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Traveller irrigation machines —

Part 2:
Softwall hose and couplings — Test methods

Machines d'arrosage mobiles —
Partie 2: Tuyau flexible et raccords — Méthodes d'essai

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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.

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.

International Standard ISO 8224-2 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

ISO 8224 consists of the following parts, under the general title *Traveller irrigation machines*:

— *Part 1: Laboratory and field test methods*

— *Part 2: Softwall hose and couplings — Test methods*

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Traveller irrigation machines —

Part 2:
Softwall hose and couplings — Test methods

1 Scope

This part of ISO 8224 specifies test methods for specific physical properties and accelerated durability tests for softwall irrigation hose and couplings used with irrigation machines.

It applies to such hose and couplings used with stationary hose-coiling, mobile hose-laying or hose-coiling, and mobile hose-dragging irrigation machines used in agriculture and forestry.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8224. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8224 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1402:1984, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing.*

ISO 1421:1977, *Fabrics coated with rubber or plastics — Determination of breaking strength and elongation at break.*

ISO 4671:1984, *Rubber and plastics hose and hose assemblies — Methods of measurement of dimensions.*

ISO 7326:1984, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions.*

ISO 8033:1985, *Rubber and plastics hose — Determination of adhesion between components.*

ASTM D 412-87, *Standard test methods for rubber properties in tension.*

ASTM D 3389-87, *Standard test method for coated fabrics abrasion resistance (rotary platform, double-head abrader).*

3 Definitions

For the purposes of this part of ISO 8224, the following definitions apply.

3.1 hose: Flexible reinforced tube for conveying water, roughly round in cross-section when filled with water under normal operation pressure, and which may be collapsible when drained of water. The hose consists of a cover, a hydraulic load-bearing textile reinforcement, and an inner impermeable tube.

3.2 elongation: Increase in the hose length caused by pressurization.

3.3 snaking: Deviation in location of the hose from the original straight-line position, as laid down by the machine, caused by elongation.

3.4 kinking: Vertical transverse folding from the normally round configuration of a pressurized hose.

3.5 pressure: Internal pressure measured in kilopascals (kPa) at the inlet end of the hose or as otherwise designated.

4 Test equipment

4.1 Pressure gauge or other equipment capable of measuring pressure within a range from 0 to 3 300 kPa (0 to 33 bar) with a reading accuracy of ± 2 %.

4.2 Dynamometer or other equipment capable of measuring draft within a range of 0 to 250 kN.

4.3 Test pump capable of maintaining water pressures up to 3 300 kPa (33 bar).

4.4 Wear test equipment to perform an accelerated wear test.

4.5 Tensile test equipment capable of providing a tensile force of at least 250 kN.

4.6 Length measurement equipment with a reading accuracy of ± 1 mm.

5 Test conditions

The tests shall be carried out at an ambient temperature of 23 °C ± 3 °C. The test liquid shall be clear water at a similar temperature.

6 Test procedures

6.1 Adhesion of cover to fabric

6.1.1 The mechanical or chemical adhesion of a hose cover to the fabric of the hose shall be tested according to procedures specified in ISO 8033.

6.1.2 Results shall be recorded as specified in ISO 8033.

6.2 Adhesion of tube to fabric

6.2.1 The mechanical or chemical adhesion of the tube to the fabric of the hose shall be tested according to procedures specified in ISO 8033.

6.2.2 The results shall be recorded as specified in ISO 8033.

6.3 Ozone resistance

6.3.1 The ozone resistance of the exterior layer of the hose shall be tested according to procedures specified in ISO 7326, Method 2 or 3, with the following modifications:

a) the elongation of the cover shall be 20 %;

b) the ozone concentration shall be maintained at 50 pphm ± 5 pphm and the air temperature at 40 °C ± 2 °C;

c) the test pieces shall be examined after 2 h, 4 h, 24 h, 48 h, 72 h, 96 h while still in extended condition.

6.3.2 Record hours until cracks become visible under × 2 magnification. If no cracks occur before 96 h of testing, record as > 96 h.

6.4 Elongation by internal hydraulic pressure

6.4.1 The elongation shall be tested according to the procedures specified in ISO 1402, except that the test piece shall be at least 3 m long. The elongation measurements shall be taken 1 min after the hose has stabilized at the pressures specified in 6.4.2 and 6.4.3.

6.4.2 Two marks, at least five times the outside diameter apart, shall be made on the test piece when initially pressurized to 70 kPa. The distance between the marks (l_1) shall be measured within ± 1 mm along a straight line.

6.4.3 Pressurize the test piece to 700 kPa and again record the distance (l_2) between the marks. The test piece shall be restrained to prevent snaking to ensure that distances are measured along the centreline.

6.4.4 The percentage elongation shall be calculated as $100[(l_2 - l_1)/l_1]$ % and recorded.

6.5 Burst pressure

The burst pressure can be evaluated with the same test piece as that used to determine elongation (see 6.4). The length of the hose test piece shall be such that its free length is 1 m, excluding end reinforcement or couplings, and shall be tested according to ISO 1402.

Increase the water pressure at a constant rate, as specified in ISO 1402, until the hose bursts or a pressure of 2 500 kPa is reached. Record the burst pressure if less than 2 500 kPa, or record as > 2 500 kPa.

6.6 Tensile break force and elongation at break

6.6.1 The procedure for testing hose for tensile break force and resultant elongation shall be that of ISO 1421, with the following modifications:

— The test piece shall be a longitudinal strip cut from the hose in the direction of the hose axis. This strip shall be long enough to leave exposed