

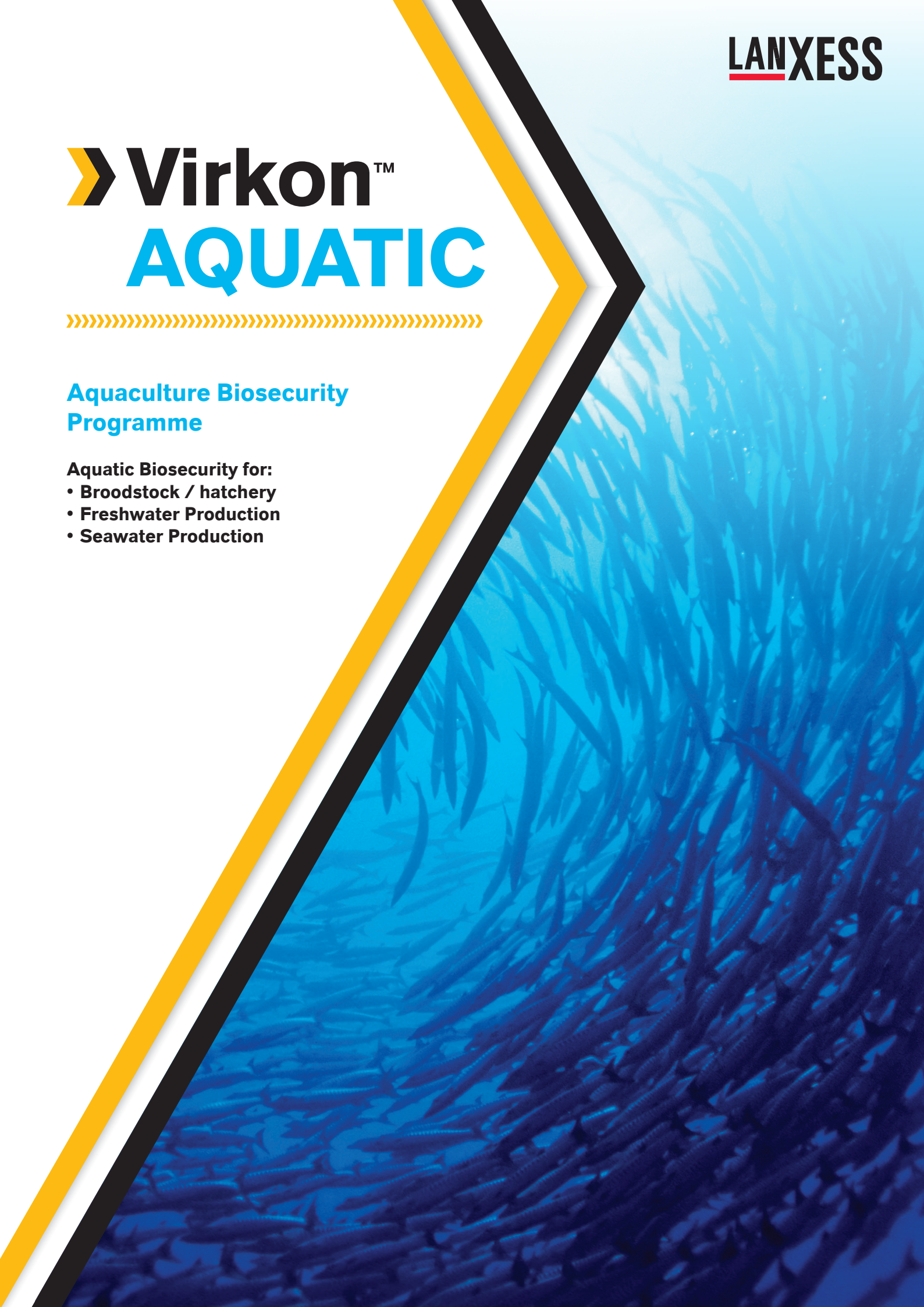
> Virkon™ **AQUATIC**



Aquaculture Biosecurity Programme

Aquatic Biosecurity for:

- **Broodstock / hatchery**
- **Freshwater Production**
- **Seawater Production**



An introduction to fish farm biosecurity

The intensification of fish production provides an ideal environment in which disease-causing organisms can flourish and cause serious damage to productivity. Disease may come from any number of sources, for example, viruses and bacteria. However it originates; it spreads through recognised vectors of infection. These include fish stocks, staff and visitors, equipment, vehicles and transportation, other aquatic life, birds and animals, the aquatic environment and even the air itself.



Medication and vaccination have traditionally played a major role in treating diseases but it is now widely accepted that they cannot, in isolation, prevent losses due to disease. Modern farming demands a holistic approach. Unless the background challenge from disease-causing organisms can be controlled, and good management practices strictly followed, medication and vaccination alone are not capable of adequately protecting fish stocks. Fish must be given an environment in which the level of infection is controlled to the point where vaccination and medication can achieve beneficial effects. Biosecurity is the key to achieving this.

Biosecurity involves the exclusion of disease-causing organisms from the environment. This is particularly important in fish production. It is achieved by the use of external and internal biosecurity barriers:

- **External Barriers** – blocking the spread of disease onto and off of a fish farm
- **Internal Barriers** – blocking the spread of disease within the fish farm

The correct use and selection of disinfectants is very important and ensures that pathogen challenge is minimised, maximising the fish's natural defence against infection.





Proven efficacy



Not all disinfectants are effective against the wide range of viral and bacterial disease-causing organisms that affect fish production. Even disinfectants with similar chemistry can have widely different spectra of activity and effective dilution rates. Selecting a disinfectant is therefore very important. The disinfectant must have independently proven efficacy against a wide range of aquaculture pathogens and be effective at low temperatures.

Application of HACCP to fish farm biosecurity

LANXESS biosecurity products and procedures have been developed to maximise the benefits achievable through good cleaning and disinfection biosecurity practices. The procedures have been developed to be consistent with HACCP principles, the seven point systematic approach to food safety adopted by livestock producers around the world.

HACCP (Hazard Analysis Critical Control Points) strategies identify the areas where pathogens may enter the system, ways to eliminate them, and the methods to show that the chain of production is being continuously audited to ensure that every procedure within that chain is effective.

The principles

Principle 1 Hazard analysis

To identify hazards, both microbiological and physical, at each step in the process through to delivery.

Principle 2 Capital Control and Points (CCPs)

At CCPs action can be taken to reduce or eliminate the hazard. For example, within the fish farm, there are control points at which pathogen reduction can take place as part of a biosecurity programme.

Site security	Well boat and work boat disinfection, vehicle disinfection and footdips on piers and cages
Personnel hygiene	Dive suits and equipment, hand hygiene
Equipment disinfection	Hand nets, harvesting equipment, vaccination and weighing equipment
Surface disinfection	Tables, floors, walls
Aerial disinfection	Misting within enclosed buildings to control airborne pathogens
Rodent control	Pest Management Programme
Production facilities	Broodstock, hatchery, fresh and sea water production

A full list of the critical control points is described in the following pages.

Principle 3 Critical limits

Establish acceptable limits for each hazard identified. Cleaning and disinfection in accordance with LANXESS biosecurity procedures will ensure that microbiological hazards meet those limits. LANXESS technical team can advise in more detail in this important area.

Principle 4 Monitoring

Observation and measurement of cleaning and disinfecting to ensure the critical limits are met at each step.

Principle 5 Correction

Action must be taken if the critical limits are not met at each step. A review of the application procedure should be made to ensure that it is in accordance with LANXESS biosecurity guidelines.

Principle 6 Recording

A complete set of records is important for legal action and may form part of a current site Quality Scheme e.g. ISO 9001. Records must be kept to show that biosecurity procedures are in place and are being implemented correctly. Records should be kept of products used, critical limits, cleaning schedules and any corrective action taken.

Principle 7 Verification

Tests and procedures to ensure that the HACCP system is working properly. The audit is often external and may include verification of dilution rates, application rates and bacteriological tests.





Key biosecurity tasks

Biosecurity plays an important part throughout every stage of the life cycle of a fish, from hatching through to processing. Thorough cleaning is an essential precursor to any effective disinfection process to maximise the benefits of Virkon™ AQUATIC, the complementary Biosolve™ E heavy-duty cleaner should be used. The following table indicates the specific key biosecurity tasks which will have the greatest impact on controlling the spread of disease, see below for Biosolve™ E & Virkon™ AQUATIC application rates.

	Dilution Rate	Application Rate
Biosolve™ E	1:100 (1%)	300-500mls per square metre, depending on usage type
Virkon™ AQUATIC	1:200 (0.5%)	300mls per square metre

	Key Biosecurity Task	Critical Control Point	Application	Frequency
Freshwater production/ Seawater production	Well boats	Deck Wells Equipment Pumps	Clean thoroughly with Biosolve™ E, rinse with clean water, then disinfect with Virkon™ AQUATIC	On a daily basis after use
		Protective clothing	Rinse with clean water, immerse in Virkon™ AQUATIC for 10 mins and hang to dry	Daily, or as required
		Boat Hull	Disinfect routinely with Virkon™ AQUATIC when slipped	Refer to official guidelines
Freshwater production/ Seawater production	Work boats and other vessels	Decks and bilges Equipment Harvesting equipment Protective clothing	Clean thoroughly with Biosolve™ E, rinse with clean water, then disinfect with Virkon™ AQUATIC	Daily, or as required
		Foot dips	Rinse with clean water, immerse in Virkon™ AQUATIC for 10 mins, rinse, and hang to dry Fill with a freshwater solution of Virkon™ AQUATIC at a dilution rate of 1:100 (1%)	Daily, or as required Replenish every 4 days, or when soiled
Freshwater production/ Seawater production	Diving teams	Diving suit Equipment Mort bags	Remove any organic debris by brushing, then immerse all items in Virkon™ AQUATIC solution for 20 mins, then rinse with clean water	On completion of operation
Seawater production	Harvesting	Plant Equipment Bins and lids Stacker Boxes	Clean thoroughly with Biosolve™ E, rinse with clean water, then disinfect with Virkon™ AQUATIC	Daily, or as required

Routine biosecurity tasks

The following table indicates the additional routine biosecurity tasks required for a complete biosecurity programme.

	Critical Control Point	Product	Dilution Rate	Application Guidance	Frequency
LANXESS vehicle disinfection programme					
Freshwater production/ Seawater production/ Broodstock/hatchery	Vehicles	Virkon™ AQUATIC	1:200	All vehicles entering site should pass through a wheeldip filled with a freshwater solution of Virkon™ AQUATIC. Replenish every 4 days, or when soiled.	On arrival
Personal Hygiene					
Freshwater production/ Seawater production/ Broodstock/hatchery	Footdips	Virkon™ AQUATIC	1:100	Place footdips at all entrances, piers and cages. Fill with a freshwater solution of Virkon™ AQUATIC. Replenish every 4 days, or when soiled.	On passing through area
Freshwater production/ Seawater production/ Broodstock/hatchery	Protective clothing	Virkon™ AQUATIC	1:200	Rinse with clean water, immerse in Virkon™ AQUATIC for 10 mins, rinse, and hang to dry.	After each period of use
Equipment					
Freshwater production/ Seawater production/ Broodstock/hatchery	Transport tanks and equipment	Virkon™ AQUATIC	1:200	Clean with Biosolve™ E solution, then disinfect thoroughly with Virkon™ AQUATIC solution. Rinse with clean water before re-use.	After each period of use
Freshwater production/ Broodstock/hatchery	Carry bins, hand nets, weighing equipment	Virkon™ AQUATIC	1:200	Clean with Biosolve™ E solution, then disinfect thoroughly with Virkon™ AQUATIC solution. Rinse with clean water before re-use.	After each period of use
Freshwater production	Dip nets and tank brushes	Virkon™ AQUATIC	1:200	Immersion, followed by rinsing in clean water.	After daily use
Freshwater production/ Seawater production/ Broodstock/hatchery	Tanks	Cleaning - Biosolve™ E Disinfection - Virkon™ AQUATIC	1:200 1:200	Clean with Biosolve™ E solution, then disinfect thoroughly with Virkon™ AQUATIC solution. Rinse with clean water before re-use.	Once empty
Waste disposal applications					
Freshwater production/ Seawater production/ Broodstock/hatchery	Waste disposal area, including skips and bins	Cleaning - Biosolve™ E Disinfection - Virkon™ AQUATIC	1:200 1:200	Clean with Biosolve™ E solution. Rinse with clean water. Disinfect by spraying with Virkon™ AQUATIC solution, and allow to dry.	Daily



Virkon™ AQUATIC efficacy against specific fish pathogens

Virkon™ AQUATIC has been tested against a wide range of viruses and bacteria. The following table summarises the data for pathogens of particular importance to the aquaculture industry.

Infectious organism	Fish disease	Test organism	Effective dilution	Independent test institution	Test method	Contact time (mins)
Virus						
ISA virus	Infectious salmon anaemia	Infectious salmon anaemia virus	1:200	Atlantic Veterinary College, University of PEI, Canada	AVI, laboratory own method	10
IPN virus	Infectious pancreatic necrosis	Isolate Fr31:75	1:200	CEFAS, UK	CEFAS, laboratory own method	30
		Infectious pancreatic necrosis, birnavirus	1:500	National Veterinary Institute, Norway	NVI, laboratory own method	1
Rhabdovirus	Infectious Haematopoietic Necrosis (IHN)	Snakehead rhabdovirus, Strain 19	1:2000	Institute of Aquaculture, University of Stirling, Scotland	Stirling, laboratory own method	5
	Viral Haemorrhagic Septicaemia (VHS)	Snakehead rhabdovirus, Ban Pako strain	1:2000	Institute of Aquaculture, University of Stirling, Scotland	Stirling, laboratory own method	5
	Spring Viraemia of Carp (SVC)	Spring viraemia of carp, rhabdovirus	1:100	Aquaculture/Fisheries Centre, University of Arkansas at Pine Bluff, USA	Arkansas, laboratory own method	30
Bacteria						
Aeromonas hydrophila	Generally secondary invader	Aeromonas hydrophila	1:200	National Veterinary Institute, Finland	Modified Kelsey-Sykes	8
Aeromonas salmonicida	Salmon furunculosis, Trout ulcer disease	Aeromonas salmonicida subsp salmonicida	1:200	National Veterinary Institute, Norway	Modified EN1276	5
		Aeromonas salmonicida subsp achromogenes	1:100 & 1:1000	The Veterinary Institute, Division of Fish, Sweden	NVI, laboratory own method	10
		Aeromonas salmonicida subsp salmonicida	1:100	National Veterinary Institute, Finland	Modified Kelsey-Sykes	8
		Aeromonas salmonicida subsp achromogenes	1:200	National Veterinary Institute, Finland	Modified Kelsey-Sykes	8
Pseudomonas aeruginosa	Pseudomoniasis	Pseudomonas aeruginosa (ATCC 15442)	1:100	LVL, Germany	EN1656	5
		Pseudomonas aeruginosa (NCIMB 10421)	1:100	Viromed Labs, USA	AOAC protocol	10
Pseudomonas anguilliseptica	Pseudomoniasis	Pseudomonas anguilliseptica	1:100 & 1:1000	The Veterinary Institute, Division of Fish, Sweden	NVI, laboratory own method	10
Renibacterium salmoninarum	Bacterial Kidney Disease	Renibacterium salmoninarum	1:100 & 1:1000	The Veterinary Institute, Division of Fish, Sweden	NVI, laboratory own method	10
Vibrio anguillarum	Vibriosis	Vibrio anguillarum serotype 1	1:100 & 1:1000	The Veterinary Institute, Division of Fish, Sweden	NVI, laboratory own method	10
Yersinia ruckeri	Enteric Redmouth Disease (ERM)	Yersinia ruckeri	1:100	National Veterinary Institute, Norway	Modified EN1276	5
		Yersinia ruckeri serotype 1	1:100 & 1:1000	The Veterinary Institute, Division of Fish, Sweden	NVI, laboratory own method	10

Cleaners

Biosolve™ E

Multipurpose Heavy-Duty Cleaner

General Attributes

- Powerful alkaline cleaning formulation
- Excellent cleaning and degreasing properties
- For use in food processing, hatcheries and on the farm



Application and Use

Task	Dilution Rate	Application Rate
Pre-cleaning surfaces and equipment	Depending on degree of soiling, prepare with 1:200 (0.5%) or 1:100 (1%) solution.	300-500mls per m ² (depending on usage type). Leave for 15 – 20 minutes. Rinse off with clean water.

For additional tasks, please see the Key & Routine biosecurity task tables.

Disinfectants

Virkon™ AQUATIC

Complete water system and surface disinfectant

General Attributes

- Complete control - aerial, water system and surface disinfectant
- Powerful - independently proven effective against important fish pathogens including ISA and IPN viruses



Application and Use

Task	Dilution Rate	Application Rate
Disinfection for pre-cleaned surfaces and equipment	1:100 (1%)	300mls per m ²
Footdips	1:100 (1%)	Fill with a freshwater solution of Virkon™ AQUATIC. Replenish every 4 days, or when soiled
Vehicle disinfection	1:200 (0.5%)	All vehicles entering site should pass through a wheeldip filled with a freshwater solution of Virkon™ AQUATIC. Replenish every 4 days, or when soiled
Cold Fogging	1:100 (1%)	40mls per m ³

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