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Rubber and plastics hoses and hose assemblies — Vocabulary

Tuyaux et flexibles en caoutchouc et en plastiques — Vocabulaire

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Contents

Page

Foreword

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This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 218, *Rubber and plastics hoses and hose assemblies,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 8330:2014), which has been technically revised.

The main changes are as follows:

— the structure of the document is now divided into subclauses as follows:

  — General 3.1;

  — Hose types 3.2;

  — Hose parts and components other than the reinforcement and end 3.3;

  — Hose reinforcement parts and components 3.4;

  — Hose end types 3.5;

  — Hose assembly terms 3.6;

  — Sizes and geometrical properties of hoses and hose assemblies 3.7;

  — Mechanical properties 3.8;

  — Hose production methods and tools 3.10;

  — Hose tests and operation conditions 3.11;

- Hose and hose assembly deformations and defects 3.12;

— the numbering and order of the terms has been revised;

— alphabetical index has been added;

— the following terms have been added:

- barb;
- burst;
- cure (with vulcanization);
- helix wire;
- identification yarn;
- OS&D hose;
- rigid mandrel;
- semi-rigid hose;
- socketshell (to ferrule);
- spiralled wire cord;
- tracer yarn;

— the following terms have been removed:

- body wire;
- brand;
- design pressure;
- dogleg;
- helical cord;
- lay;
- mandrel-made hose;
- nominal bore;
- OSD hose;
- protected hose;
- quick-acting connection;
- rated system pressure;
- tolerance;
- warp;
- weft;
- coupling adapter;

- shell clamp and split clamp;

— the definitions to the following terms have been amended:

- carcass;
- compound;
- embedded helix;
- end reinforcement;
- female;
- flexural stiffness;
- helix;
- hose deformation;
- hybrid hose;
- hydraulic hose;
- hydrostatic stability test;
- knitted hose;
- male;
- mandrel-built hose;
- marker yarn;
- marking;
- moulded hose;
- plain end;
- quick connection;
- reusable hose fitting;
- sleeve;
- straight end;
- twin hose;
- vacuum test;
- vulcanization;
- wire.

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.

Rubber and plastics hoses and hose assemblies — Vocabulary

1 Scope

This document defines terms used in the hose industry.

Recommended terminology for electrical conductivity and resistance of rubber and plastics hoses and hose assemblies can be found in ISO 8031:2020, Annex A.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 General

3.1.1
hose
flexible tube consisting of a *lining* (3.3.2), *reinforcement* (3.4.1) and, usually, a *cover* (3.3.6)

3.1.2
hose assembly
hose (3.1.1) with a *hose fitting* (3.6.4.1) attached to one or both ends

3.1.3
hydraulic hose
hose (3.1.1) with a *braid* (3.4.10) or spiral *reinforcement* (3.4.1) designed for systems which transfer power via fluid under pressure

3.1.4
tubing
flexible polymeric tube without *reinforcement* (3.4.1)

3.1.5
operating conditions
pressure, temperature, motion and environment (including the conveyed fluid) to which a hose (assembly) may be subjected

3.1.6
compound
DEPRECATED: rubber
intimate mixture of a rubber or rubbers or other polymer-forming materials with all the ingredients necessary that are combined to give the desired properties when used in the manufacture of a hose

[SOURCE: ISO 1382:2020, 3.105, modified — "for the finished product" is replaced by "that are combined to give the desired properties when used in the manufacture of a hose".]

3.2 Hose types

3.2.1 Hose types based on shape and properties

3.2.1.1
hardwall hose
hose (3.1.1) with a built-in wall *reinforcement* (3.4.1) or with a solid elastomer wall of sufficient thickness to prevent the hose to flatten during *bending* (3.7.2.1) or coiling when empty

3.2.1.2
softwall hose
hose (3.1.1) without a supporting helix of rigid or semi-rigid material

3.2.1.3
rough bore hose
hose (3.1.1) in which a reinforcing *helical wire* (3.4.2.5), or its shape, is exposed in the *bore* (3.3.1)

3.2.1.4
smooth-bore hose
hose (3.1.1) in which no reinforcing wire helix or its shape is exposed on the inner surface of the *lining* (3.3.2)

3.2.1.5
oil suction and discharge hose
OS&D hose
hose used for oil suction and discharge in many types of operation

3.2.1.6
layflat hose
collapsible hose
softwall hose (3.2.1.2) which, when unpressurized internally, collapses to such an extent that the inner faces of the *bore* (3.3.1) make contact and the hose cross-section appears flat

3.2.1.7
convoluted hose
hose (3.1.1) fluted helically (externally and/or internally)

3.2.1.8
externally convoluted hose
hose (3.1.1) containing a reinforcing *helix* (3.4.2) in which the outer cover has been formed into corrugations between the turns of the helix

Note 1 to entry: Such hoses may be *rough bore* (3.2.1.3), semi-embedded bore or *smooth bore* (3.2.1.4).

3.2.1.9
corrugated hose
hose (3.1.1) with a *cover* (3.3.6) fluted circumferentially with bellows-like corrugations (externally and/or internally)

Note 1 to entry: Hoses are in production today with internal circumferential corrugations.

3.2.1.10
spiralled hose
hose (3.1.1) reinforced with strands wound helically in layers, with adjacent layers in opposing directions

3.2.1.11
pre-shaped hose
pre-formed hose
hose vulcanized or formed into a particular shape

3.2.1.12
semi-rigid hose
hose that maintains its round cross-section even when unpressurized

3.2.2 Hose types based on reinforcement and other components

3.2.2.1
wire-reinforced hose
hose (3.1.1) in which the primary *reinforcement* (3.4.1) is wire

3.2.2.2
helix-reinforced hose
hose (3.1.1) in which reinforcing *helical wire(s)* or *plastic* (3.4.2.5) are incorporated

3.2.2.3
armoured hose
hose (3.1.1) with a protective covering, generally applied as a *braid* (3.4.10) or *helix* (3.4.2), to minimize physical damage

3.2.2.4
woven hose
hose (3.1.1) in which *reinforcement* (3.4.1) has been applied by circular weaving

3.2.2.5
round-woven hose
hose (3.1.1) with a round-woven *reinforcement* (3.4.1)

EXAMPLE Fire-fighting hose, rig supply hose.

3.2.2.6
wrapped-ply hose
hose (3.1.1) in which a *reinforcement* (3.4.1) of *woven fabric* (3.4.4.1) is wrapped in layers

3.2.2.7
braided hose
hose (3.1.1) in which the reinforcement has been applied as interwoven spiral strands

3.2.2.8
knitted hose
hose (3.1.1) with *knitted ply* (3.4.13)

3.2.3 Hose types based on production method

3.2.3.1
moulded hose
hose (3.1.1) vulcanized in a rigid mould or inside a plastic sheath that is subsequently removed

3.2.3.2
machine-made hose
hose (3.1.1) not made by hand on a mandrel

Note 1 to entry: Particularly, *wrapped-ply hose* (3.2.2.6).

3.2.3.3
mandrel-built hose
hose (3.1.1) fabricated on a *mandrel* (3.10.1)

3.2.3.4
twin hose
two hoses linked in parallel to each other during manufacture

3.2.3.5
composite hose
multilayer hose
hose (3.1.1) consisting of layers of non-vulcanized materials in sheeting form held together by two metal or plastics spirals

3.2.3.6
hand-built hose
hose (3.1.1) made by hand on a *mandrel* (3.10.1), reinforced by textile or wire, or combination of both, and a *cover* (3.3.6)

3.2.4 Hose types based on material

3.2.4.1
rubber hose
hose (3.1.1) consisting of a *lining* (3.3.2) made of vulcanized rubber with a *reinforcement* (3.4.1), generally textile or metal wire, and usually a *cover* (3.3.6) made of vulcanized rubber

3.2.4.2
plastics hose
hose (3.1.1) consisting of a *lining* (3.3.2) made of plastics material with a *reinforcement* (3.4.1) of textile material or metal wire and a *cover* (3.3.6) of plastics material

3.2.4.3
thermoplastics hose
hose (3.1.1) consisting of a *lining* (3.3.2) made of thermoplastic material with *reinforcement* (3.4.1) of a textile material or metal wire and a *cover* (3.3.6) made of thermoplastic material

3.2.4.4
hybrid hose
hose consisting of a rubber *lining* (3.3.2) and thermoplastic *cover* (3.3.6) or thermoplastic lining and rubber cover

3.3 Hose parts and components other than the reinforcement and end

3.3.1
bore
inside of a hose through which the material to be conveyed passes

3.3.2
lining
innermost continuous all-rubber or plastics element of a hose

3.3.3
hose wall
material between the internal and external surfaces of a *hose* (3.1.1)

3.3.4
veneer
thin innermost layer forming an integral part of the hose *lining* (3.3.2), applied for some special purpose

3.3.5
breaker ply
open mesh *fabric* (3.4.4) used to enhance the bond between a hose *lining* (3.3.2) or *cover* (3.3.6) and its *carcass* (3.4.15) and to spread impact

Note 1 to entry: This element can also add *reinforcement* (3.4.1) to these components.

3.3.6
cover
outer layer covering the *reinforcement* (3.4.1)

3.3.7
rubber tubing
flexible tube made of vulcanized rubber without a *reinforcement* (3.4.1)

3.3.8
jacket
seamless tubular braided or woven ply generally on the outside of a hose

3.3.9
marking
mark or symbol identifying the *hose* (3.1.1) in accordance with the relevant International Standard

Note 1 to entry: In the relevant International Standard, a colour code may be included at the option of the manufacturer.

Note 2 to entry: The mark or symbol is embossed, inlaid or printed on the hose, *coupling* (3.6.4.1) or *hose assembly* (3.1.2).

3.3.10
barrier
thin layer of film (polymeric) within the construction of the hose for preventing fluid or gas from diffusing through the *hose wall* (3.3.3) to the atmosphere

3.3.11
armouring
protective covering over a hose, generally applied as a *braid* (3.4.10) or *helix* (3.4.2) to prevent mechanical damage or to support the *reinforcement* (3.4.1) of a hose section

3.4 Hose reinforcement parts and components

3.4.1
reinforcement
non-rubber strengthening member of a hose

Note 1 to entry: See *carcass* (3.4.15).

3.4.2
helix
shape formed by spiralling a wire or other material around or within the body of the hose

3.4.2.1
embedded helix
helical wire (3.4.2.5) entirely enclosed by the *hose wall* (3.3.3)

3.4.2.2
embedding layer
layer of rubber in which is embedded a reinforcing *helix* (3.4.2) of wire or other material

3.4.2.3
filler strip
material added during fabrication of a hose containing a supporting *helix* (3.4.2) to fill the spaces between the successive turns of the helix

3.4.2.4
semi-embedded helix
semi-embedded spiral
helical wire (3.4.2.5), concentric with the *bore* (3.3.1), semi-embedded in the *lining* (3.3.2) of a *hose* (3.1.1) so that only a portion of the wire is exposed

3.4.2.5
helical wire
helix wire
spiralled wire cord
wire or wire cord spiralled over or under the *reinforcement* (3.4.1) around or within the wall of the hose construction to prevent flattening or *kinking* (3.12.4) during *bending* (3.7.2.1) of the hose or under vacuum

Note 1 to entry: The helical wire may be bonded or unbonded to the hose wall by design.

3.4.3
wire cord
reinforcement material of thin metal wires which consist of several strands of fine wires twisted together

3.4.3.1
textile cord
reinforcement material of textile yarns which consists of several strands of fine yarns twisted together

3.4.4
fabric
plane structure produced by interlaced *yarns* (3.4.6), fibres or filaments

3.4.4.1
woven fabric
flat structure composed of two series of interlaced *yarns* (3.4.6) or filaments, one parallel to the axis of the *fabric* (3.4.4) and the other transverse

3.4.4.2
bias cut
cut made diagonally across a textile material at an angle less than 90° to the longitudinal axis

3.4.4.3
bias seam
seam at which *bias cut* (3.4.4.2) fabrics are joined together

3.4.4.4
bias angle
smaller included angle between the warp threads of a cloth and a diagonal line cutting across the warp threads

3.4.5
reinforcement angle
angle formed by the intersection of a *reinforcement* (3.4.1) strand and a line parallel to the axis of the *hose* (3.1.1)

3.4.6
yarn
slender, very long, ribbon-like or cylinder-shaped composition of filaments which are twisted, laid or spun together

3.4.7
marker yarn
identification yarn
tracer yarn
yarn (3.4.6) which is placed in the hose during manufacture for traceability

3.4.8
ply
layer of *reinforcement* (3.4.1)

3.4.9
transition layer
transition ply
rubber layer between two plies of different rubber *compounds* (3.1.6) which do not adhere to each other after *vulcanization* (3.10.7)

Note 1 to entry: The transition layer provides a good bond to both rubber layers.

3.4.10
braid
continuous *sleeve* (3.6.4.11) of interwoven single or multiple strands of *yarn* (3.4.6) textile or wire

3.4.11
insulating layer
material between plies of *reinforcement* (3.4.1)

3.4.12
reinforcing rings
steel or plastics rings, embedded over the reinforcement layers of some hose designs, which have the same function as a helical or body *wire* (3.4.14)

3.4.13
knitted ply
layer of textile *reinforcement* (3.4.1) in which the *yarns* (3.4.6) are applied in an interlocking looped configuration in a continuous tubular structure

3.4.14
wire
metallic component used in a hose to give added strength, increased dimensional stability, or crush resistance, and can provide a path for electrical continuity

3.4.15
carcass
fabric (3.4.4), cord and/or metal reinforcing section of a *hose* (3.1.1), including any rubber layers used to promote *adhesion* (3.8.14), as distinguished from the hose tube or *cover* (3.3.6)

Note 1 to entry: See *reinforcement* (3.4.1).

3.5 Hose end types

3.5.1
soft end
hose end in which the rigid *reinforcement* (3.4.1) of the body, usually wire, is omitted

3.5.2
straight end
end of a *hose* (3.1.1), the structure and dimensions of which are identical to those of the body of the hose, except corrugations and helix reinforcement is omitted

Note 1 to entry: Constructed to prevent leaks due to a helix or wall corrugations in the area of the fitting.

3.5.3
enlarged end
expanded end
hose end having a diameter greater than the internal diameter of the hose to accommodate a *coupling* (3.6.4.1) or to fit on to pipework

3.5.4
capped end
DEPRECATED: sealed end
hose end covered to protect its internal elements

3.5.5
plain end
un-modified end of a corrugated or helix reinforced hose, in contrast to a straight end

3.5.6
reinforced end
hose end equipped with extra *reinforcement* (3.4.1) to achieve additional strength or stiffness

3.5.7
end-reinforcement
extra *reinforcement* (3.4.1) applied to the end of a hose to provide additional strength or stiffening

3.6 Hose assembly terms

3.6.1 General hose assembly terms

3.6.1.1
fitting
device attached to the end of the *hose* (3.1.1) to facilitate connection to equipment or another hose

Note 1 to entry: The actual *coupling* (3.6.4.1) is either part of the fitting or a separate device attached to the hose fitting.

3.6.1.2
adapter
accessory, which can exist in various sizes and materials, designed to complete the connection between *hose fitting* (3.6.4.1) and another piping system component, or to change a hose fitting from one type or size to another type or size

Note 1 to entry: Often, a tube fitting is used.

3.6.1.3
hose guard
external protection on a *hose assembly* (3.1.2) to provide additional protection against abrasion, heat or chemical substances

Note 1 to entry: While spring forms and flat steel or plastic coils are in common use, a variety of materials can be used to suit each particular situation.

3.6.1.4
female, adj
forming an internal thread or recess, which may be of a fixed part or a swivel nut and is designed to hold a mating (male) part

3.6.1.5
male, adj
forming the external thread or part which enters into the female part to provide a connection

3.6.1.6
nozzle
spout
part of an end-fitting attached to the free end of a *hose assembly* (3.1.2) from which the fluid is dispensed

3.6.2 Connections

3.6.2.1
flange connection
connection obtained between a *hose assembly* (3.1.2) and another hose assembly or a pipeline end or a manifold by bolting together the flanges

3.6.2.2
quick connection
quick acting connection
quick-release connection
connection that can be rapidly made by engaging the two mating parts and that can also be broken rapidly by simple action

3.6.2.3
threaded connection
connection obtained between two hose assemblies, or a *hose assembly* (3.1.2) and a pipeline end or manifold, by screwing together the two connector elements

3.6.2.4
banjo
hollow fitting clamped between seals and incorporating a hollow bolt to allow 360° rotation of connecting pipe work or *hose* (3.1.1)

3.6.3 Types of fittings

3.6.3.1
wired-on fitting
wired-in fitting
method of fitting attachment by winding wire in a spiral, usually under tension, on to the outside of the *hose* (3.1.1), directly over the *nipple* (3.6.4.10)

3.6.3.2
clamped hose fitting
hose fitting (3.6.4.1) that is secured in position by means of a clamp

3.6.3.3
hose connector
fitting that has a *nipple* (3.6.4.10) at both ends that can be inserted to connect two hose lengths together

3.6.3.4
permanent fitting
fitting that, once installed, may not be removed for use in another *hose* (3.1.1)

Note 1 to entry: This is the case with crimped, swaged and built-in fittings.

3.6.3.5
plain-end fitting
fitting with ends without a thread, groove or bevel, typically used for welding

Note 1 to entry: Example is for a flange attachment.

3.6.3.6
reusable hose fitting
reusable coupling
hose fitting (3.6.4.1) that is so designed that it can be disassembled from a *hose assembly* (3.1.2) and reassembled to another hose assembly without losing its function

3.6.3.7
built-in hose fitting
hose fitting (3.6.4.1) that is built into the hose construction during manufacture, and subsequently vulcanized in position

3.6.4 Parts of hose fittings, couplings and other components

3.6.4.1
hose fitting
coupling
connector
end-fitting
fitting, usually made of metal, attached to the end of a *hose* (3.1.1) to facilitate connection to equipment or another hose

Note 1 to entry: A female fitting carries the internal fastening; a male coupling carries the external fastening.

3.6.4.1.1
swivel coupling
coupling (3.6.4.1) that allows the fitting to rotate

3.6.4.1.2
elbow
hose fitting (3.6.4.1) bent to present the termination at a more suitable connecting angle

Note 1 to entry: Standard angles of 90°, 60°, 45° and 30° are common, with customized variations.

3.6.4.2
clamp
hose clamp
metal band around the outside of a hose to bind the *hose* (3.1.1) to a *hose fitting* (3.6.4.1), thus making a *hose assembly* (3.1.2)

3.6.4.2.1
interlocking clamp
clamp that engages the *hose fitting* (3.6.4.1) in a manner which prevents the clamp from sliding off the hose fitting

Note 1 to entry: Typically, a bolt or U-bolt with fingers which interlock with a ring on the fitting.

3.6.4.2.2
band
thin strip of metal used as a non-bolted clamp

3.6.4.3
bead
raised ring on the end of a *nipple* (3.6.4.10), typically of a semi-circular profile which is machined, cast, or roll-formed and used to prevent the hose fitting from slipping out of the hose or a metal ring that is welded, shrunk or cast on to the outer surface of a nipple

3.6.4.4
barb
one or multiple raised rings on the *nipple* (3.6.4.10), typically of a ramp-shaped profile which is machined or cast and used to prevent the hose fitting from slipping out of the hose

3.6.4.5
binding-in wire
nipple wire
wire used to anchor a *hose* (3.1.1) to a *nipple* (3.6.4.10), usually applied during the construction of the hose assembly

3.6.4.6
bolt hole circle
circle on the flange face around which the centres of the bolt holes are distributed

3.6.4.7
collar
ferrule
socketshell
portion of a *hose fitting* (3.6.4.1) that is compressed by *swaging* (3.6.5.3) or *crimping* (3.6.5.1) to seat the hose on to the fitting *serrations* (3.6.4.12) and create a permanent attachment

Note 1 to entry: With *reusable fittings* (3.6.3.6), locking and sealing are accomplished mechanically by the collar without swaging or crimping.

Note 2 to entry: a) "swaging" means to axially compress down onto the hose, b) "crimping" means to radially compress onto the hose, and c)"reusable" means to compress from within due to internal expansion.

3.6.4.8
collar
< nipple > raised portion of a *nipple* (3.6.4.10) that functions as a connection for a *ferrule* (3.6.4.7) or other locking device or functions as a hose stop

3.6.4.9
interlocking ferrule
ferrule which physically engages the *hose fitting* (3.6.4.1), preventing the ferrule from sliding off the fitting

Note 1 to entry: Physical engagement can be fixed or blocked.

3.6.4.10
nipple
spigot
hose nipple
hose fitting stem
insert
hosetail
tail
shank
section of the *fitting* (3.6.4.1) that is inserted into the hose

3.6.4.11
sleeve
material put around the hose to provide protection against kinking, abrasion or other damage

3.6.4.12
serration
corrugation or other features that increase the holding power of the *nipple* (3.6.4.10) or *ferrule* (3.6.4.7)

3.6.5 Methods of assembling

3.6.5.1
crimping
hose fitting (3.6.4.1) attachment method utilizing a number of fingers or dies mounted in a radial configuration, the dies closing perpendicular to the hose and fitting axis, thus compressing the collar or ferrule radially around the hose and creating a lock and seal between the hose and fitting

3.6.5.2
skiving
removal of a short length of *cover* (3.3.6) or *lining* (3.3.2) to permit the attachment of a *hose fitting* (3.6.4.1) directly over the hose *reinforcement* (3.4.1) which ensures a metal to metal connection

Note 1 to entry: "skiving" is called "internal skiving" if the *rubber tubing* (3.3.7) or *lining* (3.3.2) is removed.

3.6.5.3
swaging
method of *hose fitting* (3.6.4.1) attachment that incorporates a set of die sections designed to progressively reduce the collar or ferrule diameter to the required final value by mechanically forcing the fitting axially into the mating die sections

3.7 Sizes and geometrical properties of hoses and hose assemblies

3.7.1 Sizes

3.7.1.1
nominal size
DEPRECATED: nominal bore size
DEPRECATED: nominal bore
size given to a hose for the purpose of identification

Note 1 to entry: It is dimensionless.

3.7.1.2
inside diameter
ID
diameter of the *bore* (3.3.1) of a hose

Note 1 to entry: It is expressed in millimetres.

3.7.1.3
outside diameter
OD
diameter of the exterior of the cross-section of a hose

Note 1 to entry: It is expressed in millimetres.

3.7.1.4
free length
length of the hose portion between the *hose fittings* (3.6.4.1) for a *hose assembly* (3.1.2) in the free state

3.7.2 Bending dimensions

3.7.2.1
bending
forcing the *hose* (3.1.1) out of a straight line into a curved position

Note 1 to entry: This term can be applied to hoses and hose assemblies.

3.7.2.2
bend radius
radius of a bent section of *hose* (3.1.1) measured to the innermost surface of the curved portion

Note 1 to entry: This term can be applied to hoses and hose assemblies.

3.7.2.3
minimum bend radius
smallest specified radius to which a hose (3.1.1) may be bent in service

Note 1 to entry: See *bend radius* (3.7.2.2).

Note 2 to entry: This term can be applied to hoses and hose assemblies.

3.7.2.4
coiling diameter
minimum diameter of coil to which a *hose* (3.1.1) can be coiled without damage

3.7.2.5
reeling diameter
minimum diameter of reel on which a *hose* (3.1.1) can be coiled without damage by *kinking* (3.12.4) or distortion

Note 1 to entry: See *collapsible hose* (3.2.1.6).

Note 2 to entry: This term can be applied to hoses and hose assemblies.

3.7.3 Reinforcement angles and spacing

3.7.3.1
angle of braid
angle of lay
acute angle between any strand of the *braid* (3.4.10) and a line parallel to the axis of the hose

3.7.3.2
spiral lay
angle and *pitch* (3.7.3.4) in which a spiral *reinforcement* (3.4.1) is applied to a *hose* (3.1.1) or other cylindrical article

Note 1 to entry: See *angle of braid* (3.7.3.1).

3.7.3.3
helix angle
acute angle between any strand of helical *reinforcement* (3.4.1) and a line parallel to the axis

3.7.3.4
pitch
lay
distance between two consecutive turns of a helix measured parallel to the axis

Note 1 to entry: This term may also apply to other reinforcing components.

3.7.3.5
spacing
distance between adjacent turns of reinforcing wire measured parallel to the axis of the helix

Note 1 to entry: This term may also apply to rings or other hoop type reinforcements.

Note 2 to entry: Spacing is the *pitch* (3.7.3.4) minus the width of the wire.

3.8 Mechanical properties

3.8.1
hydrostatic stability
ability to resist, within limits, changes in length and/or diameter and/or *twist* (3.12.8) at a specified pressure

Note 1 to entry: This term can be applied to hoses and hose assemblies.

3.8.2
burst pressure
pressure at which rupture of the hose occurs when tested to the relevant International Standard

Note 1 to entry: This term can be applied to hoses and hose assemblies.

3.8.3
maximum working pressure
DEPRECATED: rated pressure
DEPRECATED: design pressure
maximum pressure which the *hose* (3.1.1) is designed to withstand, including any momentary surges, during service

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

Note 2 to entry: The maximum working pressure is expressed in SI units (MPa, kPa) or bar, or both.

3.8.4
proof pressure
pressure applied during a non-destructive test and held for a specified period of time to prove the integrity of the construction

Note 1 to entry: It is expressed in SI units (MPa, Pa) or in bar (or both).

Note 2 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.8.5
permeability
property of a material of transmitting gases and liquids by passage through one surface and out at another surface by diffusion and sorption processes

Note 1 to entry: Not to be confused with "porosity".

Note 2 to entry: The property of permeability involves the diffusion of molecules, called the permeant, through a membrane or interface. The permeability property works through diffusion; the permeant will move from high concentration to low concentration across the interface.

Note 3 to entry: In a pressurized hose the permeant can pass from the inside of the hose to the outside through the hose *lining* (3.3.2) and *cover* (3.3.6).

3.8.6
effusion
escape of gas from inside the hose through the *lining* (3.3.2) into the *carcass* (3.4.15)

3.8.7
diffusion
escape of gas from inside the hose through the *carcass* (3.4.15) and *cover* (3.3.6) into the environment

3.8.8
flexibility
ease of *bending* (3.7.2.1) a hose (3.1.1) without it being damage by kinking, collapse, breaking or cracking

Note 1 to entry: A hose can be bent around a mandrel for test purposes.

3.8.9
stiffness
flexural stiffness
resistance of a hose to *bending* (3.7.2.1)

3.8.10
working temperature
maximum or minimum temperature at which a hose (3.1.1) is designed to be used

Note 1 to entry: This term can be applied to hoses and hose assemblies.

3.8.11
working pressure
pressure to which a hose (3.1.1) will be subjected, including any momentary surges, during service

Note 1 to entry: This term can be applied to hoses and hose assemblies (3.1.2).

3.8.12
pull-off force
fitting pull-out force
force required to pull a *hose* (3.1.1) from its attachment

3.8.13
torsion
deformation of a *hose assembly* (3.1.2) by twisting of the hose body caused by external force or incorrect installation

3.8.14
adhesion
strength of bond between cured rubber surfaces or between a cured rubber surface and a non-rubber surface or the strength of bond between two non-rubber (plastics) hose layers fused or glued together

3.8.15
ply adhesion
force required to separate two adjoining plies of a *hose* (3.1.1)

3.8.16
vacuum resistance
resistance to vacuum
ability to withstand a specified vacuum in the *bore* (3.3.1) without collapse or delamination of the *lining* (3.3.2) or separation between hose layers

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.8.17
vacuum stability
ability of a *hose* (3.1.1) to resist, within limits, changes in length and/or diameter when subjected to a specified vacuum in the *bore* (3.3.1)

Note 1 to entry: This term can be applied to hoses and *hose assemblies* (3.1.2).

3.8.18
elongation
change in length of a *hose* (3.1.1)

Note 1 to entry: It is expressed numerically as a percentage of the initial length.

Note 2 to entry: This term can be applied to hoses and *hose assemblies* (3.1.2).

3.9 Electrical aspects

3.9.1
bonded hose construction
hose (3.1.1) with conductive metallic elements incorporated in the hose construction

Note 1 to entry: When determined in accordance with ISO 8031, the electrical resistance per unit length in the case of hoses (lengths without couplings), or the electrical resistance between the fittings, in the case of hose assemblies, does not exceed 10^2 Ω in a bonded hose construction.

3.9.2
static wire
wire incorporated in a *hose* (3.1.1) to conduct static electricity

3.9.3
anti-static wire
bonding wire
conducting wire
metal wire incorporated in the *hose wall* (3.3.3) in order to remove static electricity generated in the *hose* (3.1.1), and usually connected to the *couplings* (3.6.4.1) of a *hose assembly* (3.1.2)

Note 1 to entry: It is usually manufactured from thin braided copper wires.

3.9.4
conductivity
property of a hose or hose assembly to conduct electricity

Note 1 to entry: Recommended terminology and limits for electrical properties are given in ISO 8031:2020, Annex A.

Note 2 to entry: Recommended hose classifications are (per length of hose assembly):

— electrically insulating hose: > 10^8 Ω; per assembly;

— electrically conductive or anti-static hose: < 10^6 Ω (grade Ω); per assembly;

— electrically bonded hose: < 10^2 Ω (grade M); per assembly;

— electrically continuous hose: < 10^2 Ω; per assembly;

— electrically discontinuous hose: > $2{,}5 \times 10^4$ Ω; per assembly.

Note 3 to entry: A classification for a long hose length without end fittings in ohm per metre (Ω/m) is still to be established.

3.9.5
linear resistance
opposition to the flow of a current through a *hose* (3.1.1)

Note 1 to entry: It is expressed in ohms per metre (Ω/m).

Note 2 to entry: It is measured in accordance with ISO 8031.

3.9.6
static conductivity
capability to provide a path for dissipation of static electricity

3.9.7
static bonding
use of conductive material to eliminate static electrical charges

3.9.8
unbonded helix
unbonded spiral
helical wire that is, by design, not connected to the end fitting/coupling

3.9.9
conductive hose
hose (3.1.1) incorporating electrically conducting materials in the hose construction, the electrical resistance in the case of hoses, or the resistance between the fittings in the case of hose assemblies, being between 10^2 Ω and 10^6 Ω

Note 1 to entry: Recommended terminology and limits for electrical properties are given in ISO 8031:2020, Annex A.

3.9.10
non-conductive hose
insulated hose
hose (3.1.1) made of non-conductive material

Note 1 to entry: It does not incorporate conductive elements and is not capable of dissipating electrostatic charges.

3.10 Hose production methods and tools

3.10.1
mandrel
rigid or flexible rod or tube of circular cross-section on which certain types of hose are manufactured

3.10.1.1
flexible mandrel
long, round, smooth rod capable of being coiled in a circle of small diameter

Note 1 to entry: It is used for support during the manufacture of certain types of hose (the mandrel is made of rubber or plastics material and may have a core of flexible wire to prevent stretching).

3.10.1.2
rigid mandrel
metallic rod or cylinder used to support the hose during manufacturing

3.10.2
wrapped cure
vulcanizing process using a tensioned strip of *fabric* (3.4.4) to apply external pressure

Note 1 to entry: See *spiral wrapping* (3.10.3).

3.10.3
spiral wrapping
method of applying external pressure to a *hose* (3.1.1) during *vulcanization* (3.10.7) by using a narrow strip of cloth wound helically, with overlaps, along the hose

3.10.4
straight wrapping
lightweight *fabric* (3.4.4) wrapped around the *hose* (3.1.1) to impart pressure and consolidate the hose during *vulcanization* (3.10.7), the warp threads of the fabric being parallel to the axis of the hose

3.10.5
wrapper mark
impression left on the surface of a hose by a material used during *vulcanization* (3.10.7)

Note 1 to entry: See *cloth-marked finish* (3.10.6).

Note 2 to entry: The marks usually show the characteristics of the woven pattern and the wrapper edge.

3.10.6
cloth-marked finish
appearance of the vulcanized *cover* (3.3.6) produced by straight or *spiral wrapping* (3.10.3) used during *vulcanization* (3.10.7) and subsequently removed

Note 1 to entry: See *wrapper mark* (3.10.5).

3.10.7
vulcanization
cure
process, usually involving heat, in which rubber, through a change in its chemical structure is converted to a condition in which the elastic properties are conferred or re-established or improved or extended over a greater range of temperatures

EXAMPLE Crosslinking.

[SOURCE: ISO 1382:2020, 3.542, modified — Note 1 to entry has been deleted and an EXAMPLE has been added.]

3.10.8
pricking
perforation of a hose *cover* (3.3.6) designed to prevent *blisters* (3.12.1) on the cover formed by the expansion of gases trapped in the interstices of the *reinforcement* (3.4.1)

3.10.9
consolidated, adv
in a state in which the components of the hose are firmly brought together by the application of pressure during manufacture

Note 1 to entry: Components cannot be considered bonded until after *vulcanization* (3.10.7). Consolidation procedures may be carried out several times during construction.

3.10.10
splice
joint or junction made by lapping or butting, straight or at an angle, and held together through *vulcanization* (3.10.7) or mechanical means

3.10.11
lap
part that extends over itself or over a similar part, usually by a desired and predetermined amount

3.10.12
lap seam
seam made by placing the edge of one piece of material so that it extends flat over the edge of a second piece of material

3.11 Hose tests and operation conditions

3.11.1
hydrostatic stability test
non-destructive test to determine the *hydrostatic stability* (3.8.1)

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.2
impulse
pressure of short duration that may be cyclic, and which produces sudden stress

3.11.3
impulse test
pulsating pressure test, usually applied to *hydraulic hoses* (3.1.3)

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.4
proof pressure test
pressure holding test to prove the structural integrity of a hose

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.5
vacuum test
test of the *vacuum resistance* (3.8.17) of a *hose* (3.1.1)

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.6
bending force
load required to induce *bending* (3.7.2.1) around a specified radius and hence a measure of *stiffness* (3.8.9)

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.7
test pressure
positive or negative pressure to which the *hose* (3.1.1) is subjected for a specified period of time under standardized conditions

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).

3.11.8
system operating pressure
operating pressure
pressure actually present in the piping system in which the hose is used during service

3.12 Hose and hose assembly deformations and defects

3.12.1
blister
hollow space between layers in the *hose wall* (3.3.3), in which air or other gasses are entrapped

Note 1 to entry: This is a special case of a blister as defined in ISO 1382:2020, 3.54.

3.12.2
hose deformation
change in hose geometry as measured according to a specified standard procedure

Note 1 to entry: Generally, outside diameter, length, locally positioned bulging, ovality.

3.12.3
kink
permanent or temporary deformation of a section of the hose *bore* (3.3.1)

3.12.4
kinking
permanent or temporary distortion of a hose by excessive *bending* (3.7.2.1), leading to closure or partial closure of the hose bore and/or permanent deformation

Note 1 to entry: This term can be applied to *hoses* (3.1.1) and *hose assemblies* (3.1.2).