

Correlation UN R13 / UN R13-H

The following **Correlation Table** shows the corresponding provisions of the **current** versions of UN R13 and UN R13-H as far as they are related to the proposed **amended** provisions by the EMB Informal Group regarding electro-mechanical braking systems.

The asterisks (*) in column 3 (UN R13-H) of the following "Correlation Table" address the new proposed "R13-EMB requirements" which should be checked whether they are also of interest for a possible update of UN R13-H (passenger M₁ vehicles and light commercial N₁ vehicles).

From the "Correlation Table" below it can be seen that the current UN R13 requirements **referenced** in the current 'EMB Proposal' (Issue January 2023 - Informal document GRVA-15-17) exist also **more or less** as **identical** requirements in UN R13-H.

Correlation Table (UN R13 / UN R13-H)

Subject	UN R13	UN R13-H	Notes
Definition " <i>Electric state of charge</i> "	2.21.4	2.17.4	R13 = R13-H
Definition " <i>Reference braking forces</i> "	2.31	- *	not existing in UN R13-H This definition is currently used only for vehicles with compressed air operated brakes
Definition " <i>Electro-mechanical brake</i> "	-	*	proposed new definition 2.44
Definition " <i>Electro-mechanical braking system</i> "	-	*	proposed new definition 2.45
Definition " <i>Wheel brake demand value</i> "	-	*	proposed new definition 2.46
Definition "performance of an electrical energy storage device"	-	*	proposed new definition 2.47
Definition "usable performance"	-	*	proposed new definition 2.48
Definition "Actual Electric Usable Performance (AEUP)"	-	*	proposed new definition 2.49
Definition "AEUP _w " - low electrical performance level	-	*	proposed new definition 2.50
Definition " <i>P_w</i> " - the low electrical supply power warning	-	*	proposed new definition 2.51
Definition " <i>Energy source</i> "	-	*	proposed new definition 2.52

Subject	UN R13	UN R13-H	Notes
Definition " <i>Electrical energy storage device</i> "	-	*	proposed new definition 2.53
Definition " <i>Electrical supply device</i> "	-	*	proposed new definition 2.54
Definition " <i>Certified Usable Performance (CUP)</i> "	-	*	proposed new definition 2.55
Definition " <i>Minimum Required Usable Performance (MRUP)</i> "	-	*	proposed new definition 2.56
Provisions for the periodic technical inspection of braking systems	5.1.4	5.1.4	R13 = R13-H (Heading)
Data of compressed-air braking system	5.1.4.5.1	-	compressed-air braking systems not covered by UN R13-H
Requirements regarding checking the correct behaviour of the warning signals AEUP _w and P _w	new 5.1.4.5.3	*	proposed new requirement
Reference braking forces	5.1.4.6	- *	Currently, a reference braking force procedure is only defined for vehicles with compressed air operated brakes
Reference braking force requirements for compressed-air braking systems	5.1.4.6.2 and 5.1.4.6.3	-	reinserted as new paragraphs 5.1.4.6.1.1 and 5.1.4.6.1.2 (paragraphs have been only renumbered)
Reference braking force requirements for electro-mechanical braking systems	new 5.1.4.6.2 5.1.4.6.2.1 5.1.4.6.2.2 5.1.4.6.2.3	*	proposed new requirements (analogue requirement as for vehicles with compressed-air braking systems)
Requirement of dual energy reserves if the service braking force and transmission depend exclusively on the use of an energy reserve	5.2.1.2.7.2	5.2.2.8	* except for the additional last sentence in paragraph 5.2.1.2.7.2: " <i>In each service braking circuit in at least one of the air reservoirs a device for draining and exhausting is required in an adequate and easily accessible position;</i> " ⇒ R13 = R13-H*
This new added paragraph 5.2.1.2.7.3. also permits - in contrast to the requirement of current paragraph 5.2.1.2.7.2 - that in the case of EMB, e.g. only one or more wheel brake(s) is/are provided with energy either by an energy reserve providing electrical power to the whole transmission or separately to the electric control and separately to the energy transmissions of a braking circuit.	new 5.2.1.2.7.3	*	This new proposed EMB requirement is an additional alternative requirement to current paragraph 5.2.1.2.7.2 (addressing all braking systems)

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Paragraph permitting that the driver's braking effort is assisted only by one energy reserve when in the absence of such an assistance secondary braking performance can be achieved by muscular energy only.	5.2.1.2.7.3 renumbered in the EMB proposal as paragraph 5.2.1.2.7.4	5.2.2.9	R13 = R13-H* * except for the different references to the dead redundancy paragraphs of R13/5.2.1.6 and R13-H/5.2.5 respectively
<i>"Energy source shall be as safe as practicable"</i>	5.2.1.5	5.2.4	R13 = R13-H
<i>"In the event of failure in any part of the transmission of a braking system, the feed to the part not affected by the failure shall continue to be ensured ..."</i>	5.2.1.5.1	5.2.4.1	R13 = R13-H
Test procedure regarding a failure in the energy supply	5.2.1.5.2	5.2.4.2	R13 = R13-H
Alternative provisions for paragraphs 5.2.1.5.1 and 5.2.1.5.2 for an electro-mechanical braking system	new 5.2.1.5.4 5.2.1.5.4.1	*	proposed new requirements (analogue requirements as for vehicles with hydraulic braking systems)
Warning required when the defined brake pressure compensation for a deterioration or defect within the braking system is exceeded	5.2.1.8.1.1	5.2.8.1.1	R13 = R13-H
Low pressure warning requirements (optical or acoustic signal)	5.2.1.13.1	5.2.14.1	R13 ≈ R13-H ⇐ Paragraph 5.2.1.13.1 contains also the totally superfluous wording " <i>in addition to a pressure gauge, where fitted</i> ")
In order that the driver can - at any time - check the actual electrical usable performance (AEUP), it is required that this value shall not only be displayed automatically on activation of the AEUP _w warning signal but also in response to the manual demand of the driver	new 5.2.1.13.2	*	proposed new requirement
Requirement as to vehicles authorized to tow a trailer of category O ₃ or O ₄	5.2.1.18	-	only R13 requirement (only editorial clarification proposed)
Auxiliary equipment may be supplied with energy from the electric transmission of the parking braking system provided that ...	5.2.1.26.3	5.2.19.3.	

Subject	UN R13	UN R13-H	Notes
Special additional requirements for service braking systems with electric control transmission	5.2.1.27	5.2.20	<p>R13 = R13-H (Heading)</p> <p>The requirements of these section had been introduced in the nineties for EBS vehicles having a service braking system with an electric control transmission but having no electrical energy transmission.</p> <p>For vehicles with electric control and electrical energy transmission, the new section 5.2.1.35 is proposed for EMB vehicles</p>
This requirement demands that the service braking system must be able to generate a static total braking force even when the ignition/start switch has been switched off and/or the key has been removed	5.2.1.27.1	5.2.20.1	<p>R13 ≠ R13-H</p> <p>However, both regulations require that the service braking system must be able to generate a static total braking force even when</p> <ul style="list-style-type: none"> - the ignition/start switch has been switched off and/or the key has been removed (R13) or - the propulsion system on/off control has been deactivated to the "Off" or "Lock" position and/or the ignition key has been removed (R13-H)
A single temporary failure (< 40 ms) shall have no distinguishable effect on the service braking performance	5.2.1.27.2	5.2.20.2	R13 = R13-H
A failure within the electric control transmission	5.2.1.27.3	5.2.20.3	<p>R13 = R13-H*</p> <p>* The last R13 sentence "<i>These requirements shall not be construed as a departure from the requirements concerning secondary braking.</i>" (which is only a clarification) is not included in the R13-H paragraph 5.2.20.3</p>
Warning requirement for a power-driven vehicle, electrically connected to a trailer via an electric control line	5.2.1.27.4	-	only R13 requirement
In the event of a failure of the energy source of the electric control transmission, full stroke actuations of the service braking control 20 must still be possible	5.2.1.27.5	5.2.20.4	R13 = R13-H

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Red warning signal required when the battery voltage falls below a value nominated by the manufacturer	5.2.1.27.6	5.2.20.5	<p>R13 ≈ R13-H*</p> <p>* Since UN R13-H has no requirements concerning residual braking performance, the R13 H paragraph 5.2.20.5 demands "secondary braking performance" instead of "residual braking performance" (in 5.2.1.27.6) 'after the warning signal has been activated'.</p>
Requirement addressing the case when auxiliary equipment is supplied with energy from the same reserve as the electric control transmission	5.2.1.27.7	5.2.20.6	<p>R13 ≈ R13-H*</p> <p>* The R13 H paragraph 5.2.20.6 does not have the sentence "<i>For vehicles authorized to tow a trailer of category O₃ or O₄ the energy consumption of the trailer shall be taken into account by a load of 400 Wⁿ.</i>"</p>
Requirements addressing the case when the auxiliary equipment is supplied with energy from the electric control transmission	5.2.1.27.8 5.2.1.27.8.1 5.2.1.27.8.2	5.2.20.7 5.2.20.7.1 5.2.20.7.2	R13 = R13-H
Requirement addressing a failure in the electric control transmission of the service braking system of a towing vehicle equipped with an electric control line	5.2.1.27.9	-	only R13 requirement
Requirement addressing a failure in the electric control transmission of a trailer	5.2.1.27.10	-	only R13 requirement
Warning signal requirements must also be respected despite the effect of environmental conditions (e.g., temperature) and ageing.	new 5.2.1.29.4.4.	*	proposed new requirement
Special additional requirements for service braking systems with electro-mechanical braking system with electric transmission	new Section 5.2.1.35	*	In this proposed new Section, all relevant electrical control transmission requirements of R13-Section 5.2.1.27 are covered and also requirements with regard to electric energy transmission (which are not contained in the requirements of R13-Section 5.2.1.27)
Clarification that for electro-mechanical braking systems the requirements of this section 5.2.1.35. apply instead of those of section 5.2.1.27.	5.2.1.35.1	*	proposed clarification
Residual performance must be ensured for all driving conditions	5.2.1.35.2	*	proposed new requirement

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The manufacturer is required to describe the functionality of the system triggering the warning levels $AEUP_w$ and P_w .	5.2.1.35.3	*	proposed new requirement
This paragraph corresponds to paragraph 5.2.1.27.1.	5.2.1.35.4	*	proposed new requirement (taking also account of the requirement of paragraph 5.2.1.27.1)
This paragraph addresses an electrical energy storage device feeding only the electric control transmission. This requirement is similar to that in paragraph 5.2.1.27.5. but adapted to electro-mechanical braking systems	5.2.1.35.5	*	proposed new requirement
In contrast to paragraph 5.2.1.35.5., this requirement addresses a configuration of an electro-mechanical braking system where energy storage devices are providing electrical energy for the electrical control and electrical energy transmission.	5.2.1.35.6	*	proposed new requirement
As an alternative to the requirements of Annex 7, Part D, paragraph 1.2., electrical energy storage devices that provide power only to the control transmission of the braking system may satisfy this requirement.	5.2.1.35.7	*	proposed new requirement
The paragraph ensures that if the electrical energy storage devices are used also by other vehicle systems (e.g. automatic traction control or other auxiliary systems) then the energy consumption of these systems shall not cause the reserves of energy to fall under a level which ensures the prescribed service braking performance as per the minimum performance requirements defined by these regulation	5.2.1.35.8	*	proposed new requirement
A warning signal shall be displayed when the energy storage capacity of the electrical energy storage device(s) is not sufficient to fulfil the requirements of Annex 7, Part D, paragraph 1.2.1.	5.2.1.35.9	*	proposed new requirement
A warning signal shall be displayed when ...	5.2.1.35.10	*	proposed new requirement; however, text still under discussion and not yet agreed

Subject	UN R13	UN R13-H	Notes
The warning signal may not be displayed ...	5.2.1.35.11	*	proposed new requirement; however, text still under discussion and not yet agreed
Power warning (P _w) requirement	5.2.1.35.12	*	proposed new requirement
The functions to monitor the ageing and charging of the electrical energy storage devices shall be checked at ...	5.2.1.35.13	*	proposed new requirement
Priority of the braking system	5.2.1.35.14	*	proposed new requirement
This requirement is essentially a copy of paragraph 5.2.1.27.6.	5.2.1.35.15	*	proposed new requirement
This requirement is similar to paragraph 5.2.1.27.7. However, this requirement addresses the whole electrical (control and energy) transmission of the service braking system.	5.2.1.35.16	*	proposed new requirement
This requirement is identical with paragraph 5.2.1.27.3 except that this requirement covers the whole electric transmission and not only the electric control transmission as addressed in paragraph 5.2.1.27.3.	5.2.1.35.17	*	proposed new requirement
This requirement is identical with paragraph 5.2.1.27.2.	5.2.1.35.18	*	proposed new requirement
Except for the added and clarifying wording "In the case of" at the beginning of the text, this requirement is identical with paragraph 5.2.1.27.4	5.2.1.35.19	*	proposed new requirement
In the case of a failure in the electric control transmission of the service braking system of a towing vehicle This requirement is identical with paragraph 5.2.1.27.9.	5.2.1.35.20	*	proposed new requirement
If the auxiliary equipment is supplied with energy from the electric transmission, the following requirements shall be fulfilled. 5.2.1.35.21.1. 5.2.1.35.21.2.	5.2.1.35.21	*	proposed new requirement
Additional requirements to Annex 2	A2/14.17	*	proposed new provisions

Subject	UN R13	UN R13-H	Notes
Prescribed test procedure for a vehicle with electrically actuated service brakes powered from traction batteries which receive energy only from an independent external charging system	A4 /1.2.11	A3/1.2.11	R13 = R13-H proposal for an amendment
No setting requirements for hydraulically operated disc brakes	A4/1.5.1.7.2	-	currently, only R13 requirement new proposal to demand same provision also for electro-mechanical braking systems
This test requirement demands that e.g., a failure on a single wheel on a high- μ surface where a very high braking force may be generated and may cause a severe condition with regard of stability, is assessed	new A4/1.3.3	*	proposed new requirement
Behaviour of the vehicle during a brake transmission failure Paragraphs 1.3.3. (see above) and 2.5. of Annex 4 ensure that there is an integrated control strategy to ensure that the driver can maintain vehicle control under fault/failure conditions.	new A4/2.5	*	proposed new requirement
General time response requirement for hydraulic systems	A4/4.1.3	A3/3.1.2	R13 = R13-H
General time response requirement (analogue to paragraph A4/4.1.3 for hydraulic systems)	new A4/4.1.4	*	proposed new requirement
Provisions relating to energy sources and energy storage devices (energy accumulators) for electro-mechanical braking systems	new A7 Part D	*	proposed new requirement
Requirement for spring braking system	A8	-	proposal for an amendment of heading of Annex 8 proposed
Current paragraph "5.1.1.3. The vehicle's engine shall then be stopped or the supply to the energy transmission storage device(s) cut off." amended	A13 /5.1.1.3	A6/5.1.1.3	R13 = R13-H proposal for an amendment
Current paragraph "5.1.1.4. amended	A13/5.1.1.4	A6/5.1.1.4	R13 = R13-H proposal for an amendment
Test procedure for the determination of the coefficient of adhesion (k)	A13/App. 2, 1.13	A6/App. 2, 1.13	R13 = R13-H proposal for an amendment