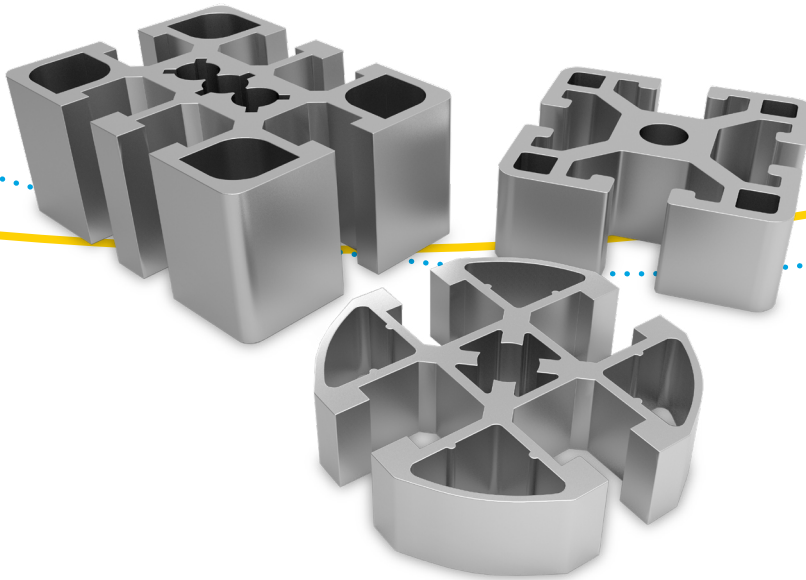


Nitrogen die cooling

An innovative concept for aluminium extrusion



Keeping extruded aluminium profiles within a desired temperature range during production can increase process speed by up to 30%, as well as improving surface quality and brightness. Depending on the extruded alloy, liquid or gaseous nitrogen can be introduced into the extrusion process, removing oxygen and acting as a cooling agent for the die.

Aluminium extrusion is a technique used to transform aluminium and its alloys into profiles with a fixed cross-section for a wide range of applications. The extrusion process makes the most of aluminium's unique combination of physical characteristics. Aluminium has a third of steel density and with the correct alloying and extrusion processes, it can develop very high tensile strength, resulting in light weight but physically strong products.

In the extrusion process, a hot aluminium block is pressed through a die to produce profiles of the desired shape. During this process heat builds up in the die due to friction, increasing wear of the die, as well as causing overheating of the extruded profile which can lead to the loss of vital properties and quality.

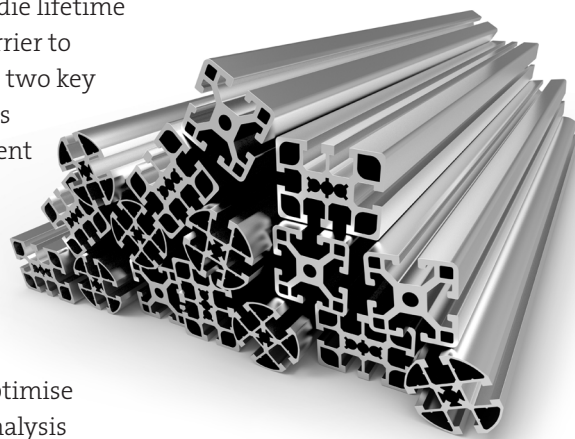
Customer benefits

- Increased yield as faster extrusion speed enabled by cooling of the die increases extrusion velocity
- Improved product quality such as surface finish and brightness
- Extended die lifetime as nitrogen cooling reduces die wear and tear, minimising die replacements and repairs and reducing costs
- Reduced or even eliminated oxides that can damage anodising or painting processes

Optimising efficiency with nitrogen

Air Products' die cooling technology can protect and improve surface quality of extruded parts, in addition to increasing extrusion rates and die lifetime by removing heat from the die and providing a nitrogen gas barrier to the extrusion surface as it exits the die. The technology exploits two key properties of nitrogen: that it is inert to aluminium and removes oxygen from the hot surface, and in liquid form (LIN) has excellent heat removal potential. The introduction of nitrogen into the process can be managed by a closed loop controller equipped with a data acquisition option and set up as an Industry 4.0 standard system, able to monitor process data, including profile and billet temperature, ram speed, use of nitrogen, etc.

Our technology is designed to deliver high LIN efficiency and optimise effectiveness while minimising cost. We provide atmosphere analysis services for this application and our engineers can help determine the most effective method to improve extrusion operations.



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