VASA HOT AIR NEWSLETTER
October 2008
The Mobile AC, Electrical and Cooling Technicians of Australasia

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VASA mounts strong campaign against massive hikes in R134a under Government's carbon trading juggernaut

VASA has joined forces with many other organisations involved in the importing, distribution and end use of fluorocarbon refrigerants to lodge major submissions to the Rudd Government's Green Paper which has the potential to drastically down-grade AC maintenance and repairs.

The Government's Carbon Pollution Reduction Scheme (CPRS) as it currently stands, will thrust hefty permit charges on R134a the moment it hits the wharves, regardless of whether the refrigerant is ever released into the atmosphere.

The permits, which may begin at $20 per kilo, or as high as $50 per kilo, will cost the importers dearly.

They will want to recover their outlays down through the supply chain, and some importers have warned VASA that by the time it reaches the average small workshop, the cost of R134a could be through the roof - perhaps up to ten times its current price.

VASA has argued that consumables, such as R134a, don't need to be included in the permit scheme, because Australia already has the world's best recovery and management system in place through the current Refrigerant Handling Licence and Authorisation legislation.

There is a real threat that if the Government ignore VASA's plea, the chaos which will result in the market will see more refrigerant emissions than ever before. It has the potential to render the current Licensing scheme impotent.

On top of that, the Government's Climate Change Department, which is promoting the CPRS, seems oblivious to the fact that the car makers of the world are on the eve of adopting new refrigerants and maybe even new systems which will have such a low global warming potential that they will fall most likely outside the radar of the CPRS.

The CPRS deals with synthetic greenhouse refrigerants, such as R134a, used in our industry, and which are already well covered by controls including reclamation and destruction.

These refrigerants are now being used in such a way that emissions are kept to a minimum and alternatives for these refrigerants are the subject of ongoing phase-out and transition which are on track to meet low global warming potential targets which the CPRS could only dream of delivering.

VASA's submission to the government's Green Paper has called for limited-life fluorocarbon refrigerants (R134a) to be exempted from the scheme.

If the government continues with its plans without modification, the CPRS has the potential to derail the National Refrigerant Handling Licence scheme, and undo all of the great work which has been done by the industry to limit emissions and improve work standards.

VASA not only made a formal submission objecting to the Government's scheme, but also wrote to the Prime Minister direct to warn him of possible electoral fall-out if the government follows its current plan.

While the Department of Climate Change seems determined to rush headlong into the Carbon Pollution Reduction Scheme, the refrigerant industry is struggling with poor detail on how the scheme will work, and the prices which will be applied to the carbon permits.

VASA sees the major flaw in the Government's rationale being their assertion that R134a is a substance that is 'consumed', like a fuel.

The Department is therefore saying that every kilo of R134a which is imported, must be automatically deemed to be an emission, despite the current industry practices of recovery of refrigerant and its proper destruction by environmentally accepted means.

VASA is saying that it is unfair to assume that every kilo of R134a is going to end up in the atmosphere. If that's the case, why has the Government put the industry through the gauntlet and upheaval of the licensing and authorisation scheme.

The CPRS is therefore at serious odds with the existing world-class refrigerant recovery, reclamation and safe destruction scheme, pioneered by Australia, and now supported by the most advanced legislation in the world for reducing the risk of synthetic greenhouse emissions.

Australia's world-class HFC refrigerant stewardship scheme is on track to meet low global warming potential targets which the CPRS could only dream of delivering.

The current national refrigerant handling licensing scheme has led to a radical improvement in the skills of those technicians charged with the handling of fluorocarbon refrigerants, and because of the controls on the purchase of such refrigerant, there has never been a better scenario in Australia, and possibly the world, for making an impact on emissions into the atmosphere.

Added to this is the movement around the world to develop a synthetic refrigerant for this sector of industry which will have an extremely low GWP.

This is likely to be in production before the end of this year. While R134a may be in use for some years yet in Australia, VASA claims that a combination of the legislative controls, the stewardship program and the inevitable introduction of low GWP refrigerants negates the need for a permit charge on a diminishing substance.

The Department of Climate Change seems to be under the impression that there are alternatives to R134a as a refrigerant in the automotive and refrigeration sector. CO_2 was promoted by the government as an alternative AC system for automotive.

But everyone in the industry knows that CO_2 is not a drop-in alternative, but a totally different technology. All systems are designed for R134a. There are no commercially viable alternatives to HFC products.

VASA is concerned that the more expensive the refrigerant becomes, the more significant the changes to the culture of the supply chain. Cost cutting and/or dangerous practices will supplant best practice repair standards, common sense and safety.

Refrigerants in all systems do not react well to mixing with each other, air or moisture because of contamination. Inflated prices of refrigerant would create a real danger of a mass move to capture and re-use refrigerant, leading to contamination, system failure and ultimately increased emissions.

Repair shops (licensed or otherwise) and amateurs will be encouraged to turn to highly flammable hydrocarbon refrigerant as a cheap alternative. Hydrocarbons are not controlled, except by Occupational Health and Safety standards which differ state by state and, with the possible exception of Queensland where such refrigerants are banned in vehicles, are largely ignored.

No licence is required to use them and the product is freely available to non-accredited repair shops or amateurs.

Hydrocarbons are like barbecue gas and, in the event of a leak, place the safety of vehicle occupants and service technicians at risk of violent explosion.

VASA has told the Government it would be prepared to work with kindred organisations and the Government to devise a plan to phase out all global warming refrigerants. It will be a massive task, but no more than industry had to manage with phasing out CFCs in the 1990s.

Big campaign to woo new members and reward existing members

The VASA directors met in October and adopted a bright new campaign presented by new Treasurer Tim Grimes, aimed at encouraging membership and retaining existing members.

In recent meetings, there has been a lot of debate about putting 'value' on a VASA membership.

Tim, whose forte is marketing, believes there should be encouragement to join through financial and other incentives.

In the meantime, while at the Adelaide members meeting, also in October, CEO Ken Newton conducted a simple survey to try to determine what VASA membership meant to that group of members.

Tim Grimes

Of the 16 members in the room, seven said their main benefit from membership was to gather knowledge and information.

Another eight members listed their benefit as being able to promote that they were members of a professional network of quality tradesmen. One member listed improvement of standards in the industry as his major benefit.

It is often difficult to express the benefits of membership, because being involved in an organisation is a different thing to different people.

Most VASA members want to be kept informed, and appreciate that the directors are looking after their interests in the corridors of power.

Subject to funding details, the Board approved Tim's master plan, which, in broad terms, involves a membership drive through all member wholesalers, with a new statement of VASA services, VASA promotional stickers on products and a complete re-development of the VASA website.

To encourage members to renew on time, the Board will introduce an early bird membership offer, which will be a tangible prize rather than a discount.

Membership value will be improved through a concerted and sponsored Yellow Pages advertising program, and a new web marketing idea in which all VASA members can promote their individual businesses free on a web page. More details will be released when the program is firmly in place.

Bring back the regional meetings

In the meantime, there is a strong move among the directors to re-introduce regional or state based gatherings in order to give more members a chance to interact with fellow members, and to take a more active role in the destiny of the organisation.

The Adelaide meetings are now recognised as the best example of membership activity on the ground, with evening meetings, with guests, at least twice a year.

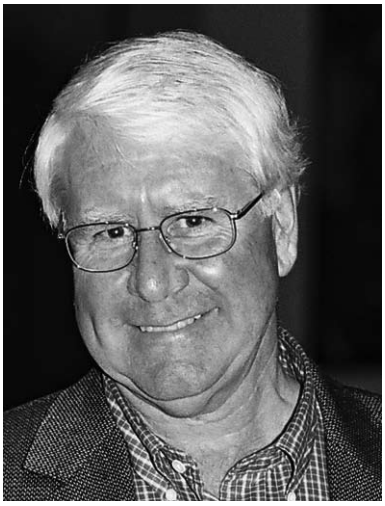
The Adelaide meetings have achieved a great number of promotional benefits for members in South Australia, and the Board would like to replicate this activity elsewhere.

Queensland once held regular meetings and training sessions which attracted 50 to 80 members. Queensland director Mark Mitchell intends to reintroduce these meetings in Queensland, and it is to be hoped that others will follow.

Ian Stangroome, a prominent VASA member who runs a service centre in Adelaide, has put up his hand to help plan the 2010 Wire & Gas Convention to be held on the Gold Coast at a venue yet to be announced. Ian last served on the convention committee which staged the highly popular convention in Adelaide back in 1998.

In the meantime, the Sydney directors, Deyan Barrie, Jeff Smit and Mark Padwick, are planning a top day out, followed by dinner at the beautiful old RACA building in the heart of Sydney for the 2009 Annual General Meeting. It will comprise training, the AGM, a workshop forum and mini trade show and a gala dinner. Members will be advised full details soon. **For your diary: Sat 30 May 2009**

If you have ever installed an air conditioning system in a vehicle, you are now a part of history



Ralph Cadman, a VASA pioneer and Life Member, has started the ball rolling on the VASA history project with the following memoirs.

Hot Air will publish more of these stories over time. VASA wants its members, or anybody for that matter, to help put together a history of the innovative people who used skills far beyond what they taught at college to install air conditioning in vehicles from all over the world.

Ralph takes up the story:

The car air conditioning industry in Australia was and perhaps now, is full of characters.

We may see some of them as larrikins, others as opportunists, some as true entrepreneurs, but all of them in their own way were explorers.

They all played a part in the development and maturing of the industry.

Although the Americans and the Japanese were reluctant to acknowledge the fact - Australia and its people are different.

The cars were the same, but the conditions were different, very different. Lousy roads, dust and heat contributed to a unique market.

It was, and still is in many ways, a small industry.
It was known as a one-man business industry. We used to know all of the major operators in the industry, world wide.

The majors all knew each other well - knew their families and the manner in which they conducted their business. So we fell into groups of those who had similar values. That's how rumours and scandals thrive.

We had to tolerate the brashness of the American engineers, the inflexibility of the Japanese and the cool European summertime needs. It was an interesting combination of dynamics.

The early days of this industry in Australia were spent trying to determine 'how to'.

The Australian pioneers communicated with suppliers by letters (10 days to USA, 21 days return with luck) and cables (36 hours).

The later years were dominated by 'how to do it faster and cheaper'. Freshly spawned ideas are now distributed world wide in seconds. I'm not sure which I prefer.

Here are some of the characters of Australian vehicle air conditioning history.

Mid 1960s
AMA (Australian Mobile Air)
Camperdown NSW
Barney Oris

Fabrication of AC units for imported cars. In later years Barney concentrated on armoured vehicles and trucks. He left the industry in the mid 80s to farm ducks! Barney ran a dark workshop on Parramatta Road. It never became a modern establishment.

Marlandaire
North Melbourne Vic
Bruce Humphreys

Commenced business as a taxi operator and later went into car air conditioning. He concentrated on ambulances and light commercials. Bruce guarded his territory zealously, but never became a major distributor in parts or AC systems. He Purchased from Danhard, AAA and jobbers in the Dallas area of USA.

Marlandaire acquired Mapco in the 80s, but it failed to impress local customers and subsequently failed after a few short years. Mapco had a detrimental financial effect on Marlandaire and was instrumental in the decline and eventual failure of Marlandaire in the early 90s.

1967
Marlan Australia, originally known as Marbro
Fivedock NSW
Ralph Cadman

Commenced importing and installing taxi door openers from Bussan Co in Tokyo. This was short lived, as a need arose to commence AC installations in Mercedes Benz sedans, for the business partner's Mercedes dealership.

It was thought the industry would remain strong for five years and time was the essence to take advantage of this short term market.

Partial systems were purchased from Smiths Industries, Guildford NSW (Hans Tol) and engine brackets were fabricated for each vehicle, sometimes in situ. Due to the increasing volume in certain models such as the 280 series, a small fabricating facility commenced. Plumbing was partial copper and industrial flex hose with reusable couplings. Installation time was gradually reduced from eight hours to around three as flex hose became more common.

Frustration with local suppliers forced direct import from USA and some local manufacturing enabled custom designed systems to be built for Rover 3500 and other European models. The Rover evaporator was moulded in fibreglass by a LHD/ RHD conversion mechanic and coils were manufacured by F Muller of Kingsgrove. Qunatities were small by today's standards, but local manufacturers saw a new opportunity coming. Modest quantities of Rover systems were exported to Singapore and Hong Kong, into the declining British outposts.

Marlan was unable to keep up with technological change, particularly with the onslaught of factory air conditioning. With moderate success, they tried to hold customers with component sales but could not compete with smaller parts operators and the business closed in the 80s. Ian Maudsley who was manager of Marlan at that time, started his own business in competition in the late 70s.

Go to the last page to claim your place in history

The Code spells out the things you MUST do and the things you SHOULD do

Hot Air is publishing the entire Code of Practice, piece by piece, to help explain how it works, and to help with interpretations.

VASA has received a number of requests for information, as well as bit of criticism of the Code for its lack of detail.

Please keep in mind that while VASA helped as much as it could in the writing of this Code, at the end of the day, the Government had the last say, so while some of the things VASA wanted may not have been included, it's the best you are going to get for now. The government has declared, however, that the Code is a document in progress, and if we feel strongly about, VASA can submit suggestions for changes to the Code.

Members need to understand that this Code does not constitute a technical design document and must be used with other standards and Codes of Practice already in existence - in particular, AS 4211.1 - 1996 gas recovery or combined recovery and recycling equipment.

The Code in detail

A.5 Equipment

A.5.1 A licensed service technician undertaking the servicing of motor vehicle air conditioning systems must have access to the following equipment:

- Refrigerant calibrated charging cylinder or weighing mechanism
- Manifold with pressure gauges
- Vacuum pump
- Refrigerant recovery system (including compressor
- and oil collector)
- Electronic leak detector
- Appropriate thermometer

A.5.2 Only recovery/recycling equipment complying with AS 4211.1, 1996 and the reference documents listed in Clause 1.3 of AS4211.1,1996 should be used.

In any case, the recovery/recycling equipment must be appropriate for the refrigerant type being used. Any system purchased or constructed after 1 January 2009 must comply with AS 4211.1,1996.

A.5.3 Recovery equipment must be operated and maintained in accordance with the manufacturer's instructions and records must be kept of all maintenance and calibration conducted.

A.5.4 Vacuum pump oil should be changed either in accordance with the manufacturer's instructions or at regular intervals.

A.6 Recovery, recycling and re-gas equipment

A.6.1 Recovery/re-gas equipment should be designed to minimise hose length that requires purging.

A.6.2 Pipes or hoses should have an isolating valve at the compressor end with the manifold valve sealing the other end.

A.6.3 Hoses to be attached to the high or low pressure side of the air conditioning system should have the isolating valve located no further than 300mm from the end of the hose.

A.6.4 Recovery equipment must have an isolating valve fitted at the recovery cylinder.

A.6.5 Isolating valves must be closed and refrigerant retained in the hose between use.

A.6.6 The isolating valves must be of a positive on/off type which will effectively seal the hose.

A6.7 The equipment should incorporate particle filter capable of trapping particulates of 15 micron spherical or greater; the equipment should incorporate an in line filter preceding the compressor or pump.

A.6.8 Recovery equipment should incorporate an oil separator so that the oil lost during recovery can be measured and the equivalent amount be replaced.

A6.9 Cylinders containing reclaimed refrigerant must be clearly marked, either:

- 'Reclaimed; non-contaminated - safe for re-use'
- or
- 'Reclaimed contaminated; not to be re-used' and must be returned to an authorised refrigerant supplier for disposal.

A.6.10 Extreme care must be taken to ensure the refrigerant recovery cylinders are not filled to beyond 80% capacity.

Any cylinder used for recovery should incorporate a device that automatically shuts down the recovery equipment to prevent the cylinder from overfilling. It is recommended these inbuilt devices be checked regularly for accuracy. (Refer to AS 4211.1–1996 and the reference notes mentioned therein for more detail on Clause 6)

A.7 Equipment operating instructions

A7.1 The equipment manufacturer and/or supplier should provide instructions for necessary maintenance procedures and covering information for the complete maintenance of the equipment to ensure continued proper and safe operation.

A.8 Safety requirements and functional description

A8.1 The equipment manufacturer and/or supplier must ensure the equipment complies with all of the safety and functional requirements stipulated in AS 4211.1,1996.

A8.2 Refrigerants that have been mixed must not be put back into service.

A.9 De-gassing

A.9.1 Whenever a system is de-gassed and opened for repair, the open lines must be immediately capped or plugged.

A.9.2 Refrigerant must only be removed from the air conditioner by the use of a refrigerant recovery system.

A.9.3 Recovered refrigerant must be collected for recycling or returned to an authorised refrigerant supplier, who is authorised to acquire refrigerant gas under the Regulations.

A.9.4 Refrigerant of one type must not be mixed with refrigerant of any other type if refrigerant is to be recycled for re-use.

A.9.5 Records must be kept of the amount and, where it is known, the type of refrigerant removed from air conditioning systems.

(See VASA note next page)

Hydrocarbon (flammable refrigerants - hazardous goods) does NOT belong in cars

The death of a fireman in New Zealand has forced technicians to think more carefully about the dangers of using a highly flammable refrigerant, under whatever name it goes by, in equipment which is not designed for it.

The accident at a coolstore in South Hamilton, has caused the NZ authorities to re-new their safety warnings on hazardous goods.

The New Zealand Department of Labour, which is investigating the incident, has released a fact sheet on the safe use of hydrocarbon refrigerants. It's on their website ***www.dol.govt.nz***

Here's a brief extract from this warning, which, to any sane person's understanding, means that NOBODY CAN USE HYDROCARBON REFRIGERANT IN ANY VEHICLE EVER MADE IN THE WORLD.

"Only use hydrocarbon refrigerants in the system if this has been approved by the unit's manufacturer and the refrigerant supplier.

Do not retrofit a system to use a flammable refrigerant unless the system is designed, or has been properly modified, to be used that way."

The only thing the government can't protect you from are the hydrocarbon refrigerant salespeople, or the 'refrigerant supplier' mentioned in the above document.

If the Australian experience is any guide, there are far too many sales types who will spin any yarn - short of telling you that their product is lethal in systems not designed for it - in order to flog it.

VASA is heartily sick and tired of receiving regular emails from zealots and sundry loonies who attack us sometimes rather viciously for closing our minds to the use of the beautiful, environmentally friendly refrigerant.

It's a typical tree hugger reaction - our refrigerant might blow you up, but it won't harm the atmosphere.

As one kindred journal noted soon after the NZ incident - 'has environmental enthusiasm overtaken the need for human safety?'

VASA has tried to tell these hydrocarbon lobbyists time after time that VASA has NOT banned hydrocarbon as a refrigerant. EVERY CAR MAKER IN THE WORLD AND MOST CLEAR-THINKING GOVERNMENTS have done that for us.

And we repeat our long standing offer - the moment anyone can deliver to our technical people a car AC system designed for using HC refrigerant and endorsed by just one car maker, VASA will develop a training program and start running it. Until then, please go away.

Even as the car company engineers and refrigerant scientist race to meet the European Union's directive to quit using the synthetic greenhouse gas R134a in vehicles, there is still not one company in the world remotely thinking about changing their systems over to take pure hydrocarbon as a refrigerant.

The use of hydrocarbon in Australia has been exaggerated out of proportion.

A survey in half a dozen leading AC repair shops in Adelaide last year, proved conclusively that HC refrigerant was being used in

a very small number of cars, and it was being used by people who had no idea what the refrigerant was, or what the dangers were. Adelaide and South Australia were supposed to be the hot-bed of HC use. Not so.

However, VASA directors were disturbed to hear complaints at the Wire & Gas convention in June, that farmers were being conned into buying HC refrigerant for their farm machinery, because it was cheap, didn't require a licence, and you could keep topping up the system to disguise the fact that the system had developed leaks.

Little do they know, of course, that in time, (if they are not blown out of the cabin in the meantime) the system will collapse because, as Denso has warned many times, the the durability of the system is threatened since the return of oil to the compressor is reduced.

Then there was the story from one member about the new Toyota dealership in his town who released a brand new car stuffed with HC refrigerant in the AC. As they say, there's one born every minute.

We finish with a strong message to our staunch New Zealand members - if a hydrocarbon salesperson appears on your doorstep, pretent you are not at home. There is nothing they can tell you which can over-ride the basic fact that vehicles are not designed for HC as a refrigerant, and as the government says, until the car manufacturer or any manufacturer says you can use HC in their system, DON'T.

The Code of Practice

VASA NOTE:

The sections of the Code covered in this Hot Air are pretty self explanatory, but we offer a comment on Clause A 9.5 simply because many technicians seem unsure about the detail required for their refrigerant records.

It's this simple: if you buy 100 kg of R134a, the ARC auditors need to know where it's all gone, and the only way you can prove this is to produce detailed records of every vehicle in which you either extracted refrigerant or replaced refrigerant.

Certainly, the normal reporting requirement every three months is a simple schedule of totals...gas purchased, gas in and gas out.

However, if you are audited, the inspectors will need to satisfy themselves that you haven't been selling gas to an unlicensed mechanic next door or that your workshop is showing an unacceptable level of refrigerant emissions.

VASA recommends that it is good basic business practice to record on each customer's invoice or job card, the refrigerant extracted and replaced. Even if the auditors never get to see it, it will certainly come in handy to keep track of customer vehicles, and notify them of the need for service.

So it becomes more useful as a marketing tool, while at the same time, covering you under the legislation should you be called on to explain where your last bottle of refrigerant went.

"I thank VASA for giving my husband, Ken Rudder the [Pioneer] Award. I was in tears when I saw [the last Hot Air magazine containing the story]. I decided to continue his business it is still doing well with the help of my son [Elton] who learnt a lot from Ken. Thank you for giving Ken the award."
- Jeannette Rudder, Vancool

Continuing the technical story on refrigerant charging, taken from the original Registered Technicians Program, written especially for VASA

LACK OF SUBCOOLING

What if in the previous example (Hot Air Issue June 2008) the liquid line was at 50ºC (equal to condensing temperature). This means there is no subcooling with a distinct possibility of incomplete condensation. This could be the reason for bubbles or foaming in the sight glass (it probably is!!!).

When there is a lack of, or no subcooling, there are two possibilities:
* insufficient condenser capacity
* low charge rates

To differentiate between them we need to go back to the head pressure analysis. If the head pressure is "on the plateau" or below the recommended level then it is likely a low charge rate.

If, however, the head pressure is creeping then it is clearly lack of condensing.

A liquid line at the same temperature as the condensing temperature indicates a lack of subcooling. The vehicle must not be sent out with no subcooling - the cause must be identified.

If the high side is not stable at recommended levels and subcooling levels are low, the problem withthe condenser must be rectified. Subcooling must be present while we are still 'on the plateau'.

USING SUBCOOLING TO DETERMINE CHARGE RATES

Subcooling levels are dependent on charge rates, providing condensing is,adequate.

Subcooling is the overcooling of the liquid in the last portion of the condenser below its ideal condensing temperature.

If the high side gauge is creeping or climbing to above normal condensing pressures and temperatures due to poor condensing action, subcool testing is an invalid testing method.

Pressures and temperatures must still be 'on the plateau'.

With ideal condensing pressures/ temperatures present in the system the subcooling level can be checked to verify charge rates.

* At low charge rates subcooling levels will be low due to a low condensing efficiency (poor refrigerant to condenser wall contact).
* At correct charge rates subcooling levels will be optimised due to condensing efficiency being at a maximum (refrigerant to condenser wall contact is maximised).
* In an overcharge condition testing becomes invalid when condensing temperatures rise to above normal levels (kick off the plateau).

Do not compare inlet and outlet temperatures of the condenser. THIS IS AN INVALID TEST as it merely compares a superheated pipe temperature with a subcooled pipe temperature - a totally useless test.

Using this knowledge together with the guidelines of 5ºC to 16ºC being an ideal subcooling range we can monitor subcooling until it is in the ideal range.
*If we can't promote any subcooling before the head pressure creeps or climbs, condensing is inadequate.
* If we can achieve +5ºC subcooling whilst maintaining head pressure then we are in the 'normal' charge band at moderate to high heat loads.

* On cooler days (low heat loads) 10ºC subcooling is normal due to the ease of promoting a subcooling run. Subcooling in excess of 16ºC indicates a possible overcharge. On cool days the high side may be stable with 18 to 20ºC of subcooling but on a hot day the head pressure is likely to 'run away'.

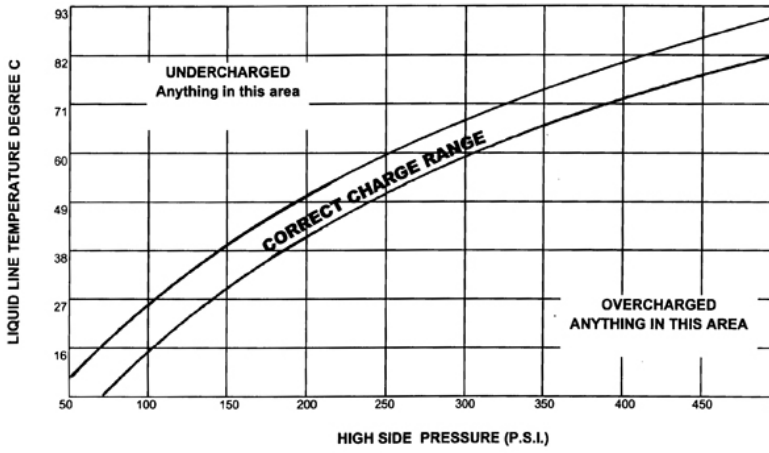
If a system is checked on a cool day with high subcooling levels it is suggested some refrigerant is removed until the normal subcooling level is reached, unless the technician can guarantee against an overcharge on a hot day. (Pre-tested an equivalent system for charge rates.)

The subcooling charts included here graph the correct charge for a properly condensed system.

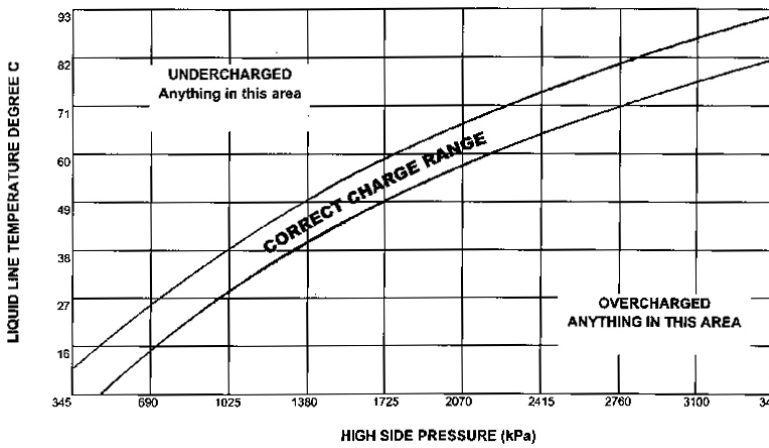
Use the subcooling charts below to analyse charge rates (providing condensing is adequate).

Comparing the high side pressure (condensing temperature) with liquid line temperature will indicate which band you are in (overcharge, undercharge or correct).

PSI SUBCOOLING REFERENCE



kPa SUBCOOLING REFERENCE



As little as 20 grams overcharge may present problems in marginally condensed systems with low capacity.

OVERCHARGING

Most problems of an overcharge need no introduction to a majority of VASA technicians. Likewise the appreciation that R134a is much more charge critical than R12, with +20 grams being a tolerance for many small charge systems. Some items of overcharge however may need some clarification.

When head pressures rise above normal levels the temperature of the condenser rises with the refrigerant temperature. This causes the formation of 'flash gas' which may be the bubbling we see in the sight glass with an overcharge. This flash gas, which is really vapour, when entering the TX will cause a decrease in evaporator efficiency and can lead to failure to fill the evaporator on hot/humid days with the subsequent generation of superheat.

Subcooling levels checks become invalid with any rise in pressure/ temperature above the normal levels.

If existing TX valves are retained the flow rate is 20% higher than with R12. The TX valve normally shuts down to compensate but during the stabilisation phase, whilst the TX is shutting down there is an increased risk of liquid flood back to the compressor. This of course means our charge rates are more critical, given we are already working close to the danger zone with normal charge rates.

UNDERCHARGING

The problems with undercharging are not as well documented and in fact have largely not been a problem with charge tolerant R12 systems.

Interconnected with this is the belief that annual servicing is finished. The reality is late model systems are far more critical to charge rates and system integrity and an annual service check (as opposed to a full service - which would be done as necessary) is probably more critical than ever before.

Let's look at the problems with undercharging:

First and foremost is the inability to fill the evaporator coil under high heat load conditions. Many technicians fail to realise the evaporator can easily be filled on a 25º day (with the TX fully open to compensate for the low charge) but on a 35º day (examples only) there is no way the evaporator can be filled for maximum efficiency.

Further to that, if the evaporator is not filled the long superheat run, plus suction line superheating that will result, may generate excessive discharge line superheat with subsequent thermal switch activation or compressor failure (lack of compressor cooling). It is important to realise this may only occur on hot days (high heat loads). No superheat testing on cooler days will indicate the problems that will arise under high heat loads.

Our role as professional service technicians is to ensure a 90% charge rate (or close to it) during service. We then know the evaporator will be capable of being filled under all heat loads.

Thirdly is the question of oil return. It is important to realise the amount of refrigerant circulating directly controls the oil circulation rate, with oil return back to the compressor being critical especially under highway conditions.

At lower charge rates, oil circulation rates reach critically low levels.

This Technical Bulletin has covered some basics and some advanced concepts of charging in retrofit. We would encourage all VASA technicians not to immediately go into worry mode over this information but rather to think more carefully when charging systems, and to relate this information in simple terms to the customer to encourage professional service as our agenda.

First Air-Conditioned Auto

With all windows sealed, and a stream of fresh, filtered air at just the right temperature entering through a special duct, the world's first air-conditioned automobile recently made its debut in a successful test run on New York City streets. It demonstrated a remarkable new system that promises all-the-year-round driving comfort, regardless of summer heat or winter cold. Air is drawn into this system through a concealed inlet, filtered to remove dirt and dust, blown over coils that chill or warm it as required, and admitted through grills to the car's interior. Cooling is effected by a refrigerating compressor beneath the floor boards, resembling that of an electric refrigerator, which takes its power from the car's generator or may be run from a special battery. To heat the air, hot water is circulated through the coils from the car's radiator. The air-conditioning equipment may be turned on or off at will from the instrument board or rear seat. Since the windows of the car are kept closed, outside noise is excluded. Any closed car, new or old, may have the air-conditioning system installed, according to the New York concern sponsoring the invention, which expects to manufacture it in the near future at a sufficiently moderate cost to permit its use even in low-priced cars. The makers foresee the car of the future provided with air conditioning as standard equipment. In that event many of the inconveniences encountered at present will be removed, along with a decrease in the danger of suffering carbon-monoxide poisoning.

Through the grills seen above, fresh air enters and old air is expelled in the first air-conditioned car seen at right

Beneath the floor boards in the auto's rear compartment is placed this refrigerating compressor to chill the air drawn into the car and make driving comfortable on hot days

Add your name to the history of Australian and New Zealand vehicle air AC

If you or your business have been working on installation and repair of vehicle air conditioning systems for more than 20 years, you deserve to be a part of the history of vehicle air conditioning.

If you feel you have made an important contribution to this industry, you should fill in this form.

If you know of anyone who you believe deserves to be included in this history, please let us know.

For posterity, please take the time to fill in the attached form - and send to:

Fax: 07 5591 8172

Post: VASA
PO Box 1160
PARADISE POINT QLD 4216

On-line:
www.vasa.org.au
Fill in the on-line form

Mobile Air Conditioning History of Australia and New Zealand

Your full name:_____

How long have you been an AC technician?_____

What qualifications did you begin with?_____

_____

List all your business names, dates of operation and addresses:

Business name	*When established*	*When closed*	*Address*

Did you <u>install</u> air conditioning systems as an aftermarket accessory? YES ☐ NO ☐

If so, in what type of vehicles did you install AC sytems?_____

_____

_____

Describe in your own words, the special skills or techniques that you developed or acquired to enable you to install or repair AC in vehicles which were originally not intended for such an accessory.

_____

_____

_____

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_____

_____

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Do you have any early photographs of your first business premises, or of yourself at work on vehicles? If so, would you make them available for this history project? (Send as high resolution jpegs, or contact VASA for assistance - Phone 0438 569 517)

Please provide your current phone number and/or email address for further contact:

Phone:_____ Email_____