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PROPOSAL TO DEVELOP A GLOBAL TECHNICAL REGULATION
CONCERNING DOOR LOCKS AND DOOR RETENTION COMPONENTS

Technical Sponsor: United States of America

Note : The text reproduced below was considered and adopted by the Executive Committee (AC.3) of the 1998 Global Agreement at its eighth session, in June 2003. It is based on document TRANS/WP.29/2003/49 that had been submitted by the United States of America, not amended (TRANS/WP.29/926, para. 132).

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Objective of the proposal

In the United States of America (USA), between 1994 and 1999, complete and partial ejections resulted in approximately 9,864 fatalities and 9,767 serious injuries per year. Door ejections accounted for 1,668 of those fatalities (19 per cent) and 1,976 of the serious injuries (22 per cent). Hinged side door openings accounted for approximately 90 per cent of all door ejection fatalities and 93 per cent of all door ejection serious injuries. This situation is likely to be a problem elsewhere.

The objective of this proposal is to develop a global technical regulation regarding door locks and door retention components intended to reduce door latch system failures. In view of the 1998 Global Agreement, we now have an opportunity to develop an improved and harmonized door locks and door retention components regulation. Moreover, the work on the global regulation will provide an opportunity to consider in the new regulation most, if not all, international safety concerns as well as available technological developments.

The USA is currently looking into upgrading its door locks and door retention components regulation to provide more stringent requirements. The current regulation was designed to test for door openings in vehicles that were built in the 1960s. Changes in vehicle latch designs common in the 1960s and 1970s have rendered the existing regulations largely obsolete. Likewise, the ECE regulation is now over thirty years old. Neither regulation has been amended significantly since their original adoption. Accordingly, the existing regulations have become less effective and likely do not provide many safety benefits at this time.

In light of the USA regulatory upgrade effort, we believe that this would be an excellent opportunity for the international community to develop a global technical regulation (gtr) concurrently with the USA. Everyone could benefit from harmonization and new technology-based improvements of the door locks and door retention components regulation. The benefits to the Governments would be the improvement of the door locks and door retention components adoption of the best safety practices, the leveraging of resources, and the harmonization of requirements. Manufacturers would benefit from reduction of the cost of development, testing and fabrication process of new models. Finally the consumer would benefit by having a better choice of vehicles built to higher, globally recognized standards providing a better level of safety at a lower price.

Description of the proposed regulation

The current requirements only test individual latch components without regard to how those components interact with each other, with other portions of the door, or with the directions of force loading conditions occurring in real world crashes. Door openings are frequently caused by a combination of longitudinal and lateral forces during the crash, which can subject the latch system to compressive longitudinal and tensile lateral forces. These forces often result in structural failures of the latch system as well as other non-latch systems such as hinge strike supports, door frame and door sheet metal. Hence, it would be beneficial to consider developing full system requirements. In addition, current requirements have no test procedure for evaluating the safety of sliding doors. Consideration of such requirements would be valuable.

The gtr will be applicable for passenger vehicles, multi-purpose vehicles as well as trucks. The performance and test requirements for the door latch, striker and hinges will be based on the stringency needed to attain reasonable safety benefits in a cost effective manner. The gtr will be developed based in part on existing national regulations, directives of Contracting Parties as well as the international standards and regulations listed below. The USA prepared a table to facilitate comparison of the present USA and ECE regulations, which are currently being widely used by many Contracting Parties. The table is annexed to this proposal.

The results of additional research and testing conducted by any Contracting Parties since the existing regulations were promulgated will also be factored into the requirements of the draft gtr and may result in the proposal of new requirements.

Elements of the gtr, which cannot be resolved by the Working Party will be identified and dealt with in accordance with the protocol established by AC.3 and WP.29. The proposed gtr will be drafted in the format adopted by WP.29 (TRANS/WP.29/882).

Existing regulations and directives

Though there are no regulations currently contained in the Compendium of Candidates, the following regulations and standards will be taken into account during development of the new global technical regulation regarding door locks and door retention components.

- UNECE Regulation 11 – Uniform provisions concerning the approval of vehicles with regard to door latches and door retention components.
- U.S. Code of Federal Regulations (CFR) Title 49: Transportation; Part 571.206: Door locks and door retention components.
- EU Directive 70/387/EEC, concerning the doors of motor vehicles and their trailers.
- Canada Motor Vehicle Safety Regulation No. 206 - Door locks and door retention components.
- Japan Safety Regulation for Road Vehicle Article 25 – Entrance
- Australian Design Rule 2/00 – Side Door Latches and Hinges.

International Voluntary Standards

- SAE J839, September 1998 - Passenger Car Side Door Latch Systems
 - SAE J934, September 1998 - Vehicle Passenger Door Hinge Systems
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Annex

COMPARISON BETWEEN FMVSS No. 206 and ECE REGULATION No. 11

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
A. Application			
1. Vehicles			
a. Passenger Cars	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 passenger cars (≤ 9 seats and < 3.5 tonnes (~7,000 lb))	
	- Back doors, door locks, latches and hinges on passenger cars manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
b. MPVs	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 MPVs (≤ 9 seats and < 3.5 tonnes (~7,000 lb))	
	Back doors, door locks, latches and hinges on MPVs manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
c. Trucks	- Side doors, door locks, latches and hinges	- Side doors, latches and hinges on M1 and N1 Trucks (≤ 9 seats and < 3.5 tonnes (~7,000 lb))	
	Back doors, door locks, latches and hinges on trucks manufactured after Sept 1, 1997 and with a GVWR ≤ 4,536 kg (10,000 lb).	Not specified	
2. Exemptions	Folding, roll-up and detachable doors and door components on doors modified for use with a wheelchair lift system	See above	
B. Requirements			
1. Hinged Side Doors, (Except Cargo)			
a. Door System	Not specified	Not specified	Research shows that door components affect one another during a crash causing doors to open. Therefore, a full door system test may capture these failures.

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
b. Latching System (latch and striker)	Requires that hinged side door latches must have a fully latched position; and a secondary/intermediate latching position.	Same	
	Requires that hinged side door latches must withstand a longitudinal load of 11,000 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a longitudinal load of 11,110 N in the fully latched position and 4,440 N in the secondary latched position.	The variation in loads are minor and they result from different methods of converting FMVSS 206's original English units to metric
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position and 4,450 N in the secondary latched position	Requires that hinged side door latches must withstand a transverse load of 8,890 N in the fully latched position and 4,440 N in the secondary latched position	
	Requires that the door latch assembly shall not disengage from the fully latched position when a longitudinal or transverse load of 30 g is applied to the door latch system (including the latch and its actuating mechanism with the locking mechanism disengaged). Verified by calculation (SAE J839) or by an agency approved test procedure.	Requires that the door latch shall not move from the fully latched position when an acceleration of 30 g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by dynamic inertial testing	Only, ECE R11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.
c. Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900 N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,110 N and a transverse load of 8,890 N applied separately.	Minor differences in test loads resulting from conversion.
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel.	ECE R11 requires that hinged side doors, except cargo doors, have hinges located on the front of the door.
Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
2. Hinged Side Doors, Cargo Type			
a. Door System	Not specified	Not specified	A better test is needed to address the number and orientation of cargo door latches and better simulate actual loading conditions that cause openings.
b. Latching Systems (latch and striker)	Requires that each hinged side cargo door latch must only have a primary latching position	1. Requires that each hinged side cargo door latch must only have a primary latching position and a secondary/intermediate latching position.	FMVSS 206 does not have a requirement and strength provisions for the intermediate latching position.
	Requires that hinged side door latches must withstand a longitudinal load of 11,000 N in the fully latched position	Requires that hinged side door latches must withstanding a longitudinal load of 11,110 N in the fully latched position and 4,440 N in the secondary latched position.	Conversions differences in test loads and ECE R11 has strength provisions for the intermediate latching position
	Requires that hinged side door latches must withstand a transverse load of 8,900 N in the fully latched position	Requires that hinged side door latches must withstand a transverse load of 8,890 N in the fully latched position and 4,440 N in the secondary latched position	
	Not specified	Requires that the door latch shall not move from the fully latched position when an acceleration of 30 g is applied in both directions longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged. Verified by calculation (SAE J839) or by dynamic inertial testing	ECE R11 requires inertial resistance for sliding door latches, whereas FMVSS 206 does not.
Hinges	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,000 N and a transverse load of 8,900 N applied separately.	Requires that each side door hinge system must support the door and withstand a longitudinal load of 11,110 N and a transverse load of 8,890N applied separately	Conversions differences in test loads
	Not specified	Requires that the retention components of hinged mounted side doors, other than folding doors, shall be mounted at the forward edge in the direction of travel. In the case of double doors, this requirement shall apply to the door wing, which opens first; the other wing shall be capable of being bolted.	ECE R11 restricts the location of hinges

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
Door Locks	Requires that each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle.	Not specified	ECE R11 has no lock requirements
	Requires that side front door locks, when engaged, disable the outside door handle or other outside latch release control shall be inoperative	Not specified	
	Requires that side rear door locks, when engaged, disable both the outside and inside handles or other latch release controls shall be inoperative	Not specified	
3. Hinged Back Doors			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	Each back door must have at least <u>one primary latch and striker assembly</u> with a fully latched position and a secondary latched position	Not specified	ECE R11 has no requirements for back doors, locks, latches or hinges.
	Requires that primary back door latches must comply with load tests one, two and three as well as to inertial resistance requirements	Not specified	
	Requires that auxiliary back door latches, if present, must comply with load tests one and two and inertial resistance requirements	Not specified	
	<u>Load test one:</u> Fully latched: 11,000 N secondary latch: 4,450 N <i>Application of load:</i> perpendicular to the face of the latch (corresponding to the longitudinal load test for side doors)	Not specified	
	<u>Load test two:</u> Fully latched: 8,900 N secondary latch: 4,450 N <i>Application of load:</i> in the direction of the fork-bolt opening and parallel to the face of the latch	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
b. Latching Systems (latch and striker) (cont'd)	<u>Load test three:</u> Back doors, opening upwards: Fully latched position shall not disengage under load of 8,900 N <i>Application of load:</i> orthogonal to directions of load tests one and two	Not specified	
	<u>Inertial Resistance Requirements</u> Requires that the fully latched position shall not disengage under inertia load of 30 g. <i>Application of the inertia load:</i> in the directions of load tests one, two and three.	Not specified	
c. Hinges	<u>Load test one:</u> Each back door hinge system shall support the door shall not separate under load of 11,000 N <i>Application of load:</i> perpendicular to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	<u>Load test two:</u> Each back door hinge system shall support the door shall not separate under load of 8,900 N <i>Application of load:</i> perpendicular to the axis of the hinge pin and parallel to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	<u>Load test three:</u> Back doors opening upward: no separation under load of 8,900 N <i>Application of load:</i> in the direction of the axis of the hinge pin	Not specified	
d. Door Locks	Requires that each back door system equipped with interior door handles or that leads directly into a compartment that contains one or more seating accommodations shall be equipped with a locking mechanism with operating means in both the interior and exterior of the vehicle. When the locking mechanism is engaged, both inside and outside door handles or other latch release controls shall be inoperative	Not specified	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
4. Sliding Doors			
a. Door System	<u>Side Sliding Doors</u> Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Same	
	<u>Back Sliding Doors</u> Requires the track and slide combination or other supporting means of side sliding doors shall not separate under outward transverse load of 17,800 N (8,890 N to each load bearing member at opposite edges of door).	Not specified	Only FMVSS 206 requires sliding back doors to have performance requirements.
b. Latching Systems (latch and striker)	Not specified	Requires that the sliding door latch/striker assembly must withstand a longitudinal load of 4,440 N in intermediate latched position 11,110 N in fully latched position.	Only ECE R11 requires sliding door latch requirements and a requirement to ensure door closure
	Not specified	Requires that the sliding door latch/striker assembly must withstand a transversal load of 4,440 N in intermediate latched position 8,890 N in fully latched position.	
	Not specified	Requires that the sliding door latch shall not move from fully latched position when acceleration of 30 g is applied longitudinally and transversally to the latch, including its actuating mechanism, with the locking mechanism disengaged.	
	Not specified	Requires that sliding doors without an intermediate latched position: if the door is not fully latched, must automatically move away to a partially open position; readily apparent to the vehicle occupants	
c. Hinges	NA	NA	
d. Door Locks	No requirements	No requirements	

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
C. Test Procedures			
1. Hinged Side Doors (including cargo)			
a. Door System	Not specified	Not specified	
b. Latching Systems (latch and striker)	<p>The test procedure specifies (defined in SAE J839):</p> <ol style="list-style-type: none"> 1. For the longitudinal load attach the latch and striker to test fixture. Locate weights to apply 890 N tending to separate latch and striker in direction of door opening. Apply test load perpendicular to latch face at a rate ≤ 5 mm/min 2. For the transverse load attach latch and striker to test fixture Apply load in line with the contacting surfaces of latch and striker, in door opening direction at a rate ≤ 5 mm/min. 	Same	
	<p>The test procedure specifies (defined in SAE J839):</p> <p>For the (S5.1.1.2) Inertia load, calculation of complete door latch system (i.e. door latch, striker, outside and inside handle, key cylinder and any connecting mechanisms) in the fully latched position, showing that the system will remain in the fully latched position when subjected to an inertia load of 30 g in any direction</p>	<p>Same as FMVSS 206 but provides the additional option to conducted dynamic inertial testing.</p> <p><i>The dynamic test is as follows:</i></p> <ul style="list-style-type: none"> -vehicle itself or simulated structure secured to a chassis with door lock system fully latched -acceleration of 30 to 36 g applied to the chassis for at least 30 msec in forward direction parallel to vehicle longitudinal axis as well as in direction of the door opening, perpendicular to above described first direction - when equipped with lock device ensure that it does not come into action during the tests. 	<p>Only, ECE R11 has provisions for an inertial dynamic testing procedure. However, it is unknown whether European manufacturers and testing facilities have ever conducted testing using this procedure.</p>

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
c. Hinges	<p><u>Conventional Hinges</u> The test procedure specifies (defined in SAE J934): Attach a test fixture to the mounting provision of the hinge system, simulating vehicle position (door fully closed) relative to the hinge centerline. Distance between the extreme end of one hinge in the system to the extreme end of another hinge in the system: 16.00 in (406.4 mm). Apply load equidistant between the linear center of the engaged portion and of the hinged pins and through the centerline of the hinge pin in the longitudinal vehicle direction (for longitudinal strength) and in the transverse vehicle direction (for transversal strength). Apply test load at a rate S 0.2 in (5 mm) per minute until failure. Record maximum load</p>	Same	
	<p><u>Piano Hinges</u> The test procedure specifies (defined in SAE J934): For piano type hinges, the hinge spacing requirements of SAE J934 shall not be applicable and arrangement of the test fixture shall be altered as required so that the test load will be applied to the complete hinge</p>	Same	
d. Door Locks	Not specified	Not specified	
2. Back Doors			
a. Door System	Not specified	Not specified	Because of number and orientation of back door latches, a door system test would better simulate actual loading conditions that cause doors to open.
b. Latching Systems (latch and striker)	The test procedure specifies: Load test one, two and three are same as for side door latches, longitudinal load, except that the test load must be applied in the directions specified in load tests one, two and three Inertia loads: same as for side door latches	Not specified	FMVSS 206 has a procedure for testing back door latches.
c. Hinges	The test procedure specifies: Same as for side hinged doors except that the loads shall be in the direction specified in test load one, two and three described above. The same test device may be used for load tests two and three.	Not specified	FMVSS 206 has a procedure for testing back door hinges.

DOOR COMPONENT	U.S. - FMVSS 206	Differences in ECE R11.02	Comments
d. Door Locks	Not specified	Not specified	
3. Sliding Doors			
a. Door System	<u>Side Sliding Doors</u> The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 N (2,000 lb) to the load-bearing members at the opposite edges of the door (17,800 N (4,000 lb) total). The demonstration may be performed wither in the vehicle or with the door retention components in a bench test fixture	Same	
	<u>Back Doors</u> The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 N (2,000 lb) to the load-bearing members at the opposite edges of the door (17,000 N (4,000 lb) total). The demonstration may be performed wither in the vehicle or with the door retention components in a bench test fixture	Not specified	FMVSS 206 has a procedure for testing sliding back doors.
b. Latching Systems (latch and striker)	Not specified	Same as for side hinged doors	FMVSS 206 does not test sliding door latches
c. Hinges	NA	NA	
d. Door Locks	Not specified	Not specified	