



HOT AIR

NEWSLETTER

The Mobile AC, Electrical and Cooling Technicians of Australasia

February 2009

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HFC-1234yf adopted as refrigerant of choice for vehicles

A December meeting in Washington, USA of stakeholders in the refrigerant industry, agreed that the new HFC-1234yf is the refrigerant-of-choice to replace HFC-134a in motor vehicle a/c.

All but four of 70-plus air conditioning stakeholders supported HFC-1234yf.

However, no officials from the German Association of the Automotive Industry were present at the meeting. This association has previously announced that its members favor R-744 (CO₂).

Meanwhile, the SAE International Cooperative Research Program has also endorsed HFC-1234yf, Honeywell's low-global-warming-potential refrigerant for use in mobile air conditioning.

The SAE Program team said the refrigerant offers superior environmental performance and that of all proposed alternatives it had been judged to have the lowest risk for use in mobile air conditioning systems in meeting environmental and consumer needs.

The SAE Program's extensive testing showed that HFO-1234yf is a "highly energy-efficient refrigerant, meaning autos with HFO-1234yf use less fuel and have fewer (greenhouse gas) emissions than those that use alternatives." The program found that while CO₂, another proposed alternative, has a global warming potential of 1, it "is less efficient than 1234yf, resulting in greater indirect emissions".

Honeywell said HFO-1234yf is a near drop-in replacement for current refrigerants, meaning it does not require a complete redesign of current air conditioning systems and can be more easily used in the existing fleet.

VASA ON THE LOOKOUT FOR NEW BLOOD

VASA directors are hoping that the next Annual General Meeting of members and election of officers might unearth some fresh new talent in the ranks.

While members of any organisation think twice about putting their hands up for executive office, the reality is that, for the right person, the challenge can be very rewarding.

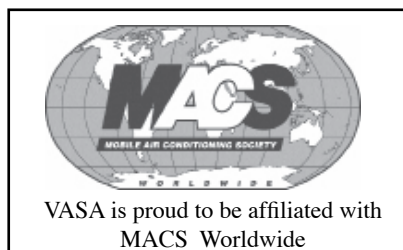
Since VASA was formed in 1993, it has never held a ballot at the AGM to elect its President, Vice President, Treasurer or directors.

Directors would like to think that this meant general membership satisfaction with its Board of Directors. However, like all organisations, new blood is always encouraged, if for no other reason than to give their serving members a bit of a break.

The Board of Directors comprises a President, Vice President, Treasurer and four directors.

Under the rules of VASA, all positions become vacant at the AGM, and all existing Board members may choose to offer themselves for re-election.

The Board of VASA meets quarterly in different cities, and all directors are expected to attend a minimum of 50% of all meetings.



VASA is proud to be affiliated with
MACS Worldwide

The Board works voluntarily for the good of all members. No honorariums are paid to any directors.

AGM papers, which include a nomination form for the Board, will be posted to all members approximately one month prior to the meeting.

Thanks to the efforts of VASA Sydney-based directors, this year's AGM will be part of a bigger event, aimed at enticing more VASA members to roll up, and also to encourage potential new members to check out the VASA benefits of membership.

Make a date in your diaries:

**VASA AGM, Training Session,
Mini Trade Show and Dinner**

**The Royal Automobile Club of
Australia (RACA) 89 Macquarie
Street, Sydney on Saturday 30 May
2009, from 9.30am to midnight.**

More details inside this newsletter.

A number of major changes are occurring within the VASA administration.

The 'back office' duties, which until a year ago were carried out by the CEO, Ken Newton, were transferred to a sister organisation AIRAH in Melbourne.

Because of the need for cost efficiencies in these uncertain times, the Board has decided to bring the 'back office' back into its own organisation, thanks to director Jeff Smit, who offered to run the treasury and routine office duties from his office in Sydney. Members will be notified of the changes of address in the AGM papers.

AT LAST - THE DVD YOU HAVE BEEN WAITING FOR

One of Australia's most sought-after trainers Grant Hand goes on camera to deliver the most comprehensive and clear air conditioning service message ever produced. A timely refresher course for the experienced - an essential tool for apprentices and newcomers to the industry.

Thanks to sponsorship funding from Refrigerants Australia, creative input from Grant Hand's company Automotive Training Solutions and production support from VASA, this long awaited program, filmed during 2008, is now available at a special price to VASA members.

You receive an attractive DVD case containing three programs, including a detailed air conditioning service on a vehicle, an insight into how to sell a professional service, as opposed to a quick 'top up' - now illegal, and finally, an in depth study of why components fail.

And, inside the DVD case is a 24 page workbook, containing a summary of professional air conditioning service procedures.

This total package is retailing for \$50, but for VASA members, a limited number of DVDs are available for only \$40.

To order your copy, a form is on the VASA website at www.vasa.org.au, or email secretary@vasa.org.au with your name and phone number and we can organise it for you, with payment by credit card or cheque.

Copies will also be on sale at all VASA functions.



VASA member No. 8 enters our Hall of Fame

Members have started to rally to VASA's call for a/c pioneers to register their role in the history of this industry.

Among the first in was Kevin (Bluey) Crisp, of Premier Instruments in Dickson, ACT.

Not only has Kevin been in the game for 42 years, his workshop was a pioneer VASA member - membership number 8.

He still helps out in the business, but his son Michael now runs the show and is the VASA member.

Kevin Crisp joined the airforce at 16 years of age and was enrolled in the first apprenticeship course. He emerged as an instrument maker and repairer, and remained in the Air Force for 15 years.

He then started Premier Instruments, in 1963, first in Lonsdale St, Braddon in the ACT, and then the current address at Badham Street, Dickson. His workshop specialised in a/c installations in a range of cars, including Mercedes, Holden, Ford, Jaguar, Datsun, BMW and Chrysler.

"In the early days, you had to adapt a/c kits to suit the vehicles. This meant modifying brackets, hoses and engine cooling fans," Kevin recalls. "In many cases we had to make an engine mount bracket in-house to suit the odd vehicle. Repairing was a learn-as-you-go experience, and so was charging the systems."

Kevin Crisp has certainly earned himself a place in the a/c industry's Hall of Fame.



Kevin and Michael Crisp outside their Dickson ACT business

Keep an eye out for Colin's equipment

A long time VASA member, Colin Beards of MCAQ in Narangba in Queensland, has been the victim of a well-planned robbery in which more than \$21,000 worth of tools and equipment were taken from his workshop.

Colin has appealed to VASA to alert members to the possibility that if workshops are offered cheap a/c equipment, no questions asked, it could well be his.

Among the more expensive items were a Mig welder, a brand new CPS refrigerant recovery machine, an Airazone recovery and recycle machine, a Jayvac recovery machine and a host of smaller tools as well as his office computer.

If any member has been approached to buy this specialised equipment, Colin would appreciate a call.

Colin Beards mcaq@optusnet.com.au or phone 0428 197 832

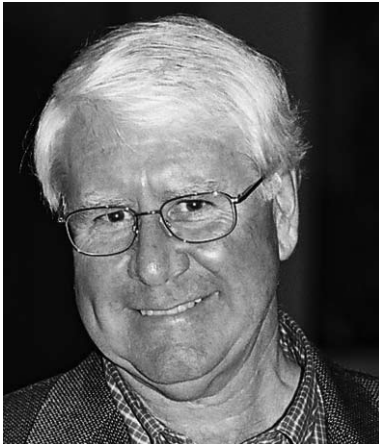
VASA membership fees are due on 1 April. Please help your voluntary association by paying promptly when you receive your tax invoice.

Congratulations to Kevin Crisp at Premier Instruments in the ACT for making the time to send in the first history form - and what a history he's got. So come on members, take a minute to fill in the form on the back page.

The form appears for the last time in this issue, so grab the opportunity.

After that, it will be available on the new VASA website at www.vasa.org.au

Part III of the Australian History of Vehicle Air Conditioning



Ralph Cadman, a VASA pioneer and Life Member continues his memoirs of the characters, movers and shakers of the vehicle air conditioning industry in Australia.

1973

Allcar Air Conditioning/Mazdair Marrickville NSW Peter Austin and Ken Rudder

This business arose with the popularity of Mazda. Because engine space was tight and the larger manufacturers avoided the risks, entrepreneurs such as Peter and Ken gave it a go. They wanted to make everything themselves to avoid the risk of others having access to a similar product.

Unicla sold them bolts and nuts (the shiny ones) but not beautifully cast brackets. Allcar preferred to hand fabricate engine brackets which would fit well in situ assisted with a ball pein hammer.

1973

Mark IV

USA began experiencing funding difficulties with the death of John Mitchell and they decided to sell off the Australian operation. Marlan was a keen suitor as was Bennett and Wood who eventually acquired the rights for Mark IV. Thus commenced the interest of large parts wholesalers in the air conditioning industry.

The panic continued to satisfy the highly seasonal market and many times economics was a second issue. Luxury car buyers demanded attention and, although the market was small, unit prices were high - around

10% of the vehicle value. One can imagine the cost in today's values of an installed unit for a 600 Mercedes Benz!

In this era, Marlan was trying hard to develop the market for Rover and Mercedes Benz customised units in Asia and several successful contacts were made with motor dealers in Hong Kong and Singapore. Aircon companies were also developing in Asia - Mark IV Hong Kong, Tropicool in Singapore and Kuala Lumpur and Formula Industries in Bangkok. Mike Mahoney from Tropicool, an ex US Air Force pilot, used his Cessna twin to deliver systems throughout the region, signs of the times in the British colonial outposts!

Air International South Melbourne Vic Owen John

Recognising the increasing need for air conditioning in imports, Owen John, a respected former Jaguar motor dealer, decided to develop customised/semi intergrated air conditioning for XJ6 series.

Parts were sourced initially from Smiths Industries, who were trying hard for 'OEM' business. OEM was a misused term and many small assemblers, such as Allcar Air, Olympic Air and others, sought to be listed as one of many OEMs in Australia, thus giving them access to international component sourcing.

It soon became apparent if you could afford an air ticket to Dallas, to the IMACA Convention and have a bold way with words, you could source any component at almost the same price as Smiths.

The history of Air International in itself has become legendary. Bruce Griffiths, sales manager, took over from Owen John when he became ill and eventually was ably assisted by Alf John. Together they took the business to much higher levels. The company was listed and became the major supplier to Holden and Mitsubishi. Over several years, additional products were added and the company became diverse, highly profitable and dominated the local OEM market, taking business away from importers.

The push was on for local content in assembly plants. Importers now had only a small place in the OEM market.

1974

AMC Granville NSW Rick Pickering

Rick Pickering became frustrated with his American connection and decided to take some of the Mark IV staff and form a local assembler/manufacturer, based on some of the new vacuum formed variations of evaporators coming from Texas. AMC picked up some minor low volume OEMs such as Landrover and started to concentrate on off road 4WD vehicles.

The AMC name was borrowed from a Texas manufacturer headed by Buddy Paschal, another 'character' in the industry. Buddy had quite a reputation in Fort Worth for his meteoric rise and fall in the aircon industry.

Rick and Ian departed from AMC in the mid '80s and the company was acquired by partners of Autotrac in Sunshine, Victoria, including Brian Haley, who felt there would be an advantage in the partnership.

As imported vehicles were having factory units developed overseas with the aid of American and Japanese suppliers, small companies such as AMC had to rely more on aftermarket low volume opportunities.

Roy Brown, who was the engineer in the early AMC days, managed the business for several years.

Of course the reliance on the aftermarket could not continue indefinitely and AMC failed in the late '80's.

(Continued next issue)

Go to the last page to claim your place in history

The VASA website, www.vasa.org.au is undergoing a complete revamp.

It will be a new look website, replacing the original site first constructed in the mid 1990s.

It is expected to come on stream by March 2009.

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

Hot Air is publishing the entire Code of Practice, section by section, to help with interpretations.

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

While VASA and the MTA had a great deal of input into the Code, at the end of the day, the Code had to undergo a strict government process involving technical as well as legal scrutiny.

It is important for technicians to understand that this Code is delivered on the assumption that those who pick it up to read it, **already know what they are doing.**

In other words, too many technicians are expecting the Code to be a full-on workshop manual. The Code is only supposed to be read by technicians who are already well trained, and have at least the minimum Certificate II standard of understanding of vehicle a/c systems.

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.13 Pressure/temperature relief

A.13.1
Any system not fitted with a high/low pressure cut-out device should not be re-gassed until a suitable switch is fitted.

VASA COMMENT:
Preferably, the switch should be fitted into the drier, or if not, after the condenser and before the TX valve (evaporator), but not too close to the discharge side of the compressor.

A.13.2
Pressure/temperature relief devices which vent to

atmosphere are only permitted when the system is also fitted with a high/low pressure cut-out switch.

A.13.3
When a pressure relief device is fitted the high pressure cut-out switch must be set to operate at a lower value than the pressure relief device.

VASA COMMENT:
If you are not sure of the rating of the pressure relief valve, you need to check first with the compressor manufacturer.

A.14 Hoses

A.14.1
All hoses which show signs of ageing or physical damage must be replaced.

A.14.2
All replacement hoses must comply with the appropriate SAE Standard. (Refer Section B)

A.14.3
Steel fittings should be used on all connections that are subject to high vibration, torsional or shear loads. For example, some large diesel engine plant and equipment.

A.15 Connections

A.15.1
Hose connections must use one of the following methods:

- crimped, using correct crimping tools
Note: Whenever crimped joints or hose clamps are undone they must be replaced with the specified new fitting.
- flared joints meeting the appropriate standard of "Refrigeration Tube Fittings"
- "O" ring seals
Note: Whenever an "O" ring joint has been opened the "O" ring must be replaced with a new one as specified.

VASA COMMENT:
It is not recommended to re-use second hand fittings or clamps because over time, these fittings deteriorate.

A.15.2
A suitable refrigerant lubricant must be applied to, and behind, all mating surfaces and sealing items, for example "O" rings, gaskets and flares, to avoid damage during tightening. Some newer equipment specifies that joints must be assembled dry; it is imperative that manufacturer's guidelines are followed.

A.15.3
All pipe work and fittings must be free of contamination prior to fitting.

A.15.4
All joints must be leak tested on completion of assembly.

A.16 Compressor

A.16.1 Check compressor mounting bolts and mounting bracket bolts for tightness and tension to manufacturer's specifications.

A.16.2 Check the compressor drive belts for wear and damage and replace as necessary. The compressor must be correctly aligned and the drive belt be correctly tensioned to manufacturer's specifications

VASA COMMENT:
As a general rule of thumb, allow a 10 mm deflection in the belt, when tensioning.

As a benefit of membership VASA members receive free subscription to The Automotive Technician and their problem solving service.
www.tat.net.au

MACS 2009 Convention Exceeds Recession Economy Expectations

The numbers might have been down at the big MACS Worldwide Convention in Dallas, Texas, USA, but it wasn't the technicians and workshop owners who caused the drop.

Elvis Hoffpaur, MACS president and chief operating officer, noted that the decline in attendance seemed to be from the manufacturing side with many companies sending fewer representatives to attend the show as their budgets tightened and travel was restricted.

"The attendance from our service members was consistent with prior years with strong attendance in all of the many hours of training sessions," said Elvis.

One of the exhibitors summed it up this way. "MACS is one of the few remaining organisations where you can see and be seen in a forum specialising in the Mobile HVAC Industry. This alone makes the experience and investment worthwhile! Many of us tend to analyse the overall conventions effectiveness by the number of participants. In a normal economic environment, I might have been disappointed in the amount of attendees this year; however, given today's economic conditions, we would give the overall experience an A."

Closer to home, VASA recalls that more than one exhibitor at one of the poorest attended Wire & Gas Conventions reported their best business ever. "It's got little to do with the numbers - it's the quality of the audience that is important."

There's a lesson here for potential exhibitors for Wire & Gas 2010.

May and June 2009 – VASA training events in Sydney and Adelaide

SYDNEY

SATURDAY, 30 MAY 2009

**Training, VASA Annual General Meeting, mini trade show and dinner
The Royal Automobile Club of Australia (RACA) 89 Macquarie Street Sydney**

ADELAIDE

SATURDAY, 13 JUNE 2009

**Training, mini trade show, partners program and dinner
Adelaide Stamford Grand
Moseley Square, Glenelg SA**

Annual General Meetings held during the bi-ennial convention are always well attended, and it's a great forum for members to air their views. However, in the 'off year' it's sometimes hard to motivate members to attend just a meeting.

So, to make it much more attractive, the VASA board has turned the AGM in Sydney into a major training and trade show event, combined with the AGM and a dinner that night. The events will be held in the historic RACA building in the city.



Already, VASA has interest from new manufacturers and wholesalers, many of whom have realised the importance of promoting electrical and electronic equipment and tools to members. After all, VASA now covers electrical as well as a/c, and the training session on the day will be oriented towards electrical problem solving.

For those who think the AGM is a formal and boring affair, **don't**. The formalities are usually very short, but members are then invited to engage in a wide ranging debate on issues which affect them and their business.

It's an opportunity for members (and potential members) to speak their mind, offer ideas to improve business, and solutions to everyday workshop problems.

Meeting notices, with full details of time, place and cost, will be sent to all members a full month ahead of the event.

PROGRAM

Saturday 30 May 2009

9.30am-10am The day starts with a morning tea

10am-12noon Training provided by The Automotive Technician trainers.

12noon-1pm Lunch
1pm-3.30pm VASA Annual General Meeting and general forum

3.30pm-4pm Afternoon tea

4pm-6pm Mini Trade Show with drinks and canapés

7pm-midnight Three course dinner with drinks and entertainment.

Each technician who attends the training, AGM and trade show will be charged a flat fee of \$95.

That payment will entitle each person to complimentary tickets for both themselves **and** their partner for the evening dinner function.

This deal is available only to those who attend the full day training and AGM. Those who may wish to attend the dinner only, will be asked to pay the full price of \$200 per couple.

There will be seven trade show exhibitors.

Wholesaler, OEM members or other suppliers can sponsor this event for \$400, and they will be invited to run a trade table exhibit in the afternoon.

Sponsors are also sought for dinner, drinks and entertainment.

**Interested companies contact
secretary@vasa.org.au**

The South Australian VASA members, with input from Northern Territory and Western Australian members, hold regular meetings and events. This is applauded by the VASA board, and interest is growing in re-igniting the regional or state training and meeting events which used to occur regularly in VASA's early days.

So it's not surprising that SA Director Dave Jackson and his team have organised a big training day and social event for June 13.



Major sponsorship support has come from Bosch, with welcome support also from supportive VASA members.



Auto Air Products



THE POWER CONVERSION SPECIALISTS



DISTRIBUTION

The show actually begins on the Friday night, 12 June, when Bosch will hold an evening for their service dealers, most of whom are VASA members.

PROGRAM

Saturday 13 June 2009

10am - 12 noon

Darren Todd, one of Bosch's main trainers will conduct a session dealing with the new

sensors being used in R744 a/c systems **and** climate control component testing. Bosch will be using the weekend to launch some new equipment for the a/c trade.

12 noon - 1pm Lunch

1pm - Presentation from one of the Bosch equipment managers for 30mins. Short break and then Dave Townley.
3pm End of training sessions. Free time till dinner.

Partners Program:

While the members are at training, partners will be on board a coach for wine tasting, followed by lunch. Their tour finishes at Haighs Chocolate for tastings and each partner will receive a box of Haigh chocolates.

The dinner will be memorable for more than conviviality and fellowship.

It will be the inauguration of the RAA award to a VASA workshop for outstanding service.

This will be a great honour for the winning business.

The award will be presented by RAA Technical Liaison Manager, Scott Robertson, or RAA Manager Technical Services, Mark Borlace.

During the weekend, there will be some pretty good give-aways.

Sunday 14 June 2009

Wind up breakfast

Inquiries and bookings for the event should be made direct to:

Dave Jackson

david@jacksonsauto.com.au

Ph 08 8376 0899

Ian Stangroome

ian@corjay.com.au

Ph 08 8234 9112

A refresher course from the original RTP, a distinctive training program developed by VASA for its members. The information it contains is as relevant today as it ever was! If you think you know it all, pass this on to younger members of your team.

Pressure/Temperature Relationships of Refrigerants

How does a refrigerant absorb heat from inside the cabin and dissipate it to outside the vehicle (via the two heat exchangers)?

First, we must understand the dynamics of heat transfer.

There are three ways in which this heat transfer can take place:

- 1 Conduction
- 2 Convection
- 3 Radiation

Given **Law No. 1** how do the heat exchangers absorb or radiate heat? The answer lies in the property of a refrigerant to have a direct pressure / temperature relationship.

By referring to Diagram 1 it can be seen that as we raise the pressure of the refrigerant we raise its temperature.

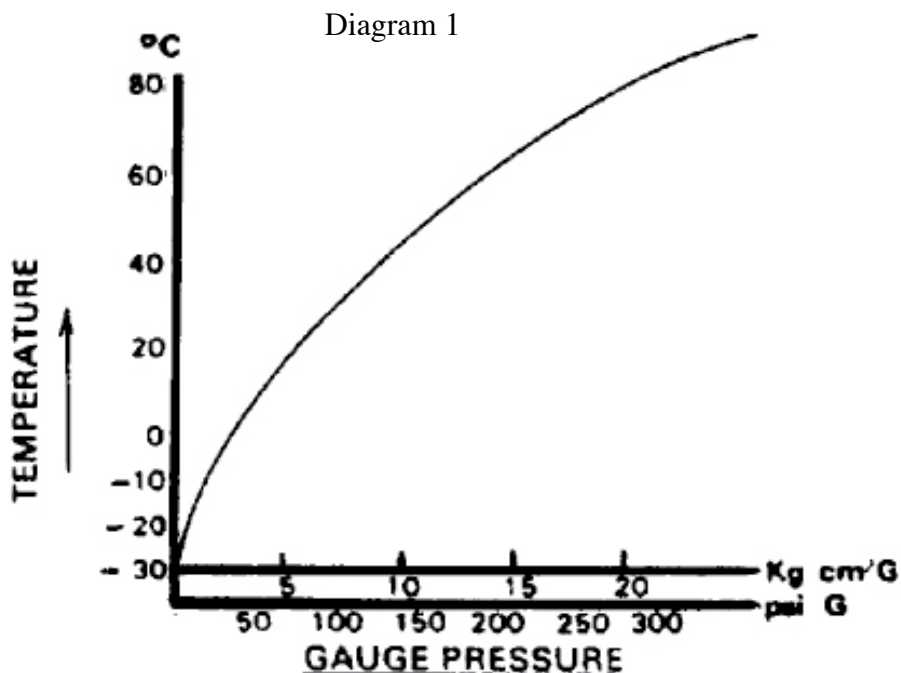
According to the diagram:

- At 200 kPa (30 PSI) the temperature of the refrigerant is approximately 0°C.
- At 1500 kPa (220 PSI) the temperature of the refrigerant is approximately 60°C.

“The key point to understanding and diagnosing refrigeration systems is that heat will always travel from hot to cold.”

REFRIGERATION LAW No. 1

Heat will always move from a warm object to a cooler one whether it be in solid, liquid or vapour form.



This characteristic curve represents the pressure/temperature relationship of R134a.

What then does this achieve? How do we generate/use this principle?

This is where the Compressor and TX valve/orifice tube comes into play.

These are the components responsible for basic pressure generation in the system.

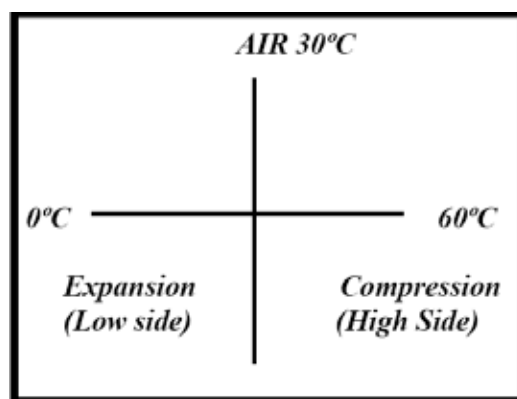
The compressor, acting in conjunction with the TX valve/orifice tube generates the basic high side and low side pressures.

If the pressure in the evaporator is controlled to 200 kPa (30 PSI) then the temperature of the refrigerant will be 0°C (approximately).

If the pressure in the condenser is controlled to 1580 kPa (220 PSI) then the temperature of the refrigerant will be 60°C (approximately).

If the temperature of the day (ambient temperature) is say 30°C and the system has created a low side of 0°C (refrigerant temperature) and a high side of 60°C (refrigerant temperature) then the refrigerant in

both heat exchangers is at a temperature that will facilitate heat transfer - in opposite ways - to and from the air.



“The Compressor and TX Valve are the basic pressure controllers of the system.”

By applying **Law No. 1** (Heat always travels from a hot object to a cooler one):

- The refrigerant inside the evaporator will absorb heat from the relatively warm cabin air.
- The refrigerant inside the condenser will dissipate heat to the relatively cooler air.

This leads us into **Law No. 2**.

Inside the vehicle the heat is absorbed into the relatively cold refrigerant (30°C cabin air to 0°C refrigerant). By sucking the heat out of the air we refrigerate the cabin air.

Conversely, outside the vehicle the refrigerant is much hotter than the air, thereby allowing for heat dissipation at the condenser (providing airflow is adequate).

Change of State Characteristics

When a refrigerant (or any substance) changes state, heat must be either absorbed or released.

When dealing with air conditioning systems there are two forms of heat we need to consider.

SENSIBLE HEAT

Sensible heat is the heat that will change the temperature of a substance. Sensible heat can be felt and can be measured with a thermometer.

LATENT HEAT

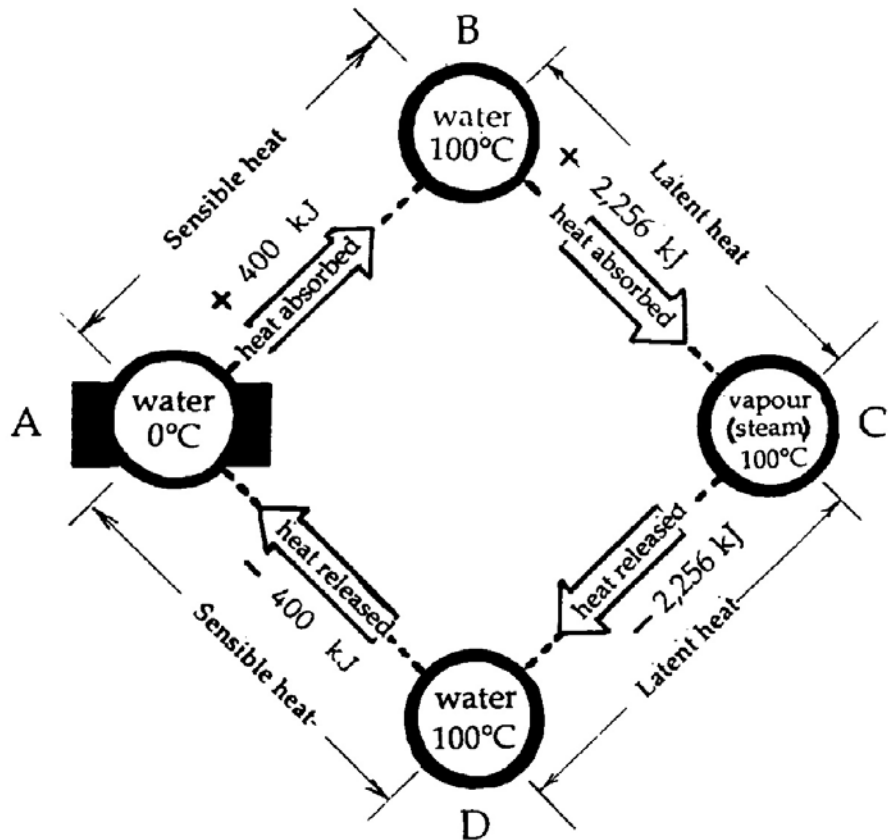
Latent heat is the principle heat form we need to consider in an automotive air conditioning system.

Latent heat is the heat that is transferred in a change of state of a substance. The refrigerant changes state in both the condenser and the evaporator by absorbing and releasing heat.

The absorbed or released heat is known as 'Latent Heat of Vapourisation' and 'Latent Heat of Condensation'.

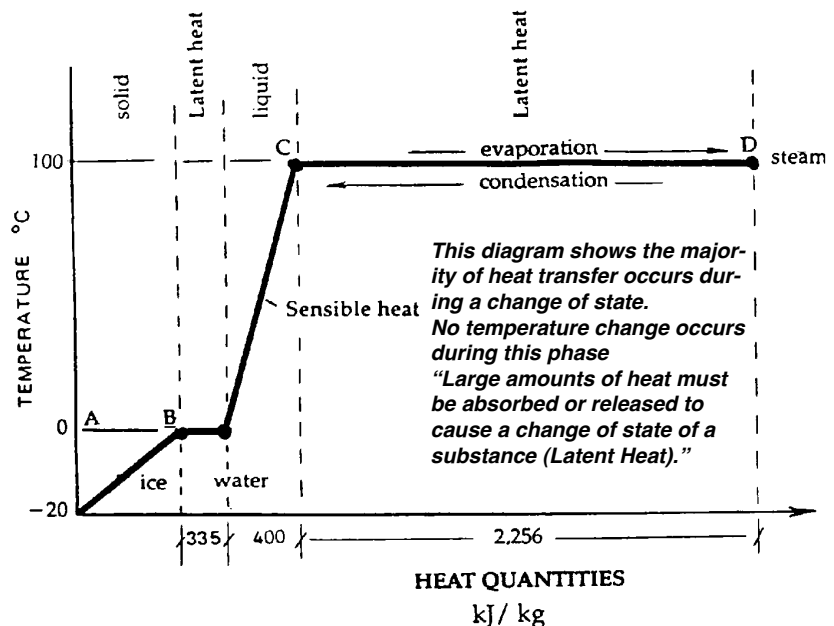
“Latent heat is otherwise known as Hidden Heat because it cannot be felt or measured. It can only be observed by causing a change of state.”

REFRIGERATION LAW No. 2 To Refrigerate is to Remove Heat



Following this diagram from Point A (water used for familiarity):
 A to B = Absorbed sensible heat = change in temperature (0 to 100°C)
 B to C = Absorbed latent heat = change of state at 100°C
 C to D = Released latent heat = reverse change of state at 100°C
 D to E = Released sensible heat = change in temperature (100 to 0°C)

REFRIGERATION LAW No 3. Heat Can Be Used To Do Two Things: Change the Temperature of a substance (Sensible Heat) Or Change the State of a Substance (Latent Heat)



Add your name to the history of Australian and New Zealand vehicle air a/c

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 a/c technician? _____

What qualifications did you begin with? _____

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

<i>Business name</i>	<i>When established</i>	<i>When closed</i>	<i>Address</i>

Did you install air conditioning systems as an aftermarket accessory? YES NO

If so, in what type of vehicles did you install a/c systems? _____

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.

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 _____