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Rubber — Vocabulary

Caoutchouc — Vocabulaire

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Contents

Foreword

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

This eighth edition cancels and replaces the seventh edition (ISO 1382:2020), which has been technically revised.

The main changes are as follows:

— ~~—~~addition of new terms (Clause 3~~(Clause 3);~~);

— ~~—~~inclusion of symbols and abbreviated terms, which are commonly used in the rubber industry;

— ~~—~~addition of an alphabetical index.

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.

Introduction

This document is intended to be helpful to persons who are unfamiliar with the terminology of the rubber industry. However, it is also intended for use as a guide by the rubber industry itself in selecting appropriate terms in order to minimize possible confusion and for use in other International Standards, as well as reports and publications on rubber.

Many rubber product areas have also produced International Standards on vocabulary specific to their products and processes, and a list of some of these vocabulary standards is given in the Bibliography.

Attention is also drawn to ISO 472 and ISO 18064 because these contain many terms of common interest to the rubber and plastics industries.

For convenience, the standards and other relevant sources referred to in this document are listed in the first section of the Bibliography. Vocabularies relating to finished rubber products are listed in the second section of the Bibliography.

Rubber — Vocabulary

1 Scope

This document establishes a vocabulary of, and is limited to, terms in general use throughout the rubber industry.

It does not define terms intended for particular rubber products.

NOTE~~:~~ 1 Refer to the Bibliography for a list of example vocabulary standards intended for particular rubber products.

It does not define terms that are generally understood or adequately defined in other readily available sources, such as general dictionaries.

NOTE 2 The terms are listed in the alphabetical order of the English terms, with an index to the corresponding English terms attached.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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/

3.1 ~~3.1~~
abrasion
loss of material from a surface due to frictional forces

3.2 ~~3.2~~
abrasion resistance
resistance to wear resulting from mechanical action upon a surface

Note 1 to entry: Abrasion resistance is often expressed by the *abrasion resistance index* (3.3~~(3.3)~~).

3.3 ~~3.3~~
abrasion resistance index
ratio of the loss in volume of a standard rubber due to frictional forces to the loss in volume of a test rubber measured under the same specified conditions and expressed as a percentage

Note 1 to entry: ISO 4649 contains a method for the determination of *abrasion resistance* (3.2~~(3.2)~~) using a rotating drum device.

3.4 ~~3.4~~
accelerated ageing
change in physical and mechanical properties in a test environment intended to produce the effect of slow natural changes at an ambient temperature in a shorter period of time

Note 1 to entry: The rate of degradation is usually increased by raising the temperature, sometimes in combination with either increased air or oxygen pressure, increased humidity or changes in other conditions.

3.5 ~~3.5~~
accelerator
compounding ingredient (3.109~~(3.109)~~) used in small amounts with a *vulcanizing agent* (3.555~~(3.555)~~) to either increase the speed of *vulcanization* (3.554~~(3.554)~~) or enhance the physical and mechanical properties of the *vulcanizate* (3.553~~(3.553),~~), or both

3.6 ~~3.6~~
acrylonitrile-butadiene rubber
nitrile rubber
NBR
oil-resistant rubber made by the *copolymerization* (3.118~~(3.118)~~) of acrylonitrile and butadiene

Note 1 to entry: Oil resistance increases with the level of acrylonitrile, which in commercial nitrile rubber grades varies from 18 % to 49 %.

3.7 ~~3.7~~
activator
compounding ingredient (3.109~~(3.109)~~) used in small proportions to increase the effectiveness of an *accelerator* (3.5~~(3.5)~~)

3.8 ~~3.8~~
active zinc oxide
fine-particle form of zinc oxide chemical *activator* (3.7~~(3.7)~~) for accelerated sulfur *vulcanization* (3.554~~(3.554)~~)

Note 1 to entry: Active zinc oxide is more effective than general-purpose zinc oxide at the low concentrations needed for the production of transparent or translucent *vulcanizates* (3.553~~(3.553)~~) or the production of vulcanizates containing reduced levels of zinc.

3.9 ~~3.9~~
addition polymerization
monomers (3.308~~(3.308)~~) are linked together to form chains, without water or other simple molecules being split off

Note 1 to entry: See also *polyaddition* (3.369~~(3.369).~~).

Note 2 to entry: There are two major types of addition polymerization process, polymerization of unsaturated compounds, such as olefins and dienes, and *polymerization* (3.378~~(3.378)~~) of certain ring *structures* (3.503~~(3.503),~~), such as lactams and alkylene oxides, by an opening of the ring to make large molecules.

3.10 ~~3.10~~
additive
substance that is added into rubber *compounds* (3.108~~(3.108)~~) to improve mixing or to modify properties of cured rubber

3.11 ~~3.11~~
adhesion
state in which two surfaces are held together by chemical or physical forces or both

3.12 ~~3.12~~
adhesion failure
phenomenon in which the interface between two bonded layers separates

Note 1 to entry: Various types of separation between rubber and rubber, rubber and metal, and rubber and fabric have been described in adhesion tests in ISO 813, ISO 814 and ~~FDIS~~ISO 2411~~:2024~~.

3.13 ~~3.13~~
adhesion promoter
compounding ingredient (3.109~~(3.109)~~) added to *unvulcanized rubber* (3.544~~(3.544)~~) to improve bonding of rubber to another material in the *compound* (3.108~~(3.108)~~)

Note 1 to entry: See also *bonding agent* (3.64~~(3.64).~~).

3.14 ~~3.14~~
adhesion strength
force required to cause separation at the interface of the bonded components of a *test piece* (3.527~~(3.527)~~) or product

3.15 ~~3.15~~
aftercure
continuation of process of *vulcanization* (3.554~~(3.554)~~) subsequent to removal of the energy source

3.16 ~~3.16~~
ageing
<the effect of, or act of> exposure to an environment for a period of time and the irreversible change of material properties during that time

3.17 ~~3.17~~
agglomerate
<carbon black and other dry filler particles> group of *particles* (3.348~~(3.348)~~) aggregates that are separated by normal rubber processing

3.18 ~~3.18~~
agglomeration
<rubber latex> reversible or irreversible joining together of *latex* (3.276~~(3.276))~~*particles* (3.348~~(3.348)~~)

3.19 ~~3.19~~
aggregate
<carbon black and other dry filler particles> rigid group of coalesced *particles* (3.348~~(3.348)~~) which is the smallest entity that can be dispersed by normal rubber processing

3.20 ~~3.20~~
air checks
laking
surface markings or depressions that occur on a moulding due to air trapped between the rubber and the mould surface

3.21 ~~3.21~~
air oven ageing
exposure in an enclosure to circulating air at elevated temperature, at atmospheric pressure and in the absence of light

3.22 ~~3.22~~
anisotropic
exhibiting different physical properties in different directions

[SOURCE: ISO 24817:2017, 3.1]

3.23 ~~3.23~~
anti-blocking agent
material used to prevent, or reduce the risk of, unwanted adherence between rubber surfaces

3.24 ~~3.24~~
anticoagulant
<natural rubber latex> substance added to field, or other, *latex* (3.276~~(3.276)~~) to retard bacterial action and acidification which would otherwise cause rapid *coagulation* (3.96~~(3.96)~~) of the latex

3.25 ~~3.25~~
antidegradant
compounding ingredient (3.109~~(3.109)~~) used to retard deterioration during ageing

Note 1 to entry: Antidegradant is a generic term for certain *additives* (3.10~~(3.10)~~) such as antioxidants, antiozonants, waxes and other protective materials.

3.26 ~~3.26~~
anti-flex-cracking agent
compounding ingredient (3.109~~(3.109)~~) used to retard cracking caused by cyclic deformation

3.27 ~~3.27~~
anti-foaming agent
<rubber latex> *compounding ingredient* (3.109~~(3.109)~~) used to prevent the formation of air bubbles in a *latex* (3.276~~(3.276))~~*mix* (3.305~~(3.305)~~) which can otherwise cause *blisters* (3.55~~(3.55)~~) or *pinholes* (3.365~~(3.365)~~) in the finished product

3.28 ~~3.28~~
antioxidant
compounding ingredient (3.109~~(3.109)~~) used to retard deterioration caused by oxidation

3.29 ~~3.29~~
antiozonant
compounding ingredient (3.109~~(3.109)~~) used to retard deterioration caused by ozone

3.30 ~~3.30~~
antistatic agent
material which counteracts the tendency for an electrical charge to build up on the surface of a product

3.31 ~~3.31~~
anti-webbing agent
<rubber latex> *compounding ingredient* (3.109~~(3.109)~~) used in a *latex* (3.276~~(3.276))~~*mix* (3.305~~(3.305)~~) to prevent the formation of *webbing* (3.560~~(3.560)~~) between adjacent parts of a dipped product

Note 1 to entry: See also *webbing* (3.560~~(3.560).~~).

3.32 ~~3.32~~
apparent hardness
stiffness measured on a *test piece* (3.527~~(3.527)~~) of non-standard dimensions or on a curved surface

3.33 ~~3.33~~
applied skin
<cellular material> thin surface layer of *elastomeric* (3.175~~(3.175)~~) material applied to a cellular product

3.34 ~~3.34~~
aromatic oil
hydrocarbon *process oil* (3.397~~(3.397)~~) usually containing at least 35 % by mass of aromatic hydrocarbons

3.35 ~~3.35~~
artificial weathering
exposure of material to laboratory conditions that accelerate the effect of natural climate-induced effects

3.36 ~~3.36~~
ash
residue from incineration of a material under specified conditions

3.37 ~~3.37~~
asphalt rubber
blend of polymeric cement, and any combination of *recycled rubber* (3.408~~(3.408),~~), *raw rubber* (3.402~~(3.402),~~), rubber *compound* (3.108~~(3.108)~~) and certain *additives* (3.10~~(3.10)~~) in which the rubber component is at least 5 % of the total blend and has reacted in the hot cement sufficiently to cause *swelling* (3.511~~(3.511)~~) of the rubber *particles* (3.348~~(3.348)~~)

Note 1 to entry: The term is widely used in the asphalt road surfacing industry, but the product is not an *elastomer* (3.173~~(3.173).~~).

3.38 ~~3.38~~
autoclave
pressurized vessel used for vulcanizing rubber in a vapour or gas

3.39 ~~3.39~~
average particle diameter
<carbon black and other particulate filler> arithmetic mean of the diameters of several individual *particles* (3.348~~(3.348)~~) measured by an electron microscope

3.40 ~~3.40~~
back-rind
retracted spew
defect in which the rubber adjacent to the *flash line* (3.211~~(3.211)~~) shrinks below the level of the moulded product

3.41 ~~3.41~~
bagging
tendency of a band of rubber on a mixing *mill* (3.302~~(3.302)~~) to sag and rotate beneath the mill *roll* (3.423~~(3.423)~~) due to lack of grip to the roll

3.42 ~~3.42~~
balata
tough flexible thermoplastic substance containing approximately equal proportions of *trans*-polyisoprene and *resin* (3.417~~(3.417),~~), obtained from the sap of various trees of the *Sapotaceae* family, especially *Mimusops globosa*

3.43 ~~3.43~~
bale coating
film applied to surfaces of *natural rubber* (3.326(~~3.326~~)) bales which inhibits adhesion to other surfaces and facilitates marking

3.44 ~~3.44~~
ball mill
rotating drum, usually mounted horizontally, containing hard, loose balls which serve to pulverize coarse material

3.45 ~~3.45~~
bank
accumulation of material at the opening between the *rolls* (3.423(~~3.423~~)) of a *mill* (3.302(~~3.302~~)) or *calender* (3.76(~~3.76~~)) or at a *spreaderbar* (3.479~~*spreader bar* (3.479~~)) or knife

3.46 ~~3.46~~
bareness
defect resulting from the failure of the rubber to fill out all the pattern detail of a mould

3.47 ~~3.47~~
batch
<compounding> product of one mixing operation

3.48 ~~3.48~~
bay region hydrogen
hydrogen in a characteristic three-sided concave area of a non-linear polyaromatic hydrocarbon with three or more fused rings

Note 1 to entry: For more information, see ISO 21461.

3.49 ~~3.49~~
bench mark
reference mark
mark of known separation applied to a *test piece* (3.527(~~3.527~~)) and used to measure *strain* (3.496(~~3.496~~))

3.50 ~~3.50~~
biobased content
amount of biologically-derived component(s) in a product expressed by carbon percentage to total carbon or mass percentage to total product mass

3.51 ~~3.51~~
biomass
material of biological origin excluding material either embedded in geological formations or fossilized, or both

3.52 ~~3.52~~
black scorch
severe stiffening of a rubber *compound* (3.108(~~3.108~~)) during processing, due to interactions between the polymer and carbon black

Note 1 to entry: The effect is similar to that of *scorch* (3.439(~~3.439~~)) and can be a particular problem in *extrusion* (3.195(~~3.195~~)) processes. The effect is most common in EPDM compounds.

3.53 ~~3.53~~
blank
piece of rubber *compound* (3.108~~(3.108)~~) of suitable shape and volume to fill the mould

3.54 ~~3.54~~
bleeding
exudation of a liquid *compounding ingredient* (3.109~~(3.109)~~) or material to the surface of a rubber

Note 1 to entry: See also *blooming* (3.61~~(3.61).~~).

Note 2 to entry: The term is also used for the migration of liquid and solid *colourants* (3.103~~(3.103).~~).

3.55 ~~3.55~~
blister
defect in a *rubber product* (3.434~~(3.434)~~) evidenced by a *crater* (3.123~~(3.123)~~) or sac that deforms the surface

3.56 ~~3.56~~
block
portion of a polymer molecule, comprising many constitutional units, that has at least one constitutional or configurational feature not present in adjacent portions

Note 1 to entry: The term is sometimes proceeded by the word “soft” for an *elastomeric* (3.173~~(3.173)~~) phase and by the word “hard” for a glassy or crystalline phase.

[SOURCE: *Compendium of Polymer Terminology and Nomenclature*~~,~~: *IUPAC Recommendations 2008*~~]~~.]

3.57 ~~3.57~~
block copolymer
polymer containing sections of more than one constitutional *monomer* (3.308~~(3.308)~~) type

3.58 ~~3.58~~
block polymer
polymer whose disparate *monomers* (3.308~~(3.308)~~) in sequence are connected linearly

[SOURCE: *Compendium of Polymer Terminology and Nomenclature*~~,~~: *IUPAC Recommendations 2008*~~]~~.]

3.59 ~~3.59~~
blocking
unintentional adherence between materials

3.60 ~~3.60~~
bloom
liquid or solid material which has migrated to the surface of a rubber

Note 1 to entry: Bloom changes the surface appearance of the rubber.

3.61 ~~3.61~~
blooming
migration of liquid or solid material to the surface of a rubber

Note 1 to entry: See also *bleeding* (3.54~~(3.54).~~).

3.62 ~~3.62~~
blowing agent
compounding ingredient (3.109~~(3.109)~~) used to produce gas by either chemical or thermal action, or both, in the manufacture of hollow or cellular products

3.63 ~~3.63~~
blowing down
<rubber latex> removal of excess ammonia from *latex* (3.276(~~3.276~~)) by stirring the latex while passing a stream of air across the surface

3.64 ~~3.64~~
bonding agent
substance, usually in liquid form, coated onto another material and used to produce a good bond between the material and rubber

Note 1 to entry: See also *chemical bonding* (3.87(~~3.87~~)) and *adhesion promoter* (3.13(~~3.13~~).).

3.65 ~~3.65~~
bound monomer
individual molecule that is combined or reacted with itself or other types of molecules in a *polymerization* (3.378(~~3.378~~)) reaction to form a polymer

Note 1 to entry: This term is used with reference to *synthetic rubber* (3.512(~~3.512~~),), and the bound monomer is usually expressed as a percentage of the total polymer.

3.66 ~~3.66~~
bound rubber
portion of the *elastomer* (3.175(~~3.175~~)) in a *mix* (3.305(~~3.305~~)) which is so closely associated with the *filler* (3.202(~~3.202~~)) as to be unextractable by the usual rubber solvents

3.67 ~~3.67~~
bowl
two or more cylinders forming the rotating members of a *calender* (3.76(~~3.76~~))

3.68 ~~3.68~~
branched polymer
molecules connected together having a branched *structure* (3.503(~~3.503~~),), chainlike between branch junctions and between each chain end and a branch junction

3.69 ~~3.69~~
bridge
two-spoked member supporting the centre of the head of an *extruder* (3.193(~~3.193~~))

Note 1 to entry: See also *spider* (3.475(~~3.475~~).).

3.70 ~~3.70~~
brittleness temperature
lowest temperature below which all of a *set* (3.448(~~3.448~~)) of *test pieces* (3.527(~~3.527~~)) fracture due to low-temperature embrittlement when tested under specified conditions

Note 1 to entry: ISO 812 contains a method for the determination of brittleness temperature.

3.71 ~~3.71~~
buffing
<recycling> particulate *vulcanized rubber* (3.553(~~3.553~~)) obtained from abrading rubber articles, especially during tyre retreading operations