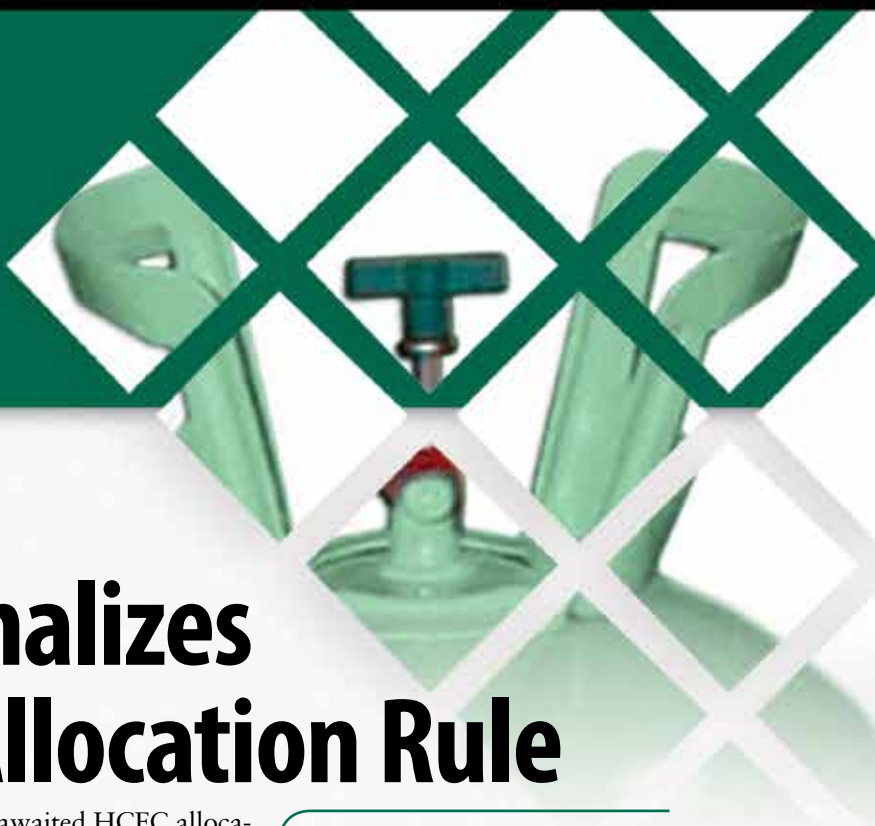
NATIONAL™ news

A Newsletter from National Refrigerants, Inc.



National News
Summer 2013

In this Issue:

National Refrigerant's full service total quality programs include every aspect of refrigerant management including reclamation, cylinder refurbishing, refrigerant banking, refrigerant and oil analytical testing and technical support.

Feature:

EPA Finalizes HCFC Allocation Rule

On April 3rd, the long awaited HCFC allocation rule was published in the Federal Register. This rule established production and import quantities for HCFCs, including R-22, to allocation holders for 2012, 2013 and 2014. The impetus for EPA's actions goes back a few years to when EPA lost a lawsuit related to the allocation system they issued in their 2009 Final Rule. When implementing the Court's decision, EPA took the opportunity to reduce the total quantity of R-22 allowed to be produced or imported because they determined that the need for virgin R-22 was lower than they anticipated in the 2009 Final Rule. The reductions EPA put forth reduce the quantity of R-22 in the years 2012-2014 by 20% – 39% from 2009 levels. These reductions are significant and limit the amount of virgin R-22 manufactured and imported to meet existing service requirements.

The chart below summarizes:

1) How many pounds allowed to be produced and imported based on the 2009 Final Rule
2) The maximum and minimum amounts proposed in 2011
3) How many pounds allowed to be produced and imported based on the 2013 Final Rule

THE BOTTOM LINE IS THERE IS NO REASON TO PANIC ABOUT THE R-22 SUPPLY. WHILE EPA'S ACTIONS HAVE INCREASED AWARENESS ABOUT THE USE OF R-22, THERE IS PLENTY OF R-22 AVAILABLE IN THE MARKETPLACE.

As indicated in the chart, the amounts allocated for 2012-2014 are below the amounts in 2009 Rule. EPA determined the amount allocated based on the demand required to service the installed base of equipment as calculated in their Vintaging Model. The Vintaging Model is the primary tool used by EPA to estimate servicing demand. Even though the Model estimates demand to be greater than the supply allocated, R-22 is still available in sufficient quantities. The industry will continue to rely on the annual allocated amounts as well as existing inventories and recovered and reclaimed R-22.

Continued on pg.2

	2009	2011 PROPOSED ALLOCATION		2013
	FINAL RULE	Maximum	Minimum	FINAL RULE
2012	90M	80M	55M	55M
2013	79M	69M	46M	63M
2014	69M	58M	36M	51M

* units in millions of pounds

Ask the Expert

Please forward all questions for publication to info@refrigerants.com

Questions & Answers regarding refrigerants, lubricants, chemicals, or regulations.

Is it legal to use hydrocarbon refrigerants, such as R-22a, to retrofit R-22 systems?

According to recent clarification from the EPA, it is NOT legal to use straight hydrocarbon refrigerants to retrofit R-22 systems.

- Hydrocarbon products have not been submitted to EPA for SNAP approval in retrofit applications. There have been several products approved for new systems, built with safeguards against flammability, but not for use in existing R-22 systems.
- It is illegal for a company to sell a hydrocarbon refrigerant for purposes of R-22 retrofitting. EPA has issued a Notice of Violation to a company marketing and selling a hydrocarbon for use in air conditioning.
- EPA has published a list of acceptable refrigerant blends for use in air conditioning and refrigeration applications. Although some of the products on this list contain upwards of 5% hydrocarbon as one of the components in the blend, the remaining 95% are HFC refrigerants and the overall blend is nonflammable.

See the EPA website at **http://www.epa.gov/ozone/snap/r22a.html** for further information.

When is it necessary to flush line sets or system components? Do I need to flush every time I work on a POE system?

Flushing is not required every time you work on a system simply because it contains POE. Systems that are relatively clean and not been open to the atmosphere for any length of time should be fine during servicing. It is recommended, however, that a flushing product be used:

1) When a system has experienced a failure that will leave a lot of residue, such as a compressor burnout. The residual contamination from a burnout should be flushed from the lines and heat exchangers before installing the new compressor.

2) Systems that will be retrofitted to a new refrigerant, especially when it will use POE, will benefit from flushing out residual oil and contamination that might promote chemical breakdown of the POE.

3) Any time a system has been open for some time and exposed to moisture and other residual construction contaminants, flushing will help to remove these materials and prepare new or repaired systems for clean operation.

Continued from pg.1: EPA Finalizes HCFC Allocation Rule

It will be your best economic option to continue to use R-22 if you:

- have an air conditioning or refrigeration system that is running well on R-22 and is not leaking
- have equipment that is not easily retrofitted
- have large equipment that has not reached its fully depreciated value

The bottom line is there is no reason to panic about the R-22 supply. While EPA's actions have increased awareness about the use of R-22, there is plenty of R-22 available in the marketplace. However, you should be aware of from whom you are purchasing your R-22. Be sure you are purchasing a known brand legally sourced from a reputable air conditioning and refrigeration wholesaler who will guarantee that every cylinder meets or exceeds AHRI700 Standard for Specifications for Fluorocarbon Refrigerants. ■

Footnote: EPA is planning to issue a proposed rule this year which will indicate how much R-22 they may be allocating for production and import from 2015 through 2019. EPA is relying on their Vintaging Model and industry supplied data to determine the appropriate amount of R-22, both virgin and reclaimed, that will be required to meet servicing requirements for 2015 and beyond. The rule is expected to be finalized in 2014.

FOR MORE INFORMATION:

www.epa.gov/ozone	www.ahrinet.org	www.phaseoutfacts.org	www.ashrae.org

TECH TIP

Charging Air Conditioners with a Refrigerant Blend

There are several key differences between R-22 and refrigerant blends that must be considered when charging an air conditioning system. For example, blends should only be removed from the cylinder as a liquid or the fractionation effect may change the composition.

Other things to consider when charging:

BY WEIGHT: The original charge size for R-22 was based on making sure all of the tubing was "full" of liquid or vapor refrigerant in the right places around the system. The percentage reported for a replacement blend is simply the ratio of the liquid density of the new refrigerant to R-22. For example, if a system holds 6 pounds and a blend is listed as requiring 95% charge size, then (0.95 * 6 lbs) = 5.7 lbs of the blend will fill the same volume in the system as 6 lbs of R-22.

BY SUPERHEAT: For fixed-orifice evaporators, the recommended charging method is to adjust the charge to obtain a specific superheat based on running conditions. There is usually a chart in the equipment manual or inside the electrical panel/cover on the unit. The procedure should be followed exactly the same for the blend as it would for R-22, but the superheat value must be determined from the VAPOR column of the PT chart. If the PT chart for the blend only has one column, it is likely listing the vapor data in the lower temperature range so that it can be used to measure superheat.

BY SUBCOOLING: Most newer or higher efficiency systems use a TXV to regulate refrigerant in the evaporator. In this case, charging is accomplished by measuring subcooling temperatures and adjusting the charge based on conditions. Again, the procedure should be exactly the same for a blend compared to R-22, only the LIQUID side of the PT chart should be used.

A Lesson on Fractionation for a New Generation

FOR ALL THOSE WHO HAVE, UNTIL RECENTLY, BEEN LIVING IN AN "R-22-ONLY" WORLD, THE BEHAVIOR OF REFRIGERANT BLENDS MAY SEEM A LITTLE STRANGE. LUCKILY, WE HAVE LEARNED A LOT ABOUT BLEND BEHAVIOR OVER THE LAST 18 YEARS SINCE THE CFC PHASEOUT.

A Review of Basic Blend Behavior: Fractionation and Temperature Glide

In blends that are capable of separating, the individual refrigerant components will move around almost independently of the other components. This will allow more of the higher pressure, higher capacity component to take up space in the vapor above the liquid compared to the relative amount in the liquid. With R-410A, for example, the vapor will have slightly more R-32 (52.5%) in the vapor than in the liquid (50%). For other blends, like R-407C, the difference in vapor composition is more pronounced (31% R-32 and 33% R125 compared to 23% and 25% in the liquid).

Fractionation is when a blend has a different vapor composition than the liquid, and that vapor is removed or leaked away from the liquid, resulting in a change in overall blend composition towards a lower pressure/lower capacity mixture.

- Fractionation occurs in a cylinder when vapor is removed or leaked. Not only is the vapor being removed at the higher pressure composition, but the product left in the cylinder changes to a lower pressure composition. This can be avoided by removing only liquid refrigerant from a cylinder.
- Fractionation occurs in a system when the system is off, the vapor has had a chance to adjust its composition above the liquid, and a leak occurs from the vapor space. Blends will not fractionate when a system is running since the "circulating" composition is the correct composition and components will be lost from a leak at the same rate.
- For air conditioners, leakage during the operating season will not significantly change the composition. Leaks during the winter time, however, when the system is sitting idle, may result in significant fractionation.

Temperature Glide is a difference in boiling point within a blend as it moves from one side of a heat exchanger to the other. Local fractionation effects within the boiling refrigerant inside the heat

Continued on pg.4

FRACTIONATION BEHAVIOR FOR R-410A

R-410A is being used in the majority of new air conditioning equipment today. Although it has a 400 series number from ASHRAE, the fractionation and temperature glide effects are almost non-existent. The vapor composition above liquid R-410A is only a few percent different resulting in a very small shift in composition when vapor is leaked: when 40% of the charge has leaked, the remaining refrigerant composition is still within specification for "new" R-410A (a shift of less than 1.5% from the original 50/50 mixture).

If the blend repeatedly leaks up to 50% and is recharged with fresh refrigerant, the final mixture is still within specification. Even when R-410A is allowed to sit over the winter is an idle system, leakage will not cause any significant change in composition and the system can be repaired and topped off.

The temperature glide for R-410A is around 0.2°F — that is two tenths of a degree F. To understand how low this is, the temperature glide for R-502 is 0.5°F in a low temp refrigeration evaporator. The pressure-temperature chart for R-410A only contains one column because the data in the vapor and liquid columns are too close to each other. The effects of temperature glide will not be noticed at all in an R-410A system.

FRACTIONATION BEHAVIOR FOR R-407C AND OTHER HIGH GLIDE BLENDS

All of the other blends that are being considered for retrofitting R-22 systems (R-407C, the R-422 series, and similar blends with or without ASHRAE numbers) will have some significant amount of temperature glide between 5°F and 10°F. These blends will change composition relatively quickly upon vapor leakage, leaving the remaining charge out of specification. Even recharging with fresh refrigerant will still leave the remaining composition short of the higher pressure/higher capacity component(s).

This does not mean, however, that the blends should not be used for retrofitting air conditioning equipment. Historical performance in the refrigeration industry has proven that higher glide blends can be used reliably regardless of the fractionation and temperature glide issues. Fractionation of a higher glide blend will likely require removal of the remaining refrigerant and replacement with a fresh charge. When the refrigerant has leaked during normal operation, however, there will probably not be any shift in composition, allowing the charge to be topped off.

Temperature glide will be noticeable across an evaporator coil circuit or condenser. The effects of glide will need to be considered when servicing a system: the evaporator coil will be colder near the expansion device and possible frosting may occur in low load conditions; superheat measurements must be taken against the saturated vapor column of a PT chart; subcool measurements must be taken against the saturated liquid column of a PT chart; and average coil temperatures must be used when checking for proper system operation compared to ambient or supply air temperatures.

Continued from pg.3: A Lesson on Fractionation for a New Generation

exchanger can cause anywhere from a few tenths of a degree glide up to 10˚ or 15˚F, depending on the blend. Standing back and looking at the air blowing over the coil, there will be an "average" temperature that will affect the ultimate supply air temperature. There are, however, several issues that must be considered for higher glide blends:

- The coldest part of the coil may frost in low load conditions
- Moisture removal rates may be different for different sections of the evaporator coil
- Superheat and Subcool measurements will be affected — temperatures must be read from a PT chart at the "end" of the glide: saturated vapor for a superheat measurement, and saturated liquid for a subcool measurement

For a more detailed discussion of blend fractionation, temperature glide, and system behavior, refer to the technical resources at our website, **www.refrigerants.com/technical_info.aspx** ■

National Refrigerants, Inc.
11401 Roosevelt Boulevard
Philadelphia, PA 19154
800.262.0012
fax: 215.698.7466
web: www.refrigerants.com
e-mail: info@refrigerants.com

To be added to the mailing list for future issues please email: info@refrigerants.com or fax a request to 215.698.7466

On The Web

Visit!

NRI Website

www.refrigerants.com

- ❖ Featuring concise information on all products including refrigerants, chemicals, lubricants and services
- ❖ Easily accessible downloads of technical support information, Material Safety Data Sheets and more

Scan the QR Code to access refrigerants.com from your smartphone!