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ALUMINIUM FOIL – MULTITALENTED LIGHTWEIGHT PACKAGING

Aluminium foil describes rolled products that are less than 0.2 millimetres thick. One can find shiny, silvery, aluminium foil in practically every household. It is barely possible to imagine a kitchen without it for keeping foodstuffs fresh; it is a welcome companion at barbecues, for roasting the jacket potatoes in the embers, with meat sizzling in aluminium trays that also prevent the fat from dripping into the embers; it is also a companion at breakfast when butter is removed from its wrapper or a yoghurt pot is opened; and for bodycare one relies on creams and skin lotions which are often promoted in portion-packed aluminium foil pouches. Aluminium foil started life early last century, in 1911 to be precise, as a wrapper for chocolate – and as an alternative to the tinfoil that had been used previously. A year later, Maggi packed its soups and stock cubes in aluminium foil. The reasons are obvious: aluminium foil is an all-rounder with diverse outstanding properties from which consumers and brand owners profit in equal measure.

Aluminium foil excels with its manifold properties

One should first mention aluminium foil's capabilities as a barrier: even the thinnest aluminium foil a mere 0.006 millimetres (6 µm) thick, and thus thinner than a human hair, provides reliable protection against light, oxygen, humidity, germs and extraneous aromas

and thus extends the shelf life of foodstuffs, care products or pharmaceutical products. Scientific investigations have shown that 6 µm thick aluminium foil can be regarded as an absolute barrier. Aluminium foil conducts heat rapidly. This is a major advantage when heat sealing, for example to hermetically seal pouches, or when sterilising foodstuffs like milk so that it stays fresh for longer without refrigeration. The rapid dissipation of heat also shortens sealing and processing times. Aluminium foil is extremely lightweight and can be very readily shaped and folded without springing back. This makes it ideal for wrapping various products like butter without having to seal them. Aluminium foil can be processed to give a shiny or matt finish, it can be colour lacquered or have a metallic silver finish with an embossed, ribbed or simply smooth surface. It is suitable for use with all printing techniques and enables a broad range of high-quality designs to be created that set brand-name articles apart from competitive products in an eye-catching manner. With aluminium foil one can cook, grill or bake – in the microwave as well as in the oven.

Aluminium foil protects foodstuffs, pharma and care products

In the food sector, aluminium foil is used, for example, to pack bakery products, coffee and tea, sweets and confectionery, dairy products, drinks, powdered soups, meat, fish and ready meals.

Thanks to its unlimited degree of barrier protection, aluminium foil is also perfectly suited to packaging sensitive health remedies and pharmaceutical products like tablets, creams, powder and liquids as well as cosmetics and care products such as skin creams, ointments or wet wipes, which it protects against drying out. Aluminium foil satisfies these requirements either as a mono-material or as a partner in a composite laminate with other packaging materials. There are numerous pack formats and sizes available, such as blister and strip packs, pads and pouches, heat-seal membranes and lids, trays, capsule foil and lots more. Three quarters of the aluminium foil produced in Europe is used for packaging purposes, including household foil. The other quarter is used for technical applications such as thermal insulation, as material for shielding against radio-frequency emissions or for heat exchangers in car air-conditioning systems.

Resource-conserving packaging

Aluminium foil also demonstrates its full capabilities where environmental aspects are concerned. Foil is recycled either to recover the metal or – as in the case of very thin foil (e.g. in composite packaging) – its energy. With waste that is collected separately (e.g. the Green Dot scheme), modern separation systems filter out the foil from the packaging waste and recover it correctly sorted. As a partner in a composite laminate with other packaging materials, the aluminium can be recovered as a metal using pyrolysis techniques. In those cases where aluminium foil or foil packaging is not collected separately for recycling but is mixed together with the rest of the household waste, the energy stored in the foil is recovered.

New studies have shown that a considerable fraction of even the thinnest foil does not oxidise during energetic recycling but melts and can be sorted from the ash of the incineration plant and returned to the material loop. Nowadays, material loops have been closed to a large extent in the packaging sector as well. The overall recycling rates for aluminium packaging are now about 87 per cent in Germany and some 60 per cent in Europe. For the remelting of used foil to use it as the starting material for new products, 95 per cent less energy is required than for the production of primary aluminium.

Aluminium packaging, including foil, makes an important contribution to sustainability in production and consumption, as independent studies have shown. It does so by protecting valuable contents, which have taken considerable effort to produce, from deterioration, thus preserving more resources than were required for its own manufacture.

Manufacturing process

Aluminium foil, which is mainly produced from commercially pure aluminium, is cold rolled in several steps or passes. The starting material is so-called re-roll stock between 0.6 and 1.5 millimetres thick. A process controller for the rolls and automated thickness measuring allows rolling speeds of up to 2500 metres a minute to be achieved. Two webs are rolled simultaneously (so-called double rolling) to produce thin foil down to four thousandths of a millimetre thick; this ensures that the foil web does not break under the high speeds and tensile forces. Heavy deformation during rolling increases the aluminium's strength and the foil is hard and brittle. It can be softened and made more flexible by subsequently heat treating it (so-called soft annealing).

Why is aluminium foil matt on one side?

During so-called double rolling (rolling of two webs on top of each other) the outer surfaces of both foil webs come into contact with the polished surface of the working rolls and are thus smoothed out. In contrast, there is mutual contact between the inner surfaces and these are thus roughened, which leads to the matt appearance of the foil. It is not important which side of aluminium household foil is on the inside or the outside when wrapping foodstuffs: both sides are equivalent from a function point of view.