International Standard

ISO 20299-2

Film for wrapping rubber bales —

Part 2: Natural rubber and modified natural rubber

Emballage des balles en caoutchouc —

Partie 2: Caoutchouc naturel et caoutchouc naturel modifié

Third edition
2024-12

Reference number
ISO 20299-2:2024(en)

© ISO 2024



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Material **2**
5 Physical properties **2**
5.1 Thickness 2
5.2 Density 2
5.3 Thermal properties 2
5.3.1 General 2
5.3.2 Vicat softening temperature 2
5.3.3 Differential scanning calorimeter — Peak melting temperature 2
5.3.4 Capillary tube — Melting temperature 2
6 Marking **2**
7 Test report **2**
Annex A (informative) **Result of a comparative study on melting point determination** **4**

© ISO 2024 – All rights reserved

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document 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*.

This third edition cancels and replaces the second edition (ISO 20299-2:2017), which has been technically revised.

The main changes are as follows:

— the title has been changed;

— the scope has been expanded to incorporate modified natural rubber bales, and the bale mass of 33,33 kg has been changed to 33,3 kg;

— the normative references have been updated;

— in Clause 5, replacement of “specific gravity” by “density”; addition of the method A of ISO 1183-1:2019 to determine the density; addition of the requirement for test specimens to determine the Vicat softening temperature; addition of method A of ISO 3146:2022 as an alternative procedure to the DSC method for the determination of melting point of the low-density polyethylene (LDPE) film;

— in Clause 6, deletion of paragraphs one and two;

— addition of Annex A.

A list of all parts in the ISO 20299 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© ISO 2024 – All rights reserved

Introduction

Block natural rubber is prepared by comminuting large lumps, washed with plenty of water. It is then dried, baled and packed. The bales are wrapped in clear polyethylene film and packed into metal or wooden crates.

Bale coating on natural rubber ribbed smoked sheet bundles is used to prevent stickiness between bales and fungus formation on the external sides, and also to allow for the stencilling of the grade mark and supplier code. The bale coating solution is a non-reinforcing filler which has no benefit in product manufacturing. Excess bale coating generates ash, which adversely affects the quality of end products and creates environmental issues.

Shifting to wrapping polyethylene film is an alternative option that is beneficial to all, as it is cost effective, environmentally friendly and pollution free. However, it is difficult and uneconomic to strip the film from each bale, and therefore an essential feature is that the film disperses into the rubber compound during mixing. This means that its melting point must be lower than the temperatures attained in internal mixing cycles, typically 120 °C to 160 °C.

Nowadays, modified natural rubbers, such as epoxidized natural rubber (ENR) and low-protein natural rubber (LPNR), are widely used due to their special properties. Therefore, it is important for the requirements of wrapping polyethylene film to cover the modified natural rubber bales.

© ISO 2024 – All rights reserved

Film for wrapping rubber bales —

Part 2:
Natural rubber and modified natural rubber

WARNING — Persons using this document should be familiar with normal laboratory practice. This document 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 determine the applicability of any other restrictions.

1 Scope

This document specifies the material and physical property requirements for non-strippable, low-density polyethylene (LDPE) film for the wrapping of:

— natural rubber bales comprised of block natural rubber of 33,3 kg or 35 kg;

— natural rubber ribbed smoked sheets, including bales of 33,3 kg, 35 kg, 50 kg and 111,11 kg;

— modified natural rubber (e.g. epoxidized natural rubber, low-protein natural rubber) bales of 33,3 kg or 35 kg;

— any other bale masses as mutually agreed between the parties, and intended to keep the bales separate during transportation and storage.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 306:2022, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

ISO 1183-1:2019, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 3146:2022, *Plastics — Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods*

ISO 11357-3, *Plastics — Differential scanning calorimetry (DSC) — Part 3: Determination of temperature and enthalpy of melting and crystallization*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

© ISO 2024 – All rights reserved