
**Road vehicles — Securing of cargo in
passenger cars, station wagons and
multi-purpose vehicles — Requirements
and test methods**

*Véhicules routiers — Arrimage des charges à bord des voitures
particulières, des breaks et des véhicules à usages multiples —
Exigences et méthodes d'essai*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 27955 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

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Introduction

Vehicles with variable space for transporting passengers, cargo, luggage and recreational equipment have been developed, produced and marketed successfully in recent years by nearly all vehicle manufacturers. In order to ensure all-embracing internal safety of these vehicles, it is necessary to effectively reduce the danger to occupants which could arise from the above-mentioned objects during extreme driving manoeuvres and also in accidents.

Regulations governing the resistance capabilities of the backrests of the rear seats and for the retaining equipment (partitioning systems) of vehicles of the M₁ class, which are intended to protect the occupants from the danger of shifting cargo during a frontal impact, are included in UNECE Regulation No.17, which first came into force in March 1999.

Since November 2007, uniform conditions have been included in UNECE Regulation No.126 for the approval of retrofit partitioning systems intended to protect the occupants from shifting cargo.

Up until now, there has been no complete and internationally recognized and harmonized specification of testing conditions for the resistance capability of front and rear seats in vehicles having a variable space concept.

DIN 75410-2, published in July 1992, is used increasingly, even at international level. In this standard, minimum requirements and tests are defined for devices for the securing of cargo (strength of seat backs, partitioning systems and lashing points) in cars, station wagons and multi-purpose vehicles. This is intended to enable a transport and an operational securing of cargo in vehicles, in order to reduce the risk of injuries to occupants caused. The main idea behind DIN 75410-2 was that lashing points in the luggage compartment, as well as sufficiently resistant seat backs and a partitioning system, are the basic elements for the protection of occupants.

For all commercially-used cars, station wagons and multi-purpose vehicles that are concerned by the accident prevention regulation for vehicles (BGV D29), compliance with DIN 75410-2 is mandatory in Germany. Furthermore, in certain countries, drivers are obliged by law to properly secure cargo in vehicles in compliance with state of the art.

In this context, ISO/TC 22/SC 12/WG 9 has analysed the requirements of UNECE Regulation No.17, UNECE Regulation No.126 and DIN 75410-2 and has harmonized requirements and test methods in accordance with state of the art. The result is this International Standard, which is a contribution to the international harmonization of requirements to increase the safety of vehicles.

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Road vehicles — Securing of cargo in passenger cars, station wagons and multi-purpose vehicles — Requirements and test methods

1 Scope

This International Standard applies to devices for the securing of cargo in passenger cars¹⁾, station wagons¹⁾ and multi-purpose passenger cars¹⁾, where the seats directly delimit the loading space.

This International Standard defines minimum requirements and tests for front and rear seats and partitioning systems, in order to improve the protection of the vehicle occupants against shifting load during a frontal impact. In addition, this International Standard defines minimum requirements and tests for lashing points in the above-mentioned vehicles in order to be able to secure a load (luggage or goods) in a reliable and roadworthy way.

For vehicles²⁾ primarily designed for the transportation of cargo and derived from a passenger car¹⁾, only the requirements concerning the lashing points of this International Standard apply. Additional requirements for these vehicles²⁾ and requirements for any other delivery vans are specified in ISO 27956.

2 Normative references

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The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6549, *Road vehicles — Procedure for H- and R-point determination*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

single seat

seat structure, complete with trim, having a backrest not attached to the vehicle structure, and intended to seat one occupant

3.2

seat bench

seat structure, complete with trim, intended to seat more than one occupant

1) M₁ class vehicles (see 70/156/EEC), also defined as Category 1-1 Vehicles in UN ECE WP29 — Special resolution No. 1 (TRANS/WP.29/1045).

2) N₁ class vehicles (see ECE document TRANS/WP.29/78/Rev.1/Amend.2).

3.3

foldable seat or bench

seat or bench intended for normal use, or occasional use, or both, and which can be folded

3.4

anchorage

system by which the seat assembly is secured to the vehicle structure, including the affected parts of the vehicle structure

3.5

locking system

device ensuring that the seat and its parts are maintained in the position of use

3.6

adjustment system

device by which the seat or its parts can be adjusted to a position suited to the anthropometry of the seated occupant

NOTE This device can, in particular, permit longitudinal, vertical and angular displacement.

3.7

displacement system

device by which the seat or one of its parts can be displaced, or rotated, or both, to permit easy access of occupants to the space behind the seat concerned

3.8

head restraint

device whose purpose is to limit the rearward displacement of an adult occupant's head in relation to his torso, in order to reduce the risk of injury in the event of an accident

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3.9

lashing point

attachment part on the vehicle or an integrated device, to which **lashing devices** (3.10) can be connected in a form-fit manner, and designed to transfer the forces applied by the lashing devices to the vehicle structure

EXAMPLE Ring, loop, tie-down, hook, eye, lug, hook-in edge, thread connection, rail.

3.10

lashing device

device that is designed to be attached to the lashing points in order to secure the load (luggage and goods) in the vehicle

NOTE Such a device can consist of a net, a tensioning device (e.g. belt, strap), a tensioning element (e.g. wrench, ratchet, spanner) and connections (e. g. hook, eyelet), as defined by the vehicle manufacturer.

3.11

partitioning system

parts or devices (e.g. partition, bulkhead, grid, net) which, in addition to the seat backs, are intended to protect occupants from displaced luggage

3.12

longitudinal plane

plane parallel to the median longitudinal plane of the vehicle

[ISO 3409:1975, definition 3.5]

3.13**transverse plane**

plane vertical to the median longitudinal plane of the vehicle

NOTE Adapted from ISO 3409:1975, definition 3.4.

3.14**test block**

test equipment, simulating cargo

3.15**luggage compartment**

area in the vehicle behind the second seat row or behind the last unfoldable/undetachable seat row (whatever row is located more rearward) normally used for the transportation of cargo

See Figure 2.

3.16**loading space**

area in the vehicle consisting of the luggage compartment plus an area which can variably be used for the transportation of occupants, or cargo, or both, as specified by the vehicle manufacturer

See Figure 3.

3.17**cargo**

load, luggage and goods which might be transported in the loading space

3.18**backrest**

part of the seat, designed to support the back, the shoulders and possibly the head of the occupant

4 Requirements**4.1 General**

Table 1 provides a summary of the applicable requirements of this International Standard.

Table 1 — Overview

Element to which requirements apply	Passenger cars having backrests directly delimiting the loading space ^a	Station wagons, multi-purpose vehicles	Applicable test procedure
Backrests	Yes	Yes	5.3
Partitioning systems	Yes ^b	Yes ^{cd}	5.3
Lashing points	Yes ^b	Yes ^c	5.4
^a For example, sedans, notchbacks, hatchbacks. ^b If equipped. ^c At least optional equipment. ^d Only required if test block positioning in accordance with 5.2.3 is possible.			

4.2 Backrests/seats

In terms of stability, backrests that are intended to take on the function of delimiting the loading space shall be designed in such a way that they improve the protection of vehicle occupants against shifting load during severe deceleration of the vehicle (see Figure 16).

During the test in accordance with 5.3, the test blocks shall be retained by the backrest and the locking system of the backrest shall still be engaged. Permanent deformations of the backrest, seat, anchorages, adjustment systems and displacement systems are permissible as long as they do not cause injury risks to the occupants. After the test, no sharp or rough edges likely to increase the danger or severity of injuries of the occupants shall be present.

NOTE The requirements of this paragraph are deemed to be met for any seat system type approved in accordance with the luggage retention requirements of UNECE Regulation No.17.

4.3 Partitioning system

Occupants sitting on the rearmost row of seats directly delimiting the loading space should be protected by a partitioning system in order to improve the protection against unsecured load also above the backrests.

During the test in accordance with 5.3, the test blocks shall be retained by the partitioning systems, or the integrated vehicle parts, or both. The partitioning systems, or the integrated vehicle parts, or both, shall remain in position and shall not break away from its attachment points.

During the test in accordance with 5.3, the front surface of the partitioning systems, or the integrated vehicle parts, or both, if defined as being part of the partitioning system (see Note below), shall not be displaced forward more than 300 mm beyond a transverse plane which touches the rear edge of the seat backs in design position.

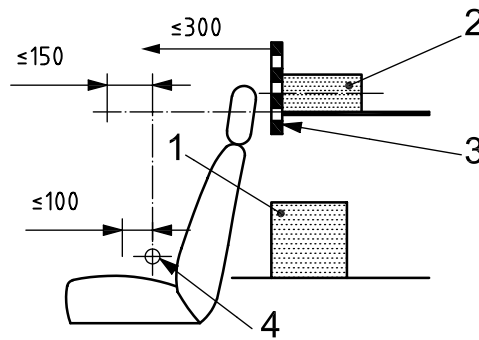
If, in exceptional cases, the forward movement exceeds 300 mm, the manufacturer shall demonstrate, e.g. with the help of high-speed films, that there is no additional risk for the occupants. In these cases, the following limits may not be exceeded by the forward contour of the partitioning system, or integrated vehicle parts, or both, if they are harder than 50 shore A:

- up to a transverse plane 100 mm forward of the R point;
- up to a transverse plane 150 mm forward of the R point for head restraints taking on partially or totally the function of the partitioning system;
- all measurement shall be taken in the longitudinal median plane of the corresponding seat or seating position for each seating position constituting the forward boundary of the loading space.

Permanent deformations or partial destructions of the partitioning system are permissible as long as no sharp edges, or separated parts, or both, cause additional injury risks to the occupants.

NOTE The vehicle manufacturer can define whether the head restraints or other integrated vehicle parts (e.g. folded backrests) are designed to take on the function of a partitioning system.

Dimensions in millimetres



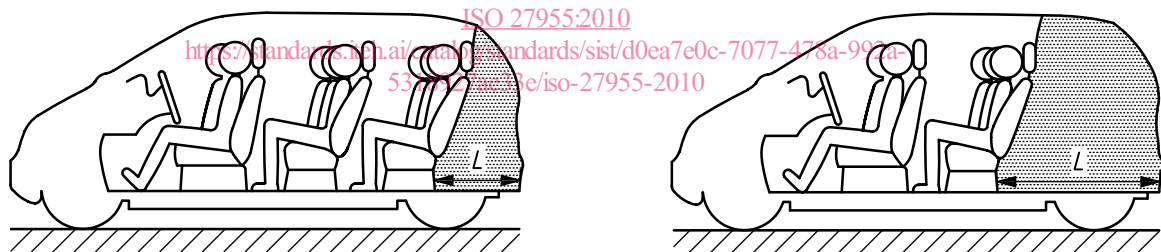
Key

- 1 test block type 1
- 2 test block type 2
- 3 partitioning system
- 4 R-point (seat reference point)

Figure 1 — Limits of forward displacement for partitioning system

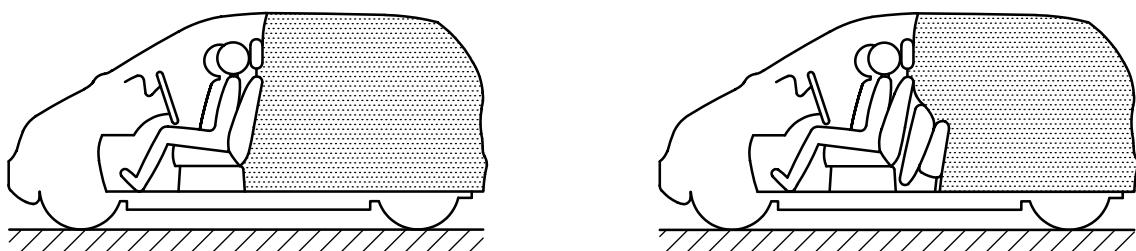
4.4 Lashing points

4.4.1 For vehicles to be equipped with lashing points (see Table 1), the **luggage compartment** (3.15) shall be equipped with at least four lashing points. It is also recommended to install lashing points into the entire **loading space** (3.16) (see Figure 3). If the length L [measured on the floor at $y = 0$ and the rear seat(s), if longitudinally adjustable, and positioned in design position] of the luggage compartment in longitudinal direction is less than 700 mm (see Figure 2), one lashing point pair (two lashing points) is sufficient.



- a) Example of 3rd seat row = rear most seat row (delimiting the luggage compartment)
- b) Example of 2nd seat row = rear most seat row (delimiting the luggage compartment)

Figure 2 — Definition of luggage compartment



- a) 2nd seat row removed
- b) 2nd seat row folded

Figure 3 — Definition of loading space