PUBLISHED DOCUMENT

PD ISO/TR 24699:2009

Rubber and rubber products — Environmental aspects — General guidelines for their inclusion in standards

ICS 83.140.01

BSI British Standards

National foreword

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The UK participation in its preparation was entrusted to Technical Committee PRI/90, Rubber and rubber products - Environmental aspects.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2009.

ISBN 978 0 580 58669 9

Amendments/corrigenda issued since publication

Date	Comments

PD ISO/TR 24699:2009

TECHNICAL REPORT

ISO/TR 24699

First edition
2009-05-01

Rubber and rubber products — Environmental aspects — General guidelines for their inclusion in standards

Caoutchouc et produits à base de caoutchouc — Aspects liés à l'environnement — Lignes directrices générales pour leur prise en compte dans les normes

Reference number
ISO/TR 24699:2009(E)

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Published in Switzerland

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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.

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In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 24699 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

Rubber and rubber products — Environmental aspects — General guidelines for their inclusion in standards

1 Scope

This Technical Report provides guidelines for inclusion of environmental aspects in standards for rubber and rubber products. It proposes an approach which is directed at minimizing any adverse environmental impact of the products under consideration without detracting from the primary purpose of ensuring their adequate fitness for use. It closely follows the guidelines laid down in ISO 17422, with certain modifications to make it applicable to rubber and rubber products.

The guidance provided by this Technical Report is intended primarily for use by standards writers. Over and above its primary purpose, however, the Technical Report provides guidance of value to those involved in design work and other activities where the environmental aspects of rubber and rubber products are being considered. It promotes the use of renewable, recycled and recyclable materials when environmentally beneficial and includes guidance on compliance with legislation concerning the end-of-life treatment of rubber products and the management of restricted and prohibited substances.

NOTE This Technical Report is intended to promote the following practices:

a) the use of techniques for identifying and assessing the environmental impact of technical provisions in standards, and for minimizing their adverse effects;

b) the adoption of good practices such as:

   1) environmentally sound procedures for the harvesting and production of raw materials,

   2) procedures for minimizing environmental pollution during the life cycle of the product,

   3) material and energy conservation during the service life of the product,

   4) ensuring safety in the use of hazardous substances,

   5) the use of technically justifiable procedures,

   6) encouraging the use of performance criteria, rather than exclusion clauses such as are based, for example, only on chemical composition;

c) paying due regard during standards development to environmental impact, product function and performance, health and safety, and regulatory requirements pertaining to end-of-life product disposal and the use of restricted substances;

d) the regular review of existing standards in the light of technical innovations permitting improvement in the environmental impact of products;

e) the application of life cycle analytical approaches wherever applicable and technically justifiable;

f) the use of both recyclable and recycled materials in the construction of rubber products when environmentally beneficial and technically and economically justifiable;

g) the use of designs and constructions that facilitate the disassembly of rubber products for recycling at the end of their service life when environmentally beneficial and technically and economically justifiable;

h) the use of materials derived from renewable and sustainable resources in rubber and rubber products when environmentally beneficial and technically and economically justifiable.

2 Normative references

The following referenced documents are indispensable for the application 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 Guide 64, *Guide for addressing environmental issues in product standards*

ISO 1382, *Rubber — Vocabulary*

ISO 1629, *Rubber and latices — Nomenclature*

ISO 17422:2002, *Plastics — Environmental aspects — General guidelines for their inclusion in standards*

ISO 18064, *Thermoplastic elastomers — Nomenclature and abbreviated terms*

3 Terms and definitions

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

3.1
design
a creative activity that, based on expressed or implied needs, existing means and technological possibilities, results in the definition of technical solutions for a product that can be commercially manufactured or fabricated into prototypes

3.2
eco-profile
partial life cycle inventory analysis beginning at the raw-material extraction phase and ending at the point where the rubber or rubber product (see 3.8) is ready for transfer to the next operator in the supply chain (so-called cradle-to-gate analysis)

3.3
environmental aspect
element of an organization's activities or products or services that can interact with the environment

[ISO 14001:2004]

3.4
environmental impact
any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

[ISO 14001:2004]

3.5
environmental provision
normative element of a standard that specifies measures for minimizing adverse environmental impact of a test method, material or product

3.6
life cycle
consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to the final disposal

[ISO 14040:2006]

3.7
life cycle assessment
LCA
compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle

[ISO 14040:2006]

3.8
rubber or rubber product
any material or combination of materials, semi-finished product or finished product that is within the scope of ISO/TC 45

3.9
test method standard
standard that describes in detail the method of test to be employed to determine specific properties or performance characteristics of a material or product

3.10
product standard
standard that specifies requirements to be fulfilled by a product or group of products

3.11
renewable materials
materials that have been produced from a source, usually plant or animal biomass, that can be renewed by short- to medium-term regeneration

3.12
recycled materials
materials that have been recovered, or otherwise diverted, from the waste stream, either from the manufacturing process [i.e. post-industrial recycled materials, but not in-house scrap (see 3.13)] or after consumer use (i.e. post-consumer recycled materials), and are reused in the manufacture of new products

3.13
in-house scrap
materials commonly reused by industry within the original manufacturing process as normal practice

NOTE In-house scrap is not recycled material.

3.14
recyclable material
material for which an economically and technically feasible recycling method exists

NOTE Such methods include segregation from the waste stream and subsequent processing.

4 Inclusion of environmental aspects in standards

4.1 General

In the preparation of International Standards, close co-ordination within and among the subcommittees and working groups responsible for different rubbers, rubber products or processes is necessary in order to create a coherent approach to the incorporation of environmental provisions. Appropriate co-ordination will ensure that such activity on environmental provisions will neither retard nor inhibit the normal standards development process.

Any plan to prepare a new standard or to revise an existing standard with the inclusion of environmental provisions should define, as far as possible, both the purpose of the standard and its expected major users. This exercise will help to determine how the standard is likely to be used, for example for quality control or for conformity assessment, to identify the relevant environmental aspects and to assess the users' level of expertise, needs and expectations.

Standards should be drafted with a view to providing provisions which eliminate or reduce any identified environmental hazards, and, where possible, these provisions should be expressed in terms of verifiable preventive measures. Requirements for preventive measures should be expressed precisely, clearly and with technical accuracy, and requirements for verification should also be clearly stated.

Whenever appropriate, the standard should state what environmentally relevant information has to be provided to persons involved with the product or process.

Use should be made of terminology as defined in ISO 1382. This Technical Report additionally includes environmental terms.

4.2 Test method standards

4.2.1 General

International standards for the testing of rubber and rubber products should also provide scope for the application of ISO Guide 64 by drawing attention to the importance of product sustainability issues, such as resource conservation and pollution prevention.

Where such issues are already being addressed, this fact should be brought to the attention of the users of the standards by means of a statement within the text of the standard. Standards writers should take this into account whenever existing standards are being revised or new ones are being prepared.

To avoid unnecessary proliferation of tests, standards writers should consider combining, or selecting between, similar test methods that are used for measuring identical properties.

4.2.2 Minimization of adverse environmental impact

When test method standards are being written or revised, their associated environmental impact should be evaluated; test equipment and procedures should be reviewed to minimize adverse environmental impact. Such reviews should not in any way compromise the fitness for purpose of the test apparatus or procedure. Once a new test standard with reduced adverse environmental impact has been developed in replacement of an existing procedure, it should be validated and, thereafter, the existing test standard withdrawn.

The following considerations apply:

a) Any substance, specified in a standard, that becomes the subject of well-founded environmental concern should include the relevant clauses taken from the appropriate Material Safety Data Sheet (MSDS). Whenever possible, such a substance should be replaced by a substance with less adverse environmental impact. Even when this is done, an effort should continue to be made to reduce not only the environmental but also the health impact of the substance which has replaced the previous one.

b) Some test method standards may of necessity call for the use of substances that could represent an environmental hazard. In such cases, the standard should include introductory warning statements such as those given in Annex A, Subclause A.2.2.

   This should be followed, at the appropriate place in the standard, by a specific warning statement such as that given in Annex A, Subclause A.2.3.

c) The substance should be identified as being suitable for the intended use by the supplier, and the environmental and safety provisions for the appropriate exposure scenario should also be described.

4.2.3 Minimization of the use of materials and energy

The use of materials and energy is affected by many factors, such as the scale of the test, the specimen size and the number of specimens, the required levels of reproducibility and repeatability, and the power specifications of the test equipment.

Test method standards should be designed with a view to minimizing the use of materials and energy without compromising the quality of the test result obtained through use of the standard.

Where appropriate, guidance should be given to the user of the standard on how to minimize the use of materials and energy.

4.3 Product standards

4.3.1 General

Writers of rubber and rubber product standards should incorporate a general statement highlighting the fact that this Technical Report and ISO Guide 64 have been taken into account in the preparation of the standard. In addition, this Technical Report and ISO Guide 64 should be cited systematically as normative or informative references within future rubber and rubber product standards for the benefit of the users of such standards.

4.3.2 Product functionality

Designing a product made of, or incorporating, rubber materials should avoid over-simplification of material-selection criteria. A balance should be maintained between the overriding functional requirements of the product and the potential adverse environmental impacts that are to be determined in the context of the product/application system.

4.3.3 Environmental aspects in product standards

Optimization of an environmental approach in the development of rubber and rubber product standards will usually involve the following stages:

a) Pre-selection of those materials ensuring appropriate technical and environmental performance as well as regulatory compliance throughout the intended service life. Consideration should be given at this stage to the use of materials derived from renewable and sustainable resources in light of their environmental and technical performance. The standard should include a statement such as that given in Annex A, Subclause A.3.2.

b) Short-listing of materials that eliminate or minimize known adverse environmental impacts throughout the product life cycle.

c) Minimization of the quantities of materials used per unit product.

d) Ease of maintenance and cleaning, where appropriate.

The environmental characteristics of the most appropriate materials to use in a specific application can be determined only by taking the complete life cycle into consideration. The scope and limitations of life cycle assessments, the subject of the ISO 14040 series of standards, within the context of the present Technical Report are discussed in ISO 17422:2002, Annex A, which is generally applicable to rubber products as well as plastics products.

NOTE The precision of measurement of material properties and characteristics may not always be absolute or correlate to actual end-use performance requirements. Because of this, some degree of subjective assessment may be required in comparing life cycle assessments of alternative designs or materials.

4.3.4 Writers of standards

Writers of International Standards for rubber or rubber products should consider the potential environmental needs of the users of these standards, as described in Annex B.

Annex A
(normative)

Suggested wording of environmental statements for inclusion in standards

A.1 General

The purpose of these suggested statements is to draw to the attention of the writers and users of standards the need to consider the negative impact that the test methods or products may have on the environment and the need to reduce this impact as far as possible whilst still maintaining conformity with the technical requirements of the standard.

A.2 Suggested statements for test method standards

A.2.1 General

The statements given in A.2.2 and A.2.3 should be included, where appropriate, in test method standards.

A.2.2 Introductory warning statements

These statements should be inserted between the title and the scope clause of the standard.

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.

IMPORTANT — Certain procedures specified in this International Standard may involve the use or generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

A.2.3 Specific warning statement

WARNING — Attention is drawn to the potential local environmental hazard deriving from the use of [name of substance].

If a warning of this kind is used, it should be placed in the main body of the text (for instance after the relevant item in the reagents clause).

A.3 Suggested statements for product standards

A.3.1 General

The statements given in A.3.2 and A.3.3 should be included, where appropriate, at a suitable place in the text of product standards.

A.3.2 Material selection

“Wherever environmentally beneficial and technically feasible, the products covered by this International Standard should use in their fabrication materials that are capable of being recycled or that are derived from renewable and sustainable resources. In addition, wherever environmentally beneficial and technically feasible, the products covered by this International Standard should use in their fabrication materials that contain post-consumer or post-industrial recycled materials. A product made of more than one material should utilize materials that are compatible in order for the entire product to be recyclable at the end of its service life.”

A.3.3 Absence of harmful substances

“The materials used to produce this product cause no harmful environmental impact during the manufacture, service life and disposal of the product, provided proper handling procedures are respected.”

Annex B
(normative)

Potential environmental needs of standards users

B.1 Writers of standards

Writers of International Standards for rubber and rubber products should consider the potential environmental needs of the users of these standards, including current and proposed legal requirements, in the major user markets, which cover the disposal of the product at the end of its service life and the use of substances in the product that may harm the environment either during, or at the end of, its service life. An example is legislation which encourages recycling as a preferred disposal route, even though a life cycle assessment may indicate that another disposal route has less overall environmental impact. There is a strong tendency for legislation introduced initially in one of the major user markets, such as the European Union, the USA or Japan, eventually to become adopted in one form or another by the countries and geopolitical blocs of other major markets. Due consideration should be given to the needs of standards writers and specifiers developing environmental provisions for products incorporating or made from rubber materials even though such products may lie within the scope of other ISO or IEC Technical Committees or come under the responsibility of national or industrial committees or organizations.

B.2 Marking of rubber products and notification of harmful substances

As mentioned in Clause B.1, recycling may be a preferred, or the legally required, route for the disposal of a rubber product at the end of its service life. For this reason, products could be marked in accordance with the requirements of such legislation using the nomenclature in ISO 1629 for thermoset rubbers and ISO 18064 for thermoplastic elastomers.

Product end-of-life legislation may also restrict or prohibit the inclusion of certain environmentally harmful substances in the products to prevent their release into the environment during service or during disposal at the end of their service life. Methods of notification of the presence or absence of such substances in products have been developed to enable the manufacturers of the products to demonstrate compliance with the requirements. For example, automotive manufacturers use the International Material Data System (IMDS) to monitor the presence of designated harmful substances in every component that is used to construct the vehicles. The data collected is used to demonstrate compliance with the legislation. It could be that similar auditing methods will be used to demonstrate compliance with other end-of-life product legislation worldwide. Where such legislation is widely applicable to a product, the statement given in Annex A, Subclause A.3.3, concerning the absence of harmful substances should be included in the standard.

Bibliography

[1] ISO 14001:2004, *Environmental management systems — Requirements with guidance for use*

[2] ISO 14040:2006, *Environmental management — Life cycle assessment — Principles and framework*

[3] CEN Workshop Agreement CWA 14243, *Post-consumer tyre materials and applications*

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