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## Optimizing Your Autoclave Operations

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*Industrial autoclaves pressurized with nitrogen assist in heat transfer and provide a safer inert atmosphere.*

An autoclave is a pressure chamber used to carry out industrial processes. These processes require elevated temperature and pressure that is different from ambient air conditions. Autoclaves are used in a variety of applications including chemically cured coatings, medical sterilization, automotive glass lamination and high performance component manufacturing such as composites.

Autoclaves can be pressurized with air or nitrogen, depending on your needs. However, nitrogen is a better option when temperatures above 250° F are required. Nitrogen is commonly used to assist in heat transfer and reduces the risk of fires, providing a safe, inert atmosphere that will displace the off-gases from the autoclave.

### The Competitive Edge in Industrial Gases

Linde can provide the gases, supply systems, and technical support required to efficiently operate your autoclave process. Linde has over 100 years of experience in industrial gases and offers a wide range of supply options including packaged gases, pipeline gases and on-site gas production. Our gases, supply systems, and technical support are designed to aid our autoclave customers in their key processes and measurement parameters.

### Increase Quality and Productivity with a System Review

Whether you are expanding your autoclave operations or would like an industrial gas usage evaluation, our Linde team can conduct an evaluation using our *Autoclave Process Review*.

The *Autoclave Process Review* was developed by Linde to evaluate existing autoclave operations and help ensure that the temperature, pressure, and gas currently used are providing the optimal composite structure for the best quality end product. In addition, we can also calculate the estimated gas usage for future autoclave expansion projects.

The system will provide estimated gas usage, potential supply system requirements, pressure & flow analysis, and piping configurations. We have included a questionnaire on the back page to help you get started.

With today's competitive business climate, you need a supplier that does more than just provide product. You need a resource that collaborates with you every step of the way and can help you optimize your operations.

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Depending on the age of your autoclave, the process you are conducting, and the pressures & flows you are using, it may be time for a confidential evaluation.

To start, review the form below and fill-in as much information as you can. Once completed or if you have any questions, please contact Eduardo Cardoso, Associate Director, Business Development at **630-320-4145** or via e-mail at [eduardo.cardoso@linde.com](mailto:eduardo.cardoso@linde.com).

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Phone Number: \_\_\_\_\_

Contact Name: \_\_\_\_\_

How many autoclaves do you have? \_\_\_\_\_

	Autoclave #1	Autoclave #2
Autoclave Location (City, State)	_____	_____
Operation days / week:	_____	_____
Operation weeks / month:	_____	_____
Cycles per day:	_____	_____
Maximum Autoclave Pressure Rating:	_____	_____
Internal Autoclave Dimensions: Length (ft.)	_____	_____
Optional: Autoclave Gas Volume (cf.)	_____	_____
Autoclave Location (City, State)	_____	_____

**Please complete the process information table below, for each autoclave**

Autoclave #1	Start	Leak Check	Return to Baseline (0 psig)	Ramp to Starting Pressure	Pressure to Hold	Cool Down Phase	Reload Phase
Time – segment duration (minutes)	_____	_____	_____	_____	_____	_____	_____
Ending pressure (psig)	_____	_____	_____	_____	_____	_____	_____
Distance from nitrogen tanks to autoclave (ft)*	_____	_____	_____	_____	_____	_____	_____
Autoclave #2	Start	Leak Check	Return to Baseline (0 psig)	Ramp to Starting Pressure	Pressure to Hold	Cool Down Phase	Reload Phase
Time – segment duration (minutes)	_____	_____	_____	_____	_____	_____	_____
Ending pressure (psig)	_____	_____	_____	_____	_____	_____	_____
Distance from nitrogen tanks to autoclave (ft)*	_____	_____	_____	_____	_____	_____	_____

\*Note: The model has the capability to analyze piping distance from nitrogen bulk storage tanks to your autoclave unit(s) in feet. We can incorporate your exact distance; otherwise, we assume 500 ft.