

Thermochemical Treatment

We deliver:

- Process consistency
- Safety
- Supply reliability
- Cost-effectiveness



The Industry Challenge

Heat treatment (HT) is a transverse application with multiple processes used in a variety of industries from automotive, aeronautics to machinery and metal fabrication.

With the development of new materials and ever-increasing requirements for mechanical properties by end-users, new heat treatment applications are rapidly expanding such as low pressure carburizing & gas quenching - or nitriding. To ensure a truly reliable and efficient process, safety and reproducibility are essential.

The Nexelia Solution

With more than 50 years of experience in heat-treatment applications, Air Liquide has developed solid expertise in providing gas solutions adapted to your needs.

A complete end-to-end solution, **Nexelia for Thermochemical Treatment** combines nitrogen and active molecules to reach the physical and chemical properties of the final metal part.

It combines the best of our gases, application technologies and expert support for:

- Atmospheric carburizing
- Low pressure carburizing & gas quenching
- Carbonitriding
- Nitriding
- Nitrocarburizing

As with all solutions under the **Nexelia** label, we work closely with you to define your needs and targets to be achieved and we commit to delivering them.

Your Advantages

• Quality & reproducibility

Thanks to homogenous and controlled gas injections in the furnace over the long run, you're ensured a stable gas atmosphere for your process, limiting the defect rate of your parts. Backed by 30 years of knowledge, our international network of experts leverage in-house tools and are ideally positioned to optimize your process.

• Optimal safety

Our installation designs comply with the most rigorous safety requirements, including local regulations as well as our own very stringent safety rules. Coupled with quality training, your operations are ensured maximum safety.

• Total reliability

Proven with many customers, all our gas-application equipments are designed for heavy-duty operations. We define your gas needs and availability requirement together and ensure full supply via remote monitoring of your gas consumption.

• Cost-effectiveness

Through a thorough audit and solid expertise, we help you reduce energy and gas consumption while optimizing the quality of your final parts.

• Traceability

For many heat-treatment processes, we offer monitoring solutions that can control the efficiency of the gas atmosphere and provide process measurements to end-users.

Core Features

Nexelia for Thermochemical Treatment provides nitrogen coupled with active molecules and provides installation design supported by our heat-treatment experts.

Nitrogen is a neutral gas for many metal alloys. Pure and dry nitrogen is an excellent protection atmosphere against oxidation.

Active molecules are defined depending on the heat-treatment process used:

- Methanol is sprayed and cracked in the furnace to reach carbon potential needed for carburizing in the atmosphere.
- Acetylene is often used as carburizing agent for low-pressure carburizing process.
- Ammonia is used for nitriding, carbo-nitriding or nitro-carburizing to reach hardness requirement for the part surface.

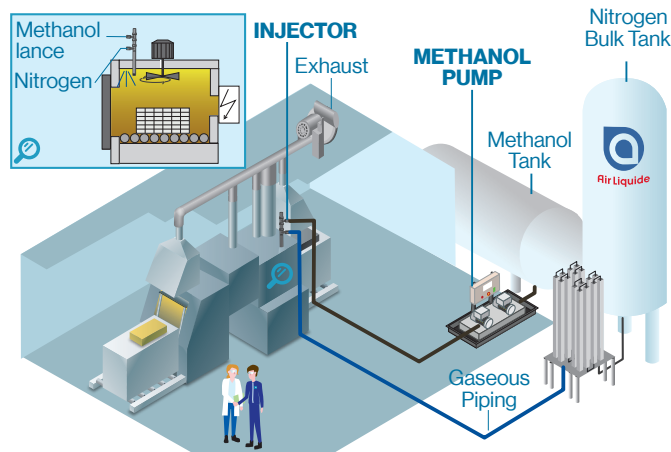
High-pressure nitrogen / helium are efficient for rapid cooling on gas-quenching processes.

State-of-the-Art Application Technology:

• Atmospheric carburizing

The **METHANOL INJECTION LANCE** guaranties the homogeneity of methanol injection and treatment efficiency. Made of stainless steel, it's composed of internal capillary tubes for the methanol and nitrogen injections. The lance can be also used to inject ammonia for the carbonitriding process.

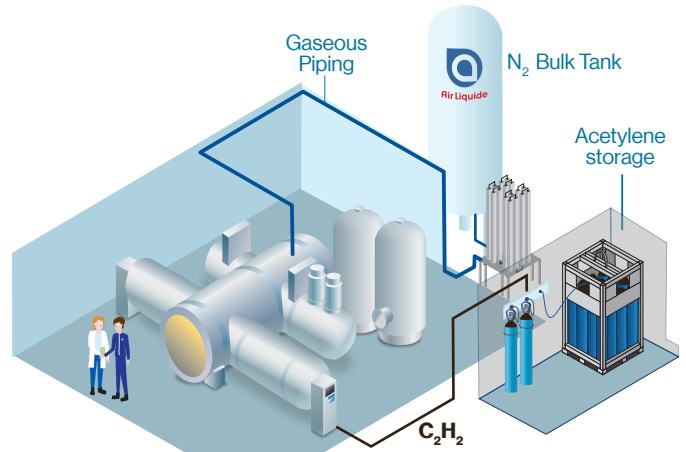
The **METHANOL PUMPING STATION** ensures reliable operation for methanol supply from the storage tank to the methanol-injection lance. A dual methanol pumping station is available to ensure full availability of the system even during maintenance.



• Low pressure carburizing & gas quenching

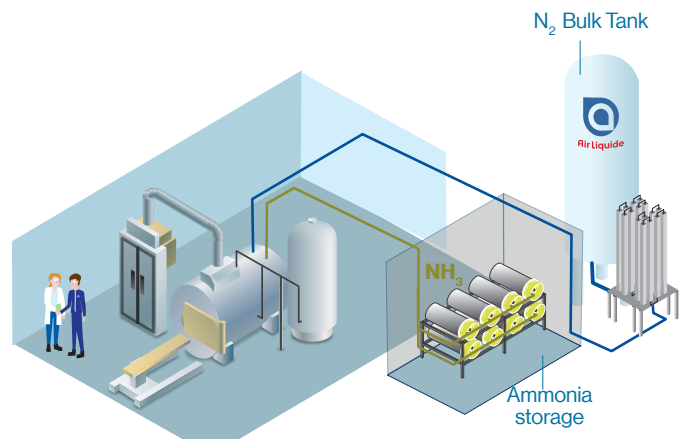
The acetylene-supply installation injects the carburizing agent into the furnace. Equipped with pressure sensors and automatic switching, it maximizes gas supply with the required safety parameters. It can be also used for the nitrocarburizing process.

For the gas quenching process, the nitrogen-supply installation is designed for high-pressure operations based on your needs. Depending on your quenching cell, helium can also be supplied for increased efficiency.



• Nitriding

The ammonia-supply installation is designed according to your consumption and peak flow, either in gaseous or liquid form.



Process Expertise & Service:

Our worldwide network of heat-treatment experts will help you:

- Design your installation according to your needs
- Audit your process and train your operators
- Define the most consistent process methods for you

We also support you for risk analysis according to local regulations.

Related Offers

- Nexelia for Cryogenic Treatment
- Nexelia for Annealing (coming soon)

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