Evans Vanodine International plc

GLOBAL HYGIENE SOLUTIONS

FAM 30

MICROBIOLOGICAL PROFILE

FAM 30 MICROBIOLOGICAL PROFILE

CONTENTS **PAGE**

APPENDICES

FAM 30 MICROBIOLOGICAL PROFILE

INTRODUCTION

FAM 30 is a powerful iodophor general purpose disinfectant. It is bactericidal, fungicidal and virucidal and therefore offers protection from a wide range of disease causing (pathogenic) microorganisms.
FAM 30 is recommended for use in all types of livestock housing including calf pens, lambing pens and broiler houses.

A rigorous and effective disinfection programme is essential to progress towards the effective elimination of viral, bacterial and fungal disease causing microorganisms.

FAM 30 is recommended to be used in a cleaning and disinfection programme developed to meet the needs of intensive livestock production.
Disease in livestock can result not only in direct losses due to dead animals but also in losses due to poor feed conversions, low weights, poor production and medication costs. The financial costs far outweigh the cost of implementing an effective cleaning and disinfection programme. Used correctly disinfection can also reduce the need for more expensive aspects of disease control such as vaccination and antibiotic therapy.

FAM 30 has been tested against a number of disease-causing micro-organisms. It has proved effective even under adverse conditions such as, heavy organic soiling and low temperatures.

Results are presented in the tables following with the pass dilutions obtained in tests expressed as one part of FAM 30 in the total volume of solution (1:x). The test methods used are referenced in the tables and details of these are given in Appendix 1. References 1, 2, 3, 17, 18 and 20 are for the European Standards for bactericidal, fungicidal, mycobactericidal and virucidal activity of disinfectants used in the veterinary area and are carried out under standard conditions (unless specifically noted) of 30 minutes contact time, 10°C and under high level soiling.

The dilutions in the tables are not use dilutions and are given to provide information about the range of micro-organisms against which FAM 30 has been tested.

PLEASE REFER TO PRODUCT LABEL FOR HOW TO USE AND FOR ALL RECOMMENDED USE DILUTION RATES.

FAM 30 MICROBIOLOGICAL PROFILE

1. NATIONAL APPROVALS

FAM 30 is approved, by the Department for Environment, Food and Rural Affairs (DEFRA) formerly known as the Ministry of Agriculture, Fisheries and Food (MAFF), for disinfection of inanimate surfaces where an approved product is required to be used under the control legislation for the following specific disease orders:

ORDER	APPROVED DILUTION RATES
Foot and Mouth Disease	1:550
Swine Vesicular Disease	1:100
Poultry diseases including avian influenza, influenza of avian origin in mammals, Newcastle disease and paramyxovirus	1:100
Tuberculosis disease	1:20
General	1:50

Approved dilution rates are determined by testing at government laboratory facilities.

This approval is granted under the Diseases of Animals (Approved Disinfectants) Orders made by the Secretary of State for Environment, Food and Rural Affairs in England, Scottish Ministers in Scotland and Welsh Ministers in Wales.

For confirmation of continuing approval refer to the Defra list of approved disinfectants at http://disinfectants.defra.gov.uk.

FAM 30 is also approved under the Diseases of Animals (Approved Disinfectants) Order in Northern Ireland and in Ireland as a disinfectant for the purposes of the Diseases of Animal Act, 1966 and Orders made thereunder.

FAM 30 MICROBIOLOGICAL PROFILE

2. CEFAS AQUACULTURE DISINFECTANT LISTING SCHEME

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) is an executive agency of DEFRA responsible for marine science.

The Fish Health Inspectorate (FHI) – based at CEFAS operate the scheme in partnership with Marine Scotland Science (MSS) and the Agri-food and Biosciences Institute, Northern Ireland (AFBI).

Evans Vanodine were the first manufacturer to submit their products and have them listed.

FAM 30 was tested against the following fish pathogens and found to be effective, *Aeromonas salmonicida, Carnobacterium maltaromaticum, Lactococcus garvieae,* and *Yersinia ruckeri.*

DILUTION LISTED
1:100

FAM 30 MICROBIOLOGICAL PROFILE

3 SUMMARY OF TEST RESULTS AGAINST AVIAN PATHOGENIC BACTERIA

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Enterococcus faecalis	Enterococcal infection	1:100	1a
Escherichia coli	Colisepticaemia in chickens, particularly broilers	1:100	1a
Mycobacterium avium	Respiratory disease in poultry	1:200	17
Pasteurella multocida	Fowl cholera and pasteurellosis	1:100	1a
Proteus vulgaris	Yolk sac infection in poultry	1:75	1a
		1:100	2a
		1:400	2b
		1:400	18 Porous surface test
Salmonella arizonae	Salmonellosis	1:100	1a
Salmonella gallinarum	Fowl typhoid	1:100	1a
Salmonella pullorum	Pullorum disease (bacillary white diarrhoea)	1:100	1a
Salmonella typhimurium	Salmonellosis	1:200	1a
Staphylococcus aureus	Arthritis, bumblefoot and septicaemia	1:50	1a
		1:100	2a
		1:250	2b

FAM 30 MICROBIOLOGICAL PROFILE

3 SUMMARY OF TEST RESULTS AGAINST AVIAN PATHOGENIC VIRUSES

VIRUS	DISEASE	VIRUCIDAL DILUTION	Test Method/ Laboratory Reference
Avian Adenovirus	Egg-drop syndrome	1:33	6a
Avian influenza virus	Avian Influenza	1:100	DEFRA
Avian influenza virus Taiwan strain H6N1	Avian Influenza	1:145	10
Avian influenza virus H5N3	Avian Influenza	1:145	10
Avian influenza reassortant virus H3N2	Avian Influenza	1:200	12a
Avian Reovirus	Associated with enteric conditions, chronic respiratory disease, inclusion body hepatitis, tenosynovitis and possibly runting, proventriculitis and skeletal changes	1:50	6b
Infectious Bronchitis Virus	Infectious bronchitis, highly contagious respiratory disease	1:55	15
Infectious Bursals disease virus	Infectious Bursals disease (Gumboro)	1:50	12b
Infectious Laryngotracheitis Virus	Infectious laryngotracheitis	1:100	6b
Newcastle Disease Virus	Newcastle Disease - Notifiable Disease	1:100	DEFRA
Turkey Rhinotracheitis Virus	Acute disease of the upper respiratory tract, generally called turkey rhinotracheitis or turkey coryza	1:100	6b

FAM 30 MICROBIOLOGICAL PROFILE

4 SUMMARY OF TEST RESULTS BOVINE PATHOGENS

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Escherichia coli	Mastitis in dairy cattle and colibacilliosis in calves	1:100	1a
Corynebacterium pseudotuberculosis	Skin lesions	1:100	1a
Leptospira interrogans	Pomona or hardjo infection resulting in abortion and loss of milk production in adult cattle :- Zoonoses	1:200	4
Klebsiella pneumoniae	Mastitis in dairy cattle	1:200	1a
Pseudomonas aeruginosa	Mastitis in dairy cattle	1:50	1a
		1:200	2a
		1:300	2b
		1:100	18 Porous surface test
Staphylococcus aureus	Mastitis in dairy cattle	1:50	1a
		1:100	2a
		1:250	2b
		1:100	18 Porous surface test
Mycobacterium fortuitum	Tuberculosis	1:20	DEFRA
VIRUS	**DISEASE**	**VIRUCIDAL DILUTION**	**Test Method/ Laboratory Reference**
Bovine enterovirus	Gastroenteritis, respiratory disease	1:100	20
Bovine rotavirus	Scours	1:75	9
Foot and Mouth Disease Virus	Foot and Mouth - Notifiable Disease	1:550	DEFRA
Infectious Bovine Rhinotracheitis Virus	Infectious bovine rhinotracheitis	1:200	8

FAM 30 MICROBIOLOGICAL PROFILE

5 SUMMARY OF TEST RESULTS AGAINST PORCINE PATHOGENS

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Actinobacillus pleuropneumoniae (App) Field isolate	Pleuropneumoniae, respiratory disease	1:800	14
Bordertella bronchiseptica	Atrophic rhinitis	1:200	1a
Bordetella bronchiseptica Field isolate	Atrophic rhinitis	1:200	14
Brachyspira hyodysenteriae Field isolate	Swine dysentery	1:200	14
Enterococcus faecalis	Watery diarrhoea in piglets	1:100	1a
Enterococcus hirae	Watery diarrhoea in piglets	1:50	1a
		1:100	2a
		1:250	2b
		1:100	18 Porous surface test
Escherichia coli	Bowel odema, colibacillosis	1: 100	1a
Haemaphilus parasuis Field isolate	Meningitis	1:100	14
Mycobacterium avium	Respiratory disease in pigs	1:200	17
Mycoplasma hyopneumoniae	Enzootic pneumonia	1:4000 Bacteriostatic dilution	5
Pasteurella multocida	Pasteurellosis	1:100	1a
Pasteurella multocida Field isolate	Respiratory disease	1:400	14
Pseudomonas aeruginosa	Cystitis and pyelonephritis	1:50	1a
		1:200	2a
		1:300	2b
		1:100	18 Porous surface test

FAM 30 MICROBIOLOGICAL PROFILE

5 SUMMARY OF TEST RESULTS AGAINST PORCINE PATHOGENS

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Salmonella enteritidis	Salmonellosis	1:100	1a
Staphylococcus aureus	Mastitis	1:50	1a
		1:100	2a
		1:250	2b
		1:100	18 Porous surface test
Staphylococcus hyicus Field isolate	Greasy pig disease	1:100	14
Streptococcus suis	Pneumonia	1:200	1a
Streptococcus suis Field isolate	Meningitis	1:400	14

FAM 30 MICROBIOLOGICAL PROFILE

5 SUMMARY OF TEST RESULTS AGAINST PORCINE PATHOGENS

VIRUS	DISEASE	VIRUCIDAL DILUTION	Test Method/ Laboratory Reference
African Swine Fever	African Swine Fever	1:200	16
Foot and Mouth Disease Virus	Foot and Mouth - Notifiable disease	1:550	DEFRA
Porcine Circovirus Type 2	Post Weaning Multisystemic Wasting Syndrome (PMWS) and Porcine Dermatitis and Nephropathy Syndrome (PDNS)	1:100*	13
Porcine Rotavirus	Epidemic diarrhoea	1:100	11
PRRS Virus	Porcine Reproductive and Respiratory Syndrome (Blue Ear Disease)	1:200	7a
PED Virus	Porcine Epidemic Diarrhoea	1:200	7b and 7c
Suid Herpesvirus	Aujesky's (Pseudorabies)	1:200	20
Swine vesicular disease virus	Swine vesicular - Notifiable disease	1:100	DEFRA
TGE Virus	Transmissable gastro-enteritis	1:50	MAFF

* FAM 30 passed the virucidal effectiveness test according to the US EPA regulatory agencies as a greater than $3\log_{10}$ reduction was demonstrated.

FAM 30 MICROBIOLOGICAL PROFILE

6 SUMMARY OF TEST RESULTS AGAINST FISH PATHOGENS

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Aeromonas salmonicida	Furunculosis acute to chronic condition, often fatal septicaemia. Haemorrhages may occur at the bases of fins and the abdominal walls, heart and liver.	1:100	1b
Carnobacterium maltaromaticum	A normal component of fish intestinal microflora has also been isolated from severely stressed fishes and has been implicated in a few cases of chronic infection in salmonids, brown bullhead, carp, striped bass, rainbow trout and channel catfish. Also associated with pseudo-kidney disease or lactobacillosis.	1:100	1b
Lactococcus garvieae	Lactococcosis (haemorrhagic septicaemia) usually affecting many fish species in marine and freshwater aquaculture.	1:100	1b
Yersinia ruckeri	Yersiniosis, (Enteric Redmouth disease) septicaemia in Salmonid fish.	1:200	1b

See Page 13 for fish pathogenic fungi

FAM 30 MICROBIOLOGICAL PROFILE

7 SUMMARY OF TEST RESULTS AGAINST HUMAN PATHOGENS

BACTERIA	DISEASE	BACTERICIDAL DILUTION	Test Method/ Laboratory Reference
Escherichia coli 0157	Food poisoning, which can result in enteritis and haemolytic uraemic syndrome (characterised by renal failure)	1:100	1a
Pseudomonas aeruginosa	Nosocomial infections (hospital acquired) wound infections	1:50	1a
		1:200	2a
		1:300	2b
Salmonella enteritidis	Food poisoning (linked with poultry) resulting in gastro-enteritis	1:100	1a
Salmonella typhimurium	Food poisoning (linked with cattle) resulting in gastro-enteritis	1:200	1a
Shigella sonnei	Dysentery	1:100	1a
Staphylococcus aureus	Boils, wound infections	1:50	1a
		1:100	2a
		1:250	2b
Streptococcus pyogenes	Throat infections	1:200	1a

8 SUMMARY OF TEST RESULTS AGAINST PATHOGENIC FUNGI

FUNGI	DISEASE	FUNGICIDAL DILUTION	Test Method/ Laboratory Reference
Candida albicans	Candidiasis	1:50	3a
Fusarium oxysporum f.sp. cubense	Fusarium wilt of bananas (Panama disease)	1:100	3b
FISH PATHOGENIC FUNGI			
Apanomyces astaci	Grayfish Plague	1:250	19
Apanomyces invaderis	Epizootic ulcerative syndrome (EUS)		
Saprolegnia sp.	Epizootic ulcerative syndrome (EUS)		

FAM 30 MICROBIOLOGICAL PROFILE

THE EFFECT OF CONTACT TIME AND TEMPERATURE ON BACTERICIDAL ACTIVITY

EN 1656 was carried out with 5 and 30 minutes contact times, at the standard 10°C temperature and at 20°C and 30°C to determine the effect on the bactericidal dilution with a range of bacteria.

BACTERIA	TEST TEMPERATURE				Test Method / Laboratory Reference
	Time	10°C	20°C	30°C	
Enterococcus hirae	5 min	1:25	1:50	1:50	1a), c), d)
	30 min	1:100	1:100	1:100	
Escherichia coli	5 min	1:50	1:100	1:100	
	30 min	1:100	1:100	1:100	
Proteus vulgaris	5min	1:200	1:100*	1:200	
	30min	1:200	1:200	1:200	
Pseudomonas aeruginosa	5 min	1:100	1:100	1:100	
	30 min	1:100	1:100	1:100	
Salmonella enterica	5 min	1:100	1:100	1:100	
	30 min	1:200*	1:100	1:100	
Staphylococcus aureus	5 min	1:25	1:25	1:25	
	30 min	1:100	1:100	1:100	

The results indicate that the bactericidal dilution of FAM 30 increases when the temperature is increased from 10°C to 20°C, when tested with a contact time of 5 minutes and only with *Enterococcus hirae* and *Escherichia coli.* A further increase to 30°C had no additional effect.

The results indicate that the bactericidal dilution of FAM 30 is not affected by temperature when tested with a contact time of 30 minutes.

FAM 30 would need to be used at considerably higher concentrations if the contact time is reduced from 30 minutes to 5 minutes (based on the most resistant bacteria tested).

*Two unexpected results were obtained but are not considered to be significant.

FAM 30 MICROBIOLOGICAL PROFILE

APPENDIX I

TEST METHODS/TEST LABORATORY REFERENCES

All EN tests have been performed by the UKAS accredited Microbiology Laboratory (Testing Number 1108) of Evans Vanodine International Plc except for EN 1657 with *Fusarium oxysporum f.sp. cubense,* EN 14204 and EN 14675 all carried out by independent laboratories.

1. EN 1656:

Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in the veterinary field.

This European Standard is applicable to products for use in the veterinary field, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry.

a) Test parameters:	30 minute contact time, 10°C, hard water, high level soiling.
Bactericidal criteria:	≥5 log reduction ≡ 99.999% reduction.
b) Test parameters:	30 minute contact time, 4°C, hard water, high level soiling.
Bactericidal criteria:	≥5 log reduction ≡ 99.999% reduction.
c) Test parameters:	30 minute contact time, 20°C, hard water, high level soiling.
Bactericidal criteria:	≥5 log reduction ≡ 99.999% reduction.
d) Test parameters:	30 minute contact time, 30°C, hard water, high level soiling.
Bactericidal criteria:	≥5 log reduction ≡ 99.999% reduction.

2. EN 14349:

Chemical disinfectants and antiseptics - Quantitative surface test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in the veterinary field.

This European Standard is applicable to products for use in the veterinary field, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry. Test bacteria are mixed with organic material and dried on to stainless steel surfaces before being disinfected with the product.

a) Test parameters:	30 minute contact time, 10°C, hard water, high level soiling.
Bactericidal criteria:	≥4 log reduction ≡ 99.99% reduction.
b) Test parameters:	30 minute contact time, 10°C, hard water, low level soiling.
Bactericidal criteria:	≥4 log reduction ≡ 99.99% reduction.

3. EN 1657

Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of fungicidal activity of chemical disinfectants and antiseptics used in veterinary field

This European Standard is applicable to products for use in the veterinary field, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry.

FAM 30 MICROBIOLOGICAL PROFILE

APPENDIX I (continued)

3. EN 1657

a) Test parameters: 30 minute contact time, 10°C, hard water, high level soiling.
Fungicidal criteria: ≥4 log reduction ≡ 99.99% reduction.

b) Test parameters: 30 minute contact time, 20°C, hard water, high level soiling.
Fungicidal criteria: ≥4 log reduction ≡ 99.99% reduction.

4. Activity against *Leptospira interrogans*
Leptospira Reference Unit, Hereford

Test parameters: 2 minutes contact time, room temperature, deionised water.

5. Activity against *Mycoplasma hyopneumoniae*
Mycoplasma Experience Ltd Surrey

Minimum inhibitory concentration test.
Test parameters: distilled water
Bacteriostatic criteria minimum concentration allowing growth

6. University of Liverpool, Department of Veterinary Pathology

Test protocol specific to each virus
Test parameters: a) 30 minute contact time, 4°C
b) 30 minute contact time, 10°C

7. Chulalonghorn University, Bangkok, Thailand

Test protocol specific to each virus
a) Test parameters: 30 minute contact time, room temperature.
Virucidal criteria ≥4 log reduction ≡ 99.99% reduction.

b) Test parameters: 60 minute contact time, 4°C.
Virucidal criteria ≥4 log reduction ≡ 99.99% reduction.

c) Test parameters: 15 minute contact time, 25°C.
Virucidal criteria ≥4 log reduction ≡ 99.99% reduction.

8. Disinfection of Animal Viruses.
D.H. Evans, P Stuart, D.H. Roberts. Br.Vet.J.(1977) 133, 356
Test protocol specific to each virus.
Test parameters: 30 minute contact time, 4°C, hard water, organic soiling.

9. Moredun Animal Health Ltd, Scotland

Test protocol specific to each virus
Test parameters: 30 minute contact time, 4°C, hard water, organic soiling.

FAM 30 MICROBIOLOGICAL PROFILE

APPENDIX I (continued)

10. Department of Veterinary Medicine, National Chun-Hsing University, Taichung, Taiwan,

Virus and organic material mixture is mixed with disinfectant, held for 30 minutes and diluted and titrated in embryonated eggs. Eggs alive after 7 days are tested for viral hemagglutinin. Comparison is made with a water control.

Test parameters:	30 minute contact time, 4°C, hard water, organic soiling.
Virucidal criteria	≥4 log reduction ≡ 99.99% reduction.

11. Department of Veterinary Tropical Diseases, University of Pretoria, South Africa

Virus and disinfectant mixed, held for 30 minutes, diluted and titrated in embryonated eggs. Embryo mortalities are recorded every day for 5 days. Comparison is made with a phosphate buffered saline control.

Test parameters:	30 minute contact time, room temperature, deionised water.
Virucidal criteria	≥4 log reduction ≡ 99.99% reduction.

12. ATS Labs, Minnesota, USA

Virus is dried on a glass surface and exposed to the disinfectant for 30 minutes. After the contact time, the surviving virus is recovered and compared with a control.

a) Test parameters:	30 minutes, 4°C, hard water, organic soiling.
Virucidal criteria	≥4 log reduction ≡ 99.99% reduction.

b) Test parameters:	30 minutes, 30°C, hard water, organic soiling.
Virucidal criteria	≥4 log reduction ≡ 99.99% reduction.

13. Microbiotest, Sterling, Virginia, USA.

A portion of virus mixed with organic soil is dried on a sterile surface. A portion of disinfectant is applied to the surface and allowed to stand for 30 minutes at 10°C. After the contact period residual infectious virus is recovered and compared with a cell culture media control

Test parameters:	30 minutes contact time, 10°C, hard water, organic soiling.
Virucidal criteria	≥3 log reduction when cytotoxicity is evident.

14. The Pig Journal (2007) 60, 15-25, Efficacy of some disinfectant compounds against porcine bacterial pathogens, J R Thompson, N A Bell, M Rafferty.

15. The survival of Infectious Bronchitis (IB) Virus in an Iodophor Disinfectant and the Influence of Certain Components.
F.T.W Jordan and T.J. Nassar J. Appl.Bact., 36, 335-341 (1973)

16. Onderstepoort Veterinary Institute South Africa

Test protocol specific to each virus

Test parameters:	30 minute contact time, 20°C, hard water, organic soiling.
Virucidal criteria	≥4 log reduction ≡ 99.99% reduction.

FAM 30 MICROBIOLOGICAL PROFILE

APPENDIX I (continued)

17. EN 14204

Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of mycobactericidal activity of chemical disinfectants and antiseptics used in the veterinary field.

This European Standard is applicable to products for use in the veterinary field, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry.

Test parameters:	5 minute contact time, 10°C, hard water, low level soiling.
Mycobactericidal criteria:	≥4 log reduction ≡ 99.99% reduction.

18. EN 16437

Chemical disinfectants and antiseptics - Quantitative surface test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in the veterinary field on porous surfaces without mechanical action.

This European Standard is applicable to products for use in the veterinary field, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry.

Test parameters:	4 hours contact time, 10°C, hard water, 3g/l bovine soil.
Bactericidal criteria:	≥4 log reduction ≡ 99.99% reduction.

19. Aquaculture Research, 1997, 28, 461-469

Comparative effects of various antibiotics, fungicides and disinfectants on Apanomyces invaderis and other saprolegniaceous fungi J H Lilley & V Inglis

20. EN 14675

Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of virucidal activity of chemical disinfectants and antiseptics used in the veterinary area.
This European Standard is applicable to products for use in the veterinary area, i.e. in the breeding, husbandry, production, transport and disposal of all animals except when in the food chain following death and entry to the processing industry.

Test parameters:	30 minute contact time, 10°C, hard water, low level soiling.
Requirements:	≥4 log reduction ≡ 99.99% reduction.