

Transformed

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 48

DETERMINATION OF HARDNESS OF VULCANIZED NATURAL AND SYNTHETIC RUBBERS

1st EDITION

July 1957

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BRIEF HISTORY

The ISO Recommendation R 48, *Determination of Hardness of Vulcanized Natural and Synthetic Rubbers*, was drawn up by the Technical Committee ISO/TC 45, *Rubber*, the Secretariat of which is held by the British Standards Institution (B.S.I.).

The draft proposal put forward by the Secretariat was considered and amended at the meetings held in London (1948), the Hague (1949), Akron (1950), Oxford (1951) and Paris (1953).

On 28 August 1954, the Draft ISO Recommendation proposed by the Technical Committee ISO/TC 45 was submitted to all ISO Member Bodies.

In consideration of comments presented by the U.S.A. Member Body a slight amendment was made to the formula relating $\log_{10} M$ to the hardness in International Rubber Hardness Degrees and the Draft was approved, subject to some editorial modifications, by the following 26 (out of a total of 34) Member Bodies:

Austria	*Ireland	Spain
Belgium	Israel	Sweden
*Canada	Italy	Switzerland
Denmark	Japan	Union of South Africa
Finland	Mexico	United Kingdom
France	Netherlands	U.S.A.
Germany	*New Zealand	U.S.S.R.
Hungary	Pakistan	Yugoslavia
India	Portugal	

No Member Body opposed the Draft.

The Draft ISO Recommendation was then submitted to the ISO Council which decided, at its meeting in July 1957, to accept it as an ISO RECOMMENDATION.

* These Member Bodies stated that they had no objection to the Draft being approved.

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FOREWORD

The standard hardness test is based on a measurement of the penetration of a rigid ball into the rubber test piece under specified conditions. The measured penetration is converted into International Rubber Hardness Degrees (IRH), the scale of degrees being so chosen that 0 represents a material having an elasticity modulus of zero and 100 represents a material of infinite elasticity modulus, and so that the following conditions are fulfilled over most of the normal range of hardness:

- (a) one International Rubber Hardness Degree always represents approximately the same proportionate difference in Young's modulus;
- (b) readings in International Rubber Hardness Degrees are approximately the same as those of the Shore durometer type "A".

For substantially elastic isotropic materials like well-vulcanized natural rubbers, the hardness in International Rubber Hardness Degrees bears a known relation to Young's modulus, although for markedly plastic or anisotropic rubbers the relationship will be less precisely known.

1. SUMMARY

The hardness test consists in measuring the difference between the depths of penetration of the ball into the rubber under a small initial load and a large final load. From this difference the hardness in International Rubber Hardness Degrees is derived by using either Table 2, page 6, or the graph based on this table, or a scale, reading directly in International Rubber Hardness Degrees and derived from the table, fitted to the penetration-measuring instrument.