



National Livestock  
Identification System  
Sheep & Goats

# NLIS Sheep & Goats

## National Livestock Identification System

### Device Standard

## Radio-frequency devices

April 2009

This Standard is based on an assessment of products and technology currently available for the sheep and goat industries. The NLIS Standards Committee will consider technologies that may become available in future, and where there is a clear benefit, the Standard will be amended to accommodate these new technologies.

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## NLIS Sheep & Goats – Radio frequency identification device standard

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# 1 Introduction

- 1.1 The National Livestock Identification System (NLIS) for sheep and goats, known as NLIS (Sheep & Goats), is a 'whole of life' system for tracing animals from their properties of birth until they die or are slaughtered, for food safety, biosecurity and market access purposes. NLIS (Sheep & Goats) was introduced nationally in 2006 by the sheep and goat industries, with the support of the State/Territory and Federal Governments.
- 1.2 In mid 2005, stakeholders agreed that NLIS (Sheep & Goats) should operate using visually-readable ear tags and paper-based movement records, and accommodate the voluntary use of NLIS approved radio-frequency (RFID) technology once a technology standard was established.
- 1.3 This Standard details minimum mandatory specifications for RFID devices supplied to producers for use under NLIS (Sheep & Goats). This RFID Standard does not apply to approved ear tags that are visually-readable only. A separate standard applies for visually-readable ear tags, a copy of which can be obtained from NLIS Ltd.
- 1.4 The NLIS Standards Committee is appointed by SAFEMEAT to establish standards for devices supplied for use under NLIS (Cattle) and NLIS (Sheep & Goats). The NLIS Standards Committee makes recommendations to NLIS Ltd on which devices should receive accreditation, be eligible to carry the NLIS logo and be supplied to producers for use as part of the NLIS. NLIS Ltd requires that companies with devices recommended for accreditation sign a licence agreement before commencing the production of devices. A copy of the licence agreement is available from NLIS Ltd.
- 1.5 Suppliers seeking NLIS accreditation for devices must supply evidence to demonstrate that their device complies with the relevant Standard. The NLIS Standards Committee may reject submissions that do not contain convincing evidence. A Technical Working Group (TWG) provides technical advice to the NLIS Standards Committee on devices and readers, as well as device manufacture, supply and associated data integrity arrangements.
- 1.6 The NLIS Standards Committee may recommend for accreditation under NLIS (Sheep & Goats) devices that they judge meet the requirements of the RFID Standard in relation to their performance in sheep. Devices may not perform as well when used to identify goats and may not be suitable for goat identification purposes. Where the NLIS Standards Committee believes that a device will meet the requirements of the RFID Standard when used to identify goats, the NLIS Standards Committee may approve the inclusion of a statement to this effect on the packaging issued with devices and in the supplier's advertising material.
- 1.7 NLIS accredited devices may only be supplied to producers in accordance with the NLIS Terms of Use and in compliance with State/Territory legislation. To support the use of NLIS (Sheep & Goats) approved RFID devices, State/Territory legislation must prohibit:
  - (a) removal of functioning devices other than by abattoir or knackery staff, or unless written authorisation has first been obtained from an authorised government official
  - (b) use of NLIS accredited devices unless those devices are registered on the NLIS database against the Property Identification Code (PIC) of the property on which they are to be used, or a database approved by the NLIS Standards Committee.

- (c) re-use of devices or device components unless the protocol for the recovery, collection, checking and re-issuing of devices or device components has been approved by the NLIS Standards Committee.
  - (d) use of devices approved under the NLIS (Sheep & Goats) RFID Standard to identify cattle, or use of NLIS (Cattle) devices to identify sheep and goats.
- 1.8 Accredited devices may be applied to either ear, unless a State has a particular requirement.

## 2 Device characteristics

- 2.1 Devices approved under this RFID Standard may only be in the form of an ear tag. Devices shall contain a half duplex (HDX) transponder complying with ISO Standards 11784 and ISO 11785. The unique number encoded within each transponder must be unalterable, and commence with a 3-character numeric manufacturer's code issued by the International Committee for Animal Recording (ICAR).
- 2.2 The NLIS Standards Committee may assess and endorse devices containing transponders, which do not comply with Clause 2.1 above, provided that:
- (a) there is a clearly demonstrated net commercial advantage to the sheep and goat industries associated with the introduction of such technology, and
  - (b) the operation of such technology and associated readers will not have an adverse impact on the reading of devices containing ISO compliant HDX transponders, or on the NLIS database.
- 2.3 For devices that are two-piece ear tags, the NLIS number must be printed on the female component of the device, with the option of the last five components of the NLIS number being duplicated on the male pin. Where this option is exercised, the packaging of two-piece tags must be designed to prevent any disassociation of the NLIS number on the female component of the tag and the numbering on the male pin. For one-piece tags, the complete NLIS number must be printed on one face of the tag, or the PIC may be printed on one face and the last eight digits of the number printed on the other face.
- 2.4 Devices shall be marked with the NLIS logo and if space permits, additional information that facilitates the identification of the property (such as a brand or property name). Where this option is not utilised, the default option is to print "Do not remove" on the male pin.
- 2.5 Ear tags accredited for NLIS (Sheep) must comply with the following colour requirements:
- (a) The female component of a two-piece NLIS (Sheep) or NLIS (Goats) breeder ear tag must be predominantly yellow, with the discretion for the male pin to adopt the national 'colour of year' system as in Clause 2.3 (a) of the NLIS (Sheep & Goats) Standard for visual tags. A one-piece breeder tag must be predominantly yellow.
  - (b) A post breeder NLIS (Sheep) or NLIS (Goats) ear tag must be predominantly pink, including the male pin.
  - (c) 'Predominantly' is defined as a minimum of 75% of the visible area. The colour of printing is not included in the calculation of this percentage.

### 3 Device numbering

- 3.1 At the time of manufacture, an NLIS number is to be generated and accurately associated with the transponder's RFID number. The NLIS number shall be in the following format:
- (a) The State/Territory approved 8-character Property Identification Code (PIC) of the property on which the devices are to be used,
  - (b) Two alphanumeric characters in combination coding for:
    - i. Manufacturer as assigned by MLA; and
    - ii. Tag type (see Appendix 1).
  - (c) Year of manufacture (the first character of the serial number cannot be 'O', 'I', 'S' or 'L').
  - (d) A 5-character serial number:
    - i. The first of which may be alpha or numeric except that the letters 'O', 'I', 'S' and 'L' cannot be used;
    - ii. The remaining 4 numbers may only be numeric.
- 3.2 The NLIS number is the visual number printed on the outside of the ear tag.

#### Example: NLIS number format

N	A	1	2	3	4	5	6	X	S	A	C	2	3	4	5
PIC (Tailtag) of the NSW property for which the device was manufactured (8 characters). Examples of PIC formats for other states are: VIC: 3ABCD123 QLD: QABC1234 SA: SA123456 WA: WABC1234 TAS: MABC1234 NT: TABC1234								Manufacturer Code	Tag type	Year manufactured	Unique number (5 characters)				

**Manuf. code (1)**

e.g. X = Allflex  
L = Leader etc.

**Tag type (1)**

S = NLIS Sheep RFID breeder ear tag  
T = NLIS Sheep RFID post-breeder tag  
K = NLIS Goat RFID breeder ear tag  
L = NLIS Goat RFID post-breeder tag

**Year manuf. (1)**

X = 2002 A = 2005  
Y = 2003 B = 2006  
Z = 2004 C = 2007  
etc.

**Unique number (5)**

The first character may be numeric or alphabetic, except for O or I.

### **3 Supply of accredited devices**

- 3.1 Suppliers shall have an auditable production system which as far as is practical eliminates errors associated with the printing of visual information on devices. Where orders have been received from producers, suppliers shall have an algorithm validation procedure to check the validity of each producer's PIC prior to printing. Where required by State/Territory authorities, suppliers shall check the PIC supplied by producers seeking devices against the name and address details on the State/Territory PIC register.
- 3.2 Suppliers must check each device to ensure that the NLIS number and transponder number are unique, and that the transponder can be reliably read, prior to the dispatch of the device to a producer. The supplier must also ensure that the NLIS number assigned to each device is correctly associated with the encoded RFID number in the transponder. A production file linking the RFID number and NLIS number for each device must be submitted to the database at the time of manufacture and prior to the dispatch of the device to the producer.
- 3.3 The permission of the NLIS Standards Committee must be sought prior to the recycling of devices (or the transponders or other components of devices) for re-use for any purpose. The NLIS Standards Committee will determine the terms and conditions under which recycling of devices or components is permitted, in consultation with relevant State/Territory authorities and SAFEMEAT.
- 3.4 Suppliers of two-piece devices must have recording systems to ensure that batches of male pins can be accurately correlated with female pins in the event of failures associated with the male pin.
- 3.5 Suppliers shall have a defective product recall and replacement procedure. Suppliers shall alert the NLIS Standards Committee within five working days of all complaints from producers, processors or stock agents about device quality, performance and reliability. A resolution report may be supplied if available.
- 3.6 Suppliers shall maintain for a minimum of seven years a copy of producer orders, the date each order was dispatched and the details regarding the transponder and NLIS numbers for each device. Records of orders and dispatch details may be kept in electronic form with backup systems in place.
- 3.7 Suppliers of accredited devices, including recycled devices, shall transmit to the NLIS database (or a database approved by the NLIS Standards Committee, and if required, to State/Territory databases), information relating to producers receiving devices, including their name and address, the date each order was dispatched and the transponder and NLIS numbers associated with each device.
- 3.8 Suppliers shall permit auditors engaged by Meat & Livestock Australia, or a State/Territory Government, or the Federal Government, to audit during normal business hours the manufacturing, printing and dispatch facilities of the supplier, provided at least 10 working days notice is given of the audit. The supplier shall permit the auditor to inspect and copy records relating to the production and dispatch of devices issued to producers for use under NLIS.
- 3.9 Suppliers of devices shall attain ISO 9000 certification for production and supply of devices within 12 months after commencement of commercial supply of the device. A copy of this RFID Standard and any non-conformance issues reported by NLIS Ltd or a State/Territory or Federal Government authority in the preceding 12 month period must be supplied to the licensee's third party auditor prior to the annual audit.

- 3.10 A copy of the third party auditor's annual report relating to production and supply of accredited devices must be submitted to NLIS Ltd within four weeks of its receipt.

## **4 Device performance specifications**

- 4.1 The likelihood of devices becoming physical contaminants in meat or edible offal must be remote. Devices must not be capable of causing chemical contamination of meat or edible offal.
- 4.2 Devices should not adversely affect the health and welfare of identified sheep and goats.
- 4.3 Devices must maintain structural integrity for at least seven years after installation on sheep and goats in Australian conditions. Printing on devices shall be readable at a distance of 0.75 metres. Devices shall remain visually-readable for at least five years.
- 4.4 The transponder within devices shall be reliably machine-readable for a minimum of seven years following the installation of devices in typical Australian field conditions.
- 4.5 NLIS (Sheep & Goats) approved devices are intended to remain attached to sheep and goats until they die or are slaughtered. The physical loss of devices from sheep and goats on typical Australian sheep meat, wool and goat properties combined with transponder failure shall not exceed 3.5% within three years under normal field conditions. Transponder failure must not exceed 0.5% over the first three years.
- 4.6 Once an animal is restrained, installation of devices shall take no more than 20 seconds per animal, pose no undue risk to the operator and cause minimal discomfort or danger to the animal. Device breakage and applicator equipment failure shall occur during no more than 2% of installation attempts.
- 4.7 Where the device is an ear tag, the supplier must specify on the accompanying directions for use whether any precautions need to be taken during application to prevent the ears of sheep and goats being ripped.
- 4.8 It is vitally important that devices be readable with a very low failure rate when sheep and goats are being handled at commercial speeds in on-farm, saleyard and abattoir situations. Using commercially operating readers, it shall be possible to reliably machine read (> 99% successful reads) installed devices in sheep moving freely up to three abreast with the device capable of being read at a distance of 0.7 metres.
- 4.9 Devices that are ear tags must be designed to prevent unauthorised removal and reuse.
- 4.10 A device is approved as a complete unit, and components may not be substituted. To maximise tag retention, a female component must only be used with a pin approved for use with the device.

## Appendix 1 – Device codes

The codes in this table apply to identification device types (tag types) approved under NLIS (Cattle) and NLIS (Sheep & Goats).

These codes appear in the tenth position of the NLIS number, for example:

N	A	1	2	3	4	5	6	X	S	A	C	2	3	4	5
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Device / tag type	Code
<b>NLIS (Cattle) Breeder device</b>	
Ear tag with machine readable transponder	<b>B</b>
Rumen capsule	<b>C</b>
<b>NLIS (Cattle) Post-breeder device</b>	
Ear tag with machine readable transponder	<b>E</b>
Rumen capsule	<b>F</b>
<b>NLIS (Sheep ) RFID breeder ear tags</b>	<b>S</b>
<b>NLIS (Sheep) RFID post-breeder ear tags</b>	<b>T</b>
<b>NLIS (Goat) RFID breeder ear tags</b>	<b>K</b>
<b>NLIS (Goat) RFID post-breeder ear tags</b>	<b>L</b>

## Appendix 2 – Glossary of terms

Note: Any reference to sheep includes lambs and farmed goats and kids.

<b>Term</b>	<b>Definition</b>
Colour of year system	A tagging system that visually denotes the age of the sheep by eight colours that rotate through a defined sequence as described in 2.3 a) of the NLIS (Sheep & Goats) Visual tag standard.
Device	An ear tag or other piece of equipment that is attached to or inserted in sheep and lambs which may serve to identify them.
Ear tag	A device which is attached to the ear of sheep and lambs and provides a means of identifying them.
Knackery	Premises operating under State/Territory law where livestock and carcasses are processed other than for human consumption.
Manufacturer code	A single letter e.g. X, L etc. in the ninth position of the unique NLIS device number position as described in 3.2 of this RFIS standard.
National Livestock Identification System (NLIS)	Australia's system for identification and tracing of animals to their property of birth and last property of residence.
NLIS logo	The logo used to identify tags endorsed under the NLIS (Cattle) and NLIS (Sheep & Goats) programs.
NLIS (Cattle) breeder device	A device for application to cattle still on their property of birth.
NLIS (Cattle) post-breeder device	A device for application to cattle no longer on their property of birth and not already identified with a Breeder or Post-breeder device.
NLIS (Sheep) visual breeder tag	A tag for application to sheep still on their property of birth (origin).
NLIS (Sheep) visual post-breeder tag	A visual ear tag, pink in colour, used to identify sheep and goats that are no longer on the property of birth and introduced animals that have lost their original sheep breeder tag.
NLIS (Sheep) RFID breeder tag	An RFID ear tag to identify sheep still on their property of birth. The female component of a two-piece ear tag must be predominantly yellow. There is discretion for the male pin to adopt the 'colour of year' system. A one-piece tag must be predominantly yellow.
NLIS (Sheep) RFID post-breeder tag	An RFID ear tag to identify sheep no longer on the property of birth, and introduced animals that have lost their original sheep breeder tag. A post-breeder ear tag must be predominantly pink, including the male pin.

<b>Term</b>	<b>Definition</b>
NLIS (Goat) RFID breeder tag	An RFID ear tag used to identify goats still on their property of birth. The female component of a two-piece breeder ear tag must be predominantly pale green. There is discretion for the male pin to adopt the 'colour of year' system. A one-piece breeder tag must be predominantly pale green.
NLIS (Goat) RFID post-breeder tag	An RFID ear tag used to identify goats no longer on the property of birth, and introduced animals that have lost their original breeder tag. A post-breeder NLIS (Goats) ear tag must be predominantly pink, including the male pin.
Over-the-Hooks	Where sheep and farmed goats are sent directly to an abattoir and paid for on a weight and grade basis post-slaughter.
Processor	A person, organisation or company actively engaged in the slaughter of sheep and lambs.
Producer	A person, organisation or company actively engaged in raising sheep or goats (including fibre, meat and dairy animals).
Property	A parcel of land, consisting of one or more blocks within the one locality, operating as part of a livestock enterprise.
Property Identification Code (PIC)	The eight-character alphanumeric code allocated by the relevant State or Territory authority to identify a specific property.
Reader (hand-held or fixed)	Readers contain a transceiver that activates the transponder in a device. The device transmits a signal containing a unique number. The signal is received by the reader and the number decoded.
Recycling	The process of recovering, collecting, accounting for, disinfecting and reissuing NLIS accredited devices or device components.
Rumen bolus	A device containing a transponder administered orally to ruminant species and designed to remain in the rumen or reticulum.
SAFEMEAT	The national committee of red meat industry, State/Territory and Commonwealth leaders responsible for developing and monitoring the implementation of food safety policy in the red meat industries.
Supplier	The entity holding the NLIS (Sheep & Goats) licence with NLIS Ltd.
Transponder	An integrated circuit (microchip) that responds to an electronic signal transmitted from a reader at a specific frequency.
Technical Working Group (TWG)	The technical working group that advises the NLIS Standards Committee on technical matters relating to tags, readers and device standards.
Wrap-around tail tag	A transaction tag made of vinyl that is wrapped around the tail of cattle above the brush, and is used for the short term identification of cattle.
Vendor	A person, organisation or company selling an animal.