INTERNATIONAL STANDARD

ISO 10990-4

First edition
1999-11-01

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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Reference number
ISO 10990-4:1999(E)

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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.

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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.

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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.

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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

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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.

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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.

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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).

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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.

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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

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trapped). The target animals, wild captured or farm raised, and their holding centre nest boxes shall be transferred to the test room/tank or compound before the testing in order to allow time for acclimatization.

6.6 Procedure

Set the traps in accordance with the instructions. Monitor the animals as they freely approach and enter the traps using a video recorder equipped with a time generator.

If the strike location is not in a vital region, euthanize the animal immediately with an appropriate euthanasic agent. If the strike is in a vital region, monitor the time taken for loss of corneal and palpebral reflexes and the heart rate of the animals as specified in 5.4. In submersion systems using killing-type traps, only palpebral and toe and ear pinch reflexes can be tested. In submersion systems using restraining-type traps, the palpebral and toe and ear pinch reflexes can be tested when the animal appears quiescent. If loss of corneal and palpebral reflexes is not achieved within the chosen time, euthanize the animal immediately.

Record the time taken for loss of corneal and palpebral and other reflexes, the precise strike location(s), the position of the animal in the trap and the distance between the trap jaws. Subject all the animals to a pathological evaluation (clause 10).

6.7 Test report

Report the following information:

a) a description of the trap;

b) the animal being tested;

c) the length of the acclimatization period;

d) for each test animal: the age, sex, mass, other characteristics useful for interpretation (such as life conditions before testing etc.);

e) the number of traps and animals tested;

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

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

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

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

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

k) a description of the observed behaviour of each animal during the test;

l) the number of animals euthanized and the time taken for euthanasia for each animal;

m) the pathology protocol prepared by the veterinary pathologist for each animal (i.e. the information detailed in annex B).

7 Field testing for killing effectiveness

7.1 Principle

The ability of the killing trap to strike the target animals at target strike locations is evaluated (when applicable) on land or underwater. This test is also used to collect data related to capture efficiency, capture rate, selectivity and user safety (see clauses 8, 9 and 11).

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NOTE Since the time taken for unconsciousness and/or death cannot be measured during field tests, tests on live conscious and/or anaesthetized animals in a test room/compound are recommended as a complement. Ideally, field tests should be used to confirm findings in the test room/compound.

7.2 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.

7.3 Apparatus

7.3.1 Camera, to photograph the sets and entrapped animals.

7.4 Traps

The experimental traps shall be assigned with identification numbers. The number of traps 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). Prior to testing, the traps shall be prepared in a manner recommended by manufacturer. The preparation might include boiling, waxing, dyeing or painting. An equal number of control traps shall be used, if comparison of the trap performance is desired (see clauses 8 and 9).

7.5 Procedure

Establish the trap layout, and record the longitude, latitude, total area of the site, the type(s) of habitat and the species (target and non-target) known to be present. Set the traps within the trap layout in accordance with the manufacturer's instructions. Take pictures of each trap and its set and of the general environment. Make the trap identification number a part of the photographic record. (If control traps are used, place the experimental and control traps in the same substrate and/or vegetation type in pairs, with appropriate separation for the target animals, or alternatively within the trap layout using random assignment and the bait or lure recommended by the manufacturer.)

Check the traps daily (once within each 24 h period; at the same time of the day if at all possible) during the test period. Take photographs of each entrapped animal with a label that shows the file number of the animal. Examine the captured non-target animals externally, release uninjured non-target animals and provide adequate veterinary care for injured non-target animals. If any animal is found alive in a trap and it is seriously injured, euthanize it immediately, using a method of euthanasia that will not obscure any traumas caused by the trap (see annex B), and record the method of euthanasia.

Record the following information regarding each visit to the traps:

— the date and time;

— the weather conditions;

— the ground conditions (e.g. frozen, snow-covered);

— the trap type;

— the site location of the trap;

— the trap site substrate and/or vegetation type;

— the status of the trap (i.e. fired, not fired);

— the species captured (if any);

— the number of identifiable escapes;

— the file number for each animal;

— the strike location(s);

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— the position of each animal in the trap;

— the condition of each animal (dead, alive, unconscious);

— any observation related to the operation and safety of the killing trap.

Make sure that the number of target animals captured by the test traps is sufficient for the differences to be statistically significant at the level to be determined by the authority implementing the standard and include all captured target animals in the test and the report. If necessary, extend the test over time until the required number of target animals have been captured.

If pathological evaluation is carried out, see clause 10.

7.6 Test report

Report the following information:

a) the date and time;

b) the longitude and latitude of the site;

c) the total area of the trap layout;

d) the type(s) of habitat;

e) the weather conditions;

f) the ground conditions;

g) the species (target and non-target) known to be present;

h) the target strike location;

i) the number of traps tested;

j) the total number of trap nights (number of traps $\times$ number of nights set);

k) the number of traps fired and not fired;

l) the species captured (if any, common and scientific name);

m) the total number of identifiable escapes;

n) the total number of captured target animals;

o) the total number of captured non-target animals;

p) the capture rates of target and non-target animals;

q) file number for each animal;

r) the strike location(s);

s) the position of each animal in the trap;

t) the condition of each animal (dead, alive, unconscious, injured);

u) the observations related to the operation and user safety of the killing trap;

v) the number of traps that struck the target animals in the target strike location;

w) the number of traps that struck the target animals in vital location other than the target strike location;

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x) if control traps are used, record the above information related to them;

y) the pathology protocol prepared by the veterinary pathologist for each evaluated animal, if pathological evaluation is carried out (i.e. the information detailed in annex B).

8 Selectivity test

8.1 Principle

The capability of the killing-trap system to capture target animals rather than non-target animals is evaluated in the field by recording the number of target and non-target animals captured by the trap and by a control trap.

8.2 Procedure

Perform the test at the same time as the field test for killing effectiveness (see clause 7). Use control traps and set them as specified in 7.5.

8.3 Test report

Report the following information for test and control traps (see also clause 12):

a) the number of captured target animals;

b) the number of captured non-target animals;

c) the selectivity (see 2.15).

9 Capture efficiency test

9.1 Principle

The capability of the killing-trap system to capture target animals is evaluated in the field by recording the number of the target animals caught by the test trap and by a control trap.

9.2 Procedure

Perform this test at the same time as the field test for killing effectiveness (clause 7). Use control traps and set them as specified in 7.5.

9.3 Test report

Report the following information for test and control traps (see also clause 12):

a) the number of captured target animals;

b) the number of traps set;

c) the capture efficiency (see 2.1).

10 Pathological evaluation of trapped animals

10.1 Principle

The trap-related injuries on a sufficient number of animals trapped during testing (see 3.2) are determined by a veterinary pathologist using accepted post-mortem veterinary examination practices.

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10.2 Test personnel

The pathological evaluation of animals trapped during testing shall be carried out by a qualified veterinary pathologist.

10.3 Procedure

Subject a sufficient number of the carcasses of trapped animals (see 3.2) to pathological, radiological and, when necessary, histological examination by a qualified veterinary pathologist using accepted post-mortem veterinary examination practices as specified below. The pathologist shall evaluate and record the trap related injuries. (see 10.3.4).

Leave the animals in the traps (unless this is impractical because of the size of the trap). Label the animals used in the trap testing with the following information:

— the date of capture;

— the file number of each animal;

— the method of killing/euthanasia.

Place the labelled carcasses (with the traps left on the animals) in plastic bags and freeze them promptly. Make sure that the carcasses are not damaged during handling and transport. Keep the carcasses frozen until pathological and/or radiological examination can be performed.

10.3.1 Post-mortem examination

Perform the post-mortem examination as specified below and complete the pathology protocol (annex B) for each animal either by reporting the observations made or by NK (not known), NA (not applicable), NI (not inspected) or NS (not submitted).

When performing a post-mortem examination, describe the nature and extent of all tissue damage related to the area of the body examined. Start at the head and proceed anterior-posterior describing all lesions. For the internal examination, dissect all organs noting haemorrhage and damage to soft tissue, bone, organs, etc.

Record the following information regarding each animal:

— the scientific name;

— the sex as M (male) or F (female);

— the age as young/yearling, sub-adult or adult (or more precisely, if known);

— the mass in kilograms;

— the state of nutrition as emaciated, poor, normal or fat;

— a description of lesions/injuries.

10.3.2 Radiological examination

Perform radiological examination when traps based on striking/clamping forces are used. (For other types of traps this is optional.) X-ray the target area of the striking/clamping force and all other organs where fractures/lesions might occur.

10.3.3 Histological examination

When necessary, collect specimens for histological examination from the following organs: heart, lung, liver, kidney, brain, adrenal, muscle (preferably longissimus dorsi) and from the area where the trap strikes/restrains. Fix the specimens in 10 % neutral buffered formalin. Collect and examine other organs, if histology is relevant to the evaluation of the type, severity and age of the lesions/injuries.

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10.3.4 Trap-related injuries

Complete the last part of the pathology protocol (annex B) and describe all the injuries that can be related to the trap/killing-trap system.

10.4 Test report

Report the information detailed in annex B for each evaluated animal (see also clause 12).

11 Inspection and testing for user safety of traps

11.1 Principle

The ability of the trap design, and/or recommended safety devices, to provide safety to the users, while handling and setting the trap, is inspected and tested. Further information on user safety is recorded during the field tests (see clause 10).

11.2 Test personnel

The test personnel shall be experienced in setting the traps for the target animals under normal trapping conditions and shall use reasonable precautions to ensure safety.

11.3 Inspection and testing procedure (when relevant)

Inspect five traps of the same design to:

a) assess whether the user could reasonably extricate him/herself from the trap unaided;

b) assess whether, with safety devices in place, a human limb is restricted from access to striking and clamping components of the trap;

c) inspect whether the striking and clamping forces are set before or after the trap is in the final set position;

d) apply any integral or accessory safety devices provided with the trap or specified by the manufacturer and fire the trap;

e) note whether the safety devices can be easily set and unset with one hand;

f) note also whether the striking components remain in cocked position regardless of the trap position; alternatively, if the striking components move out of the cocked position, note whether they exert any clamping force;

g) assess the potential for and likely extent of human injury resulting from accidental discharge of the trap.

11.4 Test report

Report the following information (see also clause 12):

a) whether the user could reasonably extricate him/herself from the trap unaided;

b) whether, with safety devices in place, the trap restricts a human limb from access to striking and clamping components;

c) whether the striking and clamping forces are set before or after the trap is in the final set position;

d) whether the safety devices (if any) can be easily set and unset with one hand;

e) whether the striking components have remained in the cocked position regardless of the trap position; alternatively, if the striking components have moved out of the cocked position, note whether they exerted any clamping force;

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f) whether there is the potential for and the likely extent of a human injury resulting from accidental discharge of the trap;

g) any additional information on safety noted during the field tests (clause 7, when performed).

12 Reporting

All test reports according to this standard shall include the information given under each test method. In addition the report shall be accompanied by the information given in Table 1 regarding the tests performed and, if applicable, reasons why some tests were not performed.

Table 1 — Declaration of performed tests

No.	Test method	Performed	Not performed	Reasons/ comments
4	Mechanical testing			
4.1	Clamping force			
4.2	Impact momentum			
4.2	Impact force			
5	Kill testing with anaesthetized animals			
6	Test room/tank or compound testing			
7	Field testing for killing effectiveness			
8	Selectivity test			
9	Capture efficiency test			
10	Pathological evaluation of trapped animals			
11	User safety			

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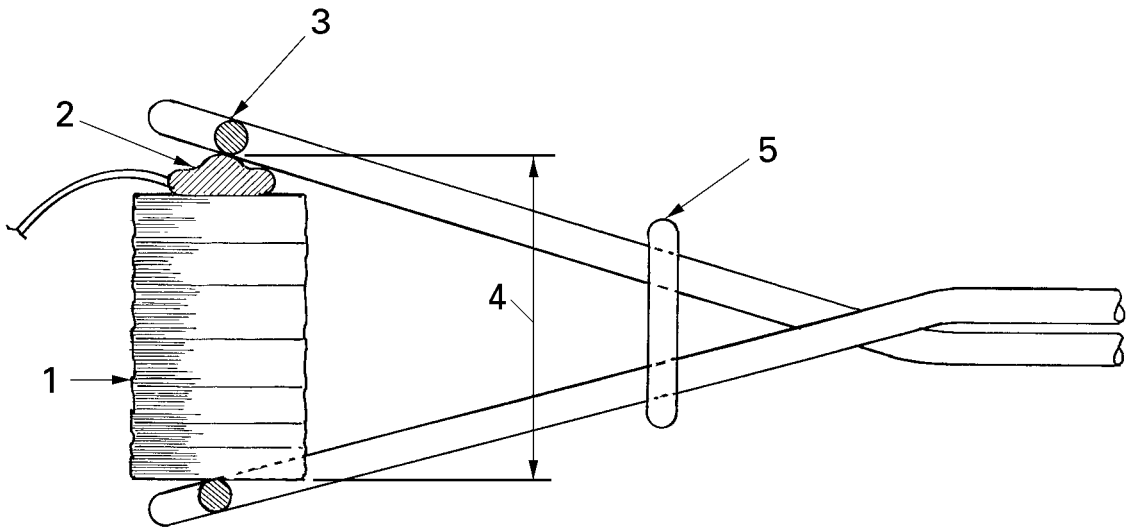
Annex A
(informative)

Mechanical testing

A.1 Typical apparatus for determination of clamping force and impact velocity

Typical examples of an apparatus for the determination of the clamping force and of the impact velocity of traps are given in Figures A.1 and A.2.



Key

1 Metal shims
2 Static load cell
3 Striking bar position
4 Specified jaw opening
5 Spring

Figure A.1 — Typical apparatus for determination of clamping force

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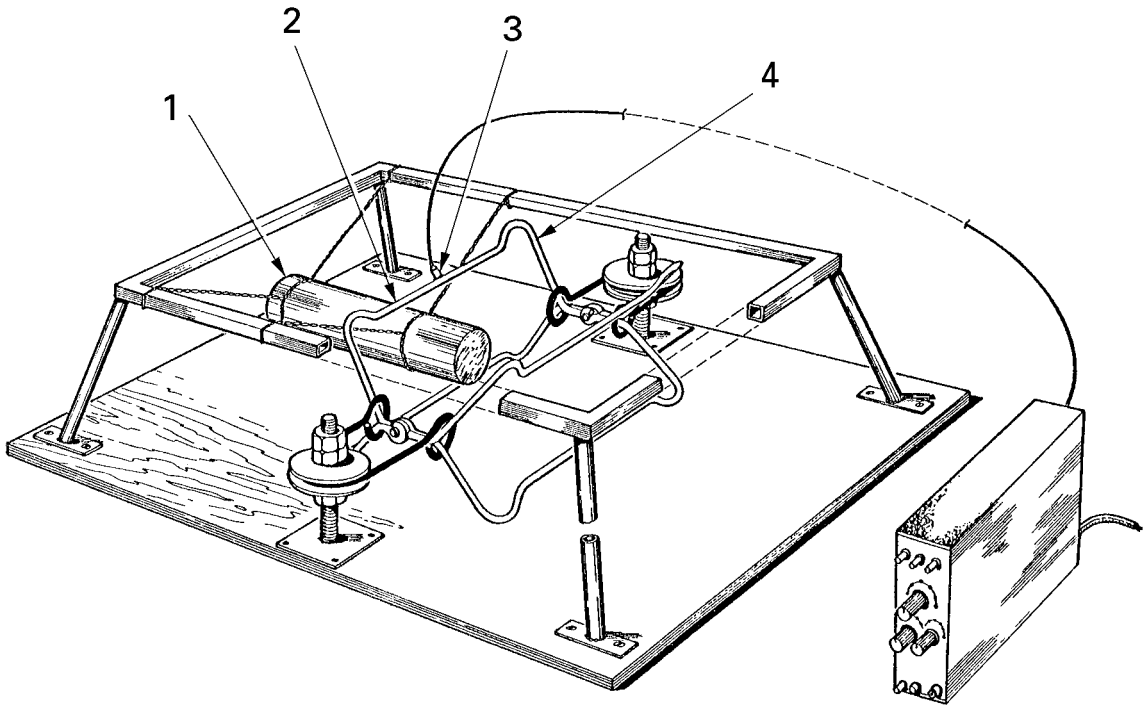

Key

1 Dummy target
2 Striking bar
3 Accelerometer
4 Trap specimen

Figure A.2 — Typical apparatus for determination of impact velocity

A.2 Determination of effective mass of striking bars

The following calculation is typical of the method to be used to determine the effective mass (m_e). The example pertains only to traps having a striking bar that executes a rotating motion on being triggered

Figure A.3 shows the dimensions and geometry of the rotating mass of a trap's striking bar. The moment of inertia of this U-shaped frame about the axis of rotation equals the sum of the moments of inertia, about this same axis, of the three bars that make up the frame. Assuming the masses m_1, m_2, and m_3 to be uniformly distributed, the total moment of inertia is

$$I = m_2 l_1^2 + \frac{1}{3} m_1 l_1^2 + \frac{1}{3} m_3 l_1^2$$

In terms of the effective mass m_e located entirely l_1 from the axis of rotation, the moment of inertia is

$$I = m_e l_1^2$$

Equating the moments of inertia yields

$$m_e = m_2 + \frac{1}{3}(m_1 + m_3)$$

Since moments of inertia are additive if they are about a common axis, the effective mass of rectangular frames symmetric about the axis of rotation may be obtained by doubling the effective mass of one half the frame. The latter would then have a geometry similar to that shown in Figure A.3.

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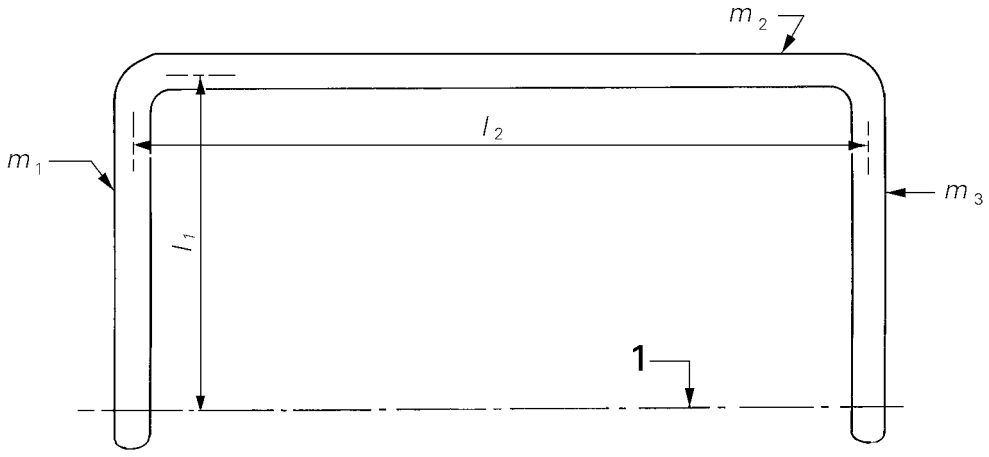

Key

1 Axis of rotation

Figure A.3 — Typical striking bar for determination of effective mass

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Annex B
(normative)

Pathology protocol

(A separate report form must be completed for each animal examined.)

Name of examining veterinarian:_____

Institution:_____

Address: _____

_____ Country: _____

ID of animal: ID-number in lab:

Animal species: Scientific name:

Sex: Age:

Mass (kg): State of nutrition:

Material submitted: whole body / part of body .....
(specify)

Type of trap: .....
(specify)

Manufacturer:

Description of trap enclosed Y / N Trap enclosed with animal Y / N

Date of catch: Date of examination:

Killing trap / submersion restraining trap Animal dead / euthanized

Animal from: experimental test / field test

Method of euthanasia: Radiographic examination Y / N

Carcass frozen / not frozen:

Other information:

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Examination of head	Macroscopic	Histological
Skin		
Subcutaneous tissues		
Muscle		
Nose		
Lips		
Teeth		
Gingiva		
Tongue		
Jaw		
Eyes		
Ears		
Cranium		
Brain		
Other parts of head		

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Examination of body (including neck)	Macroscopic	Histological
Skin		
Subcutaneous tissues		
Mammary glands		
Muscles		
Ligaments		
Ribs-sternum		
Vertebral column		
Tail		
Thoracic cavity		
Heart		
Trachea		
Lungs		
Oesophagus		
Abdominal cavity		
Liver		
Spleen		
Stomach		
Intestines		
Kidneys		
Adrenals		
Bladder, uterus, external genitalia		
Vessels		
Other organs		

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Examination of limbs	Macroscopic	Histological
Skin		
Subcutaneous tissues		
Tendons		
Ligaments		
Muscles		
Long bones		
Hip joint		
Scapular / humeral joint		
Elbow / knee joint		
Carpal / tarsal joint		
Metacarpal / metatarsal joint		
Feet		
Foot pads		
Toes		
Claws		
Other		
Other observations		

Trap-related Injuries: Based on the post-mortem examination it is my opinion that the following lesions/injuries can be related directly to the trap/trapping method:

.....

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Signature_____ Date _____

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Instructions

This pathology protocol shall be completed by a qualified veterinary pathologist and shall be enclosed with the killing trap test report.

Post-mortem examination

Perform the post-mortem examination as specified below and complete the aforementioned pathology protocol for each animal either by reporting the observations made or by NK (not known), NA (not applicable), NI (not inspected) or NS (not submitted).

When performing a post-mortem examination, describe the nature and extent of all tissue damage related to the area of the body examined. Start at the head and proceed anterior-posterior describing all lesions. For the internal examination, dissect all organs noting haemorrhage and damage to soft tissue, bone, organs, etc.

Record the following information regarding each animal:

— the scientific name;

— the sex as M (male) or F (female);

— the age as young/yearling, sub-adult or adult (or more precisely, if known);

— the mass in kilograms;

— the state of nutrition as emaciated, poor, normal or fat;

— a description of lesions/injuries.

Radiological examination

Perform the radiological examination when traps based on striking/clamping forces are used. (For other types of traps this is optional.) X-ray the target area of the striking/clamping force and all other organs where fractures/lesions might occur.

Histological examination

When necessary, collect specimens for histological examination from the following organs: heart, lung, liver, kidney, brain, adrenal, muscle (preferably longissimus dorsi) and from the area where the trap strikes/restrains. Fix the specimens in 10 % neutral buffered formalin. Collect and examine other organs, if histology is relevant to the evaluation of the type, severity and age of the lesions/injuries.

Trap-related Injuries

Complete the last part of the pathology protocol and describe all the injuries that, in your opinion, can be related to the trap/killing-trap system.

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