INTERNATIONAL STANDARD

ISO 11345

First edition
1997-12-15

Rubber — Assessment of carbon black dispersion — Rapid comparative methods

Caoutchouc — Évaluation de la dispersion du noir de carbone — Méthodes comparatives rapides

Reference number
ISO 11345:1997(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 11345 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products,* Subcommittee SC 2, *Physical and degradation tests.*

Annex A of this International Standard is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Introduction

The degree of carbon black dispersion in a rubber compound is important because certain physical properties, e.g. tensile strength, hysteresis and abrasion resistance, are influenced by dispersion.

This method makes use of the well known fact that in a compound in which the ingredients are well dispersed, light is reflected from a freshly cut surface revealing a smooth, unblemished texture. The presence of improperly dispersed ingredients is shown by irregularities which usually take the form of circular, convex "bumps" or concave pockmarks on the surface, and their presence indicates a less-than-perfect dispersion of the compounding ingredients. The size and frequency of these irregularities may be used to judge the degree to which the compound falls short of an optimum dispersion. A set of ten standards based on size and frequency of these irregularities has been established to which numerical ratings have been assigned. This scheme provides a means of evaluating dispersion in a rubber compound and assigns numerical designations to the degrees of dispersion.

This International Standard describes test procedures for assessing the degree of macrodispersion of carbon black in rubber. The methods are primarily intended to be used as rapid factory controls during mixing and subsequent processing stages to assure adequate carbon black dispersion. Two test methods are described:

Method A: Visual microscopic or photographic/microscopic inspection

Method B: Split-field microscopic inspection

This page intentionally left blank

Rubber — Assessment of carbon black dispersion — Rapid comparative methods

WARNING - Persons using this International Standard shall be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies qualitative visual test methods for the rapid and comparative assessment of macrodispersion only of carbon black in rubber. Ratings are made relative to a set of standard photographs (ratings 1 - 10), and the results are expressed on a numerical scale. This International Standard, with its standard photographs, is applicable only to compounds which contain carbon black.

2 Principle

The carbon black filled rubber compound is cut to expose a fresh surface for examination at a magnification of 30 x.

Two alternative methods are described:

Method A: Visual microscopic or photographic/microscopic inspection

Method B: Split-field microscopic inspection

The dispersion level of the carbon black is compared with a series of ten photographic or electronically stored standards photographed with oblique illumination of 30° at an effective magnification of 30 × and then rated numerically from 10 (excellent) to 1 (very poor). (Figure 1).

A rating of 10 indicates a state of dispersion having near maximum physical properties while a rating of 1 would indicate structural flaws causing considerably decreased physical properties. Normally, the visual dispersion ratings indicate the following levels of compound quality.

Visual dispersion rating	Dispersion classification
9-10	excellent
8	good
7	acceptable
5-6	doubtful
3-4	poor
1-2	very poor