

## Don't Be Fooled by So-Called "Naturals"

### Industrial Gases (aka "Naturals") aren't the future of cooling

"Natural" refrigerants, aka refrigerant-grade industrial gases, are so named because they (e.g., ammonia, CO<sub>2</sub>, and propane) are found in crude form in the natural environment. However, to describe them as "natural" is misleading. They are all chemically manufactured using industrial processes.

Industrial gases are not:

✗ Risk Free

✗ Universal

✗ Natural

✗ New



Unlike "naturals," new-generation F-gases, also known as hydrofluoroolefins (HFOs), offer excellent performance and a low-to ultra-low global warming potential (GWP) without the undue risks, complex systems, and specially trained service technicians required by the former.

### Concerns with "naturals" include:



Corrosive



High flammability



High operating pressures



Higher lifecycle emissions



Higher cost of ownership



Lack of product availability



### GWP is just part of the story

A UNEP report found that >80% of the climate impact of refrigeration systems is due to indirect emissions from the electricity they consume. Because "naturals" are relatively inefficient, their total lifecycle emissions are in many cases higher than those of HFOs.<sup>1</sup>

## A Better Choice

Here is how HFO refrigerants compare to some of the most common “naturals”:

	HFOs	CO <sub>2</sub>	Ammonia	Hydrocarbons
Energy Efficiency	<b>Excellent</b>	Poor (esp. in high ambient temperatures)	Excellent	High
Operating Pressure	<b>Moderate</b> (On par with traditional systems)	High	Moderate	Moderate
System Leaks	<b>Low</b> (With proper refrigerant management programs)	Higher (Due to high working pressures)	Potentially deadly (Due to toxicity)	Moderate (Deliberate venting during service and EOL)
Corrosiveness	<b>Low</b>	Low	High	Low
Flammability	<b>None to Mild</b> (e.g., Opteon™ XP/Opteon™ XL)	Nonflammable	Mild	High (Explosive)
Product Availability	<b>High</b>	Low	Moderate	Moderate
Installation Cost (CapEx)	<b>Moderate</b> (On par with traditional systems)	High (Due to components suitable for high working pressures)	High (Due to specialized components)	High (Self-contained applications)
Service and Maintenance Costs (OpEx)	<b>Moderate</b> (On par with traditional systems)	High (Limited technician pool and higher component cost)	High (Due to specialized components and hazards)	High
Lifetime Cost	<b>Moderate</b> (On par with traditional systems)	High (Due to higher system cost and poor efficiency)	High (Monitoring and maintenance requirements)	Moderate



### HFOs do what “naturals” can’t.

HFOs offer a efficient, reliable, and sustainable alternative to the risks and many other shortcomings of so-called “naturals.” The continued availability and innovation of HFOs is crucial to decarbonizing the global economy, maintaining an efficient supply chain for perishable goods, and achieving government-mandated climate targets.

<sup>1</sup> “System Efficiency Is More Important Than GWP: Efficiency,” GlobalFACT, <https://globalfact.org/update/system-efficiency-is-more-important-than-gwp-efficiency/>, accessed December 2, 2022.