International

ISO 1817

Rubber, vulcanized or thermoplastic — Determination of the effect of liquids

Caoutchouc vulcanisé ou thermoplastique — Détermination de l'action des liquides

Ninth edition
2026-08

Reference number
ISO 1817:2026(en)

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Published in Switzerland

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This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

This ninth edition cancels and replaces the eighth edition (ISO 1817:2024), which has been technically revised.

The main changes are as follows:

— Clause 4: the possible use of water baths, oil baths or heat blocks was added for method B.

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The action of a liquid on vulcanized or thermoplastic rubber can generally result in:

a) absorption of the liquid by the rubber;

b) extraction of soluble constituents from the rubber;

c) a chemical reaction with the rubber.

The amount of absorption [a)] is usually larger than that of extraction [b)], so that the net result is an increase in volume, commonly termed “swelling”. The absorption of liquid can profoundly alter physical and chemical properties and hence change tensile strength, extensibility and hardness of the rubber, so it is important to measure these properties after treatment of the rubber. The extraction of soluble constituents, especially plasticizers and antidegradants can likewise alter the rubber's physical properties and chemical resistance after drying (assuming the liquid to be volatile). Therefore, it is necessary to test these properties following immersion and drying of the rubber. This document describes the methods necessary for determining the following properties after immersion and after immersion and drying:

— change in mass, volume and dimensions;

— extractable matter;

— change in hardness and tensile stress-strain properties.

Although in some respects these tests can simulate service conditions, no direct correlation with service behaviour is implied. Thus, the rubber giving the lowest change in volume is not necessarily the best one in service. The thickness of the rubber must be taken into account, since the rate of penetration of liquid is time-dependent and the bulk of a very thick rubber product can remain unaffected for the whole of the projected service life, especially with viscous liquids. Moreover, it is known that the action of a liquid on rubber, especially at high temperatures, can be affected by the presence of atmospheric oxygen. The tests described in this document can, however, provide valuable information on the suitability of a rubber for use with a given liquid and, in particular, constitute a useful control when used for developing rubbers resistant to oils, fuels or other service liquids.

The effect of a liquid can depend on the nature and magnitude of any stress within the rubber. In this document, test pieces are tested in an unstressed condition.