

Comparison of liquid nitrogen and CO2 for food chilling and freezing applications



| Freezing and chilling with liquid nitrogen | Freezing and chilling with CO2 |
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| <p>Liquid nitrogen has a higher capacity to absorb heat.</p> <ul style="list-style-type: none"> • Smaller tunnels with liquid nitrogen for a smaller footprint • 15-25% higher production than CO2 for the same footprint | <p>CO2 is warmer, with less heat removal capacity, resulting in warmer operating temperatures.</p> <ul style="list-style-type: none"> • Larger sized tunnels for the same production rate |
| <p>Liquid nitrogen equipment has broader rangeability*</p> <ul style="list-style-type: none"> • Ability to increase throughput or heat removal beyond original design capacity • Ability to freeze or chill variety of types of products by modifying operating temperatures without sacrificing production rates. | <p>CO2 equipment has a narrow operating temperature range*</p> <ul style="list-style-type: none"> • Design capacity is typically maximum capacity • Some products may require modifications to dwell times impacting production rates to minimize product damage |
| <p>Freezing equipment converted from CO2 to liquid nitrogen can be operated at colder temperatures providing an opportunity to increase hourly production throughput in the same footprint.</p> | |
| <p>Nitrogen is a chemically inert gas and will not alter food quality. Nitrogen solubility in water is far lower than CO2.</p> | <p>CO2 may dissolve in high water content foods resulting in an acid taste because of carbonic acid formation</p> |
| <p>Storage tanks are typically vertical, and can be horizontal. No utilities required for the tank.</p> | <p>Storage tanks are typically horizontal, and can be vertical. Utilities required for compressor.</p> |
| <p>Liquid nitrogen has no carryover</p> | <p>Snow carryover, where CO2 could stay with the product as it leaves the freezing tunnel or cooling equipment, may negatively impact downstream packaging.</p> |
| <p>Steady sources of supply</p> | <p>Possible supply interruptions (source types differ; Summer months demand increases)</p> |

*Typical design criteria for a Liquid nitrogen freezer is an operating temperature of -120 to -150 F. Operating setpoint temperatures in a nitrogen tunnel can be changed to run warmer or colder to meet specific product needs. CO2 tunnels have a fixed nominal setpoint operating temperature as it sublimates from a solid to a gas.

If you'd like to discuss your application with one of our technical experts please call 800-654-4567 (mention code 922)

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