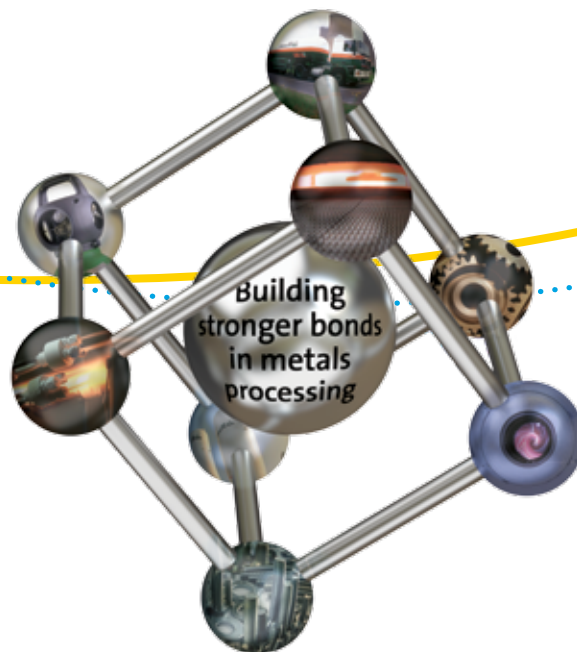


Optimising Metals Processing Technology, innovation and industry know-how



For more than half a century Air Products has worked with the metals processing industry to provide a full range of gases, gas handling equipment, technology and global supply capability, as well as unrivalled industry experience, service and support.

Understanding your needs ...

is what we pride ourselves on.

We have a global team of industrial gas application engineers, metallurgists, R&D experts, as well as process control and safety specialists to help you with your challenges in metals processing - and help you stay ahead of the competition.

Whether it's for annealing, sintering, brazing, carburising, nitriding, vacuum-treating, or thermal spraying, Air Products can provide the technology and the know-how to assist you.

High quality finishes

Coating applications

Uneven coatings, poor adhesion and reduced corrosion resistance are among the many challenges faced during coating applications. Our technology delivers a uniform material deposit, with a smooth and even coat. At the same time, it can also help to increase production efficiency and speed while reducing material losses.

Wire galvanising

A number of challenges can occur with wire galvanising, such as irregular coatings or the unwanted formation of liquid zinc droplets. Operators need to achieve a specific and homogeneous coating thickness, while also maintaining an optimum production speed and Air Products' technology can help achieve this.

Benefits include

- Consistent thickness and
- High-quality surface finish
- Increased flexibility on coating thickness
- Up to 50% increase in production speed
- Energy costs savings due to reduced wire preheat temperature

Thermal spray

Air Products' patented thermal spray cooling technology uses cryogenic nitrogen vapour and an in-flight evaporating nitrogen aerosol spray. The system is capable of cooling parts much faster than conventional methods, while maintaining specified temperatures.

Benefits include

- Reduced costs
- Minimal powder and gas waste
- Increased speed
- Enhanced temperature control
- Improved product quality
- Increased deposition efficiency

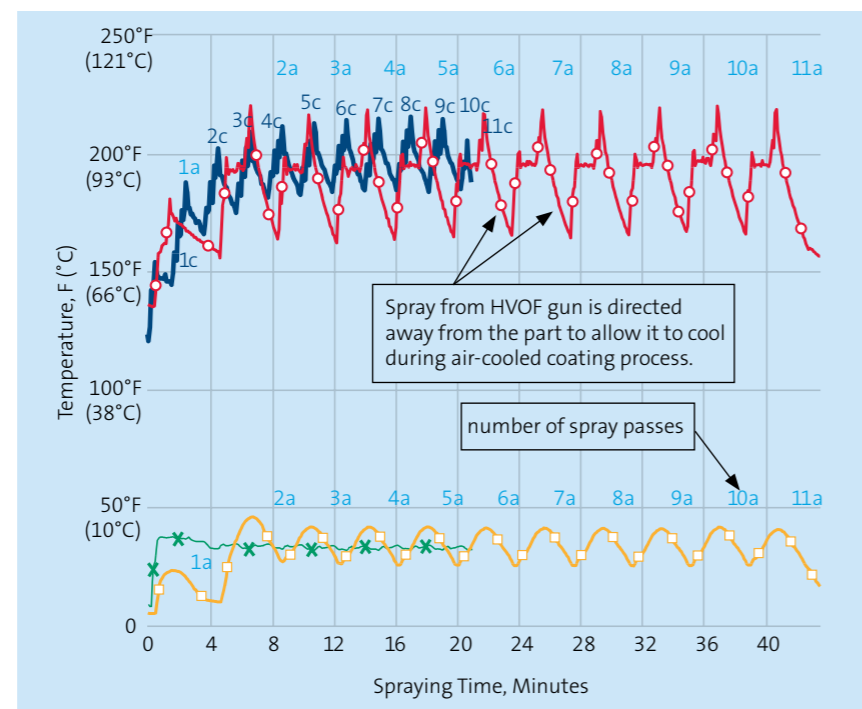


Air Products' patented nitrogen cooling Thermal Spray technology

"A desire to respect the environment and make savings on production time and costs are the reasons behind our collaboration with Air Products on thermal cooling,"

Director General, Metrasur.

Traditional Air Cooling vs. Air Products' Thermal Spray Cooling Technology for Coatings Deposited in 11 Spray Passes. With the Air Products Thermal Spray Cooling technology, the part's temperature was maintained within a much tighter range during the spray operation. In addition, it halved the spraying time and the amount of powder and process gases consumed – plus improved productivity.



Turning up the heat

Heat treatment applications

Air Products has the knowledge and expertise to ensure you obtain the most appropriate furnace atmosphere for your heat treatment applications. Our highly skilled engineers can develop customised systems that comply with legislation, optimise production rates and make sure that your exacting atmosphere conditions are consistently maintained.

Benefits include more accurate control, significantly improved part quality and increased cost savings



Nitrogen/Endothermic Systems

Air Products can help modify your existing endothermic gas generators to comply with European legislation on explosion-proofing equipment using flammable atmospheres.

We can provide the expertise, design and engineering to develop a customised system tailored to your process requirements.

Benefits include

- Full European legislation compliance
- Reduced maintenance and personnel costs
- Decreased flare-off losses

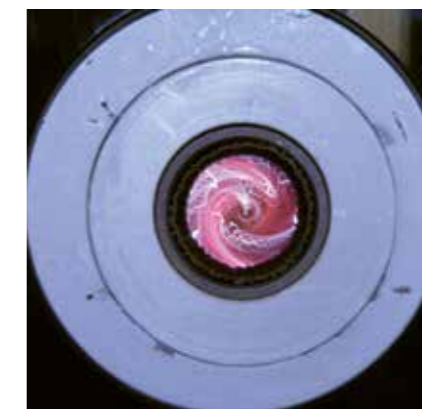
Plasma activated carburising

Air Products' patented cold plasma technology has been designed to eliminate the internal oxidation defects that traditionally occur during atmospheric pressure carburising.

Our novel system injects a cold plasma-activated nitrogen-hydrocarbon gas blend resulting in improved part quality with additional cost benefits, compared to conventional processes.

Benefits include

- Eliminates intergranular oxidation
- Easy to install
- Atmospheric toxicity is minimised
- Accurate control of the carburising potential
- Instant turn on/off capability
- Improved part quality
- Increased cost benefits.



Air Products' plasma activated carburising technology

Belt life technology

How long a belt lasts is more important than ever, yet there are many variables which can have an adverse impact; these include the belt alloy, initial break-in procedure, wire gauge and tracking. By adjusting the sintering atmosphere it is possible to achieve a significant number of improvements in belt life. Air Products' patented atmosphere process technology has been shown to minimise the variations in atmosphere composition and dew point, which are typical with endothermic atmospheres and dissociated ammonia. Using nitrogen and hydrogen-based atmospheres, with a controlled dew point, it is possible to achieve the required results in control and purity.

Benefits include

- Extends the life of stainless steel belts by 25-50%
- Provides a protective oxide coating on the belt, while remaining carbon-neutral to parts
- Reduces the carbon and nitrogen pickup and helps maintain the desired mechanical properties of the belt
- Lower maintenance requirements
- Reduce furnace downtime
- Fewer belt changes/replacement

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