

Hydrocarbons, Is this the future for refrigerants ?

What are the alternatives

- ▶ R410A
- ▶ R152
- ▶ R1234YF
- ▶ R32
- ▶ Rthis, Rthat

THE ALTERNATIVES R410a

- ▶ GWP OF 1700 – HOW DOES THIS SOLVE ANYTHING
- ▶ EXCESSIVELY HIGH OPERATING PRESSURES
- ▶ VERY EXPENSIVE
- ▶ Complete re-design, not a drop in

THE ALTERNATIVES R152

- ▶ Low GWP
- ▶ Flammable
- ▶ Toxic when overheated or burnt
- ▶ Quite expensive
- ▶ Not as efficient as the gas it replaces
- ▶ Complete re-design, not a drop in

THE ALTERNATIVES R1234yf

- ▶ Low GWP
- ▶ Highly toxic
- ▶ Flammability listed as “mild” or “manageable” compared to the higher flammability of R152-a.
- ▶ Expensive
- ▶ Not as efficient as the gas its replacing
- ▶ Complete re-design, not a drop in

THE ALTERNATIVES R32

- ▶ Quite high GWP considering what we are trying to achieve
- ▶ Flammable
- ▶ Complete re-design, not a drop in
- ▶ Toxic

THE ALTERNATIVES Rthis Rthat

- ▶ There are also maybe another 100+ blends of various chemical refrigerants, some with Hydrocarbons added to help oil migration
- ▶but what is clear

THERE IS NO ONE IDEAL REFRIGERANT

Fluid	Ozone Depletion	Global Warming	Biopersistent Degradation Products	Efficiency	Flammability	Toxicity	Fluid Cost	Equipment Cost
CFCs	Red	Red	Red	Green	Green	Green	Green	Green
HCFCs	Red	Red	Red	Green	Green	Green	Green	Green
HFCs	Yellow	Red	Red	Green	Green	Green	Green	Green
PFCs	Green	Red	Red	Yellow	Green	Green	Yellow	Green
FFCs	Green	Red	Red	Green	Green	Green	Yellow	Green
RFCS	Green	Red	Red	Green	Green	Green	Yellow	Green
RFES	Green	Red	Red	Green	Yellow	Green	Red	Green
RFAs	Green	Red	Red	Green	Yellow	Green	Red	Green
RCS	Green	Red	Red	Green	Red	Green	Green	Green
Ammonia	Green	Red	Red	Green	Yellow	Red	Green	Yellow
Carbon Dioxide	Green	Red	Red	Yellow	Green	Red	Green	Yellow
Sulphur dioxide	Green	Red	Red	Green	Yellow	Red	Green	Yellow
Methylamine	Green	Red	Red	Green	Yellow	Red	Green	Yellow
Nitrous oxide	Green	Yellow	Red	Yellow	Green	Yellow	Green	Green
Air	Green	Red	Red	Yellow	Green	Yellow	Green	Green
Water	Green	Red	Red	Green	Green	Green	Green	Red

KEY:

Good ■

Moderate ■

Poor ■

Chemical Refrigerants

- ▶ Most chemical refrigerants have multiple issues to overcome
 - Global Warming Potential
 - Toxicity
 - Efficiency
 - Flammability
 - Lubricant compatibility
 - Nasty chemical bi-products during production
 - Expensive
 - Attract high carbon tax
 - Potential for fakes / poor quality imports

SO WHAT ARE THE ALTERNATIVES

HYDROCARBONS

THE NEGATIVE SIDE OF HC's

- ▶ TRAINING
- ▶ QUALITY
- ▶ FLAMMABILITY

YES THAT'S IT, NOTHING ELSE

TRAINING

WHERE CAN YOU GET IT

- ▶ SOME HC SUPPLIERS OFFER SOME TRAINING
- ▶ A FEW TAFE's AROUND THE COUNTRY
- ▶ The Australian Refrigeration Association is beginning to talk about formulating training programs
- ▶ AIRAH ??????????????????????
- ▶ THE UN HAS COMMISSIONED TRAINING IN SOME PARTS OF THE WORLD, MAINLY IN DEVELOPING COUNTRIES

TRAINING

- ▶ TRAINING, SHOULD ONLY BE OFFERED TO PREVIOUSLY TRAINED/TICKETED AC TECHNICIANS/ENGINEERS
- ▶ HC' SHOULD NOT BE RETAILED TO THE GENERAL PUBLIC
- ▶ AUSTRALIA SHOULD HAVE AN ADDITIONAL TICKET FOR HC WORK

QUALITY

Just like chemical refrigerants, there are good and bad HC refrigerants. What can we do to ensure quality?

- ▶ Only buy from reputable suppliers
- ▶ Request quality batch certification
- ▶ Purchase from companies who offer product support.

FLAMMABILITY – THE BIG ?

- ▶ YES HC's ARE FLAMMABLE
 - However so are many of the 'new' chemical refrigerants being introduced
 - When HC's burn the by-products are carbon and steam
 - When chemical refrigerants burn they give off toxic, often lethal fumes/by-products
 - The window of flammability (2% – 10%) is a very narrow and known value

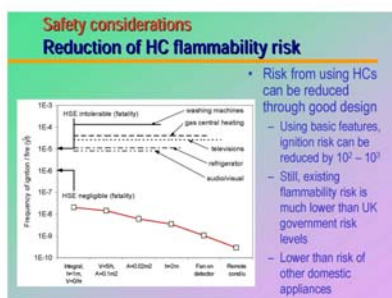
FLAMMABILITY – THE BIG ? – 2

- ▶ Due to the much lower charges required when using HC's the risk or potential risk
- ▶ We all use flammable gases every day
 - Petrol
 - Car LPG
 - BBQ LPG
 - Piped gas into the kitchen (LPG or town gas)
 - Oxy Acetylene (Flammable from 1 – 98%)
 - Propellants in Spray Cans
 - Hair Spray Inhalers
 - Paint Polish
 - Cooking Oil Fly/Insect Killers

FLAMMABILITY – THE BIG ? – 3

- ▶ We all use flammable gases every day – continued
 - Glues
 - Expanding Foam
 - The list goes on and on.
 - And we never even think about it
 - And with all of these products we are **purposely** releasing them to the atmosphere

FLAMMABILITY – THE BIG ? – 4



FLAMMABILITY – THE BIG ? – 4

Whilst I agree that HC's cannot be used for every installation/application, I do think, with the correct training, procedures', safety devices and control of product – an estimate of 80% of our cooling needs can be met using HC's.

LETS LOOK AT THE PLUS SIDE

- ▶ VERY LOW GWP, NORMALLY < 10
- ▶ NON TOXIC
- ▶ EFFICIENT
- ▶ NATURAL
- ▶ NO NASTY BI-PRODUCTS
- ▶ COMPATIBLE WITH MOST CURRENTLY USED LUBRICANTS
- ▶ RELATIVELY MUCH LESS EXPENSIVE
- ▶ DO NOT ATTRACT CARBON TAX

SO TO ANSWER THE QUESTION

Hydrocarbons, Is this the future for refrigerants?

NO ! NOT TOTALLY, HOWEVER



Hydrocarbons, Is this the future for refrigerants?

We do believe that, with the correct training, correct application, good quality products, monitoring and auditing, that it can be properly used in about 95% of all our cooling needs.

The other 5% the chemical boys can fight over!