
**Rubber compounding ingredients —
Stearic acid — Definition and test
methods**

*Ingrédients de mélange du caoutchouc — Acide stéarique —
Définition et méthodes d'essai*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This second edition cancels and replaces the first edition (ISO 8312:1999), of which it constitutes a minor revision with the following changes:

- atomic absorption spectrometric method is stated as the preferred method in the Scope;
- Normative references in [Clause 2](#) were updated and a Bibliography was added.

Rubber compounding ingredients — Stearic acid — Definition and test methods

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International 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 defines stearic acid (including blends of stearic and palmitic acid) for use as a compounding ingredient in the rubber industry and specifies the test methods for describing its properties.

Classification of stearic acid and stearic acid/palmitic acid blends according to iodine value and typical chemical and physical properties for such materials for use in the rubber industry are given in [Annex L](#). [Annex L](#) is given for information only.

In this International Standard, the atomic absorption spectrometric method is the preferred method.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 660, *Animal and vegetable fats and oils — Determination of acid value and acidity*

ISO 662, *Animal and vegetable fats and oils — Determination of moisture and volatile matter content*

ISO 935, *Animal and vegetable fats and oils — Determination of titre*

ISO 1042:1998, *Laboratory glassware — One-mark volumetric flasks*

ISO 3596, *Animal and vegetable fats and oils — Determination of unsaponifiable matter — Method using diethyl ether extraction*

ISO 3657, *Animal and vegetable fats and oils — Determination of saponification value*

ISO 3961, *Animal and vegetable fats and oils — Determination of iodine value*

ISO 4058, *Magnesium and its alloys — Determination of nickel — Photometric method using dimethylglyoxime*

ISO 5508, *Animal and vegetable fats and oils — Analysis by gas chromatography of methyl esters of fatty acids*

ISO 6685, *Chemical products for industrial use — General method for determination of iron content — 1,10-Phenanthroline spectrophotometric method*

ISO 7780:1998, *Rubbers and rubber latices — Determination of manganese content — Sodium periodate photometric methods*

ISO 8053, *Rubber and latex — Determination of copper content — Photometric method*

ISO 12966-2, *Animal and vegetable fats and oils — Gas chromatography of fatty acid methyl esters — Part 2: Preparation of methyl esters of fatty acids*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
stearic acid (for use in the rubber industry)
 mixture of straight-chain saturated fatty acids composed substantially of stearic acid in the form $C_{17}H_{35}COOH$ and palmitic acid in the form $C_{15}H_{31}COOH$

4 Sampling

Sampling shall be carried out in accordance with ISO 15528, using a stainless-steel sampling device.

5 Physical and chemical properties

The physical and chemical properties shall be determined by the methods of test listed in [Table 1](#).

Table 1 — List of physical and chemical properties of stearic acid and the methods used for their determination

Property	Test method
Acid value, mg KOH/g	ISO 660
Saponification value, mg KOH/g	ISO 3657
Titre value, °C	ISO 935
Fatty acids, C_{16} to C_{18} , including unsaturates, percentage (mass fraction)	ISO 5508 and ISO 12966-2
Total matter volatile at $105\text{ °C} \pm 3\text{ °C}$, percentage (mass fraction)	ISO 662, oven method
Ash at $550\text{ °C} \pm 25\text{ °C}$, percentage (mass fraction)	Annex A
Iodine value, g/100 g	ISO 3961
Mineral acidity, $\text{cm}^3/100\text{ g}$	Annex F
Copper, mg/kg	Annex B ^a or G
Manganese, mg/kg	Annex C ^a or H
Iron, mg/kg	Annex D ^a or I
Unsaponifiable matter, percentage (mass fraction)	ISO 3596
Nickel, mg/kg	Annex E ^a or K
Note Where an atomic absorption spectrometer is not available, the molecular absorption spectrometric methods given in Annexes G, H, J and K may be used.	
^a For speed and simplicity, the methods given in Annexes B, C, D and E are recommended.	

6 Test report

The test report shall include the following information:

- all details necessary for complete identification of the product tested;
- a reference to this International Standard, i.e. ISO 8312;

- c) the results obtained:
- percentage ash w_A , from [A.4](#);
 - copper content w_{Cu} , from [B.6](#) or from [Annex G](#) (state the method used);
 - manganese content w_{Mn} , from [C.6](#) or from [Annex H](#) (state the method used);
 - iron content w_{Fe} , from [D.6](#) or from [Annex J](#) (state the method used);
 - nickel content, w_{Ni} , from [E.6](#) or from [Annex K](#) (state the method used);
 - mineral acidity, N_{ma} , from [E.5](#);
 - the results of other tests which may have been performed (see [Table 1](#));
- d) any unusual features noted during the determinations;
- e) any operations not included in this International Standard, or in other International Standards cited, which might have affected the results;
- f) the dates of the tests.

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