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**EUROPEAN NEW CAR ASSESSMENT PROGRAMME
(Euro NCAP)**

SEAT BELT REMINDER ASSESSMENT PROTOCOL

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Seat Belt Reminder Assessment Protocol

1. Introduction

It is well recognised that the correct wearing of seat belts is the most effective way of providing protection for vehicle occupants in a crash. Currently, wearing rates vary greatly across the European Union and research has shown that many of the non-wearers would use their seat belt with some encouragement. A small proportion of non-wearers will not be persuaded to use their belts.

Seat Belt Reminder (SBR) systems are intended to encourage the first of these groups to use their seat belt, whilst at the same time not be so annoying that the second group would take undesirable action to disable the system. Such action could include, tampering with or cutting electrical connections which might have undesirable consequences.

It is intended that habitual users who always put their seat belt on, before starting their journey, would hardly notice the existence of the system and would not be annoyed by it.

To avoid the danger that dedicated non-users would try to tamper with the system, Euro NCAP would like to encourage systems which can be deactivated. The possibility for long term deactivation of the system is encouraged but it is not mandatory. The system could also incorporate short term deactivation for individual journeys.

Although, simple seat belt reminder systems have been available for some time, the technology behind the more sophisticated systems is new. Euro NCAP has set some minimum requirements but wishes to allow the development of increasingly improved systems.

Some recommendations are made for how improvements may occur and these may eventually become Euro NCAP requirements. The expectation is that the requirements will develop in the light of further knowledge.

2. Information required from manufacturers

Before the SBR can be evaluated by Euro NCAP, it is necessary for the manufacturer to explain which seating positions are covered by the system and how the system is intended to work. Only those seating positions, requested by the manufacturer, will be assessed by Euro NCAP, even if the system extends to other seats.

3. Seat Occupancy Requirement

In the case of the driver's seat, occupancy can be assumed so the system does not have to be capable of detecting whether or not the seat is in use.

For the front seat passengers, seat use must be detected. Euro NCAP defines occupancy as use by an occupant larger, taller or heavier than a small female (5th percentile).

Rear seat occupant detection is not required but it is recommended.

4. Seat Belt Use

For all seats offered for assessment, seat belt use must be monitored. Their use needs to be identified at the start of the journey and any change of use must be detected throughout period of use of the vehicle.

For rear seat belt buckles that require a key to unlock the secondary buckle, monitoring of the secondary buckle is not required.

5. Removable Seats

Where seats, covered by the reminder system, are removable as part of the car's normal usage, it is recommended that all electrical connections are made automatically, when the seat is installed in the vehicle.

Alternatively, a manual connection can be made by the installer, provided that the following requirements are complied with:

- Connectors must be conspicuous and easily visible to the installer, during the installation process.
- Clear markings must indicate the purpose of the connection and show how the connection is made.
- The markings must be permanently attached to the vehicle.
- The markings must be conspicuous using contrasting colours.
- The markings must be easily visible to the installer during the installation process.

The presence or absence of the seat must not adversely affect the operation of other parts of the reminder system.

When a seat is installed in the vehicle and the electrical connections are disconnected, the seat belt reminder system should not give a false signal that the seat belt is being worn when it is not being worn.

If the removable seat is optional, the assessment will be based on a car equipped with the optional removable seat.

6. Start and Duration of Signal

6.1. Front seating positions

The reminder system should “start” at the commencement of each “journey” that the vehicle makes. Once a journey has started, short breaks (of up to 30 seconds) in the

journey are permitted to allow for events such as stalling of the engine. In these cases, the re-commencement of the journey does not constitute a new journey and the reminder system is not required to start again.

Initial Signal

It is recommended that an audio and/or visual signal is started, shortly after the ignition is switched on or shortly after the vehicle starts to move, where one or more seat belts are not in use.

Intermediate Signal

Optionally an intermediate signal may be given, at some time before the “Final Signal” is required, where one or more seat belts are not in use.

If this “Intermediate Signal” is more sophisticated than a simple audiovisual signal, the start of the Final Signal may be delayed. Such an Intermediate Signal might be a clear, easily visible text message or a loud and clear voice message.

Final Signal

The audiovisual Final Signal is the only signal which is a Euro NCAP requirement, where one or more seat belts are not in use.

The start and duration requirements are defined as follows:

Start

The Final Signal must start before at least one of the following:

- The ignition has been switched on, or the engine has been running, for 60 seconds, or
- The car has been in “Forward Motion” for 60 seconds, or
- The car has been in Forward motion for 500 metres, or
- The car has reached a forward speed of 25 km/h

The choice of which one or more of the above criteria is used is optional.

Where an Initial Signal is employed, the start of the Final Signal may be delayed. In this circumstance, the Final Signal must start within 30 seconds of the car having reached a forward speed of 25 km/h.

Where a “more sophisticated Intermediate Signal” is employed, the start of the Final Signal may be delayed. However, the Final Signal must start before at least one of the following:

- The engine has been running for 90 seconds, or
- The car has been in “Forward Motion” for 90 seconds, or
- The car has been in Forward motion for 1000 metres, or
- The car has reached a forward speed of 40 km/h

The choice of which one or more of the above criteria is used is optional.

For the purpose of defining the start of the Final Signal, forward motion at less than 10 km/h, or rearward motion, is not deemed to be motion.

Duration

The duration of the Final Signal must be at least 90 seconds.

If the audiovisual Final Signal is not continuous:

- Gaps of more than 1 second in the signal must not occur more frequently than every 5 seconds.
- Gaps of less than 1 second, which allow for visual signals which flash and audio signals which “beep,” are ignored.
- If gaps in the signal exceed 3 seconds, that time is not included in the “Duration” time.
- No gap must last for more than 25 seconds.
- The signal must start with a positive audio/visual signal, for at least 5 seconds

Once the Final Signal has started, it must only stop under one of the following circumstances:

- The signal has operated for the Duration specified
- The related seat belts are put into use
- The engine has stopped
- Reverse gear has been selected (Note: When forward gear is re-selected and forward motion commences (>10 km/h), the Final Signal must start again).
- The vehicle speed drops below 10 km/h, in which case, the signal must resume when the vehicle speed rises above 10 km/h. When it resumes it must be with a positive signal.
- When the occupant leaves the car

6.2. Rear seating positions

The reminder system should “start” at the commencement of each “journey” that the vehicle makes. Short breaks in the journey are allowed, where the reminder system is not required to start again. Such short breaks, of not more than 30 minutes, are to allow for events such as stalling of the engine or re-fuelling, where passengers may remain in the vehicle.

For the rear seat belt reminder, it is acceptable for a journey to be considered as having been completed when 30 minutes have elapsed, after the engine has stopped.

In the absence of seat occupancy information, only a visual signal is required by Euro NCAP. An audiovisual signal is recommended where seat occupancy information is available.

The start and duration requirements of the visual signal are defined as follows:

Start

The signal must start within five seconds of at least one of the following:

- Engine start, or
- The start of forward motion (>10 km/h)

The choice of which one or more of the above criteria is used is optional.

Where seat occupancy is monitored, the start of the signal may be delayed by 10 seconds. With good justification, longer delays may be acceptable.

For the purpose of defining the start of the signal, forward motion at less than 10 km/h, or rearward motion, is not deemed to be motion.

Duration

The duration of the signal must be at least 30 seconds.

If the visual signal is not continuous:

- Gaps of more than 1 second in the signal must not occur more frequently than every 5 seconds.
- Gaps of less than 1 second, which allow for visual signals which flash are ignored.
- If gaps in the signal exceed 3 seconds, that time is not included in the “Duration” time.
- No gap must last for more than 25 seconds.

The system may allow the driver to acknowledge the visual signal, so switching it off.

No visual signal is required, if the system is able to determine that there are no occupants in the rear seating positions.

7. Signal

Euro NCAP only requires the provision of simple audiovisual or visual signals. However, manufacturers are recommended to use the best possible means of communicating the reminder message to the driver and all the passengers. The provision of a visual signal for the user of each seat, the use of a loud and clear voice message or the use of a prominent text message on a satellite navigation or other LCD screen is recommended.

The signal should not annoy users, to the extent that they may be tempted to tamper with the restraint or the vehicle’s electrical system.

A progressive or stepped audible signal is recommended. However, there is no requirement regarding the volume of any audible signal other than the Final Signal.

If for any reason, multiple audible signals are being generated at the time that the reminder signal is operating, they must not interfere with each other, to the extent that the message is less clear, unless a more critical safety warning is being made.

7.1. Front seating positions

The Final Signal used for the front seating positions must be both audio and visual.

The audible component of the Final Signal must be “Loud and Clear,” for the driver and all relevant passengers.

Note: If, in future, an effective objective method of assessing a Loud and Clear signal is developed, Euro NCAP will consider its use for marginal cases.

The visual signal and its message must be clearly visible to driver, without the need for the head to be moved from the normal driving position.

There must be a clear and obvious link between the audible and visual signals. For example, in the case of flashing or intermittent visual or audible signals, this may be achieved by having them in synchronisation.

Note: This requirement will be applied to any assessments first published after 1st January 2006.

It is recommended that all front seat passengers can see the visual signal relevant to their seating position

It is recommended that the relevant visual signals are illuminated for the whole of the time that the seat is occupied without the seat belt being used.

7.2. Rear seating positions

The signals for the rear seating positions need only be visual.

The visual signals and their message must be clearly and easily visible to driver, without the need for the head to be moved from the normal driving position.

It is recommended that all rear seat passengers can see the visual signal relevant to their seating position.

It is recommended that the relevant visual signals are illuminated for the whole of the time that the seat is occupied without the seat belt being used.

The visual signals, available for the driver, should clearly indicate the number of seat belts in use or not in use. Absence of information is not an acceptable signal.

Note: Where text messages are used, it is recommended that they are in at least one of the languages of the country in which the car is sold. This will become a requirement for any assessments first published after 1st January 2006.

8. Change of Status

If during the journey, after the Final Signal has stopped, any seat belt experiences a “change of status,” where a buckled belt is unbuckled, the reminder must indicate this immediately with a “loud and clear” audio signal and visual signal.

The change of status may be indicated by the commencement of the Initial Signal, Intermediate Signal or Final Signal. If this is by the commencement of either the Initial or Intermediate signals, the reminder sequence must continue as it would at the commencement of a new journey. However, this Change of Status signal should have no gaps of greater than 10 seconds.

When a vehicle stops to allow a passenger to leave and then continues its journey, no change in status indication is required.

9. Test Conditions for Assessment of Loud and Clear Audible Signals

- The sound level will be assessed by a user, having normal hearing acuity, sitting in the relevant seat.
- The assessment will be made with the vehicle being driven at constant speed, of 25 km/h, in second gear. Vehicles with automatic transmission will have it locked in second gear, if this is possible. (Note: Where a more sophisticated Intermediate Signal is employed, it may be necessary to travel at 40 km/h before returning to 25 km/h, to assess the audible signal.)
- The ventilation fan will be set to its maximum setting.
- All ventilation vents will be fully opened, if this is possible.
- The radio / audio system will be switched off.

Note: It is recommended, that reminder systems are designed so that, if they sound whilst the radio / audio system is playing, they interrupt the radio / audio sound. Alternatively, the radio/ audio system could be used to convey the reminder message.

- The air conditioning will be switched off, if this is possible
- With convertibles, the roof will be closed.
- All windows will be closed.

Note: It is recommended that the reminder system is designed so that the audible signal can be easily heard under any normal usage conditions.

10. Deactivation

The reminder system may be designed to allow deactivation. Short term deactivation can cover a single journey. Long term deactivation may be used for dedicated non-users of seat belts. It is intended that this would reduce the likelihood that users might tamper with the system.

The Seat Belt Reminder system must not be deactivated at the time that the car is offered for sale.

10.1. Short term single journey deactivation

Short term deactivation must be more difficult than putting the seat belt on and off once. Short term deactivation should only affect the seating position for which the deactivation has been chosen. It should not affect the operation for other seating positions.

Note: This requirement will be applied to any assessments first published after the release of Phase 17+ results, in 2006. Until then, belting and un-belting within 10 seconds will continue to be the minimum requirement.

The Reminder system must reactivate if ignition is switched off for more than 60 seconds.

10.2. Long Term

Long term deactivation must require a sequence of operations, which could not be guessed at or carried out accidentally.

Re-activation must be possible in a relatively simple manner. It should not be more complex to re-activate the system than it was to deactivate it. No new components or special tools should be required to carry out the reactivation procedure.

Instructions for long term deactivation must not be supplied with car. However, they can be supplied to the user, on request.

Included with the deactivation instructions must be the instructions on how to reactivate the system.

If deactivation has to be carried out by dealer, reactivation may also be carried out by the dealer.

In the case of low volume, special purpose vehicles, the Euro NCAP Secretariat can give ad hoc approval to remove the Euro NCAP requirement for the fitting of the SBR system to those vehicles.

11. **Scoring**

For Seat Belt Reminder systems which fully comply with the Euro NCAP requirements, the following points will be awarded to the overall occupant score for that vehicle:

Driver

Driver's seating position 1 point

Front Passenger Seats

All front passenger seating positions 1 point

Single Row Rear Passenger Seats

All rear passenger seating positions 1 point

Multiple Row Rear Passenger Seats

For each of "n" rear passenger seats 1/n point

If the third or more row of seats is optional, on any variant, the assessment will be based on a vehicle fitted with the optional seats.

In future, up to two additional points may become available to reward very sophisticated systems with enhanced capability. Such capability is not yet defined.

12. **Future Developments**

It is expected that the protocol will continue to develop, in the light of experience with these new systems. Consideration will also be given to converting some of the current recommendations to requirements.

Appendix I

Definitions

Change of Status

The change in use of the seat belt, where it is buckled or unbuckled.

Deactivation

Short Term deactivation for a single journey or Long Term deactivation for a longer period.

Final Signal

The only signal required by Euro NCAP.

Initial Signal

A signal, for the front seating positions, which commences at the start of the journey. It is desirable but is not required by Euro NCAP. No specifications are given for the signal, leaving manufacturers the freedom to use the signal they believe is most effective.

Intermediate Signal

A signal, for the front seating positions, which does not commence at the start of the journey but which commences before the Final Signal. It is desirable but is not required by Euro NCAP. No specifications are given for the signal, leaving manufacturers the freedom to use the signal they believe is most effective.

Journey

Movement of the vehicle under its own power.

Monitored

The continuous checking of the use, non-use or change in use of the seat belt or seat occupancy.

More Sophisticated Intermediate Signal

An intermediate signal, with a clear, easily visible text message or a loud and clear voice message. No specifications are given for the signal, leaving manufacturers the freedom to use the signal they believe is most effective.

Occupancy

Use by an occupant larger, taller or heavier than a small female (5th percentile).

Recommendation

A feature which is desirable but which is not required for the Euro NCAP assessment.

Requirement

A feature that is necessary to be awarded points in the Euro NCAP assessment.

Short Break

A short period of time during which the vehicle is stopped, where it would be unnecessary to start the reminder signal again when the journey re-commences.

Start of Reminder System

The commencement of the Seat Belt Reminder sequence.