Annex 19 Working Document – proposed amendments from the AMEVSC Secretary

Changes to document AMEVSC-02-03e proposed by the AMEVSC Secretary in developing the test schedule (paragraph 2.4.), Annex 19 Appendix 11 and Annex 19 Appendix 12 in line with the changes made to paragraph 2.3.2. Changes highlighted in yellow.

Draft Proposal for Amendment of Regulation No. 13

A. PROPOSAL

Annex 19

The title, amend to read:

"PERFORMANCE TESTING OF ~~TRAILER~~ BRAKING **SYSTEM** COMPONENTS"

After the title, insert a new section heading, to read:

"**A. PERFORMANCE TESTING OF TRAILER BRAKING COMPONENTS**"

Paragraph 1., amend to read:

"1. General

This ~~annex~~ **section** defines the test procedures applicable in defining the performance of the following:"

After paragraph 6.6.1., add a new section B, to read:

"**B. PERFORMANCE TESTING OF MOTOR VEHICLE BRAKING COMPONENTS**

1. General

This section defines the procedures applicable in defining the performance of the following:

1.1. A vehicle stability function

1.2. A test report for the above may be used in conjunction with the procedures defined in section B of Annex 20 to this Regulation or at the time of evaluating a motor vehicle which is being subject to actual performance requirements defined for the respective motor vehicle

2. Vehicle stability function

2.1. General

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2.1.1. This section defines the procedure to determine the dynamic characteristics of a vehicle equipped with a vehicle stability function as specified in paragraph 5.2.1.32. of this Regulation.

2.2. Information document

2.2.1. The system manufacturer shall supply to the Technical Service an information document applicable to the vehicle stability control function(s) for which performance verification is required. This document shall contain at least the information defined in Appendix 11 to this annex and shall be attached as an appendix to the test report.

2.3. Definition of test vehicle(s)

2.3.1. Based on the stability control function(s) and their application(s) defined in the system manufacturer's information document, the Technical Service shall carry out a vehicle based performance verification. This shall include one or more dynamic manoeuvres as defined in paragraph 2.1.3. of Annex 21 to this Regulation on a motor vehicle(s) which is representative of the application(s) defined in paragraph 2.1. of the system manufacturers information document.

2.3.2. When selecting the motor vehicles(s) for evaluation, consideration shall also be given to the following:

(a) Braking system: the braking system of the test vehicle(s) to be evaluated shall comply with all of the relevant requirements of this Regulation.

(b) Vehicle category - M_2, M_3 [N_2, N_3]

(c) Vehicle description (e.g. bus, coach, truck, towing truck, semi-trailer tractor, etc.):

(d) Vehicle configuration(s) (e.g. 4x2, 6x2 etc): each configuration to be evaluated

(e) Drive orientation (Left or right hand drive): not a limiting factor – evaluation not required

(f) Single front axle steering: not a limiting factor – evaluation not required (see (g) and (h))

(g) Additional steering axles (e.g. forced steering, self-steering): to be evaluated

(h) Steering ratio: to be evaluated – end-of-line programming or self-learning systems not a limiting factor

(i) **Drive axles: to be taken into consideration with regard to the use (loss) of wheel speed sensing in the determination of vehicle speed**

(j) **Lift~~ing~~ axles: lift axle detection/control and lifted condition to be evaluated**

(k) **Engine management: communication compatibility to be evaluated**

(l) **Gearbox type (e.g. manual, automated manual, semi-automatic, automatic): to be evaluated**

(m) **Drive train options (e.g. retarder): to be evaluated**

(n) **Differential type (e.g. standard or self-locking): to be evaluated**

(o) **Differential lock(s) (driver selected): to be evaluated**

(p) **Brake system type (e.g. air over hydraulic, full air): to be evaluated**

(q) **Brake type (disc, drum (single wedge, twin wedge, S-cam)): not a limiting factor, however, should other types become available, then comparative testing may be required**

(r) **Anti-lock braking configurations: to be evaluated**

(s) **Wheelbase: to be evaluated**

[, with the system manufacturer specifying maximum and minimum values which may be verified using vehicles within [+/-20%]]

[In the case where vehicles conforming to the minimum and maximum wheelbases as specified in the information document are not available at the time of testing, minimum and maximum wheelbase verification may be carried-out utilising system manufacturer test data for vehicles with a wheelbase within 20% of the actual minimum and maximum wheelbase vehicles being tested by the Technical Service]

(t) **Wheel type (single or twin): to be covered in the system manufacturer information document**

(u) **Tyre type (e.g. structure, category of use, size): to be covered in the system manufacturer information document**

(v) **Track width: not a limiting factor – covered by variations in centre of gravity evaluation**

(w) **Suspension type (e.g. air, mechanical, rubber): to be evaluated**

(x) Centre of gravity height: to be evaluated, with the system manufacturer specifying maximum values which may be verified using vehicles within [+20%]

[In the case where vehicles conforming to the maximum centre of gravity height as specified in the information document are not available at the time of testing, maximum centre of gravity height verification may be carried-out utilising system manufacturer test data for vehicles with a centre of gravity height within 20% of the actual maximum centre of gravity height of the vehicles being tested by the Technical Service]

(y) Lateral acceleration sensor position: installation envelop as specified by the system manufacturer to be evaluated

(z) Yaw rate sensor position: installation envelop as specified by the system manufacturer to be evaluated

2.4. Test schedule

2.4.1. To evaluate the vehicle stability control function the tests used shall be agreed between the system manufacturer and the Technical Service and shall include conditions, appropriate to the function being evaluated, that would without the intervention of the stability control function result in loss of directional control or roll-over control. The dynamic manoeuvres, test conditions and results shall be included in the test report.

The evaluation shall include the following, as appropriate:

2.4.1.1. Vehicle category/vehicle description:

Vehicles of different categories and descriptions may be used in the evaluation of vehicles of other categories and vehicles with other descriptions, e.g. a semi-trailer tractor for a short wheelbase truck, or a long wheelbase truck for a bus. However, at least one vehicle shall be included in the testing and the subsequent report with the same vehicle category and vehicle description as that of the vehicle for which type-approval is being requested utilizing Annex 20 Section B paragraph …… in meeting the requirements of Annex 21.

2.4.1.2. Additional steering axles:

Evaluate the influence by a comparison of results with the axle in its normal steering mode and with the steering disabled so that it becomes a fixed axle, unless it is an end-of-line programming parameter.

2.4.1.3. Steering ratio:

Tests to be carried-out to determine the effectiveness of any end-of-line programming or self learning using a number of vehicles with different steering ratios, or the approval is restricted to the steering ratios actually tested.

2.4.1.~~1~~ 4. Lift axle:

Tests to be carried-out with the lift axle in the raised and lowered conditions, with position detection and signal transfer being evaluated to establish that the change in wheelbase has been recognised

2.4.1.~~2~~ 5. ~~Power train~~ Engine management:

Control of the ~~power train~~ engine, or any other source(s) of motive power, to be shown to be independent from driver demand

2.4.1.~~3~~ 6. Drive train options ~~(e.g. retarder, differential (driver selected locking or self-locking))~~:

The effect of any options to be shown, e.g. retarder management to be independent of the driver in the case of a retarder

2.4.1.7. Differential type/differential lock(s):

Effect of self-locking or driver selected locking to be shown, e.g. function maintained, reduced or switched-off.

2.4.1.8. Anti-lock braking configurations:

Tests shall be carried-out on at least one anti-lock braking configuration that is suitable for each of the vehicle configurations being evaluated, with a different anti-lock braking configuration being used for each vehicle configuration, if there is an end-of-line programming of the anti-lock braking configuration.

If there is no end-of-line programming, each anti-lock braking/vehicle configuration shall be tested.

If the vehicle stability function is hosted on different systems (e.g. ABS, EBS), tests shall be carried-out on vehicles having the different hosting systems.

2.4.1.9. Wheelbase:

Once the difference in wheelbase between the minimum wheelbase vehicle and the maximum wheelbase vehicle is greater than 1 metre, a vehicle with an intermediate wheelbase shall also be tested.

2.4.1.10. Suspension type:

Vehicles shall be selected on the basis of the basic suspension type, e.g. air, mechanical, rubber, of each axle or axle group.

2.4.1.11. Centre of gravity height:

Tests shall be carried-out on vehicles where it is possible to adjust the centre of gravity height so as to demonstrate that the roll-over control is able to adapt to changes in the centre of gravity height.

2.4.1.12. Lateral acceleration sensor position:

The effect of the lateral acceleration sensor being installed in different positions on the same vehicle shall be evaluated to confirm the installation envelop specified by the system manufacturer.

2.4.1.13. Yaw rate sensor position:

The effect of the yaw rate sensor being installed in different positions on the same vehicle shall be evaluated to confirm the installation envelop specified by the system manufacturer.

2.4.1.14. Loading:

Vehicles shall be tested in both the laden and unladen/part laden conditions to demonstrate that the vehicle stability function is able to adapt to differing conditions of load.

In the case of a semi-trailer tractor, the tests shall be carried-out with a coupled semi-trailer in which the roll-over control, if fitted, has been disabled. The semi-trailer tractor alone (solo condition, no additional weight) shall also be evaluated.

2.5. Test report

2.5.1. A test report shall be produced, the content of which shall be at least that defined in Appendix 12 of this annex."

Annex 19 Appendix 7

The title, amend to read:

"VEHICLE **(TRAILER)** STABILITY FUNCTION INFORMATION DOCUMENT"

Annex 19 Appendix 8

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The title, amend to read:

"VEHICLE **(TRAILER)** STABILITY FUNCTION TEST REPORT"

Add new Appendices 11 and 12 to Annex 19, to read:

"**Annex 19 – Appendix 11**

VEHICLE (MOTOR VEHICLE) STABILITY FUNCTION INFORMATION DOCUMENT

1. General

1.1. Name of manufacturer

1.2. System

1.3. System variants

1.4. System options

1.4.1. Control function (directional / roll-over / both) including an explanation of the basic function and/or philosophy of the control

1.5. System configurations (where appropriate)

1.6. System identification including software level identifier.

2. Applications

2.1. List of motor vehicles ~~types~~ by description and configurations ~~for which approval is required~~ that are covered by the information document

2.2. Schematic diagrams of the respective configurations installed on the motor vehicles defined in item 2.1. above with consideration given to the following:
- **(a) Lift axles**
- **(b) Steering axles**
- **(c) Anti-lock braking configurations**

2.3. Scope of application with respect to suspension:
- **(a) Air**
- **(b) Mechanical**
- **(c) Rubber**
- **(d) Mixed**
- **(e) Anti-roll bar**

2.4. Additional information (if applicable) to the application of the directional control and roll-over control function~~(s)~~, for example:
- **(a) Wheelbase, track, centre of gravity height**

(b) Wheel type (single or twin) and tyre type (e.g. structure, category of use, size)
(c) Gearbox type (e.g. manual, automated manual, semi-automatic, automatic)
(d) Drive train options (e.g. retarder)
(e) Differential type/differential lock(s) (e.g. standard or self-locking, automatic or driver selected)
(f) ~~Engine management system~~ Management of the engine or any other source(s) of motive power
(g) Brake type

3. Component Description

3.1. Sensors external to the controller
(a) Function
(b) Limitations on the location of the sensors
(c) Identification (e.g. part numbers)

3.2. Controller(s)
(a) General description and function
(b) Functionality of internal sensors (if applicable)
(c) Hardware identification (e.g. part numbers)
(d) Software identification
(e) Limitations on the location of the controller(s)
(f) Additional features

3.3. Modulators
(a) General description and function
(b) Hardware identification (e.g. part numbers)
(c) Software identification (if applicable)
(d) Limitations

3.4. Electrical Equipment
(a) Circuit diagrams
(b) Powering methods

3.5. Pneumatic circuits
System schematics including anti-lock braking configurations associated with the motor vehicle types defined in paragraph 2.1. of this appendix

3.6. Safety aspects of the electronic system in accordance with Annex 18 to this Regulation

3.7. Electro-magnetic compatibility

3.7.1. Documentation demonstrating compliance with ECE Regulation No. 10 ~~including the 03 series of amendments~~ as required by paragraph 5.1.1.4. of this Regulation.

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~~*Comment: R13 makes reference to the 02 series of amendments to ECE Regulation 10 however the 03 series became effective in July 2008 therefore R13 should be amended accordingly.*~~

Annex 19 –Appendix 12

VEHICLE (MOTOR VEHICLE) STABILITY FUNCTION TEST REPORT

Test Report No: …….

1. Identification:

1.1. Manufacturer of the vehicle stability function (name and address)

1.2. Applicant (if different from the manufacturer)

1.3. Systems ~~platform~~

1.3.1. System variants

1.3.2. System options

1.3.2.1. Control functions

2. System(s) and installations:

2.1. Anti-lock braking configurations ~~(where appropriate)~~

2.2. Vehicle applications

2.2.1. Vehicle category (e.g. N_2, N_3, etc)~~:~~

2.2.2. Vehicle ~~type(s)~~ description (e.g. semi-trailer tractor, bus, etc.)~~:~~

2.2.3. Vehicle configuration(s) (e.g. 4x2, 6x2 etc)~~:~~

2.2.4. End of line programming

2.3. System identification

2.4. Functional description

2.4.1. Directional control

2.4.2. Roll-over control

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2.4.3. Low speed operation

2.4.4. Off-road mode

2.4.5. Drive train options

2.5. Components

2.6. Trailer detection and functionality

2.7. Intervention warning

2.8. Failure warning

2.9. Stop lamp illumination

3.0 Assessed vehicle variables:

3.1. General

3.2 Brake system type

3.3. Brake type

3.4. Centre of gravity

3.5. ~~Engine management.~~ Management of the engine or other source(s) of motive power

3.6. Gearbox type

3.7. Installation configurations

3.8. Lift axles

3.9. Effect of load variations

3.9.1. Roll-over control

3.9.2. Directional control

~~**3.10. Drive orientation (Left or right hand drive)**~~

3.~~11~~ 10. Steering ratio

3.~~12~~ 11. Additional steering or steered axles

3.~~13~~ 12. Suspension

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3.~~14~~ 13. Track width

~~3.15 Tube sizes~~

~~3.16. Tyre type~~

~~3.17 Vehicle type~~

3.~~18~~ 14. Yaw rate and lateral acceleration sensor(s)

~~3.19 Vehicle configuration~~

3.~~20~~ 15. Wheelbase

3.~~21~~ 16. Wheel type, tyre type, tyre size

4 Limits of Installation:

4.1 Suspension type

4.2 Brake type

4.3 Location of Components

4.3.1. Yaw rate and lateral acceleration sensor(s) position

4.4 Anti-lock braking configuration(s)

4.5. Additional steered axles

4.6 Additional recommendations and limitations

4.6.1. Brake system type

4.6.2. ~~Engine management.~~ Management of the engine or other source(s) of motive power

4.6.3 Lift~~ing~~ axles

5 Test data and results:

5.1. Test vehicle data (including the specification and functionality of any trailer(s) used during the test(s))

5.2. Test surface information

5.2.1. High adhesion surface

5.2.2. Low adhesion surface

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5.3. Measurement and data acquisition

5.4. Test conditions and procedures

5.4.1. Vehicle tests

5.4.1.1. Directional control

5.4.1.2. Roll-over control

~~**5.4.2. Simulation?**~~

5.5. Additional Information

5.6. Test results

5.6.1. Vehicle tests

5.6.1.1. Directional control

5.6.1.2. Roll-over control

5.7. Assessment in accordance with Annex 18 to this Regulation

5.8. Compliance with ECE Regulation No. 10

6. Attachments:

7. Date of test:

8. This test has been carried out and the results reported in accordance with Annex 19, Section B to ECE Regulation No. 13 as last amended by the …… series of amendments.

Technical Service [1]/ conducting the test

Signed: ……. Date: ……

9. Approval Authority 1/

Signed: ……. Date: ……

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[1]/ To be signed by different persons even when the Technical Service and Approval Authority are the same or alternatively, a separate Approval Authority Authorisation issued with the report."