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Hot Air

Newsletter of the Vehicle Air-conditioning Specialists of Australia
December Edition – 1996
National Secretariat: VASA (ACN 063 969 782) PO Box 6222 Silverwater NSW 2128

Here's one thing Santa won't have in his sack – R12

We were warned – Australian vehicle air-conditioning specialists are facing a wave of contamination of air conditioning systems and in-shop gas stocks as a result of a possible flood of alternative gasses when R12 runs out early next year.

As much as VASA members would like to think that R134a will be adopted universally by the industry, the signs are that Australia is going to go the same way as USA – a market flooded with alternatives.

If that's the case, says VASA president Mark Mitchell, the only answer to cross contamination is generic fittings.

In the USA, the Environmental Protection Agency has ruled that generic fittings must be provided by the gas suppliers, but in Australia, the EPA has chosen to stand back and try to let the industry sort it out for themselves.

"This just won't happen," said Mark Mitchell. "So far, VASA's pleas for some authority to rule on generic fittings have fallen on deaf ears.

"It's a catch 22. If the market is flooded with alternative gasses, generic fittings will be essential. Identification of types of gas through stickers on air conditioning fittings are next to useless. Stickers just don't last in an engine room.

"We can see the day coming where air conditioning shops will face mass contamination of their client's vehicles as well as the bulk gas supplies in their workshop through incompatible gasses being mixed with R134a and remaining R12 stocks. From the customer's viewpoint, the problem can lead to inefficient air conditioning, damage to system components and ultimately higher repair bills".

So VASA's advice to its members is going to be "Don't mess around with alternative gases. R134a is the preferred gas chosen by the world motor vehicle manufactuiring and air conditioning component parts industries – so what does that tell you?"

R12 Prices will Go Through the Roof - AFCAM

National stocks of R12 refrigerant gas for the automotive air conditioning industry are on the way out.

It will happen over this summer and by the end of the first quarter next year, R12 for car air conditioning will be history and prices will be through the roof.

AFCAM'S View on R12 Stocks – (from Page 1)

This is the latest word from Steve Anderson of AFCAM (Association of Flurocarbon Consumers and Manufacturers) who forecast the end of declining stocks when he addressed the VASA convention in August.

He told Hot Air that as stocks dry up, prices will go mad. His advice to the air conditioning industry is to bite the bullet and start phasing in the preferred replacement gas R134a over summer.

He said supplies of new R12 are dwindling fast. Refrigerant Reclaim Australia do have some stocks, but nowhere near enough to meet industry demands.

Steve warned VASA delegates in August that:- "As stocks of R12 decline, there is likely to be more and more contaminated material circulating in the industry. The problems posed by increasing levels of contamination are likely to lead to increased equipment failures, unless there is a way to reprocess this gas to acceptable standards and unless the reprocessor is prepared to give a warranty on the product."

SMUGGLING

At the same convention, Clive Erskine of AFCAM said smuggled CFC's were already detected in Australia.

On the question of blends, Clive said it made little sense to use them in servicing car air conditioning systems.

"If you put a blend into a vehicle, every kg of it will have to be destroyed when it is removed. So in the long run, blends are not a smart move," said Clive.

Above – President Mark Mitchell – don't mess around

Right – Steve Anderson — R12 will soon be gone

Right – Clive Erskine – little sense in blends

MACS chief Simon Oulouhojian – a plea for sanity

FLASHBACK:-

Simon says – Keep the Stream Pure – Will we Survive the Plague?

That was the single most important piece of advice from a person who understands the refrigerant gas debate around the world better than anyone – VASA's special guest at its annual convention in Sydney, Simon Oulouhojian, President of MACS (Mobile Air Conditioning Society Worldwide – of USA). He warned that although the world's major car manufacturers had stipulated a change over to R134a, there were commercial forces at work around the world peddling a variety of blends and replacements, some of which were contaminating the refrigerant stream.

"The problem is we don't know if we are going to survive the plague.

"Next to heroin, R12 smuggling is the next biggest illegal import in the US. The Customs people are gradually sealing off illegal refrigerant coming into the country because a lot of the stuff is not pure R12 and is full of contaminants, posing great danger to air conditioning technicians and the motoring public," Simon added.

WorkCover's Response to Federal Office of Road Safety on the so-called Code of Practice for Hydrocarbons

"WorkCover (NSW) requested amendments to **remove any implication that government at large was party to or supported the Code**. We also asked that emotive statements within the draft be removed and pointed out that it is not necessary for the whole of the passenger compartment to be filled with gas within the explosive range to have a fire or explosion. WorkCover reiterated NSW's objection to the use of LP Gas in the regassing of vehicle air conditioning systems not designed for LP Gas."

Are Our Pollies Deaf – or is the Hydrocarbon Industry Spending Squillions on PR?

VASA's major focus since Convention has been to respond to and disseminate a Technical Assessment on a so-called Code of Practice drafted by the Hydrocarbon Refrigerant Industry.

Many flaws were found.

VASA circulated its Technical Assessment to all relevant ministers at Federal and State level. It's not as if these people have never heard of VASA, but it would appear that the HC lobby "got there first".

It is a matter which should concern all Australians – that a lobby group can so effectively sway government minds with unsubstantiated claims and generalised statements about the widespread use and acceptance of HC gas in motor vehicles in other countries.

One such response to VASA's assessment was from **Hon Diana Laidlaw MLC**, South Australia and we provide extracts:-

"Their (Federal Office of Road Safety) research, and that of the Department of Transport South Australia, showed that hydrocarbon refrigerants can be used safely, provided that some elementary precautions are observed.

Independent studies have shown that the increase in risk associated with the use of hydrocarbon refrigerants in motor vehicles is small. Far from being universally opposed by industry, hydrocarbon refrigerants have been commercially available in the United States since 1991. Since that time, over 200,000 car air conditioners using HC refrigerants have accumulated over 400,000 operating years without one report of damage or injury.

The benefits both to the environment and to individual consumers far outweigh any risk that might relate to the use of HC refrigerants, provided that proper precautions are taken".

What the Car Companies Say

"The Federal Chamber of Automotive Industries adopted the view that use of hydrocarbons in air conditioners would be strongly opposed. We remain wholly aligned with that view"

Daewoo Automotive Australia

"MMAL strongly objects to the use of HC refrigerant in motor vehicle air conditioning and cannot support any attempt to justify its use by the referenced Code of Practice."

Mitsubishi Motors Australia Ltd

"Nissan, in line with FCAI member companies policy on this matter, would not support the use of hydrocarbons in motor vehicle air conditioning"

Nissan Motor Co (Australia) Pty Ltd

"Toyota Australia's position in respect of the use of H.C. type refrigerant in air conditioning systems in any of its products is that it is totally opposed to such practice and as such will not be a party to any activity or anybody promoting its use in automotive air conditioning systems."

Toyota

....and VASA's Response (In Part)

"I was disappointed to receive your letter and on behalf of VASA I would make the following points:-

- We may stand corrected, however it is our belief that neither the SA Department of Transport nor the Federal Office of Road Safety has done any independent research into use of LPG as a refrigerant.

- We are disappointed that your department appears to have taken advice from the proponents in the use of LPG as a refrigerant and not from either vehicle air conditioning system manufacturers, component manufacturers or vehicle manufacturers and at this stage none of the above mentioned industry groups support or approve the use of hydrocarbon refrigerants in their products.

- Our concern is and always will be that our members are not placed in situations that may impose on either themselves, or their customers' safety, and which are outside industry standards and practices and could involve them in legal or financial areas that they are not in a position to cope with.

- We question the assumption that environmental and consumer benefits outweigh any safety consideration. In our expert opinion to change a vehicle air conditioning system to allay any safety concerns would make the cost of this conversion exorbitant for the average consumer.

In closing, we as an association of independent vehicle air conditioning specialists believe that existing vehicle air conditioning systems are not designed or were never intended to use highly flammable LP gas as a refrigerant and at this point in time it appears that no vehicle manufacturer is considering changing existing designs to accommodate them.

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Alternative Refrigerants–

Within the current retro fit arena there are a number of refrigerants being marketed as replacements for R12. Recent enquiries to the VASA technical and training committees has highlighted the confusion within the industry and more importantly the possible damage that may be caused to systems, and business credibility, if incorrect refrigerants are used.

Unfortunately we do not have a parallel to the USA SNAP (Suitable New Alternatives Program) where refrigerants are independently tested for suitability. As with all phases of the retrofit program products have been marketed, driven by corporate interests striving for financial gain and market share, and portrayed to the industry as 'perfect' or 'drop in replacements' for R12.

ONE FACT REMAINS* – *there is no 'Drop In' replacement for R12 (134a included) given the diverse range of systems and climatic conditions that exist in this country.

After countless hours of arduous testing, manufacturers and OEM suppliers world-wide have settled on 134a as the industry standard and without independently documented evidence to suggest a more suitable replacement, businesses would be wise to seek independent clarification of suitability before using replacements other than 134a.

This article addresses, from a technical perspective, the basic requirements of a refrigerant in an automotive air conditioning system with respect to:

- **flow**
- **pressure control**
- **refrigerant temperature**
- **cooling efficiency**
- **component compatibility**

BEWARE:

The Maga-Salesman.

This 'without prejudice' article addresses some of the problems which may arise when using refrigerants in systems for which they were not designed.

Too often people are being misled by "magic hair tonic salesmen" who would have us believe there is a perfect replacement for R12.

R134a is harder on condensing than R12, which in high ambient or high humidity conditions may highlight system inadequacies with regard to the condenser/condenser airflow but it must be remembered it is still the industry refrigerant of choice, and in most cases a retrofit to 134a is a relatively simple procedure.

As trained professional service technicians, VASA members must be able to recognise any system inadequacies that do exist and with the customer's consent modify the system accordingly.

As the professionals of the industry, do not allow yourself to be conned by the Magic Hair Tonic Salesman.

Basically the air conditioning system consists of four main components - two heat exchangers and two pressure/flow controllers. For the purpose of this article we will not be including the receiver/drier (FDR). Sure, it's got some important functions in enhancing system performance, but it is not a vital component.

When a system is designed the engineers/technicians have a myriad of requirements that must be met.

Among these are:

- ⇒ **adequate heat exchanger performance**

Technical trainer and author of this summary, Grantley Hand (right) with some of VASA's graduates

- ⇒ **the balancing of the heat exchangers**
- ⇒ **a suitable flow of refrigerant through the system**
- ⇒ **suitable pressure control of the refrigerant**
- ⇒ **lubricant circulation through the system**

Let's get back to basics – A system is designed to contain a refrigerant that has a pressure/temperature relationship that matches the pressure and flow control devices of the system.

For example, a system on R12, when fully charged, operates with a low side pressure of 100kPa (15psi) to 200kPa (30 psi) at normal ambients/humidities. The pressure/temperature relationship of R12 means that the refrigerant inside the evaporator coil, whilst vaporising, is -12 C to 0 C, and the approximate fin temperature on a cycling clutch system will be 0 C to 12 C.

At this pressure the corresponding flow is such that superheat across the coil is in accordance with manufacturers' specifications and there is a sufficient flow of refrigerant back to the compressor to keep it cool and accordingly keep discharge line superheat to safe levels.

134a is almost identical in its pressure/temperature relationship in the evaporator pressure band.

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A Technical Perspective

As such, evaporators operate at almost the same temperature, sufficient flow keeps the compressor cool, discharge line superheat is controlled and the existing R12 TX valve controls superheat across the evaporator coil to approximately the same levels as on R12.

We have heard that there are refrigerants that are 'so good' that we only need 30-40% of R12 charge quantities to make the system cool adequately.

Before adopting these refrigerants as a replacement for R12 you MUST ask yourself the following questions and conduct your own test program, or seek professional advice to identify its suitability as a replacement for R12 on the systems you commonly work on.

- Are superheat levels across the evaporator maintained (and in the suction line) hence:-
- Are discharge line super heat levels within 10% of R12 levels?
- Is a suitable quantity of re frigerant flowing back to the compressor to ensure ad equate compressor cooling?
- Is a suitable quantity of refrigerant flowing back to the compressor to ensure it does not 'pull a vacuum' on the suction at MAXIMUM expected compressor operating speeds?

WARNING:
An alternative refrigerant may operate satisfactorily at lower compressor speeds (ie city cycle) but may pull a vacuum, pump itself dry and seize at highway speeds.

- Do evaporator pressures/ temperatures closely correspond to those of R12?

  This is vital if the system adopts Evaporator Pressure Regulation where the Pressure of the refrigerant ie 200kPa (30psi) maintains a coil temperature of 0^C – 1^C to prevent icing of the condensate on the fins.

  Believe it or not, it is possible for the refrigerant to be 'too good', ice up the coil, hence reduce heat absorption, or shut down the TX valve to such an extent that the compressor once again pulls into a vacuum and pumps itself dry.

NOTE: EPR systems normally do not have a thermostat to prevent icing of the coil – they rely on pressure.

From the aforementioned points an appreciation can be gained that a system with pressure/flow controllers is designed around a refrigerant and as such any replacement chosen must exhibit similar characteristics to the original refrigerant for which the system was designed.

The alternative is that if a replacement refrigerant is used, the pressure/flow controllers and system design may need to be changed to suit the characteristics of the replacement refrigerant.

The highlighted points should also give an appreciation as to the reluctance of the compressor manufacturers to honour warranties on their compressors when refrigerants are used for which the system was not designed.

President Mark Mitchell wrote this letter to a WA bureaucrat in the Department of Transport. It sums up his – and VASA's – frustration about the way our politicians aren't really listening.

"The single issue which VASA finds rather annoying in this whole debate is that government departments and various other authorities and groups of experts sit in judgement on an industry – without ever asking the industry what it is doing or what it thinks.

We find it strange that a body such as the one which drafted the so called "Code of Practice", can be accepted so readily and enthusiastically by some government departments, while the industry most closely involved is totally ignored. How can a body call itself "Independent" when it can't possibly be because it has obvious interests in the promotion of Hydrocarbons.

VASA wonders why there was no consultation attempted with any of the industry sectors such as vehicle manufacturers, air conditioning systems manufacturers or air conditioning component manufacturers in the formulation of their proposals.

Perhaps the reason for this oversight is the knowledge that in the perspective of the world motor industry and air conditioning systems and parts industries, there is no worldwide push to adopt hydrocarbons.

The hydrocarbon lobby also seem to conveniently omit any reference to the fact that not one major world car manufacturer or manufacturer of air conditioning systems and parts, will support the use of hydrocarbons in equipment which is simply not designed for them.

KYSOR products in Australia

Melbourne Auto-Air has been appointed Australian and New Zealand agent for the Kysor range of truck and off-road equipment.

General manager John Blanchard said "KYSOR will compliment our existing OEM business in that product sector and strengthen our product base. Our intention is to appoint various distributors around Australia and New Zealand to handle this product line."

Melbourne Auto-Air is currently preparing an Australian version of Kysor's catalogue for release early in 1997. It is expected to coincide with the arrival of the first stock.

For further information, please contact David Ellis or John Blanchard at Melbourne Auto Air.

News for the Trade

It is a sign of the times that members are beginning to appreciate the value of HOT AIR as a communication tool to people in the trade.

Hence, in this issue, we have started a News Page, which will be open to those members who have new products, new ideas or something important to say.

Please fax or email to the Editor at any time and if they are considered important to members, they will be included in the next available issue of Hot Air.

Across the Tasman

Following the VASA Work 'n Play Conference in August, a comprehensive training program was organised and undertaken in New Zealand at two locations – Autokool in Hamilton and Auckland Auto Air in where else but Auckland!

Many thanks to Stuart and Mary Helm, and Barry and Jon Rogers for the organisation of the courses and the use of their premises for training. It is extremely encouraging to see businesses such as these following the Ivan Frangi blueprint for success – 'Don't keep on doing what you did yesterday and expect to be in front tomorrow'.

The training program covered all aspects from principles of air conditioning to advanced system diagnosis, electrical/electronics and climate control. Many thanks to all technicians for their participation and their extremely encouraging feedback of the courses.

Our next step is to investigate the systems that are fitted to the fully imported vehicles flooding New Zealand to formulate some testing/diagnostic strategies to increase member's level of professionalism even further. We will all learn something from this venture.

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All submissions are subject to review by the VASA Public Relations Committee

Reconditioned Compressors

Melbourne Auto-Air will release a range of reconditioned A6 compressors precharged with PAG oil, ready for the retrofit market.

Sales Manager, Robert Picone, said "The reason we are using PAG oil, rather than Esters, is that there is research material from General Motors in the U.S. indicating that A6 compressors have substantial metal to metal wear when lubricated with Ester oil. The PAG oil used has a viscosity at 40^C of 124 to 139 cSt. This is the same as what we use in the new A6 compressors we sell. We have introduced this initiative to reduce the time spent in the workshop in carrying out a retrofit."

Melbourne Auto-Air already offer a range of York type compressors with Ester oil and Tecumseh compressors with Ester oil, where wear is not such a problem. The A6 compressor will be available in January

VASA MEMBERSHIP

To maintain standards and credibility throughout the industry, strict entry standards apply to VASA.

To gain full membership, persons or organisations must meet the following criteria:

In excess of 50% of income must be derived from automotive air conditioning...or.....

Must demonstrate a proven knowledge to correctly fit, service, diagnose and repair automotive air conditioning systems. This includes both refrigeration and electrical circuits in passenger vehicles, buses (less than 5 kg capacity), trucks, agricultural and earthmoving equipment.

An entry examination/assessment must be submitted and the required standard of 80% achieved before full membership will be granted.

Associate Memberships are also available.

Why is VASA so insistent about training

Due to the limited response to the training questionnaire in the last issue of Hot Air and a large number of inquiries about training , here's an explanation about the level of training on offer, the aims of the training and a run-down of what the training involves.

Of those who did respond, a large number were people who have undertaken some VASA training previously. Now they know what is on offer they are hungry for more. Many thanks to those in this category as well as to those who did respond for the first time.

Unfortunately there were insufficient responses to justify running courses prior to this summer. However, all responses have been logged and given sufficient numbers, a comprehensive training program will be held after summer (March to October 1997).

TRAINING WHY?

Friends, the old Mark IV days are over. Technology is increasing the complexity of systems on two fronts, refrigeration and more importantly electrical. The modern system is smooth, quiet, efficient but is definitely less tolerant of incorrect charge rates, system contamination, component blockages/inefficiency etc. On the electrical front an increasing number of systems are electronically controlled – and interfaced with the engine/powertrain control module. We now have the ECM/PCM controlling not only the A/C operation but also 2 speed fan switching, basic fan operation, unloader circuits and limited operation strategies.

Compounding this is an increasing number of vehicles adopting the full climate control systems now optional or fitted standard to top of the range models only. The future will see multiplexing, OBD and OBD II systems in Australia.

Compounding the problem of the technology explosion in the industry, we are also faced with retrofitting to 134a (which in most cases is relatively easy if you know what you are doing and how a system works). Charge determination on 134a, particularly with residual motor oils causing a severe foaming of the sight glass is another problem.

If the system is of a hybrid type, or contains non-genuine componentry, or you do not have access to charge rates, how are you going to critically charge the system without the use of a sight glass? The answer is you need alternative strategies of charge determination and that includes knowing how a system really works to a far greater level than we ever did before with the 'good ol' sight glass'.

System contamination is the next problem and probably the mother of them all. If we learn from the American experience, system contamination may be a nightmare. Without being an alarmist, you don't have to be Einstein to work out that with a number of alternative refrigerants on the market, all being charged through R12 ports (R134a excepted), system and supply contamination is almost inevitable.

Under the USA SNAP program, any refrigerant endorsed as a replacement for R12 must have dedicated service fittings and appropriate high standard labelling.

We unfortunately are not that clever. We charge systems through 1/4-3/16 schrader fittings, fit a label that will fall off in a short period of time, and then expect the refrigerant stream to remain pure.

YOU HAVE TO BE JOKING!!!

The answer is to purchase a good quality refrigerant identifier that can sample and indicate R12, R134a, blends and HC compounds (approximately $2500) or as a second measure at least be able to recognise the danger signs. You must know how a system works, what the system and the gauges are telling you and what the characteristics of a contaminated system are and why.

Without painting too gloomy a picture, VASA members are the professionals of the trade and are likely to get a majority of the problem systems that no one else can fix.

The increasing complexity of systems, charge determination, electrical control systems and system contamination all dictate our level of understanding and our problem solving skills must be held at an optimum level.

What does VASA training cover?

The training covers from basic system operation, through advanced skills diagnosis (refrigeration), and special systems diagnostics in the refrigeration arena.

Courses 3, 4 and 5 cover electrical diagnostics from basics, through to full climate control systems.

Some technicians have privately expressed a concern at their lack of electrical knowledge and fear enrolling in the electrical courses.

PLEASE DON'T

The nature of our trade is that previously electrical knowledge has not been an essential component and as such we could get by with little electrical knowledge.

Continued next page ➡

Jumble Market

The regular column where members can unload their surplus junk! – sorry, superceded or surplus stock.

Hot Air will charge a minimum fee of $5 – which is $1 a line for five lines.

Glen Watkinson in South Australia is the Jumble Market manager.....so send him your cheque and your ad.

His address is:-
Car Aire
932 Port Road
Woodville West SA 5011.

FOR SALE

GENUINE COMMODORE VR 6 CYL COMPLETE A/C SYSTEMS

Melbourne Auto-Air has available a limited quantity of the above GENUINE complete A/C systems. These can also be fitted to VN/VP models, with a few small modifications, mainly the purchase of a VN/VP switch.

VASA READY REFERENCE DIRECTORY

1996/97

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THIS IS THE PRIMARY REASON WE ARE OFFERING THE BASIC ELECTRICAL COURSE, to cater for technicians to enable them to get a grounding in electrical fundamentals and the use of meters to facilitate the progression to the more advanced electrical/electronic climate control systems.

SUMMARY

These are the challenges that will face the trade this summer and beyond. Training will help address these challenges.

It must be stressed that the training on offer is designed to provide technicians with a solid theoretical and practical underpinning to increase the individual's ability to evaluate, diagnose and rectify system faults and design limitations in both the refrigeration and electrical arenas.

It is the solid underpinning knowledge that will keep our businesses and technicians at the forefront of the industry and as such will encourage growth and professionalism.

⇔ **Continued from Page 3**

Further, you should be made aware that your state is the base of some of the world's leading manufacturers and system designers in auto air conditioning and we would have thought that they would be consulted or at least used as reference points in any investigation of the subject matters. We can only assume you have not consulted them yet.....among them are Auto Aire, Car Aire, Highgate Industries, Cabin Comfort and others."

Mark Mitchell, President of VASA 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.