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THE END IS NEAR FOR R-22

HOW TO PREPARE YOUR ORGANIZATION FOR THE PHASE OUT OF R-22 (HCFC) REFRIGERANTS

According to their 2008 study, the EPA is limiting the amount to HCFC R-22 to 20% less than industry demand. This means that R-22 will likely increase in cost substantially and available stocks could be bought up by the bigger organizations. It also means that reclaimed, recycled, and used R-22 could become more valuable than virgin in that it could be used “universally” in pre and post 2010 systems.

WHITEPAPER SUMMARY

PREPARING FOR R-22 HCFC PHASE OUT

PRODUCTION & IMPORT CAP WILL MOST LIKELY BE 20% SHORT OF 2010 MARKET DEMAND FOR R-22 (HCFC) REFRIGERANTS

ACCORDING TO THEIR 2008 STUDY, THE EPA IS LIMITING THE AMOUNT TO HCFC R-22 TO 20% LESS THAN INDUSTRY DEMAND. THIS MEANS THAT R-22 WILL INCREASE IN COST SUBSTANTIALLY AND AVAILABLE STOCKS COULD BE BOUGHT UP BY THE BIGGER ORGANIZATIONS. IT ALSO MEANS THAT RECLAIMED, RECYCLED, AND USED R-22 COULD BECOME MORE VALUABLE THAN VIRGIN IN THAT IT COULD BE USED "UNIVERSALLY" IN PRE AND POST 2010 EQUIPMENT.

The Pending 2010 Allocation Rule: What it Means to Your Organization

The R-22 phase out regulation defines the United State's plan to allocate virgin hydrochlorofluorocarbons (HCFCs) to meet the international obligations under the Montreal Protocol.

The rule proposes to reduce the amount of R-22 and other HCFCs available to the United States market for the period from 2010 to 2014.

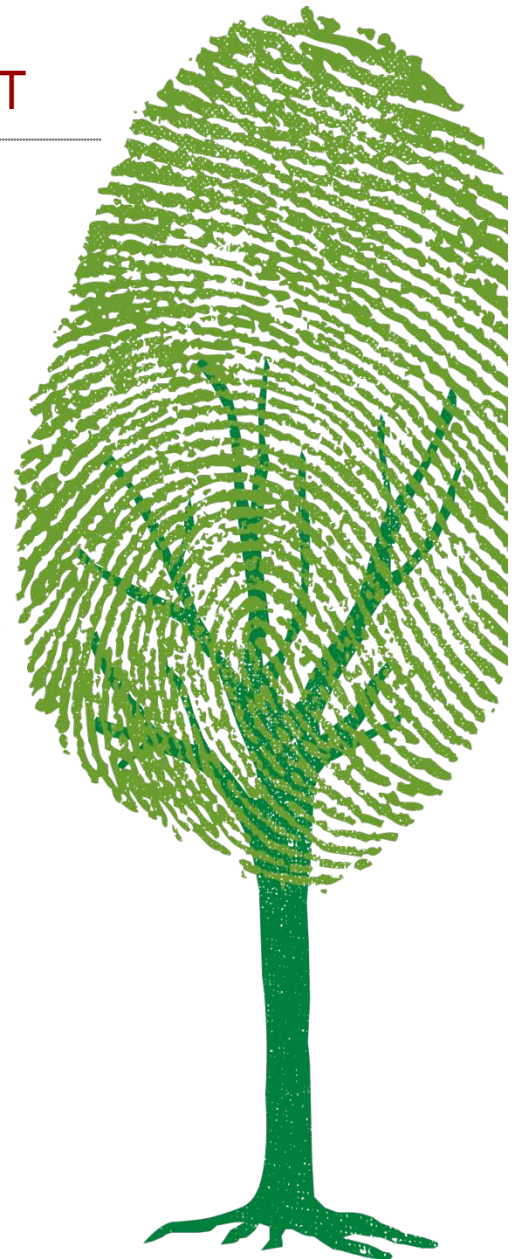
To understand this rule better, one should look at the United State's historical implementation of the Montreal Protocol. In 2003, the U.S. met the 35 percent step down in the HCFC cap by phasing out R-141b used in foam blowing.

The EPA set an allocation number on R-22 to 100 percent of the 2004 market demand. The market conditions will change in 2010 when the EPA plans to reduce the R-22 allocation to 26.5 percent of the original cap. This will result in a **73.5 percent reduction in the supply of R-22 HCFC refrigerants.**

This regulation change and the new allocation of R-22 could create a large gap in the availability of virgin R-22 refrigerant. It is hoped that this will stimulate an increase recovery and reclamation of used refrigerant. It is too soon to tell if these strategies will mitigate refrigerant sourcing challenges or not. But these policy enhancements will be a boon to EPA certified reclaimers.

The prudent strategy is the continued education of your organization related to the R-22 phase out requirements and to begin managing your refrigerant inventory more accurately.

Large users of R-22 HCFC refrigerants should take in to consideration the value of the recovered refrigerant when planning retrofits as prices are expected to soar.



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PART 1: 20% BELOW DEMAND

R-22 PHASE OUT MEANS HIGHER PRICES

KEY POINTS OF THE R-22 PHASE OUT REGULATION

By law written into the EPA legislation, HCFCs are scheduled to be phased down in 2010 by 75% of the baseline cap (set in the 1990's). On January 1st, 2010, it will be illegal to import, produce, or sell R-22 for use in new equipment or pre-charged in new equipment manufactured after 2009. This is a very significant piece of new legislation.

VERISAE, INC.

VERISAE HELPS
CUSTOMERS GET TO THE
TRUTH BEHIND THEIR
ASSETS; WHAT THEY'RE
VENTING, BUILDING,
TRACKING, AND
MANAGING.

R-22 PHASE OUT – WHAT THIS MEANS TO YOU

We have HVAC-R systems with R-22 refrigerant gas. What's the big deal?

For starters, R-22 is the most widely used refrigerant in the world. Since the 1940's R-22 has been the refrigerant gas that we use in central air-conditioning (AC) systems at home and work. It is efficient, non-toxic and easy to use. It's difficult to grasp how important R-22 is to our society.

R-22 based air-conditioning was the catalyst of southern United States growth. Without R-22 and other refrigerant gases farmers and grocers wouldn't be able to provide their product to such a diverse marketplace across the entire U.S.

R-22 is an HCFC class refrigerant containing chlorine giving it the potential to damage the ozone and therefore has been targeted since the 1990's for eventual phase out by the Montreal Protocol, an international treaty.

Most air-conditioning manufacturers introduced non-ozone depleting products that utilize non ozone depleting R-410A. Although the adoption by contractors and consumers has been slow for R-410A, the upside is that R-410A is more efficient and is chlorine free.

How will supply and demand for R-22 refrigerant change with these rules?

In 2007 and 2008, the U.S. Environmental Protection Agency (EPA) published an industry model of the expected HCFC market size and the related demand for R-22. There is a huge on-going demand for R-22 refrigerant gas to service the existing install base of HVAC-R systems currently in operation.

Based on the market demand modeled by the EPA and published in the Federal Register, two proposed rules for meeting the 2010 phase-down called for by the Montreal Protocol of R-22 and other HCFC refrigerants emerged:

1. The first rule regards the 2010 allocation of production and import rights of R-22. There is a SIGNIFICANT phase down of HCFCs R-22 and other damaging refrigerant gasses in the immediate future.
2. The second proposal is on the ban on production, import, and sale of R-22 in new equipment post January 1st, 2010.

R-22 PHASE OUT – YOUR OBLIGATIONS AND THE REQUIREMENTS

What are the key points of the R-22 phase out I must understand?

By law written into the EPA legislation, HCFCs are scheduled to be phased down in 2010 by 75% of the baseline cap (set in the 1990's). On January 1st, 2010, it will be illegal to import, produce, or sell R-22 for use in new equipment or pre-charged in new equipment of any kind. This is a very significant piece of legislation that may not be on the radar of 90% of the organizations running HVAC-R systems.

What are the specifics of the HCFC pre-charged rule as it relates to R-22?

A rule designed to limit the manufacturing and importing of R-22 containing products post 2009. On January, 14th, 2009, the EPA posted a clarification on their website pointed out that the proposed rule allows for equipment manufactured with HCFCs BEFORE 12.31.2009 to be sold in 2010 and beyond as long as it is replacement part to an existing R-22 system. This is an extra allowance (loophole) that allows equipment manufactured after 2009 to be charged with reclaimed refrigerant. This too will be further evaluated to ensure existing and future legislation continues to benefit the environment.

How can I get my organization's concerns or comments heard by the EPA regulators?

After a significant number of comments from equipment manufacturers, owners of HVAC-R systems, industry groups, and distributors, the EPA clarified the pre-charged rule to allow for R-22 equipment, such as window air conditioning units, manufactured before January 1st, 2010 to be sold after January 1st, 2010. This gives some breathing room for smaller businesses and home owners but it is well known that regulations regarding refrigerant gases will continue to be ratcheted down. Commenting and meetings are presented on the EPA website.

What do all the percentages (allocations cap, market demand, supply, etc.) mean to my HVAC-R systems?

Under the phase out rules for R-22 production and import, all allocations across the refrigerant industry will go from about 312 million pounds to about 110 million pounds, a 64.8% reduction across all shapes and sizes of organizations. This is the first time that R-22 has been reduced in any way and in such a pervasive manner. In 2003, R-22 was allocated to 100% of the allowable cap and the step down was covered by the phase out of foam blowing agents. We are about to enter a whole new manner of restriction where the R-22 gas itself will be capped. This will have a far greater impact on day-to-day operations across the entire economy.

How will the R-22 phase out effect the market price of this refrigerant gas?

According to the 2008 study, the EPA is limiting the amount to HCFC R-22 to **20% LESS than industry demand**. This means that R-22 will likely increase in cost substantially and available stocks could be bought up by the bigger organizations. It also means that reclaimed, recycled, and used R-22 could become more valuable than virgin in that it could be used "universally" in pre and post 2010 equipment. Refrigerant gas tracking and management is necessary to assure that no gas escapes. This new legislation requires companies to keep accurate records that can be produced on demand by regulators to assure that HVAC-R systems are not leaking and that all refrigerant gases are recovered correctly.

R-22 PHASE OUT – WHAT YOU SHOULD DO ABOUT IT

How can I mitigate the risk of not having enough R-22 for our organization?

You should begin immediately keeping accurate maintenance records and understand your R-22 usage and reporting requirements, in addition to forecasting your ongoing needs of R-22 into 2010. This means tracking your refrigerant gases down to the individual pound across your entire organization. It is critical to track R-22 but many other refrigerant gases are regulated due to their harmful effects on the environment and their carbon impact.

Can I gain any advantage by recycling or reclaiming the R-22 I already own?

Yes. But there are a few requirements to be followed as it relates to the service technicians you employ. Used refrigerant must be reclaimed and re-certified by an EPA approved reclaimer before it can be sold to a third party. It can however be re-used in your own equipment without re-certification. It is best to start as soon as possible to truly understand and manage your refrigerants as they will and are turning into vital assets that should not be vented or just given away during service events.

EPA Section 608 is a certification requirement for technicians before they can work on HVAC or AC systems. Individuals cannot purchase any amount of refrigerant unless they are certified. Section 608 also restricts cylinder sizes of HCFC refrigerants to greater than 20 pounds. All technicians must be certified in order to buy refrigerants.

What else should I be considering or aware of related to refrigerant gas management?

The EPA requires leaks to be fixed within 30 days and can impose fines of up to \$32,500 per day- per unit for excessive leaks. Ignorance of these regulations is not an excuse. They were written and passed many years ago. To make a point, the EPA continues to impose hefty fines to organizations who do not comply. Make sure to purchase new R-22 from reputable sources; fines of up to \$300,000 per 30 pound cylinder are possible for illegally imported product.

Will refrigerant gases, regardless of the R-22 phase out, affect my carbon footprint and reporting requirements?

Yes, most definitely. Due to the connection between refrigerant gases and their effect on climate change, many legislative bodies including various U.S. states and the EPA have stepped up and increased the detailed refrigerant reporting requirements.

Legislation due to become law in 2009 will require that all owners or operators of systems containing 50 pounds of refrigerant gas or more to monitor for leaks, maintain detailed service records, track all purchases of refrigerant, and potentially submit annual reports of refrigerant usage and destruction.

Starting in California by January, 2010, some of the larger AC or HVAC systems will require more frequent refrigerant reporting and more detailed system registrations and real-time, leak monitoring.

In all situations across not only service technicians, those who sell refrigerant gas, and those who own or operate AC or HVAC systems, the need for detailed, up-to-date refrigerant data, across an entire organization has never been more important.



PART 2: SOLVING PROBLEMS

COMPLIANCE RISK & INVENTORY MANAGEMENT

VENTING OF REFRIGERANT GASES IS NOT A PROFITABLE OPTION

It is illegal to vent any refrigerants during servicing, maintenance, repair, or system disposal. Services provided for ozone depleting substances require certification for handling, disposal, and transport. Annual reports of refrigerant usage are required by owners of HVAC-R systems. Tracking and refrigerant usage must be logged for any system that has a charge of 50 lbs or greater.

VERISAE, INC.

VERISAE DELIVERS A POWERFUL SUITE OF WEB-BASED PROCESS MANAGEMENT SOLUTIONS FOR FACILITIES, THE AC/HVAC SYSTEMS IN THOSE FACILITIES, AND THE PEOPLE WHO MANAGE AND REPORT USAGE OF THEM.

VERISAE TRACKS THE COMPLEXITIES FOR YOU

Companies resistant to or unable to keep up with changing compliance regulations will inevitably face large fines for non-compliance just as most companies would when resisting, postponing or violating environmental laws. This will include companies who intentionally or unintentionally emit refrigerant gases into the atmosphere or who are negligent in submitting compliance reports.

Mandatory reporting for HVAC-R systems provides transparency related to the objective of reducing impacts on our environment and business operations. The relationship between Ozone Destruction, Greenhouse Gas (GHG) emissions, refrigerant gas usage, and the eventual mandatory carbon emissions reporting is based upon a global effort to implement regulations that decrease overall greenhouse gas emissions.

As a result, the relationship between high global warming refrigerants such as HFCs and HCFCs, as well as other harmful substances is clearly linked. As such, in order to contain further environmental destruction, businesses operating systems are required to control, track, and report not only refrigerant gas usage but also carbon emissions to regulatory agencies. There are multiple reasons and requirements to attend to for organizations in the 21st century, carbon economy.

Given the gravity of ever-increasing levels of carbon dioxide being emitted into the environment and the danger greenhouse gases pose to humans, the inevitability of further carbon emissions reporting in wider ranges would be of greatest benefit. Records of sales, disposal, storage, and usage of such refrigerants are required to be kept for a period of up to 5 years for all refrigerant systems and gas usage.

Effective refrigerant gas management serves business by reducing the impact on capital assets such as expensive refrigerants. Facility equipment and how they operate are major expenses for any organization. Managing refrigerants reduces costs related to replacement and topping off of vented gases. Effective refrigerant tracking also translates into good stewardship of the environment. Such a relationship is business friendly as well a revenue-rewarding.

The remainder of this section defines the refrigeration compliance guidelines as they relate to data monitoring and management with the goal of assisting with the preparation refrigerant usage reports for any organization faced with this task.

COMPLIANCE SOLUTIONS ARE REALLY DATA SOLUTIONS

The collecting, logging, and retrieving of refrigerant system data is costly and ineffective across more than a couple locations if it is pencil based and manual. In many cases, system auditing and paper-based record keeping is prone to errors and on-the-spot checks are impossible. As an HVAC-R system owner, you may find it difficult to remain in compliance with government refrigerant mandates as they change or to know what data must be maintained for the refrigeration systems as they operation day-to-day.

Although, you may be the owner or operator of a single or multiple HVAC-R systems, it is still your responsibility to maintain accurate and up-to-date information on any service technician working with your refrigerant gas. A little known fact when one realizes that most of the systems related information usually leaves your facility with the technician when they complete a job. The list below outlines the data elements to be logged for each system, for each refrigerant event, for each location, and reported to the regulatory agencies on either a quarterly or yearly bases – in advance on a schedule or upon request.

Refrigerant Event Documentation

Each time a refrigerant usage event takes place, service technicians must be made responsible for capturing important information such as type of gas, amount recovered, amount added, time between re-checks, etc. A continuous quality and verification process must be in place across your organization to ensure that data is captured for each event.

Service Task Management

Several key tasks are required to minimize refrigerant use and assure compliance. In particular, key performance indicators must be set and monitored for each refrigeration system with immediate notifications when failures occur.

Managed Service Provider Database

Service Contractors and/or the locations they are responsible for change on a regular basis. EPA requirements state that a certified technician must be associated with each refrigerant service event. It is important to keep accurate data.

HVAC-R System Management

In addition to contractor maintenance, many organizations have a continuous process of location opening, remodels, acquisitions, and closings. Ongoing database management will be required to address these needs and keep track of what system contains how much refrigerant gas and what is the usage history for each system. As systems are added or mothballed, new components are added or as major renovations occur, it becomes increasingly difficult to track your refrigerants - to the pound – across all of your locations.

Refrigerant Gas Inventory

System owners are responsible for keeping organized procedures for proper refrigerant inventory and maintenance. It is imperative to roll out some sort of refrigerant inventory management program to reduce waste and to gain efficiencies as it relates to expense refrigerants. Regulations will require tracking of systems of 50 pounds or greater.

Data Analysis and Refrigerant Reporting

Refrigerant data analysis should be an ongoing activity to determine leading faults in refrigerant loss and possible solutions to reduce problem, to establish usage trends, to review high usage locations and systems to determine possible design issues, abuse, maintenance deficiencies, etc. EPA compliance response can occur on a moment's notice. Organizations must be able to respond to and provide reports required as a result of an EPA inspection – immediately.

Many owners of HVAC-R systems containing refrigerant gas face similar problems; manual processes to track refrigeration systems are labor intensive, inaccessible when needed, and more prone to errors and omissions with little assurance that data collected or the processes that are followed will keep their organization in regulatory compliance. HVAC-R system owners can find it difficult to remain in compliance with government refrigerant mandates as they change and to know what data must be maintained for the refrigeration systems they operation.



PART 3: EMPOWERED CHANGE MANAGING IN THE CARBON ECONOMY

CENTRALIZED REFRIGERANT MANAGEMENT SERVICES

Verisae is a leading supplier of computerized maintenance services, asset, energy, and refrigerant management solutions, and carbon emissions reporting software. Services are provided worldwide with offices in the US, UK and Asia. Verisae fugitive emissions tracker is a web-based solution to manage and control refrigerant use. Verisae makes it easy to report refrigerant related events across your organization.

VERISAE, INC.

COMPLIANCE FEATURES

* WEB-BASED, NO SPECIAL SOFTWARE NEEDED

* KEEP UP-TO-DATE WITH THE LATEST REGULATIONS

* SYSTEMS ALERTS AND MESSAGING

* SELF-SERVICE AND REGULATION SUPPORT

* AC/HVAC SYSTEMS MONITORING & TRACKING

* REFRIGERANT USAGE EVENT MANAGEMENT

* SERVICE PROVIDER AND TECHNICIAN MANAGEMENT

* COMPLIANCE REPORTING DASHBOARD

SIMPLE TRACKING FOR A COMPLEX PROBLEM

Refrigerant Management Product Vision

Refrigerant Tracker addresses the needs of system owners to register, configure, and manage their refrigeration systems. The collection and retrieval of refrigerant system data is made cost effective, minimizes the complexity of system auditing, and equips organizations to remain in compliance with governmental refrigerant mandates.

Refrigerant Tracker enables accurate monitoring, tracking, and reporting of refrigerant gas usage across a single location with one HVAC-R system or multiple locations with many systems. You can remain in compliance with existing and emerging regulations. You will know accurate inventories. You can keep updated maintenance logs, and track refrigerants - easily!

Secured Refrigerants. Protected Environment. Mitigated Risks.

New refrigerant tracking legislation expected to pass in early 2009 and 2010 will further restrict refrigerant gas usage, reporting, and phase out of damaging HCFCs. With continued tracking of carbon emissions and the pending mandatory reporting of greenhouse gases (GHGs), all organizations maintaining HVAC-R systems with more than 50 pounds of refrigerant gas will need to maintain detailed records.

Refrigerant Tracker is flexible, as tighter controls over harmful substances emerge from government regulators, it will evolve to support business needs.

Refrigerant Tracker enables customers to demonstrate compliance of governmental mandates via reports, exportable data, or informational dashboards at any time via any computer connected to the Internet. Information is presented in a clear, concise, and graphical manner.

Customers have the ability to track refrigerant usage events through one centralized, web-based product. Refrigerant Tracker provide for automated alerts to clients when pre-set thresholds or mandated leak rates are either surpassed or are approaching upper limits.

At its' core, Refrigerant Tracker reduces business risk. It facilitates refrigerant tracking and saves an owners money by managing the information about refrigerant leaks and their causes.



PART 4: YOUR NEXT STEP

TAKING ACTION TO TRACK REFRIGERANTS

OVER 38,000,000 MILLION POUNDS OF REFRIGERANT GAS

Verisae's enterprise refrigerant tracking solutions is in active use by some of the top 100 retailers across the globe. Our solution footprint covers every U.S. state, within over 23,000 sites, across more than 500,000 systems, and includes in excess of 38,000,000 pounds of refrigerant gas. Verisae understands the complexity of refrigerant gas tracking.

VERISAE, INC.

REFRIGERANT TRACKER HELPS FACILITATE THE CAPTURE OF IMPORTANT SYSTEM LEAK DETAILS LIKE FAULT CODES, TECHNICIAN ACTION INFORMATION, AND LEAK LOCATIONS.

A REFRIGERANT TRACKING DASHBOARD LETS THE SYSTEM OWNER KNOW WHAT SYSTEMS HAVE ISSUES OR NEED IMMEDIATE ATTENTION.

REFRIGERANT TRACKER SAVES YOU MONEY, REDUCES RISK, AND HELPS PROTECT THE ENVIRONMENT.

REDUCING RISKS ONE SYSTEM AT A TIME

Verisae's Sustainability Resource Planning (SRP) platform encompasses the core functions of sustainability requirements by combining multiple business processes and systems into one database that is used across the organization. These modules help our customers manage and optimize facilities, the assets in those facilities, the energy those assets consume, the carbon emissions they emit, and the people who manage and maintain them.

We do this through an integrated IT platform that seamlessly enables large, dispersed enterprises to manage and take proactive measures to improve operating efficiencies, reduce energy consumption and lower carbon emissions.

RISING ENERGY COSTS - The continuing growth in energy costs and the value of reducing those costs through better maintenance and optimized operations, increased efficiencies of energy usage, demand management and real time pricing responses will create significant strategic advantages for progressive organizations in the near future.

ENVIRONMENTAL COMPLIANCE & BUSINESS UNCERTAINTY - The need to measure, monitor and manage the use of GHGs from manufacture through use, reuse and destruction will grow significantly over the next five years across multiple geographic and vertical markets. Verisae is positioned with the solution sets and industry-leading experts to provide software and services to establish early advantages for customers who turn to actionable sustainability services.

THE EMERGING CARBON ECONOMY - Verisae is uniquely positioned to offer solutions and to play an important role in measuring, monitoring, managing and verifying carbon credits in this rapidly emerging carbon market. As described previously, the largest negative cost opportunity in reducing carbon emissions exists in the area of building and equipment efficiencies.



PART 5: APPENDIX

A TOOL TO GET YOU STARTED

TRACKING REFRIGERANT GAS USAGE IS CRITICAL

Refrigerant gas usage must be recorded each time a leak is discovered and/or refrigerant gas is added to a system. Government regulations require an accurate, chronological accounting of refrigerant usage. It is critical that the usage of refrigerant gas is collected after each servicing or leak fix. Data related to usage must be logged in chronological order to maintain proper EPA leak rate calculations. Use the form proved below as an example of the refrigerant data to be captured for each usage event.

Download a Copy @ – [Refrigerant Usage Event Form](#)

REFRIGERANT USAGE FORM

VERISAE REFRIGERANT TRACKING FORM 1D

<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Location</td><td></td></tr> <tr><td>System Name</td><td></td></tr> <tr><td>Asset Tag #</td><td></td></tr> <tr><td>Model #</td><td></td></tr> <tr><td>Serial #</td><td></td></tr> <tr><td colspan="2" style="text-align:center;">Refrigerant Type (Circle One)</td></tr> <tr> <td>R-22</td> <td>R-408A</td> <td>R-422A</td> </tr> <tr> <td>R-404A (HP62)</td> <td>R-402A (HP80)</td> <td>R-422D</td> </tr> <tr> <td>R-507(AZ50)</td> <td>R-401A (MP39)</td> <td>Other _____</td> </tr> </table>	Location		System Name		Asset Tag #		Model #		Serial #		Refrigerant Type (Circle One)		R-22	R-408A	R-422A	R-404A (HP62)	R-402A (HP80)	R-422D	R-507(AZ50)	R-401A (MP39)	Other _____	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Date of Service</td><td></td></tr> <tr><td>Work Order #</td><td></td></tr> <tr><td>Technician Name</td><td></td></tr> <tr><td>Company Name</td><td></td></tr> <tr><td>EPA Cert #</td><td></td></tr> <tr> <td>Leak Status (circle one)</td> <td style="text-align:center;">Leak Repaired</td> <td style="text-align:center;">Repair Attempted</td> </tr> <tr> <td>Amount Added (lbs)</td> <td>Recovered</td> <td></td> </tr> <tr><td>Verisae Reference #</td><td></td></tr> </table>	Date of Service		Work Order #		Technician Name		Company Name		EPA Cert #		Leak Status (circle one)	Leak Repaired	Repair Attempted	Amount Added (lbs)	Recovered		Verisae Reference #	
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Leak Location: Check One Location in the Appropriate Column							
Compressor	Discharge Line	Condenser	Receiver	Liquid Line	Evaporator	Suction Line	Other
<input type="checkbox"/> Body or Terminal Lugs <input type="checkbox"/> Demand Cooling <input type="checkbox"/> Fittings <input type="checkbox"/> Head/Valve Plate <input type="checkbox"/> Oil Float <input type="checkbox"/> Transducer <input type="checkbox"/> Schrader <input type="checkbox"/> Shaft Seal <input type="checkbox"/> Unloader <input type="checkbox"/> Vibration Eliminator	<input type="checkbox"/> 3 Way Valve <input type="checkbox"/> Ambient (Bypass) Valve <input type="checkbox"/> Ball Valve <input type="checkbox"/> Check Valve <input type="checkbox"/> Heat Reclaim Coil <input type="checkbox"/> Hot Gas Bypass <input type="checkbox"/> Hot Gas Solenoid <input type="checkbox"/> Muffler <input type="checkbox"/> Oil Separator <input type="checkbox"/> Piping/ Header* <input type="checkbox"/> Pressure Regulating Valves <input type="checkbox"/> Schrader <input type="checkbox"/> Transducer	<input type="checkbox"/> Ball Valve <input type="checkbox"/> Coil <input type="checkbox"/> Piping /Header* <input type="checkbox"/> Schrader <input type="checkbox"/> Spitting Valve <input type="checkbox"/> Tube Bundle (Water Cooled) <input type="checkbox"/> Transducer	<input type="checkbox"/> King Valve <input type="checkbox"/> Level Indicator/ Alarm <input type="checkbox"/> Pressure Relief Valve	<input type="checkbox"/> Ball Valve <input type="checkbox"/> Differential Valve <input type="checkbox"/> Drier <input type="checkbox"/> Liquid Suction Heat Exchanger <input type="checkbox"/> Piping/Header* <input type="checkbox"/> Pump <input type="checkbox"/> Schrader <input type="checkbox"/> Sight Glass <input type="checkbox"/> Solenoid Valve <input type="checkbox"/> Sub Cooler <input type="checkbox"/> Transducer	<input type="checkbox"/> Ball Valve <input type="checkbox"/> Coil <input type="checkbox"/> Distributor <input type="checkbox"/> Expansion Device- TXV, Float, Cap Tube <input type="checkbox"/> Piping /Header* <input type="checkbox"/> Piping /Header* <input type="checkbox"/> Schrader	<input type="checkbox"/> Accumulator <input type="checkbox"/> Ball Valve <input type="checkbox"/> CPR <input type="checkbox"/> EPR <input type="checkbox"/> Filter Shell <input type="checkbox"/> Piping/ Header* <input type="checkbox"/> Schrader <input type="checkbox"/> Suction Valve (Solenoid) aka Stop <input type="checkbox"/> Transducer	<input type="checkbox"/> Must Explain* <input type="checkbox"/> Nothing added <input type="checkbox"/> Retired System* <input type="checkbox"/> Startup-New System/ <input type="checkbox"/> Remodel <input type="checkbox"/> Theft* <input type="checkbox"/> Top Off From Previous Repair*

Technician Comments: (* Indicates that further explanation is necessary)

3 rd Level Leak Location	Fault Code (Check one)	Action Code (Check one)	Verification Method	
<input type="checkbox"/> Not Applicable <input type="checkbox"/> Compressor 1 <input type="checkbox"/> Compressor 2 <input type="checkbox"/> Compressor 3 <input type="checkbox"/> Compressor 4 <input type="checkbox"/> Compressor 5 <input type="checkbox"/> Circuit 1 <input type="checkbox"/> Circuit 2 <input type="checkbox"/> Circuit 3 <input type="checkbox"/> Circuit 4 <input type="checkbox"/> Circuit 5 <input type="checkbox"/> Circuit 6 <input type="checkbox"/> Circuit 7 <input type="checkbox"/> Circuit 8 <input type="checkbox"/> Circuit 9	<input type="checkbox"/> Circuit 10 <input type="checkbox"/> Circuit 11 <input type="checkbox"/> Circuit 12 <input type="checkbox"/> Circuit 13 <input type="checkbox"/> Circuit 14 <input type="checkbox"/> Circuit 15 <input type="checkbox"/> Circuit 16 <input type="checkbox"/> Circuit 17 <input type="checkbox"/> Circuit 18 <input type="checkbox"/> Circuit 19 <input type="checkbox"/> Circuit 20	<input type="checkbox"/> Abuse <input type="checkbox"/> Braze or Joint Failure <input type="checkbox"/> Corrosion <input type="checkbox"/> Faulty Part <input type="checkbox"/> Gasket Seal Failure <input type="checkbox"/> Line Break <input type="checkbox"/> Missing Part <input type="checkbox"/> Normal Mechanical Wear <input type="checkbox"/> Other- Must Explain <input type="checkbox"/> Vibration Related	<input type="checkbox"/> Isolated Leaking Part from System <input type="checkbox"/> Re-soldered <input type="checkbox"/> Replaced Gasket or Seal <input type="checkbox"/> Replaced Part <input type="checkbox"/> Replaced Unit <input type="checkbox"/> Retired -Shutdown System- Removed Refrigerant * <input type="checkbox"/> Retrofitted Refrigerant* <input type="checkbox"/> System Expansion <input type="checkbox"/> System Addition <input type="checkbox"/> Tightened Connection <input type="checkbox"/> Top off from previous repair* <input type="checkbox"/> Under repair* <input type="checkbox"/> Welded line	<input type="checkbox"/> Bubbles <input type="checkbox"/> Dye Injection <input type="checkbox"/> Electronic/ Ultrasonic <input type="checkbox"/> Pressure <input type="checkbox"/> Evacuation <input type="checkbox"/> N/A
			2nd Verification	
			<input type="checkbox"/> Bubbles <input type="checkbox"/> Electronic/ Ultrasonic <input type="checkbox"/> N/A	

**FOR MORE INFORMATION:
YOU ARE FREE TO CONTACT.**

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