



The Commission for Occupational Health and Safety and Standardization (KAN) was founded in 1994 in order to safeguard German occupational safety and health interests during the harmonization of standards within the European Single Market and to assure the participation of the social partners in the standardization process. KAN also pursues the objective of ensuring that the best possible consideration is given to OSH issues in international as well as German and European standardization.

KAN focuses on

- formulating fundamental OSH positions on key standardization issues,
- assessing the content of standards to determine whether they meet the OSH requirements from a German point of view and comply with the protection objectives specified in European directives,
- exerting influence on standardization programmes and mandates (mandates are standardization requests issued by the European Commission to the private CEN/CENELEC standards bodies),
- initiating new standards if necessary from the point of view of occupational safety and health,
- distributing information on standardization work for OSH experts.

If you'd like to know more, feel free to contact us.

KAN – Commission for Occupational Health and Safety and Standardization
Secretariat
Alte Heerstraße 111, 53757 Sankt Augustin / Germany
Tel.: +49 2241 231-3461
Fax: +49 2241 231-3464
E-mail: info@kan.de
www.kan.de/en



This code will take you to the full text of the KAN study (available in German only).

All of KAN's publications can be downloaded from www.kan.de/en/publications. You can order the publications available in printed form free of charge using our online order form.



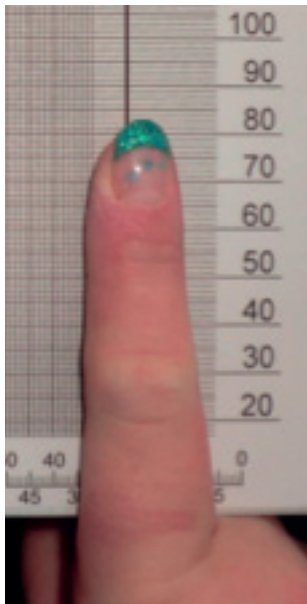
**Test finger:
Tested and found
to be too short**



A test finger can be used to test whether the enclosures of machines and installations are designed such that persons are not able to come into contact with dangerous parts. An assessment commissioned by KAN has found however that test fingers according to EN 60529 do not always guarantee this protection.

The design of enclosures must prevent persons from touching any dangerous electrical or mechanical parts. In order to test this, a jointed test finger is employed which is intended to simulate a human finger. The design of the test finger is set out in EN 60529:2000, "Degrees of protection provided by enclosures (IP code)", which specifies a length of 80 mm and a diameter of 12 mm.

In the course of KAN's study of anthropometric data in standards, it was found that the length of the test finger,



Measurement of index finger length

which was defined over 30 years ago, no longer corresponds to the anthropometric reality within the population. For this reason, the ASER institute in Wuppertal was commissioned in June 2011 with the task of reviewing whether the underlying data are still up to date. In addition to the length and width of the finger, factors such as a realistic series of joint angles and the influence of fingernails were to be examined. In the first step, current distributions of index finger length and width were compared with the



Proposal: Plug-on sleeve

dimensions of the test finger. In addition to the German values, data based upon ISO/TR 7250-2 "Basic human body measurements for technological design – Part 2: Statistical summaries of body measurements from individual ISO populations" from other countries were also included in the evaluation.

The test finger must be lengthened

The assessment found that the diameter of the test finger presented a high level of safety: with values of between 14 and 18 mm, the finger width of almost all adults both in Germany and in other ISO countries is substantially greater than the test finger diameter of 12 mm. Consequently, enclosure openings which the test finger is unable to penetrate are also inaccessible to the human finger.

The situation is different with regard to the length of the test finger. At the current length of 80 mm, protection is not fully assured for a not inconsiderable percentage of the population in Germany. If the distributions of the index finger length recorded in other countries are also taken into account, the deviation from the test finger length is even greater. From an anthropometric perspective, the length of the test finger should therefore be extended.

The ASER institute concludes that a test finger length of over 90 mm is required in order to allow for the actual index finger lengths of the population in the countries under consideration. To make allowance for

the length distribution of all countries if possible and for the potential penetration depth of the index finger, which owing to the skin fold at the base of the finger is greater than the length measured in accordance with the standard, extension by 15 mm is proposed. In order for fingernails of different length to be included in the design of the test finger, a further 5 mm must be added to the length.

Plug-on sleeve to lengthen the test finger

EN ISO 13857 governing safety distances on machines stipulates a safety distance of at least 120 mm for square openings which can be penetrated by a finger (i.e. 12 to 20 mm). In order for the test finger also to cover this standard, it must have a total length of 120 mm.



Lengthened test finger

The length of the individual test finger phalanges to EN 60529 does not reflect those of actual human index fingers. Whereas on the test finger, the shortest phalanx is the lowest, i.e. that nearest the body, on human beings it is generally the top phalanx. A worst-case analysis (long, thin fingers) is however considered sufficient. It is not necessary for different types of test finger to be specified in the standard.

In order for the results of the assessment to be implemented, the ASER institute proposes the use of a plug-on sleeve for the testing of larger enclosure openings. KAN will discuss with experts whether this solution is suitable for use in practice and how the results of the assessment can best be implemented.