

INTERNATIONAL STANDARD

ISO
7780

First edition
1987-06-01



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

Rubbers and rubber latices — Determination of manganese content — Sodium periodate photometric methods

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

Reference number
ISO 7780:1987 (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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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

It cancels and replaces International Standards ISO 1397 : 1975 and ISO 1655 : 1975, of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Rubbers and rubber latices — Determination of manganese content — Sodium periodate photometric methods

0 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 concerning 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* (section one), 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* (section two), 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 provided chlorine is also absent.

1 Scope and field of application

This International Standard specifies photometric methods for the determination of manganese, after oxidation with sodium periodate, in rubbers and rubber latices.

Section one specifies a method for compounded or vulcanized rubbers which do not contain chlorine. The method is not affected by heavy loadings of fillers such as synthetic and natural silicates, calcium carbonate in various forms, or by the presence of compounding ingredients which form an insoluble phosphate under the conditions of the test.

Section two specifies a method for raw rubber, latex and compounded rubber which does not contain heavy loadings (more than about 10 %) of inert silicate fillers or any ingredient such as titanium dioxide which under the conditions of test will form an insoluble phosphate. The method can be applied to natural and synthetic rubbers which do not contain chlorine.

2 References

- ISO 123, *Rubber latex — Sampling.*
- ISO 124, *Rubber latices — Determination of total solids content.*
- ISO 1795, *Raw rubber in bales — Sampling.*
- ISO 1796, *Rubber, raw — Sample preparation.*
- ISO 4793, *Laboratory sintered (fritted) filters — Porosity grading, classification and designation.*