SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Multishield DC Intramammary Suspension for Cows

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each 4.5g intramammary syringe contains

Active Substances:	
Neomycin	70 000 IU
(corresponding to Neomycin Sulphate	100 mg)
Penethamate	77.2 mg
(corresponding to Penethamate Hydriodide	100 mg)
Benzylpenicillin	227.2 mg
(corresponding to Procaine Benzylpenicillin	400 mg)

Excipients:
For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Intramammary suspension.
A smooth, off white, oily suspension.

4. CLINICAL PARTICULARS

4.1 Target species

Cows (at dry off)

4.2 Indications for use, specifying the target species

In cows at drying off:

Treatment of subclinical mastitis caused by bovine mastitis microorganisms susceptible to the combination of active substances, penicillin and neomycin, and as part of strategy for the prevention of new infections occurring during the dry period.

4.3 Contraindications

Do not use in lactating cows.
Do not use in cases of hypersensitivity to β-lactam antibiotics, cephalosporin antibiotics, neomycin or other aminoglycoside antibiotics or to any of the excipients.
Do not use in cows with clinical mastitis.

4.4 Special warnings

None.

4.5 Special Precautions for Use

Special precautions for use in animals

Use of the product should be based on susceptibility testing of the bacteria isolated from the animal. If this is not possible, therapy should be based on local (regional, farm level) epidemiological information about susceptibility of the target bacteria.
Official, national and regional antimicrobial policies should be taken into account when the product is used.
The therapeutic efficacy of the product is only established against pathogens that are susceptible to the active substances.
Serious acute mastitis [potentially lethal] due to pathogens like *Pseudomonas aeruginosa*, can occur after drying off despite preventive treatment. Good aseptic practices should be thoroughly respected in order to reduce that risk; cows should be housed in a hygienic paddock far from the milking parlour and regularly checked several days after drying off.
Use of the product deviating from the instructions given in the SPC may increase the prevalence of bacteria resistant to benzylpenicillin and may decrease the effectiveness of treatment with other beta lactam antimicrobials (penicillins and cephalosporins) due to the potential for cross-resistance.

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

Persons administering the product should avoid contact with this preparation as occasionally skin allergy may occur.
Penicillins and cephalosporins may cause sensitisation following injection, inhalation, ingestion or skin contact. Sensitivity to penicillins may lead to cross sensitivity to cephalosporins and vice versa. Allergic reactions to these substances may occasionally be serious.
Do not handle this product if you know that you are sensitised or if you have been advised not to work with such preparations.
If you develop symptoms such as a skin rash following exposure, seek medical advice and show this warning to the doctor. Swelling of the face, lips or eyes, or difficulty with breathing are more serious symptoms and require urgent medical attention.

4.6 Adverse reaction (frequency and seriousness)

Allergic reactions (allergic skin reactions, anaphylaxis)
Penicillins may cause hypersensitivity following administration. Allergic reactions to these substances may occasionally be serious.
The frequency of adverse reactions is very rare.
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).

If adverse reactions occur, the current treatment should be withdrawn and symptomatic treatment should be initiated.

4.7 Use during pregnancy and lactation

The product is not recommended for use in lactating cows, except at the drying off stage.

4.8 Interaction with other medicinal products and other forms of interactions

No data available.

4.9 Amounts to be administered and administration route

Single intramammary administration.
100 mg of neomycin sulphate, 100 mg of Penethamate Hydriodide and 400 mg of Procaine Benzylpenicillin into each quarter.

The contents of one syringe should be infused into each quarter via the teat canal immediately after the final milking of a lactation.

Before instillation, the udder should be milked out completely. The teat and its orifice should be thoroughly cleaned and disinfected with a cleaning towel. Care should be taken to avoid contamination of the injector nozzle. Gently insert the content of one syringe into each quarter. Disperse the product by gentle massage of the teat and udder. The syringe must only be used once.

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

Overdosing may invalidate the stated milk and meat withdrawal times.

4.11 Withdrawal period(s)

Meat and Offal: 28 days.

Milk: 96 hours post calving in cows with a dry period of more than 50 days.
50 days plus 96 hours after treatment from cows with a dry period of 50 days or less.

5. PHARMACOLOGICAL PROPERTIES

Pharmacotherapeutic group: Combination of antibacterials for intramammary use,
Beta-lactam antibacterials with other antibacterials.
ATCvet Code: QJ51RC22

5.1 Pharmacodynamic properties

The product contains an aminoglycoside (neomycin sulphate) and two penicillin derivatives (procaine benzyl penicillin and penethamate hydriodide).

Aminoglycosides disturb the permeability of the bacterial cell membrane by an effect exerted during cell wall development. Once the aminoglycoside has entered the cell, it binds to the target site on the ribosome, inducing misreading of the genetic code. Neomycin in common with other aminoglycosides has activity predominantly against gram negative microorganisms.

Neomycin has been shown to have synergistic activity with β-lactam antibiotics against Gram positive bacteria.

Penicillins have a time-dependent, bacteriocidal effect by interfering with microbial cell wall synthesis. They inhibit the activity of transpeptidase enzymes which catalyse cross linkage of the glycopeptide polymer units that form the cell wall. Both Procaine benzylpenicillin and Penethamate hydroiodide are hydrolysed in the udder to release free penicillin.

Bovine mastitis microorganisms which can be treated with the product includesusceptible isolates of *Staphylococcus aureus, Streptococcus agalactiae, Streptococcus uberis,* other susceptible *Streptococcus* spp*, Trueperella pyogenes* and susceptible isolates of *E.coli.*

The predominant mechanism of penicillin resistance in Gram-negative bacteria is the production of β-lactamase enzymes and this is also a well-recognised feature of some *Staphylococcus* spp isolates. Alteration of the penicillin binding proteins is a less prevalent resistance mechanism however this has been recorded in some bovine mastitis isolates of *Staphylococcus* spp. Reported penicillin resistance levels vary considerably between geographical areas. The prevalence of resistance against neomycin remains low in those species.

Enzymatic modification is the most common type of aminoglycoside resistance. There are only limited reports of identification of the genes for enzymes active against neomycin in veterinary mastitis pathogens.

5.2 Pharmacokinetic Particulars

Penethamate hydriodide is an ester of benzylpenicillin which is rapidly hydrolysed at pH 7.3 to liberate free penicillin which quickly distributes throughout the udder tissue.
Procaine benzylpenicillin is a complex, sparingly soluble organic salt of benzylpenicillin and its use, in combination with a slow-release base, is intended to delay release of the active penicillin moiety at the site of administration and so give rise to a prolonged duration of action.

Neomycin is a poorly lipid soluble, basic aminoglycoside that shows a high degree of binding to udder tissue and has low systemic absorption thus it persists in the udder for a prolonged period after administration.

6. PHARMACEUTICAL PARTICULARS

6.1 List of Excipients

Liquid paraffin

Aluminium di/tristearate.

6.2 Major incompatibilities

Not applicable.

6.3 Shelf Life

Shelf-life of the veterinary medicinal product as packaged for sale: 2 years.
Syringes are for single use only.

6.4 Special Precautions for Storage

Do not store above 25°C.
Do not refrigerate or freeze.

6.5 Nature and composition of immediate packaging

Low density Polyethylene intramammary syringe, containing 4.5g intramammary suspension.
Syringes packed in cartons of 24 syringes or buckets of 120 syringes.
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 materials derived from such veterinary medicinal product should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

Bimeda Animal Health Limited
2 / 3 / 4 Airton Close
Tallaght
Dublin 24
Ireland

8. MARKETING AUTHORISATION NUMBER

Vm 50146/4005

9. DATE OF FIRST AUTHORISATION

02 May 2013

10. DATE OF REVISION OF THE TEXT

October 2018

Approved: 18 October 2018