



INTRODUCTION

In food manufacturing, nitrogen is used in different processes such as grinding, mixing, coating, freezing, and packaging to help preserve food. Nitrogen may come from cylinders, storage tanks, or generators, and either be a gas or liquid. While commonly used, improper use of nitrogen could expose you to harm. In this lesson we will cover the hazards, the personal protective equipment, and safe work practices associated with nitrogen in food manufacturing.

HAZARDS

When handling or working with nitrogen, you could be exposed to one or more of the following hazards:

- Asphyxiation from nitrogen creating oxygen deficient environments when it leaks into the surrounding the area
 - Signs of an oxygen deficient atmosphere can include headaches, lightheadedness, dizziness, nausea, vomiting, falling unconsciousness, or death.
- Pipes, containers, or cylinders exploding from built-up pressure
- Frostbite or burns from skin making contact with liquid nitrogen
- Shattering of glass, plastic, rubber, or carbon steel materials when it makes contact with liquid nitrogen
- Eye injuries if nitrogen gets into the eyes



PERSONAL PROTECTIVE EQUIPMENT

To help minimize the chances of an accident occurring, you should wear the appropriate personal protective equipment (PPE) when handling or working with either liquid nitrogen or nitrogen gas. PPE may include:

- Safety glasses or goggles
- Face shield
- Long-sleeved clothing
- Aprons or other protective clothing
- Gloves (insulated or leather gloves are recommended)
- Close-toe or steel-toe shoes
- Self-contained breathing apparatus respirator

Inspect all provided PPE for wear or damage before you put it on. Report damaged or worn items to your supervisor. Do NOT wear damaged PPE.

SAFE WORK PRACTICES

BEFORE WORKING WITH NITROGEN

Before working with nitrogen, you should do the following:

- Read and become familiar with the manufacturer-provided safety data sheet (SDS).
- If your facility uses a nitrogen generator, read and become familiar with the manufacturer-provided owner's or operator's manual.
- If applicable, make sure that all nitrogen cylinders are properly marked.
- If applicable, inspect any provided personal oxygen monitors for damage.
 - Report damaged monitors to your supervisor.
 - Do NOT use a damaged monitor.
- Inspect all pressure gauges for damage and to assure that they are working properly.
 - Report damaged or malfunctioning gauges to your supervisor.
 - Do NOT use a damaged or malfunctioning pressure gauge.

WHEN WORKING WITH NITROGEN

When working with nitrogen, you should do the following:

- Only allow trained and authorized employees to work with nitrogen.
- Be alert for any alarms that may sound if oxygen levels fall to or below 19.5%.
 - Air may be monitored by either stationary alarm systems or by personal monitors.
 - If oxygen levels fall to or below 19.5%, you should leave the area immediately because the area is oxygen deficient.
 - Do NOT alter alarm values.
- If you are using a machine or system that uses nitrogen, use the machine or system in accordance with the manufacturer's instructions and your company's policies and procedures.
- Only use nitrogen in well-ventilated or outdoor areas.
- Use nitrogen in accordance with the manufacturer's instructions and your company's policies and procedures.
- Do NOT exceed pressure limits for nitrogen as containers or piping could explode.
- Do NOT enter any confined spaces that have been identified as containing nitrogen because it could be oxygen deficient unless you have been authorized and have received proper training for these types of confined spaces.
 - *For more information on confined spaces, please refer to our "Confined Space", "Confined Space: Air Testing" lessons.*
 - Any employees who enter confined spaces should do so in accordance with your company's Confined Space program.

Cylinders

If you are using nitrogen cylinders, you should do the following:

- Assure that cylinders are protected from damage.
 - Do NOT drag, roll, slide, or drop a cylinder containing nitrogen.
- Use a cart, trolley, hand truck, etc., that has been designed to transport cylinders when moving cylinders between locations.
 - Make sure that cylinders have been properly secured in accordance with the manufacturer's instructions and your company's policies and procedures.
 - Do NOT lift a cylinder by its cap.
- Do NOT open the valve until it has been properly connected to equipment that has been prepared for use.



FOOD MANUFACTURING: NITROGEN SAFETY

- Open and close the valve in accordance with the manufacturer's instructions.
- Assure that the valve has been properly closed when finished with the nitrogen.
- Store nitrogen cylinders in accordance with the manufacturer's instructions and your company's policies and procedures.

For more information on compressed gases, please refer to our "Compressed Gas Safety" lesson.

CONCLUSION

To conclude, nitrogen is commonly used as either a gas or a liquid for many food manufacturing processes. Improper use or handling of nitrogen could expose you to harm, such as asphyxiation, containers or pipes exploding from built up pressure, frostbite or burns, etc. To help minimize the chances of an accident occurring, nitrogen should be used in accordance with the manufacturer's instructions and your company's policies and procedures. If you have questions about nitrogen at your facility, please speak with your supervisor.