

1.Scope :

This standard specifies the minimum coverage to be provided by motorcyclists' back protectors worn by riders in normal traffic situations. The standard contains the requirements for the performance of the protectors under impact and details of test methods. Requirements for sizing, ergonomic requirements, and requirements for innocuousness, labeling and provision of information are included.

The provision of this standard may not fully cover the needs of particular protectors (e.g. inflatable protector or other types of protector).

2.Terminology :

- 2.1 motorcyclist's lumber protectors: motorcyclist's back protectors with dimensions limited to cover the lumber region; intended to reduce the severity of injuries caused by impacts.
- 2.2 zone of protection: the zone of protection is a specific area of the protective equipment that intended to provide protection and this area is subject to specific testing.
- 2.3 body dimensions: the following body dimensions should be adequate for designation of back protectors (see Figure 1)
- 2.4 waist to shoulder: the maximum vertical length ,measured posteriorly from the waist to the junction of the shoulder to the neck.
- 2.5 waist line: the maximum horizontal girth measured during normal breathing with the subject standing upright and the tape measure passed around the body in the plane of the waist.

1- waist to shoulder

2- waist line

NOTE The dimension of 50mm refer to a subject of 1.78m tall and should be scaled pro rate with the height of the actual subject.

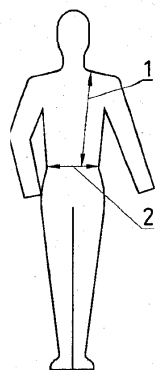


Figure 1 Body dimensions

3. Requirements :

- 3.1 motorcyclist's back protectors shall meet an overall requirement that they are safe to use, comfortable to wear and fit for their purpose.
- 3.2 Innocuousness: Construction material and incorporated substances shall not endanger those coming into contact with them. The manufacturer shall include in the information a declaration that to his knowledge no harmful substances are contained in the product. The manufacturer shall give guidance on the safe destruction and disposal of the products and of any hazards that could arise during mechanically disrupting or incinerating the product.
- 3.3 Minimum dimension of zones of protection: The minimum dimension of the zone protection shall be determined from Tables 1 and 2.
- 3.4 Sizing and size marking: Motorcyclist's back protectors shall be marked with their sizing using a pictogram to EN 340. ISO 7000-1641 shall also be used. The pictograms are to be placed on the product and on the package in which it is supplied.

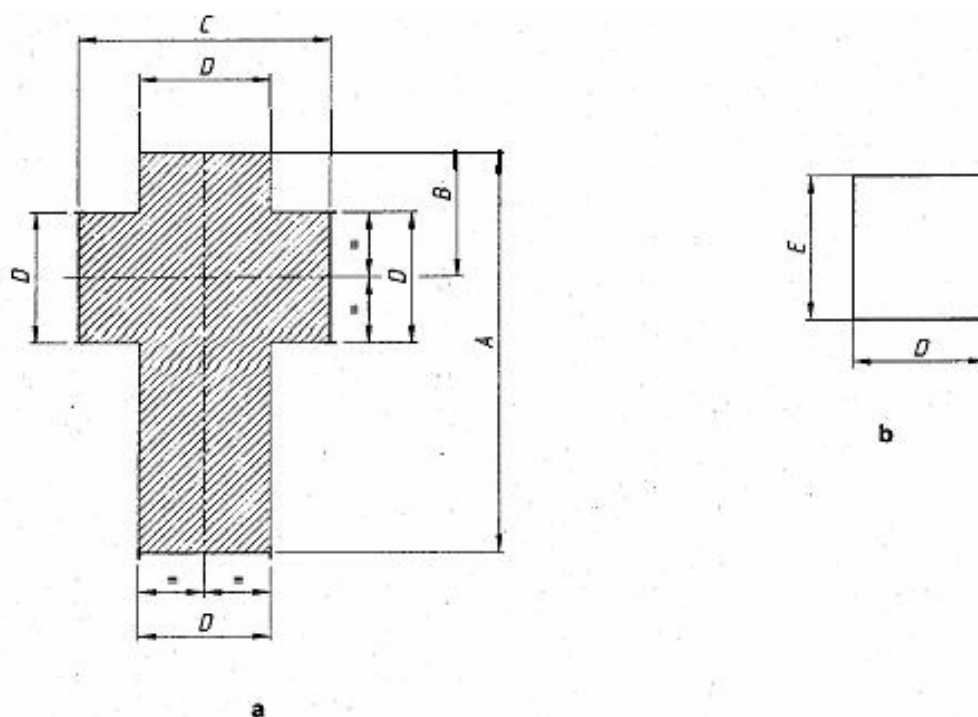


Figure 2 Minimum dimension of zones of protection

Table 1 Dimensions of minimum zone of protection for back protector

Dimensions in figure 2a			
A	B	C	D
0.72X	0.29X	0.44X	0.29X
All dimensions are referred to waist to shoulder length (100%) of the user			

Table 2 Dimensions of minimum zone of protection for lumbar protector

Dimensions in figure 2b	
E	D
0.32X	0.29X
All dimensions are referred to waist to shoulder length (100%) of the user	

3.5 Level of impact performance:

Level 1 protectors: The average peak force recorded below the anvil in the tests described in 6.4 shall be below 18kN, and no single value shall exceed 24kN.

Level 2 protectors: The average peak force recorded below the anvil in the tests described in 6.4 shall be below 9kN, and no single value shall exceed 12kN.

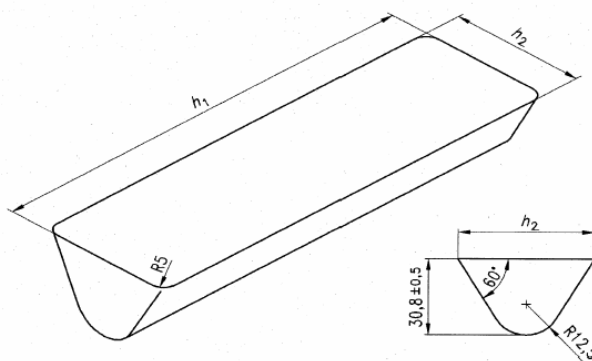
4. Conditioning and testing atmosphere :

The sample shall be conditioned for at least 24h in an atmosphere with a temperature of $(20\pm 2)^{\circ}\text{C}$ and a relative humidity of $65\%\pm 5\%$. If the tests are carried out in an atmosphere different to these specified values, the tests have to be commenced within 5 min of being removed from the conditioning atmosphere.

5. Test method (Summary) :

5.1 Test Equipment- Apparatus : The apparatus shall be such a mass (“ falling weight”) can be released in order to drop along a guided vertical path onto the sample placed on a test anvil. The center of the mass of the falling weight shall lie over the center of the anvil. The mass of the impactor and guided mass shall be $(5000\pm 50)\text{g}$ and its kinetic energy on impact shall be $(50\pm 1.5)\text{J}$.

5.2 Bar impactor: A bar impactor which shall be rectangular with a length, h_1 equal to $(160\pm 2)\text{mm}$, a width, h_2 at the top, equal to $(50\pm 1)\text{mm}$ and with a radius hemispherical face, R , equal to $(12.5\pm 0.1)\text{mm}$ shall be provided, see Figure 3.



5.3 Anvil: The anvil shall be made of polished steel with the following dimension l_1 equal to (190 ± 20) mm, l_2 equal to (100 ± 2) mm and r_1 equal to (150 ± 5) mm, see Figure 4. The anvil shall be attached through a piezoelectric load cell or equivalent force transducer to a mass of at least 1000kg.

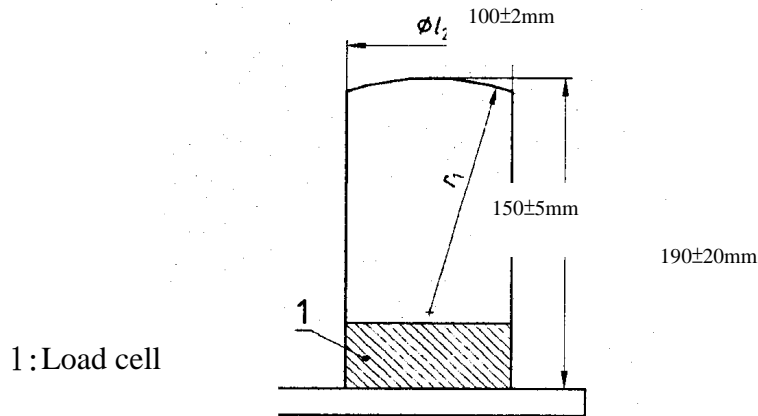


Figure 4 Anvil

5.4 Force measurement instrumentation: The anvil shall be mounted so that during impact testing the whole force between the anvil and the massive base of the apparatus passes through a quartz force transducer in line with its sensitive axis. The force transducer shall have a calibrated range of not less than 50kN and a lower threshold of less than 0.5kN. The output of the force transducer shall be processed by a charge amplifier and displayed and recorded on suitable instruments. The recording system shall show a continuous force with a time record, or shall have a peak force detection capability. Digital sampling system shall have a minimum rate of 10kHz. The measuring system including the drop assembly shall have a frequency response in accordance with channel frequency class (CFC) 1000 of ISO 6487.

5.5 Tolerance and uncertainty: Measuring instruments or their independent working components unless otherwise specified shall have an error limit of $\pm 2\%$ of the pass/fail level of the characteristic being measured.

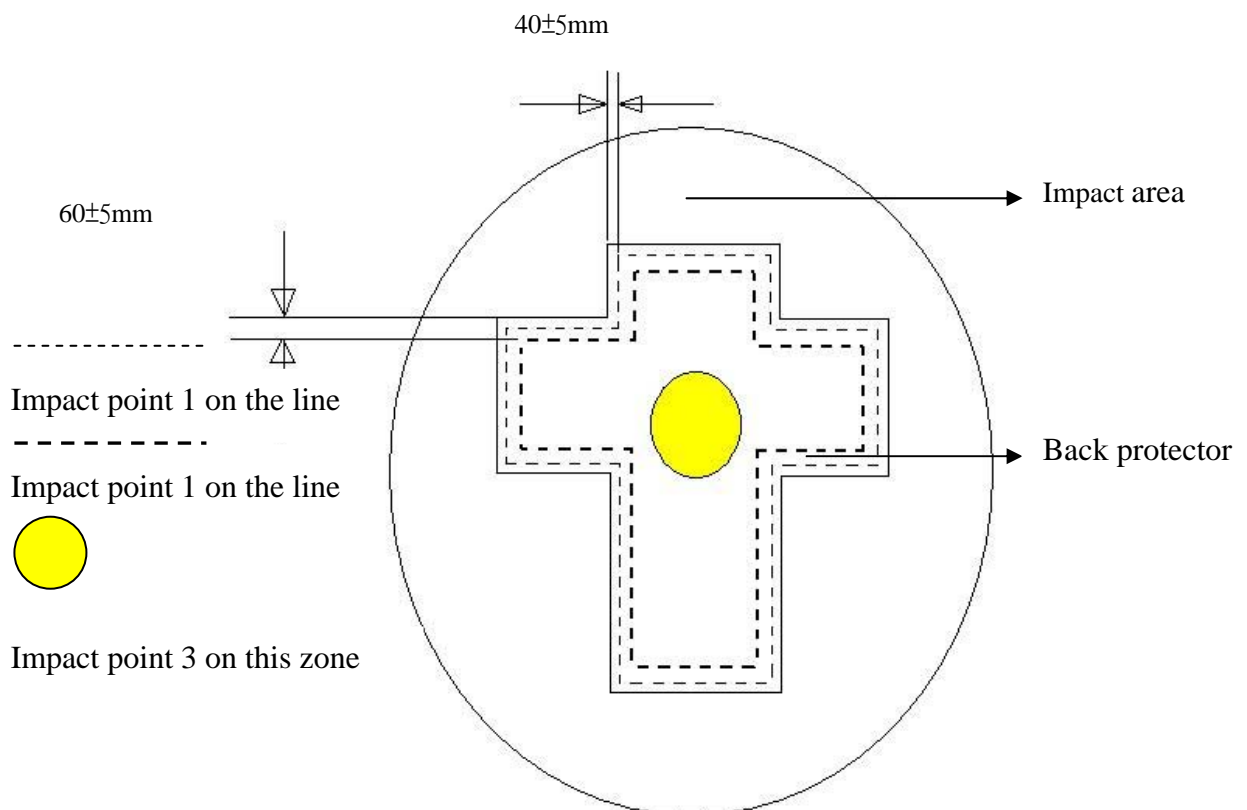
5.6 Test procedure :

(1) Back protectors shall be supplied by the manufacturer or his agent complete with label, or copies of the proposed labels, and the information supplied by the manufacturer that shall be supplied with the products. At least three samples of back protectors shall be supplied for testing.

(2) Measurement and marking of back/ lumbar protectors: The required dimension of minimum zone of protection of the back/ lumbar protector shall be determined from their stated torso length, which shall correspond to Table 1 or Table 2, as applicable. Templates for the minimum zone of protection shall be prepared from stiff but flexible material such as coated fabric or card. The templates shall be accurately prepared (tolerances $\pm 5\%$). The templates shall be used to mark the perimeter of the minimum zone of protection onto the outside of the back/ lumbar

protector with a felt tip pen or similar marker. The correspondence between the lines marked on the back/ lumbar protector by the template and the extent of the protective structures shall be determined. Any apparent weak points, or points which appear to offer reduced protection, shall also be marked.

- (3) Care should be taken to ensure that the cutting and removal of parts of the back protector do not effect its performance during the impact tests. Cut edges shall be bound with adhesive tape to retain the normal relationship between components of the protector.
- (4) Number of tests : A minimum of five impacts shall be carried out on each type of construction present using the equipment described in clause 5. The impacts shall be distributed over the protectors. The centers of the impacts shall be more than 90mm apart. A series of at least five impacts shall be carried out, one shall be (40 ± 5) mm from the perimeter line and one shall be at the center of the zone of protection. At least two single impacts shall also be made on all visually identified weak points and/ or in the direction found to be more severe. The same test cycle shall be applied to other size if some contraction parameter is different (e.g. thickness).



5.7 Test report :

- (1) Test results: The mean value shall be calculated from the nine measurements.
- (2) Test conditions
- (3) Test equipment
- (4) Date of test
- (5) Test method and date

6.Reference standard :

6.1 EN 1621-1: 1997 : Motorcyclists' protective clothing against mechanical impact-

Part 1:Requirements and test methods for impact protectors

6.2 EN 1621-2: 2003 : Motorcyclists' protective clothing against mechanical impact-

Part 2:Motorcyclists's back protectors-Requirements and test methods

6.3 [EN 340](#) : Protective clothing-General requirements

6.4 [ISO 6487](#) : Road Vehicles-Measurement techniques in impact tests-Instrumentation

6.5 [ISO 7000](#) : Graphical symbols for use on equipment-Index and synopsis