



BREAKTHROUGH MITE CONTROL



Exzolt[®]
FLURALANER

PRODUCT DETAILER



BREAKTHROUGH MITE CONTROL

Exzolt[®], from MSD Animal Health, provides comprehensive management of poultry red mites in chickens. Exzolt is delivered through the drinking water – reducing stress caused by conventional chemical sprays and minimising the potential of chemical exposure to workers. In two convenient administrations, Exzolt offers fast and nearly complete elimination of mite populations that can be maintained under proper biosecurity measures.

KEY USES

- ▶ Mite infestations in pullets, breeders and layers
- ▶ In situations with mite strains resistant to classic chemical treatments
- ▶ To improve overall animal health, welfare and productivity

KEY PERFORMANCE BENEFITS

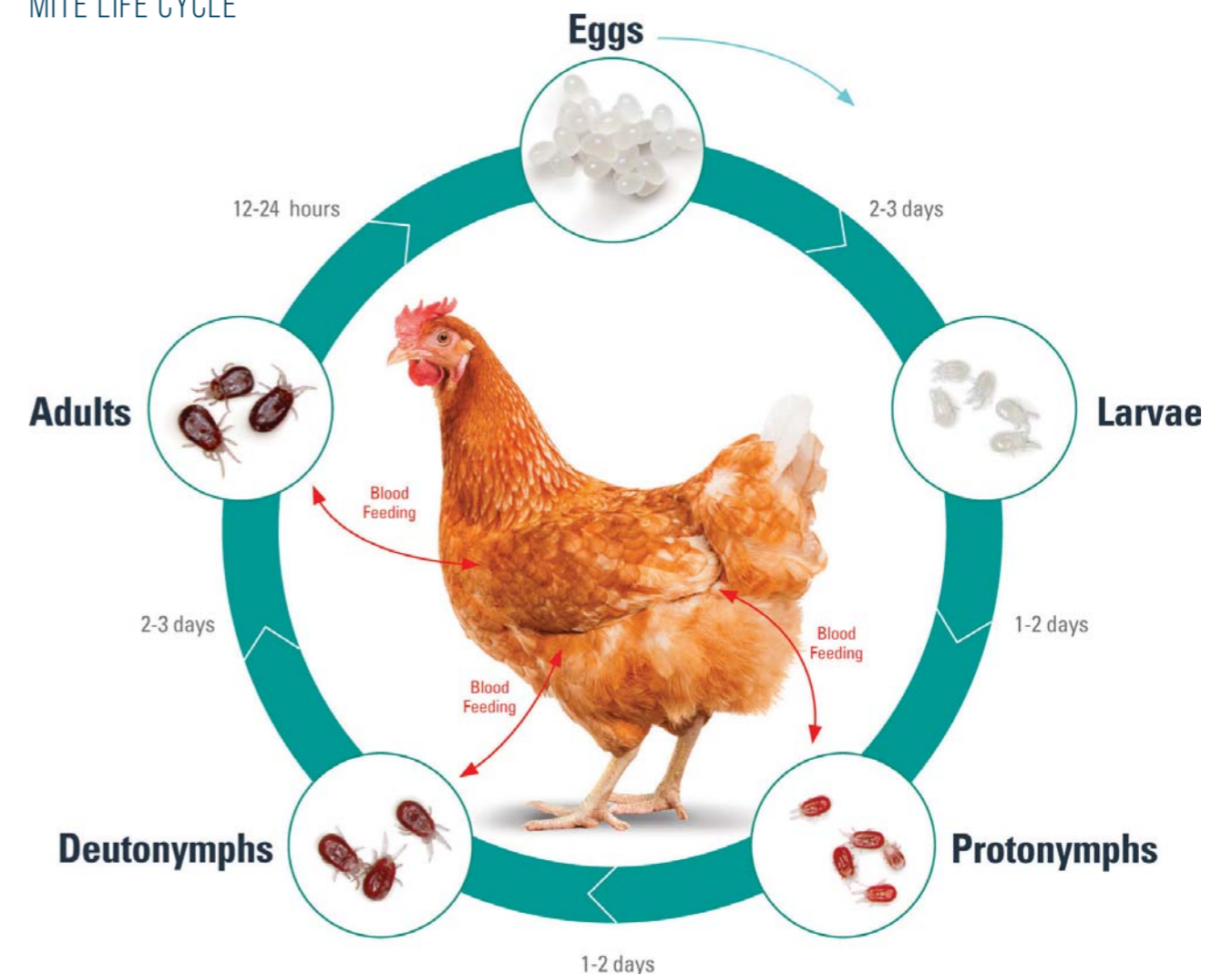
- ▶ Treatment of poultry red mite infestations in pullets, breeders and layers
- ▶ Zero-day withdrawal period for eggs and short 14-day withdrawal for meat or offal
- ▶ Easily administered to layer and breeder chickens, with a very wide margin of safety
- ▶ Avoids exposure of staff and birds to chemical sprays
- ▶ Dosage regime spans two mite life cycles – achieving more than 99%¹ mite-killing efficacy
- ▶ Ready-to-use for simple dilution, with no sedimentation, clogging or wastage



THE THREAT OF POULTRY RED MITES IN EUROPE

Poultry red mites (*Dermanyssus gallinae*) are the primary mite threat in Europe. These pests can cause anemia, increase mortality and disease susceptibility while eroding productivity parameters like feed efficiency, egg production, egg quality and weight gain.² In addition to physiological damage, mite parasites are a costly global problem for poultry production. In Europe alone, the approximate total annual cost of red mite infestations totals £315 million, with more than 300 million hens in all production types suffering from infestations.³

MITE LIFE CYCLE



The life cycle of the poultry red mite, *Dermanyssus gallinae*. Aside from the egg, the poultry red mites have 4 life cycle stages: larva, protonymph, deutonymph and adult. Larvae hatch with 6 legs and do not feed. After the first molt, both nymphal stages and adults have 8 legs. Protonymphs, deutonymphs and adult females routinely feed on host blood, but males only occasionally feed.²

PHYSIOLOGICAL AND ECONOMIC DAMAGE

Mite bites are painful and induce skin irritation, contributing to high stress levels in infested birds. Increased self-grooming and head scratching both day and night (characteristic symptoms of anxiety that also contribute to decreased weight gain) have been observed in artificially infested hens.² In addition to experiencing anemia as well as higher rates of mortality and disease susceptibility, flocks infested with mites typically suffer eroded productivity as evidenced by:

- ▶ Decreased feed intake
- ▶ Decreased egg production
- ▶ Decreased egg quality (shell thinning, spotting)
- ▶ Decreased weight gain

Economic losses from poultry mite infestations severely affect the productivity of the egg industry. It is estimated that the current cost of red mite infestation in Europe is about £175 million for productivity losses and up to about £315 million for overall costs.³

Current management methods lack sufficient efficacy to keep mite infestations under control at many poultry farms and often pose safety threats for both birds and humans. But Exzolt is different.



COMBATING POULTRY RED MITES

Exzolt is a unique parasiticide for chickens that provides potent efficacy against poultry red mites. Administered through the drinking water, Exzolt provides a convenient oral solution via the drinking water. Exzolt provides fast and potent acaricidal efficacy, with proven safety for chickens and the users of the product.

ACTIVE SUBSTANCE

Fluralaner (carbamoyl-benzamide-phenyl-isoxazoline), the active substance of Exzolt, is a member of the novel antiparasitic compound class of isoxazoline-substituted benzamide derivatives. Orally administered, fluralaner reaches target ectoparasites through the gastrointestinal tract and the bloodstream.

PHARMACOLOGY

After oral medication via medicated drinking water, fluralaner is rapidly absorbed and reaches maximum plasma concentrations 36 hours after the first administration and 12 hours after the second administration. The drug is highly bioavailable (~91%), highly bound to proteins, widely distributed throughout the body (highest concentrations in liver and skin/fat), minimally metabolized and eliminated mainly via the hepatic route.

Once ingested by a mite feeding on a treated chicken, fluralaner acts as a potent inhibitor of parts of the arthropod nervous system.

COMBAT RESISTANCE

As with most medicinal or chemical interventions used for animal health, the development of resistance is an ongoing concern. However, resistance has not been detected against fluralaner. In vitro bio-assays have shown that fluralaner is effective against parasites having proven field resistance, including:

- ▶ Organophosphates (tick, mite)
- ▶ Pyrethroids (tick, mite)
- ▶ Carbamates (mite)



POTENT EFFICACY

Treating the chicken with Exzolt, rather than treating the chicken's environment, is an innovative approach to targeting mite parasites. Convenient treatment with Exzolt through the drinking water causes effective levels of the acaricide to be systemically distributed within all birds, ready to kill mites whenever parasites extract a blood meal from their hosts.

At the recommended dosage regime of 0.5 mg fluralaner/kg BW twice, seven days apart, near-total elimination of mite populations in clinical trial treated houses was quickly achieved in all layer, breeder and/or pullet houses.

EXZOLT

- ▶ Induces a rapid and massive decrease in mite populations in a chicken house
- ▶ Treats the bird, not just the environment
- ▶ Starts quickly (within four hours), with prolonged duration in birds spanning two mite life cycles
- ▶ Offers high bioavailability and systemic distribution in poultry
- ▶ Acts against mites resistant to classical acaricides

TREATMENT REGIME

The recommended treatment regime for Exzolt (0.5 mg/kg BW twice at a seven-day interval) was identified as a result of a comprehensive dose-determination program that evaluated multiple doses and durations using artificial infestations of poultry red mites under experimental conditions.

The objective of the dose-determination studies was to select a treatment regime that provides efficacy for the duration of two consecutive mite life cycles (~15 days). Mite development from egg to the first blood-feeding stage (hematophagous protonymphs) normally occurs within three to five days, and a blood meal is required for further development of protonymphs to deutonymphs and adults, and also for production of mite eggs. Thus, the mite life cycle is disrupted due to the rapid onset of fluralaner activity, the very high mite-killing efficacy (duration of at least two mite life cycles) and the absence of egg production from female mites exposed to

treated chickens. Data indicates that Exzolt is more effective than traditional spray products for rapidly and dramatically decreasing building infestation burdens.

TREATMENT PROGRAM

Apply 0.5 mg fluralaner/kg BW to the drinking water twice, seven days apart. Exzolt is a ready-to-use solution for simple dilution, with no sedimentation or clogging.

When used in conjunction with proper biosecurity measures, Exzolt's treatment program of two doses seven days apart fights mite resistance and contributes toward long-term control of mite populations in poultry houses.

MITE CONTROL IN THE WATER

- ▶ Treats all birds, unlike hit-and-miss spraying
- ▶ More convenient and simpler application than sprays
- ▶ Uniform dosing accuracy
- ▶ Two short one-day treatments, one week apart
- ▶ Flexible; easy to tailor treatment to bird management programs (feeding, housing, etc.)
- ▶ Reduced labour compared to sprays and other treatment methods
- ▶ Re-sealable, multiple-entry container

SAFETY

Containing fluralaner, Exzolt is a potent acaricide with a proven safety profile, the first isoxazoline approved for use in poultry. Exzolt is well tolerated in all classes of chickens, with a very wide margin of safety, and avoids exposure of house workers and birds to chemical sprays.

WORKER SAFETY

Administration through the drinking water minimises the potential of chemical exposure to people. Treatment compliance is also enhanced by convenient administration of the ready-to-use solution in drinking water, greatly reducing the workload for house workers compared to spraying (e.g., removing birds and/or eggs, multiple applications, quarantines, less safety equipment, application license requirements, fewer safety precautions, etc.).

ANIMAL WELFARE

Two target animal safety studies demonstrated that Exzolt was well tolerated and highly palatable in chicks and adult hens, even when dosed at 15-times the intended total dosage.⁴ In breeder chickens, a reproductive safety study demonstrated that Exzolt is well tolerated even at six-times the intended total dosage. There are no adverse effects on fertility, hatchability, chick viability or overall reproductive performance.

Eggs from hens treated with Exzolt are completely safe for consumers and no withdrawal period is necessary before collection of eggs for human consumption – even on the day of treatment or between treatment days. A withdrawal period of 14 days after the last administration of Exzolt is required for human consumption of meat and offal.

ASSURED SAFETY

- ▶ Zero egg withdrawal time for layers
- ▶ Not stressful for hens
- ▶ Approved for breeders
- ▶ No harm on egg production, hatchability or progeny
- ▶ Broad safety margin

Use of Exzolt at the recommended daily dose rate of 0.5 mg/kg BW twice at a seven-day interval offers a wide margin of safety for all classes of pullets, breeders and layers, and does not impact rates of water consumption.

DISCOVER BREAKTHROUGH MITE CONTROL

Exzolt represents an innovative approach for comprehensive management of poultry red mites in chickens, providing systemic acaricidal activity within the bird instead of relying on external contact with a pesticide or other treatment compounds. Only Exzolt offers a unique combination of features and benefits that, together, distinguish the product as a major advance for optimising the health and productivity of layers, breeders and pullets threatened by poultry red mites.

EXZOLT SUMMARY

- ▶ Induces a rapid and massive decrease in mite populations in a chicken house, with demonstrated 99%+ efficacy¹
- ▶ A fast kill starts within 4 hours of administration, and the two administrations a week apart span two mite life cycles, thus disrupting mite population dynamics
- ▶ Convenient treatment in the drinking water at a low dose of 0.5 mg/kg BW per day, repeated one week later, allowing uniform and accurate dosing compared to other control methods
- ▶ Ready-to-use solution (1% fluralaner, 10 mg/ml) for simple dilution, with no sedimentation, clogging or wastage
- ▶ More effective, convenient and targeted option than mite sprays with a proven safety profile
- ▶ Highly active against mite strains resistant to classic acaricides
- ▶ Ideal for layers due to zero egg withdrawal period
- ▶ No adverse impacts on egg production, hatchability or chick survival of breeders (in fact, positive impacts often observed)
- ▶ Easily administered to layer and breeder chickens, with a very wide margin of safety
- ▶ Avoids exposure of house workers and birds to toxic sprays
- ▶ Short 14-day withdrawal for meat or offal

Exzolt is a high-quality product that offers research-based technical support from MSD Animal Health. It fulfills a critical unmet need for overall bird health and welfare.

BIOSECURITY BEST PRACTICES FOR POULTRY RED MITE CONTROL

IMPLEMENT THESE GUIDELINES IN YOUR OPERATION TO HELP PREVENT AND CONTROL POULTRY RED MITE INFESTATIONS.

1 ENVIRONMENT

- ▶ Install perimeter fence and controlled access at all entrances
- ▶ Ensure that house surroundings are clean and with hard pavement
- ▶ Place restrictions to the visitor entrance
- ▶ Clean and disinfect vehicles on entering the farm
- ▶ Ensure wild bird proofing is in place
- ▶ Maintain main entrances, building structure and fan openings in good order

2 MATERIAL/EQUIPMENT

- ▶ Maintain foot baths at entrances
- ▶ Purchase specific equipment and tools for each house
- ▶ Maintain and clean egg conveyor belts and cross-belts periodically
- ▶ Maintain and clean manure conveyor belts periodically
- ▶ Clean feeding system periodically
- ▶ Remove unnecessary equipment and tools from the house

3 REARED HENS

- ▶ Check pullets for presence of poultry red mites before placement in the layer house
- ▶ Implement control measure in the rearing house for red mites (if hens are reared in the same farm)
- ▶ Check containers and crates for presence of red mites

- ▶ Clean containers and crates after use
- ▶ Implement monitoring protocol for red mites

4 REMOVAL OF CARCASSES

- ▶ Remove dead birds twice daily from the sheds
- ▶ Implement adequate removal system
- ▶ Maintain clean wheelbarrow (if in use)
- ▶ Allocate carcass collection vessels in a proper location (not alongside the house)
- ▶ Clean and disinfect mortality collection point to avoid poultry red mite spread

5 VISITORS AND PERSONNEL CONTROL

- ▶ Install changing area with biosecurity barrier
- ▶ Use showers where available before entering the farm
- ▶ Require separate outer clothing for each layer house
- ▶ Instruct hen collection teams to fulfill site biosecurity requirements

6 CLEANING, DISINFECTION, PESTS AND VERMIN CONTROL

- ▶ Implement cleaning + disinfection + depopulation protocol
- ▶ Evaluate cleaning + disinfection + depopulation efficacy
- ▶ Hire professional pests/vermin control

MIXING AND ADMINISTRATION GUIDE

GETTING STARTED

- ▶ Check the water system to ensure it works properly and is free of leaks; also ensure that water is available to all nipple or bell drinkers.
- ▶ If using a dosing pump, make sure the dosing pump is properly set to deliver the medicated water during the pre-determined treatment period (hours/day).
- ▶ Determine the preferred drinking period (can range from 4 to 24 hours) when Exzolt will be administered on the treatment day.
- ▶ Estimate how much water birds will consume during treatment based on their water consumption during the same period the day before.



CALCULATE THE DOSAGE

- ▶ **The dose is 0.5 mg fluralaner per kg bodyweight (equivalent to 0.05 ml Exzolt) administered twice, 7 days apart.**
The full course of therapy must be administered for full therapeutic effect.
- ▶ To ensure administration of the correct dosage, use calibrated scales to determine the average bodyweight within the flock.
- ▶ The required amount of product on each treatment day is calculated from the total estimated bodyweight (kg) of the entire group of chickens to be treated:
Volume of product (ml) per treatment day = Total bodyweight (kg) of chickens to be treated x 0.05 ml/kg
500 ml of Exzolt treats 10,000 kg bodyweight of birds (i.e. 5,000 chickens weighing 2 kg bodyweight) **per day** of treatment administration.

| DOSING GUIDE | | | | | |
|-------------------------|---|-------|--------|--------|--------|
| AVERAGE BODYWEIGHT (KG) | DAILY QUANTITY OF EXZOLT (ML) FOR THE FOLLOWING NUMBER OF BIRDS | | | | |
| | 1,000 | 5,000 | 10,000 | 15,000 | 20,000 |
| 1 | 50 | 250 | 500 | 750 | 1,000 |
| 1.1 | 55 | 275 | 550 | 825 | 1,100 |
| 1.2 | 60 | 300 | 600 | 900 | 1,200 |
| 1.3 | 65 | 325 | 650 | 975 | 1,300 |
| 1.4 | 70 | 350 | 700 | 1,050 | 1,400 |
| 1.5 | 75 | 375 | 750 | 1,125 | 1,500 |
| 1.6 | 80 | 400 | 800 | 1,200 | 1,600 |
| 1.7 | 85 | 425 | 850 | 1,275 | 1,700 |
| 1.8 | 90 | 450 | 900 | 1,350 | 1,800 |
| 1.9 | 95 | 475 | 950 | 1,425 | 1,900 |
| 2 | 100 | 500 | 1,000 | 1,500 | 2,000 |
| 2.1 | 105 | 525 | 1,050 | 1,575 | 2,100 |
| 2.2 | 110 | 550 | 1,100 | 1,650 | 2,200 |
| 2.3 | 115 | 575 | 1,150 | 1,725 | 2,300 |
| 2.4 | 120 | 600 | 1,200 | 1,800 | 2,400 |
| 2.5 | 125 | 625 | 1,250 | 1,875 | 2,500 |
| 3 | 150 | 750 | 1,500 | 2,250 | 3,000 |
| 3.5 | 175 | 875 | 1,750 | 2,625 | 3,500 |
| 4 | 200 | 1,000 | 2,000 | 3,000 | 4,000 |

Individual bird average bodyweight x number of birds in group x 0.05 = ml dose rate for 1 administration.

Repeat the dose 7 days later.

1 FULL TREATMENT = 2 SEPARATE DOSES, 7 DAYS APART.

PREPARING THE SOLUTION

- ▶ Mix the required volume of Exzolt with water into a large medication tank or create a stock solution diluted with drinking water and administered over time using a proportioner or dosing pump.
- ▶ When preparing the stock solution always add product and water simultaneously in order to avoid foaming.
- ▶ Rinse the container used to measure the required product volume during the filling phase ensuring that the complete dose is emptied into the medication tank or the stock solution and that no residues remain in the measuring device.
- ▶ Stir the content of the medication tank gently.
- ▶ For each day of treatment, medicated water must be freshly prepared.



START MEDICATION

- ▶ Recheck the water system to ensure it is still working properly and free of leaks; also ensure that water is available to all nipple or bell drinkers.
- ▶ Make sure the dosing pump is properly set to deliver the Exzolt during the pre-determined treatment period (hours/day).
- ▶ Prime the drinker lines with medicated water and check to see when medicated water has reached the end of the line. This procedure will have to be repeated on each of the two treatment administration days.
- ▶ Check and record water consumption on each day of treatment administration and ensure all the Exzolt is consumed.

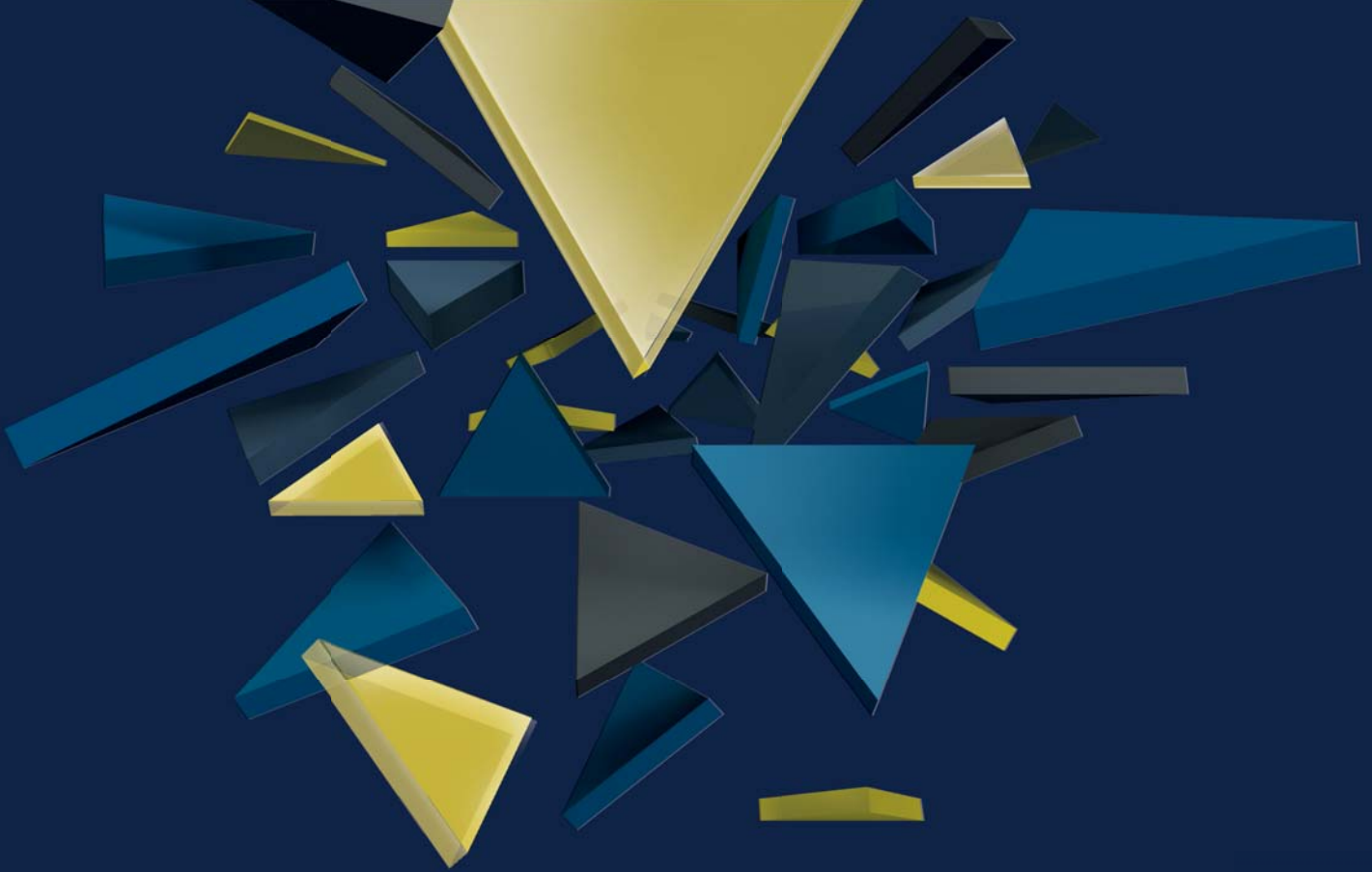


CLEAN

- ▶ After each daily treatment, resume normal water supply.

PRECAUTIONS

- ▶ Avoid contact with skin, eye and mucous membranes.
- ▶ Wear protective gloves at all times while handling the veterinary medicinal product and cleaning the measuring device. Wash hands after use. In case of skin and/or eye contact, immediately rinse with plenty of water. Remove contaminated clothes after spillage.



Exzolt®

FLURALANER

References:

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2. Sparagano D.A.E., George D.R., Harrington D.W.J., Giangaspero A. Significance and control of the poultry red mite *Dermanyssus gallinae*. Annu Rev Entomol 2014; 59:447-466.
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Exzolt® contains fluralaner **POM-V**. Further information is available from the SPC, datasheet or package leaflet. MSD Animal Health UK Ltd. Registered office Walton Manor, Walton, Milton Keynes MK7 7AJ, UK. Registered in England & Wales no. 946942. Advice should be sought from the medicine prescriber.

Use Medicines Responsibly. For more information please refer to the Responsible Use sections of the NOAH website.

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