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Integrated approach to mobile air conditioning testing and labeling

*Input to European Commission's Public Consultation:
reaching the 130 g/km objective through vehicle technology.*

Introduction

To tackle growing emissions from cars, an integrated approach is needed where additional devices such as mobile air conditioning are taken into account.

Air conditioning has become a standard feature in every car manufactured and sold within the EU. However, current testing conditions under New European Driving Cycle (NEDC) do not take into account the additional fuel consumption of the cooling devices nor of other indispensable features such as tyres, lights and heating devices.

The impact of MACs on fuel consumption depends largely on the quality of the systems. Whereas well engineered A/C- Systems account for around 5% of the car's real fuel consumption, poorly engineered and low cost A/C- Systems are responsible for around 20% of the car's real fuel consumption or even more in certain conditions.

Consumers need to be aware of the additional fuel consumption and emissions of air conditioning and other devices before making purchasing decisions. Labelling on MACs should be provided to offer more accurate and user-friendly information to consumers.

Why is testing important?

Realistic testing conditions facilitate the comparison between different technologies, and allow manufacturers to make better decisions for their customers and society at large.

As an example, regarding the choice of refrigerant for mobile air conditioning, latest tests show that the fuel consumption at the same cooling performance can be reduced by 0,3 l/100 km at 25°C by switching the current technology to the environmentally friendly CO₂ Technology (R744).

This leads to a reduction of CO₂ tailpipe emissions by 7 g/km. Since the direct emissions from the R744 systems are also lower, every car can reduce up to **12g/km** of CO₂ equivalent emissions just by switching refrigerant system.

MAC Testing

Setting up a cost-efficient testing methodology for MAC systems is perfectly feasible today, as the US EPA (Environmental Protection Agency), leading automotive suppliers and the German Car Consumer Association (ADAC) have proved.

The options range from a low cost, simple, albeit effective testing, such as the one used by ADAC, to the more thorough but more costly procedure used by suppliers such as Visteon. We encourage the Commission to analyse the following procedures as a benchmark to establish a common EU testing procedure:

1) ADAC Testing (lower cost)

Test conditions:

- Driving Cycle: NEDC
- Ambient Temperature: 28°C, Relative Humidity 40-50%
- Solar Load: 750W (simulated by electrical heater)
- Start Conditions: 28°C

Key Conclusions

- Between 2.47 to 4.15 litres/100 km of fuel needed to cool down a car from 31°C to 22°C after parking in the sun
- After first cool down, constant operation will raise consumption by up to 2 litres/100km (46g CO₂ /km)

2) USA EPA SC 03 Test (used today)

Test conditions

- Driving Cycle: SC 03, Low speed cycle / 35 km/h
- Ambient Temperature: 35°C, Relative Humidity 40%
- Solar Load: 850W
- Start Conditions: Soaked 10 mins
- Comment: Compressor runs 100% of the time

Keys of the US system:

- Estimates that MACs can use extra 25% fuel
- 2008 Model year vehicles will have 'stickers' indicating 'real' Fuel efficiency (from Sept 2007 onwards)
- By 2011, car manufacturers will need to perform mandatory testing of MACs

3) Visteon testing (higher cost)

Test conditions

- Driving Cycle: NEDC
- Ambient Temperatures: 10°C, 25°C, 35°C and 45°C, with relative Humidity ~40%
- Solar Load: 750W
- Start Conditions: Soaked at 50°C

Key results – Current MACs

- At 25°C, extra fuel consumption of 1.23 litres/100km (28g CO₂/km)
- At 35°C, extra fuel consumption of 1.97 litres/100km (45g CO₂/km)

MAC Labeling

To better inform consumers and allow them to make an educated choice on the MAC systems, additional labeling should be provided following the model of the energy efficiency of appliances used today. A simple label, based on colour codes with user-friendly information should be displayed on a visible part of the vehicle. Additionally, the label should also be visible in all marketing material by car manufacturers, as well as promotional material in showrooms and advertising.

Conclusion

Additional fuel consumption and greenhouse gases from devices, such as air conditioning, need to be reduced. Including MAC in current vehicle testing and adding labeling are the best incentives for the car industry to develop highly efficient air conditioning systems for cars.

The USA already includes MAC in Tests today (SC 03), showing obvious differences in system performance and fuel use. There is an urgent need to set up minimum efficiency requirements in the EU in order to minimise this additional fuel use. Different possibilities exist to do this effectively, from the low cost solution test, similar to the ADAC procedure, to the high cost solution test, similar to the Visteon procedure.

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