We all know that aluminium is becoming increasingly popular across multiple industries and for a variety of different applications. One of the reasons for this is that aluminium is one of the lightest engineering metals in the world, with a strength to weight ratio superior to steel.

Did you know that aluminium is one of the metals with the lowest density?

Alongside this, aluminium is lightweight and ductile, meaning that there are various processes which can be carried out on aluminium, such as Forging, Casting and Extrusion. At Simmal, we are recognised by many for our intricate and sophisticated aluminium extrusions, therefore we are going to take a deep dive into the world of extrusions!

Wait a minute!

Before we get into the extrusion details itself, it's important to note that there are two different types of production for aluminium: Primary and Secondary.

Primary production is the process of smelting pure aluminium metal, which is the most common version.

Secondary production is the process of recycling aluminium scrap into re-useable aluminium which has been shown to be 92% more energy efficient than primary production.

Examining extrusions with Simmal

Both productions can be used to create aluminium extrusions, however secondary production provides more possibility for a profit to be made.

For example, aluminium cans, which usually end up in landfills once they have been thrown away, can be recycled back into aluminium to create value-added products like aluminium sheets and even aluminium extrusions!

The stages

Like any process, there are multiple stages involved in the extrusion of aluminium, such as the design and the development of the application.

Design

The design stage is an important aspect for aluminium extrusions as it means that individuals can have unlimited possibilities with the design of the product. Through this stage, it enables precision components to be designed, which can be positive as there wouldn't be a need for multiple prototypes to be produced, hence saving money. During this stage, decisions can be made as to the aesthetic of the extrusion to suit with the company/product ethos, which can include changing the textures and/or coatings that will be added on.

The different types of profiles that can be created include square, triangle, single radius and L-shaped profiles, in which more complex designs can be made dependent on the request from the individual and the purpose of the profile. Once the design stages of the profile are complete and approved, it is time for the next stage – development!

Manufacturing

At Simmal, we use aluminium blocks (otherwise known as Billets) to start the process, in which the metal is heated to raised temperatures which can be anywhere between 375°C – 930°C. From this, the aluminium can be transformed into the desired profile using selective extrusion dies.

Now you may be asking 'What is a die'? Well, a die is a tool which produces the desired product through extruding (forcing) the aluminium through the shape.

Different dies include: solid dies, hollow/semi-hollow dies. A combination of solid, semi-hollow and/or hollow dies can be incorporated into a single die as well.

Cooling process

Once the aluminium has been extruded, the cooling process will begin which involves the aluminium leaving through the die opening onto a running table. The extrusion is cut at the desired length with a profile saw and then transferred to the cooling table, where it is moved along to the stretcher to straighten the extrusion. This increases the hardness and strength of the product. The final step usually involves the cutting of the extrusions to specific lengths and to heat the extrusions in "ovens" to harden the aluminium through speeding up the process.

Other tools

Now, not all extruded products are identical to each other. In fact there are options available after extrusion, which can be used to customise the product. This includes being able to adjust the colour, texture and brightness of the profile's finish. These different processes are called Anodising or Powder Painting.

Here is a quick overview of what these two processes are:

- *Anodising:*

  This involves applying a coat to aluminium to provide a protective oxide layer, which is conducted through electrolysis, through which the metal forms the anode. The fact that aluminium also has a high electrical conductivity level means that the coat will remain on the profile for longer, making it more durable.

- *Science Fact:*

  An anode is a positive flow of current, which refers to the movement of the electrical charge!

- *Powder Painting:*

  This process is used across multiple materials, especially aluminium, in which it is a dry form of paint. By doing this, it provides the high-quality and durable finish that is desired.

Market sectors

Aluminium has become increasingly popular over the years, with different market sectors starting to widely use aluminium extrusions.

This is because many industries are demanding low-priced materials which maintain their quality and properties of previous materials.

At Simmal, we design and manufacture aluminium profiles across all these market sectors, personalising each experience to suit the individual's needs.

Conclusion

To summarise, aluminium extrusions have become popular due to its advantageous attributes, from its lightweight features to having one of the highest strength-to-weight ratios to its ability to conduct heat and electricity.

It is understandable why brands like Audi and Lotus are manufacturing frameworks and structures for their vehicles with aluminium extrusions, alloys and other components due to the many positives that follow.

This begs the question as to whether we have reached the full potential with aluminium extrusions or whether we are only just scratching the surface of something greater.

On the other hand, there are possible threats in the way. Does the recent 10% tariff on aluminium imports, introduced by US president Donald Trump, pose a threat on the aluminium industry and will this affect the boom in manufacturing and sales?

Only time will tell, but for now, we are not worried, especially with studies showing a continuous positive trend for the aluminium industry. ■