



National Standards Authority of Ireland

IRISH STANDARD

I.S. ISO 188 : 1986

ICS 83.060

**RUBBER, VULCANIZED - ACCELERATED
AGEING OR HEAT-RESISTANCE TESTS**

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Údarás um Chaighdeáin Náisiúnta na hÉireann

DECLARATION

OF

SPECIFICATION

ENTITLED

RUBBER, VULCANIZED - ACCELERATED AGEING OR HEAT-RESISTANCE TESTS

AS

THE IRISH STANDARD SPECIFICATION FOR

RUBBER, VULCANIZED - ACCELERATED AGEING OR HEAT-RESISTANCE TESTS

NSAI in exercise of the power conferred by section 16 (3) of the National Standards Authority of Ireland Act, 1966 (No. 28 of 1996) and with the consent of the Minister for Enterprise, Trade and Employment, hereby declares as follows:

1. This instrument may be cited as the Standard Specification (Rubber, vulcanized - Accelerated ageing or heat-resistance tests) Declaration, 1986.
2. (1) The Specification set forth in the schedule to this declaration is hereby declared to be the standard specification for Rubber, vulcanized - Accelerated ageing or heat-resistance tests. The Schedule comprises the text of ISO 188 : 1982.
(2) The said standard specification may be cited as Irish Standard ISO 188 : 1986 or as I.S. ISO 188 : 1986.

Rubber, vulcanized — Accelerated ageing or heat-resistance tests

0 Introduction

Accelerated ageing or heat-resistance tests are designed to estimate the relative resistance of rubber vulcanizates to deterioration with the passage of time. For this purpose, the rubber is subjected to controlled deteriorating influences for definite periods, after which appropriate properties are measured and compared with the corresponding properties of the unaged rubber.

The purpose of the test may be to assess the deterioration of the rubber either

- a) during prolonged periods at normal or high temperatures in air; or
- b) during use at elevated temperatures and at elevated oxygen pressure.

Two types of test method are given in this International Standard, namely :

- a) air-oven methods (using a cell-type oven or a normal oven);
- b) oxygen pressure method.

The selection of the time, temperature and atmosphere to which the test pieces are exposed will depend on the purpose of the test and the type of polymer.

In the air-oven tests, deterioration is accelerated by raising the temperature and, in the oxygen pressure test, by increasing the oxygen concentration and the temperature. The degree of acceleration thus produced varies from one vulcanizate to another and from one property to another.

Consequences of this are :

- a) Accelerated tests do not truly reproduce under all circumstances the changes produced by natural ageing.
- b) Accelerated tests sometimes fail to indicate accurately the relative natural or service life of different rubbers; thus, tests at temperatures greatly above ambient or service temperatures may tend to equalize the apparent life of rubbers which deteriorate at different rates in storage or service. Tests at one or more intermediate temperatures are

useful in assessing the reliability of accelerated ageing at high temperatures.

c) Accelerated tests involving different properties may not agree in assessing the relative life of different rubbers and may even arrange them in different orders of merit. Therefore, deterioration should be measured by the changes in property or properties which are of practical importance, provided that they can be measured reasonably accurately.

Attention is drawn to the fact that air-oven and oxygen pressure ageing tests should not be used to simulate natural ageing which occurs in the presence of either light or ozone — when the rubbers are stretched.

1 Scope and field of application

This International Standard specifies two types of accelerated ageing or heat-resistance tests on vulcanized rubbers, namely air-oven methods (using either a cell-type oven or a normal oven) and oxygen pressure method.

2 Reference

ISO 1826, *Rubber, vulcanized — Time-interval between vulcanization and testing — Specification.*

3 Accelerated ageing by heating in air

3.1 Principle

Tests pieces are subjected to controlled deterioration by air at an elevated temperature and at atmospheric pressure, after which the physical properties are measured and compared with those of unaged test pieces. The physical properties concerned in the service application are used to measure the deterioration, but in the absence of any statement of these properties, it is recommended that tensile strength, stress at intermediate elongation, breaking elongation and hardness be measured.

In this test, the oxygen concentration is low, and if oxidation is rapid, oxygen may not diffuse into the rubber quickly enough to maintain uniform oxidation. The test is therefore liable to give misleading results with poor-ageing rubbers, when the normal thickness specified in the International Standard appropriate to the test method is used.

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