VASA
VEHICLE AIRCONDITIONING SPECIALISTS OF AUSTRALASIA

HOT AIR
NEWSLETTER

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FILE THIS ISSUE OF HOT AIR IN YOUR VASA FOLDER

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Inside...

2002 Convention and Trade Show

VASA and AAAE join hands for a bumper show in Brisbane in June 2002

A convention dedicated to greatly increasing the flow of technical information from product suppliers to technicians in the automotive electrical and mobile airconditioning industry will be held in Brisbane on the long weekend in June 2002.

The "2002 Wire and Gas Training Convention" will be a joint effort by two active industry organisations, VASA (Vehicle Airconditioning Specialists of Australasia) and AAAE (Australian Association of Automotive Electricians). It will be VASA's 10th annual convention and trade show and the first for the Auto Electricians.

Both organisations are experiencing growth in membership and this convention is an all out effort to add value to membership fees and focus on training and technical knowledge in joint venture with suppliers.

The two bodies agreed to combine their efforts to stage a convention where auto technicians would be exposed to new business skills and future motor vehicle technologies which will benefit both their careers and their business bottom line.

Continued next page....

If this were a tabloid, the headline would be SHOCK, HORROR, PROBE

A new gas survey on vehicles has unearthed a malignant cancer much more serious than you could have imagined.

It shows that somewhere out there, technicians with no morals, no intelligence and possibly no brains, are chucking any old mixture into a highly technical and delicately balanced system. Their philosophy seems to be - hopefully I won't see that customer again, let the next guy worry about it. More importantly, it has the makings of a contamination drama which could eventually spread throughout the entire Australian car fleet.

..and it's in this area that everyone, including all VASA members, must take some ownership. VASA research shows that some VASA workshops have recovery cyclinders but no identifiers. Perhaps unwittingly, many are contributing to the problem, perhaps because they think it doesn't concern them. **THEY ARE WRONG.**

For this issue's horror story, turn to Page 3.

...Continued from Page 1

VASA and AAAE have agreed that in a tough market place, the cost of exhibiting and attending conventions must be realistic and affordable to allow access to training by as many technicians as possible. With this in mind, the convention team is planning to offer the lowest possible registration fees for delegates and the highest possible standard of technical displays. The cost of exhibition space would also be kept as low as possible.

In addition, each exhibitor will be given a spot at the plenary sessions to train delegates on their respective technologies, systems or tools.

Responding to calls from the memberships of both organisations, product training and advanced technical know-how on the modern vehicle will dominate the convention, which will be supported by a wide range of automotive and business speakers.

It is also planned to make the convention as "hands on" as possible, with test vehicles on the convention floor.

Deyan Barrie
President AAAE

Mark Mitchell
President VASA

The convention trade show will run for two full days, and be thrown open for half of each day to anyone in the trade, whether or not they are members of VASA or AAAE.

VASA secretariat is working on a set of guidelines for use of the VASA logo and on future VASA signage to reflect the various levels of membership, especially between service centres, wholesalers and manufacturers.
These guidelines will be released in the new year.
In general terms, VASA members are encouraged to use the logo wherever they can, but not in a way which will compromise VASA's independence. **Much more on this soon.**

This is the signage introduced by SA members. It measures .6m high and 1m wide and is on weather proof material.

Bite the bullet on signage– strong message from Queensland members

Queensland, South Australia and Western Australian members have held highly successful meetings in recent months, strengthening the membership base and proving conclusively that there are indeed some great benefits in being part of a professional network.

At long last, members are driving the marketing effort of VASA, with many of them becoming more vocal about external signage and better methods of promoting the fact that they belong to a network of repairers which can bring benefits to customers.

Queensland members particularly have been very vocal on signage. They are taking a lead from South Australia, which has introduced a cooperative advertising scheme involving the Yellow Pages and external signage on their buildings and vehicles.

In Queensland, members want to take it a giant step further by making signage mandatory for all VASA workshops, with the cost being added to the annual membership fees. On a show of hands, it would seem Queensland would overwhelmingly support such a scheme.

The idea will be taken to the executive and a vote will be required to make it a national scheme, which VASA would like to do. In the meantime, costs are being sought, because it is felt that if the numbers were right, the costs of signage could be quite low. **More on this soon.**

Phase 1 of Gas Survey proves conclusively why something must be done soon about gas identification and labelling

The first phase of a national survey has found that the management of refrigerant gas in the majority of vehicles is OUT OF CONTROL.

VASA has been concerned for years about the haphazard labelling (or lack of) of gas content after servicing, but is now worried that this latest survey reveals a recipe for growing consumer dissatisfaction as technicians grapple with the unknown gas substances in most vehicles.

The first survey, conducted in a large Queensland a/c workshop over a 3-week period in November and December, is the result of gas analyser tests on every vehicle with gas in the system, without discrimination. 48 vehicles were tested, many of them 1996 models and earlier.

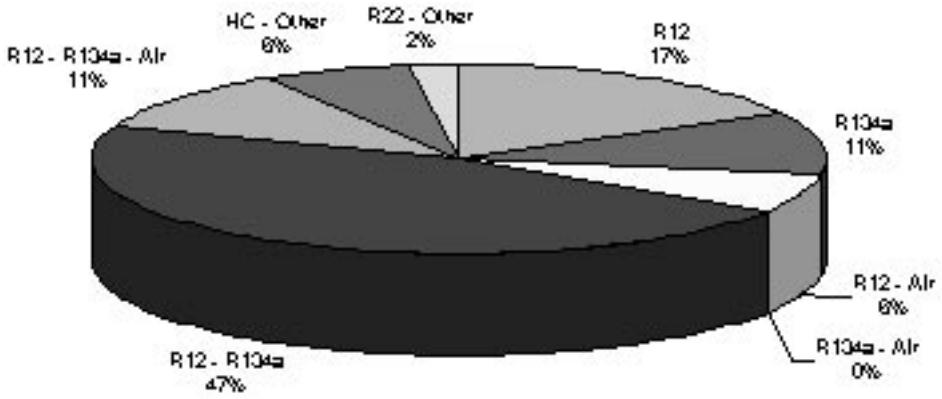


CHART ABOVE - GAS MIXTURE CATEGORIES
47% of cars had a mixture of R12 and R134a in the system. Only 11% contained pure 134a. while 17% contained pure R12.

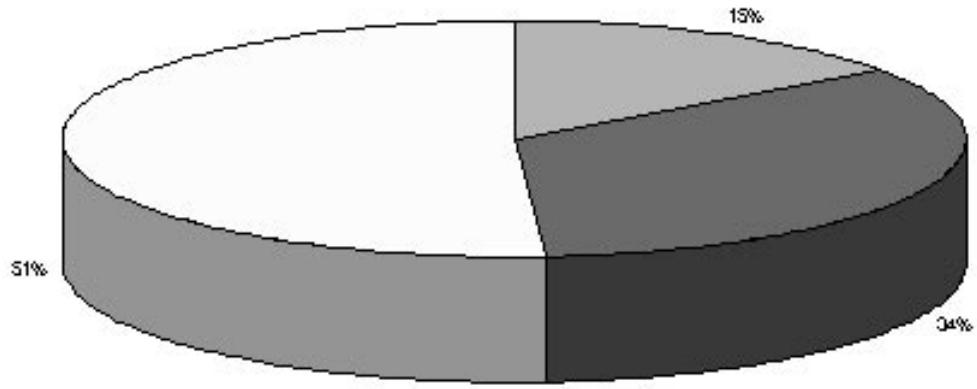


CHART ABOVE - SYSTEM LABEL CATEGORY
51% of all vehicles had NO label while another 34% had the wrong label.

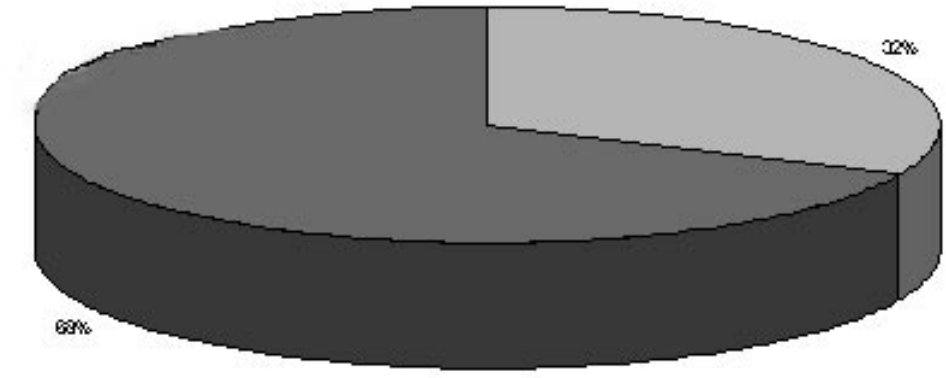


CHART ABOVE - SYSTEM SERVICE PORT CATEGORIES
68% of vehicles surveyed were fitted with incorrect ports

The test will now be copied in most other states.

VASA president Mark Mitchell called for the survey so that he can alert Refrigerant Reclaim Australia. Mark was appointed to the RRA board earlier this year.

RRA is charged with recovery and reclamation of refrigerant gas and is working on programs aimed at clearing out bodgy gas management practices in the vehicle a/c repair and maintenance industry.

Mark said the survey information was a vital prerequisite to significant change.

Among other measures, VASA is investigating foil labels which will last longer in the engine bay.

If poor practices are allowed to continue and these mixtures lay banked in either the current fleet of vehicles or in the stocks of refrigerant gas held in workshops, then as the newer vehicles approach their turn for service and repair they too will become contaminated.

This is a gas cancer which must be stopped.

VASA Exclusive:

Upgrade skills and improve business with Members' special rate until year's end

An exclusive offer to VASA members to take up advanced training for Certificate IV and Diploma will cut out at the end of December.

Douglas Mawson Institute of Technology, which pioneered the unique courses for technicians made the low introduction price available only to VASA members as a means of encouraging as many people as possible to make the decision to upgrade their skills.

While the end of December is not far off, those who get to read their Hot Air in time, only need to send a quick fax, indicating their willingness to enroll in the courses, and they will then be signed up officially in January at the reduced rate. ***But you must act immediately you read this.***

These are "post trade" courses, open to anyone to give national certification to a technician so that he or she can become a leader in the industry.

The uniqueness of the program is that you DO NOT GO ANYWHERE NEAR A CLASSROOM. You can actually do the study WHILE YOU WORK so it is really the best of both worlds. The "study" mode is where you work through workbooks, at your workplace, and complete and submit assignments which relate directly to your work environment.

They are, quite simply, designed to help you and your business.

If you think you've been at the game long enough and you know it all, try the RECOGNITION OF CURRENT COMPETENCE (RCC) process - you might amaze yourself.

You may pass some subjects with flying colours and a minimum of effort - others might require a bit of swatting up and the workbooks will be set for you.

VASA President Mark Mitchell recently achieved a Diploma through the RCC process and immediately saw great benefits in the program. He enrolled two of his staff immediately and they will do some by RCC and some by study. Whatever way they do it, he is convinced that helping his staff through the Diploma will assist his business and improve his bottom line.

President Mark Mitchell goes back to school - in this case, the RCC assessment process with lecturer Grant Hand

VASA technical director Grant Hand is managing the whole process, which is a big plus, because Grant is very aware of the dynamics of many VASA businesses. You will never get this kind of relationship elsewhere.

How Long will it take?

By study, the Certificate IV andDiploma will be completed within one year each - submitting assignments in your quiet period. They don't expect assignments back in the middle of summer when you are flat out.

The RCC process may be considerably shorter. With an on-site audit, one or two days is all that will be required, provided that Grant can sight evidence and validate it. It really is a very minimal time commitment if you are a professional - and they can validate that you are a professional.

What will it cost?

For qualified tradespersons, who opt for the RCC process, each certificate may be as low as $500 per Certificate if you take up the offer by the end of this December 2001.

For non-qualified persons (those without a trade certificate but lots of experience), the costs are only marginally higher - approximately $700 per Certificate due to more subjects to complete the status of trade qualification.

So if you want to know more in a hurry, simply fax Grant direct at the number below before the end of December and tell him you are keen to look at the program documents. If you subsequently sign up within a week or so after the end of December you will qualify for the current cost of courses. After 1 January, the prices go up across the board.

Remember that this is an exclusive offer - you will never get a deal like this again to improve your skills, your business and your future.

The fax number

08 8289 4260

DO IT NOW

Exhibitors and Sponsors - register for the new look, back-to-basics convention and trade show

An initial survey of potential exhibitors at the 2002 Wire and Gas Convention in Brisbane next June, has given the convention committee great hope that a new era has dawned for this industry show case.

VASA is well aware of the shortcomings of more recent trade shows and has heeded the oft repeated cry “we are tired of seeing the same old faces and we don’t see anything new.”

Well, here’s everyone’s chance to turn the ship around.

Not only will there be new faces at the convention because of the partnership with AAAE, but the emphasis is changing from corporate drum beating to down to earth training on products.

As VASA President Mark Mitchell says, “We are getting back to the grass roots - the sort of show we began with in the early 90s.”

Exhibitors are entitled to ask what the new concept is likely to achieve and how will it impact on their products - and their pockets.

So here are 14 good reasons for exhibiting in Brisbane next June.

1. This is a Trade Show with a big difference.
2. It is not an “add on” to a convention. It is integral to the convention.
3. It’s a joint venture between VASA, AAAE and manufacturers, wholesalers, importers and suppliers to train the technicians of Australia on today’s products and technologies.
4. Don’t assume all technicians know about your product because you use distributors …would King Island Cheese let Coles do their product promotions – no way - they do it themselves in order to build long term product loyalty. If you want your product known in the market you must consider presenting at this event. Teach the market about your product and the sales will come by default.
5. Exhibitors will pay considerably less than comparable conventions for a display booth...3m x 3m booths with signage, lights and power will be under $1,000 for the entire weekend.
6. Lunch for delegates on both days will be held in the Trade Show area, stimulating social interaction and encouraging networking. In addition, every exhibitor will be given a free opportunity to address the plenary session to train technicians on their latest product or service. (Genuine training and product knowledge, as opposed to a sales pitch).
7. The event will be at the Brisbane Exhibition Centre on the Queen's Birthday long weekend in June 2002 – from Friday 7 June to Monday 10 June, with the Trade Show extending over two days from 11.30am on Saturday and Sunday.
8. It has the potential to more than double the exposure for trade suppliers than at any other VASA convention because it draws on the membership of two organisations PLUS a very receptive Queensland and northern New South Wales marketplace.
9. It provides an exciting new platform for suppliers to the automotive electrical industry to reach a wide, new audience. VASA typically draws delegates from all states and New Zealand.
10. The catalyst for increasing the registrations and day visitors will be an extremely low registration fee for delegates and absolutely free admission and free parking for any non-member auto electrician or air conditioning technician who wants to attend the two afternoons of open Trade Show.
11. Queensland and Northern New South Wales represent the biggest concentration in Australia of technicians working in the vehicle air conditioning industry.
12. This is the first time in Australia that a combined convention and trade show has been held for both the air conditioning and auto electrical industries.
13. It's the first time a VASA convention and trade show has come to Brisbane.
14. Accommodation, registration and some functions will be at the adjoining Rydges Hotel - where a very attractive package has been organised.

The initial response is encouraging. One exhibitor noted “This sounds like a great idea and should be very successful given the format you have indicated.” Another said “Great concept, Vasa conventions were starting to get quite expensive for the average workshop.”

Much more detail will be released in coming months and on the VASA website, but in the meantime, if any exhibitor would like to receive our Exhibitor pack when it comes out in January, please send an email request to secretary@vasa.org.au or fax 0755263044.

Long weekend, June 2002 - Brisbane Convention Centre and Rydges Hotel

Watch the VASA website for constantly updating information and registration forms.

RTP is now on the web

The Registered Technicians Program, that wealth of information which has the answers to many of your daily workshop questions in its many pages, is now available for you to download off the VASA website, FREE OF CHARGE, BUT ONLY TO MEMBERS.

This is one of the many privileges of membership of VASA.

The RTP is a tremendous technical resource, accessible by subject and problem.

Thumbnails of the various sections are avialable in PDF format and you can print off the pages you want in your own office.

Every year but the current year will be available on the website

Business Award for VASA member workshop

Jackson's Auto Repairs of Somerton Park, SA has been named Small Business of the Year in the 2001 South Australian Training Awards.

The awards, conducted by the Department of Education, Training and Employment recognise and reward groups and individuals who strive for excellence in vocational education and training.

They also showcase the talent and entrepreneurial flair of this State's students, training providers and enterprises.

Jackson's Auto Repairs sees training as an essential part of its business. Along with the company's dedication to its core business, training enables the firm to expand and diversify its operations to ensure long-term sustainability and subsequent employment for its staff.

There are eight staff in various roles that all contribute to identifying training needs and on-the-job training is conducted continuously by experienced staff.

As winner of the 2001 Small Business of the Year award, sponsored by WorkCover Corporation, Jackson's Auto Repairs received a $2500 training grant and a trophy recognising their achievement.

South Australia is a national leader in the provision of innovative and industry-friendly vocational training programs and is producing professionals whose qualifications are recognised throughout the world.

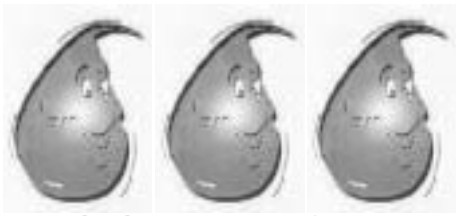
VASA president Mark Mitchell said such a win for a VASA member and his team proved once again the value of training and professional work practices.

"It's got nothing to do with getting your name in the paper," said Mark. "But when you make the decision to improve workplace skills, it's like having blinkers removed from your eyes and you can suddenly see the many different steps you can take to improve your business and your profits."

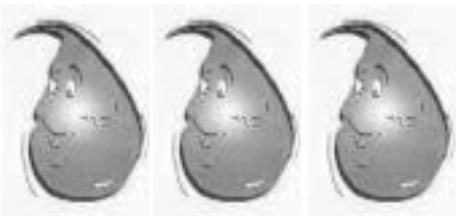
ON THE WEB

Did you know that on the VASA website ***www.vasa.org.au***, in the member's lounge, you will find a stack of technical information which can help you on a daily basis in your workshop.

You need to know the refrigerant capacity for a Peugeot 205 or a Renault Fuego? - it's on the website, along with an Orifice Tube Pressure Chart and a Compressor/clutch failure check list. Your website is a mine of information - go there regularly. **www.vasa.org.au**



The innocent drop of water which can cause so many headaches for the a/c technician



The importance of evacuation! Just when you think you know it all, another time consuming complaint comes rolling in the door. It's time for revision.

All too often, the complaint which comes across the VASA desk could be put down to the lack of correct servicing procedure and usually its is moisture contamination in the system yet again.

Consider how one little drop of water can dampen your profits - and your reputation.

With the increased moisture sensivity of modern A/C and refrigeration systems, proper evacuation is essential. Most system complaints can be attributed to moisture. Here's how and why.

During new system set up, all protective caps are removed, admitting moisture and air into the system components.

If air - a non-condensable - remains in the system, it collects on the high side reducing system efficiency.

This causes a rise in head pressure. The discharge valve gets hotter than normal and organic solids form causing compressor failure.

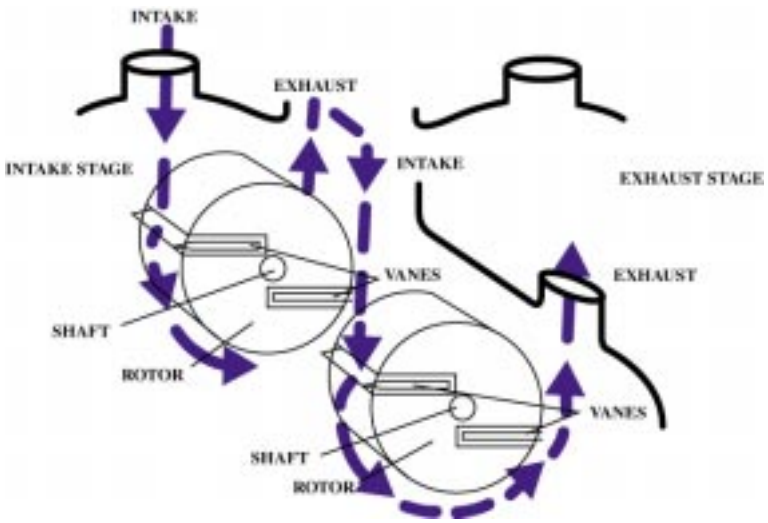
Moisture in the system can form ice which closes off openings in expansion valves and cap tubes, and prevents adequate cooling.

Ultimately, moisture and air combined with refrigerants containing chlorine can produce acids and sludge which could cause in-warranty failures.

During service and parts replacement, the same contaminants get in again and you could be called back for repairs by a dissatisfied customer.

Moisture and air can even enter through system leaks and as the moisture in the air increases, so does the amount of contamination. The higher the humidity, the bigger your problem.

A vacuum pump "pulls" air and moisture out of the system before the system is damaged. The higher and more complete the vacuum, the more moisture is removed.



What is a micron as a unit for measurement for a vacuum?

When referring to microns as a unit of measurement for vacuum, the reference is to microns of mercury in the same way as you would refer to atmospheric pressure in inches of mercury on a barometer. One inch Hg is about 25,000 microns.

To help clarify terminology, remember that the deeper the vacuum; and the more complete the vacuum, the lower the number of microns.

In VASA Service Standards - issued to every member along with your initial membership folder, there is a page on evaluation, and here it is...

A vacuum pump capable of achieving a vacuum of 29.6 in Hg (-100kPa) must be used for evacuation to ensure the moisture in the system boils off at approximately 5º Celsius.

For adequate moisture removal time must be allowed for:

1 The water to boil off and turn into a vapour
2 This vapour to migrate out of the system due to the pressure differential between the vacuum pump and the longest run (furthermost point) of the air conditioning system.
3 Residual refrigerants and moisture trapped in the oil to boil off and be removed from the system.

The above 3 factors dictate the time allocated for evacuation of the air conditioning system.

Continued next page...

...from the previous page

VASA recommends a minimum time of 30 minutes on vacuum for a routine service on normal systems.

With one or more of the following conditions in existence, extra time must be allowed:

1 Excessive moisture in system – a system that has been open to the atmosphere (or empty) prior to the service necessitates extra time to boil off the large moisture contamination present in the system.

2 If it is a large capacity, multi evaporator, or long hose run system, then additional time should be allowed for the migration of water vapours out of the system.

3 The refrigerant is being changed (i.e. in retrofit) where it is essential to remove a high percentage of residual refrigerant gasses from the system.

4 It is low ambient day particularly with high humidity, where extended periods are required to boil off the moisture.

VASA recommends that if any of the above conditions exist an extended vacuum time (preferably 4 hours or overnight) be adopted or double evacuation procedures be adopted. Refer to relevant R.T.P. Bulletins for these procedures.

NOTE: If larger units are commonly serviced/repaired or when servicing systems containing highly hydroscopic refrigerants (i.e. 134a) a 2 stage high capacity (50 litre/min. +) vacuum pump should be used.

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VASA has members everywhere – well almost

One of the joys of managing the VASA membership database, is in knowing that members thrive in some pretty far flung places.

Those who think VASA is a city controlled group of large workshops and wholesalers couldn't be more mistaken.

Members can be found from Darwin to Launceston, Cairns to Auckland, Perth to Alice Springs and now, believe it or not, we have our first member in Samoa.

Rakesh Chandra of Apia General Rewinders is well known to some of VASA's New Zealand members and it was through them that he was acquainted with VASA and its training programs.

Rakesh writes:

"Thank you for accepting me as a new member.

I was born in Fiji in 1958 and was educated up to fifth form. I started work in 1975 at Pacific Hotels and Development Limited as an assistant electrician. At certain times I used to work with the refrigeration technician. As a result, I was able to do both courses.

In 1980 I joined Kooline Refrigeration as an electrician, refrigeration and air conditioning technician. In 1985 I joined Southern Electric Co as a supervisor and in 1987 I joined Mordern Electric Limited.

I moved to Samoa in 1990 as a workshop manager for a new business that I started for the owners.

After my contract in 1993, I joined the Goverment of Samoa, and in 1995 I started my own business.

I do all electrical works,refrigeration and air conditioning, motor rewinding, auto electrical and car air conditioning works.

I employ eight people and we also do sales of electrical, refrigeration,air conditioning, and auto air conditioning parts.

Most of my supplies are from New Zealand. A common problem we face in Samoa is auto air conditioning is parts, because different models of cars come to Samoa, and Samoa is left-hand drive."

It looks like you have to be a jack of all trades in a small market area like Samoa. Good luck Rakesh and thanks for your membership.

The NSW position on flammable refrigerants in MVACs

Special Minister of State John Della Bosca, in explaining why NSW is having so much difficulty arriving at a Code of Practice on the use of hydrocarbon gas compounds as refrigerants in cars, makes these statements:

"The putting of liquefied flammable gas in a MVACS is prohibited by Clause 242 of the Dangerous Goods (General) Regulation 1999. This prohibition was instituted in November 1995 and it was maintained when the 1999 Regulation was made.
The merits of the Clause 242 prohibition were assessed by WorkCover and the conclusion reached was that the prohibition should be maintained for the time being and the Government accepted this conclusion.
WorkCover is now finalising its own review of the draft code. In the meantime, **the prohibition remains in force and the Government is not inclined to vary this arrangement unless and until a sound justification for changing it is clearly demonstrated.**

Introducing the Anemometer – the essential tool for professional a/c technicians by Grant Hand

An anemometer is an essential tool that measures airflows through the condenser and evaporator of the A/C system, not to mention a range of other uses within the automotive and general engineering areas.

This is not a sales pitch for anemometers. But it must be acknowledged, that they are an essential item in the toolkit of professional technicians.

The two principle heat exchangers - the evaporator and condenser are responsible for absorbing heat and dissipating heat respectively. It is these two components that are directly responsible for determining the capacity of the system.

Most customer complaints are not that the air is not cold enough - but that the cabin doesn't cool down.

Cabin cooling to acceptable levels is a capacity determination, not a cold discharge air determination. ***Yes there is a difference!***

The level of cabin cooling is determined in principle by :

The size of the evaporator and the amount of refrigerant passing through the evaporator (this is the capacity of the evaporator eg 4,300 KCal/hr or 16,000 BTUs/hr) - PLUS -

The volume of air passing over the evaporator.

The second point is critical because if the volume of air decreases, so does the net heat load on the evaporator decrease and therefore the TX valve closes down, reducing refrigerant flow and therefore the capacity of the evaporator.

There is another issue here.

If the rate of cooling is not greater than the incoming heat into the cabin plus the internal generated heat (heaters, body heat) then the cabin will never cool down. We will never reach what we call balancing point, where the capacity of the system exceeds the heat load.

So the moral of the story is that if the airflow through the evaporator is not up to specification, it will dramatically reduce the capacity of the system.

That is why Ford (among other manufacturers) has been specifying discharge air velocities for a number of years.

How else do we know (without substantial testing or inspection) that:

- There is an air sourcing restriction eg blocked air inlet (fresh air mode) or blocked return filter
- There is a blocked evaporator (externally - a common fault in severe service conditions
- There is a duct switching/door distribution calibration problem
- There is low blower speed (low voltage supply, high resistance [internally] faulty motor [poling]
- Bent fins / damaged evaporator

Anemometer test table

There is another part to the story

L.H.S.	CENTRE	R.H.S.
6.0 m/s	9.0 m/s	6.0 m/s

- the condenser

If the condenser cannot dump off the heat absorbed by the evaporator, plus suction line superheat plus superheat of compression, then the ability of the evaporator to absorb "fresh loadings of heat" is reduced, high side pressures may not stabilise and subcooling levels may reduce or not even exist. In a worst case scenario the condenser will not even condense the gas to a liquid and vapour will be fed to the TX valve, resulting in a dramatic reduction in system performance. *(You may have noticed an increasing amount of bubbles/foaming in the sight glass when the condesner fan/airflow is not working)*

A condenser rated at 9,200 KCal/hr at 4.5 m/s airflow will only dissipate 3,400 K/Cal/hr at 1 m/s airflow and 5,600 KCal/hr at 2 m/s airflow. Many systems tested by VASA technicians "hunting for a lack of cooling problem", have been traced back to a poor condenser airflow problem. *(Ever noticed the suction line warming noticeably when the condenser fans don't work properly - strange isn't it, considering the suction line is directly connected to the evaporator. Doesn't it tell you something about the effect lack of condensing has on cooling capacities)*

The real problem with condenser airflows is that they don't necessarily mean a "kick" in head pressure - you can have normal head pressures with reduced cooling, especially if the servicing is conducted on a cool day.

The second point here is that many technicians believe they can "feel" the difference between 2m/s and 4 m/s airflow or they have strange "does paper hold on the condenser face" type tests. There is only one way to validate sufficient airflows through both heat exchangers - **with an anemometer.**

Weights and measures

Let's hear it for Sir Charlie and the Wheatstone Bridge

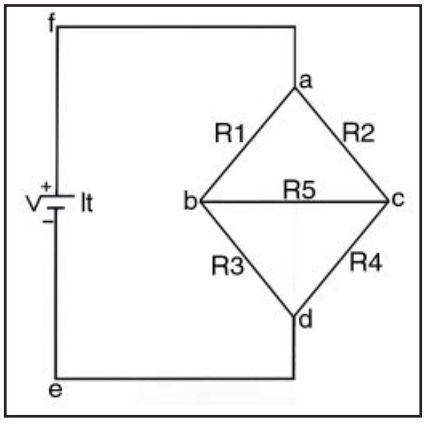
Scales. Simple looking gadgets which were once a lot simpler in the days of counterweights. Now its all electronic, so how do they actually convert a pressure on a platform, into an electrical signal.

Scales consist of two main parts - a load platform with sensors attached to it and an electronics package housed in a neat case to interpret the signals and display them in a useful form.

Obviously, for the electronics to work we need to have some means of converting weight on the platform into an electrical signal. Luckily, in the 19th Century, Sir Charles Wheatstone devised a measuring method, and using some resistance of materials theory, a mechanical to electrical converter was made.

There are several types of strain gauges available. These all have the properties of varying resistance when they are deformed. The trick is developing a system where the deformation is linear enough and makes sense no matter where the load is placed on the platform.

At CPS, we have a method of bonding our strain gauges in such a way that wherever load is placed on the platform, the gauge is still depressed vertically in a way proportional to the load placed on it. Now, using our strain gauges we can determine



what the weight is. This is done by wiring the gauges in a form known as a Wheatstone Bridge. The principal of a Wheatstone Bridge is relatively straight forward. Four resistors of the same value are mounted in the configuration shown A voltage is applied to points **a** and **b** and the volts measured across **b** and **c**. If the resistors are all equal, it should be seen that the voltages across all the resistors is the same Therefore between **b** and **c** there is zero volts.

Now comes the clever part. If a load is placed on our platform, the resistances changes Let's say that **R1** and **R4** now increase in value, and **R2** and **R3** decrease in value. This means that the volt drop across **R1** and **R3** will be less. (The total sum of resistance in each side is the same so the current hasn't changed).

Now we should see that between points **b** and **c,** there will be a voltage difference. This is what we measure.

From this point on, we take this voltage, amplify it, digitally convert it and apply some maths to convert this signal into a direct mass/volts relationship and then send this number to the display.

Some other techniques such as temperature compensation are applied but this is the basic theory of operation.

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You know how VASA keeps harping about the "Network of Choice" - the big dream of a great national network of repair workshops. Some workshops do it automatically, others will simply have to learn it or get off the bus...read this heartfelt letter of thanks from one member to another - now that's what we call a network!

"One of the issues discussed at the service forum at the Sydney conference was the need to have confidence in fellow members to whom we direct a customer.
Just last week I had this exact occasion arise. I would like to commend Stephen Hodges of Darwin Auto Electrics for the way he dealt with my customer from Brisbane, travelling on his around Australia holiday. I found Stephen to very helpful and obliging and furthermore the cost of the rectification work was also very, very reasonable.
It is pleasing to see that the VASA network can and is working to create member confidence and more importantly, customer confidence. Once again I would like to extend to Stephen and his staff a big thank you."
Posted by Richard Lewis on June 26, 2001 at 10:50:44:

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Unicla TC170 Ford FS10 Replacement compressor

This compressor is suited to all mounting brackets made for the FS10 and has an interchangeable clutch.

It features the Unicla ten cylinder swashplate operation and is housed in a heavy duty case with a lip seal.

It is particularly quiet and smooth running, with heavy duty and durable capabilities. The TC170 can be fitted with a range of Unicla clutches and interchangeable rear caps which adds to its suitability for a variety of applications.

The TC170 is suited to all mounting brackets made for the FS10 compressor. It is configured with twin upper and lower mounting holes 11mm in diamter and spaced 90mm and 78mm respectively.

This makes the TC170 a suitable compreessor replacement on several Ford vehicles or any vehicle where the FS10 mounting configuration is used.

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Unicla

Oil, What Oil??

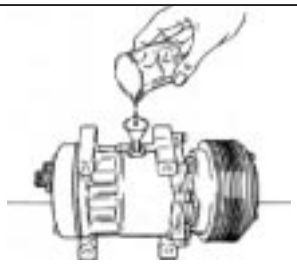
The oil level in a compressor must be checked when a system component has been replaced, an oil leak is suspected, or the system has lost some or all of its refrigerant.

Too often we get compressors returned with either too little, or too much oil in them. This can be the root cause of noise, poor performance or even total failure.

Each compressor has its own unique oil circulation ratio that determines the amount of oil circulating with in the system and the amount of oil that stays in the pump. By replacing the compressor with a new one be it the same exact model or another manufacture's model, you are doubling the oil charge or in some instances tripling.

Here are tips on what to do to with a Sanden SD series compressor to ensure the oil charge is correct.

1. Run the compressor for 10 minutes with the engine at idle.



2. Recover all refrigerant from the system, slowly so as not to lose any oil.

3. Determine the mounting angle of the compressor from horizontal (i.e., oil plug or adaptor on top). This is most readily done by using a machinist's universal level, if access to the compressor permits. Alternatively remove the compressor and drain the oil via the oil filler plug and the ports.

4. Remove the oil filler plug. Using a socket wrench on the armature retaining nut, turn the shaft clockwise until the counterweight can be seen

Product Enquiries:
Sanden International
Phone 02 9791 0999
mpadwick@sanden.com.au

SANDEN

Get rid of UV dye stains!

Anyone who sells or uses UV dye will have had dye stains somewhere they didn't want them. If you were looking for a product to clean it, Dye Off will do the job.

On a slightly different subject, we strongly advise you to think seriously about the equipment you are using before you buy the batteries to fire it up.

Most equipment is highly technical, usually digital and you are relying on it. A leak seeker that alarms all the time due to dodgy batteries is not much use.

A set of alkaline batteries will generally last a season in a leak seeker depending on use. A CC100 will generally run for about 20 hours using an Energizer or Duracell battery. Nicad batteries provide good brute power and managed correctly can be cost effective, but for test equipment applications they are not the best choice.

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QUICK SALE

VASA has a stock of VASA workshirts which it would like to get rid of to make space for more important things.
They are a great looking shirt, 65% polyster and 35% cotton and are in XL, L and M sizes.
Members who would like to buy one or more can simply email or fax an order and we will bill you on your membership renewal which will go out in March 2002...and the price, - reduced to **$25** each including GST + postage, for a quick sale.
It's a bargain.

Orders: **email: secretary@vasa.org.au**
fax: 0755263404

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