. It is lighter than steel and even a steel beverage can relies on aluminium for the top of the can since the better control on gauge and properties of aluminium mean that the easy open end of the can can only be made in aluminium.



  Even though aluminium has a low specific gravity, the aluminium industry has worked hard to reduce the gauge of the can, and hence the weight, while improving the mechanical properties so that the thinner material making the can still carries out all of the requirements of a can.

Sustainability of Aluminium Packaging

The use of aluminium packaging saves food wastage and saves energy in transport. The aluminium can be recycled after use repeatedly with no loss in quality. The high value of aluminium in the waste stream means that it is economically viable as well as environmentally advantageous for aluminium packaging products to be removed from the waste stream for recycling.

Most councils now collect materials including aluminium for recycling, either as part of a regular household kerbside collection or through 'bring' banks, like those at supermarkets.

- Aluminium Packaging leads the circular economy
  In 2019, 207000 tons of aluminium packaging were sold, of which 116670 tons were recycled, 76% of all aluminium cans are recycled with 88% of all aluminium packaging in Europe recycled.

The can you recycle today will be made into a new can, filled and put back on the shelf in just 60 days. In a whole year, that one can could be recycled six times, saving enough energy to make 160 new cans.

Further information about aluminium and aluminium alloys, their production, fabrication and end use can be obtained from:

- Aluminium Federation www.alfed.org.uk
- European Aluminium Association in Brussels www.european-aluminium.eu
- International Aluminium Institute in London www.world-aluminium.org

More information particularly about aluminium packaging can be obtained from European Aluminium Foil Association www.alufoil.org and Alupro www.alupro.org.uk

For details of low recycling centres www.recyclenow.com/local-recycling