SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Zermex 0.5% w/v Pour-On Solution for Cattle

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each ml contains:

Active substance:	
Moxidectin	5 mg
Excipient(s):	
Butylated hydroxyanisole (E320)	0.10 mg
Tert butyl hydroquinone	0.03 mg

For a full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Pour-on solution
Pale yellow oily solution.

4. CLINICAL PARTICULARS

4.1 Target species

Cattle

4.2 Indications for use, specifying the target species

Infestations of cattle with parasites sensitive to moxidectin.

For the treatment of infestations caused by:

- Adult and larval gastro-intestinal nematodes:
  Haemonchus placei
  Ostertagia ostertagi (including inhibited larvae)
  Trichostrongylus axei
  Nematodirus helvetianus
  Cooperia oncophora
  Cooperia punctata (adults)
  Oesophagostomum radiatum (adults)
  Bunostomum phlebotomum (adults)

- Adult respiratory tract nematode
  Dictyocaulus viviparus

- Warbles (migrating larvae)
  Hypoderma bovis

Hypoderma lineatum

- Lice

Linognathus vituli
Haematopinus eurysternus
Solenopotes capillatus
Bovicola bovis (Damalinia bovis)

- Mange Mites

Sarcoptes scabiei
Psoroptes ovis
Chorioptes bovis

- Horn Flies

Haematobia irritans

In cattle it has a persistent effect in preventing against reinfestation by:

Ostertagia ostertagi for 5 weeks
Dictyocaulus viviparus for 6 weeks.

4.3 Contraindications

Not to be used in other species as severe adverse reactions, including fatalities in dogs, may occur.

4.4 Special warnings

Care should be taken to avoid the following practices because they increase the risk of development of resistance and could ultimately result in ineffective therapy:

- Too frequent and repeated use of anthelmintics from the same class, over an extended period of time.

- Underdosing, which may be due to underestimation of bodyweight, misadministration of the product, or lack of calibration of the dosing device (if any).

Suspected clinical cases of resistance to anthelmintics should be further investigated using appropriate tests (e.g. Faecal Egg Count Reduction Test). Where the results of the test(s) strongly suggest resistance to a particular anthelmintic, an anthelmintic belonging to another pharmacological class and having a different mode of action should be used.

To date, no resistance to moxidectin in cattle parasites has been reported. The use of this product should be based on local (regional, farm) epidemiological information about susceptibility of the nematodes and recommendations on how to limit further selection for resistance to anthelmintics.

4.5 Special precautions for use

i. Special precautions for use in animals

To avoid secondary reactions due to the death of *Hypoderma* larvae in the oesophagus or the spine, it is recommended to administer the product at the end of the period of fly activity and before the larvae reach their resting sites: consult the veterinarian to know the correct treatment period.
For external use only.
For topical application only.

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

Avoid direct contact with skin and eyes.
If splashed in the eye or on the skin, wash with plenty of clean, running water immediately.
Seek medical advice if irritation persists.
Wear protective clothes and impermeable gloves when applying the product.
Do not eat, drink or smoke whilst handling the product.
Wash hands after use.

iii. Other precautions regarding impact on the environment

Moxidectin fulfils the criteria for a (very) persistent, bioaccumulative and toxic (PBT) substance; therefore, exposure of the environment to moxidectin must be limited to the extent possible. Treatments should be administered only when necessary and should be based on faecal egg counts or evaluation of the risk of infestation at the animal and/or herd level.

Like other macrocyclic lactones, moxidectin has the potential to adversely affect non-target organisms:

- Faeces containing moxidectin excreted onto pasture by treated animals may temporarily reduce the abundance of dung feeding organisms. Following treatment of cattle with the product, levels of moxidectin that are potentially toxic to dung fly species may be excreted over a period more than 2 weeks and may decrease dung fly abundance during that period. It has been established in laboratory tests that moxidectin may temporarily affect dung beetle reproduction; however, field studies indicate no-long term effects. Nevertheless, in case of repeated treatments with moxidectin (as with products of the same anthelmintic class) it is advisable not to treat animals every time on the same pasture to allow dung fauna populations to recover.

- Moxidectin is inherently toxic to aquatic organisms including fish. The product should be used only according to the label instructions. Based on the excretion profile of moxidectin when administered as

the pour-on formulation, treated animals should not have access to watercourses during the first week after treatment.

4.6 Adverse reactions (frequency and seriousness)

Reactions at the site of application may occur after application in very rare occasions.

Neurological signs (including ataxia, trembling and lethargy) have been reported in very rare cases.

The frequency of adverse reactions is defined using the following convention:
- very common (more than 1 in 10 animals treated displaying adverse reaction(s))
- common (more than 1 but less than 10 animals in 100 animals treated)
- uncommon (more than 1 but less than 10 animals in 1,000 animals treated)
- rare (more than 1 but less than 10 animals in 10,000 animals treated)
- very rare (less than 1 animal in 10,000 animals treated, including isolated reports).

4.7 Use during pregnancy, lactation or lay

Moxidectin has been shown to be safe for use in pregnant and lactating animals and breeding bulls.

4.8 Interaction with other medicinal products and other forms of interaction

None known.

4.9 Amounts to be administered and administration route

500 µg moxidectin/kg bodyweight (1 ml for 10 kg) as a single topical application.

To be administered along the midline of the back of the animal from the withers to the tailhead.

Apply to clean healthy skin.

To ensure administration of a correct dose, bodyweight should be determined as accurately as possible; accuracy of the dosing device should be checked. If animals are to be treated collectively rather than individually, they should be grouped according to their bodyweight and dosed accordingly, in order to avoid under or over dosing.

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

No symptoms of overdosage have been observed with the product given at ten times the recommended dose.

Signs may be manifested as transient salivation, depression, drowsiness and ataxia. There is no specific antidote.

4.11 Withdrawal period(s)

Meat and offal: 14 days.
Milk: 6 days (144 hours).

5. PHARMACOLOGICAL PROPERTIES

ATC Vet Code: QP54AB02

5.1 Pharmacodynamic properties

Moxidectin is a parasiticide active against a wide range of important internal and external parasites. It is a second generation macrocyclic lactone of the milbemycin family. Its principal mode of action is interference with the GABA (gamma amino butyric acid) receptors involved with neuromuscular transmission.

Moxidectin stimulates the release of GABA and increases its binding to the postsynaptic receptors. The net effect is to open the chloride channels on the postsynaptic junction to allow the inflow of chloride ions and induce an irreversible resting state. This results in flaccid paralysis and eventual death of parasites exposed to the drug.

5.2 Pharmacokinetic particulars

Following pour-on application, the drug is distributed throughout the body tissues (except muscle) but due to its lipophilicity the concentrations in fat are 5-15 times those in other tissues.

Moxidectin undergoes partial biotransformation by hydroxylation in the body and the only significant route of excretion is the faeces, where the parent compound accounts for approximately 50%.

5.3 Environmental properties

Moxidectin fulfils the criteria for a (very) persistent, bioaccumulative and toxic (PBT) substance. In particular, in acute and chronic toxicity studies with algae, crustaceans and fish, moxidectin showed toxicity to these organisms, yielding the following endpoints:

Organism		EC_{50}	NOEC
Algae	*S. capricornutum*	>86.9 µg/l	86.9 µg/l
Crustaceans (Water fleas)	*Daphnia magna* (acute)	0.0302 µg/l	0.011 µg/l
	Daphnia magna (reproduction)	0.0031 µg/l	0.010 µg/l
Fish	*O. mykiss*	0.160 µg/l	Not determined
	L. macrochirus	0.620 µg/l	0.52 µg/l
	P. promelas (early life stages)	Not applicable	0.0032 µg/l
	Cyprinus carpio	0.11 µg/l	Not determined

EC_{50}: the concentration which results in 50% of the test species individuals being adversely affected, i.e. both mortality and sub-lethal effects.

NOEC: the concentration in the study at which no effects are observed.

This implies that when allowing moxidectin to enter water bodies, this may have a severe and lasting impact on aquatic life. To mitigate this risk, all precautions for use and disposal must be adhered to.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Butylated hydroxyanisole (E320)
Tert butyl hydroquinone
Solvesso 100
Myristyl Propoxylate Propionic Ester
Polybutene Polymer
Propylene Glycol
Citric Acid Monohydrate
Fractionated Coconut Oil

6.2 Incompatibilities

None known.

6.3 Shelf life

Shelf-life of the veterinary medicinal product as packaged for sale: 2 years.
Shelf-life after first opening the immediate packaging: 6 months.

6.4 Special precautions for storage

Do not store above 25°C.
Keep the container in the outer carton.
Protect from light.
If accidentally frozen, shake vigorously before use.

6.5 Nature and composition of immediate packaging

Fluorinated high-density polyethylene containers, in pack sizes of 500 ml and 1 litre squeeze-measure-pour system or 2.5 and 5 litre backpacks.
Not all pack sizes may be marketed.

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

Any unused veterinary medicinal product or waste material derived from such veterinary medicinal products should be disposed of in accordance with local requirements. Do not contaminate watercourses with the product. Dangerous to fish and aquatic life.

7. MARKETING AUTHORISATION HOLDER

Zoetis UK Limited
1st Floor, Birchwood Building
Springfield Drive
Leatherhead
Surrey
KT22 7LP

8. MARKETING AUTHORISATION NUMBER

Vm 42058/4170

9. DATE OF FIRST AUTHORISATION

02 February 2000

10. DATE OF REVISION OF THE TEXT

March 2023

Approved: 17 March 2023