# Summary of Product Characteristics

## 1 NAME OF THE VETERINARY MEDICINAL PRODUCT

Nerfasin 20 mg/ml, solution for injection for cattle, horses, dogs and cats.

## 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

| | |
|---|---|
| Per ml: | |
| **Active substance:** | |
| Xylazine (as hydrochloride) | 20.0 mg |
| (equivalent to 23.31 mg xylazine hydrochloride) | |
| **Excipients:** | |
| Methyl parahydroxybenzoate (E218) | 1.0 mg |

For a full list of excipients, see section 6.1.

## 3 PHARMACEUTICAL FORM

Solution for injection.
Clear, colourless solution.

## 4 CLINICAL PARTICULARS

### 4.1 Target Species

Cattle, horses, dogs and cats.

### 4.2 Indications for use, specifying the target species

Sedation.
Premedication in combination with an anaesthetic.

### 4.3 Contraindications

• Do not use in animals with gastrointestinal obstruction as the muscle relaxant properties of the drug appear to accentuate the effects of the obstruction and because of possible vomiting.
• Do not use in animals with severe renal or hepatic impairment, respiratory dysfunction, cardiac abnormalities, hypotension and/or shock.
• Do not use in diabetic animals.
• Do not use in animals with a history of seizures.
• Do not use in calves younger than 1 week of age, foals younger than 2 weeks or in puppies and kittens younger than 6 weeks.
• Do not use during the last stage of pregnancy (danger of premature birth), except at parturition (see section 4.7).

## 4.4 Special warnings for each target species

**Horses:**
• Xylazine inhibits the normal intestinal motility. Therefore, it should only be used in horses with colic, that are not responsive to analgesics. The use of xylazine should be avoided in horses with caecal malfunction.
• After treatment of horses with xylazine, the animals are reluctant to walk, so whenever possible the drug should be administered in the place where the treatment/investigation is going to take place.
• Caution should be taken in the administration of the product to horses susceptible to laminitis.
• Horses with airway disease or malfunction may develop life-threatening dyspnoea.
• The dose should be kept as low as possible.
• The association with other pre-anaesthetic agents or anaesthetic agents should be the subject of a benefit/risk assessment. This assessment should consider the composition of the products, their dose and the nature of the surgery. Recommended dosages are likely to vary according to the choice of the anaesthetic association.

**Cats and dogs:**
• Xylazine inhibits the normal intestinal motility. This may make xylazine sedation undesirable for upper gastro-intestinal radiographs, because it promotes filling of the stomach with gas and makes interpretation less certain.
• Brachycephalic dogs with air way disease or malfunction may develop life-threatening dyspnoea.
• The association with other pre-anaesthetic agents or anaesthetic agents should be the subject of a benefit/risk assessment. This assessment should consider the composition of the products, their dose and the nature of the surgery. Recommended dosages are likely to vary according to the choice of the anaesthetic association.

**Cattle:**
• Ruminants are highly susceptible to the effects of xylazine. Normally cattle remain standing at the lower doses, but some animals may lie down. At the highest recommended doses most animals will lie down and some animals may lapse in lateral recumbency.
• Reticulo-ruminal motor functions are depressed after injection of xylazine. This may results in bloat. It is advisable to withhold feed and water several hours before administration of xylazine.
• In cattle the ability to eructate, cough and swallow is retained but reduced during the period of sedation, therefore cattle must be closely watched during the recovery period: the animals should be maintained in sternal recumbency.
• In cattle life threatening effects may occur after intramuscular doses above 0.5 mg/kg body weight (respiratory and circulatory failure). Therefore very precise dosing is required.
• The association with other pre-anaesthetic agents or anaesthetic agents should be the subject of a benefit/risk assessment. This assessment should consider the composition of the products, their dose and the nature of the surgery. Recommended dosages are likely to vary according to the choice of the anaesthetic association.

## 4.5 Special precautions for use

### Special precautions for use in animals

Keep the animals calm, because they may respond to external stimuli.
Avoid intra-arterial administration.
Tympany may occasionally occur in recumbent cattle and can be avoided by maintaining the animal in sternal recumbency.
To avoid aspiration of saliva or food, lower the animal's head and neck. Fast the animals before use of the product.

• Older and exhausted animals are more sensitive to xylazine, whilst nervous or highly excitable animals may require a relatively high dose.
• In case of dehydration, xylazine should be used cautiously.
• Emesis is generally seen within 3-5 minutes after xylazine administration in cats and dogs. It is advisable to fast dogs and cats for 12 hours prior to surgery; they may have free access to drinking water.
• Pre-medication with atropine in cats and dogs may reduce salivation and bradycardia effects
• Do not exceed the recommended dosage.
• Following administration animals should be allowed to rest quietly until the full effect has been reached.
• It is advised to cool animals when the ambient temperature is above 25°C and to keep animals warm at low temperatures.
• For painful procedures, xylazine should always be used in combination with local or general anaesthesia.
• Xylazine produces a certain degree of ataxia; therefore, xylazine must be used cautiously in procedures involving the distal extremities and in standing castrations in the horse.
• Treated animals should be monitored until the effect has faded totally (e.g. cardiac and respiratory function, also in the post-operative phase) and should be segregated to avoid bullying.
• For use in young animals, see the age restriction mentioned in section 4.3. If the product is intended to be used in young animals below these age-limits, a benefit/risk assessment should be made by the veterinarian.

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

• In case of accidental oral intake or self-injection, seek medical advice immediately and show the package leaflet to the physician but DO NOT DRIVE as sedation and changes in blood pressure may occur.
• Avoid skin, eye or mucosal contact.
• Wash the exposed skin immediately after exposure with large amounts of water.
• Remove contaminated clothes that are in direct contact with skin.
• In the case of accidental contact of the product with eyes, rinse abundantly with fresh water. If symptoms occur, seek the advice of a physician.
• If pregnant women handle the product, special caution should be observed not to self-inject as uterine contractions and decreased foetal blood pressure may occur after accidental systemic exposure.

Advice to doctors:
Xylazine is an a2-adrenoreceptor agonist, symptoms after absorption may involve clinical effects including dose-dependent sedation, respiratory depression, bradycardia, hypotension, a dry mouth and hyperglycaemia. Ventricular arrhythmias have also been reported. Respiratory and haemodynamic symptoms should be treated symptomatically.

## 4.6 Adverse reactions (frequency and seriousness)

In general, side effects, typical for an a2-adrenergic agonist, like bradycardia, reversible arrhythmia and hypotension can occur. Thermoregulation can be influenced and consequently body temperature can decrease or increase dependant on the ambient temperature. Depression of respiration and / or respiratory arrest can occur, especially in cats.

**Cats and dogs**
• Cats and dogs frequently vomit during the onset of the xylazine-induced sedation, especially when the animals have just been fed.
• Animals may show profound salivation following an injection with xylazine.
• Other adverse effects for dogs and cats include: muscle tremors, bradycardia with AV-block, hypotension, reduced respiratory rate, movement in response to strong auditory stimuli, hyperglycaemia and increased urination in cats.
• In cats xylazine causes uterine contractions and it may induce premature parturition.
• In dogs, adverse effects are generally more pronounced after subcutaneous administration compared to intramuscular and the effect (efficacy) can be less predictable.
• In susceptible dog breeds with a large chest (Great Dane, Irish Setter) rare cases of bloating have been reported.
• In anaesthetized animals, mainly during and after the recovery period, in very rare cases, cardio-respiratory disturbances (cardiac arrest, dyspnea, bradypnea, pulmonary edema, hypotension) and neurological signs (seizures, prostration, pupillary disorders, tremors) were observed.

**Cattle**
• In cattle xylazine may induce premature parturition, and it also reduces implantation of the ovum.
• Cattle, which have received high doses of xylazine sometimes suffer from loose faeces for 24 hours afterwards.
• Other adverse reactions include snoring, profound salivation, ruminal atony, atony of the tongue, regurgitation, bloating, nasal stridor, hypothermia, bradycardia, increased urination and reversible prolapse of the penis.
• In cattle, adverse effects are generally more pronounced after intramuscular administration compared to intravenous

**Horses**
• Horses often sweat as the effects of the sedation are wearing off.
• Severe bradycardia and reduced respiratory rate have been reported especially in horses.
• Following administration to horses, a transient rise followed by a fall in blood pressure usually occurs.
• More frequent urination has been reported
• Muscle tremors and movement in response to sharp auditory or physical stimuli are possible. Although rare, violent reactions have been reported in horses following the administration of xylazine.
• Ataxia and reversible prolapse of the penis may occur.
• In very rare cases xylazine may induce mild colic as the gut motility is depressed temporarily. As a preventive measure the horse should receive no feed after sedation until the effect has faded completely.

## 4.7 Use during pregnancy, lactation or lay

Although laboratory studies in rats have not shown any evidence of teratogenic or foetotoxic effects the use of the product during the first two trimesters of pregnancy should only be made according to the benefit/risk assessment by the responsible veterinarian.
Do not use in the later stages of pregnancy (particularly in cattle and cats) except at parturition, because xylazine causes uterine contractions and it may induce premature labour.
Do not use in cattle receiving ovum transplants as the increased uterine tone may reduce the chance of implantation of the ovum.

## 4.8 Interaction with other medicinal products and other forms of interaction

Other CNS depressant agents (barbiturates, narcotics, anaesthetics, tranquillizers, etc.) may cause additive CNS depression if used with xylazine. Dosages of these agents may need to be reduced. Xylazine should therefore be used cautiously in combination with neuroleptics or tranquillizers.
Xylazine should not be used in combination with sympathomimetic drugs such as epinephrine as ventricular arrhythmia may follow.
The concurrent intravenous use of potentiated sulphonamides with alpha-2 agonists has been reported to cause cardiac arrhythmias which may be fatal. Whilst no such effects have been reported with this product, it is recommended that intravenous administration of Trimethoprim/Sulphonamide containing products should not be undertaken when horses have been sedated with xylazine.

## 4.9 Amounts to be administered and administration route

Cattle: intravenous, intramuscular.
Horses: intravenous.
Dogs: intramuscular.
Cats: intramuscular, subcutaneous.
The intravenous injection should be given slowly, especially in horses.

* Cattle:
*Dosage:*

| **Dosage for cattle** | | | |
|---|---|---|---|
| Dosage level§ | xylazine (mg/kg) | Nerfasin 20 mg/ml (ml/100 kg) | Nerfasin 20 mg/ml (ml/500 kg) |
| **A. Intramuscular** | | | |
| I | 0.05 | 0.25 | 1.25 |
| II | 0.1 | 0.5 | 2.5 |
| III | 0.2 | 1 | 5 |
| IV | 0.3 | 1.5 | 7.5 |
| **B. Intravenous** | | | |
| I | 0.016-0.024 | 0.08-0.12 | 0.4-0.6 |
| II | 0.034-0.05 | 0.17-0.25 | 0.85-1.25 |
| III | 0.066-0.10 | 0.33-0.5 | 1.65-2.5 |

§Dose 1: Sedation, with a slight decrease of muscle tone. The ability to stand is maintained.
Dose 2: Sedation, marked decrease of muscle tone and some analgesia. The animal usually remains standing, but may lie down.
Dose 3: Deep sedation, further decrease of muscle tone and a degree of analgesia. The animal lies down.
Dose 4: Very deep sedation, a profound decrease in muscle tone and a degree of analgesia. The animal lies down.

* Horses
*Dosage:* single dose of 0.6 - 1 mg xylazine per kg body weight.
(3 - 5 ml product per 100 kg body weight).

* Dogs
*Dosage:* single dose of 0.5 - 3 mg xylazine per kg body weight.
(0.025 - 0.15 ml product per 1 kg body weight).

* Cats
*Dosage:* single intramuscular or subcutaneous dose of 0.5 - 1 mg xylazine per kg body weight.
(0.025 - 0.05 ml product per 1 kg body weight).

The stopper should not be punctured more than 20 times.
The number of punctures should be recorded on the outer packaging.

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

In the event of an accidental overdose, cardiac arrhythmias, hypotension, and profound CNS and respiratory depression may occur. Seizures have also been reported after an overdose. Xylazine can be antagonized by a2-adrenergic antagonists. To treat the respiratory depressant effects of xylazine, mechanically respiratory support with or without respiratory stimulants (e.g. doxapram) can be recommended.

## 4.11 Withdrawal Period(s)

Cattle:
Meat and offal: 1 day
Milk: zero hours

Horses:
Meat and offal: 1 day
Milk: zero hours

## 5 PHARMACOLOGICAL or IMMUNOLOGICAL PROPERTIES

***Pharmacotherapeutic group:*** hypnotics and sedatives xylazine

***ATCvet code:*** QN05CM92

## 5.1 Pharmacodynamic properties

• Xylazine belongs to the a2-adrenoceptor agonists.
• Xylazine is a a2-adrenoceptor agonist, that acts by stimulation of central and peripheral a2-adrenoceptors. Through its central stimulation of a2-adrenoceptors, xylazine has potent antinociceptive activity. In addition a2-adrenergic activity, xylazine has a1-adrenergic effects.
• Xylazine also produces skeletal muscle relaxation by inhibition of intraneuronal transmission of impulses at the central level of the central nervous system. The analgesic and skeletal muscle relaxation properties of xylazine show considerable interspecies variations. Sufficient analgesia generally will be attained in combination with other products only.
• In many species, administration of xylazine produces a short-lived arterial pressor effect followed by a longer period of hypotension and bradycardia. These contrasting actions upon the arterial pressure apparently are related to the a2- an a1-adrenergic actions of xylazine.
• Xylazine has several endocrine effects. Insulin (mediated by a2-receptors in pancreatic B-cells which inhibit insulin release), ADH (decreased production of ADH, causing polyuria) and FSH (decreased) are reported to be influenced by xylazine.

## 5.2 Pharmacokinetic properties

Absorption (and action) is rapid following intramuscular injection. Levels of drug peak rapidly (usually within 15 minutes) and then decline exponentially. Xylazine is a highly lipid soluble organic base and diffuses extensively and rapidly (Vd 1.9-2.7). Within minutes after an intravenous injection, it can be found in a high concentration in the kidneys, the liver, the CNS, the hypophyses, and the diaphragm. So there is a very rapid transfer from the blood vessels to the tissues. Intramuscular bioavailability is incomplete and variable ranging from 52-90% in the dog to 40-48% in the horse. Xylazine is metabolised extensively and eliminated rapidly (±70% via the urine, while the enteric elimination is ±30%). The rapid elimination of xylazine is probably related to an extensive metabolism rather than to a rapid renal excretion of unchanged xylazine.

# 6 PHARMACEUTICAL PARTICULARS

## 6.1 List of excipients

Methyl parahydroxybenzoate (E218)
Sodium chloride
Sodium hydrogen carbonate (for pH-adjustment)
Hydrochloric acid (for pH-adjustment)
Water for injections

## 6.2 Incompatibilities

In the absence of compatibility studies, this veterinary medicinal product must not be mixed with other veterinary medicinal products.

## 6.3 Shelf-life

Shelf life of the veterinary medicinal product as packaged for sale: 3 years
Shelf life after first opening the immediate packaging: 28 days

## 6.4 Special precautions for storage

Do not refrigerate or freeze.

## 6.5 Nature and composition of immediate packaging

10 ml, 30 ml and 50 ml clear type II glass vials closed with a bromobutyl rubber stopper and aluminium cap in a carton box containing 10 ml, 25 ml and 50 ml product, respectively.

Not all pack sizes may be marketed.

## 6.6 Special precautions for the disposal of unused veterinary medicinal products or waste materials

Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.

## 7 MARKETING AUTHORISATION HOLDER

Le Vet B.V.
Wilgenweg 7
3421 TV Oudewater
The Netherlands

## 8 MARKETING AUTHORISATION NUMBER(S)

VPA 10816/013/001

## 9 DATE OF THE FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 18th May 2012

## 10 DATE OF REVISION OF THE TEXT

February 2015