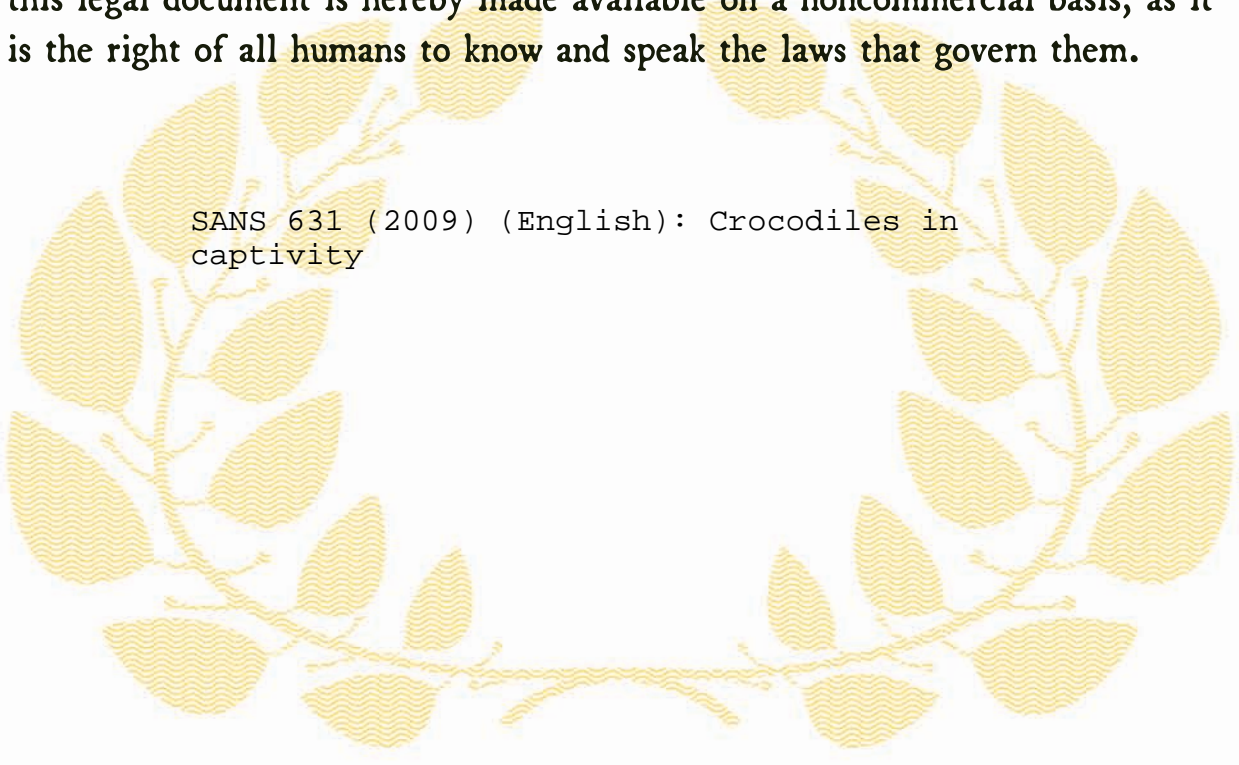




Republic of South Africa

EDICT OF GOVERNMENT

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SANS 631 (2009) (English): Crocodiles in
captivity



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Edition 1

SOUTH AFRICAN NATIONAL STANDARD

Crocodiles in captivity

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Table of changes

Change No.	Date	Scope

Acknowledgement

The SABS Standards Division wishes to acknowledge the valuable assistance derived from publications of the National Society for the Prevention of Cruelty to Animals (NSPCA) and the South African Crocodile Farmers Association (SACFA).

Foreword

This South African standard was approved by National Committee SABS SC 1040F, *Steering committee for nature conservation – Commercial wildlife breeding and farming*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in January 2009.

A reference is made in 4.1.1, 4.1.2 and 4.1.3 to general requirements for crocodile keepers which are in accordance with "the current relevant national legislation". In South Africa this means the Animal Protection Act, 1962 (Act No. 71 of 1962).

A reference is made in 4.2.1, 4.2.3, and 4.2.4 to requirements regarding the health and safety of employees in accordance with "the current relevant national legislation". In South Africa this means the Occupational Health and Safety Act, 1995 (Act No. 85 of 1995).

A reference is made in 5.6.8 to the management of wastewater in accordance with "the current relevant national legislation". In South Africa this means the National Water Act, 1998 (Act No. 36 of 1998).

A reference is made in 6.1.2 to the use of detergents or detergent-disinfectants on surfaces, equipment and utensils in accordance with "the current relevant national legislation". In South Africa this means the Standards Act, 1993 (Act No. 29 of 1993).

A reference is made in 10.1.1 and 10.1.3 to general requirements for the slaughtering and skinning of crocodiles which are in accordance with "the current relevant national legislation". In South Africa this means the Meat Safety Act, 2000 (Act No. 40 of 2000).

Annexes A and B are for information only.

Introduction

This standard was developed as a guideline to assist crocodile keepers in aligning their farming, breeding, harvesting and husbandry methods with welfare standards, to help protect captive crocodiles, improve the health and safety aspects relating to the keeping of crocodiles, and to assist in building relationships between crocodile keepers, wildlife authorities and the relevant animal welfare organizations (see acknowledgement).

This standard is part of a continuous development process which aims to ensure the welfare of crocodiles and the crocodile industry. It will be reviewed from time to time to incorporate advances in the understanding of crocodile physiology and behaviour, as well as technical changes in animal husbandry and its relationship to the welfare of crocodiles.

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Crocodiles in captivity

1 Scope

1.1 This standard lays down requirements for the humane treatment of crocodiles for the purposes of breeding, rearing, transportation, translocation, slaughtering and exhibition by crocodile keepers or any other party keeping crocodiles for such purposes. It also covers environmental conditions for the breeding, rearing, transportation, slaughtering and exhibition of crocodiles in captivity, risks associated with crocodile farming, activities related to exhibition, and the health and safety of employees.

1.2 This standard does not cover naturally occurring crocodile populations in the wild. However, it is noted that where crocodiles are kept in the wild on private game farms as “free ranging” game, these crocodile populations will be affected from time to time by unfavourable natural catastrophic events.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

2.1 Standards

SANS 1884-3, *Holding pens for temporary housing of animals – Part 3: Vehicles for transportation of wild carnivores by road to holding pens and other facilities.*

VC 8054, *Disinfectants and detergent-disinfectants.*

2.2 Other publications

International Air Transport Association (IATA).

3 Definitions

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

3.1

adult crocodile

crocodile of length 2 000 mm and longer

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3.2

competent

qualified by training or suitable experience

3.3

crocodile

Nile crocodile, *Crocodylus niloticus*, or any of the exotic crocodilian species not endemic to South Africa

3.4

crocodile keeper

person, or any other party, that keeps crocodiles for any purpose

NOTE This includes crocodile farmers, zoo keepers, game farmers, animal hobbyists, research facilities, etc.

3.5

dressings

the progressive separation of a crocodile carcass into edible parts and inedible material

3.6

euthanasia

humane and painless killing of an animal

3.7

hatchling

crocodile in the first year of life

3.8

high-risk task

task that involves any activity in close proximity to crocodiles (for example, the handling of juvenile and adult crocodiles, the collection of eggs, crocodile transportation, or show feeding)

3.9

humane

using methods that afford the minimum amount of stress and pain

3.10

husbandry

breeding, rearing, care and management of animals

3.11

juvenile crocodile

Nile crocodile older than one year and of length 750 mm to 2 000 mm

3.12

nape skin

skin of the bottom jaw

3.13

pithing

insertion of a metal rod or sharp pointed instrument into the brain

3.14

rearing crocodiles

hatchlings and juvenile crocodiles

3.15

show feeding

feeding of crocodiles for public exhibition

4 Requirements for crocodile keepers

4.1 General

4.1.1 All crocodiles shall be kept and treated humanely in accordance with the current relevant national legislation (see foreword).

4.1.2 All crocodile keepers shall be authorized to keep crocodiles in captivity in accordance with the current relevant national legislation (see foreword).

4.1.3 All crocodile keepers shall comply with the requirements of the current relevant national legislation (see foreword).

4.1.4 Adequate facilities and resources, which include accommodation, food, water supply, and healthcare for sick and injured crocodiles, shall be supplied for the well-being of all crocodiles.

4.1.5 All work with crocodiles and their handling shall be under the supervision of a well trained, competent person.

4.1.6 Adult crocodiles shall not be handled, except for purposes of translocation or treatment of illnesses and disease.

4.1.7 Rearing crocodiles shall only be handled for day to day husbandry purposes. The excessive handling of rearing crocodiles shall be avoided.

4.1.8 Crocodiles in captivity shall not be unduly stressed by excessive noise, chemical pollution, human interaction or the lack of thermal regulation.

NOTE It is recommended that an experienced crocodile veterinarian, designated by the South African Crocodile Farmers Association (SACFA), arbitrate where there is a dispute related to crocodiles in captivity.

4.1.9 There are risks involved with the keeping of crocodiles, therefore, crocodile keepers shall ensure that there is communication and supervision of employees throughout the risk management process.

4.2 Employee health and safety

4.2.1 All crocodile keepers shall ensure the health and safety of employees in accordance with the current relevant national legislation (see foreword).

4.2.2 Crocodile keepers shall ensure that first aid training is provided to employees, where relevant.

4.2.3 All crocodile keepers shall, in accordance with the current relevant national legislation (see foreword),

- a) inform employees about the nature of the work,
- b) provide training to employees regarding all hazards associated with the work, and
- c) provide supervision to employees.

4.2.4 All employees shall be provided with personal protective clothing and equipment in accordance with the current relevant national legislation (see foreword), where relevant.

4.3 Working with crocodiles

4.3.1 Employees should be experienced in the relevant duties to be performed.

4.3.2 When there are other crocodiles in an enclosure, work with an individual crocodile shall be done outside this crocodile enclosure, where possible.

4.3.3 When an employee is required to enter an enclosure and the crocodiles cannot be isolated, at least one other employee shall be present to provide assistance in case of an emergency.

4.4 Crocodile health

4.4.1 Sick or injured crocodiles shall be treated timeously, and should be isolated from healthy crocodiles.

4.4.2 It is recommended that for good husbandry practices, an experienced crocodile veterinarian be consulted regarding the healthcare of crocodiles.

4.4.3 Dead crocodiles shall be removed immediately from enclosures. It is recommended that weak and deformed hatchlings be put to death by recommended euthanasia methods.

4.4.4 All crocodiles shall be inspected at least once a day by trained employees for their well-being.

5 Requirements for crocodile enclosures

5.1 General

5.1.1 The type of enclosure and housing shall be determined by the size of the crocodiles.

5.1.2 The enclosure shall be of a size that provides for the normal physiological functions of the crocodile.

5.1.3 The enclosure shall be walled or fenced, and shall be of such height, depth and design as to prevent the escape of crocodiles and access by the public.

5.1.4 Crocodile enclosures and pens shall be designed to accommodate maintenance requirements. The walls, fences, or enclosures shall be maintained and inspected daily.

5.1.5 Crocodile enclosures shall be so designed as to prevent injury to the crocodiles.

5.1.6 Enclosures with sharp corners shall be fitted with inward overhangs to prevent crocodiles from climbing out. It is recommended that a second fence be constructed around the enclosure to ensure an

additional barrier in the event that a crocodile escapes and to prevent access to the crocodiles by unauthorized people.

5.1.7 Crocodile enclosures shall be kept clean and free from leftover food.

5.2 Enclosures for adult crocodiles

5.2.1 The enclosure for adult crocodiles shall be:

- a) a single upright solid wall or galvanised steel mesh fence, of height at least 1 500 mm; or
- b) an upright solid wall or galvanised steel mesh fence, of height at least 1 200 mm, and with a 300 mm 45° inward overhang constructed from similar strength material.

5.2.2 It is recommended that the fence be constructed from welded mesh wire of aperture size 100 mm × 50 mm and a 3,15 mm gauge.

5.2.3 The enclosure shall be at least 300 mm beneath the surface of the ground to prevent burrowing.

5.3 Enclosures for juvenile crocodiles

5.3.1 The enclosure for juvenile crocodiles shall be:

- a) a single upright solid wall or galvanised steel mesh fence, of height at least 1 200 mm; or
- b) an upright solid wall or galvanized steel mesh fence, of height at least 1 000 mm, and with a 300 mm 45° inward overhang constructed from similar strength material.

5.3.2 It is recommended that the fence be constructed from welded mesh wire of aperture size 50 mm × 50 mm and a 2,5 mm gauge.

5.3.3 The enclosure shall be at least 100 mm beneath the surface of the ground to prevent burrowing.

5.4 Enclosures for hatchlings

5.4.1 The enclosure for hatchlings shall be a single upright solid wall, of height at least 1 000 mm.

5.4.2 Where hatchlings are kept outdoors, precautions shall be taken to ensure their safekeeping and well-being from predation by other animals such as birds, monkeys and monitor lizards. Precautions shall also be taken to protect hatchlings from theft.

5.5 Enclosures for breeding crocodiles

5.5.1 The enclosure shall be provided with appropriate nesting sites. The nesting site shall be a flat sand bed of a depth of at least 1 000 mm.

5.5.2 If artificial nesting sites are used, then it is recommended that river sand be used as the nesting medium. The area of the nesting site should be 4 000 mm² and at least 1 000 mm deep.

5.5.3 It is recommended that the stocking sex ratio for breeding crocodiles be five females to one male.

5.6 Water

5.6.1 All captive crocodiles shall be provided with water.

5.6.2 The water quality shall be such as to allow crocodiles to drink without compromise to their physical well-being.

5.6.3 The water body shall be not less than 25 % of the total area of the enclosure, with due regard to the requirement regarding dry land area in 5.8.2.

5.6.4 The water body shall be of a depth or gradient that will facilitate thermal regulation and, in the case of adult crocodiles, mating.

NOTE The depth can vary throughout the water body.

5.6.5 The water body shall be of sufficient width and length as to allow the adult and juvenile crocodiles to swim actively.

5.6.6 The water body shall be constructed with a slope for gradual entry into and exit out of the water.

5.6.7 The water shall be drained at least once a year for cleaning purposes. However, water should only be drained at times which would minimize the stress on the crocodiles, i.e. after the breeding season and on days which are not excessively hot hence preventing crocodiles from overheating.

5.6.8 Wastewater shall be managed in accordance with the current relevant national legislation (see foreword).

5.7 Temperature

5.7.1 Crocodiles should not be exposed for long periods in water with a temperature below 12 °C.

NOTE Crocodiles are cold-blooded reptiles with an optimum digestive body temperature between 30 °C and 32 °C.

5.7.2 For crocodiles kept in outdoor enclosures, the wind chill, and the availability of afternoon sun and shade shall be considered.

5.7.3 In the absence of available shade, crocodiles shall have access to water of depth not less than 1 000 mm.

5.8 Stock density

5.8.1 The number of crocodiles in an enclosure shall not obstruct their normal physiological functions.

5.8.2 Adult crocodiles shall be provided with a minimum dry land area not less than 10 m² per crocodile.

5.8.3 The stocking density shall be such as to minimize death, injury or disease.

6 Requirements for the feeding of crocodiles

6.1 General

6.1.1 All crocodiles shall be provided with food that contains appropriate protein levels (for example, beef, chicken or pellets). The meat shall be stored in a refrigerator. Crocodiles kept in the wild (see 1.2) shall have access to a food source.

6.1.2 The food shall be prepared under hygienic conditions. All surfaces, equipment and utensils shall be washed with a detergent or a detergent-disinfectant that complies with VC 8054, and in accordance with the current relevant national legislation (see foreword).

6.1.3 Appropriate amounts of food shall be provided, taking into consideration the season and the size of the crocodiles.

6.1.4 Calcium and phosphorous for skeletal growth and vitamins (for example, a multivitamin premix) shall be provided if not present in the food.

NOTE The requirements for vitamins and minerals will vary in accordance with the crocodile's size, age and diet, or environmental conditions. An example of a multivitamin premix is given in table A.1 (see annex A).

6.1.5 Crocodile keepers shall ensure that the food is not contaminated by drugs, poison, other chemicals, or pathogens which can affect the health of the crocodile.

6.1.6 The food shall be provided in such a manner as to prevent injury during feeding (for example, by distributing the food over a wide area).

6.1.7 Live prey shall not be fed deliberately to captive crocodiles. This excludes live fish in the water body (pond).

6.1.8 Uneaten food shall be removed within 12 h after being placed in an enclosure.

6.2 Feeding of adult crocodiles

6.2.1 Seasonal and temperature fluctuations shall be considered when feeding adult crocodiles.

6.2.2 The average digestive cycle of an adult crocodile in summer is approximately 10 d. However, since the decrease in ambient temperature results in an increase in the digestive period, crocodiles should not be fed in colder months.

6.3 Feeding of juvenile crocodiles and hatchlings

6.3.1 The feeding regime of juvenile crocodiles shall be determined by their size. The size and quantity of the food shall be appropriate to the size of the juvenile crocodile.

6.3.2 All hatchlings shall have access to food and shall be taught how to feed. It is recommended that the rolling motion of meatballs or pellets, of a size appropriate to the hatchling, be used initially to teach newborn hatchlings how to feed.

7 Requirements for safety during egg collection, incubation, and the handling of hatchlings

7.1 General

7.1.1 Crocodile eggs are collected for scientific research and breeding purposes.

7.1.2 The breeding crocodiles should not be unduly stressed during egg collection. Egg collectors shall determine the exact location of the nest to minimize stress to the female crocodiles.

7.1.3 When removing the egg from the nest, its orientation shall not be changed, i.e. the egg shall not be turned upside down (see 7.3.8).

7.1.4 The egg shall be gently lifted and placed into an incubation receptacle or container (for example, a polystyrene box). A suitable incubation medium (for example, vermiculite) should be used to secure the eggs in the incubation receptacle.

7.1.5 The incubation medium shall be used once only for the incubation of the eggs and shall be disposed of after the eggs have hatched.

7.1.6 The eggs in the nest and in the incubation receptacle shall not be exposed to direct sunlight for extended periods of time during the collection process.

7.1.7 The egg collecting process should not be done in front of the public.

7.2 Safety during egg collection

7.2.1 The collection of eggs is a high-risk task in which the egg collector can be attacked. The egg collector shall thus be aware of:

- a) the female crocodile guarding the nest;
- b) other females crocodiles guarding their own nests in the area; or
- c) a territorial male crocodile.

7.2.2 It is recommended that a minimum of three people be present when eggs are being collected.

7.2.3 The following safety measures shall be followed to protect the egg collector and to reduce stress to the female crocodile when eggs are being collected:

- a) the isolation of crocodiles by means of gates, fences or other barriers;
- b) the isolation of the egg collector by means of a portable, non-transparent physical barrier; or
- c) the distraction of the crocodile by another employee while the eggs are being collected.

7.2.4 Advances from adult crocodiles can be prevented by the use of a strong, thick wooden pole or a heavy gauge plastic pipe, of length 2,0 m to 2,5 m and a diameter of 5 cm, to

- a) deliver a soft tap to the snout, or

NOTE The upper part of the snout and skull are thick boned and the risk of injury to the crocodile is low.

- b) push the crocodile away.

NOTE The plastic pipe can also be beaten against the ground to make a sound, which is sufficient to deter an advancing crocodile.

7.3 Incubation

7.3.1 The eggs should be collected immediately after being laid or within 12 h of being laid.

7.3.2 It is recommended that the eggs be cleaned and disinfected after collection, using the following procedure:

- a) lift the egg in accordance with 7.1.3;
- b) rinse the egg gently under running water;
- c) dip the egg in disinfectant; and

NOTE The disinfectant should be diluted in accordance with the manufacturer's instructions.

- d) gently place the egg in the incubation medium.

7.3.3 The incubation environment should be maintained as follows:

- a) at a temperature of 28 °C to 33 °C;
- b) at a humidity of 95 % to 99 %, allowing for free gas exchange (oxygen); and
- c) with no free water.

7.3.4 The incubation environment should be sufficiently ventilated and temperature controlled.

7.3.5 The incubator shall not be exposed to direct sunlight or cold wind.

7.3.6 The eggs in the incubator should not be exposed to temperatures less than 24 °C or more than 34 °C.

7.3.7 The eggs shall not be exposed to dry conditions which can lead to dehydration.

7.3.8 The eggs and the containers in which they are placed shall not be jolted or handled violently.

NOTE The embryos are delicately attached to the eggshell and can dislodge and die.

7.3.9 The incubation period for the eggs is between 74 d and 112 d. When the eggs start hatching, the whole clutch should be removed from the incubator to prevent the premature hatching of other eggs.

NOTE Hatchlings vocalize upon hatching and this can stimulate the premature hatching of non-full term embryos.

7.3.10 The eggs that are removed from the incubator should be kept in an appropriate environment that is similar to the environment in the incubator (see 7.3.3).

7.4 The handling of hatchlings

7.4.1 A trained employee should assist hatchlings that need assistance in hatching.

7.4.2 Hatchlings may be washed with warm water of temperature 28 °C to 32 °C, and transferred to hatcheries with an appropriate environment that is similar to the incubation environment (see 7.3.3).

7.4.3 Hatchlings should be fed as soon as possible after hatching. Premature hatchlings shall not be fed unless the abdominal wall (navel) has closed.

NOTE A period of 72 h is required for the complete ingestion of the yolk.

7.4.4 Hatchlings are susceptible to stress and disease and shall therefore be handled gently without sudden movements. The hatchlings shall be monitored for any disease.

NOTE Hatchlings are more susceptible to disease than adult crocodiles.

8 Requirements for the capture, transportation and translocation of crocodiles

8.1 Capture

8.1.1 General

8.1.1.1 The capture, transportation and translocation of crocodiles shall be planned and executed efficiently with minimum stress to the crocodiles.

8.1.1.2 At least one member of the crocodile capture team shall be trained in the capturing and handling techniques.

8.1.1.3 Crocodiles in captivity can be moved from one enclosure to another. The method of capture depends on the size of the crocodile, the type of enclosure and the distance in which the crocodile will be moved.

8.1.1.4 When captured for translocation, the crocodiles shall not be injured.

8.1.1.5 Adult crocodiles should not be given food at least 3 d before being captured for transportation.

8.1.2 Methods of capture

8.1.2.1 Chemical immobilization agents

8.1.2.1.1 A veterinarian should recommend the drug to be used for the immobilization of the adult crocodile and should also supervise the administration of this drug.

NOTE 1 In South Africa, it is recommended that gallimine triethiodide (Flaxedil®) be used for immobilizing crocodiles, and neostigmine methylsulphate (Neostigmine®) be used as the antidote. The recommended dosages are given in table B.1 (see annex B).

NOTE 2 Flaxedil® and Neostigmine® are registered drugs in South Africa.

8.1.2.1.2 The drugs shall be administered by a trained person using a pole syringe or dart.

8.1.2.1.3 Accidental injection of workers with the immobilizing drug or the neutralizing drug can lead to respiratory problems. Emergency treatment shall be made available when working with these drugs.

8.1.2.1.4 Care shall be taken when handling the immobilized crocodiles. The immobilizing drug is not an anaesthetic or sedative, therefore, the immobilized crocodile can still feel pain.

8.1.2.1.5 When immobilized crocodiles are manually moved in a horizontal position, the following precautions shall be taken:

- a) the crocodile shall be supported at all times;
- b) the crocodile shall not be dragged;
- c) the crocodile shall not be carried by its legs; and
- d) the crocodile shall not be dropped.

8.1.2.1.6 Immobilized crocodiles should be loaded onto canvas stretchers or carryboards.

8.1.2.2 Electrical immobilization

Approved electrical immobilization, followed by the application of physical restraints, can be used for juvenile crocodiles and adult crocodiles.

NOTE Electrical immobilization for adult crocodiles is still being researched and refined with regard to the duration and the acceptable voltage to be used.

8.1.2.3 Physical restraint

Hand catching and physical restraint should be used for hatchlings and any other crocodiles of a size that will not cause injury to the handler.

8.1.2.4 Cage traps

8.1.2.4.1 Appropriate cage traps may be used for the capture of crocodiles.

8.1.2.4.2 The traps shall be monitored for 24 h a day.

8.1.2.4.3 The crocodiles shall be removed from the trap as soon as possible after being caught, except when the trap is being used as the transport container for the crocodile.

8.2 Transportation

8.2.1 All crocodiles shall be transported in accordance with the requirements given in SANS 1884-3.

8.2.2 The transportation of crocodiles by air shall be in accordance with the IATA regulations.

8.3 Translocation

8.3.1 General

8.3.1.1 An enclosure that complies with the requirements in 5.1, 5.2, 5.6 and 5.7 shall be prepared to receive the translocated crocodiles.

8.3.1.2 The maximum time from capture to release shall not be more than 48 h for immobilized crocodiles, and 100 h for non-immobilized crocodiles.

8.3.2 Release into the new enclosures

8.3.2.1 It is recommended that the crocodiles be left to recover naturally from the immobilizing agent, and that the antidote only be administered when necessary.

8.3.2.2 The sedated crocodiles should be placed in a shaded area away from water.

8.3.2.3 All mechanical, visual and auditory disturbances shall be minimized while the crocodile becomes familiar with the new environment.

8.3.2.4 The crocodiles shall be monitored for stress or illness for 2 d to 3 d after release.

8.3.2.5 A crocodile veterinarian, or a person experienced in the release of crocodiles, shall be informed of delays in the recovery of a sedated crocodile.

9 Requirements for the exhibition of crocodiles

9.1 Crocodile keepers shall take precautions to ensure the safety of the public, employees and the crocodiles.

9.2 Warning signs shall be erected to discourage the public from disturbing, prodding and feeding crocodiles, or throwing objects at them.

9.3 Only trained employees shall perform show feeding. The public shall not actively participate in show feeding.

NOTE In establishments where only a small number of crocodiles are kept, employees might not have the opportunity to be regularly exposed to show feeding which could affect their competency in this regard.

10 Requirements for the slaughtering of crocodiles

10.1 General

10.1.1 Crocodiles shall be slaughtered in a designated hygienic facility or in an abattoir in accordance with the current relevant national legislation (see foreword), and shall be screened from the public.

NOTE The South African National Department of Agriculture is currently working on a crocodile regulation that will be found under the said Act.

10.1.2 The slaughtering of crocodiles shall be performed by a trained employee and in such a manner as to limit stress on the affected crocodile.

10.1.3 The crocodile shall be brain-dead before skinning and dressing in accordance with the current relevant national legislation (see foreword) can take place.

NOTE Due to its physiology, physical reflex activity can be observed after the crocodile has been killed and this does not necessarily indicate inhumane or improper killing methods.

10.2 Methods of slaughter

10.2.1 Single shot to the brain

10.2.1.1 The crocodile shall be shot through the back or the side of the cranial platform as shown in figures 1(a) and (b), using a rifle with a 0,22 Long Rifle cartridge. A subsonic velocity cartridge should be used if a silencer is used.

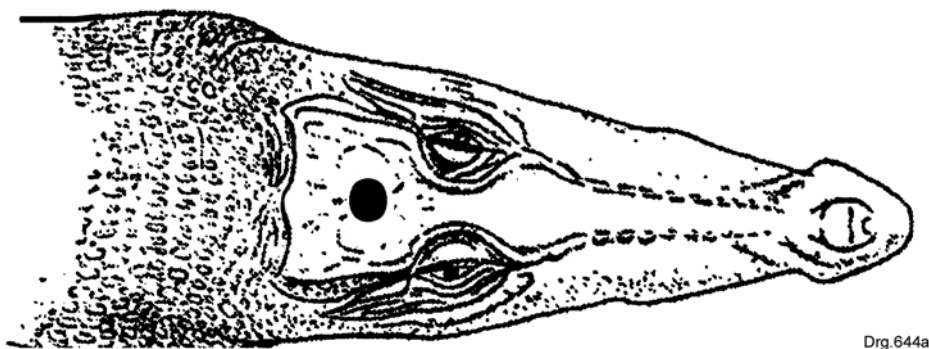


Figure 1(a) – Targeted area for bullet entry point

10.2.1.2 A high-powered hunting rifle shall be used for the humane killing of adult crocodiles that escaped from enclosures and are a risk to the safety of the public and employees. It is recommended that the crocodile be shot in the head from a safe distance (see figure 1(b)).



Figure 1(b) – Targeted area for a shot from a distance

Figure 1 – Target areas for shooting crocodiles

10.2.1.3 Care shall be taken to ensure that the nape skin of the crocodile is not damaged by the bullet.

10.2.1.4 As soon as the crocodile is declared dead, the spinal cord shall be severed by means of a cut between the skull and the first cervical vertebra using a sharp cutting instrument that is suitable for the purpose (for example, a sharp-edged knife).

10.2.1.5 The brain shall be destroyed by pithing (see 3.13) soon after the spinal cord has been severed.

10.2.2 Stun and cut method

10.2.2.1 The stun and cut method should be used for crocodiles less than 2 m in length.

10.2.2.2 The crocodile shall be stunned by means of a captive bolt or electric stunner.

10.2.2.3 The spinal cord shall be severed immediately afterwards by means of a cut between the skull and the first cervical vertebra using a sharp cutting instrument that is suitable for the purpose (for example, a sharp-edged knife).

10.2.2.4 The brain shall be destroyed by pithing soon after the spinal cord has been severed.

Annex A
(informative)

Multivitamin premix

Table A.1 – Example of a multivitamin premix

1	2
Ingredient (per 1 ton of premix)	Unit
Antioxidant	3 500 mg
Biotin H ₂	1 000 mg
Folic acid	3 000 mg
Niacin	100 000 mg
Pantothenic acid	50 000 mg
Vitamin A	12 000 000 IU
Vitamin B ₁	15 000 mg
Vitamin B ₁₂	30 mg
Vitamin B ₂	20 000 mg
Vitamin B ₆	15 000 mg
Vitamin C	1 000 000 mg
Vitamin D ₃	2 000 000 IU
Vitamin E	120 000 mg
Vitamin K ₃	15 000 mg
Zinc Bacitracin ^a	80 000 mg
^a Not a vitamin, but added as a growth hormone.	

Annex B

(informative)

Recommended dosages for chemical immobilizing agents**Table B.1 – Recommended dosages for Flaxedil®¹⁾ (40 mg/mL) and Noestigmine®²⁾ (2,5 mg/mL) for crocodiles of different lengths**

1	2	3
Total length m	Flaxedil® mL	Noestigmine® mL
1,98	1,70	0,60
2,13	2,00	0,80
2,29	2,50	1,00
2,59	3,50	1,00
2,90	4,50	1,00
3,05	5,00	1,00
3,35	6,00	1,00
3,66	7,00	1,00
3,96	8,00	2,00
4,12	8,50	2,00
4,42	9,00	2,00
4,57	9,50	2,00
Above 4,70	10,00	2,00
NOTE Parts of this table were taken from <i>Crocodiles – Biology, husbandry and diseases</i> (see bibliography).		

1) Flaxedil® is the trade name of a product supplied by Rhone Poulenc Rorer SA (Pty) Ltd. This information is given for the convenience of the users of this standard and does not constitute endorsement by the SABS Standards Division of the product named. Equivalent products may be used if they can be shown to lead to the same results.

2) Neostigmine® is the trade name of a product supplied by Fresenius Kabi SA (Pty) Ltd. This information is given for the convenience of the users of this standard and does not constitute endorsement by the SABS Standards Division of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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