



## PART 1

### EN 1621-1 - MOTORCYCLISTS' PROTECTIVE CLOTHING AGAINST MECHANICAL IMPACT - MOTORCYCLISTS' LIMB JOINT IMPACT PROTECTORS - REQUIREMENTS AND TEST METHODS

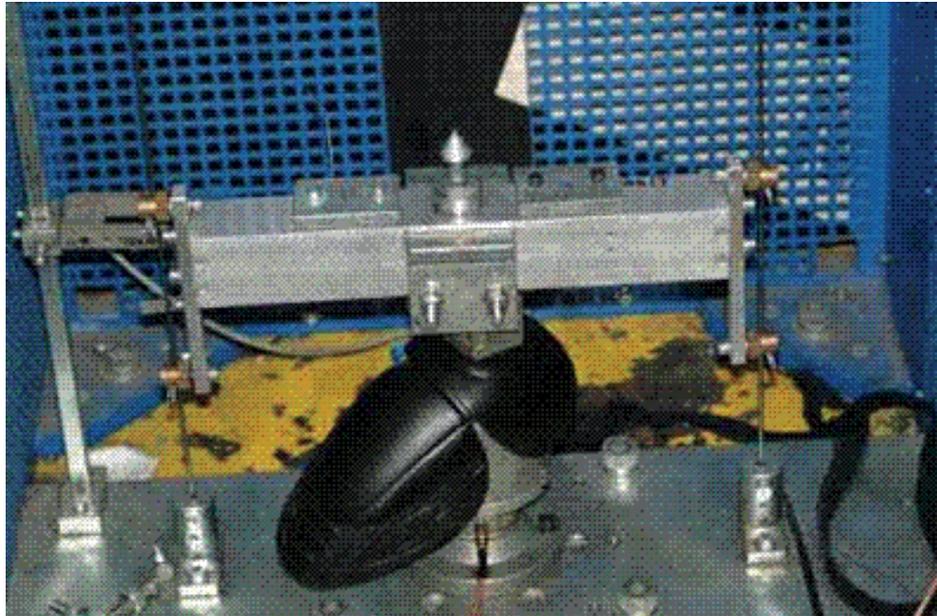
Many motorcyclists will be familiar with EN 1621-1, because since its original publication in 1997, shoulder, elbow, knee and, to a lesser degree, hip protectors marked as meeting the requirements of this standard have appeared in increasing numbers across the whole range of motorcycling garments. The standard has also been accepted as the de facto global benchmark and is regularly quoted as such on Internet web sites.

Limb joint impact protectors are tested on the same apparatus used to evaluate many other forms of impact protection, including horse riders' body protectors, martial arts protectors, cricket equipment and riot protection for the police.

The Personal Protective Equipment Directive became an active part of UK law on 30th June 1995. Since that date, suppliers of protective clothing and equipment "designed to be worn or held by an individual for protection against one or more health and safety hazards" (the Directive's definition of PPE) have been required to categorise their products as PPE, and to CE mark them by self-certification or through independent, third-party accreditation by test facilities known as "European notified Bodies", or to classify them as non-protective.

Simply, the apparatus is a tower mounted on a one metric tonne block of steel or concrete, to which is bolted a load cell. The product for testing is mounted the relevant one of a series of anvils, representing the various parts of the human body, which is bolted above the load cell. Impactors broadly replicating the "threat" (a flat road surface, a fist, a cricket ball or a brick, for example) are dropped onto the sample and the transmitted force received by the load cell is recorded.

Picture 1 shows a protector under test. The standard specifies the impact energy of the impactor and the maximum permitted transmitted force. For motorcyclists' impact protectors, the impact energy is 50 Joules (roughly the equivalent of being struck by an average 2.5 kilogramme house brick dropped from 2 metres) and the mean transmitted force should not exceed 35 kiloNewtons (kN).



Limb joint impact protectors are impact tested after they have been conditioned in a standard atmosphere at 20oC and 65% relative humidity. A second test takes place after the protectors have been exposed to hydrolytic ageing. This replicates the reduction in effectiveness which rainwater and perspiration can have on some foams which were in common use in motorcyclists' limb joint impact protectors.

Additionally, there are optional tests after protectors have been conditioned at higher (40oC) and lower (-10oC) temperatures. The foams used in many lower-priced products function best within a very narrow temperature range and become softer as their temperature increases and harder as it falls. In both cases, this will result in the foams being less effective at reducing the transmitted force through to the wearer. Higher-performing foams, which are able to function across a broader temperature range, overcome this, but, not unexpectedly, products featuring these materials carry a price premium.