

## Proposal for amendments to Regulation No. 55 (Mechanical coupling components)

The text reproduced below was prepared by the experts of the GRRF Informal working group ACV, to be inserted into Regulation No. 55. This is to provide provisions for new technologies such as Fully Automatic Coupling Systems, FACS. The modifications to the text of addendum No 54 Regulation 55 Revision 1 are marked in **bold** characters.

### I. Proposal

#### Main text

Insert a new paragraph 2.6.14 defining a new coupling class

**2.6.14 Class W** A non-standard dedicated drawbar type coupling at FACS level of automation. A type W coupling comprises two parts, a female (F) and a male (M). Between the two parts there is a geometric excluding interface common to one specific approved type. This interface is where the connection/disconnection between towing and towed vehicle is executed. When mated it does not allow any motion or displacement.

One of the parts M or F includes a permanent mechanical swivel joint that realizes the amount articulation required for drawbar couplings. This joint shall not be possible to open without the use of tools. The centre of this joint shall from the perspective of vehicle geometry be used as the coupling point.

A unique reference point shall be provided on each coupling part, F and M, to enable vehicle dimensions to be measured on each vehicle separately. These reference points shall be documented in the drivers manual of the coupling.

In actual use one F-part may be used with several M-part and vice versa within the same approved Type.

The word "type" in this context shall have the meaning according to section 2.10 of this regulation.

#### **[Additional Class for fifth wheel couplings at FACS level of automation only]**

Amend paragraph 2.8 and insert a new paragraph 2.8.1, 2.8.2 and 2.8.2.1

2.8. ~~Manually controlled coupling system, Remotely controlled coupling systems or Fully Automatic Coupling Systems (FACS) designate different levels of automation. are devices and components which enable the coupling device to be operated from the side of the vehicle or from the driving cab of the vehicle.~~

**2.8.1 Manually controlled coupling systems (MSC)**

**have all but coupling of the mechanical coupling ( ref. §4.3 ) manually operated.**

**2.8.2** Remote control systems are devices and components which enable the coupling device to be operated from the side of the vehicle or from the driving cab of the vehicle.

**2.8.3 Fully automatic coupling system (FACS)**

**is a coupling and uncoupling system where all connections i.e. mechanical, electrical, pneumatic and applicable auxiliary functions are realised through an automatic process in which the coupling and**

**uncoupling process is completed without the driver leaving the cab and without further command from the driver than starting the process.**

**In the context of this regulation coupling systems where all connections but **not** the operation of auxiliary functions is part of a closed automatic process shall be treated in the same way as FACS.**

**2.8.3.1 Class C + D, class G + H, K + L and class S may come at Manual, Remote or FACS level of automation (ref. §2.8.3).**

**Coupling system class W only comes at FACS level of automation (ref. §2.8.3).**

**2.8.3.2 Fully automatic coupling systems that are controlled by a complex electronic control system shall be subject to a review according to the Annex 18 of the ECE Regulation 13.**

Amend paragraph 4.3

" ... mass greater than 3.5 tonnes. **In this context a FACS is to be seen as an automatic coupling.**"

**Annex 2 and Annex 3**

**Information document to include information on level of automation.**

**Item 10 in Annex 2 and item 9 in Annex 3 to include information on the approved installation of electrical connector.**

**Annex 5**

**§§12 ff need to be rewritten to account for FACS. This section shall also include requirement that a FACS level of automation coupling shall have a unique installation of the electrical connector.**

## **II. Justification**

### **Summary of the proposal**

- 1) Introduce a new coupling class W available only at the FACS level of automation.
- 2) Define the FACS level of automation.
- 3) Position the FACS level coupling in the context of the requirement for automatic coupling operation for trailer over 3.5 tonnes maximum permissible mass.

### **Detailed justification of the proposal**

Coupling systems exist that have a geometric excluding interface. At the current level of technology development this is a robust way to achieve Fully Automatic Coupling System, FACS, level of automation for drawbar couplings. Hence a new class is defined. Other levels of automation may be found in ISO13044-1.

The geometric excluding interface excludes any possibility for a coupling part F of an approved coupling type  $W_X$  to be used together with a coupling part M of approved coupling type  $W_Y$ . I.e.  $W_X$  and  $W_Y$  are geometrically incompatible. Hence there is a guarantee that only matching brake electric/electronic interfaces will come together. This allows for specific treatment of the brake electric/electronic interface being acceptable.

In order to secure that the total coupling/uncoupling process is performed in exactly the same way each time a Fully Automatic Coupling System level of automation is defined.

Paragraph 4.3 requires all coupling systems used with trailers of a maximum permissible mass greater than 3.5 tonnes to be automatic as concerns mechanical coupling. In order to clarify that a FACS is above and including this level of automation a clarifying text added.

In order to safeguard a reliable implementation of the double mechanical locking requirement of the paragraph 4.5 any complex control system of a FACS is mad subject to a review according to Annex 18 of the ECE regulation 13.

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