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Specification for

Passive seat belt systems

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Committees responsible for this British Standard

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- Man-made Fibres Producers' Committee
- Medical Research Council
- Ministry of Defence
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- Royal Automobile Club
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Foreword

This British Standard has been prepared under the direction of the Automobile Standards Committee and aligns with EEC Directive 77/541/EEC, which covers seat belts and restraint systems of motor vehicles, where items are related.

Certification. Attention is drawn to the certification facilities described on the inside back cover.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 32, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for passive seat belt systems which are intended for separate use, i.e. as individual fittings, by persons of adult build occupying forward-facing seats of motor vehicles, and which are intended to be attached to at least three anchorage points which comply with EEC Directives ECE 14.01 or 76/115/EEC, and where the entire restraint of the occupant is applied by means of webbing straps.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this standard the following definitions apply.

2.1 Belts

2.1.1

passive safety belt (seat belt, belt)

an assembly of straps with emergency release device and attachments and any deployment system, which deploys automatically and requires no action by the occupant and is anchored to a power driven vehicle and is designed to diminish the risk of injury to its wearer in the event of collision or of abrupt vehicle deceleration, by limiting the mobility of the wearer's body. Such an assembly is generally referred to as a "belt assembly", a term also embracing any device for energy absorption or belt retraction

2.1.2

lap belt

a belt that passes across the front of the wearer's pelvic region

2.1.3

diagonal belt

a belt that passes diagonally across the front of the chest, from the hip to the opposite shoulder

2.1.4

three-point belt

any belt assembly that is anchored at three points and is a combination of a lap belt and a diagonal belt

2.2

belt type

a category of belts which do not differ in such essential respects as:

- a) rigid parts (release devices, attachments, retractor, etc.);
- b) the material, weave, dimensions and colour of the straps;
- c) the geometry of the belt assembly.

2.3

deployment system

a device or series of devices that are primarily provided to move the restraining straps to and from the correct wearing position

2.4 Straps

2.4.1

restraining strap

a flexible component designed to hold the body and to transmit stresses to the belt anchorages

2.4.2

deployment strap

a strap that is not designed to transmit declaration loads in excess of $0.45 g_n$

2.5

active release device

any release device other than an emergency release device enabling the wearer to couple or uncouple the belt. It may incorporate a belt adjusting device

2.6

emergency release device

a device that enables the wearer to be released from the belt independently of any deployment system incorporated

2.7

belt adjusting device

a device enabling the belt to be manually adjusted according to the requirements of the individual wearer and to the position of the seat. The adjusting device may be either part of the release device, retractor or any other part of the safety belt

2.8

attachments

parts of the belt assembly, excluding the deployment straps but including the necessary securing components, which enable it to be attached to the belt anchorages and which are intended to transmit any or all of the stresses to such anchorages

2.9

energy absorber

a device designed to dissipate energy independently of, or jointly with, the restraining straps and forming part of a belt assembly

2.10 Retractors

2.10.1

retractor

a device for accommodating a part or the whole of the restraining strap of a safety belt. Additionally it may accommodate part or the whole of the deployment strap

2.10.2 non-locking retractor

a retractor from which the strap is extracted to its full length by a small external force and which allows of no adjustment of the strap which has been extracted

2.10.3 manually unlocking retractor

fitted to restraining straps, a retractor requiring the manual operation of a device by the user to unlock the retractor in order to obtain the desired strap extraction and which locks automatically when the said operation ceases

2.10.4 automatically locking retractor

a retractor allowing extraction of the strap to the desired length and, when the release device is fastened, automatically adjusting the strap to the wearer. Further extraction of the strap is not possible without deliberate action on the part of the wearer

2.10.5 emergency locking retractor

a retractor which, in normal driving conditions, does not restrict the freedom of movement of the wearer of the safety belt. It has a length adjusting device which automatically adjusts the restraining strap to the wearer, may include means associated with deployment of the passive belt and has a locking mechanism actuated in an emergency by:

- a) deceleration of the vehicle, extraction of the strap relative to the retractor or any other automatic means (single sensitivity); or
- b) any combination of these factors (multiple sensitivity).

2.11 emergency locking device

a device which, in normal driving conditions, does not restrict the freedom of movement of the wearer of the safety belt. It has a locking mechanism actuated in an emergency by extraction of the strap relative to the device, it may be capable of unlocking after emergency activation. Such a device may or may not be incorporated into a retractor

2.12 belt anchorages

the fixed parts of the vehicle structure or seat structure or any other fixed part of the vehicle to which the load transmitting parts of the passive safety belts are secured when deployed

2.13 vehicle type

a category of power-driven vehicles which do not differ in such essential respects as the dimensions, lines and constituent materials of the components of the vehicle structure or seat structure or any other part of the vehicle to which the safety belts and the restraint systems are attached including means/parts associated with passive belt deployment

2.14 restraint system

a system combining a seat, fixed to the structure of the vehicle by appropriate means, and a safety belt for which at least one anchorage is located on the seat structure

2.15 seat

a structure, which may or may not be integral with the vehicle structure complete with trim, intended to seat one adult person. The term covers both an individual seat and part of a bench seat intended to seat one person

2.16 adjustment system

the device by which the seat or its parts can be adjusted to a position suited to the morphology of the seated occupant. This device may, in particular, allow:

- a) longitudinal displacement;
- b) vertical displacement;
- c) angular displacement.

2.17 seat anchorage

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

2.18 displacement system

a device enabling the seat or one of its parts to be displaced angularly or longitudinally, without a fixed intermediate position, to facilitate passenger access

2.19 locking system

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

2.20 disabling mechanism

a device that deactivates the retractor locking mechanism to facilitate entry and exit from the vehicle

2.21**recessed release device push-button**

a push-button that cannot be activated to release the device by a sphere having a diameter of 40 mm

2.22**non-recessed release device push-button**

a push-button that can be activated to release the device by a sphere having a diameter of 40 mm

3 Performance requirements

3.1 General. The belt or the restraint system shall be so designed and constructed that, when correctly installed and when properly used by an occupant, it will operate satisfactorily and reduce the risk of bodily injury in the event of an accident.

3.2 Rigid parts**3.2.1 General**

3.2.1.1 No part of the safety belt shall have sharp edges liable to cause wear or breakage of the straps by chafing.

3.2.1.2 All parts of the belt assembly liable to be affected by corrosion shall be suitably protected. After undergoing the corrosion test specified in 4.1, neither signs of deterioration likely to impair the proper functioning of the device nor any significant corrosion shall be visible to the unaided eye of a qualified observer.

3.2.1.3 Rigid parts intended to absorb energy or to be subjected to or to transmit a load shall not be fragile.

3.2.1.4 Every care shall be taken that rigid items and plastic parts of a safety belt are so located and installed that, when a power-driven vehicle is in normal use, they cannot become trapped under a sliding seat or in a door of the vehicle. However, where there is a possibility that a part does not meet the above requirement, it shall be subjected to the cold impact test specified in 4.4.4. After test, if any visible cracks are present in the plastics covers or retainers of rigid items, these plastics parts shall be removed and the remaining assembly shall then be checked for its continued security. If the remaining assembly is still secure, or if no visible cracks are present, the assembly shall be checked again and shall meet the requirements of 3.2.2 and 3.4.

3.2.2 Release devices

3.2.2.1 The device shall be so designed as to preclude any possibility of incorrect use. This means, inter alia, that it shall not be possible for the release device to be left in a partially-closed position. The procedure for opening the release device shall be obvious both to the wearer and to a rescuer. Wherever the release device is likely to be in contact with the wearer, the width of its contact surface shall not be less than 46 mm.

3.2.2.2 A release device, even when not under load, shall remain closed, whatever its position. It shall not be possible to release any active release device with a force of less than 10 N. It shall not be possible to release the emergency release device with a force of less than 10 N (or with an acceleration of 60 g_n in any direction at an on-set rate of at least 10 000 g_n/s for a period of at least 3 ms).

A release device shall be so designed as to be easy to use and to grasp. It shall be capable of being released when tested as specified in 4.7.

A release device shall be released by pressing either a button or a similar device. The projection of the surface to which this pressure is applied shall have, in the position of actual unlocking and in a plane perpendicular to the initial movement of the button:

- a) for enclosed devices, an area of not less than 4.5 cm² and width of not less than 15 mm;
- b) for non-enclosed devices, an area of not less than 2.5 cm² and a width of not less than 10 mm.

This area shall be coloured red. No other part of a release device shall be of this colour.

In cases where the centreline of the release device is located more than 200 mm above the R point it shall not be possible to release the emergency release device by applying a force of 60 N to the release button through a sphere of diameter 100 mm.

3.2.2.3 A release device shall be capable of withstanding repeated operation and, before the dynamic test specified in 4.6, shall undergo 100, in the case of an emergency release device, or 5 000, in the case of an active release device, opening and closing cycles in conditions of normal use.

3.2.2.4 A release device, when tested in accordance with 4.4.3 shall operate normally.

3.2.2.5 The force required to open a release device in the test specified in 4.7 shall not exceed 60 N.

3.2.2.6 A release device shall be tested for strength in accordance with the requirements of 4.4.1 and 4.4.5, as appropriate. It shall not break, be seriously distorted or become detached when subjected to the specified load.

3.2.2.7 In the case of release devices that incorporate a component common to two assemblies, and if the release device of one assembly can, in use, be fitted to the mating part of either that assembly or the other assembly, the strength and release tests specified in 4.6 and 4.7 shall be carried out for both possibilities.

3.2.3 Attachments (as defined in 2.8). Attachments shall be tested for strength in accordance with the requirements of 4.4.1 and 4.4.2. They shall neither break nor become detached when subjected to the specified load.

3.2.4 Retractors

3.2.4.1 General. Retractors shall fulfil the requirements specified in 3.2.4.2 and the tests for strength specified in 4.4.1 and 4.4.2.

3.2.4.2 Emergency locking retractors

3.2.4.2.1 An emergency locking retractor shall satisfy the following conditions when tested in accordance with 4.5.2.

- a) It shall have locked when the vehicle deceleration reaches a value of $0.45 g_n$.
- b) It shall not lock at strap accelerations, measured in the direction of the extraction, of less than $0.8 g_n$.
- c) It shall not lock when its sensing device is tilted to angles of 12° or less in any direction from the installation position specified by its manufacturer.
- d) It shall lock when its sensing device is tilted to angles of 27° or more in any direction from the installation position specified by its manufacturer.
- e) In cases where the emergency locking of a retractor depends on an external signal, or power source, the design shall ensure that the retractor locks automatically upon failure or interruption of that signal or power source. *However, it shall be possible to override locking under such failure or interruption other than when the seat belt is being actuated during an emergency.*

3.2.4.2.2 When tested in accordance with 4.5.2, an emergency locking retractor with multiple sensitivity, one of which is strap sensitivity, shall, in addition to meeting the requirements of 3.2.4.2.1, lock when the strap acceleration is at least $2.5 g_n$ measured in the direction of the extraction.

3.2.4.2.3 In each of the tests mentioned in 3.2.4.2.1 and 3.2.4.2.2, the amount of strap movement occurring before the retractor locks shall not exceed 50 mm, starting at the length specified in 4.5.2.1. In order to comply with the requirements of 3.2.4.2.1 b), a retractor shall be considered as satisfactory if, at the strap acceleration values specified, it does not lock until at least the first 50 mm of strap has been unwound, starting at the length specified in 4.5.2.1.

3.2.4.2.4 If the retractor is part of a lap belt only, the retracting force of the strap shall be not less than 7 N when measured in the free length between the manikin and the retractor, in accordance with 4.5.4. If the retractor is part of a diagonal strap, the retracting force of the strap shall be not less than 2 N and not more than 7 N when similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device which, upon manual or automatic operation, prevents the strap from being completely retracted, such a device shall not be operated when the retracting force is assessed. *Designs which do not allow for measurement in the manner specified above shall achieve the equivalent effect.*

3.2.4.2.5 The strap shall be withdrawn from the retractor and allowed to retract repeatedly in accordance with the method specified in 4.5.1 until 40 000 cycles of withdrawal and retraction have been completed. The retractor shall then be subjected to the corrosion test specified in 4.1 followed by the dust resistance test specified in 4.5.3. It shall then satisfactorily complete a further 5 000 cycles of withdrawal and retraction, after which it shall still meet the requirements of 3.2.4.2.1, 3.2.4.2.2, 3.2.4.2.3 and 3.2.4.2.4.

After the above tests, the retractor shall still function correctly and stow the strap efficiently.

3.2.4.2.6 If a “disabling” mechanism is incorporated into the locking device, the action of this mechanism shall be incorporated into each cycle of the test specified in 3.2.4.2.5.

3.2.5 Belt adjusting device

3.2.5.1 Two samples of each belt adjusting device shall be tested in accordance with the requirements of 4.3. The strap slip shall not exceed 25 mm for each sample of adjusting device and the sum of displacements of all the adjusting devices of a belt shall not exceed 40 mm.

3.2.5.2 All adjusting devices shall be tested for strength in accordance with 4.4.1. They shall neither break nor become detached when subjected to the specified load.

3.2.5.3 When tested in accordance with 4.4.6, the force required to operate any manual device shall not exceed 50 N.

3.3 Straps

3.3.1 Restraining straps

3.3.1.1 Characteristics. The characteristics of the straps shall be such as to ensure that their pressure on the wearer's body is distributed as evenly as possible over the whole width and that they do not twist, even under load. They shall have energy-absorbing and energy-dispersing capacities.

3.3.1.2 Width. The width of the strap under a load of 980 daN shall not be less than 46 mm. This dimension shall be measured during the breaking-strength test specified in 4.2.2, and without stopping the machine.

3.3.1.3 Strength after room-conditioning. In the case of the two strap samples conditioned in accordance with 4.2.1.1, the breaking load of the strap, determined in accordance with 4.2.2, shall be not less than 1 470 daN. The difference between the breaking loads of the two samples shall not exceed 10 % of the greater of the breaking loads measured.

3.3.1.4 Strength after special conditioning. In the case of the two strap samples conditioned in accordance with any one of the provisions of 4.2.1 (except 4.2.1.1 and 4.2.1.6), the breaking load of the strap shall be not less than 75 % of the average of the loads determined in the test referred to in 3.3.1.3 and not less than 1 470 daN.

NOTE One or more of these tests may be dispensed with if the composition of the material used, or information already available, renders the test or tests superfluous.

3.3.2 Deployment straps

3.3.2.1 Strength after room-conditioning. In the case of the two strap samples conditioned in accordance with 4.2.1.1, the difference between the breaking loads of the two samples shall not exceed 10 % of the greater of the breaking loads measured.

3.3.2.2 Strength after special conditioning. In the case of the two strap samples conditioned in accordance with any one of the provisions of 4.2.1 (except 4.2.1.1 and 4.2.1.6), the breaking load of the strap shall be not less than 75 % of the average of the loads determined in the test referred to in 3.3.2.1.

NOTE One or more of these tests may be dispensed with if the composition of the material used, or information already available, renders the test or tests superfluous.

3.3.3 Strength after abrasion procedure

3.3.3.1 Two samples shall be conditioned in accordance with 4.2.1.6 and the breaking load shall be assessed in accordance with either 3.3.1.3 or 3.3.2.1 as appropriate and 4.2.2. The breaking load shall be at least equal to 75 % of the average of the breaking loads determined during tests on unabraded straps, and not less than the minimum load specified for the items being tested. The difference between the breaking loads of the two samples shall not exceed 20 % of the greater of the breaking loads measured.

3.3.3.2 The items to be subjected to an abrasion procedure and the procedures to be followed shall be as indicated in the following table. A new sample shall be used for each procedure.

	Type 1 procedure	Type 2 procedure	Type 3 procedure
Attachment	—	—	×
Guide or pulley	—	×	—
Buckle-loop	—	×	×
Adjusting device	×	×	×
Parts sewn to the strap	—	—	×

3.4 Belt assembly or restraint system: requirements for dynamic testing

3.4.1 General. The belt assembly or restraint system shall be subjected to a dynamic test in accordance with 4.6.

3.4.2 Belt assembly

3.4.2.1 Except in the case of restraint systems, the dynamic test shall be performed on two belt assemblies which have not previously been under load.

Before the dynamic test is performed the belt assemblies shall be tested as follows.

a) The release devices of the belt assemblies shall withstand:

- 1) in the case of emergency release devices: 100 opening/closing cycles;
- 2) in the case of active release devices: 5 000 opening/closing cycles in conditions of normal use (3.2.2.3).

b) Retractors shall be tested for durability in the following manner.

- 1) The strap shall be withdrawn from the retractor and allowed to retract repeatedly in accordance with 4.5.1 until 40 000 cycles of withdrawal and retraction have been completed (3.2.4.2.5).
- 2) The belt assembly shall be subjected to the corrosion test specified in 4.1 (3.2.4.2.5).

3) The belt assembly shall be subjected to the dust resistance test specified in 4.5.3 (3.2.4.2.5).

4) The belt assembly shall be subjected to a further 5 000 cycles of withdrawal and retraction as specified in item b) 1).

c) The release devices shall be subjected to a further test:

1) in the case of emergency release devices: 10 opening/closing cycles;

2) in the case of active release devices: 500 opening/ closing cycles in conditions of normal use (3.2.2.3).

d) The deployment system shall be tested in accordance with 5.1.

3.4.2.2 No part of a belt assembly or a restraint system securing the occupant shall break and no release device or locking or displacement system shall unlock.

3.4.2.3 The forward displacement of the manikin shall be between 80 mm and 200 mm at pelvic level in the case of lap belts. In the case of other types of belts, the forward displacement shall be between 80 mm and 200 mm at pelvic level and between 100 mm and 300 mm at chest level.

NOTE These displacements are the displacements in relation to the measurement points shown in Appendix A, Figure 6.

3.4.3 Restraint system

3.4.3.1 If movement of the chest reference point exceeds that specified in 3.4.2.3 it shall be shown, either by calculation or by a further test, that no part of the torso or the head of the manikin used in the dynamic test would have come into contact with any forward rigid part of the vehicle, apart from contact of the chest with the steering assembly, if the latter meets the requirements of Directive 74/297/EEC and provided that contact does not occur at a speed higher than 24 km/h. For this assessment, the seat shall be considered to be in the position specified in 4.6.6.

3.4.3.2 In the case of a two-door vehicle, the displacement and locking systems enabling the occupants of the rear seats to leave the vehicle shall still be operable by hand after the dynamic test.

4 Tests

4.1 Corrosion test

4.1.1 A complete safety belt assembly shall be positioned in a test chamber as specified in Appendix B. In the case of an assembly incorporating a retractor, the strap shall be unwound to full length, less 300 ± 3 mm.

Except for short interruptions that may be necessary, e.g. for checking and replenishing the salt solution, the exposure test shall proceed continuously for a period of 50 h. In the case of passive restraints, only those parts intended to be permanently attached to loadbearing parts shall be treated in accordance with 4.1.2.

4.1.2 On completion of the exposure test, the assembly shall be gently washed or dipped in clean running water at a temperature not exceeding 38°C , so as to remove any salt deposit that may have formed, and then allowed to dry at room temperature for 24 h before being inspected in accordance with 3.2.1.2.

Separable parts comprising the deployment system which include electrical components shall not be washed or dipped but allowed to dry for 24 h at room temperature.

4.2 Breaking strength test

4.2.1 *Conditioning of straps for the breaking strength test.* Appropriate samples cut from the strap shall be conditioned as follows.

4.2.1.1 *Room-conditioning.* The strap shall be kept for a minimum of 24 h in an atmosphere having a temperature of $20 \pm 5^\circ\text{C}$ and a relative humidity of $65 \pm 5\%$. If the test is not carried out immediately after conditioning, the sample shall be placed in a hermetically sealed receptacle until the test begins. The breaking load shall be determined within 5 min of the strap's removal from the conditioning atmosphere or receptacle.

4.2.1.2 Light-conditioning

4.2.1.2.1 The requirements of Section B.02 of BS 1006 shall apply. The strap shall be exposed to light for the time necessary to produce fading of Standard Blue Dye No. 7 to a contrast equal to grade four on the grey scale.

4.2.1.2.2 After exposure, the strap shall be kept for a minimum of 24 h in an atmosphere having a temperature of $20 \pm 5^\circ\text{C}$ and a relative humidity of $65 \pm 5\%$. The breaking load shall be determined within 5 min of the sample's removal from the conditioning installation.

4.2.1.3 Cold-conditioning

4.2.1.3.1 The strap shall be kept for a minimum of 24 h in an atmosphere having a temperature of $20 \pm 5^\circ\text{C}$ and a relative humidity of $65 \pm 5\%$.

4.2.1.3.2 The strap shall then be kept for 1½ h on a plane surface in a low-temperature chamber in which the air temperature is -30 ± 5 °C. It shall then be folded and the fold shall be loaded with a mass of 2 kg previously cooled to -30 ± 50 °C. When the strap has been kept under load for 30 min in the same low-temperature chamber, the mass shall be removed and the breaking load shall be measured within 5 min of the strap's removal from the low-temperature chamber.

4.2.1.4 Heat-conditioning

4.2.1.4.1 The strap shall be kept for 3 h in a heating cabinet in an atmosphere having a temperature of 60 ± 5 °C and a relative humidity of 65 ± 5 %.

4.2.1.4.2 The breaking load shall be determined within 5 min of the strap's removal from the heating cabinet.

4.2.1.5 Exposure to water

4.2.1.5.1 The strap shall be kept fully immersed for 3 h in distilled water, at a temperature of 20 ± 50 °C, to which a trace of wetting agent has been added.

NOTE Any wetting agent suitable for the fibre under test may be used.

4.2.1.5.2 The breaking load shall be determined within 10 min of the strap's removal from the water.

4.2.1.6 Conditioning by abrasion

4.2.1.6.1 The abrasion procedure shall be performed on every device in which the strap is in contact with a rigid part of the belt. However, the type 1 abrasion test [4.2.1.6.4 a)] need not be carried out on the belt-adjusting device where the micro-slip test (4.3) shows that the strap slips less than half the specified amount. The setting on the test apparatus shall approximately maintain the relative position of strap and contact area.

4.2.1.6.2 The samples to be subjected to abrasion shall be kept for a minimum of 24 h in an atmosphere having a temperature of 20 ± 5 °C and a relative humidity of 65 ± 5 %. The room temperature during testing shall be between 15 °C and 30 °C.

4.2.1.6.3 The requirements for each abrasion procedure shall be as set out in the following table.

	Load	Frequency	Number of cycles	Shift ^b
Type 1 procedure	N	Hz		mm
Type 2 procedure	25	0.5	5 000	300 ± 20
Type 3 procedure	5	0.5	45 000	300 ± 20
Type 3 procedure ^a	0 to 50	0.5	45 000	—

^a See 4.2.1.6.4 c).

^b The shift represents the amplitude of a back-and-forth motion applied to the strap.

4.2.1.6.4 Particular procedure conditions shall be as follows.

a) *Type 1 procedure* (for cases where the strap slides through an adjusting device). The 25 N load shall be vertically and permanently applied to one section of the strap.

The other section, set horizontally, shall be subjected to a back-and-forth motion.

The adjusting device shall be so placed that the horizontal section of the strap shall remain under load (see Appendix C, Figure 7).

b) *Type 2 procedure* (for cases where the strap changes direction once in passing through a rigid part either when being worn or during deployment). The angles of both sections of the strap shall be as shown in Appendix C, Figure 8. The 5 N load shall be permanently applied.

NOTE For cases where the strap changes direction more than once in passing through a rigid part, the load of 5 N may be increased such as to provide the required 300 mm of strap movement through that rigid part.

c) *Type 3 procedure* (for cases where the strap is fixed to a rigid part by sewing or similar means). The total shift shall be 300 ± 20 mm and the 50 N load shall be applied only during the time corresponding to a shift of 100 ± 20 mm for each half period (see Appendix C, Figure 9).

4.2.2 Test of breaking strength of straps (static test)

4.2.2.1 The test shall be carried out each time on two new samples of strap, of sufficient length, conditioned in accordance with one of the provisions of 4.2.1.

4.2.2.2 Each strap shall be gripped between the clamps of a tensile testing machine. The clamps shall be so designed as to avoid breakage of the strap at or near the point of contact with the clamps. The speed of traverse shall be about 100 mm/min. The free length of the sample between the clamps of the machine at the start of the test shall be 200 ± 40 mm.

4.2.2.3 In the case of restraining straps, when the load reaches 9.8 kN, the width of the strap shall be measured without stopping the machine.

4.2.2.4 The load shall be increased until the strap breaks, and the breaking load shall be noted.

4.2.2.5 If the strap slips or breaks at the point of contact with one of the clamps or within 10 mm of either of them, the test shall be invalid and a new test shall be carried out on another sample.

4.3 Micro-slip test (see Appendix C, Figure 9)

4.3.1 The components or devices to be subjected to the micro-slip test shall be kept for a minimum of 24 h before testing in an atmosphere having a temperature of 20 ± 5 °C and a relative humidity of 65 ± 5 %.

The test shall be carried out at a temperature between 15 °C and 30 °C.

4.3.2 It shall be ensured that the free section of the adjusting device points either up or down on the test bench, as in the vehicle.

4.3.3 A 50 N load shall be attached to the lower end of the section of strap.

The other end shall be subjected to a back-and-forth motion, the total amplitude being 300 ± 20 mm (see Figure 9).

4.3.4 If there is a free end serving as reserve strap, it shall in no way be fastened or clipped to the section under load.

4.3.5 It shall be ensured that on the test bench the strap, in the slack position, descends in a concave curve from the adjusting device, as in the vehicle.

The 50 N load applied on the test bench shall be guided vertically in such a way as to prevent the load swaying and the belt twisting.

The attachment shall be fixed to the 50 N load as in the vehicle.

4.3.6 Before the actual start of the test, a series of 20 cycles shall be completed so that the self-tightening system settles properly.

4.3.7 1 000 cycles shall be completed at a frequency of 0.5 Hz, the total amplitude being 300 ± 20 mm. The 50 N load shall be applied only during the time corresponding to a shift of 100 ± 20 mm for each half period.

4.4 Static tests of belt restraining components incorporating rigid parts

4.4.1 The release device and the adjusting device shall be connected to the tensile-testing apparatus by the parts of the belt assembly to which they are normally attached, and the load shall then build up to 9.8 kN. If the release device, or the adjusting device, is part of the attachment or of a common part of a three-point belt, the release device or adjusting device shall be tested, with the attachment, in accordance with **4.4.2**, except in the case of retractors having a pulley or strap guide at the upper belt anchorage, when the load shall be 9.8 kN and the length of strap remaining wound on the reel shall be the length resulting from locking as close as possible to 450 mm from the end of the strap.

4.4.2 The attachments shall be tested in the way described in **4.4.1**, but the load shall be 14.7 kN and shall, subject to the provisions of the second sentence of **4.6.1**, be applied in the least favourable conditions likely to occur in a vehicle in which the belt is correctly installed. In the case of retractors, the test shall be performed with the strap completely unwound from the reel.

4.4.3 Two samples of the complete belt assembly shall be placed in a low-temperature chamber at -10 ± 1 °C for 2 h. After being removed from the chamber the mating parts of the buckle shall then be locked together manually.

4.4.4 Two samples of the complete belt assembly shall be placed in a low-temperature chamber at -10 ± 1 °C for 2 h. The rigid items and plastics parts under test shall then be laid in turn upon a flat steel surface (which has been kept with the samples in the low-temperature chamber), placed on the horizontal surface of a compact rigid block with a mass of at least 100 kg; within 30 s of their being removed from the low-temperature chamber, an 18 kg steel mass shall be allowed to fall under gravity from a height of 300 mm on to the item. The impact face of the mass shall have a hardness of at least 45 HRC and take the form of a convex surface having a transverse radius of 10 mm and a longitudinal radius of 150 mm. One sample shall be tested with the axis of the curved bar in line with the strap, and the other sample shall be tested at 90° to the strap.

4.4.5 Release devices having parts common to two safety belts shall be loaded in such a way as to simulate the conditions of use in a vehicle with the seats in the mid-position of their adjustment. The direction of application of the load shall be established in accordance with **4.6.1** to **4.6.6**. A load of 1 470 daN shall be applied simultaneously to each of the straps. Suitable apparatus for the above test is shown in Appendix D (Figure 10).