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**SECOND REPORT ON THE DEVELOPMENT OF A GLOBAL TECHNICAL REGULATION  
CONCERNING DOOR LOCK AND DOOR RETENTION COMPONENTS**

Transmitted by the Working Party on Passive Safety (GRSP)

Note: This document contains the second report on the development of a global technical Regulation (gtr) concerning door lock and door retention components by the GRSP informal group in charge of the development of the gtr. It is based on the text of a document distributed without a symbol (informal document No. 18) during the thirty-fourth GRSP session.

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Documents are also available via the INTERNET:  
<http://www.unece.org/trans/main/welcwp29.htm>

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## 1. INTRODUCTION

During the one-hundred-and-twenty-sixth session of WP.29 of March 2002, the Executive Committee of the 1998 Global Agreement (1998 Agreement) adopted a Programme of Work, which includes the development of a Global Technical Regulation (gtr) to address inadvertent door openings 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 United States of America presented informal document No. 6 in March 2003, formally proposing the work and highlighting the relevant issues to be addressed in the gtr.

The working group met to generally evaluate the likelihood of developing a door retention gtr on 2-3 September and on 9 December, in Paris, France and Geneva, Switzerland, respectively. A more thorough evaluation of the United States of America proposal was conducted on 3-4 April in London, England, on 23-24 July 2003 in Paris, France, and on 19-20 November in Paris, France. A sixth meeting is scheduled for February 2004.

A Preliminary Report was presented at the thirty-third GRSP meeting (Informal document No. 5). 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 during the first three meetings of the group. It also provides an evaluation of the safety problems associated with door openings and a review of the existing international regulations.

This 2nd Progress Report discusses the status of prior issues raised in the Preliminary Report, as well as new issues raised during the drafting of the gtr at the July and November 2003 working group meetings. Attached to this report is the most current draft of the door lock and door component gtr, including all associated appendices.

## 2. PROGRESS ON DRAFTING OF A GTR

At the July 2003 meeting of the working group, a draft gtr was presented for discussion. Using this as a template, revisions were made. A second draft was circulated among the members of the working group prior to the November 2003 meeting and was discussed at that meeting. While not all issues have been resolved, no issues are sufficiently problematic to prevent the agreement on a draft regulation. Accordingly, the working group is generally on track for meeting the schedule presented in the last progress report. That schedule has been modified as follows:

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

### 3. DISCUSSION OF ISSUES ADDRESSED IN THE DRAFT GTR

The following discussions reflect the working group's 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.

Due to concerns over conducting the hinged side door system test on some vehicle doors, questions still remain as to what vehicles from these categories will be covered under the gtr. Among those desiring a gtr more limited in scope, it was proposed that Category 1 and Category 2 vehicles greater than 3500 kg should be exempt from the gtr or could be added in the future after evaluating various door designs for these vehicles. Some of those arguing in favour of a more inclusive gtr noted that current United States of America, 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. It was noted that the United States of America requirements, while regulating all vehicles other than buses, do exempt certain door designs that cannot realistically be expected to meet the requirements of the standard. One suggestion was to use this same approach that has been used in North America for about 30 years.

The working group requests guidance from the GRSP regarding the applicability of a door latch gtr to vehicles heavier than 3.5 kg.

B. New Definitions in Standard

The working group has revised, developed, and agreed to new definitions to better reflect the language in the draft gtr. Further work still needs to be accomplished in defining folding doors.

C. 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. 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 an inertial load dynamic test, load tests on latches in the direction orthogonal to the parallel and perpendicular to the latch face, and limitations on circumstances under which rearward mounted door hinges would be allowed on hinged side doors.

1. Hinged Doors Issues

The United States of America 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 United States of America plans to provide this analysis at the next meeting of the working group.

Other members of the working group have evaluated the contemplated test procedures. They have expressed several concerns that the new procedure will end up being unduly design

restrictive and non-repeatable, 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 may also 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 was concerned that a static test inadequately tests door systems for real world conditions. He stated that 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 have generally expressed serious concerns over these forms of tests being included into a gtr.

### 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 one member has further evaluated the procedure. Some problems were noted in the test procedure that the group will attempt to resolve. There is also a request for justification of the recommended loads.

### 1.3. Rear mounted hinges

Regulation No. 11 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 working group agreed to recommend that all hinges located on the forward edge of doors or otherwise, would be required to: make the interior door handles be inoperable, if the vehicle speed is  $> [4 \text{ km/h}]$ , and require that a vehicle be equipped with a door telltale indicator, as would be required for sliding doors without a primary door latch.

#### 1.4. Rear side door locks

Unlike the door lock and door retention component requirements in North America, Regulation No. 11 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 Regulations Nos. 94 and 95. The United States of America and Canada 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. Accordingly, language is being drafted that may accommodate both egress in a post-crash environment and child safety under normal operating conditions.

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

#### 1.5 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. The United States of America 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 United States of America 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.

## 2. Sliding Door Issues

The requirements and test procedures in both Regulation No. 11 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 Regulation No. 11. 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 United States of America 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 a gtr. It was suggested that the requirements for the new sliding door test parallel those currently in Regulation No. 11, Section 5.4, which requires that the track, sliding combination or other supports do not separate under specified force loads. Also, it was recommended to consider a proposal to require that these doors do not separate from the doorframe more than 100 mm along any point along the perimeter. Some concerns were voiced as to the level of potential risk involved in measuring such a displacement requirement. The working group agreed to consider modifying the contemplated requirement to retain the original intent behind the requirement, while addressing any potential risk of injury to the test technicians.

### 2.2. Requirement for a telltale

The working group members agreed to require either a secondary latch or some type of visual indicator signalling to the driver when a sliding door was not fully closed.

### 3. Addition of orthogonal force loading requirements for sliding and hinged doors

The working group has discussed the possibility of adding a force loading requirement in the direction orthogonal to the directions perpendicular and parallel to the latch face for hinged and sliding doors. All governing bodies expressing a view, support the inclusion of such a requirement, stating that the requirement is not burdensome and may prove beneficial in mitigating the risk of door failures in rollover crashes. Industry representatives in the working party are opposed to such a requirement because they believe it may be difficult and may not address a real world safety problem. The working group will continue to discuss this item in order to reach a final conclusion.

### 4. Dynamic Requirements Issues



4.1. Dynamic inertial test procedure (optional to calculation)

The working group has agreed to recommend adopting Regulation No. 11 dynamic inertial test requirements to the gtr, as an option to the inertial calculation. In addition to the longitudinal and lateral tests, tests in the vertical direction are also being considered. The ECE test procedures were provided to the ad hoc committee and these are being validated by Canada. Testing is expected to be complete by the end of January 2004.

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

Existing ECE standards with dynamic crash test components already require that the door stay closed during dynamic crash tests. It is believed that it is unnecessary to repeat this requirement in the gtr. However, the working group believes that it is appropriate to discuss in the preamble to the gtr that jurisdictions not party to the 1958 Agreement would adopt a corollary requirement as part of their crash test requirements.

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. As with the requirement that doors stay closed during dynamic crash testing, the working group suggests discussing the adoption of such requirements by jurisdictions not party to the 1958 Agreement in the preamble to 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 initially recommended that a door telltale indicator be required for each vehicle door to be activated when doors are partially or completely open. The group has tentatively concluded that such a requirement is only needed for doors without a secondary latch position (i.e., some sliding doors) and hinged side doors with rear mounted hinges that can operate independent of a mated hinged side door with front-mounted hinges.

**4. 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.

**5. REFERENCE DOCUMENTS USED BY THE WORKING GROUP**

A list of informal documents used by this Informal group is listed and available on the UNECE website. In addition, test reports and other pertinent documents detailing the United States of America and Canada proposed test procedures are accessible from the **United States of America**

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)
Informal document No. 15 of the fifty-first GRSP session	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
	Proposal for a Test Procedure Concerning the Resistance against Inertial Loads of Side Door Locks on Motor Vehicles (OICA)
INF GR/DL/2/2	
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)
INF GR/DL/4/1	Agenda July 2003 Meeting
INF GR/DL/5/1	Agenda November 2003 Meeting
	BMW Presentation, "Proposed Door Test Procedures - Hinged Side Doors"
INF GR/DL/5/2	
INF GR/DL/5/3	Photos and acceleration plots of inertial loading in z-direction

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