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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Textile floor coverings — Assessment of static electrical propensity — "Walking" test

This Technical Report, after having been prepared by a Working Group under ISO/TC 38/SC 12, *Textile floor coverings*, was approved by the sub-committee in a postal ballot in July 1979, thirteen P-members voting in favour and two against. The comments received were reviewed at the seventh meeting of ISO/TC 38/SC 12 in October 1980, where it was agreed that the amended text should be submitted to ISO/TC 38 for a postal ballot. This was carried out in March 1981, where twelve P-members of ISO/TC 38 voted in favour and one against.

The subject of static electrical propensity has been studied for a number of years in a Working Group of ISO/TC 38/SC 12 and, although the "Walking" test method has been refined during this period, the fourth draft proposal did not receive sufficient support for further processing as a draft International Standard. Nevertheless, many members of the Working Group felt that the method was of such importance and already so widely used that some form of official international publication was essential, whatever its shortcomings.

Contents

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0 Introduction

The present method of test for assessing the static electrical propensity of textile floor coverings has been prepared following extensive development work and laboratory trials. There are several reasons why a full International Standard was not produced, and these include the following :

— the variations in test results between laboratories, within laboratories and between operatives where shown to be high in a number of inter-laboratory trials; the reasons for such variations were not yet fully understood and were still being studied;

— the sensitivity of the method to changes in atmospheric conditions is very high, and the maintenance of these conditions within the prescribed limits is not easily achieved;

— experience of the method using two of the three sole materials is very restricted, and more information on the relationship of all three materials is required;

— new proposals concerning an alternative or additional mode of walking, and a different manner of recording the results, have been put forward and need evaluating alongside the existing method; details of these proposals are given below :

Scuffing walk

Instead of the procedure described in 9.2 which requires that the sandals be lifted to between 50 and 80 mm above the specimen, the following method is proposed : "Walk on the specimen, at the rate of 2 steps per second, rubbing the sandals on the specimen without lifting the feet, so that the sandals are always in contact with the specimen; when the walker has reached the end of the specimen, he turns in one place and moves over the specimen in the opposite direction. Come no closer than 50 cm to walls of the conditioning room and to other objects in it. Cover as much of the specimen as possible. When the peak voltage ceases to rise, continue walking for at least 30 s." The proponents of this method claim better reproducibility and higher voltages giving more discrimination, its critics comment on the lack of supporting background evidence, whilst several Working Group members see an advantage in including both walking methods in the test procedure.

Expression of results

Instead of the existing clause 10, the following procedure is proposed : "Determine from the recorder diagram the linear mean of the five highest peaks and valleys and express the result in kilovolts." The supporters of this alteration point out that the method is independent of the response time of the recording instrument; its critics claim that it is less reproducible and more dependent on the manner of walking.

These two variations are put forward for information in the hope that they will be studied in conjunction with the basic test method with a view to further consideration at a later date.

1 Scope and field of application

This Technical Report describes a "Walking" test method for the determination of the electrostatic propensity of textile floor coverings of all types.

2 References

ISO 48, *Vulcanized rubbers — Determination of hardness (Hardness between* 30 *and* 85 IRHD*).*

ISO/R 275, *Zinc oxide for paints.*

ISO 1957, *Machine-made textile floor coverings — Sampling and cutting specimens for physical tests.*

ISO 2781, *Rubber, vulcanized — Determination of density.*

ISO 3844, *Shoe sizes — Method of marking.*

3 Principle

The body voltage generated when a person wearing standardized footwear walks on the textile floor covering under controlled atmospheric conditions is measured.

4 Apparatus

4.1 Grounded metal base plate, measuring at least 200 cm × 100 cm.

NOTE — The use of an earthed metal plate on the floor of the test room or, alternatively, a floor which is entirely of metal may constitute a hazard where mains voltages are present. It is recommended that mains voltage sources in the test room be protected by the use of suitable earth leakage circuit breakers.

4.2 Rubber mat, of dimensions 220 cm × 120 cm, thickness 4,5 ± 0,5 mm and vertical resistance ⩾ 10^{12} Ω, in relation to a surface area of 1 cm^2.

NOTE — Determination of resistance value is not in practice carried out over an area of 1 cm^2.

4.3 Sandals, made in accordance with the requirements in annex A, and reserved specifically for this test method. At least two sole materials shall be used, conductive "BAM" rubber and either polyvinylchloride (PVC) or XS-664P Neolite, in accordance with the requirements in annex B. The resistance between the metal plate and an operative standing on it wearing the sandals with conductive rubber soles shall be ⩽ 10^9 Ω, determined in accordance with the method in annex C; with the Neolite soles it shall be approximately 1,5 × 10^{10} Ω.

4.4 Means of cleaning the footwear :

4.4.1 Fine sandpaper.

4.4.2 Scoured cotton cloth, free from finish or detergent.

4.5 Ionizing source.

NOTE — Care should be taken if the ionizing source is of the polonium-210 type, which is toxic although not emitting harmful radiation.

4.6 Body voltage measuring system, consisting of a d.c. static voltmeter, an autographic recorder and a hand electrode, meeting the following requirements :

a) input resistance of voltmeter and hand electrode system : ⩾ 10^{14} Ω

b) input capacitance of hand electrode : ⩽ 20 pF

c) response time of whole system (electrode/voltmeter/recorder) such that the full-scale deflection on the recorder is reached within 0,25 s.

NOTE — Over-damping prevents true maximum voltage being observed; under-damping may cause overshooting. The system should be checked periodically against high and low voltage sources applied at step frequency.

An example of a suitable hand electrode system is given in annex D.

4.7 Wet-and-dry bulb ventilated hygrometer, capable of determining relative humidity to an accuracy of 1 %.

5 Atmosphere for conditioning and testing

The specimens shall be conditioned and the test conducted in an atmosphere of 23 ± 1 °C and 25 % ± 2 % relative humidity.

NOTE — It is important to maintain the atmosphere of the test room within the stated limits of temperature and humidity, as under controlled conditions in the region of 23 °C and 25 % r.h., variations in humidity of up to 2 % *can* produce changes in body voltage of up to 20 %.

6 Sampling and selection of specimens

Carry out sampling and selection of specimens in accordance with ISO 1957. From each sample, select at least one specimen, measuring 200 cm × 100 cm.

NOTES

1 In addition to the specimen, it is desirable to have standard specimens of known electrostatic propensity (if possible, one high charging and one low charging) in order to check the equipment and performance at regular intervals.

2 Generally, the test is carried out on the textile floor covering as received, i.e. with finishes and special treatments as appropriate. However, if it is required to investigate the permanency of such finishes and treatments, then it may be necessary to submit the specimen to a cleaning process or to practical wear conditions before testing. If so, these pre-treatments should be recorded in the test report.