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09-6-9



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## Cool Car Regulation: Alternative Technologies

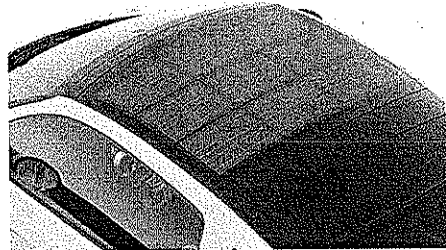
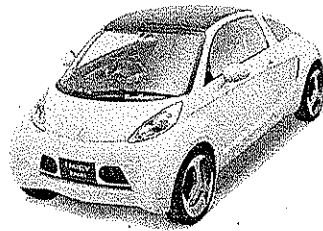
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June 25, 2009

Mitsubishi Motors Corporation  
Mitsubishi Motors R&D of America, Inc.

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### Solar Powered Ventilation Technology



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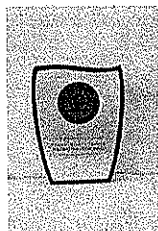
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### High-Efficiency Automotive A/C System



Mitsubishi Motors (with Mitsubishi Heavy Industries) won the 2007 U.S. EPA Climate Protection Award for its work on a new, high-efficiency automotive A/C system.

The system includes a new scroll compressor and operation controls that reduce both power consumption (39%) and improve cooling performance (7%).



OUTLANDER SE

Next:

## Our Suggested Changes

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## Cool Glazing Regulation: Concerns and Alternatives

June 25, 2009

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Mitsubishi Motors R&D of America, Inc.

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### Concerns with Proposed Regulations

- Assumption of A/C downsize – unlikely. A/C system are optimized for extreme temperature conditions (e.g., Death Valley in July) – not “shoulder month” usage.
- Many consumers pay a premium for automatic climate control and are unlikely to switch off this feature even with “cool” interior.
- Convertible vehicle owners will likely lower tops especially during “shoulder months”.
- Compliant sunroofs will be very dark and useless for intended purpose – allowing light and views through the roof.

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- Proposed Regulation specifies one technology: solar reflective glazing
- Alternative technologies can be as effective at a lower cost.
- Possible alternative technologies include:
  - Higher efficiency A/C system
  - Auto-closing sunroof shade (when sunroof is closed and engine is shut off)
  - Auto-venting sunroofs (dependent on interior temperature)
  - Solar-powered sunroof vent fan
  - Solar absorbing glass

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## Too Little Lead Time

What Model Year can glass technology be changed?

Assume this regulation is approved by OAL and enacted by January 2010.

- No --2010MY vehicles are nearing the end of production.
- No -- 2011MY models are starting mass production.
- No -- 2012MY have already completed the design process (Design Freeze) and undergoing production planning.
- Difficult -- 2013MY models are already in the final design stages (no new features can be added, only revision of existing features).

Need to resolve wireless communication issues and **Safety Standards Validation (IMPORTANT)**.

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## Suggested Changes

Delay implementation until 2014MY, AND:

Adopt performance standard as the compliance goal to enable the use of alternative technologies and encourage innovation.

No Performance based standard? Then:

- Short Term, adopt 60% Tts all window standard to allow "window tinting" technologies.
- Technology review in 2014.
- Increase sunroof standard from 30% to 45% Tts to avoid customer dissatisfaction.
- Allow exemptions for battery electric vehicles (BEVs) and convertibles.

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