# INTERNATIONAL STANDARD

# ISO 7780

Second edition
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# Rubber and rubber latices — Determination of manganese content — Sodium periodate photometric methods

*Caoutchoucs et latex de caoutchouc — Dosage du manganèse — Méthodes photométriques au periodate de sodium*



Reference number
ISO 7780:1998(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7780 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

This second edition cancels and replaces the first edition (ISO 7780:1987) which has been technically revised.



International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

# Introduction

Manganese in certain forms is known to catalyse the oxidative breakdown of natural rubber, although the mechanism by which degradation is brought about is not fully understood. It is recognized also that other forms of manganese can be present, even in relatively large amounts, without degradation taking place. However, there is always the possibility in the case of compounded rubbers that, under the influence of some constituents of the compound (notably the unsaturated acids), the manganese could assume a more aggressive role.

Clearly, it would be an advantage to distinguish analytically between catalytically active and inactive forms, but no generally accepted method has yet been put forward for doing so. There is therefore no alternative to determining the total amount of manganese in the rubber.

Little is known about the influence of manganese on the catalytic oxidation of synthetic rubbers, although it is widely accepted that its effect may be less severe than is the case with natural rubber. Possibly for this reason, the determination of manganese in synthetic rubbers and in compounds based on synthetic rubbers is less frequently carried out; nevertheless, the methods specified in this International Standard are applicable to all the commonly used elastomers.

The first of the two specified methods, referred to as the *general method*, is believed to be applicable to all rubbers and compounded rubbers in all forms. In this method, the ash from the rubber is taken through a fusion stage in order to obtain the manganese in soluble form; it is most suited to rubber compounds containing heavy loadings of inert fillers such as clay, or materials which form insoluble phosphates, for example titanium dioxide. The second method, referred to as the *restricted method*, is shorter and suitable for raw rubbers, their corresponding latices, and rubber compounds not containing a heavy loading of the fillers referred to above. It is expected that the second method would be used more frequently.

For those equipped with atomic absorption equipment, ISO 6101-4:1997, *Rubber — Determination of metal content by atomic absorption spectrometry — Part 4: Determination of manganese content*, may be used in place of ISO 7780. Both standards should be consulted because there may be some background material in each which could be useful before choosing the most desirable method for the determination of manganese in raw and vulcanized rubbers and latices.