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~~**agenda item A.3)**~~

UN/ECE/WP29/GRSP INFORMAL GROUP

ON

DOOR LOCK
&
DOOR RETENTION COMPONENTS

PRELIMINARY REPORT
(PRESENTED BY MR. GEORGE MOUCHAHOIR, CHAIRMAN OF THE INFORMAL GROUP)

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1. INTRODUCTION

During the 126th session of WP.29 of March 2002, the Executive Committee of the 1998 Global Agreement (1998 Agreement) adopted a Program of Work, which includes the development of a Global Technical Regulation (GTR) to address inadvertent door opening in crashes. The Executive Committee also charged the Working Party on Passive Safety (GRSP) to form an informal working group (working group) to discuss and evaluate relevant issues concerning requirements for door locks and door retention components to make recommendations regarding a potential GTR.

The United States of America volunteered to lead the group's efforts and develop a document detailing the recommended requirements for the GTR. The U.S. presented an informal document WP29/2003/6 in March 2003, formally proposing the work and highlighting the relevant issues to be addressed in the GTR.

Under the guidelines governing the development of a GTR, the working group is to first evaluate the merits of the proposal. This evaluation should include:

- An examination of the merits of the proposal in detail, outlining the pros and cons of the proposal;
- Consideration of other regulations on the same subject, which are listed in the compendium;
- A determination that the proposal addresses a problem of sufficient magnitude to warrant the development of a regulation;
- An examination of whether the nature, extent and cause of the problem addressed by the proposal are correctly characterized;
- An examination of whether the proposal provides a sufficiently effective, performance oriented approach to address the problem;
- A determination that the approach identified in the proposal is appropriate to address the problem; and
- A description of needed additional information.

The working group met to generally evaluate the likelihood of developing a door retention GTR on September 2nd and 3rd and on December 9th, in Paris, France and Geneva, Switzerland, respectively. A more thorough evaluation of the U.S. proposal was conducted on April 3rd and 4th in London, England. A fourth meeting is scheduled for late July/early August this year.

The Contracting Parties represented on the working group are the Netherlands, France, Canada, Japan, United States of America, and the European Union. Representatives from European Association of Automotive Suppliers (CLEPA) and International Organization of Motor Vehicle Manufacturers (OICA) are also participants.

This report summarizes the main issues discussed by the working party in evaluating the proposal to develop a draft global regulation on door lock and door retention components.

2. REQUEST TO PROCEED WITH THE DRAFTING OF A GTR

Current regulations were designed to test for door openings in vehicles that were built in the 1960s. Aside from changes made to U.S. and Canadian requirements in the early to mid-1990s to address rear door openings, no significant changes have been made to any of the current regulations, notwithstanding changes in vehicle latch designs from those that were common in the 1960s and 1970s. Accordingly, the existing regulations have become less

effective and likely do not provide many safety benefits. Additionally, existing door retention regulations are comparable in terms of content, indicating harmonization in the area is possible.

Given the similarity of existing standards, the causes of door openings should be amenable to a global solution. This is because there is little variability in door retention designs among those jurisdictions that currently regulate door design. It is the belief of the working group that everyone could benefit from harmonization in this area, particularly since no existing regulations address new technology-based improvements of the door locks and door retention components. Governments would benefit from the adoption of best practices, leveraging of resources, and the harmonization of requirements. Manufacturers would benefit from the reduction of the cost of development, testing, and production process of new models. The consumer would benefit by having better choice of vehicles built to higher, globally recognized standards providing a better level of safety at a lower price.

Accordingly, the working group requests a draft GTR be prepared based on its evaluation of the U.S. proposal and the safety problems associated with door openings in general. While not all issues that would be addressed by a GTR have been resolved, no issues are sufficiently problematic to prevent the development of a draft regulation. It is proposed that a draft proposal could be prepared for discussion at the next GRSP meeting pursuant to the following schedule:

Tasks	Dates
1st Progress Report to GRSP	June 2003
1st Progress Report to AC.3	June 2003
Preparation of 1st Draft GTR	July 2003
4th Informal group Meeting	July/August 2003
2nd Draft GTR	September 2003
5th Informal group Meeting	October 2003
2nd Progress Report/Draft GTR to GRSP	December 2003
6th Informal Group Meeting	February 2004
2nd Progress Report to AC.3	March 2004
3rd Progress Report/Adoption of Final Draft GTR by GRSP	May 2004
3rd Progress Report to AC.3	June 2004
Submittal of Final Draft GTR to AC.3	November 2004

3. EVALUATION OF THE SAFETY PROBLEM

At the request of the working group, the U.S. provided data on the magnitude of the door ejections and door openings based on 1994-99 National Automotive Sampling System (NASS) and Fatal Analysis Reporting System (FARS) annual estimates. No data from other jurisdictions was presented. The U.S. data shows that:

- There are approximately 42,000 door openings, or failures in the United States per year;
- Complete and partial ejections cause 9,864 fatalities & 9,767 serious injuries in the U.S. each year;
- Door ejections constitute 19 percent (1,668) of ejection fatalities and 22 percent (1,976) of ejection serious injuries;

- 94 % of serious injuries and fatalities attributable to ejections through doors involve unbelted occupants; and
- Hinged side door openings account for 90 % of door ejection fatalities and 93% of ejection serious injuries.

According to the U.S. statistics, less than one percent of occupants who sustain serious and fatal injuries in tow-away crashes are ejected through doors. However, the risk of a door failure is relatively high. Additionally, despite the relatively rare occurrence of door ejections in crashes, the risk of serious or fatal injury is high when ejection occurs. Door ejections are the second leading source of ejections in all crashes in the U.S. They are particularly likely in rollover crashes.

Door openings are frequently caused by a combination of forces occurring during a crash, which simultaneously subject door retention components to either compressive/tensile lateral and longitudinal forces. These forces often result in structural failures of the latch system and hinges. Structural failure of the latch and striker are the leading cause of door openings. The U.S. data indicate that about one half of door openings are associated with damage to the latch or striker alone, and about two-thirds involve damage to the latch or striker, either alone, or in combination with damage to one or more of the hinges. Failures involving the door supports and the doorframe occur far less frequently. Side door openings constitute approximately 90 percent of all door ejection fatalities and 93 percent of the serious injuries.

The rate of ejections through doors is heavily dependent on belt use. Accordingly, the risk of ejection will likely vary from jurisdiction to jurisdiction, based on differing rates of belt use. Nevertheless, the incidence of door openings should be relatively constant given the similarity in door designs and the lack of occupant behaviour patterns as a factor in door failures.

4. REVIEW OF EXISTING INTERNATIONAL REGULATIONS

The following existing regulations, directives, and standards pertain to door locks and door retention components:

Existing Regulations and Directives

- UN/ECE Regulation 11 – Uniform provisions concerning the approval of vehicles with regard to door latches and door retention components.
- U.S Federal Motor Vehicle Safety Standard No.206, Door locks and door retention components. (FMVSS No. 206)
- 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. (CMVSS No. 206). [Note: The North American regulations FMVSS and CMVSS No. 206 are substantially similar].
- Japan Safety regulation for Road Vehicle Article 25 –
- 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
- ISO – No standards found

These and other available standards on the subject continue to be examined by the working group. A preliminary anlysis has been made to identify the differences in the application,

requirements, and test procedures of the North America and ECE R11 regulations, as appended to this report (Informal Document TRANS/WP.29/GRSP/2002/15). There are no apparent conflicts between the GTR proposal and other existing international standards.

5. DISCUSSION OF ISSUES TO BE ADDRESSED BY A GTR

The following discussions reflect the working groups' identification of specific issues, as well as the group's evaluation of those issues.

A. Applicability

The application of a door retention component GTR will, to the extent possible, use the revised vehicle classification and definitions that the Working Party on General Safety (GRSG) Common Task Group has prepared.

However, questions remain as to what vehicles from these categories will be covered under the GTR. Some members of the group urge that the GTR should initially only apply to M1 (< 9 seats), and N1 (<3.5 tonnes) vehicles, while others have stressed the inclusion of all vehicles other than M2s, M3s, and N3s, for at least some portions of the GTR. Among those desiring a GTR more limited in scope, it was proposed that N2 vehicles could be added in the future after evaluating various door designs for these vehicles. Some of those arguing in favor of a more inclusive GTR noted that current U.S., Canadian, and Australian requirements already apply to all vehicles other than buses (M2 and M3 vehicles) and that the applicability of existing requirements to commercial trucks has not proven problematic for vehicle manufacturers. Accordingly, a question remains as to whether to specifically include N2s and N3s in the GTR, with the potential to exclude certain N2 and N3 vehicles from some or all of the requirements.

The working group will continue to discuss the application issue and will examine the revision to the vehicle classification by GRSG and any effects it would have on the definitions of vehicles applicability of this GTR in order to reach a final recommendation.

B. General Requirements

The working group agreed to recommend that the GTR should specify requirements for side and back doors, door retention components and door locks and to consider all available research and testing done by various jurisdictions. The groups agreed to recommend that force levels identified in the current component static tests for latches and hinges be harmonized to eliminate variations due to rounding of unit conversions. New requirements and test procedures for hinged side and sliding doors proposed by North America for inclusion are being evaluated for consideration. Other requirements being evaluated include provisions to ensure doors remain closed and operational following dynamic crash testing, as well as an inertial load dynamic test and limitations on circumstances under which rearward mounted door hinges would be allowed on hinged side doors.

1. Hinged Side Doors Issues

Currently, ECE R11 has similar requirements to FMVSS No. 206, although ECE does not distinguish between cargo and non-cargo door latches. The group agreed to recommend that side cargo doors (i.e., double doors) meet the same requirements as side hinged doors. The U.S. and Canada have developed a series of new test procedures designed to better simulate real world door opening in crashes.

1.1. New hinged full door test requirements

These tests consist of lateral and longitudinal door-in-frame quasi-static (full door) tests in both longitudinal and lateral directions, independently from the door system. These procedures are designed to simulate various failures during crashes:

- The lateral full door test is designed to simulate latch failures in crashes that produce outwards forces on the door (i.e., through occupant loading or inertial loading) such as side crashes that result in vehicle spin and rollover. This procedure is intended to replace the current lateral tensile bench test.
- The longitudinal full door test is designed to simulate a collision in which the side of the vehicle is stretched, leading to the possibility that the striker could be torn from its mated latch (i.e., far side door in side impacts, and front and rear offset crashes on the opposite side door). This procedure is intended to replace the current longitudinal tensile bench test.

At present, most members do not support the adoption of full door tests into the GTR. Because of the current EU requirement for both the component tests and a door closure requirement in dynamic tests, there is some question among the members as to whether a full door test provides any additional value. One member has requested an analysis of how the full door test will improve safety (or the reduction in door openings) as compared to existing requirements. The U.S. will provide this analysis.

Other members of the working group have been unable to evaluate the contemplated test procedures because they did not have a sufficiently precise test procedure (e.g., size of loading plates, point of application against the door, whether and how screws attach the loading plate to the door, how screws attach the loading plate to the test frame.) However, they expressed several concerns that the new procedure will end up being unduly design restrictive, given the limitations of the test frame. For example, it may be that multiple test frames would be required to ensure an appropriate "fit" between the door and the test frame. This is because placement of the test load relative to the latch mechanism may be sufficiently different to produce significantly different results, and because door specific holes must be drilled into the test frame. Additionally, the test frame may not adequately address new latch designs that may be mounted in non-traditional locations. Likewise, the procedure does not allow manufacturers the benefit of non-latch attachments that are primarily used for side impact purposes but also may have a positive effect on door closure.

Those members voicing concerns over the new procedures have argued that conducting the proposed tests on a full vehicle rather than a test frame is impractical because not all loads can be applied to a closed door. However, it may be possible to cut the door frame and attach it to the test frame, although such an approach may not fully replicate the actual door-in-frame as installed in the vehicle since cutting the door frame may change its characteristics. Such an approach may address the fit between the latch and striker, as well as the physical characteristics of the door and the doorframe.

The primary concern with the proposed tests is whether they adequately address the instances of door failures in the real world or whether a dynamic or quasi-dynamic test (e.g., dynamic loading against the door interior) would be preferable. One member noted that he/she was concerned a static test inadequately tests door systems for real world conditions. He/she stated a dynamic requirement, where a dummy or other test form was propelled into the door, would be preferable to the static application of a load against the door, even if the statically-applied load were higher than the dynamically-applied load.

Because of the more encompassing concerns related to the full-door tests, there was little discussion over whether the trim should be removed or what would constitute "trim" if it were removed. A question was raised as to what exactly would be the point of the tests since the load direction would change with the application of force. It is unclear to what extent the removal of trim would limit the change in load direction.

While not rejecting the full door tests completely, the members noted that a more thorough evaluation, based on a more fully-articulated test procedure, was needed and generally expressed serious concerns over these forms of tests being included into a GTR. Committee members were provided a more detailed test procedure for analysis. Several members have agreed to evaluate the procedure and communicate any questions over test methodology.

1.2. New Combination Component Test

The combination latch/striker component bench test is designed primarily to simulate the force conditions causing near side door openings in side impacts (longitudinal and lateral force loading).

The group discussed this combination test and has agreed to further evaluate the procedure.

1.3. Rear mounted hinges

ECE R11 requires, with a limited exception, that hinges be located at the forward edge of hinged side doors, because of the difficulty in closing a rear hinge door that is inadvertently opened while the vehicle is in motion. Some members of the group believe this requirement is too design restrictive. The group members agreed to develop and consider a proposal for requirements and procedure for testing reverse mounted side hinged doors to prevent such openings. A proposal was submitted that would require that all hinges be located on the forward edge of doors or otherwise, would be required to: (1) limit vehicle speed to ≤ [25 km/h], if door is open; (2) make the interior door handles be inoperable, if vehicle speed is > [4 km/h], and; (3) require that a vehicle be equipped with a door telltale indicator. While the proposal has not been fully evaluated, it appears to merit further consideration. Accordingly, the working group has agreed to further consider the proposal.

1.4. Rear side door locks

Unlike the door lock and door retention component requirements in North America, ECE R11 does not have provisions for rear side door locks. Some of

the working group members expressed concerns over including such requirements in the GTR, while others insisted that such requirements are necessary for the protection of children in the rear seat. In discussing this issue, several recommendations were made for inclusion in the GTR: i) a door that can be opened with a single movement of the door handle when the door is in a locked position must be fitted with a child safety lock, ii) automatic door locks that allow the driver to engage or disengage the child safety locks from the front seat would be acceptable, iii) doors that require some action other than the release of the door with a single movement of the door handle when the door is in a locked position may have child locks, but would not be required to have such locks; these doors could be required to have a manual door-lock release that would allow rear-seat passengers to open the door in the event of a crash. It was suggested that door lock requirements should be consistent with the ECE 94 and 95. The U.S. indicated that child locks are not regulated in the current North American standards, and that in any final recommendation, it is important that doors not be allowed to be opened from the interior with a single movement of the door handle when the door is locked.

The informal group will continue to discuss this item in order to reach a final resolution.

2. Side Sliding Doors Issues

The requirements and test procedures in both ECE R11 and the North American standards were discussed and the working group agreed to recommend the inclusion of the current requirements for the track and slide combinations of side sliding doors. Further, the group agreed to recommend adding the latch/striker system requirements of ECE R11. However, neither regulation had a detailed full vehicle sliding door test procedure that better simulates real world door openings in crashes.

2.1. Full vehicle test

The U.S. and Canada have jointly developed a new full vehicle sliding door test procedure to replace the existing door-in-frame test in the North American standards. The procedure specifies that the track and slide combination or other supporting means for each sliding door, while in the closed position, cannot separate from the door frame when lateral forces of 18 kN are applied. The total displacement of each of the loading devices is to be limited to 460 mm.

Everybody in the working group reacted favourably to the proposals and agreed to consider them in GTR. It was suggested that the requirements for the new sliding door test parallel those currently in ECE R11, Section 5.4, which requires the track, sliding combination or other supports not separate under specified force loads. Also, it was recommended to consider a proposal to require these doors not separate from the doorframe more that 100 mm along any point along the perimeter.

2.2. Requirement for a telltale or audible alert

The working group members agreed to require either a secondary latch or some type of indicator signaling when a sliding door was not fully closed. Among the possible approaches are a visual or audible alert that informs the driver that

the door is not completely closed. As noted above, it may be desirable to require a telltale or other alert whenever any door is incompletely closed.

3. Issues Unique to Back Doors

The group agreed to recommend that the requirements for cargo and back doors should be similar to those for hinged side doors; although some members argued that data on the risk of ejection through these doors must justify such a requirement. FMVSS/CMVSS No. 206 currently impose the same requirements on back doors as are applicable to side hinged doors. With the exception of the two areas discussed immediately below, the working group has agreed that these requirements would be appropriate for the GTR.

3.1. Back sliding door requirement

The group recommends not including requirements for these doors in the GTR, because these doors do not currently exist and could cause unforeseen risk to vehicle occupants or bystanders.

3.2. Rear glass tailgates

Some members commented that the North American standards restriction on latches or hinges attached to glazing is too restrictive, and that a less restrictive requirement, in terms of how much of the applicable door consists of glazing, seems appropriate. U.S. noted the point of the requirement was not to encourage "all glazing" doors, but rather an acknowledgement that these doors could not meet the strength requirements of FMVSS No. 206 and were exempted for practical reasons. The group requested and OICA agreed to develop various design parameters that would reduce the likelihood that ejections from these doors would not be the result of a retention component failure. The U.S. has agreed to review its requirement and better clarify what constitutes a door and what constitutes a window (i.e., hinges attached to a window fully incorporated into a latched tailgate).

The informal group will continue to discuss this item in order to reach a final recommendation.

4.Dynamic Requirements Issues

4.1. Dynamic inertial test procedure (optional to calculation)

The working group has agreed to recommend adopting the ECE R11 dynamic inertial test requirements to the GTR, as an option to the inertial calculation. France provided a sled pulse currently used in ECE type-approval testing. The deceleration pulse for the test ranged from 30g to 36g for a duration of at least 30 ms. Questions were raised regarding the corridor for the sled test pulse as well as an objective and repeatable test procedure to enforce the requirement. OICA working with France provided a draft general test procedure and a wide range for the forces for an enforceable pull test on the latch [100N—500 N]. Some members argued and the group agreed to narrowing the force range provided to a value of [250N ± Tolerance]. Additionally, some members argued for appropriate measures to detect whether the door flips open and closes again during the inertia testing (e.g. use of adhesive tape or thread, or a spring to apply a force to a striker during the inertia testing). OICA agreed to

further work on the detailed procedure to address this issue. The U.S. and Canada have agreed to define a sled test pulse corridor and evaluate the procedure as an option to the calculation.

4.2. Door closure and door operability requirements following dynamic crash testing

Some members would like to consider adopting a requirement in the GTR that side doors remain shut during vehicle dynamic crash tests. Existing ECE standards with dynamic crash test components already require the door stay closed during the test. It is believed that it is unnecessary to repeat this requirement in the GTR; it would suffice to reference the requirements of the other ECE regulations or of the FMVSS/CMVSS in the GTR.

The group likewise considered whether the GTR should require that at least one door per row be operable following crash testing (possible to exclude rear doors in rear impacts and side struck doors in side impact testing). Existing ECE standards with dynamic crash test components already have such a requirement. A test procedure needs to be developed. Some members believe that it is unnecessary to repeat this requirement in the GTR; it would suffice to reference the requirements of the other ECE regulations or of the FMVSS/CMVSS in the GTR.

C. Other concerns

Questions were raised during group discussions as to whether to include in the GTR at this time other requirements, such as vehicle entrapment involving electric door, remote keyless entry systems, power assisted side and sliding door closure, and whether to include a "telltale indicator" for all doors. It was recommended that a door telltale indicator be required for each vehicle door to be activated when doors are partially or completely open. The group will continue to discuss these issues and whether to include them in the GTR at this stage.

6. COST EFFECTIVENESS ASSOCIATED WITH A GTR

The estimated cost of the new requirements, if adopted, would likely be minor. However, a full evaluation of the costs effectiveness associated with a GTR, will be provided once the working group completes its evaluation of the proposed test procedures.

7. REFERENCE DOCUMENTS USED BY THE WORKING GROUP

A list of informal documents used by this Informal group is listed and available on the UN/ECE website. In addition, test reports and other pertinent documents detailing the U.S. and Canada proposed test procedures are accessible from the **U.S. Department of Transportation Docket Management System (Docket No. NHTSA-1996-3705) Web access at http://dms.dot.gov/**

Number of Informal Document**	Title of Informal Document
TRANS/WP.29/GRSP/2001/1	Proposal for Draft Candidate GTR on Door Latches and Door Retention Components (OICA)
TRANS/WP.29/GRSP/2002/15	Comparison Between FMVSS No. 206 and ECE R11 (U.S.)
INF GR/DL/1/1	Agenda September 2002 Meeting
INF GR/DL/1/2	Summary of Lateral Full Door Test (U.S.)
INF GR/DL/1/3	Summary of Longitudinal Full Door Test (U.S.)
INF GR/DL/1/4	Summary of Combination Test (U.S.)
INF GR/DL/1/5	Summary of Transport Canada Sliding Door Test (Canada)

INF GR/DL/1/6	Transport Canada Test Reports (Canada)
INF GR/DL/2/1	Agenda December 2002 Meeting
INF GR/DL/2/2	Proposal for a Test Procedure Concerning the Resistance against Inertial Loads of Side Door Locks on Motor Vehicles (OICA)
INF GR/DL/2/3	Comparison of Locking Requirements in FMVSS 206 with ECE R11 (OICA)
INF GR/DL/3/1	Agenda April 2003 Meeting
INF GR/DL/3/2	Crash Data on US Door Ejection/Openings (U.S.)
INF GR/DL/3/3	Full Door and Combination Detailed Test Procedures (U.S.)
INF GR/DL/3/4	Dynamic Inertial Sled Test Pulse (France UTAC)

** Informal Report (INF), GRSP Informal group (GR), Door Locks and Door Retention Components (DL), Meeting No., and Report Number

APPENDIX

COMPARISON

BETWEEN

FMVSS NO. 206 AND ECE R11

COMPARISON BETWEEN FMVSS No. 206 and ECE R11

1 DOOR COMPONENT	2 U.S. - FMVSS 206 (Shaded area reflects where FMVSS 206 lacks requirement equivalent to ECE)	3 Differences in ECE R11.02 (Shaded area reflects requirements different from FMVSS 206)	4 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.
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 withstanding 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 30g 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 30g 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 11 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 8,900N 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 11 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	

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 latches must only have a primary latching position	1. Requires that each hinged side cargo door latches 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 11 has strength provisions for the internediate 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 30g 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 11 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 8,900N 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 11 restricts the location of hinges
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 11 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 one primary latch and striker assembly with a fully latched position and a secondary latched position	Not specified	ECE 11 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	
	Load test one: Fully latched: 11,000 N secondary latch: 4,450 N *Application of load*: perpendicular to the face of the latch (corresponding to the longitudinal load test for side doors)	Not specified	
	Load test two: Fully latched: 8,900 N secondary latch: 4,450 N *Application of load*: in the direction of the fork-bolt opening and parallel to the face of the latch	Not specified	
	Load test three: Back doors, opening upwards: Fully latched position shall not disengage under load of 8900N *Application of load:* orthogonal to directions of load tests one and two	Not specified	
	Inertial Resistance Requirements Requires that the fully latched position shall not disengage under inertia load of 30 g. *Application of the inertia load*: in the directions of load tests one, two and three.	Not specified	

c. Hinges	Load test one: Each back door hinge system shall support the door shall not separate under load of 11,000 N *Application of load*: perpendicular to the hinge face plate such that the hinge plates are not compressed against each other.	Not specified	
	Load test two: Each back door hinge system shall support the door shall not separate under load of 8,900N *Application of load*: 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	
	Load test three: Back doors opening upward: no separation under load of 8,900N *Application of load*: 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	

4. Sliding Doors			
a. Door System	Side Sliding Doors 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	
	Back Sliding Doors 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 11 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 4440 N in intermediate latched position 8890 N in fully latched position.	
	Not specified	Requires that the sliding door latch shall not move from fully latched position when acceleration of 30g 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	

C. Test Procedures			
1. Hinged Side Doors (including cargo)			
a. Door System	Not specified	Not specified	
b. Latching Systems (latch and striker)	The test procedure specifies (defined in SAE J839): 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	
	The test procedure specifies (defined in SAE J839): 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 30g in any direction	Same as FMVSS 206 but provides the additional option to conducted dynamic inertial testing. *The dynamic test is as follows:* -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.	**Only, ECE 11 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	Conventional Hinges 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& 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	Same	
	Piano Hinges 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	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.
d. Door Locks	Not specified	Not specified	

3. Sliding Doors			
a. Door System	Side Sliding Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 Newtons (2,000 pounds) to the load-bearing members at the opposite edges of the door (17,800 Newtons (4,000 pounds) total). The demonstration may be performanced wither in the vehicle or with the door retention components in a bench test fixture	Same	
	Back Doors The test procedure specifies: Compliance shall be demonstrated by applying an outward transverse load of 8,900 Newtons (2,000 pounds) to the load-bearing members at the opposite edges of the door (17,000 Newtons (4,000 pounds) total). The demonstration may be performanced 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	