

Virkon™ S

**Powerful Broad Spectrum
Virucidal Disinfectant**



Kills over 500 strains of disease-causing pathogens rapidly, in real farm conditions



Redefining the chemistry of biosecurity.

When Virkon™ S was launched in 1986, it was the most advanced farm disinfectant for its time. It was one of the first oxidative disinfectants to be used on the farm and continues to lead the way in pig biosecurity, having been deployed successfully against 500 disease-causing organisms.

For over 30 years, Virkon™ S has set new benchmarks in many important aspects of biosecurity, from improved handling and operator safety profiles, to proven on-farm efficacy and application flexibility. Add to this the excellent stability and long shelf life of the powder-based

formulation, and it is easy to see why governments the world over keep stocks of Virkon™ S for emergency disease-control purposes.

Virkon™ S was originally developed to specifically address the practical biosecurity requirements of modern-day farming and livestock production. The powerful capabilities of peroxygen-based chemistry in the formulation of Virkon™ S provide a broad spectrum of efficacy with specific focus against viral disease-causing organisms.

New design. Same unrivalled science.

The Virkon™ range of disinfection products now have a dynamic new look to match their biosecurity disinfecting power. Look out for the new enhanced pack designs from Alltech Lienert Australia.

Visit virkon.com for more details.





Industry-leading chemistry recognised by governments worldwide.

Virkon™ S is a scientific breakthrough with performance characteristics that have defined biosecurity standards. Not surprisingly, Virkon™ S is the choice of the Food and Agriculture Organization of the United Nations and governments worldwide to secure biosecurity and strengthen emergency disease control (EDC) contingency planning. The Australian and New Zealand governments' AUSVETPLAN is probably the best-regarded EDC reference source. Virkon™ S continues to be the only branded disinfectant referred to in the 2008 AUSVETPLAN, stating that "Virkon™ S is a modern disinfectant with outstanding virucidal properties."

It is proven:

- To kill over 500 strains of viruses, bacteria, and fungi
- Against Porcine Reproductive and Respiratory Syndrome virus (PRRSv), Porcine Circovirus type 2 (PCV2), Porcine Epidemic Diarrhoea virus (PEDv), *Salmonella* and *Campylobacter*, and against African Swine Fever virus (ASFv) approved by the APVMA under permit (PER88135) for use as a disinfectant in case of an outbreak of ASF.
- To be powerful, fast acting, flexible, multipurpose biosecurity disinfectant

Proven chemistry. Proven results.

Independently proven broad spectrum efficacy.

As part of our commitment to evolving chemistry, safety, and stewardship, we have heavily invested in performance and safety testing. And, Virkon™ S has a significant number of studies supporting approved label claims against the OIE listed diseases, including Foot and Mouth Disease (FMD), Classical Swine Fever (CSF), Aujeszky's Disease (AD), Transmissible Gastroenteritis (TGE), and African Swine Fever (ASF). Virkon™ S is also UK DEFRA Approved for Foot and Mouth Disease (FMD), Swine Vesicular Disease (SVD), and General Orders (GO).

For *Salmonella*, studies confirm that Virkon™ S is highly active against the most prevalent strains responsible for food poisoning. The broad spectrum efficacy of Virkon™ S has been independently proven against:



- Over 100 strains of viruses in 22 viral families
- Over 400 strains of bacteria
- Over 60 strains of fungi

These studies were conducted using a wide range of contact times, temperatures, and organic challenge levels.

Formulated broad spectrum killing power.

Formulated to overcome the problems of limited spectrum and limited activity exhibited by other disinfectants, Virkon™ S achieves deactivation and destruction of the target organism through a broad spectrum, non-selective range of oxidation reactions. Unlike other disinfectant chemistries, such as aldehydes, Virkon™ S does not exert a specific toxicological effect on the target organism and is proven to kill pathogens in seconds.





**Performs in the laboratory.
Performs on the farm.**

Proven on-farm efficacy offers producers reassurance and the knowledge that the product they are using will be effective in real farm conditions, where low temperatures and high levels of organic challenge can present serious problems to other disinfectants. Live pig transport is an important vector of PRRS virus into farms and within pig flows.



Excellent control of food-poisoning pathogens to EN test standards.

With stringent EU legislation on *Campylobacter* control in full force across the swine industry, Virkon™ S has been re-evaluated at Wageningen University in the Netherlands to specifically address the EU legislation. The EN 1656 *Campylobacter* study confirmed that Virkon™ S achieved excellent dilution rates.

The gold standard boot dip disinfectant – for rapid speed of kill.

Independent field trials have demonstrated the impracticality of many types of disinfectants for boot dips due to slow kill rates. Researchers at Indiana's Purdue University in the US compared the performance of disinfectants from six leading classes,² and only the QAC disinfectant provided adequate boot dip disinfection but required an impractical five-minute soak after boot cleaning. However, when Virkon™ S was evaluated under similar circumstances, effective disinfection was achieved after boot cleaning in just 30 seconds.³ The study confirmed that Virkon™ S achieves excellent speed of kill at low temperatures and in the presence of organic challenge.



Operational benefits. Because Virkon™ S simply offers more.

No need for rotation.

Independent studies have demonstrated that Virkon™ S is less likely to lead to the development of acquired resistance when compared with certain other disinfectant chemistries, consequently removing the need for disinfectant rotation.^{4,5}

Superior operator safety.

Extensive investment has been made to assess the safety of Virkon™ S users. The assessment demonstrates that Virkon™ S is not corrosive to skin and does not cause sensitisation. A typical in-use dilution of 1:100 (1%) has been shown to be non-irritating to skin and eyes, and is not a sensitising agent.

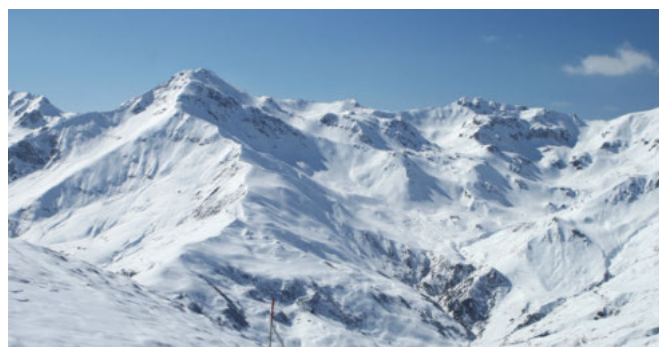
Effective low-temperature performance.

The ability of a disinfectant to work well at low temperatures contributes to the value of its use on a daily basis. It is well established that the efficacy of disinfectants can decrease as temperature decreases. Further, it has been shown that formaldehyde exhibits reduced biocide performance when the temperature is lowered. Conversely, Virkon™ S maintains activity against various viruses at 4°C.

Easy to transport and store.

Virkon™ S can be transported conveniently and rapidly by rail, sea, and air. It is not classified as “dangerous for transport,” reducing the cost of shipment and negating the requirement to manage staff qualified in the shipment of dangerous goods. Due to the complexities and restrictions surrounding shipment of dangerous goods, shipment times can be prolonged.

The powder formulation of Virkon™ S simplifies storage thanks to its stability. So it can be stored for long periods, making it ideal for stockpiling in bulk.





Environmental profile.

The Virkon™ S oxygen-based chemistry contains simple inorganic salts and organic acids. The active ingredient decomposes by a variety of routes within the environment, in soil and in water, breaking down to form the naturally occurring substances potassium salts and oxygen. The major organic components are classified as readily biodegradable, according to OECD and EU test methods.

Virkon™ S is not considered persistent in the environment, according to the standard European process for the classification and labelling of chemical preparations. Independent studies have shown that diluted Virkon™ S should not, when used as directed, pose any threat to sewage treatment facilities.⁶

Stopping the spread of ASF infection.

ASF is extremely dangerous due to its highly contagious characteristics, ability to be easily spread via a variety of vectors, high morbidity and mortality rates, and extreme resilience to withstand high and low temperatures. add to this the fact the there is currently no effective treatment or vaccine available, and it is easy to understand why pig producers fear this disease.

Virkon™ S is approved by the APVMA under permit (PER88135) for use as a disinfectant in case of an outbreak of ASF.

Suitable for organic farming.

Virkon™ S' formulation has been reviewed and recognised by the UK Government Advisory Committee on Organic Standards (ACOS) and supported by DEFRA, the UK's Department for Environment, Food and Rural Affairs, as suitable for use in organic farming applications for the cleaning and disinfection of buildings. In Australia, Virkon™ S has been approved as "suitable for organic farming" certification number 13180 by Australian Certified Organic (ACO).

Biosecurity in a single pack.

Virkon™ S offers farmers a convenient, multipurpose biosecurity system all in one pack for a wide range of applications:

- Surfaces
- Equipment
- Vehicles
- Aerial application by cold fogging
- Water delivery systems

Supporting the reduction of antibiotic use.

Governments worldwide are seeking reductions in the use of livestock antibiotics to limit the development of antibiotic resistance, which can pass to the human population. Targeted legislation to reduce the use of prophylactic antibiotics in the food chain is now becoming a reality. So it's critical that producers take steps to improve their biosecurity measures.



With proven efficacy in a wide range of real-world biosecurity challenges against both viruses and bacteria, Virkon™ S has proven key to combating the effects of viruses and bacteria in livestock production. As a disinfectant of choice for governments worldwide, Virkon™ S leads the way forward in biosecurity best-practice programmes.



Application & Use Guidance

Surface and Equipment Disinfection

Surface Disinfection	Dilution Rate	Application
Routine disinfection for all surfaces, earth, wood, and concrete	1:100 (10 grams of Virkon™ S to every 1 litre of water)	Using a pressure washer or other mechanical sprayer, apply Virkon™ S solution at an application rate of 300ml/m ² .

Surface Application Usage Chart

To estimate the total surface area to be disinfected, including walls and ceilings, multiply the total floor area by 2.5.

Surface Area to be Disinfected	Volume of Water Required	Dilution Rate	
		Routine Disinfection and UK DEFRA 'General Orders' 1:100 (1%)	1:200 (0.5%)
		Quantity of Virkon™ S to be added	
50m ²	15 litres	150g	75g
100m ²	30 litres	300g	150g
500m ²	150 litres	1.5kg	750g
1000m ²	300 litres	3kg	1.5kg
2500m ²	750 litres	7.5kg	3.75kg

1. Decide on the volume of disinfectant solution required at the appropriate dilution rate.
2. Measure out the appropriate quantity of Virkon™ S powder to achieve the desired dilution rate.
3. Add the Virkon™ S powder to the water and stir until fully dissolved (which can take longer in cooler water).
4. Using a pressure washer or other mechanical sprayer, apply Virkon™ S solution at an application rate of 300ml/m².
5. All surfaces should be cleaned and allowed to dry prior to disinfection.

Equipment Disinfection

Equipment Disinfection	Dilution Rate	Application
Routine cleaning and disinfection of movable equipment	1:100 (10 grams of Virkon™ S to every 1 litre of water)	Using a brush or pressure washer, wash all equipment in Virkon™ S solution until visibly clean.

Application & Use Guidance

Disinfectant Boot Dips: Preparation and Use

Disinfection	Dilution Rate	Application
Routine disinfection of footwear	1:100 (10 grams of Virkon™ S to every 1 litre of water)	Replace solution once it has either become soiled or after a period of 4–5 days.

Water System Disinfectant

Terminal disinfection — all water systems can potentially contain some viral and bacterial contamination, especially header tanks where dust and debris can accumulate. Disinfection will clean the system and eliminate viruses, bacteria, and fungal growth.

Water System Disinfection	Dilution Rate	Application
Terminal disinfection (between production cycles)	1:100 (1%)	Isolate header tank at the mains and drain off to drinker points farthest from tank. Clean out any gross soiling and debris. Refill with water and add the appropriate amount of Virkon™ S powder, thoroughly stir and leave for 10 minutes. Release to fill the water system to all drinking points and leave for a minimum of 4 hours before draining the water system and all drinking points. Flush the system with clean water until the water is visibly clean.

Virkon™ S Water Disinfection Usage Table

Litres of Water to be Disinfected	Dilution Rate		
	Routine Terminal 1:200	High Disease Risk Terminal 1:100	Continuous Water Disinfection 1:1000
	Quantity of Virkon™ S to be added		
100 litres	500g	1 kg	100g
250 litres	1.25 kg	2.5 kg	250g
500 litres	2.5 kg	5 kg	500g
1000 litres	5 kg	10 kg	1 kg



Aerial Disinfection

Misting/Aerial Spraying, Cold Fogging

To assist the control of organisms that may be introduced into a building during the set up procedure, and to disinfect inaccessible areas of the building and the air, use either a fine mist sprayer or thermal fogging machine to apply Virkon™ S disinfectant solution evenly. Aerial disinfection may also help control any contamination introduced to the building surfaces by airborne particulate matter present within the environment.

Equipment Disinfection	Dilution Rate	Application
Misting / Aerial Spray	1:200	Using either a pressure washer or knapsack sprayer on its finest mist setting, apply 20ml of Virkon™ S solution per m ³ of air space.*
Cold Fogging	1:100	Use a mechanical mister to apply the Virkon™ S solution at a rate of 40ml per m ³ of air space.

* Equivalent to approximately 1 litre of Virkon™ S solution per 20m² of floor space. The calculations in this table are a guide based upon UK conversion rates, and reflects usage in buildings with semi-porous surfaces. Please check your country/regional specific requirements.

References

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4. *Possible associations between Salmonella persistence in poultry houses and resistance to commonly used disinfectants and a putative role of mar.* K.O. Gradel et al./ Veterinary Microbiology 107 (2005) 127–138.
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Powerful Broad Spectrum
Virucidal Disinfectant



10 reasons to put Virkon™ S at the heart of pig farm biosecurity.

1. Virkon™ S redefined farm biosecurity and leads the way forward in emergency disease control measures
2. Approved by governments worldwide to combat major diseases, such as FMD, PRRS, PED and more
3. The only branded disinfectant referred to in the 2008 AUSVETPLAN, Australia and New Zealand's emergency disease control plan
4. The gold standard boot dip disinfectant that kills pathogens 10 times faster than the nearest competitor, even at low temperatures and in the presence of organic challenge^{2,5}
5. Independently proven in field trials to be highly effective against the most serious threat to livestock: viruses
6. No need to rotate; proven to reduce the potential infectivity of resistant *Salmonella* superstrains
7. Formulated to include ingredients that have been carefully selected for their ability to degrade naturally within the environment
8. Easy to store and to transport by rail, sea, and air, with no additional spend requirements for storage or transport
9. Biosecurity in a single pack for surfaces, equipment, vehicles, aerial disinfection, and water delivery systems
10. Virkon™ S has been approved as "suitable for organic farming" certification number 13180 by Australian Certified Organic (ACO).

LANXESS
Energizing Chemistry

LANXESS  **BIOSECURITY SOLUTIONS**
Shaping the Future of Biosecurity

Antec International Limited
LANXESS Material Protection Products
Windham Road, Chilton Industrial Estate,
Sudbury, Suffolk, CO10 2XD
United Kingdom

Tel. +44 (0)1787 377305
biosecurity@lanxess.com
biosecuritysolutions@lanxess.com
lanxess.com

Learn more at virkon.com

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The specified uses and registered claims for the product may vary from country to country. Please contact LANXESS to verify country-specific approved uses.

Use biocides safely. Always read the label and product information before use.

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