

Demystifying “Drop-in” Refrigerants in Residential and Commercial A/C

Technical Bulletin

Product: Genetron® 422D (R-422D)

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Application: HVAC

Background: The term “drop-in” is used throughout the HVAC industry to describe various refrigerants that are used to replace legacy refrigerants.

Problem: “Drop-In” is widely misunderstood and can lead to incorrect application of refrigerants.

Resolution: The following information can help improve your understanding of the proper application of “drop-in” refrigerants.



Genetron 422D (R-422D) is a non-ozone-depleting HFC blend. It is designed to:

- Replace R-22 in residential and commercial A/C systems that use mineral oil and AB oil
- Reduce the need for an oil change to synthetic oil¹
- Achieve capacity and efficiency close to R-22
- Achieve discharge temperatures lower than R-22

R-22 HVAC Retrofit Applications

	422D	407C ²
HVAC Units and heat pumps without an accumulator or receiver	No oil change needed	Change to 80+% POE oil
Residential HVAC units and Heat pumps with an accumulator or receiver	20% POE may be needed*	

*Complex systems and systems with long connecting lines may require higher POE oil percentage.

Improving Oil Return

R-422D is a great choice to replace R-22 in A/C systems because it has the highest percentage of hydrocarbon vs alternatives, and a high mass flow, both of which aid in oil return. In some cases adding 20% polyol ester (POE) oil can solve oil return problems.

Commonly-Asked Questions About “Drop-in” Refrigerants

Will drop-in refrigerants work in all cases?

No, systems with receivers or other vessels where refrigerant and oil can gather will have difficulty with oil return to the compressors. This may cause performance issues and possible compressor damage. This is true for any “drop-in” refrigerant.

Can “drop-in” refrigerants be used to “top-off” existing systems?

No, mixing one refrigerant with another refrigerant is a violation of the U.S. EPA’s SNAP use conditions and is therefore illegal.

Furthermore, this practice creates a mixture with an unknown pressure / temperature relationship and therefore makes servicing difficult and risky. Superheat and sub cooling values cannot be calculated, which can lead to poor performance and compressor damage.

Also, mixing refrigerants eliminates any recovery value that the refrigerant may have and will create the costly need to destroy the refrigerant.

Do I need to change seals when using a drop-in refrigerant?

Any time a chlorinated refrigerant such as a CFC or HCFC is replaced by an HFC or HFO refrigerant, the elastomeric seals need to be replaced to avoid leaks.

Do expansion valves need to be changed?

R-422D is designed so that the existing expansion valves can be used. On some occasions the orifice may need to be changed for optimum performance. Refer to Bulletin 1 “Orifice sizing guidelines”.

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- 1 Always follow compressor manufacturer recommendations for oil
 - 2 R-407C is not considered a drop-in due to the need to change to POE oil

For more information:
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