Bundesministerium
für Verkehr und
digitale Infrastruktur

Problems with Noise-Emissions of Vehicles / NORESS and possible Solutions

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Contents:

Present Situation (1)

Most M1/N1-vehicles have to fulfil ASEP.

ASEP-Compliance via Manufacturer Declaration.

Measurement between $V_{AA'} \geq 20$ and maximum $V_{BB'} \leq 70$ or 80 km/h

Gear/Gear-ratios where vehicle-accleration $a_{wot} \leq 5{,}0\ m/s^2$ and
$n_{BB'} \leq 2{,}0 * PMR^{-0{,}222} \times S$ or
$n_{BB'} \leq 0{,}9 * S$ ($n_{BB'}$: smaller value)

Contents:

1. Present Situation

2. Problems

3. Solutions

Problems (1)

Complaints about noise annoyance based in 100% on

- Reckless Driving Behavior,

- Technical Changes (Manipulations),

- UN-/EU-Approvals of to loud vehicles / NORESS or

- Utilization of “Grey areas” of EU-/UN-Reg. by Manufacturers

As a result, more and more demands for:

- requirements for stricter limits (e.g. Stage 3) and

- in the meantime, the ICE's own right to exist is critically discussed !

In the long term, the vehicle manufacturers get in trouble about this !

Problems (1)

1. Reckless Driving Behavior

(Starting at the highest engine RPM, extreme acceleration, non-compliant speed)

Responsible: Driver (DE-Fines: speed exceedance up to 1520,- € + driving ban).

Note: **Negative image** falls **on driver** and **possibly to vehicle-category!**

Result: **Request for more controls and higher penalties !**

Problems (2)

2. Technical Changes (Manipulations)

(Racing-Silencers, dB-Eaters, Additional control units, illegal flap systems/-steering etc.)

Responsible: **Registered Keeper / Driver** (DE-Fines: 270,- / 180,-€);

Multiple offenders: Psychological Test is possible

Note: **Negative Image** falls on **Manufacturer**, **vehicle-category** or **ICE** !

Result: Request for **higher penalties** and **lower limits** (e.g. Stage 3) !

Sufferer: Vehicle **Manufacturer**

Problems (3)

3. UN-/EU-Approvals of to loud vehicles / NORESS

(ASEP-Declaration of Manufacturer not OK, Deviation Vehicle/NORESS to Approval etc.)

These Approvals create pressure on development of the "quiet manufacturers”

Responsible: Manufacturer

Note: Negative Image falls on Manufacturer, vehicle-category or in general ICE !

Result: Request for lower limits (e.g. Stage 3) !

Sufferer: Each Vehicle Manufacturer

Problems (4)

4. Utilization of “Grey areas” of UN-/EU-Regulation by Manufacturers

(Racing-Mode, Extremely loud outside ASEP (Range/Gears), Use of dB-Eater etc.)

Owners Manuals often **don’t give** any **Information** about **forbidden use** of „Racing-Modes“ inside public traffic, including **legal consequences** for the driver.

Responsible: **Manufacturer / Driver** (DE-Fines: - / 20,-€);
Multiple offenders: Psychological Test is possible

Note: **Negative Image** of loud Vehicles/NORESS falls on **Manufacturer, vehicle-category** or in **general ICE !**

Result: Request for **lower limits** (e.g. Stage 3); first registration **ban ICE** e.g. > **2025**!
Sufferer: **Each Vehicle Manufacturer**

UN-R 51.03 / (EU) 540/2014 corrected “Grey Areas" only minimally !

Contents:

1. Present Situation

2. Problems

3. Solutions

Solutions (1 and 2)

Problem 1 Reckless driving behavior

Solution to 1:
Can not be solved by GRB and its UN-Regulations.

Problem 2. Manipulations
(Racing-SD, dB-Eater, additional illegal controllers of silencers with variable geometries and illegal modifications etc.)

Solution to 2:
Insert **additional requirements** comparable to UN-R 41.04 Point 6.5 in UN-R51 (Additional prescriptions related to **tamperability** and **manually adjustable multi-mode exhaust or silencing systems**).

Solution (3)

Problem 3. UN-/EU-approvals of loud vehicles or NORESS
(Manufacturer's ASEP-declaration is not OK; Deviations between sold products and type approval vehicle/NORESS etc.)

Solution to 3: **ASEP** have to be **part of type approval test** and these tests have to be done mandatory **by Technical Service (TS)**:

1. **complete** tests of ASEP **by TS** or

2. verification of a **minimum number of points by TS**, which have to be measured by the **manufacturer completely before type approval tests** or

3. mandatory measurement by TS (complete or verification of min. number of points) **only for silencer systems with variable geometries**, etc.

Solution (4)

Problem 4
Utilisation of grey areas of UN-/ EU-Reg. by vehicle-/NORESS-manufact.

(Racing-Mode, Extremely loud outside ASEP (Range/Gears), Use of dB-Eater etc.)

Solution to 4: **Extension** of the existing **ASEP-Range** (speed/gears) with the aim:

Produced sound level of a vehicle outside ASEP-Range/-Gears has to be more or less the same during "usual road use" than inside ASEP-Range/-Gears.

Definition "usual road use":

- Vehicle speed between minimum 0 and maximum 100 or 120 km/h and
- engine speed between

  a minimum $\mathbf{n_{AA}}$, of e.g. 1200 rpm and a maximum $\mathbf{n_{BB}}$, < 90 %

Solution (4)

Responsible values for ASEP-Range:

- **Minimum values ($n_{AA'}$)**: The **vehicle speed of more than 0 km/h of each gear ratio** which produces **at minimum an engine speed of e.g. 1200 rpm.**

  Examples:

  1. **Gear**: Idle-speed 850 rpm & vehicle speed at 1200 rpm is 5 km/h.

     ASEP range 1. Gear starts at 5 km/h (Minimum)

     2. Gear: vehicle speed at engine speed 1200 rpm is 20 km/h.

     ASEP range 2. Gear starts at 20 km/h (Minimum)

- **Maximum values ($n_{BB'}$)**: The **vehicle speed lower than e.g. 120 km/h** of **each gear ratio** which produces **at maximum an engine speed of e.g. n_{BB} < 90% S.**

  Examples (S = 6000 rpm; 90% S = 5400 rpm):

  1. **Gear**: vehicle speed at 5400 rpm is 15 km/h.

     ASEP range 1. Gear ends at 15 km/h (Maximum)

     4. Gear: vehicle speed at 5400 rpm is 130 km/h.

     ASEP range 4. Gear ends at 120 km/h (Maximum)

Solution (4)

Statement:

ASEP has to be measured also in a speed range between $0 < V_{ASEP} < 20$ km/h and $80 < V_{ASEP} <$ e.g. 100 to 120 km/h during type approval tests

Discussions are needed about:

- **Restrictions on test conditions for vehicle speeds > 80 km/h** (e.g. no ISO-test track is needed; test side in accordance to Annex 3 can have deviations).

- **Calculation of limit values** of additional ASEP-areas which have to be fulfilled.

- **Reconstruction on measurement:** e.g. "**v * a - concept"** with realistic vehicle speed and acceleration ranges.

  (Realistic = low speeds & higher acceleration; higher speed & lower acceleration)

  Different areas where all gears/gear-ratios used ($n_{AA'}$ > 1200 and $n_{AA'}$ < 90% S)
  Urban (0 - 50 km/h), **Country Road** (60 - 90 km/h) and **highway** (90 - 120 km/h)

- **Realistic timeline** for these bigger ASEP-modifications.

Conclusion

Problems

2. Manipulation

3. UN-Approvals of loud vehicles or NORESS

4. GREY-AREAS

FUTURE Stage 3 and ICE ? ☹

Conclusion

Solutions

1. **Anti-tampering requirements**

2. ASEP part of TA-test

3. Extension ASEP-Range

FUTURE Stage 3 and ICE ? ☺

Thanks for your attention!