

Public Workshop on Proposed Revisions to the Low-Emission Vehicle Program: Mobile Air Conditioning Elements

**Dr. Tao Zhan, Research Division
Dr. Leela Rao, Mobile Source Control Division**

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Introduction

- **California's next vehicle GHG emission standard (2017 MY and beyond) will be incorporated into the Low-Emission Vehicle (LEV) III regulation**
- **AC elements are included in LEV III**
- **Mandatory requirements:**
 - Low-GWP refrigerant
 - Limit on leak rate
 - Limit on indirect emissions (evaluated by performance test)

AC Requirement 1: GWP 150 (100% for 2017 MY)

- **Provides a nearly 90% direct emission reduction**
- **Industry can choose from 3 SNAP approved refrigerants**
- **Movement toward use of low-GWP refrigerant**
- **Harmonizes with EU**

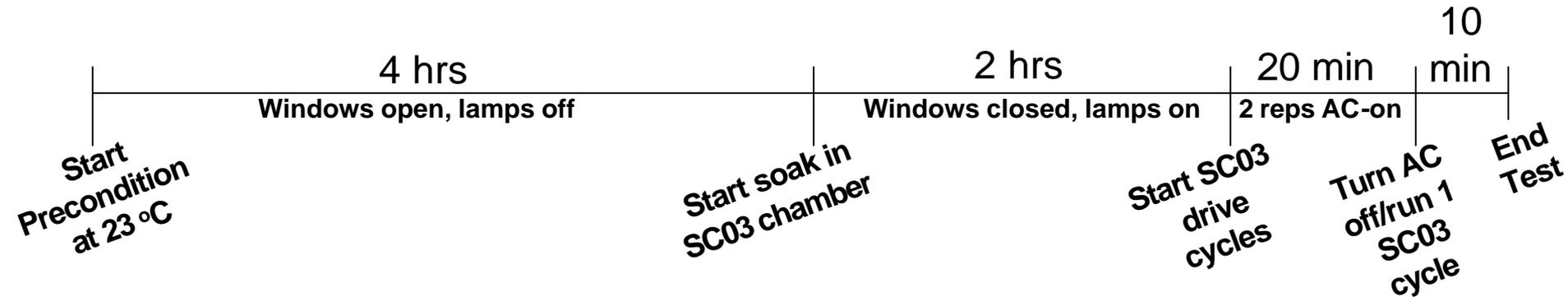
AC Requirement 2: Fleet Average Leak Rate 9 g/yr

- **Long-term performance and consumer protection**
 - Low leak rate is important to maintain efficiency and reduce maintenance costs
 - Request for comments: how to ensure adequate lubrication during colder months for better long-term containment
- **Leak rate is evaluated using SAE J2727-type standards for AC using low-GWP refrigerants**
- **9 g/yr (refrigerant) is achievable**
 - 18 g/yr per US EPA, 50% reduction feasible per I-MAC
 - Commercially available AC platforms using premium technologies can achieve 9 g/yr, per Pavley/EPL AC certification
 - Industry moving toward use of better technologies
 - Electric compressor market share will likely grow (with growth of hybrid/electric vehicles), thus further lower leakage

AC Requirement 3: Indirect Emissions Standard

- **ARB is proposing to develop an AC indirect emissions standard to be evaluated through a whole-vehicle performance test procedure**
 - Proposed test procedure will include a thermal soak and involve three back-to-back runs of the SC03 test cycle
 - Fleet average indirect emissions must be less than or equal to a standard, which will be developed in conjunction with the test procedure
- **Standard and test procedure will not be developed in time for the LEV III Board hearing in Nov., therefore staff will propose initial adoption of US EPA's Idle Test procedure and AC Efficiency Credits scheme as a placeholder**
- **Staff plans to revise the regulation by 2012 to reflect the AC indirect emissions standard and whole-vehicle performance test procedure effective for MY 2017 and later vehicles**

AC Requirement 3 (Cont.): Proposed Performance Test Procedure



Difference between CO₂ from AC-off cycle and CO₂ from the weighted average of AC-on cycles (cool down and steady state) must be £ the standard

ARB is soliciting OEM input and data on this test procedure, including:

- Use of back-to-back SC03 cycles to measure indirect emissions
- Vehicle test groups (platform based, footprint, other?)
- Test data on measured AC indirect emissions

AC Requirement 3 (Cont.): Whole-Vehicle Performance Test Benefits

- **Able to assess benefits from all types of technologies**
- **Able to account for the benefits of new technologies as they are developed without redesigning test**
- **Evaluates all technologies under realistic solar load and driving conditions**
- **Enforceable**
- **Draft test cell specifications have been developed in collaboration with industry**
- **Minimize testing burden by:**
 - Allow broad AC test groups
 - Use existing OEM test facilities

ARB Contacts

Direct Emissions

- **Research Division**

- Dr. Tao Zhan, (916) 445-9495, tzhan@arb.ca.gov
- Dr. Tao Huai, (916) 324-2981, thuai@arb.ca.gov

Indirect Emissions

- **Mobile Source Control Division**

- Dr. Leela Rao, (626) 350-6469, lrao@arb.ca.gov
- Sharon Lemieux, (626) 575-7067, sclemieu@arb.ca.gov