

Minimum inspection requirements for electric and hybrid-electric vehicles

INTRODUCTION

Following the roadmap for update of UN Rules annexed to the 1997 Vienna Agreement, approved by WP.29 at its 159-th session, the representatives of the Russian Federation and the International Motor Vehicle Inspection Committee (CITA) worked out the items to be considered during the periodical inspection of vehicles with electric or hybrid electric powertrain.

Electric and hybrid-electric vehicles are becoming more and more used on the roads. The technologies used arise some additional aspect that have to be considered when assessing their roadworthiness.

The proposals are introduced to be further on incorporated into new Rule annexed to the 1997 Vienna Agreement.

PROPOSALS

Minimum inspection requirements for electric and hybrid-electric vehicles

The inspection shall cover at least the items listed below.

Item	Method	Main Reasons for Rejection	Defect Assessment		
			MiD	MaD	DD
1. <i>Electric Vehicle and Hybrid Electric Vehicle electrical hazard marking as defined by UNECE Regulation 100 if required¹ / fitted)</i>	<i>Visual inspection.</i>	(a) <i>Missing or cannot be found.</i> (b) <i>Incomplete or illegible.</i> (c) <i>Not in accordance with vehicle documents or records.</i>	X X X	X X X	
2. <i>Electric regenerative braking system</i>	<i>Visual inspection.</i>	(a) <i>Components missing, damaged or corroded.</i> (b) <i>Warning device malfunctioning.</i> (c) <i>Warning device shows system malfunction.</i>		X X X	

Item	Method	Main Reasons for Rejection	Defect Assessment		
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3. <i>Electronic power steering (EPS)</i>	<i>Visual inspection.</i>	(a) <i>Warning device malfunctioning.</i> (b) <i>Warning device shows system malfunction.</i> (c) <i>Power assistance not working</i> (d) <i>Electrical wiring/connections corroded</i>		X X X X	X X
4. <i>Low voltage electrical wiring (as defined by UNECE Reg 100)</i>	<i>Visual inspection with vehicle over a pit or on a hoist, including inside the engine compartment (if applicable).</i>	(a) <i>Wiring insecure or not adequately secured.</i> <i>Fixings loose, touching sharp edges, connectors likely to be disconnected.</i> <i>Wiring likely to touch hot parts, rotating parts or the ground, connectors disconnected (relevant parts for braking, steering).</i>	X	X	X
		(b) <i>Wiring slightly deteriorated.</i> <i>Wiring heavily deteriorated.</i> <i>Wiring extremely deteriorated (relevant parts for braking, steering).</i>	X	X	X
		(c) <i>Damaged or deteriorated insulation.</i> <i>Likely to cause a short-circuit fault.</i> <i>Imminent risk of fire, formation of sparks.</i>	X	X	X
5. <i>Electric power train (as defined by UNECE Reg 100)</i>					
5.1. <i>Residual Energy Storage System (RESS), e.g. Traction battery(ies)</i>	<i>Visual inspection with vehicle over a pit or on a hoist, including inside the engine compartment when appropriated</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Insecure or not adequately secured</i> (c) <i>Damaged or corroded components</i> (d) <i>Leaking</i> (e) <i>Shields not in place or damaged</i> (f) <i>Damaged or deteriorated electrical insulation</i>		X X X X X X	X X X X X X
5.2. <i>RESS management system if fitted / required¹, e.g. range information, state of charge indicator, battery thermal control.</i>	<i>Visual inspection when possible</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Components missing or damaged</i> (c) <i>Warning device malfunctioning</i> (d) <i>Warning device shows system malfunction</i> (e) <i>Operation of RESS ventilation / cooling system impaired, e.g. blocking of ventilation holes, ducts, fluid leaks</i>		X X X X X	X X X X X

Item	Method	Main Reasons for Rejection	Defect Assessment		
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5.3. <i>Electronic converters, motor and change control an wiring harness and connectors</i>	<i>Visual inspection with vehicle over a pit or on a hoist, including inside the engine compartment when appropriated</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Insecure or not adequately secured</i> (c) <i>Damaged or corroded components</i> (d) <i>Shields not in place or damaged</i> (e) <i>Damaged or deteriorated electrical insulation</i>	X X	X X X X	X X
5.4. <i>Traction motor(s)</i>	<i>Visual inspection with vehicle over a pit or on a hoist, including inside the engine compartment when appropriated</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Insecure or not adequately secured</i> (c) <i>Damaged or corroded components</i> (d) <i>Shields not in place or damaged</i> (e) <i>Damaged or deteriorated electrical insulation</i>	X X	X X X X	X X
5.5. <i>Auxiliary power equipment, e.g. heating, defrosting</i>	<i>Visual inspection with vehicle over a pit or on a hoist, including inside the engine compartment when appropriated</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Insecure or not adequately secured</i> (c) <i>Damaged or corroded components</i> (d) <i>Shields not in place or damaged</i> (e) <i>Damaged or deteriorated electrical insulation</i>	X X	X X X X	
5.6. <i>Service disconnect device</i>	<i>Visual inspection and voltage absence check, where possible without disassembling</i>	(a) <i>Insecure or not adequately secured</i> (b) <i>Damaged or corroded components</i> (c) <i>Shields not in place or damaged</i> (d) <i>Damaged or deteriorated electrical insulation</i> (e) <i>Voltage presence</i>	X X	X X X X	X X X
5.7. <i>“Active driving possible mode” indicator and associated information signal if driver leaves vehicle in active driving possible mode if fitted / required¹</i>	<i>Visual inspection and by operation if possible</i>	(a) <i>Indicator / information signal not fitted in accordance with the requirements¹</i> (b) <i>Indicator / information signal not functioning correctly</i>		X X	
5.8. <i>“State of drive direction” indicator if fitted / required¹</i>	<i>Visual inspection and by operation</i>	(a) <i>Indicator not fitted in accordance with the requirements¹</i> (b) <i>Indicator not functioning correctly</i>		X X	
5.9. <i>RESS external charging system if fitted / required¹</i>					
5.9.1. <i>Charging cable(s) if fitted / required¹ and if possible</i>	<i>Visual inspection if possible</i>	(a) <i>Not in accordance with requirements¹</i> (b) <i>Damaged or corroded components</i> (c) <i>Damaged or deteriorated electrical insulation</i>	X X X	X X X	X X X

Item	Method	Main Reasons for Rejection	Defect Assessment		
			MiD	MaD	DD
5.9.2. Vehicle charging immobilisation interlock if fitted / required ¹	Visual inspection and by operation if possible	(a) Not in accordance with requirements ¹ (b) Interlock non fitted in accordance Not in accordance with requirements ¹ (c) Warning device malfunction (d) Warning device shows system malfunction (e) System not functioning		X X X X	 X X X
5.9.3. Vehicle inlet charging connection if fitted / required ¹	Visual inspection	(a) Insecure or not adequately secured (b) Damaged or corroded components (c) Shields not in place or damaged (d) Damaged or deteriorated electrical insulation (e) Inadequate weather sealing of vehicle inlet charging connection or charge cable interface	X X	X X X X X	X X X
5.9.4. Vehicle electrical chassis(protective earth) and inter-charging protective earth connection if fitted / required ¹	Electrical continuity check	(a) Not in accordance with requirements ¹ (b) Continuity check failed			X X