ICAR test of conventional plastic ear tags

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History

- ICAR involved in developing the original ISO 11784 and ISO 11785 standards
- ICAR has been testing RFID devices for more than ten years
- Test protocol for conventional plastic eartags developed from late 1990´s
- First test round invited in 2006

Conventional plastic eartags

- Ear tag testing procedure consists of the following parts:
  - Preliminary basic checks of tags and pliers
  - Laboratory test
  - Preliminary/Extended field test
  - Provisional/Final Approval

Plastic ear tags with RFID

- Current ICAR test protocols test RFID devices only in laboratory conditions
- Current ICAR test protocols test only electronic conformance and performance
- New ICAR test on RFID ear tags based on test on conventional plastic ear tags
- Test of transponder performance on tags after three and 12 months

Required performance

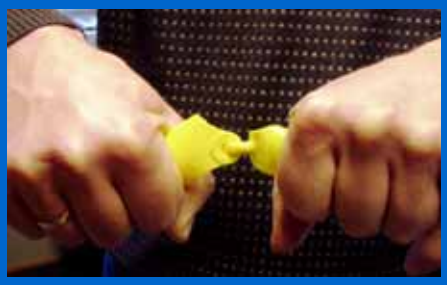
- Locking mechanism
  - Application ease
  - Break force at relevant temperature
  - Tamperproof
- Endurance (chemical, physical)
- Reading distance, optical
- New tag – aged tag
- Retention rate

Preliminary assessments

- Application, without and with ears
- Axial pull at 150 N
  - Ambient temperature
  - 80 ºC (175 ºF)
- Transverse pull
  - Ambient temperature
  - 80 ºC (175 ºF)

Pre Test, Axial Pull

Pre Test, Transverse pull



Criteria preliminary test

- No tags of 60 failed locking without ears
- No tags of 40 failed locking with ears
- No tags of 20 broken and still reuseable at 150 N axial pull at ambient temperature
- No tags of 20 broken and still reuseable at 150 N axial pull at 80 ^{o}C
- No tags of 20 broken and still reuseable at transverse pull at 80 ^{o}C

Laboratory test

- Type of plastic
- Plastifying agent
- Organic, carbon and mineral content
- Toxic elements
- Performance assessments

Laboratory test

- Heat and humidity
  - (23°C, 50 % humidity)
- Acid bath
  - 3 weeks in 50°C acid liquid (pH = 3)
- Alcaline bath
  - 3 weeks in 50°C alcaline liquid (pH = 12)

Accelerated ageing

The accelerated ageing process consists of 180 simulated climatic cycles (about 1000 hours) each being comprised as follows:

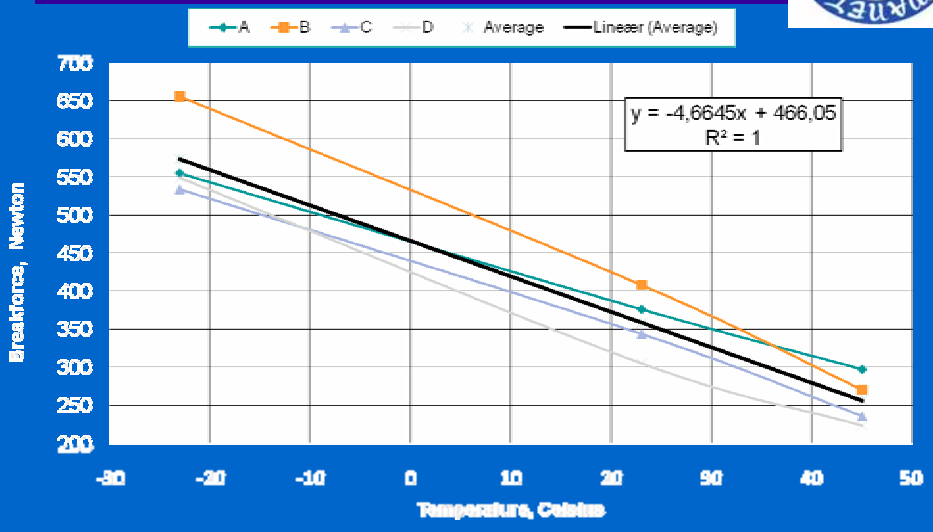
CLIMATIC CYCLE *	TEMP-ERATURE	HUMIDITYAND LIGHT	DURATION OF THE PHASE
Phase 1 – rain effects	20°C	simulated rain - no light	30 min
Phase 2 – cold effects	-20°C	cold - no light	60 min
Phase 3 – heat and humidity effects	55°C	humidity of air = 95 %	60 min
Phase 4 – dry heat and light effects	55°C	Irradiance : 0.55 W/m^{2}at wavelength 340nm Total light power emitted P = 623 W/m^2 Spectrum : 300 – 800 nm Arc xenon UV light Inner and outer filters in borosilicate the radiant heat is produced by a black board of anodised aluminium with temperate of 55°C	80 min

* The rate of temperature change between each phase is 2° C/min.

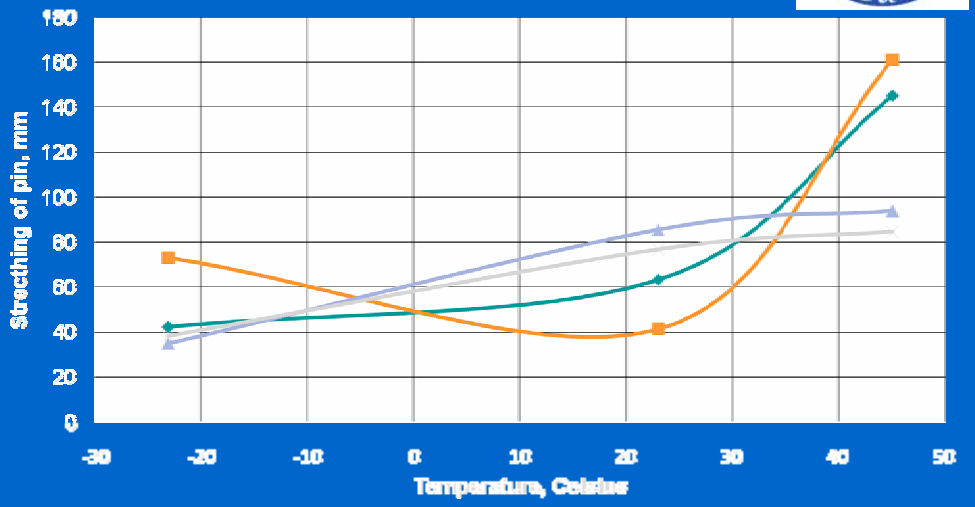
Tested character-istic	Unused Tag					Aged Tag*		
	Un-treated	Heat & Humidity 23°C	acid bath	alkaline bath	abrasive treatment	Un-treated	Heat & Humidity 23° C	abrasive treatment
Resistance of the locking system		✓					✓	
Visual readability	✓				✓	✓		✓
Machine readability	✓	✓	✓	✓	✓	✓	✓	✓

* An aged tag is a tag that has been subjected to the accelerated ageing process.

Break force



Stretching of pin before unfastening



Readability test

- 4 digit test codes
  - printed on tags
  - printed in same size black on white paper
  - placed on wall with appropriate lighting
- Five assessors moving towards wall starting at 15 meter distance
  - stop when they read the code
  - distance measured

Approval criteria

- Unused tag without treatment
  - Tags must be read at at least 80 % of distance to black print on white paper
- Tags with abrasive treatment
  - Tags must be read at at least 65 % of distance to black print on white paper
  - Even artificially aged tags

Abrasion and readability

Field test

- At least two countries
  - Minimum 400 test animals per country
  - Minimum 15 test farms per country
  - Wide range of typical practical conditions
- Local ICAR approved organisation
- Reference ear tag used to indicate abnormal tag performance

Retention rates

- After three months
  - At least 99 % retention
  - No more than 3 % necrosis
- After twelve months
  - At least 98 % retention
  - No more than 3 % necrosis

After approval

- ICAR reserves the right to withdraw its approval of an eartag if
  - its long-term field performance is unsatisfactory
  - the manufacturer significantly alters the design, composition or printing of the eartag.
- In addition, ICAR has the right to periodically conduct an unannounced test

Follow up on performance

- Performance followed intensively during 12 months of test
- Feed back from
  - Manufacturers
  - ICAR member organisations
  - Competent autorities

  about problems in long term performance

Thank you
for your attention

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