



# OCE Discussion Topics

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# Topics for Discussion

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- Terminology (OCE vs WNTE)
- Application
- Definitions
- Requirements
  - General
  - Performance
  - WNTE limits
- Lab-based test
- Deficiency provisions
- Certification provisions
- Section A



# Terminology – OCE vs WNTE

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- EC has stated a concern regarding terminology used in the gtr
  - Specifically, OCE & WNTE are often used interchangeably
  - OCE should be a general term
  - WNTE should be considered a means of OCE control



# Terminology – OCE vs WNTE

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- US proposes the following terminology
  - OCE includes:
    - prohibition against defeat strategies
    - WNTE requirements
  - The WNTE requirements consist of
    - WNTE control area
    - WNTE emission limits
    - WNTE lab test (optional for CPs)
  - The manufacturer demonstrates compliance with OCE by:
    - Making an OCE compliance statement
    - doing the WNTE lab test (if applicable)



# Application

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- EC has proposed that the gtr apply to gasoline engines & vehicles
- US proposes that the gtr not apply to gasoline
  - OCE group has not considered this until San Francisco.
  - Does WNTTE work for gasoline?
  - Leave this for possible future revision/addition to the OCE gtr
    - Link to addition of gasoline to WHDC?



# Definitions – Defeat Strategy

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- Current definition reads:
  - Defeat strategy means either:
    - (a) an AES that reduces the effectiveness of the emission control relative to the BES under conditions that may reasonably be expected to be encountered in normal vehicle operation and use, unless:
      - the operation of the AES is substantially included in the applicable type approval or certification tests, including the WNTTE requirements; or
      - the AES is activated for the purposes of protecting the engine and/or vehicle from damage or accident; or
      - the AES is only activated during engine starting or warm up; or
      - the AES is used to trade-off the control of one type of regulated emissions in order to maintain control of another type of regulated emissions under specific ambient or operating conditions not substantially included in the type approval or certification tests. The overall affect of such an AES is to compensate for the effects of extreme ambient conditions in a manner that provides acceptable control of all regulated emissions
    - Or, (b) a BES that discriminates between operation on an applicable type approval or certification test and other operations and provides a lesser level of emission control under conditions not substantially included in the applicable type approval or certification tests.



# Definitions – Defeat Strategy

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- In San Francisco, the EC proposed to remove 1<sup>st</sup> & 4<sup>th</sup> bullet under (a) such that the definition would read:
  - Defeat strategy means either:
    - (a) an AES that reduces the effectiveness of the emission control relative to the BES under conditions that may reasonably be expected to be encountered in normal vehicle operation and use, unless:
      - the AES is activated for the purposes of protecting the engine and/or vehicle from damage or accident; or
      - the AES is only activated during engine starting or warm up; or
    - Or, (b) a BES that discriminates between operation on an applicable type approval or certification test and other operations and provides a lesser level of emission control under conditions not substantially included in the applicable type approval or certification tests.
- Rationale for EC proposal
  - Concern over complexity of definitions
  - Concern over definitions containing requirements



# Definitions – Defeat Strategy

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- In response to EC concerns, the US suggested a very simple definition with detailed requirements for AES and BES in the “Requirements” section.
  - Defeat strategy definition would read:
    - Defeat strategy means an emission strategy that does not meet the performance requirements for a base and/or auxiliary emission strategy as specified in this gtr.
    - The current definition of defeat strategy would be moved to the “Requirements” with necessary re-wording but no change in content.
- Rationale: This was meant to result in definitions that define and requirements that require.
- Refer to “OCE defeat strategy definition & requirements – US DRAFT.pdf” document (GRPE/OCE/20/02).





## Defeat Strategy – US idea & EC comments

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- Refer to “EU defeat strategy bis.pdf” document (GRPE/OCE/20/03).



# Emission & Defeat Strategies – How do we interpret the current text?

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- What does the current text allow/prohibit?
- Are changes needed?
- What changes, if any?



# Definitions – Emission Control System

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- Current definition reads:
  - Emission control system means hardware and software on a vehicle which has been developed or calibrated for the purpose of controlling emissions (e.g. particulate filter, charge air cooler, EGR cooler)
- US proposes that it read:
  - Emission control system means, collectively, the elements of design and emission strategies developed or calibrated for the purpose of controlling emissions.
- Rationale for US proposal:
  - Better flow from prior definitions which were “elements of design” and “emission strategy.”



# Definitions – Engine Starting / System / Warm up

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- Engine starting
  - US proposes definition from CARB/EPA HDOBD
- Engine system
  - US proposes definition from WWH-OBD gtr but adds the phrase “and its emission control system”
  - Rationale:
    - Greater clarity (?); if not, remove.
- Engine warm up
  - US proposes definition from CARB HDOBD regulation.



# Definitions – Engine Operation

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- Do we need definitions for steady-state and transient engine operation?
  - If WHDC defines these terms, we should probably use the WHDC definitions.
  - If WHDC does not define these terms, why should OCE?



# Requirements – General & Performance

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- 4 General
  - 4.1 Prohibition of defeat strategies
  - 4.2 WNTTE emissions requirements
- 5 Performance
  - 5.1 Emission strategies
    - 5.1.1 General requirements
    - 5.1.2 Requirements for BES
    - 5.1.3 Requirements for AES



## Requirements – General (section 4)

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- US proposes the headings read:
  - 4. General Off-cycle Emissions Requirements
    - 4.1 Prohibition of defeat strategies
    - 4.2 WNTTE emissions requirement



# Requirements – Performance (section 5)

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- US regional legislation approach
  - Define defeat device
  - Prohibit defeat devices
  - Require that engine comply with the NTE
- Current OCE approach
  - Define defeat strategy
  - Prohibit defeat strategies
  - Require that BES & AES are not defeat strategies
  - Require that engine comply with the WNTTE
- Do we want to continue with the current OCE approach?
  - If no, US proposes that we pare down section 5.
  - If yes, US proposes that we clarify section 5.





## Requirements – Performance (section 5.1)

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- Assuming we want to continue with the current OCE approach
  - US proposes that section 5.1 mirror the definitions of defeat strategy
    - Current text implies that there is something different between definitions (section 3) and requirements (section 5.1)
    - US proposed text (section 5.1) is aligned, bullet-by-bullet with definitions (section 3)



# Requirements – WNTE Emission Limits (section 5.2)

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- WNTE emission limits (NL proposal, GRPE/OCE/20/inf67)
  - NOx: WNTE Adjustment =  $0.25 * EL + 0.1$  (0.25\*EL + 100 mg)
  - HC: WNTE Adjustment =  $0.15 * EL + 0.07$  (0.15\*EL + 70 mg)
  - CO: WNTE Adjustment =  $0.20 * EL + 0.2$  (0.20\*EL + 200 mg)
  - PM: WNTE Adjustment =  $0.25 * EL + 0.003$  (0.25\*EL + 3 mg)
- WNTE emission limits (OICA proposal, GRPE/OCE/19/inf65)
  - NOx: WNTE Adjustment =  $- 0.02 * EL^2 + 0.3 * EL + 0.09$
  - HC: WNTE Adjustment =  $0.15 * EL^2 + 0.1$
  - CO: WNTE Adjustment =  $0.02 * EL^2 + 0.1 * EL + 0.2$
  - PM: WNTE Adjustment =  $1.3 * EL^2 + 0.1 * EL + 0.004$
- EC & US support NL proposal
  - Essentially the same limits are achieved with both proposals
  - NL proposal is easier, less complex
- US concern:
  - Rounding with respect to the mg based equations in NL proposal



## WNTE Lab-based Test (section 7.4 & 7.5 (?))

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- Refer to the following document from P. Good
  - “WNTE Lab Test – Revised EC Proposal.doc” (GRPE/OCE/20/inf68)
- Refer to the following documents circulated by J. Stein
  - “WNTE Lab Test 5 2 08\_ACEA Mod.doc” (GRPE/OCE/20/inf69)
  - “2008\_03\_17 9-Grid proposal.pdf” (GRPE/OCE/20/inf70)



## Deficiency Provisions (section 8)

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- Current text includes deficiency provisions
- EC has proposed to remove these provisions and leave deficiencies to regional legislation
  - US has no issue with current text but can support EC proposal



## Certification provisions (section 10)

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- EC has proposed moving much of the current text to an Annex
- US supports the EC proposal.



## Section A

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- Refer to the following document from US and EC representatives
  - “OCE draft gtr – Section A – Tokyo Apr 2008.doc” (GRPE/OCE/20/inf71)