Proposal for amendments to Regulation No. 13 (Heavy vehicle braking)

The text reproduced below was prepared by the experts from Sweden to be inserted into Regulation No. 13. This is to provide provisions for new technologies such as Fully Automatic Coupling Systems, FACS, and fully integrated drivetrain control including propulsion and braking implemented in the towed vehicles. The modifications to the text as proposed in GRRF-69-12 are marked in **bold** characters.

I. Proposal

Main text

Amend paragraph 5.1.3.6.2.:

5.1.3.6.2 The electric control line of t**he Brake electric/electronic interface** shall conform to ISO 11992-1 and 11992-2:2003 and be a point-to-point type using ~~the seven pin connector according to ISO 7638-1 or 7638-2:1997 x/. I.e. the signals of the Brake electric/electronic interface shall be allocated in conformance with ISO 7638.~~ **exclusively allocated contact pins in the specified connector according to 5.1.3.6.4.1 to 5.1.3.6.4.3 below.** The data signals of the Brake electric/electronic interface shall be used to transfer information exclusively for braking (including ABS) and running gear (steering, tyres and suspension) functions as specified in ISO 11992-2:2003. The braking functions have priority and shall be maintained in the normal and failed modes. The transmission of running gear information shall not delay braking functions. The power supply, provided through the Brake electric/electronic interface, shall be used exclusively for braking and running gear functions and that required for the transfer of trailer related information not transmitted via the electric control line. However, in all cases the provisions of paragraph 5.2.2.18. of this Regulation shall apply. The power supply for all other functions shall use other measures.

~~The ISO 7638 connector may be used for 5-pin or 7-pin applications, as appropriate.~~

Insert new paragraph 5.1.3.6.3, 5.1.3.6.4, 5.1.3.6.4.1 to 5.1.3.6.4.3, to read:

5.1.3.6.3 Brake electric/electronic interface general requirements

5.1.3.6.3.1 The Brake electric/electronic interface shall in the specified connector be kept together in a separate region.

5.1.3.6.3.2 The data communication signals (6 and 7) of the Brake electric/electronic interface may be left uninstalled provided that physical arrangements are made such that towed vehicles requiring connection according to ISO 11992-1 and 11992-2 may not be connected.

5.1.3.6.3.3 The signal 1 and 4 of the Brake electric/electronic interface shall be physically realized such that leads with 4 mm^2 cross section may be used. The remaining pins in the Brake electric/electronic interface shall handle at least 1.5 mm^2 .

5.1.3.6.3.4 For vehicles having an electric system with a nominal voltage lower than 24V the signals 1 and 4 of the Brake electric/electronic interface shall be such that leads of 6 mm^2 may be used.

5.1.3.6.3.5 The connector in which the Brake electric/electronic interface is a part shall per se fulfill the requirements in the ISO4091. The endurance test shall be extended to 10 000 cycles.

5.1.3.6.3.6 The connector in which the Brake electric/electronic interface is a part shall have a geometrically excluding interface or be part of a geometrically excluding interface such that unintended connection is avioded.

5.1.3.6.4 The embodiment of the brake electric/electronic interface:

5.1.3.6.4.1 A Brake electric/electronic interface used together with mechanical couplings according to ECE Regulation 55 class C + D, G + H, K + L, S or T where the electric connection is engaged by hand shall be realized using the ISO7638-1/ISO7638-2 connector x/ [Footnote introduced in step 1**].**

The ISO 7638 connector may be used for 5 pin or 7 pin applications, as appropriate.

5.1.3.6.4.2 A Brake electric/electronic interface that is part of a fully integrated electrical connector used in FACS (Fully Automatic Coupling System) according to ECE Regulation 55 class C + D, G + H, K + L or S where the electric connection is engaged automatically as part of the automatic process shall be realized in accordance with ISO13044-x, as appropriate for the respective coupling class.

Vehicles with a FACS implementation according to this paragraph shall also have an implementation according to paragraph 5.1.3.6.4.1 of this Regulation allowing manual Brake electric/electronic interface to enable coupling of a non-FACS truck with a FACS trailer and vice versa. As one non-FACS vehicle and one FACS vehicle are being coupled together the driver shall be warned of the situation. While realizing this manual option the point-to-point connection requirement shall secured also for the manual connection.

5.1.3.6.4.3 A Brake electric/electronic interface that is part of a fully integrated electrical connector used in FACS (Fully Automatic Coupling System) according to ECE Regulation 55 class W may be realized with a unique dedicated connector provided that :

- **Requirements of paragraph 5.1.3.6.2 and 5.1.3.6.3 are fulfilled.**
- **The signal allocations to the connector pins are documented in the type approval documentation for the ECE R55 type approval.**

Amend paragraph 5.1.3.8, to read:

" ... part of the power-driven vehicle." **For vehicle combinations with a FACS automation level there may be a short flexible hose on either side of the coupling in order to enable automatic operation.** In all other cases, the ..."

II. Justification

Summary of the proposal

1) Introduce requirements stating when the “Brake electric/electronic interface” shall be handled with the ISO7638 connector and when and how it may be handled through other means.

2) An amendment is made to allow for flexible hose on either side of a FACS level coupling,

Detailed justification of the proposal

New technologies like Fully Automated Coupling Systems, FACS are introduced into the market. These technologies address Safety, Efficiency, Environment and Work related illness. The connector ISO7638 is incompatible with FACS. Further details and motives for FACS may be found in a supplementary document to this proposal.

Further examples of system solutions down the line that will be incompatible with the ISO7638 are "totally integrated vehicle combination control systems". Those may include advanced propulsion, stability and handling systems implemented in the trailers. Some information on the project with this content may be found a supplementary document to this proposal. Further down the line short range radiofrequency communication may be introduced to improve the data communication between truck and trailer.

Regulation No. 13 is requiring the use of ISO7638 which is incompatible with the above applications. In order to allow for those applications and other to be handled in a safe way paragraphs 5.1.3.6.2 has been adjusted. Further 5.1.3.6.3 has been added to handle all requirements that are implicit to ISO7638. Finally paragraphs 5.1.3.6.4, 5.1.3.6.4.1 to 5.1.3.6.4.3 are introduced to layout the physical requirements on the realization (embodiment) of the “Brake electric/electronic interface”. In addition the alternative embodiments with respect to different applications are outlined.

As new technologies and systems are coming to the market, the definition of “Brake electric/electronic interface” may need to be updated and then an additional paragraph 5.1.3.6.4.x will be added. The remainder of the regulation will be unchanged as regards “Brake electric/electronic interface”

The current revision of the ECE R13 requires that flexible hoses may be used on one side of the coupling only. Many FACS implementations require flexibility on either side of the coupling to be able to encompass the movements necessary in the automatic coupling process.