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Animal (mammal) traps —

Part 4:
Methods for testing killing-trap systems used on land or underwater

Pièges pour animaux (mammifères) —
Partie 4: Méthodes d'essai de systèmes de piégeage mortels utilisés sur la terre ferme ou sous l'eau

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Contents

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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.

International Standard ISO 10990-4 was prepared by Technical Committee ISO/TC 191, *Animal (mammal) traps*.

ISO 10990 consists of the following parts, under the general title *Animal (mammal) traps* :

— *Part 1: Mechanically powered, trigger activated killing traps*

— *Part 2: Restraining traps*

— *Part 3: Submersion killing traps*

— *Part 4: Methods for testing killing-trap systems used on land or underwater*

— *Part 5: Methods for testing restraining traps*

Annex B forms a normative part of this part of ISO 10990. Annex A is for information only.

Introduction

The purpose of this part of ISO 10990 is to provide test methods for performance evaluation of traps in the areas of animal welfare, capture efficiency, selectivity and user safety. Jurisdictional regulations and guidelines related to conducting tests with animals should be followed.

Animal (mammal) traps —

Part 4:
Methods for testing killing-trap systems used on land or underwater

1 Scope

This part of ISO 10990 specifies methods for use in performance testing of:

— traps used on land to kill mammals;

— traps used in submersion sets to kill semi-aquatic mammals.

The performance testing includes methods for evaluation of effective killing, pathological evaluation, mechanical properties (see note), selectivity, capture efficiency and user safety.

NOTE ISO/TC 191 recognizes that other trapping systems are under development but are at a preliminary stage. Consequently, inclusion of appropriate mechanical tests for such traps is premature at this time. Nevertheless, the committee recommends and supports the development of new types of traps and trapping systems together with appropriate testing methodologies. ISO/TC 191 further recommends that the issue receives in-depth (re)consideration at the five-year review and that all appropriate advances in technology are incorporated through the deliberations of the committee at that time.

2 Terms and definitions

For the purposes of this part of ISO 10990, the following terms and definitions apply:

2.1
capture efficiency
capability of the trap, as part of a killing-trap system, to capture target animals within a specified time period

NOTE This is expressed as a percentage of the total number of traps set.

2.2
capture rate of target animals
capability of a trap, as part of a killing-trap system, to capture target animals

NOTE This is expressed as a percentage of the total number of potential captures of target animals.

2.3
capture rate of non-target animals
capability of a trap, as part of a killing-trap system, to capture non-target animals

NOTE This is expressed as a percentage of the total number of potential captures of non-target animals.

2.4
clamping force
steady-state force exerted on an animal by the striking component(s) of the trap after the impact momentum has been delivered

2.5
control trap
most commonly used trap (of the killing, or submersion restraining type) for the target animal which is used in accordance with the killing-trap system established through most commonly used practice

NOTE This will be determined by the authority using this part of ISO 10990, such as a nationally recognized certification body.

2.6
impact force
peak force delivered by the closing striking component(s) to a load cell or cells

2.7
impact momentum
momentum delivered to an animal when struck by the closing striking component(s)

2.8
instructions
instructions available to the user at the point of sale of the trap(s)

2.9
killing trap
device for use on land or underwater to kill a mammal as part of a killing-trap system

2.10
killing trap performance
capability of a killing trap, as part of the killing-trap system, to kill an animal (a mammal) within a time period, and to meet the requirements related to mechanical properties, selectivity, capture efficiency and user safety as specified by the authority implementing the standard

2.11
killing-trap system
system set with the intent to kill a mammal comprising a combination of

— equipment (the trap and the trigger configuration);

— set (including site modifications, lures, baits, location and other relevant requirements specified in the instructions)

2.12
manufacturer
producer including inventor or a national distributor

2.13
non-target animal
animal of any species other than the one for which the trap is set

2.14
potential captures
number of animals caught plus the number of animals having identifiably escaped

2.15
selectivity
number of captured target animals divided by the total number of captured animals

2.16
striking components
those parts of the trap which contact the animal and deliver the impact and/or clamping forces

2.17
strike location(s)
point(s) of contact where the impact or clamping force(s) of the trap is applied to the animal

2.18
target animal
individual of the species for which the killing-trap system has been set with the intent to kill

2.19
target strike location(s)
any location, specified by the trap manufacturer, on the animal where impact caused by the trap can kill the animal

2.20
test animals
wild or farm-raised target animals used in tests

2.21
trap opening
chordal or straight-line distance between the striking component(s)

NOTE The trap opening is specified by the manufacturer for each target animal and strike location.

2.22
trap layout
pattern in which the test traps and control traps are positioned for field testing

3 Sampling

3.1 Sampling of traps

Select the number of traps specified in each test procedure, from the total number of traps submitted, using random sampling procedures.

3.2 Number of replicates in tests

The number of replicates in the tests shall be sufficient to determine if the differences are statistically significant at the level to be determined by the authority implementing the standard. However, in deciding on the number of replicates required, it should be noted that the greater the sample size, the more reliable are the test results. This decision needs to be considered against welfare aspects related to reducing the number of animals used in the testing.

4 Mechanical testing

4.1 Determination of clamping force (when relevant)

4.1.1 Principle

The clamping force is determined over the full displacement of the striking component(s) by reducing the opening by 5 mm each time. Alternatively, the clamping force is determined only at the trap opening specified by the manufacturer.

4.1.2 Apparatus

4.1.2.1 Static load cell, or equivalent device.

4.1.3 Preparation of traps

Select at least five traps for testing. Prior to testing, prepare the traps for use according to the manufacturer's instructions. The preparation might include boiling, waxing, dyeing, or painting. Fire each trap five times on a substrate that will prevent damage to the striking component to ensure that all trap components are in working order.

4.1.4 Procedure

Close the jaws of the trap slowly onto a static load cell or equivalent device (see annex A, Figure A.1) located at the trap opening chosen (see 4.1.1).

Alternatively, demonstrate the force that a trap will maintain when the test is conducted by firing the springs from their cocked position while the striking component is resting upon the load cell at the chosen trap opening (see annex A, Figure A.1).

Record the final force indicated by the load cell at the opening. Perform the test three times on each trap. Calculate the mean clamping force (F_1) at the chosen trap opening(s) for each specimen in newtons (N).

4.1.5 Test report

Report the following information (see also clause 12):

a) the trap opening(s) used in the test (expressed in millimetres);

b) the area (window) of the trap opening(s) used in the test (expressed in square centimetres, cm^2);

c) the three clamping force measurements for each specimen in newtons (N);

d) the mean value and standard error of clamping forces of the sample.

4.2 Determination of impact momentum and impact force (when relevant)

4.2.1 Principle

The impact momentum or impact force is determined (above or under water as applicable) at the trap opening appropriate for the target species.

4.2.2 Apparatus

4.2.2.1 Test rig, for clamping trap in position.

4.2.2.2 Accelerometer, for measuring the impact momentum.

4.2.2.3 Dynamic load cells, mounted on a dummy target giving the specified trap opening(s) (impact force).

4.2.3 Preparation of traps

Select at least five traps for testing. Prior to testing, prepare the traps for use according to the manufacturer's instructions. The preparation might include boiling, waxing, dyeing, or painting. Fire each trap five times on a substrate that will prevent damage to the striking component to ensure that all trap components are in working order.

4.2.4 Impact momentum procedure

In order to calculate the impact momentum, determine first the effective mass of the striking component and then determine the impact velocity.

4.2.4.1 Determination of effective mass

Calculate the effective mass (m_e) of the striking component. For traps with simple U-shaped or rectangular-frame killing bars describing a rotating motion about an axis, the detailed procedures of annex A may be followed.

4.2.4.2 Determination of impact velocity

Determine the velocity of the striking component at the trap opening(s) specified by the manufacturer for the target strike location(s). Determine the velocity ten times on each trap as follows, either by:

a) direct procedure — the velocity is measured at the trap opening specified by the manufacturer; or

b) indirect procedure — the acceleration of the striking component is recorded, as shown in Figure A.2 of annex A, from the time of tripping to the time of reaching the specified trap opening; the time-acceleration curve is integrated to provide a time-velocity curve; the velocity is read at impact from the time-velocity curve; the mass of the accelerometer is taken into account in the determination of the impact velocity; or

c) another equivalent method.

Use a substrate similar to animal tissue to prevent damage to the measuring device. For killing traps to be used in a submersion system, the impact velocity/force determinations shall be performed underwater.

4.2.5 Impact force procedure

As an alternative to impact momentum the impact force may be determined. Measure the impact force directly using one or more load cells mounted on a “dummy target”. Fire the trap so that the striking components make unimpeded contact with the load cell(s) and obtain the impact force directly from the output of the load cell(s). For killing traps to be used in a submersion system, determine the impact velocity/force underwater.

4.2.6 Test report

Report the following information for the procedure used:

a) direct procedure:

1) the trap opening(s) used in the test in millimetres;

2) the impact force of the trap at the specified trap opening(s); or the following

b) indirect procedure:

1) the effective mass (m_e) of the striking component;

2) the impact velocity of each specimen in metres per second (m/s) (defined as the mean value of the ten velocity determinations with standard errors);

3) the impact velocity (v) of the sample (i.e. the mean impact velocity of the specimens with standard errors), and

4) the impact momentum (p) of the trap, expressed in kg·m/s, at the specified trap opening, calculated using the following formula:

$$p = m_e \cdot v$$

where

m_e is the effective mass, expressed in kilograms (see 4.2.4.1);

v is the impact velocity of the sample, expressed in metres per second (see 4.2.4.2).

5 Kill testing with anaesthetized animals

5.1 Principle

The ability of the trap to render target animals irreversibly unconscious is evaluated by subjecting anaesthetized animals to the impact momentum and/or the clamping force of the trap under laboratory conditions.

NOTE 1 Veterinary supervision is recommended through all stages of this test until adequate experience has been gained by other test personnel.

NOTE 2 The effect of trap forces on anaesthetized animals cannot always be directly related to their effect on live, conscious animals. Therefore, tests on live, conscious animals in a test room/compound, and/or in the field are recommended to complement the test on anaesthetized animals.

5.2 Apparatus

5.2.1 Anaesthetic, dissociative neuraleptic analgesic (chosen to be appropriate for the species), in combination with a tranquilizer, which does not inhibit the corneal or palpebral reflexes, in doses appropriate for the species. (For example, ketamine hydrochloride with xylazine are suitable for certain species.)

5.2.2 Tester for eye reflexes, a lens cleaner or equivalent apparatus using air shall be used to test the eye reflexes.

5.2.3 Stopwatch, alternatively a video recorder equipped with a time generator may be used.

5.3 Preparation of traps

The number of test traps shall be sufficient to determine if the differences are statistically significant at the level to be determined by the authority implementing this part of ISO 10990 (see 3.2). Use a different trap of the same design for each test animal. Prepare the traps for use in accordance with the manufacturer's instructions. Before testing, fire each trap five times on a substrate similar to an animal tissue.

5.4 Procedure

Immobilize an adequate number of target animals (see 5.3) and render them insensible to pain using the anaesthetic (see note 1). Set the traps in accordance with the manufacturer's instructions. Place each of the immobilized animals in a trap in positions of the target strike locations (see 2.19). Fire the trap and monitor for loss of corneal and palpebral reflexes as follows (see note 2).

a) Test the presence of corneal reflexes continually until there is no further response in both eyes.

b) After loss of the corneal reflexes, test the presence of palpebral reflexes in both eyes.

Once the animal has lost its corneal and palpebral reflexes, continue to monitor the heart rate until heart activity ceases. If the heart activity persists beyond the time period specified by the authority implementing the standard (having regard for the welfare of the animal) or the animal recovers, euthanize the animal, whether or not reflexes have disappeared.

Record the time period necessary for corneal and palpebral reflex loss, the strike location, the position of the animal in the trap and the distance between the trap jaws.

NOTE 1 ISO/TC 191 considered the potential for testing anaesthetized semi-aquatic mammals underwater. However, there are insufficient scientific data to confirm whether any anaesthesia medium applied to such animals would in fact prevent or allow a normal diving response to be invoked. Normal physiological responses that might include diving response are essential if such testing is to be at all of value. ISO/TC 191 recognizes that further research is needed before this element can be incorporated into an International Standard.

NOTE 2 Loss of a brain stem reflex represents a loss of a subconscious reflex. Since palpebral and corneal reflexes are brain stem reflexes, it can be assumed that the loss of these reflexes indicates that the animal is insensible and unconscious. The loss of these reflexes is not an accurate measure of the onset of insensibility. In most situations, insensibility occurs prior to loss of palpebral and corneal reflexes. Other reflexes pertinent to the species in question could be used as indicators of the onset of insensibility in conjunction with the palpebral and corneal reflexes, such as ear pinch, tooth movement, lip pinch, nose prick etc. The loss of palpebral and corneal reflexes is likely to be a conservative measure of loss of sensibility, even without these ancillary measures.

5.5 Test report

Report the following information:

a) the number of traps and animals tested;

b) the position of each animal in the trap [including the strike location(s)];

c) the distance between the trap jaws for each test animal;

d) the time taken for loss of corneal and palpebral reflexes for each animal;

e) the time each animal was monitored after the firing of the trap;

f) the time taken for cessation of the heart beat for each animal;

g) the number of animals euthanized.

6 Test room/tank or compound testing

6.1 Principle

The ability of the trap to render mobile, fully conscious target animals insensible is assessed in a test room or compound. The submersion traps are tested in water/tank.

6.2 Test personnel

The test personnel shall be experienced and capable of trapping the target animals. They shall also be familiar with the equipment and the testing procedures.

6.3 Apparatus and test room/compound

6.3.1 Test room/compound or tank

The test room, compound or water-filled tank for submersion traps shall be of adequate size to allow the target (test) animals to move freely. The room/tank or compound shall be equipped with a barrier to separate the animal from the trap and with a nest box or equivalent area where the animal is able to rest. Remote observation of the animal activity shall be possible.

6.3.2 Video recorder equipped with a time generator

To monitor and record the test, see 6.6.

6.3.3 Tester for eye reflexes

When testing above water, a lens cleaner or equivalent apparatus using air shall be used to test the eye reflexes. (In submersion systems, other methods shall be used, see 6.6.)

6.4 Preparation of traps

Prepare the test traps for use in accordance with the manufacturer's instructions. The preparation might include boiling, waxing, dyeing or painting. Use a different trap of the same design for each test animal.

6.5 Test animals

The target animals shall be examined by a qualified veterinarian to ensure that the animals are healthy. The number of animals shall be sufficient to determine if the differences are statistically significant at the level to be determined by the authority implementing the standard (see 3.2). The test animals shall be representative of the population which is trapped (i.e. similar in mass and size and representing both sexes in the same ratio as the animals