
Rubber products — Guidelines for storage

Produits à base d'élastomères — Lignes directrices pour le stockage

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ISO 2230:2002

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Printed in Switzerland

Contents

	Page
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification of rubber types according to their relative susceptibility to deterioration	2
5 Packaging	4
6 Storage	5
7 Inspection, testing and recording of data during storage	7
 Annex	
A Recommendations for inspection and testing of specific products	10
Bibliography.....	11

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 2230 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

This second edition cancels and replaces the first edition (ISO 2230:1973), which has been technically revised.

Annex A of this International Standard is for information only.

ISO 2230:2002
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Introduction

Many rubber products and components are stored for long periods before being put into service, and thus it is important they are stored in conditions that minimize unwanted changes in properties. Such changes may result from degradation, in which case they may include excessive hardening, softening, cracking, crazing and other surface effects. Other changes may be caused by deformation, contamination or mechanical damage.

In preparing this revision, the requirements of different users and the multiplicity of rubber types and products have been factors of major consideration. It is recognized that some rubbers are more susceptible than others to deterioration by such factors as heat, light, ozone, oxygen and humidity. Exposure to these factors should therefore be minimized in order to extend storage life, and to do so a system of storage control, proper packaging and periodic inspection becomes necessary.

A system of recording, for the proper maintenance of storage and inspection data, is included to assist in verifying that the provisions of this standard are maintained in association with common elements associated with product specifications and their verification through conducting of statistically significant methods of test. Further guidance can be found, to supplement the information contained in this standard, in ISO 9000, ISO 9001 and ISO 9004.

In this standard, only the causes of generation of deleterious influences such as ozone and radiation are mentioned as being prohibited. Methods for measuring concentrations or intensities of these are not within the scope of this standard.

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Recommendations are included in annex A for the inspection and testing of specific products.

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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

This International Standard gives guidelines for the inspection, recording procedures, packaging and storage of products, assemblies and components made from vulcanized or thermoplastic rubber prior to being put into circulation.

It is applicable to both solid and cellular rubber products prepared from dry raw rubber, latex or other sources. It is not intended for use with raw rubber in bale, liquid (solution or emulsion) or particulate form, storage guidance for which is given in ISO 7664.

The recommendations for packaging form an integral part of the controlled storage procedure, as well as providing means of identifying the material and product.

2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1629:1995, *Rubber and latices — Nomenclature*

ISO 4591:1992, *Plastics — Film and sheeting — Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)*

3 Terms and definitions

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

3.1

initial storage period

the maximum period, starting from the time of manufacture, for which a rubber product, appropriately packaged, may be stored under specified conditions before a sample needs to be inspected or re-tested

3.2

extension storage period

the period for which a rubber product, appropriately packaged, may be stored after the initial storage period, before further inspection and re-testing is necessary

3.3

storage life

the maximum period of time that a rubber product, appropriately packaged, may be stored, after which time it is regarded as unserviceable for the purposes for which it was originally manufactured

NOTE The storage life of a rubber product is influenced by its shape and size as well as its composition, with thick products usually undergoing slower change due to degradation than thinner ones.

3.4

assembly

any product or component containing more than one element, one or more of which is made of rubber

3.5

ageing

the irreversible change of material properties during exposure to an environment, for a period of time

4 Classification of rubber types according to their relative susceptibility to deterioration

4.1 General

Unless otherwise specified in the product specification, rubber products should be classified (for the purpose of storage) in terms of the relative susceptibility to deterioration of the rubber type used, as follows:

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Group A: rubbers with moderate susceptibility to deterioration by ageing, as listed in Table 1.

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The following additional rubbers are classified as group A:

- all new vulcanizable rubbers until their storage capabilities have been established;
- all thermoplastic rubbers until their storage capabilities have been established;
- any rubber that cannot be classified as group B or group C.

Group B: rubbers with low susceptibility to deterioration by ageing, as listed in Table 2.

Group C: rubbers which are highly resistant to deterioration by ageing, as listed in Table 3.

NOTE Attention is drawn to the following:

- resistance to deterioration can be influenced by compounding ingredients other than the type of base rubber;
- products can undergo changes during storage other than those caused by ageing of the rubber.

Table 1 — Group A rubbers

Abbreviation	Chemical name from ISO 1629	Common name
BR	Butadiene rubber	Polybutadiene
NR	Isoprene rubber, natural	Natural rubber
IR	Isoprene rubber, synthetic	Polyisoprene
SBR	Styrene-butadiene rubber	SBR
AU	Polyester urethane rubber	Polyurethane
EU	Polyether urethane rubber	Polyurethane

Table 2 — Group B rubbers

Abbreviation	Chemical name from ISO 1629	Common name
NBR	Acrylonitrile-butadiene rubber	Nitrile
NBR/PVC	Blend of acrylonitrile-butadiene rubber and poly(vinyl chloride)	Nitrile/PVC
XNBR	Carboxylic-acrylonitrile-butadiene rubber	Carboxylated rubber
HNBR	Hydrogenated NBR (with some unsaturation)	Hydrogenated nitrile
CO, ECO	Polychloromethyloxiran and copolymer	Epichlorohydrin
ACM	Copolymer of ethylacrylate (or other acrylates) and a small amount of a monomer which facilitates vulcanization	Acrylic
CR	Chloroprene rubber	Neoprene
IIR	Isobutene-isoprene rubber	Butyl
BIIR	Bromo-isobutene-isoprene rubber	Bromobutyl
CIIR	Chloro-isobutene-isoprene rubber	Chlorobutyl

Table 3 — Group C rubbers

Abbreviation	Chemical name from ISO 1629	Common name
CM	Chloropolyethylene	Chlorinated polyethylene
CSM	Chlorosulfonyl polyethylene	Chlorosulfonated polyethylene
EPM	Ethylene-propylene copolymer	EPM, EPR
EPDM	Terpolymer of ethylene, propylene and a diene with the residual unsaturated portion of the diene in the side chain	EPDM
FKM	Rubber having fluoro, perfluoroalkyl or perfluoroalkoxy substituent groups on the polymer chain	Fluorocarbon
Q	Silicone rubber	Silicone
FMQ	Silicone rubber having both methyl and fluorine substituent groups on the polymer chain	
PMQ	Silicone rubber having both methyl and phenyl substituent groups on the polymer chain	
PVMQ	Silicone rubber having methyl, phenyl and vinyl substituent groups on the polymer chain	
MQ	Silicone rubber having only methyl substituent groups on the polymer chain, such as dimethyl polysiloxane	
VMQ	Silicone rubber having both methyl and vinyl substituent groups on the polymer chain	

4.2 Blends and composites

A blend of two or more rubbers of different groups should be classified as the group of the rubber(s) forming more than 50 % of the blend. If two rubbers are in equal proportions, the blend belongs to the group having the higher susceptibility to deterioration. For a composite product containing components made out of different rubbers, classification should be as the group of the rubber considered most susceptible to deterioration.