

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 813

PREPARATION OF TEST PIECE AND METHOD OF TEST
OF THE ADHESION OF VULCANIZED RUBBER TO METAL
WHERE THE RUBBER IS ASSEMBLED TO ONE METAL PLATE

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 813, *Preparation of test piece and method of test of the adhesion of vulcanized rubber to metal where the rubber is assembled to one metal plate*, was drawn up by Technical Committee ISO/TC 45, *Rubber*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question by the Technical Committee led, in 1962, to the adoption of a Draft ISO Recommendation.

In November 1963, this Draft ISO Recommendation (No. 614) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Germany	Poland
Australia	Hungary	Spain
Austria	India	Sweden
Brazil	Israel	Switzerland
Canada	Italy	United Kingdom
Chile	Japan	U.S.A.
Colombia	Korea, Rep. of	U.S.S.R.
Czechoslovakia	Netherlands	Yugoslavia
France	New Zealand	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in September 1968, to accept it as an ISO RECOMMENDATION.

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**PREPARATION OF TEST PIECE AND METHOD OF TEST
OF THE ADHESION OF VULCANIZED RUBBER TO METAL
WHERE THE RUBBER IS ASSEMBLED TO ONE METAL PLATE**

1. SCOPE

This ISO Recommendation describes a method for testing the adhesion strength of rubber-to-metal bonds where the rubber part is assembled to one metal plate.

This ISO Recommendation primarily applies to test pieces prepared in the laboratory under standard conditions, such as may be used to provide data for the development and control of rubber compounds and methods of manufacture.

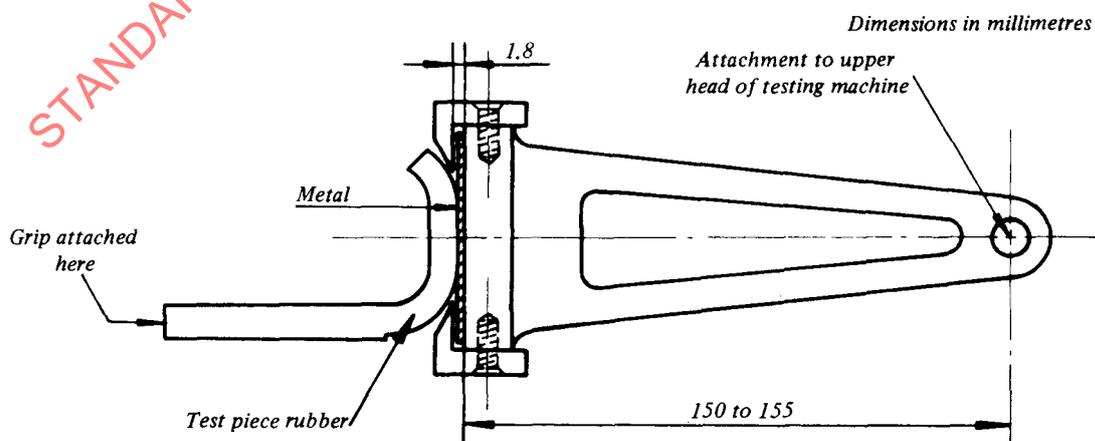
2. PRINCIPLE OF TEST

The test consists of measuring the force required to cause separation of a rubber part adhering to a metal surface, the angle of separation and the width and thickness of the rubber being fixed within agreed limits. The angle of separation is 90° .

3. APPARATUS

3.1 *Testing machine.* A tensile testing machine conforming to the requirements of national standards for verification of testing machines should be used. It should be capable of accurately registering the maximum force in newtons obtained during the test, and of maintaining the specified constant rate of separation of the jaws of 50 ± 5 mm per minute.

NOTE. — Inertia (pendulum) type dynamometers are apt to give results which differ because of frictional and inertial effects. An inertia-less (for example, electronic or optical transducer) type dynamometer gives results which are free from these effects and is therefore to be preferred.



**FIG. 1 — Test fixture for the adhesion test.
The tensile force is applied at an angle of 90° to the plane of the rubber-to-metal bond.**

- 3.2 *Fixture.* Any suitable fixture for holding the test piece to the upper head of the machine may be used, provided that the direction of pull to cause separation is at all times during the test as nearly perpendicular as possible to the plane of the rubber-to-metal bond, that is, making an angle of 90° with the face of the top holding fixture. The fixture shown in Figure 1, page 5, complies with this requirement.
- 3.3 *Grip.* Any suitable grip may be used provided that it does not allow the rubber to slip or cause it to rupture.

4. STANDARD TEST PIECE

4.1 Dimensions of standard test piece

The standard test piece should consist of a strip of rubber 6.0 ± 0.1 mm thick in the test area, 25.0 ± 0.1 mm wide and 125 mm long, adhering to a 25 mm square area of the face of a metal strip.

The dimensions of the metal strip should be 1.5 ± 0.1 mm thick, 25.0 ± 0.1 mm wide and 60 ± 1 mm long.

The test piece should be so prepared that the bonded area of 25 mm length and 25.0 ± 0.1 mm width is approximately in the middle of the metal strip as shown in Figure 2.

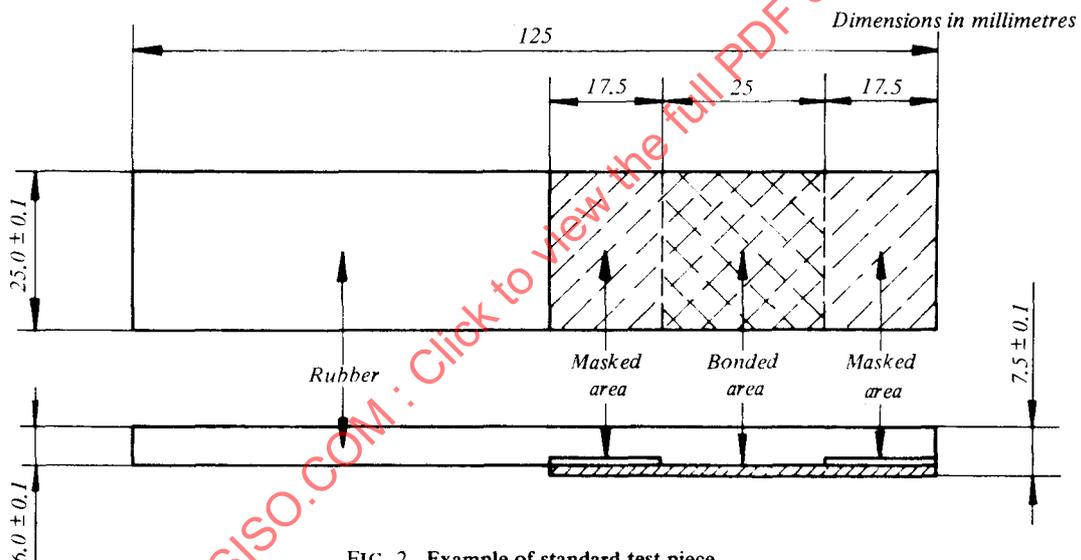


FIG. 2—Example of standard test piece

4.2 Preparation of standard test piece

4.2.1 Two types of moulds may be used for vulcanization : moulds for several test pieces, or moulds for single test pieces.

4.2.1.1 When the test pieces are to be made using one mix and one type of adhesive system, a mould for several test pieces may be used. The inside mould dimension parallel to the longitudinal axis of the metal strip should be 125 mm. The dimension along the transverse axis of the metal strip may be altered according to the number of test pieces to be cured at one time. The dimension perpendicular to the longitudinal and transverse axes of the metal strip should be 7.50 ± 0.05 mm.

4.2.1.2 When only one test piece is to be made from a given mix, a mould as described in clause 4.2.1.1 should be used, except that the dimension along the transverse axis of the metal strip should be restricted to the width of the test piece.