

PROPOSAL FOR GUIDELINES ON MEASURES ENSURING THE AUDIBILITY OF HYBRID AND ELECTRIC VEHICLES

Preamble

The environmental benefits expected to be achieved by hybrid electric and pure electric road transport vehicles (HEV and EV) have resulted in vehicles becoming quiet. This has resulted in the removal of an important source of audible signal that is used by pedestrians (e.g. blind and low vision pedestrians) and road users (e.g. cyclists), to signal the approach, presence or departure of these vehicles.

The guideline is intended to present recommendations to manufacturers for a system to be installed in vehicles to provide vehicle operation information to pedestrians and vulnerable road users.

This guideline is intended as interim guidance until the completion of on-going research activities and the development of globally harmonized device performance specifications.

Scope

This guideline addresses Acoustic Vehicle Alerting System (AVAS) for hybrid electric and pure electric road transport vehicles (HEV and EV).

A. Acoustic Vehicle Alerting System

1. Definition

Acoustic Vehicle Alerting System (AVAS) is a sound generating device designed to inform pedestrians and vulnerable road users.

2. System performance

AVAS is intended to be **fitted to** a vehicle.

AVAS shall fulfil the requirements set forth below.

3. Operation conditions

(a) Sound generation method

The AVAS shall automatically generate a sound in the minimum range of vehicle speed from start up to approximately 20 km/h and during reversing, **if applicable for that vehicle category**. In case the vehicle is equipped with an internal combustion engine that is in operation within the vehicle speed range defined above, the AVAS may not need to generate a sound.

For vehicles having a reversing sound warning device, it is not necessary for the AVAS to generate a sound during backup.

(b) **Pause switch**

The AVAS may have a switch to stop its operation temporarily ("pause switch").

If a pause switch is introduced, however, the vehicle should also be equipped with a device for indicating the pause state of the vehicle-approach informing device to the driver in the driver's seat.

The AVAS should remain capable of re-operating after stopped by a pause switch.

If fitted in the vehicle, a pause switch should be located in such a position that the driver will find and manipulate it with ease.

(c) **Attenuation**

The AVAS sound level may be attenuated during periods of vehicle operation.

4. **Sound type and volume**

(a) The sound to be generated by the AVAS should be a **continuous** sound that provides information to the pedestrians and vulnerable road users of a vehicle in operation.

However, the following and similar types of sounds are not acceptable:

- (i) Siren, horn, chime, bell and emergency vehicle sounds
- (ii) Alarm sounds e.g. fire, theft, smoke alarms
- (iii) Intermittent sound

The following and similar types of sounds should be avoided:

- (iv) Melodious sounds, animal and insect sounds
- (v) Sounds that confuse the identification of a vehicle and/or its operation (e.g. acceleration, deceleration etc.)

(b) The sound to be generated by the AVAS should be easily indicative of vehicle behaviour, for example, through the automatic variation of sound level or characteristics in synchronization with vehicle speed.

(c) The sound level to be generated by the AVAS should not exceed the approximate sound level of a similar vehicle of the same category equipped with an internal combustion engine and operating under the same conditions.

Environmental consideration:

The development of the AVAS shall give consideration to the overall community noise impact.