

Tuesday, July 17 – Panel Discussion Questions

Tuesday Panel Discussion with Governmental Representatives and Questions from Attendees Regarding International Governmental Regulations for Mobile A/C Systems

Governmental Representatives:

Kozakiewicz	Agnieszka	European Commission
Potts	Winston	California Air Resources Board
Andersen	Stephen	US Environmental Protection Agency
Taddonio	Kristen	Environmental Protection Agency
Thundiyil	Karen	US EPA

EU/EPA

Question: What are the positions of US EPA and EU Commission on the use of flammable refrigerants including hydrocarbons in automobile applications?

EU/EPA/CARB

Question: When will the a/c systems be included in the CO2 emissions evaluation test?

EU

Questions: What are the measures that the EU intends to put in place to assure the MAC efficiency? The way of use and the way of interpretation should be considered.

Question: According to EU new rules, a/c components should be leak tested vs. new specification. Is this mandatory?

Questions: Should this test be run on technological samples or on vehicle part numbers? i.e. for a hose assembly, do we have to test hose, fitting and flanges or the assembly complete? Point to point routing included?

Question: Are hybrid electric versions of existing vehicles considered new type vehicles?

Question: What provisions are required to prevent the system from being charged with refrigerants with GWP > 150?

Questions: Who objects to using R134a in Europe? VDA? All European countries?

Question: For a car legally equipped with R134a in 2017, does regulation mean it cannot be serviced with 134a in 2018?

Question: Does grandfathering permit the sale of J2210 equipment by the mfg and to what date?

Question: Elaborate on how long the EU reach process would take and which requirements are needed for the new chemical blends?

Questions: Will EC prohibit the use of refrigerants with GWP > 150 even for self-contained, closed-refrigerant-loop systems? For example, self-contained secondary loop systems?

Question: When and by whom will the present, incorrect definition of a “dual evaporator system” in the present F-gas regulation be corrected?

Question: By 1/5/2008, will there be a list of authorized “approvers” for the leakage certification or will it be the same as, for example, “evaporative fuel emissions?”

Question: General a/c norm EN378 prohibits flammable refrigerant from being used in direct expansion systems. Will this rule be waived for R152a?

Question: Is HFC-134a or other refrigerants with GWP > 150 banned from production by 2017?

Question: Are there provisions in the EU regulatory system to ban refrigerants with GWP > 150 in blends (even though the blend has GWP < 150)?

EU - Kozakiewicz

What are the measures that the EU intends to put in place to assure the MAC efficiency? The way of use and the way of interpretation should be considered.

On 7 February 2007 the European Commission adopted a Communication to the Council and the European Parliament Results of the review of the Community Strategy to reduce CO₂ emissions from passenger cars and light-commercial vehicles. This revised strategy is based on a comprehensive set of measures to influence both the supply and demand sides of the EU market for cars and vans. The overall effect of these is to promote affordable fuel efficiency improvements and reductions in CO₂ emissions, as well as substantial fuel savings for car and van drivers. The main measures of the revised strategy are as follows:

- EU legislation to reduce CO₂ emissions from new cars and vans will be proposed by the Commission by the end of this year or at the latest by mid 2008.
- Average emissions from new cars sold in the EU-27 would have to reach the 120g CO₂/km target by 2012. Improvements in motor technology would have to reduce average emissions to no more than 130g/km, while complementary measures would contribute a further emissions cut of up to 10g/km, thus reducing overall emissions to 120g/km. These complementary measures include efficiency improvements for car components with the highest impact on fuel consumption, such as tyres and **air conditioning systems**, and a gradual reduction in the carbon content of road fuels, notably through greater use of biofuels. Efficiency requirements will be introduced for these car components.
- For vans, the fleet average objectives would be 175g by 2012 and 160g by 2015, compared with 201g in 2002.

- Support for research efforts aimed at further reducing emissions from new cars to an average of 95g CO₂/km by 2020.
- Measures to promote the purchase of fuel efficient vehicles, notably through an amendment to the car labelling directive to make it more effective and by encouraging Member States that levy road tax to base it on cars' CO₂ emissions. The Council will be encouraged to adopt the Commission's proposal on road taxes without further delay.
- An EU code of good practice on car marketing and advertising to promote more sustainable consumption patterns. The Commission is inviting car manufacturers to develop this and sign up to it by mid-2007.

On 19 December 2007 Commission has adopted the first part of the CO₂ legislation. It is currently examining the possible solutions for increasing efficiency of mobile air-conditioning systems.

According to EU new rules, a/c components should be leak tested vs. new specification. Is this mandatory?

As from 21 June 2008 (12 months from the date of adoption of the test procedure) the manufacturer will be unable to obtain a type approval for a new type of vehicle if it is fitted with MACs designed to contain F-gases with a GWP higher than 150 leaking more than 40 grams per year (one evaporator systems) and 60 grams per year (dual evaporator systems). This date is postponed by one year for all new vehicles having been type-approved in the past. These provisions are mandatory for vehicles of categories M1 and N1 class I.

Should this test be run on technological samples or on vehicle part numbers? i.e. for a hose assembly, do we have to test hose, fitting and flanges or the assembly complete? Point to

point routing included?

The MAC legislation allows for testing of single components or of groups of components.

Are hybrid electric versions of existing vehicles considered new type vehicles?

Yes, they are considered new types of vehicles.

What provisions are required to prevent the system from being charged with refrigerants with GWP > 150?

According to Article 6 (2) of Directive 2006/40/EC air-conditioning systems fitted to vehicles type-approved on or after 1 January 2011 shall not be filled with fluorinated

greenhouse gases with a global warming potential higher than 150. With effect from 1 January 2017 air conditioning systems in all vehicles shall not be filled with fluorinated greenhouse gases with a global warming potential higher than 150, with the exception of

refilling of air-conditioning systems containing those gases, which have been fitted to vehicles before that date.

Who objects to using R134a in Europe? VDA? All European countries?

After the proposal from the European Commission, the European Parliament and the Council have decided to phase-out R134a from air-conditioning systems fitted to motor vehicles.

For a car legally equipped with R134a in 2017, does regulation mean it cannot be serviced with 134a in 2018?

According to Article 6(2) of Directive 2006/40/EC air-conditioning systems fitted to vehicles type-approved on or after 1 January 2011 shall not be filled with fluorinated greenhouse gases with a global warming potential higher than 150. With effect from 1 January 2017 air conditioning systems in all vehicles shall not be filled with fluorinated greenhouse gases with a global warming potential higher than 150, with the exception of refilling of air-conditioning systems containing those gases, which have been fitted to vehicles before that date.

Elaborate on how long the EU reach process would take and which requirements are needed for the new chemical blends?

All information on REACH can be found at http://ec.europa.eu/enterprise/reach/index_en.htm

Will EC prohibit the use of refrigerants with GWP > 150 even for self-contained, closed-refrigerant-loop systems? For example, self-contained secondary loop systems?

The second phase of the legislation is the complete ban of MACs designed to use fluorinated greenhouse gases with a global warming potential higher than 150. It shall be effective as from 1 January 2011 for new types of vehicles (the manufacturer will be unable to obtain a type approval for a new type of vehicle if it is fitted with this kind of systems) and as from 1 January 2017 for all new vehicles. From that date on, new vehicles with these systems cannot not be registered, sold and enter into service.

When and by whom will the present, incorrect definition of a “dual evaporator system” in the present F-gas regulation be corrected?

This issue will be considered and if necessary, amendments will be proposed.

By 1/5/2008, will there be a list of authorized “approvers” for the leakage certification or will it be the same as, for example, “evaporative fuel emissions?”

The fulfilment of technical requirements for the EC type-approval concerning mobile air-conditioning systems have to be checked by the appropriate national bodies before an EC type-approval can be given. The list of the approval authorities of the Member

States can be found on the following webpage:
http://ec.europa.eu/enterprise/automotive/pagesbackground/administering_authorities.htm. They shall be able to provide more details concerning the test and the relevant procedures.

Is HFC-134a or other refrigerants with GWP > 150 banned from production by 2017?

Regulation (EC) No 842/2006 of the European Parliament and of the Council on certain fluorinated greenhouse gases does not ban production but only placing on the market of specific products and equipment containing, or whose functioning relies upon, F gases.

Are there provisions in the EU regulatory system to ban refrigerants with GWP > 150 in blends (even though the blend has GWP < 150)?

According to Article 3 of Directive 2006/40/EC term 'fluorinated greenhouse gases' means hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) as referred to in Annex A of the Kyoto Protocol and **preparations containing these substances**, but excludes substances controlled under Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer. ' **Preparation**' means a mixture composed of two or more substances at least one of which is a fluorinated greenhouse gas. The total global warming potential of the preparation shall be determined in accordance with Part 2 of the Annex to Directive 2006/40/EC.

EPA – Thundiyil

Question: Is US EPA considering a ban of the 30lb non-returnable containers in favor of a return cylinder system? If not, why?

Question: Is, or will, the OK for use of flammable refrigerants be combined with some use and/or design prerequisites?

Question: Has the new SNAP R152a criteria involving the exposure limits within the passenger component opened up the possibility of using R152a in a direct evaporation system i.e. not secondary loop?

Question: Will mfg be allowed to ship non-2788 equipment to other countries that do not require 2788 equipment?

Question: Will new 609 regulations require all technicians to be re-certified?

Questions: Are there any evaluations done on the fire risk in the engine compartment with R152a? Ignition on exhausts manifold, turbocharger with R152a?

Question: RE: Final Rule Section 609 – Will equipment made under J2010 be allowed to be sold after 1/1/08 and for how long?

Question: RE: R134a cans – When do you expect to restrict all R134a sales to qualified techs?

EPA – Andersen/Taddonio

Questions: When will distributors not be allowed to sell non-2788 equipment? What is the cut off for distribution?

Taddonio Response: End of 2007 (expected). The final three states are Indiana, Louisiana, and Maryland. Since the ARSS in Arizona, Indiana has referred the issue to their Department of Environment - a decision is expected soon. Maryland's Department of Transportation also referred the CO2 issue to their Department of Environment. In a letter dated August 22, 2007, George Aburn Jr., Director of the Maryland Department of Environment Air and Radiation Management Administration, responded that in response to the question of whether their definition of toxic would preclude CO2. He said "Based on the information we have obtained to date, your inquiry has identified an issue that needs further research, evaluation, and discussion both internally and with Maryland Department of Transportation." The letter further explains that a legislative change may be necessary, and that the Maryland Department of Environment will work collaboratively with the MD Department of Transportation to accomplish the change if necessary. The U.S. EPA is supporting them in this role. The only state that has not responded to inquiries is Louisiana; we are currently pursuing other avenues.

Questions: CO2 barrier: Do we have to go into state parliaments to remove the current CO2 barrier? Or is it sufficient to get the ok by a responsible person? What is expected timing to remove all barriers for CO2?

Taddonio Response: The best strategy is to work collaboratively with the U.S. EPA and the Mobile Air Conditioning Climate Protection Partnership when dealing with states. See response above regarding current status of talks with States. If you have helpful information to share with state authorities, please contact Kristen Taddonio: taddonio.kristen@epa.gov. All suggestions are welcome.

Questions: Why doesn't US EPA take active role to do legal regulation (not recommended) like EC did? What will be the required boost pressure of CO2 system?

Taddonio Response: Neither EPA nor the Department of Transportation have set a required boost pressure for CO2 MACS (yet).

Question: How or will the US EPA support California's early action items? i.e. would they make the "restriction on DIU cans" a federal ruling?

CARB

Question: What method does the state intend on using to enforce the new regulation?

Question: CARB considered a ban of R134a by 2007. Is this still the plan? If yes, tell about the activation?

Panel Discussion Questions (DELPHI/GM)

Tuesday Overview of Formal Ride GM Opel Astra Vehicles Having HFC134a, DP-1, AC-1 and Secondary Loop R152a Systems

Representatives:

Baker	James	Delphi Corp
Ghodbane	Mahmoud	Delphi
Hill	Bill	GM

Question: Was the S.L. R-152a system optimized by reducing the evaporating temperatures?

Question: What is the reason for better COP or 2ndary loop in model prediction?

Questions: Is the FE test for R-152a v. baseline really a fair test since the R-152a system was controlled to a higher air outlet temp? Similar reductions in compressor load could be obtained in R134a by increasing evap temp set points. My feeling is that if the comparison were truly apples-to-apples that R-152a would show worse then R-134a.

Questions: What size diameter has the 2ndary loop tubing? Is it insulated?

Questions: On 2ndary loop system, how much is the cost increased, \$/lb of refrigerant?

Question: What method did you use to compare COP for 152a as measured at chiller or including losses in 2ndary loop?

Question: What was weight of coolant in 12# and for 2ndary loop?

Question: Regarding R-152a, what is +12 lbs as a % of baseline system mass?

Question: Regarding R-152a, would the prototype shroud improve performance of the baseline system?

Question: What was the reason for the re-routing of the evap flow path?

Question: Why was CO2 system not part of this alternative?

Question: 2ndary loop is up to 5% lower COP (stated) and also 12 lbs heavier. Can you explain the reduction in fuel consumption?

Question: Can you explain why 30% glycol was used instead of 50/50 mix?

Question: What is the "glide" (delta T) of glycol mixture through center core? Does this result in capacity reduction or thermal stratification?

Question: Shouldn't the use of a fixed displacement compressor improve the SL efficiency?

Question: In the 2ndary loop system, could the compressor be electrically driven and could the cooler and heater be integrated?

Question: In the 2ndary R-152a system, do you use insulation in the coolant loop? What is coolant operating temperature?

Questions: Why do we hold for R-152a? Can we build 1000 vehicles for state of California and EU? What will it take to build vehicles for California and EU?

Question: How does 2ndary loop system provide dehumidified air for defrost/demist function?