

# Heat Treatment Services

## We deliver:

- ✓ Furnace survey
- ✓ Troubleshooting
- ✓ Process Optimisation
- ✓ Performance Control
- ✓ Support for Safe Operations

## The Industry Challenge

Mechanical properties and surface appearance of metallic parts strongly rely on optimal heat treatment processes. While safety and quality is key for successful operations, meeting evolving market demand is also a must. Process deviations, furnace aging and various alloy-grade treatments are common concerns.

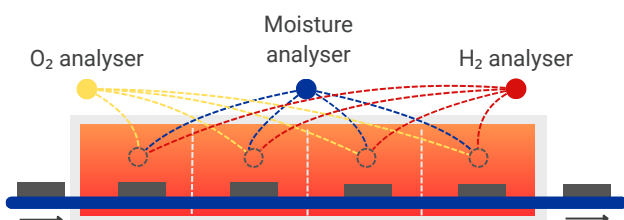
## The ALNAT™ S Solution

Air Liquide offers a comprehensive service solution combining the best of our gases, application technologies and services based on expert support. **ALNAT™ S** covers new or retrofit project assessments, gas control panel designs, surveys, training and troubleshooting.

Our solution suits both new and existing facilities, annealing, tempering, neutral hardening, atmospheric carburizing, nitriding, brazing and sintering processes.

## Monitoring Process Parameters

Air Liquide will analyse the percentage of gases from the furnace atmosphere as part of ALNAT™ S.



## Your Advantages

### Safety and risk mitigation

Regular safety surveys of your gas installation are essential to detecting potential negative furnace impact. This is as equally important when designing a new installation as controlling or retrofitting an existing one.

### Troubleshooting

We can help you fix issues that may take you off guard. Whether it is about your gas installation or your furnace atmosphere, we respond promptly.

### Process optimisation

Fine tuning heat treatment atmospheres is an integral part of good operating practices. Our specialists are experienced in providing gas expertise to customers, helping them master their furnace performance and product quality.

### Skill development

Our training programmes share how to use industrial gases for heat treatment in safe and effective ways. They are targeted at improving operator skills and retaining competitiveness.

## Core Features

Heat Treatment Service	Included Services	Gas Analysis	Temperature Analysis	Deliverables
Spot Furnace Survey	Troubleshooting	On demand furnace atmosphere analysis	On demand furnace temperature analysis	Recommended corrective actions
Reccurent Furnace Survey	Periodic safety Process control	1-2 times a year furnace atmosphere analysis	1-2 times a year furnace temperature analysis: temperature measurement of process and/or temperature homogeneity	
Performance	Periodic safety Process control Annual technical meetings with Air Liquide's heat treatment team	Continuous furnace atmosphere analysis and process overview discussions	Continuous furnace temperature analysis and process overview discussions	

### Case Study #1: Black Oxidation

#### Customer profile

- Annealing of gears for weaving machines
- Heat treatment at 870 °C in a batch furnace (0.6 m<sup>3</sup>)
- N<sub>2</sub> atmosphere (5 m<sup>3</sup>/h)

#### Discovery and Solution

- Detected increasing residual O<sub>2</sub> levels from the back to the front door of up to 1,075 ppm
- Air Liquide recommended replacing the door seal and mounting a vent to avoid too much pressure in the furnace once tightly sealed

#### Results

- No more surface oxidation
- No more post treatment
- N<sub>2</sub> flow reduced by 30%

### Case Study #2: Random Surface Colouration

#### Customer profile

- Bright annealing of stainless steel tableware at 1,050 °C in a continuous furnace
- 75% H<sub>2</sub> – 25% N<sub>2</sub> atmosphere with injections at the inlet and outlet of the furnace
- Quenching chamber at the exit of the hot zone

#### Discovery and Solution

- Detected quenching chamber design issue causing air leakage and insufficient cooling rate
- Detected random O<sub>2</sub> concentration between 20 – 2,000 ppm in the quenching chamber
- Air Liquide recommended for manufacturer to conduct sealing work on the quenching chamber

#### Results

- Issue found (air leakage and quenching speed)
- No more coloured parts from the furnace

## Contact us

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