

Aluminium and copper are still going strong in automotive manufacture

For the development of the world's aluminium industry, automotive manufacturing is pointing the way ahead today. While the use of aluminium car bodies used to be associated only with historic race cars for many years, a turnaround was perceived when Audi's A8 with Space Frame entered series production in 1994. However, it took almost another 20 years before aluminium, with its unsurpassed lightweight design properties, prevailed in volume manufacturing over steel and other lightweighting materials such as plastics and carbon fibre. Although of course, it needs to be recognized here that no material simply replaces another – the key to success lies in the optimum choice and combination of materials, tailored to a given application.

The optimum performance of metallic materials is obtained by appropriate heat treatment. In the evolution of new aluminium alloys and associated thermal processing methods including technologies for recycling, we are now witnessing a dynamism that would hardly have been expected 20 or 30 years ago.

This is where OTTO JUNKER, with over 90 years' experience in furnace manufacture, proves a competent partner to the semi-finished products industry, tiered suppliers, and automotive manufacturers. While the company covers virtually the full range of metals with its induction melting systems, its thermoprocessing equipment focuses entirely on the heat treatment of aluminium and copper.

This includes, e.g., solutions for the production of extruded aluminium profiles for crash management systems, which involves the heating of aluminium billets in a JunkerDynamicHeater® system (JuDy). Also in the portfolio are heat treatment and ageing furnaces for alloy wheels, brake callipers and other discrete items. In this context, the walking-beam conveyor system has established itself due to its significant advantages (e.g., energy efficiency, protection of the material) over other conveyor concepts (e.g., roller hearths).



Heat treatment line for alloy wheel, equipped with a walking beam conveyor system

The most vigorous uptrend in recent years is apparent in the field of strip flotation furnaces for aluminium auto body sheet (ABS).

Consistent with market growth, OTTO JUNKER has dedicated a substantial portion of its research and development activities to the strip flotation furnace with adjoining quench. The company has been able to build on its extensive experience with aircraft-grade aluminium here.

Apart from their sheer impressive length – which in the case of a strip flotation furnace may attain as much as 100 m – these lines embody a vast know-how. Particularly in the field of cooling technology, OTTO JUNKER has set new standards with its HiPreQ® mist quench for the ABS grades used in automotive production. This was achievable thanks to the company's own Technology Centre at its Simmerath headquarters site, which is equipped with advanced pilot equipment. In North America alone, demand for ABS is forecast to grow from 300,000 t in 2015 to over 1 million t in 2020.



Strip flotation furnace system embodying OTTO JUNKER's cooling strategy (HiPreQ®)

An essential factor explaining the brisk demand for, and high acceptance of, aluminium is the material's recyclability and the fact that the energy input needed in recycling is substantially lower than that required for smelting the primary metal. It takes about 15,700 kWh of electric power to produce one tonne of primary aluminium. With this amount of energy, an electric car consuming just over 15 kWh/100 km on average, such as BMW's i3 model, could travel more than 100,000 km. Recycling aluminium, however, requires only 5% of the energy demand that goes into its primary production, so the material here sheds some of the negative image it owes to its environmental performance in smelting.

Accordingly, for this recycling application OTTO JUNKER offers suitable gas-heated melting furnaces capable of holding up to 120 tonnes. On recycling lines designed specifically for beverage cans, which are preceded by paint stripping equipment, the pyrolysis gases emitted are used for heating the entire process. The paint stripping step is designed to minimize the loss of material by burn-off, thus ensuring a maximum recycling yield.

Along with aluminium, copper is an important material to the automotive engineer.

As the demand for electrical components rises and vehicles increasingly go electric, the need for plug connectors, lead-frames, etc., is growing as well.

But while copper is used in its uncoated state in electronics, it is becoming increasingly important in automotive production that copper should be coated to limit the impact of environmental factors. With its hot-dip tinning line for copper strip, OTTO JUNKER offers a solution to this requirement for the automotive industry and its suppliers.

Intensive efforts are also being made at the level of digitalization as part of the commitment to advance heat treatment technology to an „Industry 4.0“ standard.

A first mobile application providing broad functions – from materials tracking, quality systems and process monitoring through to plant operation and maintenance – was recently launched by OTTO JUNKER.

As for artificial intelligence, its use will still require major development steps, to be sure. But initial progress has been made here as well.

In closing, it can be stated that new solutions and applications relying on aluminium and copper materials continue to enjoy brisk demand. Ample testimony of this will be in evidence at the ALUMINIUM trade fair in Düsseldorf.

Be there – and see for yourself!

OTTO JUNKER GMBH
Jaegerhausstrasse 22
52152 Simmerath
GERMANY

Tel.: +49 2473 601 0
Fax: +49 2473 601 600
E-Mail: info@otto-junker.com