

H t Air



Newsletter of the Vehicle Air-conditioning Specialists of Australia
December Edition – 1997

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Blends and the "quicky" re-gas

The Fall-out Begins

Until now, the battle of "which gas" for mobile air conditioning systems, has been fought very much at a trade level. The consumer has been happily led by his or her chosen repairer, most often based on price.

The consumer back-lash has started.

The problems which VASA leaders warned of unless the industry stood firm on a mono refrigerant society for mobile air conditioning, are starting to multiply across the country.

The indiscriminate use of blends by unqualified "gas-jockeys" at the expense of proper system diagnosis, are causing a wave of breakdowns. VASA members are picking up the pieces - and the customers are not impressed.

Sooner or later, the customers land in VASA workshops and have to be told the sad news.

Their first reaction is to accuse VASA members of promoting their preferred gas.

The answer is simple – and VASA president Mark Mitchell

recommends it to all members - explain to customers that the manufacturer of their vehicle has stipulated a recommended procedure and gas for all of their vehicle air conditioning systems and VASA members follow this procedure.

In one way, VASA is delighted. Its members will ultimately emerge as qualified shops to handle mobile air conditioning problems.

It is regrettable that the public are the guinea pigs. Many will find out the hard way that they have been duped into accepting the wrong refrigerant gas in their car.

In the workshops blends will, sooner or later, bring their chemical viruses into the shop's gas cylinders, posing even greater headaches for the industry.

The message from Mark Mitchell is clearall members of VASA, stand firm.

The customer suffers and VASA picks up the pieces

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IMACA
International Mobile Air Conditioning Association

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International Mobile Air Conditioning Society
WORLDWIDE



VASA President Mark Mitchell – the answer is so simple

The Fall-out Begins

Be ready this summer for a rash of disgruntled customers who will seek you out after recurring problems with their air conditioning. To them, you are just another repair shop.

You have to carefully explain why their systems are faulty after the proper VASA approved diagnosis. You must also explain that all VASA members follow the recommendations of the individual car makers, thus ensuring trouble free service and operation.

If you need to, you must also explain that VASA is not in the business of promoting one gas over another. It just so happens that only one gas – R134a – has undergone 11 years of testing by the major equipment, vehicle and gas manufacturers in the world and has been adopted by them as the world standard.

All VASA is doing is supporting the original designers and engineers of the equipment we all use every day. It is concerned only with product consistency and performance standards.



**VASA President
Mark Mitchell
and the
National Executive,
plus the Editors of Hot Air
sincerely trust your
Christmas is boiling hot
and that your Christmas
stocking is full of
air-conditioning
servicing and
installations.**



The following incidents are indicative of what is starting to happen in VASA workshop driveways. Hot Air will respect confidences, but these stories actually happened and can be authenticated if need be. Both events occurred in the same VASA premises within one week.

The Case of the Leaking Compressor

A customer's car had a leaking compressor. His system had broken down within seven days of having a regas with a blend refrigerant at a gas-jockey's workshop just down the road.

In this case, the gas is not directly blamed, but it points to the fact that those who use blends also ignore service procedures and business ethics.

Down the road at the gas-jockey's place, they've long since lost interest in the vehicle. Come Friday afternoon, they are sitting out the back with their feet up, boasting that "we put through 40 regases today – we made a bomb".

Sure they did...at the customer's ultimate expense.

To them it's a numbers game. Why waste time on the 20 point check of system components.

What's the point anyway – they most likely wouldn't know how to fix a problem if they found one.

The Case of the cooking engine

A young woman, angry that the air conditioning in the inexpensive second hand car she had just bought had broken

down, despite the used car dealer taking it to his "mate" to get re-gassed before the sale, was looking for answers from another workshop (a VASA workshop).

When the bonnet was opened, the first thing that was obvious was the engine was close to being "cooked". No electric fans were working on the condenser nor was the primary radiator fan, and of course, the gas-jockey had simply squirted it full of a cheap blend.

She was very defensive, angry because now another person was trying to sell her a different gas. The VASA member quietly explained the reason – her Ford, no matter how old, had a recommended gas and service procedure to follow, put in place by the Ford Motor Co. It hadn't been done. Not only that, an unskilled person had failed to notice significant faults in the system, which, one more kilometre down the road, would have cost her a couple of grand for a new engine.

So much for the cheap er-gas by the used car dealer's "mate".

Still – that's why VASA was formed, wasn't it?

Registered Technician Program to Debut Early 1998

VASA's Registered Technician Program will have its debut early in 1998. The program is a positive move by VASA to ensure a new level of professionalism in every VASA workshop.

It is mainly aimed at raising the standard of technicians working on air conditioning systems.

VASA Training Chairman Grantley Hand has received vital feedback and suggestions from members on the structure of the RTP.

"Thanks to all who respondedthis information is VITAL in the establishment of a program that suits the industry," said Grantley.

The main provisions of RTP will be:

 All members must register a minimum of one staff member.

 Extra staff members can enrol (via a registration form that will be sent out). These members may be either company/ employer sponsored, or self sponsored.

 An RTP folder and information pack will be distributed to all members of the program (not one per company - one per member).

 This information pack will include:

- ◆ a 25mm 3-ring A4 embossed folder
- ◆ dividers to identify nine specific technical areas



*VASA Training Chairman,
Grantley Hand*

- ◆ an information pack covering "Principles of Refrigeration"
- ◆ an information pack covering "Principles of Electricity"
- ◆ an information pack covering various specifics pertinent to our industry eg conversion charts, pressure/temperature charts, glossary of terms.

 The information pack is a compilation of vital material on which our trade is based. It will serve as a reference for members for subsequent RTP bulletins.

 RTP bulletins will be distributed bi-monthly with a questionnaire for return by mail or fax. (pre-addressed envelope supplied)

 At the completion of 12 months membership technicians/businesses will be certified providing

all questionnaires have been completed.



The first year's subscription will cover the folder, information pack, six bi-monthly bulletins, mail back envelopes and certificate.

Once again thanks to all who have contributed to the formulation of this program.



Bye George

Mobile air conditioning pioneer George Jackson has died, at home in Colorado USA.

George was honoured with the VASA annual Pioneer Award at the Gold Coast Convention in 1997. At 82 years of age, he was still working in the industry.

Until recent months, George was still importing air conditioning components and was the Australian agent for Ogura clutches.

George was involved with the first exports of the most famous of all after market air conditioning units, the Mark IV, back in 1949.

He started his own firm in Australia in 1973.

A pat on the back is due to VASA Queensland member Geoff Merritt, and secretary, Shelagh, who helped George dispose of his stock in his final months so that he could return to America.

Who's in the driving seat now

How many times has VASA suggested that members improve their standards of customer service?

...and how often has president Mark Mitchell suggested that those who accept the advice will be the only ones to survive in the highly competitive after market industry.

VASA's harping on this subject has now been vindicated by new research information from our affiliate, MACS, in the USA dealing particularly with the role of women in decision making about the family car and its repairs and servicing.

In America now, more than 65% of those who take vehicles for service are women. Some repair industry experts estimate that the average may actually be closer to 80%.

Women are not only becoming more influential in deciding what car to buy, they are also taking over the traditionally male-dominated responsibility of maintenance and repair, the National Institute for Automotive Service Excellence (ASE) reports.

"More and more women are deciding where to take their car for service and repair," says Ronald H. Weiner, ASE president. "As this trend continues, females will represent the majority of customers with whom technicians and service managers must communicate."

The overall percentage of female drivers is rising, while the overall percentage of male drivers is decreasing.

Women have influential buying power. Ford Motor Marketing reports that women influence 80% of all purchases and have 95% veto power regarding automotive purchases.

Women are purchasing more cars than ever before. According to Art Spinella of CNW Research, an automotive marketing research firm, nearly half of new car purchases are made by women, and 53% of used-car sales can be attributed to women. In certain age and ve-

hicle categories, females represent more than 50% of current buyers.

"Female customers don't need or want to be treated differently... we just want respect," comments Lyn

St. James, Indy car driver and a Car Care Council Board Member.

"Repair businesses that respond to women's needs and expectations by providing clean waiting rooms, timely delivery, and repair orders that are easy to understand are making smart business decisions."

"There is a growing appreciation of female customers. Technicians report that females ask more questions, inquire about details, and are more willing to look under the hood or check out parts," says Diane Hohman, an automotive aftermarket

consultant.

"Efforts to address the needs of female customers are evident in the marketplace. From conducting women's car care clinics to hiring female service personnel and technicians, repair businesses are taking steps to welcome female customers."

Donna Wagner, director of operations for the Car Care Council, believes that the presence of female professionals in repair shops may help create a more user friendly environment for female customers.

"Many women feel less intimidated when interacting with female service advisors and technicians. A greater comfort level can turn the whole repair experience into a more positive one."

While the total number of women in the repair profession is small, the rate of increase over the last few years is noteworthy. According to the U.S. Department of Labor, the number of female technicians grew 22% from 1994 to 1996, while the number of male technicians increased by 3% during the same period.

Source: Automotive Cooling Journal, September 1997 with thanks to MACS.

BECOME A MEMBER OF
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HOT AIR

If you would like to become a member of VASA or receive copies of 'Hot Air' contact:

John Blanchard – Vic
Tony Heat – NSW
Bevan Carrick – QLD
Glen Watkinson – SA
Alan Ould – WA

Phone & Fax numbers are on the back page of this issue.

It's Wine, Work and Song at Adelaide by the sea in July 98

A grand European style hotel of the Victorian era on the waterfront at Adelaide, is the stunning venue for the 1998 VASA convention, now well into the planning phases.

Convention chairman Glen Watkinson reports the Convention will run from July 24 to 26.

The hotel is at Adelaide's city by the sea, Glenelg, overlooking the spectacular coastline. It's a mixture of holiday resort and business, an environment which allows work in relaxing surrounds.

The hotel is five minutes from the airport and 15 minutes from the city, with direct access via Adelaide's only tram service which stops right at the front door.

The 243 rooms are extra large, and there is a choice of VIP suites and one and two bedroom fully serviced luxury apartments are available.

And VASA delegates will be delighted to know the hotel has a fully equipped gym, outdoor heated pool, sauna and spa.

The new Kangaroo Island ferry is just outside the door and there is an amusement park, cinema and a host of cafes and restaurants within cooee.

For conventioners, negotiations are in place for a tour of the GMH state-of-the-art manufacturing

motor vehicle assembly plant, as well as a visit to the world renowned South Australian wine growing district.

A full program of events is being planned for part-

ners on both the Friday and Saturday during the work sessions. (Yes, we are going to work)

The committee is planning a program which pays special attention to the Trade Exhibitions integrated with the social events.



Glen Watkinson - SA Convention 98 Chairman and VASA Vice-President - "put a note in your diary, now"

The cocktail party on the Friday evening will be held in the exhibition area to give exhibitors extra exposure to potential customers.

The annual banquet will be in the grand ballroom and promises to be a spectacular affair once again, taking in to account the members survey from the 1997 event.

Hotel pic

The hotel has a purpose built convention centre with state of the art facilities and direct vehicular access. It offers quality surroundings to display your company products to their best advantage.

We are seeking sponsorship from the many businesses involved with VASA and look forward to early inquiries to Glen Watkinson on 0883474141.

Glen implores all VASA members and friends, make 1998 the year to visit Adelaide, not only for the convention but for your annual holidays.

The hotel will offer convention room rates each side of the convention. Extend your stay with visits to Kangaroo Island, the Flinders Ranges and a tour of the Barossa.

This is South Australian Committee's major project for 1998. It will worth attending, both from a business and social viewpoint.

Full program details will be published in the next Hot Air in 1998.

A rumour runs on wheels and every hand oils the wheels as they run

Every trade has its rumour mongers. Lately, it seems, the motor dealerships car yards in southern states are fertile grounds of mis-information.

Word has reached VASA from officials in one insurance company that some service managers are peddling the story that the big car makers are moving away from the adopted refrigerant R134a.

That's certainly news to us - and to the manufacturers....and you don't need to be too bright to figure out where the rumours are coming from. We'll give you a hint - they sell products other than R134a which they say are OK to use in vehicles.

For those of you with any doubts about motor industry solidarity on the use of R134a, take out your July 1997 edition of Hot Air and review the story from Europe dealing with the Behr company abandoning further R & D on the possible use of hydrocarbons for car air conditioners.

For those who missed it, Hot Air repeats the main points.

The Behr company of Germany is of one of the world's largest vehicle air conditioning manufacturers.

On 14 May 1997 Behr held a technical press information day.

In recent years, Behr has been intensively involved in researching the isobutane/propane unit. According to Behr a propane/isobutane unit would be well pos-

sible because of its physical cooling capacities. Evaporator, condenser and compressor could practically be built in the same way as for R134a. Extra safety features will be necessary because of the inflammable character of propane/isobutane when mixed with air. The risk of refrigerant leaking into the car interior should be minimised as much as possible.

Behr thinks a hydrocarbon unit will need (1) an evaporator with minimal refrigerant volume, (2) refrigerant sensors near the evaporator and (3) two valves, one before and one after the evaporator. In case of any damage to the interior part of the unit, with release of refrigerant, the sensors will immediately shut the valves to avoid more leaking. Simultaneously the side windows will open. Behr also determined that, in order to have sufficient cooling performance, the minimum refrigerant volume of the evaporator should be 40 grams.

Behr Abandons Flammables Research

On the basis of this hypothetical construction, Behr did experiments to investigate the consequences of the ignition of a hydrocarbon-air mix inside the vehicle interior. Various volumes of this mixture were exposed to a source of ignition. It turned out that 15 grams were enough to ignite the mixture and start a fire in the dashboard. During some

tests body parts got deformed.

As a result of the outcome of the tests and the fixed minimum refrigerant volume of 40 grams per evaporator, Behr officially decided to stop all further research and engineering. Safety aspects and acceptable cooling performance seem impossible to combine in a satisfying manner.

Behr is actively involved in improving the present R134a systems.

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VASA's COMMITMENT TO SERVICE

In order to maintain credibility and promote professionalism within the industry, VASA members make the following commitments to service and agree to abide by the warranty guidelines.

All VASA members will:

- Maintain a high standard or practice, recognising the customer's right to courteous service at all times.
- Act honestly and fairly in all dealings with the public, conducting their business with the highest level of skill and integrity.
- Price goods and service fairly, avoiding deceptive pricing and advertising practices.
- When requested, examine a vehicle, diagnose any faults detected and provide an estimate of the rectification costs.
- Notify in advance all costs to be incurred in order to rectify any faults in the system.

"Recycled" and "reclaimed" refrigerants are not the same thing.

As we have all learned in recent months, there are many shams regarding the sale of R12 refrigerant, ranging from containers filled with water and compressed air to mixtures of "whatever".

Refrigerant from legitimate suppliers has been tampered with and containers of pure R12 have had a measurable amount of air.

Contamination, whether in the form of air or another refrigerant, can cause various problems. Not knowing the purity of refrigerant leaves many unanswered questions regarding not only the A/C system but the condition of service equipment.

Refrigerant identification equipment certified to the recently published SAE J1771 will help identify refrigerant purity. The SAE document provides for two different types of refrigerant identifiers. These requirements separate the identifiers into Go/No-Go and diagnostic tool classifications.

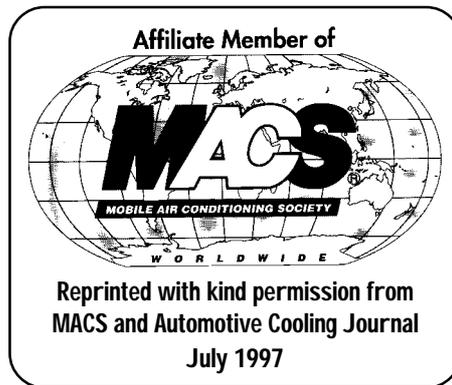
When purchasing containers of refrigerant, using a certified SAE diagnostic identifier will allow identification, by percentage, of the container's contents. Refrigerant identifiers that are not capable of meeting the SAE requirements may not indicate the true contents of the refrigerant container or A/C system

PURCHASE OF RECLAIMED REFRIGERANT

As supplies of new R12 disappear, there will be a demand for reclaimed refrigerant. It should be noted that refrigerant reclaimers on the EPA list of companies which supply reclaimed R12 may not be part of the Air Conditioning and Refrigeration Institute (ARI) certified refrigerant purity program.

Refrigerant removed from commercial equipment that may have had a compressor "burn-out" or acquired other forms of acids and impurities

When purchasing refrigerant – it pays to know what you're buying



**By Ward Atkinson,
MACS Technical Advisor**

can result in major mobile A/C problems if not processed to the ARI 700 purity requirements.

RECYCLING VS RECLAMATION

EPA's recent publication 'Just the Facts for MVACS: EPA Regulatory Requirements for Servicing Motor Vehicle Air Conditioners' provides the following information on used refrigerant.

"Recycling is the use of a machine to remove impurities and oil and then recharge the refrigerant into either the same car or a different car."

"Recycled refrigerant is not as pure as reclaimed refrigerant. Recycling occurs in the service shop."

"Reclamation is the removal of all oil and impurities beyond that provided by on-site recycling equipment, and reclaimed refrigerant is essentially identical to new, unused refrigerant."

"Reclamation cannot be performed in the service shop. Rather, the shop generally sends refrigerant either back to the manufacturer or directly to a reclamation facility."

This fact sheet discusses the use of on-site recycled refrigerant for automotive use as compared to the purity requirements that are recognized by the refrigerant industry.

As mentioned earlier, the ARI has a Reclaimers Certified Refrigerants program. Facilities that are in this program meet both the EPA and the appropriate industry ARI 700 reclamation refrigerant requirements.

Since there is no federal requirement that reclaimed refrigerant containers be labelled for purity, there is no way to identify their contents. Therefore, having knowledge of reclaimers in the ARI program may help assure the quality of reclaimed refrigerant that is purchased.

SHIPPING OF REFRIGERANTS FOR RECLAMATION

The shipping of used or contaminated containers of refrigerant must comply with federal, and in some cases local, regulations.

The disposal (one-way, new refrigerant) container, cannot be refilled with any refrigerant. To be in compliance, only DOT refillable containers can be used to transport used refrigerant. It is questionable that modifying and using a new propane cylinder (as suggested by one alternative refrigerant supplier) will comply with all governmental and industry requirements.

In general, used refrigerant should be placed in a grey container with a yellow top, identifying that it contains dirty or unknown refrigerant. The major safety concern is the potential overfilling of the container. Mixtures of different refrigerants result in different weights.



VASA TECHNICAL LIBRARY

To Order, call
Mark Padwick
Technical Committee
Chairman
Phone: (02) 9791 0999
Fax: (02) 9791 9029

All items are available to members free, but a postage and handling charge will apply.

Publications Produced by VASA

VASA Membership Booklet

An introductory booklet to VASA describing the criteria for membership and the aims and objectives of VASA.

VASA Members' Manual

Issued to all VASA members upon joining the association and outlining the services, standards and business ethics set down by VASA.

VASA Training Course Brochure

This brochure describes the current courses undertaken by VASA. However, it is not a course timetable. Timetables are available from the VASA Training Committee.

VASA Technical Training Manuals

Detailed manuals containing the background information and support data for the relative VASA Courses. These manuals are only issued upon completion of any VASA Course.

VASA Insurance Repair Procedure

Prepared by the VASA Technical Committee at the request of the major motor insurance companies. This procedure is a summary of basic VASA recommended service principles and is currently under review by the VASA Insurance and Technical Committee.

VASA Service Director

A ready reference of VASA Service and Dealer outlets. This Directory is not a full membership list and only contains those members capable of vehicle airconditioning service.

VASA 'Hot Air' Newsletters

Newsletter of VASA published quarterly and contains current industry news and technical information.

VASA Flushing Procedure and Policy

A comprehensive document describing all the issues associated with system flushing and outlining VASA's specific recommendations.

Publications Produced by IMACA

IMACA 'Shop Talk' Newsletters

Sent to VASA bi-monthly throughout each year and contains up to date product specifications and general industry news.

IMACA Retrofit Training Program

Published in 1994 in the form of video and booklet and gives a step-by-step explanation of procedures as recommended by IMACA.

IMACA OEM Retrofit Procedures R12 to R134A

This binder is a compilation of US OEM retrofit procedures made available to IMACA as of 1 June 1997. Many of these procedures will apply to Australian OEM guidelines.

IMACA Standard # 200

Vehicle air conditioner capacity (Btu) or (Watts) certification.

IMACA Standard # 250

Rating test method for Vehicle Air Conditioners.

IMACA Standard # 301

Thermostatic Expansion Valves for vehicle air conditioners.

IMACA Standard # 302

D.C. Motors for vehicle air conditioners

IMACA Standard # 303

Fans for vehicle air conditioners

IMACA Standard # 305

Fittings and tubing details

IMACA Standard # 306

Hose for vehicle air conditioners

IMACA Standard # 307

Electrical for vehicle air conditioners

IMACA Standard # 309

Receiver – Dehydrator for vehicle air conditioners.

IMACA Standard # 311

Electro-mechanical Thermostats for vehicle air conditioners.

IMACA Standard # 312

Hose assembly for vehicle air conditioners.

IMACA Standard # 314

Water/Coolant control valves for vehicle air conditioners.

IMACA Standard # 315

Vacuum solenoid valve for vehicle air conditioners.

IMACA Standard # 316

Electronic thermostat control systems for vehicle air conditioners.

IMACA Standard # 317

Vacuum motor for vehicle air conditioners.

IMACA Standard # 320

Fittings, hose and assemblies.



The INs and OUTs of the Schrader Valve

It's great to have a product with a "household name," but when that name is used for the generic product, the manufacturer not only has to defend the name, but also its reputation. When it comes to such automotive applications as tyres and A/C, "Schrader valve" certainly is in that category.

Schrader is a large supplier of OE fittings and retrofittings to the aftermarket and they aren't always the pin-type valve cores. It developed the octagonal thread-in service valve fitting that GM used on



IMACA Standard # 400

Recreational vehicle air conditioning system rating test method for vehicle air conditioners. Electric powered unit.

IMACA Facts Sheet

Titled 'Just the Facts for MVAC's: EPA Regulatory Requirements for Servicing of Motor Vehicle Air Conditioners'. Developed by the US Environmental Protection Agency.

Publications Produced by MACS

MACS 'Action' Newsletter

Sent to VASA monthly and contains all up to date OEM reports and general industry news.

MACS Service Reports

Sent to VASA monthly as the technical publication of MACS and is aimed at the 'hands on' reader and technician.

MACS Slide Presentation

Technical Overview 1997. Includes topics such as: Refrigerants, Retrofits, Regulations and Contamination.

MACS Refrigerant Recycling

Service procedures. Service data book, 93 and 95.

MACS Air Contamination Video

Under writers lab. H.C. test refrigerator. Potential hazards of the use of flammable refrigerants.

199,193 CFC-12 vehicles and today it makes both octagonal and hex thread-on retro-fittings. The octagonals are especially suitable for limited-access areas.

The valve core without the positive stop was used for many years and certainly served its purpose—we're not trying to condemn it. However it presents a possible problem when you install a hollow retrofitting over it— if tolerances stack up the HFC-134a quick-connect service coupling might not open the valve.

In fact, Schrader recommends replacement of that valve core with a positive-stop type before you install any retrofitting. On pre-'92 models, the other type was used.

When you get to '92 models, however, there might be either type and you can't really tell unless you remove the valve and take a look. So no matter what type you take out, are you really going to put it back, particularly if you can grab a retrofitting with a new valve core off the shelf? Not likely.

With the high-side service valve, you have a simple choice: discard the CFC-12 valve core (regardless of type) and install a retrofitting with a new valve core, or install a hollow retro-fitting (hopefully over a positive stop CFC-12 valve core).

With the low-side service valve, as we've noted, it's more complicated. There are the hollow designs with their wafer-thin hex sections. If you install them over a service valve with the valve core that does not have a positive stop, you could face a problem with the service coupling of an HFC-134a gauge hose.

The retrofitting with the pin extender is another option.

However, as we've pointed out, the only thing the extender does for you is allow you to leave in the lowside valve core and if it's not a positive



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MACS Service Report

stop design, do you really want to . . . even if you set up the extender adjustment properly?

Everco recognised that issue and is phasing out the extender pin in favour of a retrofitting with a new valve core and Schrader now is offering both high-side and low-side retrofittings to the market. (In fact, the type with a valve core has a hex.) But don't forget to take out the CFC-12 valve core. You don't want to remember you left it in, when you've installed the retro-fitting and the sealant has set up.

Incidentally, if you have to take out a thread-in octagonal fitting from a CFC-12 system, Schrader doesn't think it should be the struggle some shops have reported. The OE spec on torque was 5-10 lbs ft., so even if the assembly line went past that and even if the O-ring is heat-stuck, you should be able to get it out—if you use the octagonal socket and not some jury-rig alternative.

If a retrofitting meets the SAE J639 standard, it should have sealer already applied. If you find that the CFC-12 service valve threads are not perfect, as is often the case, you'll probably want more than the couple of threads normally coated with sealer on the typical retrofitting. Schrader noted that the SAE spec simply said that the retrofitting be "not inadvertently removed" and that if something like Loctite 271 (the sealer for cylinder liners, etc.) were used, someone could possibly destroy the fitting trying to remove it.

We suspect it would and when we look at what's happening with cross-charging, etc., an absolutely-positive discouragement seems like a good idea to us. And some extra sealer for so-so threads should be an inexpensive security blanket.

Another car maker opts for ester

Another European luxury vehicle maker has decided to go with polyol ester oil for retrofit—Jaguar. Yes, Jaguar is owned by Ford and Ford uses PAG oils for retrofit.

But every company makes its own engineering decisions (after all, Saab is owned by General Motors and Saab also is using ester oil for retrofit, as is independent Volvo).

What is most newsworthy about the Jaguar decision is that it is being applied to two Sanden compressors (a five cylinder and a seven-cylinder) and to GM axial six cylinder compressors.

Volvo and Saab also used Sanden compressors in their CFC-12 systems (Volvo also used Zexel [Diesel-Kiki] compressors and Saab also used SeikoSeiki pumps).

The Jaguar choice for retrofit oil is ICI Emkarate RL 100, a medium-high viscosity ester, also chosen by Volvo. Saab uses Castrol Icematic 100. The Swedish makers said they understood that Sanden had demonstrated better compressor life results in laboratory tests with PAG oils, but that their tests showed the esters were gentler toward the refrigeration system seals in actual field retrofits.

As you can see, the engineering decisions on retrofit had to reconcile some divergent information and make a product choice based on what was believed to provide the best balance for retrofit, a situation with a lot of unknowns.

Jaguar has made some other, also surprising decisions in its retrofit program, including the draining of mineral oil from the Sanden compressors.

What was Jaguar's reasoning behind some of the procedures?

Well, one reason for draining mineral oil involves removal of entrained CFC-12 to minimise the mixing of



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the chlorine in CFC-12 with the PAG oils. When residual mineral oil with a lot of entrained CFC-12 was mixed with some PAGs (particularly early formulations on which engineering decisions were based), the mixture attacked some existing CFC-12 system seals. That issue obviously doesn't apply here, because of the choice of an ester oil.

However, there are other reasons for draining mineral oil. They include the desire to create as much room as possible for the new refrigerant and a charge of synthetic oil (in this case, an ester). We've asked the Jaguar engineering staff in England a lot of questions. If and when we get the answers, we'll share them in a future issue.

product is returned to the submitting wholesalers," Michael said.

"Australian regulations require that any material sold must meet new product specification as defined by ARI 700. Some states also require that the seller of the product be specially licensed.

"When purchasing material from non-traditional sources there is a likelihood of getting contaminated impure product. This can lead to costly liability issues if the contaminated material damages plant and equipment.

"RRA supports on-site recycling by contractors for their own use as this is a sound use and extension of resources. However, we urge all companies and service technicians to accurately test the material before re-use. Equipment for testing refrigerant is available in the market place.

"Contaminated refrigerant should be returned to wholesalers and then sent on to RRA. Cylinders for collecting used refrigerant, correctly marked and labelled, are available from wholesalers. RRA is able to reclaim significantly contaminated refrigerant and where this is not possible it destroys the material in the most economic and environmentally responsible manner available."

The Australian auto air conditioning industry has been warned of the big risks attached to buying so-called recycled refrigerant from anyone other than the established wholesalers.

Michael Bennett, general manager of Refrigerant Reclaim Australia (RRA) said that any product bought from non-established sources could be most likely contaminated.

There are two approaches to recycling refrigerant.

1 Material that has been recovered from systems and put through a recovery/recycling unit. These units are common in workshops but will generally only remove oil and moisture. They do not remove other refrigerants, acids, non-condensable gases (such as nitrogen) and other contaminants.

2 Material that has been processed through complex plant designed to produce product to the ARI 700 specification (ARI is American Refrigeration Institute). Reclaimed material has the same specification as newly manufactured refrigerant ie: purity greater than 99.5%.

"RRA, the not-for-profit industry-sponsored organisation established to recover, reclaim and destroy used refrigerants, is the only company in Australia that can reclaim refrigerant to new specifications. Used refrigerant returned to wholesalers is sent to RRA for reclamation or destruction. When reclaimed the prod-

Correct charging with R134a

Industry feedback indicates many technicians (not necessarily VASA members) are undercharging systems when retrofitting to R134a.

This article will address the problems that can arise through incorrect charging.

These points of discussion may be obvious to many of our professional technicians but it is important they are universally recognised to ensure correct diagnosis of performance loss and component failure.

The 90% Charge Rule

We have all heard the rule "charge to 90% of R12 weight". What is the basis of this rule?

Firstly it is important to recognise that systems are charged by LIQUID VOLUME not by weight. The reason for weight charging is that it is a unit of measure that is much easier to work with than liquid volume - and after all there was a direct relationship when R12 was used. If we were directed to charge to 750 grams of R12 then that MASS of refrigerant occupied a certain LIQUID VOLUME. R134a, however, has a different weight/liquid volume relationship.

The molecular weight of R12 is 1.23, whereas R134a is 1.12. Due to this variation, indicating that R134a is a "light" refrigerant, the same weight of R134a will occupy a larger LIQUID VOLUME. The variation is approximately 10%.

Therefore if we charge to the same weight of R134a we are putting 10% more liquid into the system - the answer - if we charge to 90% of R12 weight we are actually putting the same liquid volume of refrigerant in.

Why the Confusion?

Gauges are our bible. We use them to analyse system operation, component operation, charge rates and to indicate expected performance of systems. R134a has a different pressure/temperature relationship than R12. In the evaporator band it is virtually identical (+ or - 2°C) but in the condenser circuit the pressures may be up to 20% higher under high heat load conditions.

This in itself is not a problem - it only becomes a problem when technicians do not realise the pressure rise is a necessary component to ensure correct condensing temperatures, therefore correct system operation.

The Problems with Overcharging!

These are obvious - the same as they were with R12 and the same as they are with all refrigerants or systems. Overcharging a system may/will cause:

- ♦ liquid flood back to the compressor (compressor failure/reduced life)
- ♦ liquid migration back to the compressor during off cycle/system shut down (compressor failure/belt breakage on initial start up or cycle on)
- ♦ lack of cooling performance due to higher low side pressures - inability to "chill-off" the evaporator coil.
- ♦ severe lack of cooling performance on some orifice tube systems due to higher evaporator pressures (no TX compensation)
- ♦ severe head pressure rises - the obvious one - excessive loading on all associated componentry.

The Problems with Undercharging!

Undercharging systems has never been perceived to be a problem (except for the reduced cooling performance). However, with the mod-

ern system, undercharging is to be avoided at all costs due to the following factors:

- ♦ inability to fill the evaporator coil under high heat load conditions - excessive superheat across the coil lack of cooling performance.
- ♦ excessive suction line superheat - the inability to fill the evaporator causes an increase in suction line temperature, obviously, which reduces the cooling vapours "feeding" the compressor
- ♦ excessive compressor temperature - with increased evaporator superheat and consequential suction line superheat the compressor may not be adequately cooled, particularly at high speeds. This will/may lead to reduced compressor life, thermal switch activation together with the loss of performance.

Summary

From the above discussion it should be obvious both undercharging and overcharging are undesirable scenarios when charging systems. Charging to 60% or 70% of R12 weight to compensate for poor condensing qualities of the vehicle/system is a practice that must be avoided - there are significant problems with system performance and reliability under high heat load conditions. What many technicians (not necessarily VASA members) are failing to realise is that everything call appear normal under low and moderate heat loads but problems such as the aforementioned can arise under high heat loads.

The professional technician will charge systems by weight/mass (if specs are available) together with other factors such as superheat and subcooling levels which will reinforce correct system charge levels.





This is a regular feature to keep VASA members up to date on weather patterns across Australia. The El Niño phenomenon dominates the weather charts, providing members with an insight into the relationship of weather patterns to the air conditioning industry.

The El Niño is a disturbance in the climatic state of the equatorial Pacific Ocean that has an impact on the climate over much larger regions.

Because of the persisting strong El Niño conditions there is a high probability of total November to January rainfall being significantly below average over parts of eastern and northern Australia.

The highest levels of risk are in north Queensland where typical probabilities of exceeding median rainfall are about 25% to 35% under the present conditions (median rainfall exceeded in 50% of years by definition).

The onset of the monsoon over northern Australia is likely to be delayed and, also, the number of tropical cyclones over Australian waters during the wet season, is likely to be below normal, particularly in the Coral Sea.

Expected drier than normal conditions over southeastern Australia will exacerbate the summer fire hazard.

(Source: Australian Meteorological Bureau)

Continued from Page 7
When purchasing refrigerant – it pays to know what you're buying

Using a weight scale can potentially result in a dangerously overfilled container in an explosive condition. Using equipment and containers with an internal float that shuts off at a predetermined liquid level provides some safety when filling.

Not all transportation carriers will accept containers of refrigerant. The carriers will require proper packaging, appropriate labels (DOT) and material identification. These requirements can be expensive, so before containers of used or contaminated refrigerant can be shipped, the proper procedures must be determined.

Pure refrigerants have a chemical UN number that is required when shipping containers. Since the container of used refrigerant may have an unknown mixture, it may not be in compliance with shipping requirements. This would then require that the container be handled by a hazardous material carrier.

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