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Radio frequency identification of animals — Standardization of injection sites for different animal species —

Part 1: Companion animals (cats and dogs)

Identification des animaux par radiofréquence — Normalisation des sites d'injection pour différentes espèces d'animaux —

Partie 1: Animaux de compagnie (chiens et chats)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 19, *Agricultural electronics*.

ISO 15639 consists of the following part, under the general title *Radio frequency identification of animals — Standardization of injection sites for different animal species*:

— *Part 1: Companion animals (cats and dogs)*

Future parts are planned.

Introduction

Since 1989, animals around the world started to be identified with injectable tube implants. At that stage, there was no standardized technology and also no standardized method of using these implants.

Since 1996, ISO 11784 and ISO 11785 are in force and many countries around the world rely on these technical standards. The ISO 11784 and ISO 11785 technologies are used to identify animals with ear tag transponders, bolus transponders, leg tag transponders, and injectable tube transponders. There is no clear guideline to which international regulations can refer to where to inject the tube. This needs to be standardized for all animal species which are identified with these injectable tube transponders.

The standardized methods of identifying species allow a quick, reliable, and effective reading of animal identification codes and a reliable recovery of the injectable tube transponder when animals are slaughtered.

This part of ISO 15639 is relevant for veterinarians, animal owners, and authorities responsible for checking the identification of animals (e.g. customs offices, veterinary clinics, shelters, and slaughterhouses).

Radio frequency identification of animals — Standardization of injection sites for different animal species —

Part 1: Companion animals (cats and dogs)

1 Scope

The standardization of the injection sites of animal species is related to different species and several fields of interest.

After decades of market experience, migration of the transponder is still a problem in most animal species being identified by injectable transponders. Migration is related to several factors. The major issues are the injection site and the application of the injectable transponder but the correct injection site can be dictated by the dimensions (length and diameter) of the injectable transponder. In dogs and cats, this is not a big issue as the transponders used are the smallest readily available. There are several publications which precisely describe the application of injectable transponders anatomically but there is a demand from the community to have a comprehensive overview of all aspects related to the application and use of injectable transponders for different animal species.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11784:1996, *Radio frequency identification of animals — Code structure*

ISO 11785:1996, *Radio frequency identification of animals — Technical concept*

3 Terms and definitions

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

3.1
transceiver (reader)
device, according to ISO 11785, used to communicate with the transponder

3.2
transponder
radio frequency identification (RFID) device that transmits its stored information when activated by a transceiver and that can be able to store new information

3.3
FDX-B/HDX transceiver (reader)
transceiver that reads at least both FDX-B and HDX transponders, as defined in ISO 11784 and ISO 11785

3.4
FDX/HDX transponder
RFID device that transmits its transponder code, according to ISO 11784 and ISO 11785, when activated by a transceiver

3.5
advanced transponder
ISO 14223 transponder, compatible according to ISO 11785, with additional functionality (e.g. anti-collision, sensor measurements) and memory options

3.6
paraveterinary workers
non-veterinarians having made a particular training on injecting transponders into animals

4 Abbreviated Terms

EID	electronic identification
FDX-A	full duplex communication protocols as referred to in ISO 11785:1996, Annex A
FDX-B	full duplex communication protocol (conforming to ISO 11785)
HDX	half duplex communication protocol
RFID	radio frequency identification device

5 Identification of animals with injectable transponders

5.1 General

A transponder is the link between an animal and information about the animal in a database. It is preferable to register animals in internationally accessible and nationally recognized databases.

Injectable transponders may be injected parenterally in most animal species and theoretically in any site where injection is possible. From a practical point of view, injection sites should meet the following conditions:

a) Animal size and physiological development

To be considered in order to minimize the effect of the application of the device on the animal's physiology.

b) Migration rate

Migration should be minimized by injecting the transponder in areas with low migration rate.

c) Breakage risk

The bigger the device, the more risk of breakage there is, although this is a very rare phenomenon. There is evidently more risk in superficial injection sites, such as subcutaneous injection, due to the exposure to impacts, bites, etc.

d) Reading distance required

Reading distance is proportional to the size of the transponder and the antenna of the reader. Very small devices are not registered properly in dynamic reading.

The following are the other factors to be considered:

— Injection site shall entail the minimum risk and stress possible for the animal. Therefore, devices should not be injected in highly vascularised or sensitive areas, such as the hoof or the axilla skinfold. Also, areas close to important organs should be avoided, such as eyelids.

— The injection site shall be easily accessed both for injection and reading of the device. It should be safe for the user to implant and read the device.

— The injection site shall be located in a reasonably clean area of the body. Special care should be taken with sites such as the perianal region or the distal portions of the extremities.

— Impact areas, where the animal is subject to frequent traumas, should be avoided.

— The site shall possess anatomic characteristics that facilitate the natural retention of the devices, reducing migration.

Since injectable transponders are applied parenterally and this is generally considered a clinical procedure, only veterinarians and paraveterinary workers should be allowed to carry out this practice.

There are many animal species that are treated as companion animals but are not mentioned in this part of ISO 15639. They will be mentioned in a future part of ISO 15639.

Due to the use of the two implantation sites, veterinarians and paraveterinary workers should review and follow the scanning procedures as discussed in this part of ISO 15639.

5.2 Companion animals: Canine and feline (dogs and cats)

The transponders have to be put subcutaneously in the canine and feline. The following are two recognized implantation sites in use worldwide.

a) The transponder (containing a microchip) is implanted in the left side of the body in the cranial third of the neck between ear and shoulder (see Figure 1).

   — Position of the insertion point: From the dorsoventral midline of the neck at the caudoventral edge of the ear 1 cm to 6 cm (one to four fingers, depending on the size and the breed) of the distance to the anterior edge of the shoulder blade.

   — Direction: Insert the cannula anteroventrally and place the transponder subcutaneously so that the position of the transponder is at a 90° angle to the jugular vein.

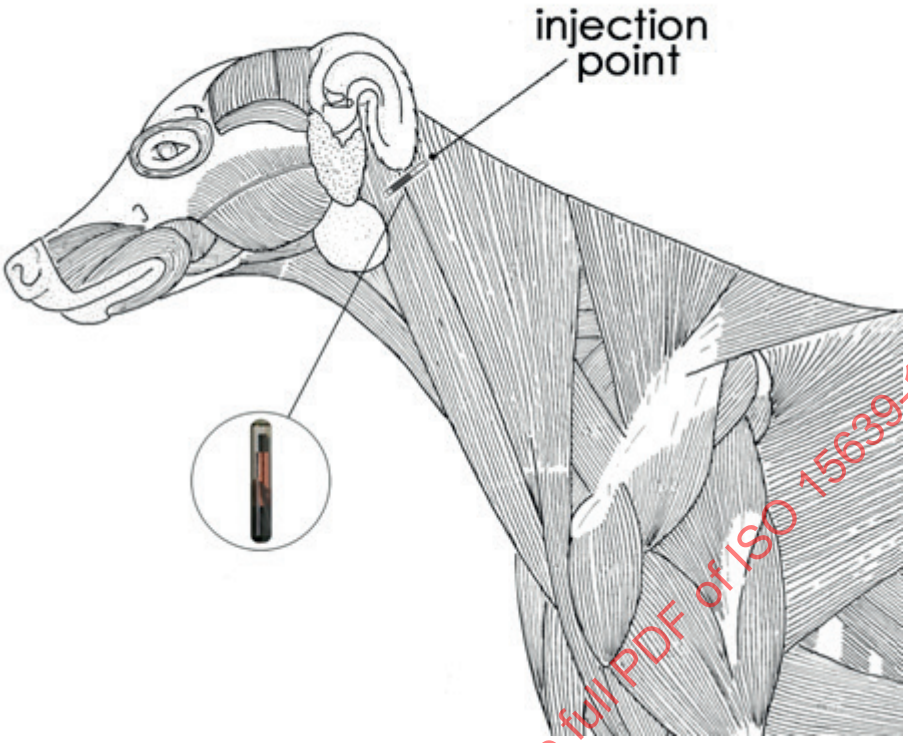

Figure 1 — Transponder is implanted at the left side of the body laterally in the neck

b) The transponder (containing a microchip) is implanted subcutaneously in a way that it lies in the midline halfway between the anterior and posterior edge of the scapulae after injection (see Figure 2).

   — Position of insertion point: The cannula is inserted through the skin at the point which deposits the transponder in the subcutaneous tissue at the specified location.

   — Directions: The cannula should be held at an angle of 20° to 30° to the skin entering the body in a cranioventrally direction.

   — Depth of penetration: The cannula should penetrate the body only a sufficient distance to ensure that the transponder comes to lie in the specified position. This will depend on the size of the animal.

Scanning with the appropriate RFID reader (conforming to ISO 11785) shall concentrate on the implantation site commonly used in that geographic locale. If an animal scan negative, it is strongly recommended to scan the alternative site in use, as defined above. As migration is possible, the animal might need to be fully scanned to detect the presence of a transponder after migration.

Since a considerable number of countries do not conform to either a) or b), it is strongly recommended to describe the injection site in the relevant ID document or passport

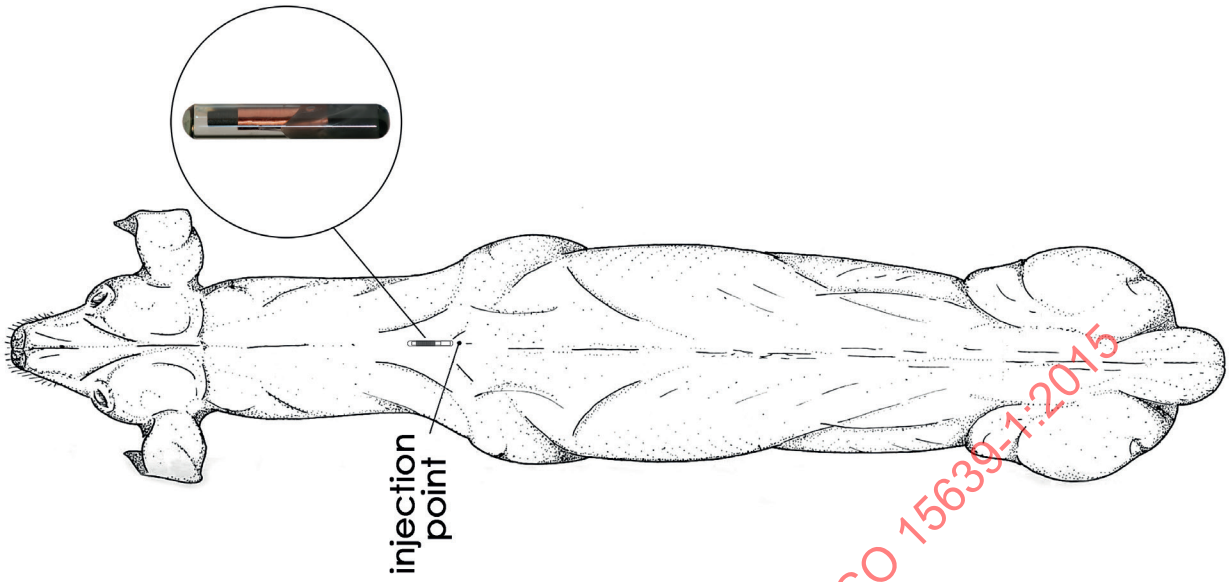

Figure 2 — Transponder is implanted at the dorsal midline just cranially to the shoulder blades

5.3 Reading and detecting the position of the injectable transponder

Depending on the size of the animal and the injection site used, it might be complicated to detect the position of the transponder.

5.3.1 General reader information

— With a hand-held reader with a big air coil antenna of which the analog part of the transceiver has been fully developed, a 12 mm transponder, which is positioned horizontally under the subcutis in parallel to the spinal column, can be read at a distance of about 10 cm to 20 cm. This means the detection of an operating injectable transponder determines that the device is present although it does not indicate where it is positioned.

— With a hand-held reader with a vertical integrated ferrite core antenna of which the transceiver has been built with a standard reader chip, a 12 mm transponder, which is positioned horizontally under the subcutis in parallel to the spinal column, can be read on a distance of up to 5 cm. This means the detecting takes place in a circular area of about 5 cm.

— Turning such a reader perpendicularly decreases the area of detection to a circular region of about 2 cm in diameter when approaching closer to the animal.

A very precise position of the transponder can be determined by X-ray.

5.3.2 Detecting the transponder position

— When it has been injected on the left side of the neck

  Approach the animal with the reader in the read and search mode and move the reader slowly from the shoulder blade direction ear in circular movements.

— When it has been injected in the midline between the scapulae

  Hold the reader close to the animal over the shoulder blades in the midline. Move the reader slowly in a circular motion along the midline and down each side of the shoulder and neck. Rotate the

reader from side to side while doing so to change the orientation between the transponder and the transceiver antenna. Keep the reader close to the animal.

— When the transponder is not found at the expected position (migration)

Detecting and decoding of an operating injectable transponder is possible with the above mentioned readers and ways, depending on the reader type and orientation, it might take time. To scan an animal with a migrated transponder, a scanner is needed which can be put in search mode to scan until either the transponder is detected or the person using the reader decides to stop reading.

a) When the transponder has been injected on the left side of the body, scan first the shoulder region to the elbow and the foot on the left side and search laterally and ventrally of the neck, direction sternum. To detect if the transponder is definitively in the animal's body, a radiograph is needed.

b) If the transponder cannot be found after searching around the whole body with a reader with a good reading performance, there either seems to be no transponder or there seems to be a defective transponder. When the transponder has been injected between the shoulder blades, it might have migrated to either the left or the right side of the animal's body. Scan first the shoulder region to the elbows and the foot on both sides and search laterally and ventrally of the neck, direction sternum. To detect if the transponder is definitively in the animal's body, a radiograph is needed.

c) Any authority adopting the standard should make clear to users that if they fail to identify a transponder at the recommended site, they should scan the alternative site before concluding that no functional microchip is present, just in case the animal in front of them has been implanted at the alternative site.

6 Education and training

Knowledge on conventional and electronic identification means and procedures is not presently a part of the educational program of most veterinary medical schools. The relevance of identification as a basic tool for animal health and production is beyond all question and therefore, it is strongly recommended to include specific training on animal identification as a basic skill for veterinarians and paraveterinary workers.

On the other hand, many other areas aside from veterinary science are also involved in identification procedures and should also be subject to specific training. The process of animal identification should be safe both for the animal and the person applying it and should also meet basic and standardized procedures in order to be more effective. This is only possible with specific training covering at least basic knowledge on devices, readers, and application procedures. Recommended procedure for the application of injectable transponders is included in Annex A.

7 Procedure for non-reading

If the transponder is implanted as per the procedure and in the appropriate location on the animal as described in Clause 5 and the transponder is not found and therefore, not read by the appropriate reader, then one should assume one of the following four scenarios:

a) non-functioning transponder;

b) reader and transponder technology do not match (e.g. injectable transponder does not conform to ISO 11784 or ISO 11785);

c) transponder was improperly implanted and either migrated or was rejected at the time of implantation;

d) transceiver is inappropriate or defective.

The following are the recommended actions to take if and when a transponder is not read or located.

a) Confirm that the reader being used is able to read ISO 11784 and ISO 11785 technology with sufficient performance.

b) If the transponder still cannot be read, a radiograph should be taken to check if the transponder is present and not broken.

c) If the radiograph shows that an intact transponder is present but it cannot be read with a transceiver that has been shown to be fully functional, a new transponder should be implanted. The failed device may be left in place or may be surgically removed. If the animal is identified as part of an official identification scheme, the details of the new transponder has to be certified by a veterinarian. The Veterinary Declaration in Annex A should be used for this purpose.

Annex A
(normative)

Problem of failed transponders

Even if there are very few cases related to the total quantity of transponders being used, it is a fact that a transponder might fail.

It is also a fact that, particularly in the companion animal sector, "old" FDX-A transponders are implanted and the animal, for whatever reason, has been equipped with a second transponders conforming to ISO 11784 and ISO 11785. This would mean that the animal is carrying two working transponders of two different technologies. Using an ISO reader will always detect the transponders conforming to ISO 11784 and ISO 11785. Using an ISO+ (plus Annex A) reader might, under certain circumstances, detect either the FDX-A or the FDX-B transponder.

The market might be faced with the two following situations:

— Case 1: no reading – a dead transponder;

— Case 2: two working transponders of different or the same technologies.

A recent case has shown that national authorities establish guidelines which cause pet owners and the RFID market for animals a lot of problems.

The RFID number is linked to any needed examination and blood test results (i.e. rabies titre) and the RFID number is not working anymore.

The following are recommendations on how to behave if a transponder is not readable.

a) Check if the reader is dedicated to read only FDX-B transponders

   — make sure that your reader is also capable of reading FDX-A technology with sufficient performance;

   — make sure that your reader is also able to read HDX transponders

b) If the transponder does not respond with ISO 11785 readers which read the technologies described in ISO 11785:1996, Annex A in addition

   — take an X-ray of the animals to see if the transponder is physically really there

      1) the veterinary removes the transponder and sets a new one;

      2) leaves the transponder in the animal and puts a new one.

   In both cases, the modification has to be certified by a Veterinary Declaration.

c) In case 2, where two working transponders are detected, the second transponder number has to be noted in the World/European Passport and/or the accompanying document.