INTERNATIONAL STANDARD

ISO 11235

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Rubber compounding ingredients — Sulfenamide accelerators — Test methods

Ingrédients de mélange du caoutchouc — Accélérateurs du type sulfénamide — Méthodes d'essai

Reference number
ISO 11235:1999(E)

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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 11235 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

Annex A forms an integral part of this International Standard.

Rubber compounding ingredients — Sulfenamide accelerators — Test methods

WARNING — Persons using this International Standard should 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

1.1 This International Standard specifies the methods to be used for the evaluation of sulfenamide accelerators.

1.2 The analytical methods are applicable for most commercial sulfenamide accelerators:

— Sulfenamides of primary amines (type I)

— Sulfenamides of unhindered secondary amines (type II)

— Sulfenamides of hindered secondary amines (type III)

1.2.1 MBTS: Benzothiazyl disulfide

NOTE Although MBTS is not a sulfenamide, it is the primary decomposition product of these accelerators and quantitatively determined by the method specified in 4.2.

1.2.2 CBS: *N*-cyclohexylbenzothiazole-2-sulfenamide

1.2.3 TBBS: *N*-*tert*-butylbenzothiazole-2-sulfenamide

1.2.4 DIBS: *N*,*N*'-diisopropylbenzothiazole-2-sulfenamide

1.2.5 DCBS: *N*,*N*'-dicyclohexylbenzothiazole-2-sulfenamide

1.2.6 MBS: *N*-oxydiethylenebenzothiazole-2-sulfenamide

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 385-1:1984, *Laboratory glassware — Burettes — Part 1: General requirements*.

ISO 648:1977, *Laboratory glassware — One-mark pipettes*.

ISO 1772:1975, *Laboratory crucibles in porcelain and silica*.

ISO 3819:1985, *Laboratory glassware — Beakers*.

ISO 4788:1980, *Laboratory glassware — Graduated measuring cylinders*.

ISO 4793:1980, *Laboratory sintered (fritted) filters — Porosity grading, classification and designation*.

ISO 6556:1981, *Laboratory glassware — Filter flasks*.

ISO/TR 9272:1986, *Rubber and rubber products — Determination of precision for test method standards*.

ISO 15528:—[1)], *Paints and varnishes — Sampling*.

3 Determination of physical and chemical properties

3.1 Sampling

The sampling of the product shall be performed in accordance with ISO 15528.

To ensure homogeneity, thoroughly blend at least 250 g of the lot sample before removing the test portion.

3.2 Test methods

Property	Clause or subclause
Purity	4
— by reduction with MBT and titration	4.1
— by high performance liquid chromatography (HPLC)	4.2
Insoluble material	5
Melting range	6
— by capillary tube	6.1
— by differential scanning calorimetry (DSC)	6.2
Volatile material	7
Wet sieve analysis	8
Ash	9

3.3 Limit of acceptance

The difference between the results of duplicate determinations shall not exceed the repeatability of the test, if it is defined; otherwise, it is necessary to repeat the test. When the repeatability is not defined, the results of both determinations shall be reported.

1) To be published. (Revision of ISO 842:1984 and ISO 1512:1991)