

SUMMARY OF THE PRODUCT CHARACTERISTICS

1. NAME OF VETERINARY MEDICAL PRODUCT

Isoxetol 100% w/w inhalation vapour, liquid

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Active substance

Isoflurane 100% w/w.

Excipients

For a full list of excipients see section 6.1

3. PHARMACEUTICAL FORM

Inhalation vapour, liquid.

4. CLINICAL PARTICULARS

4.1 Target species

Dogs, cats, horses, ornamental birds including homing pigeons, reptiles, small mammals (rat, mouse, hamster, chinchilla, gerbil, guinea pig and ferret).

4.2 Indications for use, specifying the target species

Induction and maintenance of general anaesthesia.

4.3 Contra-indications

This product should not be used in animals with a known sensitivity to isoflurane or a known susceptibility to malignant hyperthermia.

4.4 Special warnings for each target species

Isoflurane has little or no analgesic property. Adequate analgesia should always be given before surgery. The analgesic requirements of the patient should be considered before general anaesthesia is ended.

Reptiles may be difficult to induce with inhalation agents due to breath holding.

The metabolism in small mammals can be affected by decrease in body temperature, due to the high surface area to bodyweight ratio. Therefore body temperature should be monitored and kept stable.

4.5 Special precautions for use

Special precautions for use in animals

Isoflurane causes dose-dependent respiratory depression and hypotension. Cardiac arrhythmias and transitory bradycardia have been reported rarely. In line with the known pharmacodynamic properties of this anaesthetic, including the reduction of systemic blood pressure, a risk-benefit assessment should be conducted before using this product in patients with compromised cardiovascular function.

Although isoflurane can be used during cranial surgery and in patients with head injuries, increased cerebral blood flow and intracranial pressure can occur.

Hyperventilating the patient can reduce the increased intracranial pressure.”

Malignant hyperthermia has been reported very rarely in susceptible animals.”

Where no MAC/ED₅₀ values are mentioned for the different species, use of isoflurane should only be considered following a risk/benefit assessment by the veterinary surgeon.

Special precautions to be taken by the person administering the medicinal product to animals

- Do not breathe vapour. Users should consult their relevant National Authority for advice on Occupational Exposure Standards for isoflurane.
- Operating rooms and recovery areas should be provided with adequate ventilation or scavenging systems to prevent the accumulation of anaesthetic vapour. All scavenging/extraction systems must be adequately maintained.
- Pregnant and breast-feeding women should avoid exposure to the product and should avoid operating rooms and recovery areas.
- Avoid using masking procedures for prolonged induction and maintenance of general anaesthesia. Use cuffed endotracheal intubation when possible for the administration of Isoxetol during maintenance of general anaesthesia.
- To protect the environment, it is considered good practice to use charcoal filters with scavenging equipment.
- Care should be taken when dispensing isoflurane, with any spillage removed immediately using an inert and absorbent material e.g. sawdust.
- Wash any splashes from skin and eyes, and avoid contact with the mouth.
- If severe accidental exposure occurs remove the operator from the source of exposure, seek urgent medical assistance and show this label.
- Halogenated anaesthetic agents may induce liver damage. In the case of isoflurane this is an idiosyncratic response very rarely seen after repeated exposure.

Advice to doctors: Ensure a patent airway and give symptomatic and supportive treatment. Note that adrenaline and catecholamines may cause cardiac dysrhythmias.

4.6 Adverse reactions (frequency and seriousness)

Isoflurane causes a dose-dependent reduction in systemic blood pressure. Cardiac arrhythmias and transitory bradycardia have been reported rarely. Isoflurane causes dose-dependent respiratory depression, and in rare cases malignant hyperthermia.

Although isoflurane can be used during cranial surgery and in patients with head injuries, increased cerebral blood flow and intracranial pressure can occur. Hyperventilating the patient can reduce the increased intracranial pressure.

4.7 Use during pregnancy, lactation or lay

Although isoflurane has been used safely during caesarean section in the dog and cat, no full data are available on its use during pregnancy and lactation in the target species. Use in pregnant and lactating animals should, therefore, only be considered following a risk/benefit assessment by the veterinary surgeon.

See also section 4.11.

4.8 Interaction with other medicinal products and other forms of interaction

Delivery in nitrous oxide and premedication with agents such as acepromazine, opioids, benzodiazepines and alpha-2-adrenoreceptor agonists are compatible with isoflurane use, however concurrent use of such agents, in particular the alpha-2-adrenoreceptor agonists, is expected to reduce the concentration of isoflurane necessary for induction and maintenance of anaesthesia.

Isoflurane may be degraded to carbon monoxide by dried carbon dioxide absorbents.

4.9 Amounts to be administered and administration route

The lowest effective dose should be administered, and, as with all anaesthetics, the correct dose is to effect. Isoflurane should be administered using an accurately calibrated vaporiser in association with an appropriate anaesthetic circuit, however, a non-precision, uncompensated vaporizer (eg Stephens vaporizer, Komesaroff machine) is also suitable for the delivery of isoflurane.

Horse

Minimum Alveolar Concentration: The MAC value of isoflurane in the horse is approximately 1.31%.

Induction of anaesthesia: As it is not normally practicable to induce anaesthesia in adult horses using isoflurane, induction should usually be achieved by the use of a short acting barbiturate, such as thiopentone sodium, or ketamine and may include guaiphenesin. Concentrations of 3 to 5% isoflurane may then be used to achieve the desired depth of anaesthesia in 5 to 10 minutes.

Isoflurane at a concentration of 3 to 5% in a high flow of oxygen may be used for induction in foals.

Maintenance of anaesthesia: Anaesthesia may be maintained using 1.5% to 2.5% isoflurane.

Ornamental Birds

Minimum Alveolar Concentration: Few MAC/ED₅₀ values have been recorded. Examples are 1.34% for the Sandhill crane, 1.45% for the homing pigeon, reduced to 0.89% by the administration of midazolam and 1.44% for cockatoos, reduced to 1.08% by the administration of butorphanol analgesic.

The use of isoflurane anaesthesia has been reported for many species, from small birds such as zebra finches, to large birds such as vultures, eagles and swans.

Induction of anaesthesia: Induction with 3 to 5% isoflurane is normally rapid. Induction of anaesthesia with propofol, followed by isoflurane maintenance, has been reported for swans.

Maintenance of anaesthesia: The maintenance dose depends on the species and individual. Generally, 2 to 3% is suitable and safe.

Only 0.6 to 1% may be needed for some stork and heron species.

Up to 4 to 5% may be needed for some vultures and eagles.

Up to 3.5 to 4% may be needed for some ducks and geese.

Generally, birds respond very rapidly to changes in concentration of isoflurane.

Reptiles

Minimum Alveolar Concentration: The literature records its use on a wide variety of reptiles (e.g. various species of lizard, tortoise, iguanas, chameleon and snakes). The ED₅₀ was determined in the desert iguana to be 3.14% at 35°C and 2.83% at 20°C.

Induction of anaesthesia: Induction is usually rapid at 2 to 4% isoflurane. Reptiles may be difficult to induce with inhalation agents due to breath holding.

Maintenance of anaesthesia: 1 to 3% is a typical concentration.

Small Mammals

Minimum Alveolar Concentration: Isoflurane has been recommended for anaesthesia of a wide variety of small mammals, e.g. rat, mouse, hamster, chinchilla, gerbil, guinea pig and ferret. The MAC value for mice has been cited as 1.34%, for rat as 1.38%, 1.46% and 2.4%.

Induction of anaesthesia: Isoflurane concentration 2 to 3%.

Maintenance of anaesthesia: Isoflurane concentration 0.25 to 2%.

Dog

Minimum Alveolar Concentration: The MAC for isoflurane is 1.28% in the dog.

Induction of anaesthesia: Anaesthesia of dogs may be induced by inspired isoflurane concentrations between 2 and 4%. The use of common preanaesthetic agents such as acepromazine, opioids, benzodiazepines and the alpha-2-adrenoreceptor agonists, and/or concurrent use of nitrous oxide reduces the concentration of isoflurane required. If anaesthesia is induced with an injectable agent, an initial isoflurane concentration slightly above that required for maintenance should usually be administered to aid the transition onto gaseous anaesthesia.

Maintenance of anaesthesia: As a general rule, surgical anaesthesia can be maintained with end tidal concentrations of around 1.3 MAC. In practice, vaporizer settings (VOC) of 1.5-2.5% in the dog are used. Again, premedication and/or concurrent use of nitrous oxide or the use of sedatives and/or analgesics during anaesthesia reduces the concentration of isoflurane required. Recovery is usually smooth and rapid.

Cat

Minimum Alveolar Concentration: The MAC of isoflurane is 1.63% in the cat.

Induction of anaesthesia: Anaesthesia of cats may be induced by inspired isoflurane concentrations of between 2 and 4%. The use of common preanaesthetic agents such as acepromazine, opioids, benzodiazepines and alpha-2-adrenoreceptor agonists, and/or concurrent use of nitrous oxide reduces the concentration of isoflurane required. If anaesthesia is induced with an injectable agent, an initial isoflurane concentration slightly above that required for maintenance should usually be administered to aid the transition onto gaseous anaesthesia.

Maintenance of anaesthesia: As a general rule, surgical anaesthesia can be maintained with end tidal concentrations of around 1.3 MAC. In practice, vaporizer settings (VOC) of 1.5-3.0% in the cat are used. Again, premedication and/or concurrent use of nitrous oxide or the use of sedatives and/or analgesics during anaesthesia reduces the concentration of isoflurane required. Recovery is usually smooth and rapid.

4.10 Overdose (symptoms, emergency procedures, antidotes), if necessary

Skilled monitoring of anaesthetic depth should accompany isoflurane use. As the primary signs of overdose are due to cardiopulmonary depression, cardiovascular signs (e.g. pulse strength, heart rate, arterial blood pressure, mucous membrane colour and refill) and respiratory signs (rate and depth of respiration) should be particularly noted.

Isoflurane overdose may result in profound respiratory depression. Therefore, respiration must be monitored closely and supported when necessary with supplementary oxygen and/ or assisted ventilation.

In cases of severe cardiopulmonary depression, administration of isoflurane should be discontinued, the breathing circuit should be flushed with oxygen, the existence of a patent airway ensured, and assisted or controlled ventilation with pure oxygen

initiated. Cardiovascular depression should be treated with plasma expanders, pressor agents, antiarrhythmic agents or other appropriate techniques.

Respiratory arrest should be treated by assisted ventilation. In the case of cardiac arrest, perform a complete cardio pulmonary resuscitation.

4.11 Withdrawal periods

Horse meat: 2 days.

Do not use in pigeons kept as food producing animals.

Do not use in mares producing milk for human consumption.

5. PHARMACOLOGICAL PROPERTIES

Pharmacotherapeutic group: Anaesthetic, general – halogenated hydrocarbons.

ATC Vet Code: QN01AB06

5.1 Pharmacodynamic properties

Isoflurane is a general inhalational anaesthetic of the halogenated hydrocarbon type. It is a volatile liquid, allowing rapid changes in the depth of anaesthesia by a suitably skilled anaesthetist.

The absorption and distribution of isoflurane is rapid, resulting in relatively rapid induction of anaesthesia and smooth recovery.

Like other inhalational anaesthetics of this type, isoflurane depresses the respiratory and cardiovascular systems.

Isoflurane may sensitise the myocardium to circulating dysrhythmogenic catecholamines.

Isoflurane generally produces good muscle relaxation, but the degree of post-operative analgesia is slight because of the rapid recovery.

Isoflurane has little or no analgesic property.

5.2 Pharmacokinetic particulars

The absorption and distribution of isoflurane is rapid. Metabolism of isoflurane is minimal (less than 0.2%) and almost all of the administered isoflurane is excreted unchanged by the lungs.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

None.

6.2 Incompatibilities

Carbon monoxide production from contact with dessicated soda- or baro- lime has been reported. This is avoided by ensuring that soda-lime is fresh or rehydrated if it has become desiccated.

6.3 Shelf-life

Shelf-life of the veterinary medicinal product as packaged for sale: 5 years.

6.4 Special precautions for storage

Do not store above 25°C. Store in tightly closed original container.
Protect from direct sunlight and direct heat.

6.5 Nature and composition of immediate packaging

250ml glass bottle (PhEur type IV) with tamper evident polyethylene lined cap.

6.6 Special precautions for the disposal of unused medicinal product or waste materials derived from the use of such products

Any unused product or waste material should be disposed of in accordance with national requirements.

7. MARKETING AUTHORISATION HOLDER

Intervet UK Ltd
Walton Manor
Walton
Milton Keynes
Buckinghamshire
MK7 7AJ

8. MARKETING AUTHORISATION NUMBER

Vm 01708/4601

9. DATE OF RENEWAL OF THE AUTHORISATION

Date: 17 April 2003

10. DATE OF REVISION OF THE TEXT

Date: September 2013

A handwritten signature in black ink, appearing to read "Palton".

Approved: 16/09/2013