



TRANE[®]

American Standard
HEATING & AIR CONDITIONING

APPLICATION BULLETIN

APP-APB011-EN - REVISED July 31st, 2012

TOPIC:

Use of the alternative “drop in” HCFC-22 replacement refrigerant R-438A in single compressor/ single speed residential split and package systems.

Purpose:

The purpose of this revision is to provide a more simplified approach when using an alternative “drop in” replacement refrigerant in systems that were originally fitted for use with R-22 by:

1. Removing all reference to line length, diameter and elevation differences, and
2. Recommend the addition of Polyolester (POE) oil to any system in which a “drop in” refrigerant is utilized, and
3. Recommending only the use of R-438A as a viable “drop in”

The above recommendations are due to field feedback and further evaluation.

Discussion:

Since the availability of HCFC-22 (R-22) is decreasing, chemical manufacturers, such as DuPont[™], are offering alternative solutions. R-438A is one of the alternate refrigerants offered today.

The refrigerant manufacturer’s data indicate that system performance may be negatively impacted by as much as ten percent when using R-438A as opposed to using R-22. In addition, R-22 systems have compressors originally charged with mineral oil which is not miscible with the liquid phase of R438A. The refrigerant manufacturer’s retrofit guide recommends adding 10 to 20% POE oil to the system if the oil level drops continuously in the compressor sump. Since the compressors used in residential systems do not contain a sight glass, and to alleviate the concern of falling oil levels, a small amount of POE oil must be added to the system per the instructions listed in this bulletin when retrofitting a system with R-438A.

Table 1 provides the amount of oil and the appropriate OIL part number required to be added to the system based on compressor type.

Recommendation:

When adding or replacing refrigerant it is recommended to use the specified refrigerant on the unit's nameplate to maintain the full benefit of the system design. In addition, if a compressor failure has occurred, and R-22 is no longer available, consideration to system change is a viable alternative. Refer to APP-APG011-EN or APP-APG012-EN for retrofitting a system for use with a new R410A outdoor unit.

If R-22 is unavailable, a single speed residential HVAC system that is labeled for use with R-22 may be retrofitted for use R-438A. If doing so, follow the refrigerant manufacturer's retrofit guidelines and the requirements listed in this bulletin.

Retrofit Guidelines in addition to the refrigerant manufacturer's guidelines

- 1. Using an alternate refrigerant as a "drop in" replacement should be considered as a last resort.**
- 2. Do not mix refrigerants.** - Only use refrigerant that is currently in the system for charge adjustment. For example: Do not use an alternative refrigerant to top off a system charged with R-22.
- HVAC systems which incorporate pump down cycles, hot gas bypass / reheat, or contain liquid receivers should only use the refrigerant the system was originally fitted for.
- When retrofitting a system to use a "drop in" refrigerant, all system driers must be replaced. Please refer to the refrigerant manufacturer's retrofit guidelines for drier type.
- All seals exposed to refrigerant, oil and atmosphere, must be changed in order to minimize risk of refrigerant leaks to the atmosphere. An example of seals include those found in quick connect couplings that were used in older systems (1992 and earlier). In addition, replace all Schrader type service core valves.
- Flow control devices normally do not require change; however, it is recommended to obtain service history from the system to reference the refrigeration pressures and temperatures at similar conditions. This will help the servicer to establish a baseline prior to the refrigerant retrofit and will be useful when adjusting the system charge with the alternative refrigerant. Please refer to the refrigerant manufacturer's guidelines for acceptable pressure and temperature ranges.
- The refrigerant manufacturer's retrofit guidelines may mention adjusting the thermal expansion valve. Trane and American Standard residential indoor units use non-adjustable thermal expansion valves, flow control check valves, capillary tubes and short orifices in residential HVAC equipment utilizing R-22 refrigerant. Consequently, sub-cooling and superheat comparable to the values with R-22 may be impossible to obtain with the original equipment flow control devices.
- Use only Service First part number OIL00193 when adding oil to a system being retrofitted.
- Label the indoor unit and outdoor unit of the system in order to alert service personnel that it has been retrofitted with the specific alternative refrigerant. Check with the refrigerant manufacturer or local refrigerant supplier for labels.

Please note that while R407C is a viable alternative and exhibits close to R-22 performance, it requires a complete oil change to POE and therefore is not considered a "drop in" alternative to R-22. It also important to note R410A is not a "drop in" R-22 alternate refrigerant. In addition, more information may be acquired in the report titled AHRI 8003: Thermal Stability and Chemical Compatibility of R-22 Replacement Refrigerants.

Required amount of additional oil based on compressor type:

TABLE 1 Additional oil requirements for Climatuff™ and Duration™ compressors			
Type	Cylinders	Amount	Oil Part Number
Reciprocating	1	8 ounces	OIL00193
Reciprocating	2	12 ounces	OIL00193
Scroll	N/A	12 ounces	OIL00193

Please note: reciprocating compressors with model numbers beginning with F or G are two cylinder compressors. (for example a GP343-FG1-GA is a two cylinder reciprocating compressor)

 **Warning**

Counterfeit refrigerants are available and should not be used under any circumstances. Counterfeit refrigerants are mixtures of refrigerants that produce approximately the same pressure as authentic refrigerants; therefore, authenticity is difficult to determine. Counterfeit refrigerant may be explosive, toxic, and flammable. In addition, if such a refrigerant is used, equipment damage may occur as a direct result. It is crucial that only authentic refrigerants be utilized. Use only refrigerant suppliers that are known and reputable.

*Product Application Engineering
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