

British Standard Automobile Series : Specification for

Rearward-facing restraining devices for infants for use in road vehicles

Série automobile. Systèmes de retenue pour jeunes enfants orientés vers l'arrière dans les véhicules routiers — Spécifications

Kraftfahrzeugserie. Kinder-Rückhaltesysteme zur Anbringung entgegen der Fahrtrichtung in Straßenfahrzeugen

Contents

	Page		Page
Foreword	2	3 Principal dimensions of 3.4 kg manikin	14
Committees responsible	Back cover	4 List of components of 9 kg manikin	16
		5 Mass of components of 9 kg manikin	16
		6 Principal dimensions of 9 kg manikin	18
Specification			
1 Scope	2		
2 Definitions	2	Figures	
3 General	2	1 Envelope of constraint	3
4 Release means and rigid parts	4	2 Headform	5
5 Straps	4	3 Dimensions of test seat	9
6 Instructions and information	4	4 Position of anchorage points	10
7 Marking	4	5 Reference seat belt	11
		6 Principal dimensions of 3.4 kg manikin	13
Appendices		7 Shoulder stiffness test	14
A Method of test to determine security against overturning	5	8 Leg joint stiffness test	14
B Test of energy absorbing material	5	9 Exploded view of 9 kg manikin	15
C Dynamic test	6	10 Principal dimensions of 9 kg manikin	17
D Test for soluble metals in plastics	6	11 Adjustment of neck cable	18
E Corrosion resistance test	6	12 Adjustment of atlas-axis joint	18
F Environmental conditioning	7	13 Adjustment of hip joint	19
G Test of breaking strength of straps (static test)	7	14 Adjustment of knee joint	19
H Test seat and anchorages	7	15 Adjustment of shoulder joint	20
J Reference seat belt	11	16 Adjustment of elbow joint	20
K Manikins	13	17 Adjustment of lumbar cable	20
L Curve of deceleration of trolley as a function of time	20	18 Curves of deceleration of trolley as a function of time (curve for calibrating stopping device)	21
Tables			
1 Characteristics of polyurethane foam filling	8		
2 Mass of components of 3.4 kg manikin	13		

Specification

Foreword

This British Standard has been prepared under the direction of the Automobile Standards Committee at the request of the Department of Transport.

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements for rearward-facing infant restraint systems, that are for use either with an adult seat belt of the type specified by the manufacturers, which carries a BSI Kitemark, an 'E' Mark or an 'e' Mark, or with any other attachment system tested as part of the device and confirmed as meeting the requirements of this standard. These infant restraints are for use for persons up to a mass of 10 kg on either front or rear seats of road vehicles, as recommended by the manufacturer.

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 infant restraint system. An arrangement of components which may comprise a combination of infant carrier, straps and adjusters. These can be defined in two groups.

Type A: an infant restraint system designed to be used with an approved adult seat belt* nominated by the restraint manufacturer.

Type B: an infant restraint system, designed to be used with any other means of attachment to the vehicle structure.

2.2 infant carrier. That part of the restraint system intended to accommodate an infant in a semi-recumbent position, so designed to distribute the restraining forces over the torso and head of an infant in an accident situation.

2.3 emergency release. A quick release device that can be readily operated to release the child from the vehicle with or without the infant carrier.

2.4 strap. A flexible component designed to restrain the infant or infant carrier and to transmit forces to the vehicle structure either directly or indirectly.

2.5 adjuster. A device through which a strap passes and which, by means of moving, enables the effective length of the straps to be controlled to suit the circumstances.

2.6 enclosed emergency release means. A device designed in such a way that it is not possible to release the buckle using a sphere having a diameter of 40 mm.

2.7 non-enclosed emergency release means. A device designed in such a way that it is possible to release the buckle using a sphere having a diameter of 40 mm.

3 General

3.1 Construction and design

3.1.1 The infant restraint system shall be so designed and constructed that, when it is correctly installed, the infant carrier and occupant are restrained in the event of deceleration, overturning or rolling of the vehicle. A suitable test to determine security in the event of overturning is described in appendix A. The general design, assembly and finish shall not incorporate any item which might cause injury to the infant. In particular, the design shall be such that compressive loads are not imposed on the crown of the infant's head in an accident situation.

3.1.2 The infant restraint system shall be so designed and constructed that either:

(a) the infant, with infant carrier, can be removed from the vehicle by release of the adult seat belt or other single release means; or

(b) the infant can be removed from the infant carrier by a single release means.

3.1.3 All surfaces liable to be contacted by the head or face of an infant shall be covered as a minimum with energy absorbing material giving a peak deceleration less than $60g_n$ when measured in accordance with appendix B.

3.1.4 If it is necessary to lock the webbing of the adult seat belt then the locking device required shall form an integral part of the infant restraint system.

3.2 Performance

3.2.1 Overturning test. The infant restraint system shall be tested in accordance with appendix A. When so tested the manikin shall not fall out of the device and, when the test seat is in the upside down position, the head of the manikin shall not move more than 300 mm from its original position in a vertical direction relative to the test seat.

3.2.2 Dynamic test

3.2.2.1 The infant restraint system shall be tested in accordance with appendix C and shall comply with 3.2.2.2 to 3.2.2.6.

3.2.2.2 The head of the manikin shall not pass beyond the planes Cr to B, B to A, A to D and D to E as shown in figure 1.

3.2.2.3 In the case of infant carriers, all portions of the test manikin's torso and the head up to the target points shall remain supported against longitudinal movement and the manikin shall be retained within the carrier.

3.2.2.4 At no time during the test described in appendix C shall the torso line create an angle of less than 20° to the horizontal.

* An approved seat belt is one that carries a BSI Kitemark, an 'E' Mark or an 'e' Mark (see clause 1).

Amendment No. 1
published and effective from 31 October 1988
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Specification for rearward-facing restraining devices
for infants for use in road vehicles

Revised text

AMD 5716
October 1988

BS number

Delete 'BS AU 202' and substitute 'BS AU 202a' on the front cover, on the back cover in two places, at the top of each page, in clause 6, item (a), in clause 7, item (a) and in the footnote to clause 7, line 1.

AMD 5716
October 1988

Clause 3.2.3 Attachment and release of components

In item (b), line 3, delete 'and' and substitute 'or'.

AMD 5716
October 1988

Clause 5.1

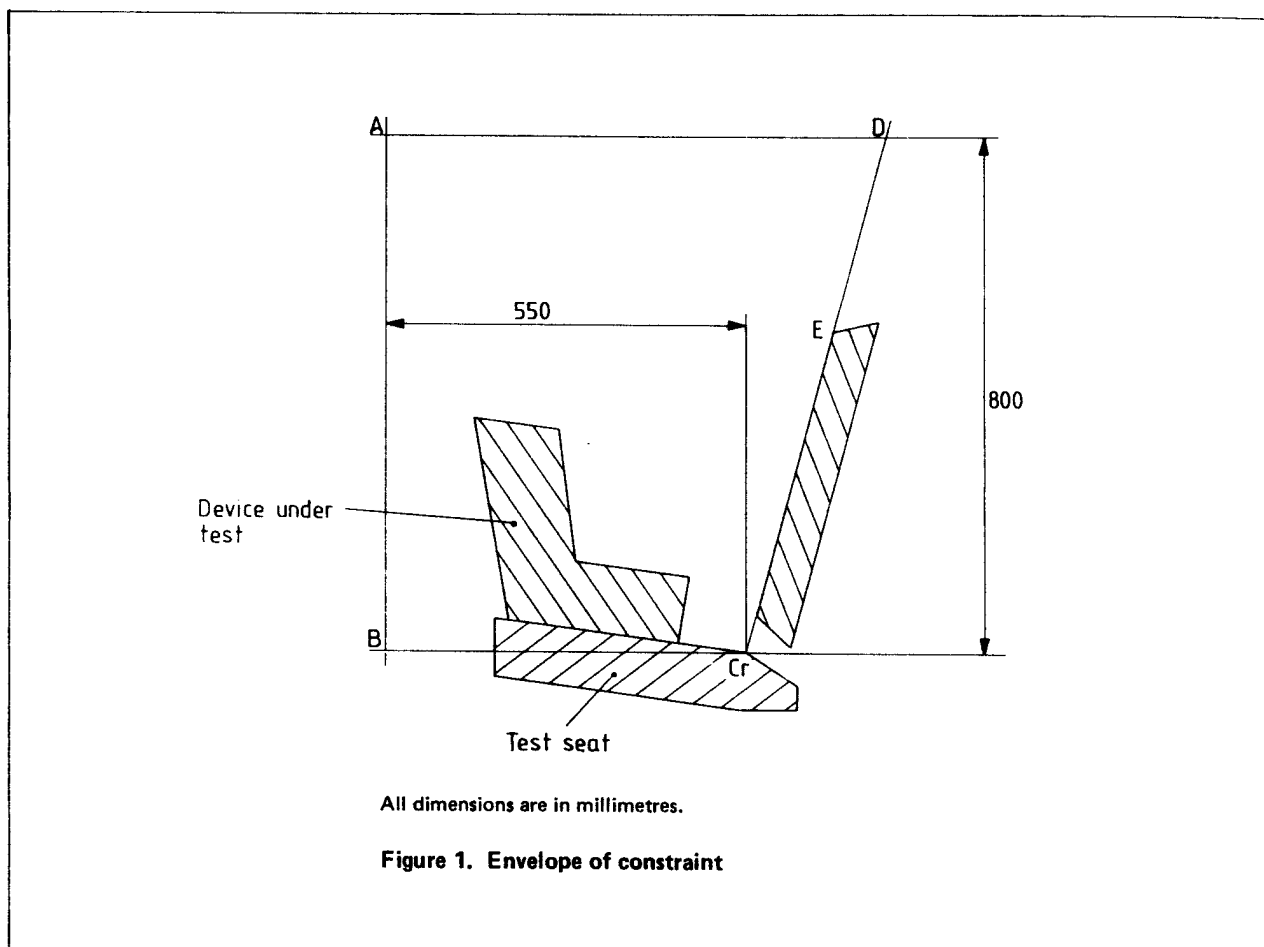
In line 1, delete '5.1'.

In line 2, delete 'F.1' and substitute 'appendix F'.

AMD 5716
October 1988

Clause 5.2

Delete this clause, including the number, but retain the note.



3.2.2.5 The manikin shall be retained, the infant carrier shall not become separated from its restraining straps, no total failure of any component shall have occurred, no load bearing component shall have become separated from its mating part and the emergency release shall be capable of normal operation.

During the test the amount of strap slip at each adjusting device shall not exceed 25 mm. The total slippage at all adjusters shall not exceed 50 mm.

3.2.2.6 After the dynamic test carried out in accordance with appendix C, the release means and its attendant straps shall be transferred to a test machine and a static tensile force of 100 N shall be applied across the release means. Whilst maintaining this force, the release force shall be measured. The release force shall be applied by a spring balance or other force measuring device in a manner and direction typical of that which would normally be applied. The force shall be applied at least 3 mm from the edge of the release surface in such a manner as to produce the maximum releasing effect. The force to effect release shall not exceed 60 N. The button or similar operating device shall be either capable of operation without distortion or, if distortion occurs, such distortion shall not affect release. Separation of the release means shall enable either the infant to be released from the carrier or the infant carrier to be removed from the vehicle immediately.

3.2.3 Attachment and release of components. The design of any separable parts shall be such that either:

- (a) the separable parts of the device cannot be put together incorrectly; or
- (b) their connection other than as intended will result in the components separating again under a force of not more than 22 N and will not adversely affect their function.

3.2.4 Toxicity. The manufacturer shall certify that the restraining device does not contain dyes, plasticizers, or any other substance that can be extracted in sufficient quantities that may be harmful to the occupant. The substances extracted shall not contain any soluble antimony, arsenic, barium, cadmium, chromium, lead or mercury, or any soluble compound of any of these elements, such that the proportion (by mass) of the element calculated as such exceeds the following amounts:

antimony	250 mg/kg
arsenic	100 mg/kg
barium	500 mg/kg
cadmium	100 mg/kg
chromium	100 mg/kg
lead	250 mg/kg
mercury	100 mg/kg

NOTE. For the purposes of this standard the term 'soluble' in relation to an element or compound means capable of being dissolved by the method described in appendix D.

4 Release means and rigid parts

4.1 General

The release means shall be so positioned that its intention and operation are obvious to a rescuer in an emergency.

4.2 Emergency release

The emergency release shall be operated by operating or raising either a button or other device. The surface to which this force is applied shall have:

- (a) for enclosed devices, an area not less than 450 mm² and a width of not less than 15 mm;
- (b) for non-enclosed devices, an area not less than 250 mm² and a width of not less than 10 mm.

If there is an emergency release means for the carrier it shall be released by the operation of a red button. The emergency release means to release the child from the carrier shall be coloured red and the adjacent area shall not be red.

4.3 Finish

All parts shall be free from burrs and sharp edges and shall, if metal, show no base metal corrosion when tested in accordance with appendix E.

4.4 No tension test

An emergency release means that has not previously been subjected to a force shall be used for this test. The force needed to open the device when it is not under tension shall not be less than 10 N measured perpendicularly to the surface of the operating device in its initial position.

5 Straps

5.1 Two strap samples shall be conditioned in accordance with F.1. After conditioning each strap shall withstand a breaking force of not less than 3.6 kN when determined in accordance with appendix G. The differences between the breaking forces of the two samples shall not exceed 10 % of the greater of the breaking forces measured.

5.2 Two strap samples shall be conditioned for and in accordance with each of the procedures described in F.2 to F.5. After conditioning the average breaking force of each of the straps shall be not less than 75 % of the average of the forces obtained from the samples conditioned and tested as specified in 5.1 and not less than 3.6 kN. The difference between the breaking forces of the two samples shall not exceed 10 % of the greater of the breaking forces measured.

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

6 Instructions and information

Each infant restraint system shall be accompanied by the following instructions and information:

- (a) the number of this British Standard, i.e. BS AU 202;
- (b) the name, trade mark or other means of identification of the responsible manufacturer;
- (c) the mass range of infant for which it is intended;
- (d) the method of placing and securing the infant within it;
- (e) the correct method of installing the infant restraint system, the specified method of attachment to the vehicle and the seating positions for which it is intended within the vehicle. The correct routing of the webbing used to secure the device to the vehicle shall be clearly indicated, e.g. that of an adult seat belt, child harness or discrete means;
- (f) method of adjustment;
- (g) method of operating the emergency release means;
- (h) the method recommended for cleaning the infant restraint system;
- (i) a general warning to the user of the danger of making any alterations to the infant restraint system without the approval of the manufacturer;
- (j) a warning that the infant restraint system should not be used if it is damaged or if it has been subjected to accident loads even if damage is not obvious.

7 Marking

Each infant restraint system shall be permanently and indelibly marked with the following:

- (a) the number of this British Standard, i.e. BS AU 202*;
- (b) the name, trade mark or other means of identification of the responsible manufacturer;
- (c) the mass range of infant for which it is intended;
- (d) the method of placing and securing the infant within it;
- (e) the correct method of installing the infant restraint system, the specified method of attachment to the vehicle and the seating positions for which it is intended within the vehicle;
- (f) the correct routing of the webbing used to secure the device in the vehicle shall be clearly indicated, e.g. that of an adult belt, child harness or discrete means.

* Marking BS AU 202 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, Quality Assurance Division, BSI, PO Box 375, Milton Keynes MK14 6LO for certification marks administered by BSI or to the appropriate authority for other certification marks.

Appendices

Appendix A. Method of test to determine security against overturning

A.1 Mount the infant restraint system in accordance with the manufacturer's instructions on a trolley equipped with a seat and seat belt anchorages as described in appendix H. For type A infant restraint systems use the reference seat belt described in appendix J attached to the seat belt anchorages and for type B infant restraint systems use the discrete anchorage means supplied.

If the device can be adjusted to different attitudes, the testing authority shall decide on the position or positions at which the test is to be conducted.

A.2 Carry out the test with each of the manikins described in appendix K and shown in figures 6 and 10 as described in A.3.

A.3 Place the manikin in the infant restraint system. Insert a flexible spacer 25 mm thick, 60 mm wide and 500 mm long between the manikin and the seat back of the infant carrier. Adjust the infant restraints in accordance with the manufacturer's instructions and remove the flexible spacer. Place the infant restraint system and manikin in the test seat.

To test a type A infant restraint system, remove the upper anchorage plate of the seat belt from the test anchorage position C and fit it to the setting anchorage position D (see figure 4). Firmly adjust the seat belt to the infant carrier but in such a way that the compression of the test seat cushion is not more than 10 mm and that the geometry of the system is not affected. Without further adjustment of the seat belt, refit the upper anchorage plate to the test anchorage position C.

To test a type B infant restraint system, adjust the straps of the infant carrier to the test rig in accordance with the manufacturer's instructions.

Rotate the test seat around a horizontal axis contained in the median longitudinal plane of the seat through an angle of 360° at a speed of $2^\circ/\text{s}$ to $5^\circ/\text{s}$.

NOTE. For the purposes of this test, devices intended for use in specific vehicles may be attached to the vehicle seat.

Repeat the test rotating in the reverse direction after having replaced, if necessary, the manikin in its initial position.

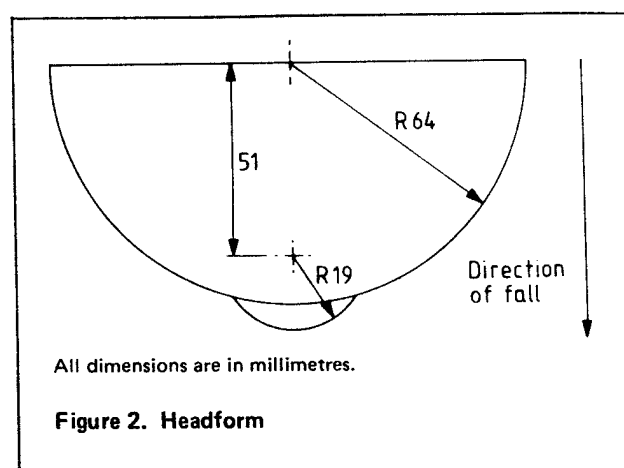
With the rotational axis in the horizontal plane and at 90° to the two previous tests, repeat the procedure in the two directions of rotation.

Appendix B. Test of energy absorbing material

B.1 Headform

B.1.1 The headform shall consist of a solid wooden hemisphere with an added smaller spherical segment as shown in figure 2. It shall be constructed such that it can be dropped freely along the axis marked and it shall have provision for mounting an accelerometer in order to measure the acceleration along the direction of fall.

B.1.2 The headform shall have a total mass, including the accelerometer, of $2.75 \pm 0.05 \text{ kg}$.



B.2 Instrumentation

The acceleration shall be recorded during the test using equipment in accordance with channel frequency class 1000 as specified in ISO 6487.

B.3 Procedure

B.3.1 Take three samples of each material from one or more infant restraints.

B.3.2 Place the sample under test on a smooth rigid base, e.g. a substantial concrete plinth.

B.3.3 Raise the headform to a height of 100 mm from the upper surface of the sample to the lowest point on the headform, and allow it to fall without impetus. Record the acceleration experienced by the headform during the impact. Repeat this procedure with the remaining samples.