



CODE OF PRACTICE FOR MILK PRODUCERS



CODE OF PRACTICE FOR MILK PRODUCERS

Compiled by
The Dairy Standard Agency
13 Esdoring Nook, Highveld Techno Park, Centurion
012 665 4250 | info@dairystandard.co.za | www.dairystandard.co.za



Published by:
Plaas Media (Pty) Ltd
217 Clifton Ave, Lyttelton Manor, Centurion, 0157
012 664 4793 | lynette@plaasmedia.co.za | www.plaasmedia.com



Third edition 2022
Second edition 2017
First edition 2013

2022 © Dairy Standard Agency
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, stored in a database and / or published in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher.

This guide is fully supported by:



Milk South Africa
Melk Suid-Afrika



SOUTH AFRICAN MILK PROCESSORS' ORGANISATION
SUID-AFRIKAANSE MELKPROSESSEERDERSORGANISASIE



MELKPRODUSENTE-ORGANISASIE
MILK PRODUCERS' ORGANISATION

PREFACE

Over the years, South Africa developed itself as a milk production and dairy product manufacturing country that is on par with global developments for sustainability. Sustainability is an integrated concept and includes internationally accepted principles.

These principles mainly pay attention to the following aspects:

Sustainable farming systems

- Breeds to be suited to the local climate, soil, pests and diseases.
- Animal health and welfare, including biosecurity.
- Milking hygiene and storage.
- Feed managing systems.

Economic sustainability

- The possibilities of increased production.
- Compliance to food safety and quality standards.
- Diverse farming systems.

Social sustainability

- Social and human capital, including farm workers – proper training and treatment of the workforce.

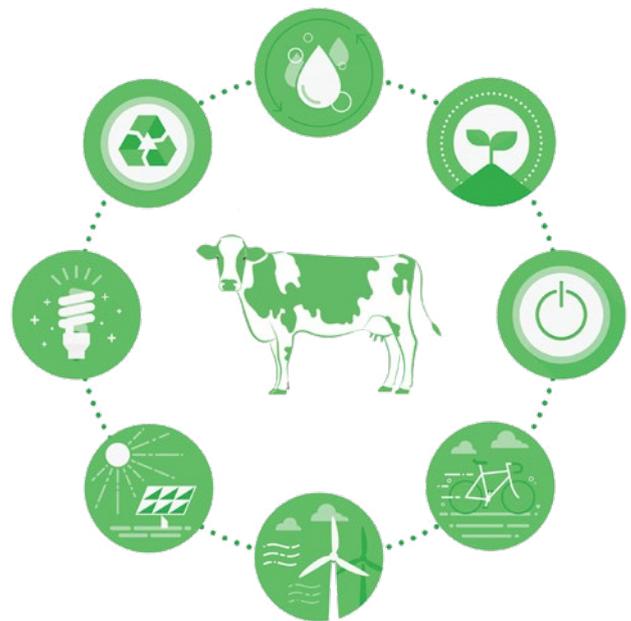
Environmental sustainability

- Maintaining soil fertility and prevention of soil loss (erosion).
- Control over water resources and environmental contaminants.
- Biodiversity – protection of natural habitats and rare plant/ animal species.
- Energy – control over energy inputs and the impact thereof on climate change.
- Waste – control of air, ground and water pollution, as well as recycling of resources.
- Participation in reduction of greenhouse gas emission initiatives.

Besides fulfilling national legal requirements, the South African dairy industry is a signatory to the *Food and Agriculture Organization (FAO)-International Dairy Federation (IDF) Dairy Declaration of Rotterdam*, as well as the Dairy Sustainability Framework whose vision is aligned with the Rotterdam declaration, promoting “a vibrant dairy sector committed to continuously improving its ability to provide safe and nutritious products from healthy cattle, while preserving natural resources and ensuring decent livelihoods across the industry.”

Towards the new and improved

This revised Dairy Standard Agency (DSA) Code of Practice (COP) is aimed at supporting the South African dairy industry in achieving its national commitments towards sustainability. In a systematic layout the COP covers the essential criteria required by national legislation and voluntary standards (national and international) relating to structural requirements, animal health and welfare, hygiene practises, biosecurity and elements of environmental management.



On the road of successful sustainability, with the statutory support from Milk SA (Milk Producers' Organisation and South African Milk Processors' Organisation) and our sponsor Zoetis, it is an honour to present this third edition of the *DSA Code of Practice for Milk Producers* to our industry and stakeholders.

Jompie Burger
Dairy Standard Agency

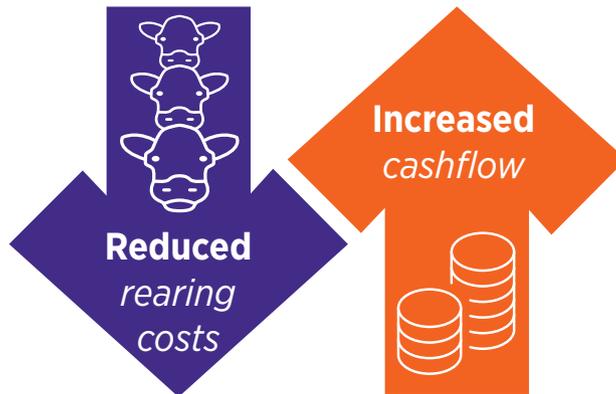


The Clarifide portfolio of genomic tests allows dairy farmers to discover opportunities to maximise herd profitability and build a healthier herd with the cow and calf Wellness Traits

Clarifide enables you to confidently select the right heifers, early on in life.

Reliably

predicting the lifetime capability of an animal from genomic testing at a few days of age can mean...



...and the ability to drive a **profitable** future.

WELLNESS IS NOW A PROFITABLE CHOICE

Find out more about CLARIFIDE_® today at www.zoetis.co.za



In partnership with World Wide Sires South Africa

SPONSOR INTRODUCTION

Zoetis is proud to be associated with and to sponsor the latest edition of the *Dairy Standard Agency (DSA) Code of Practice for Milk Producers*. The *DSA Code of Practice* provides dairy producers and the secondary dairy industry with an invaluable tool to navigate the complex legal and legislative requirements of the dairy value chain. This is of even greater value for emerging milk producers who are just entering the dairy value chain.

As the world's leading animal health company, we are driven by a singular purpose: to nurture our world and humankind by advancing care for animals. For nearly 70 years, Zoetis has supported those who raise and care for animals – from clinics and homes to farms. We care deeply about developing ways to ensure animals are in the best health possible, and we apply our Research & Development (R&D), manufacturing and technical expertise to create new and better medicines, vaccines, diagnostics and technologies that can address the animal health and business challenges our customers face every day.

We believe the bond between people and animals is special and makes the world a better place. Working together to advance care for animals, we are building a more sustainable future that benefits our colleagues, customers, communities and planet.

Our name, Zoetis (zō-EH-tis), has its root in zo, familiar in words such as zoo and zoology and derived from zoetic, meaning “pertaining to life”. It signals our company's dedication to supporting the world's veterinarians, livestock farmers and pet owners who raise and care for the animals we depend on.

Our purpose

Our purpose – to nurture the world and humankind by advancing care for animals – inspires how we are reimagining animal health. We focus on innovations across the continuum of care for animals – from prediction and prevention to detection and treatment of disease – as well as in digital and data analytics that can accelerate the achievement of those goals.

We also continue developing our highly engaged colleagues who help us champion a healthier, more sustainable future.

Sustainability

At Zoetis we are championing a healthier, more sustainable future. We are taking bold action to build a healthier future for animals, people and the planet we call home.

One of the most important aspects under sustainability remains antibiotic stewardship – the responsible use of antimicrobials without sacrificing the welfare and care of animals, promoting a preventive approach to animal health with positive implications on human health.

For example, vaccines have contributed to a reduction in the use of antibiotics over the years and Zoetis is committed to continue the development of these types of products in the future. For years our Enviracor™ J-5 vaccine has been aiding in preventing clinical *Escheria Coli* infections, reducing the need for antimicrobial treatments.

Our non-antibiotic internal teat sealant, Orbeseal®, affords dairy producers the opportunity to reduce their antibiotic usage by reducing the incidence of clinical and sub-clinical mastitis in their herds, resulting in healthier, more productive animals.

Our CLARIFIDE® Plus genomic predictions help commercial dairy producers around the world to increase financial sustainability and improve animal welfare by offering wellness solutions that significantly reduce disease conditions, morbidity and mortality in dairy cows and calves.

The same test also provides various production trait predictions such as milk, fat and protein, allowing producers to select animals to continue in their herd that will produce milk in the most sustainable and efficient way.

Zoetis remains committed to the South African dairy industry and we look forward to continuing our support through initiatives such as the *DSA Code of Practice*, and providing innovation and support through our products and services.

Happy milking!
The Zoetis Team

The Zoetis logo is displayed in a large, bold, orange font. It features a stylized 'z' with a curved underline that extends to the right. The background of the page features a decorative wavy line in shades of blue, orange, and green at the bottom.



CHAPTER 1

1.1 INTRODUCTION	11
1.2 DEFINITIONS	14

CHAPTER 2

2.1 GENERAL REQUIREMENTS FOR THE MILKING SHED	17
2.1.1 Approved milking shed	17
2.1.2 Certificate of acceptability	17
2.1.3 Design of a milking shed	17
2.1.4 Grounds of the milking shed, including outside structures, roads and animals	18
2.1.5 Waste management	19
2.1.6 Water	20
2.1.7 Protection of the environment	20
2.2 REQUIREMENTS FOR THE MILKING PARLOUR	22
2.2.1 Structure	22
2.2.2 Milking equipment	25
2.3. GENERAL REQUIREMENTS FOR THE MILK ROOM	28
2.3.1 Structure	29
2.3.2 Milk storage and cooling equipment	31

CHAPTER 3

3.1 GOOD MILKING PRACTICES	36
3.2 MILKING PROCEDURES	36
3.3 RECOMMENDED MILKING PROCEDURES	37
3.4 TEAT AND UDDER HEALTH	38

CHAPTER 4

4.1 HERD HEALTH	40
4.2 DISEASE TREATMENT	41
4.3 IMMUNISATION	42
4.4 CHEMICALS AND VETERINARY MEDICINES	42
4.4.1 Antibiotics	42
4.4.2 Over-the-counter products	42
4.4.3 Extra-label drug use	42
4.5 ON-FARM ANTIBIOTIC MANAGEMENT	43
4.5.1 Antibiotic resistance (AMR)	43
4.5.2 Test the tank, not the cow	43
4.6 SPECIFIC DISEASES	44
4.6.1 Tuberculosis (TB)	44
4.6.2 Brucellosis (CA)	44
4.6.3 Mastitis	45
4.6.4 Contagious mastitis	45
4.6.5 Environmental mastitis	46
4.7 FEED AND WATER	47
4.7.1 Potential hazards	47

CHAPTER 5

5.1 THE CONCEPT OF ANIMAL WELFARE	52
5.2 ANIMAL WELFARE IN PRACTICE	53
5.3 WELFARE AND MANAGEMENT PROCEDURES	53
5.3.1 Veterinarian-Client-Patient relationship (VCPR)	53
5.3.2 Employee training	54
5.3.3 Written protocols	54
5.3.4 Identification and recordkeeping	54
5.3.5 Milking routine	54
5.4 NEWBORN AND MILK-FED DAIRY CALVES	54
5.5 NUTRITION AND WELFARE	55
5.6 HERD HEALTH PLAN	56
5.6.1 Newborn and milk-fed calves	56
5.6.2 Painful medical procedures	56
5.6.3 Animal observations	57
5.6.4 Hygiene	57
5.7 WELFARE: ENVIRONMENT AND FACILITIES	57
5.7.1 Temperature	57
5.7.2 Air quality	57
5.7.3 Lie-down areas	57
5.7.4 Flooring	57
5.7.5 Light	58
5.7.6 Noise	58
5.8 HANDLING AND WELFARE	58
5.8.1 Visual perception	58
5.8.2 Personal space	58
5.8.3 Learning	58
5.8.4 Calf handling	58
5.9 TRANSPORTATION AND WELFARE	58
5.10 THE WELFARE OF SICK AND INJURED ANIMALS	59
5.11 AUDITING OF ANIMAL WELFARE	59

CHAPTER 6

6.1 INTRODUCTION	63
6.2 BIOSECURITY DEFINED	63
6.2.1 Importance of biosecurity	63
6.3 BIOSECURITY AND DAIRY FARMING: THE BASICS	63
6.3.1 The animals	63
6.3.2 The people	64
6.3.3 The programmes	64
6.4 ASSESSMENT OF YOUR BIOSECURITY STATUS	65
6.4.1 #1 – Quality is an important part of my profit	65
6.4.2 #2 – Keeping infectious diseases off my farm	66
6.4.3 #3 – My use of strategic vaccinations	67
6.4.4 #4 – Calf/heifer management as a special part of biosecurity	67

6.4.5 #5 – Biosecurity includes testing	67
6.4.6 #6 – Bio-containment	69
6.4.7 #7 – Equipment	69
6.4.8 #8 – Sanitation	69
6.5 DEVELOPMENT OF A BIOSECURITY PLAN	69
6.5.1 Preparing for an on-farm biosecurity plan	70
6.5.2 Essentials of a biosecurity plan	70
6.6 REFERENCES	77

CHAPTER 7

7.1 INTRODUCTION	80
7.2 GENERAL HYGIENE	80
7.2.1 Cleaning and disinfection programme	81
7.3 CLEANING AND DISINFECTION IN THE MILKING PARLOUR	83
7.4 CLEANING AND DISINFECTION IN THE MILK ROOM	83
7.5 CLEANING PROCEDURES	83
7.6 MANUAL CLEANING OF EQUIPMENT, CANS, TRANSPORT TANKS, BULK TANKS AND HAND MILKING EQUIPMENT	85
7.6.1 Cleaning equipment	85
7.6.2 Cleaning chemicals and disinfectants	86
7.7 PERSONAL HYGIENE	86
7.7.1 Illness and injuries	88
7.7.2 Personal cleanliness	89
7.7.3 Personal behaviour	89
7.7.4 Protective clothing	89
7.7.5 Change room	89
7.7.6 Personnel hygiene facilities	89
7.8 TRAINING	90

CHAPTER 8

8.1 GUIDELINES FOR THE DEVELOPMENT OF A DOCUMENTATION SYSTEM	94
8.2 BENEFITS OF DOCUMENTATION	94
8.3 STANDARD FOR RAW MILK	100
8.4 RECOMMENDED TESTS ON THE FARM	100

CHAPTER 9

9.1 INTRODUCTION	106
9.2 REGISTRATION PROCEDURES	106
9.3 MINIMUM REQUIREMENTS	106
1: FARMER'S INITIATIVE	108
2 (a): OVERVIEW OF RESPONSIBILITIES	108
2 (b): DETAILS OF RESPONSIBILITIES	109
3: THE ROAD TO ACHIEVING EXPORT CERTIFICATION FOR A MILKING SHED	110
4: SYNOPSIS OF DOCUMENTATION AND PROCEDURES REQUIRED FOR MILKING SHED CERTIFICATION	112

Creating a happy balance



TREAT NOW. DRINK NOW

with zero milk withdrawal period

For the treatment and control of gastro-intestinal Roundworms, Lungworms, Mange Mites, Red (Biting) and Blue (Sucking) Lice, Horn Flies and Blue Ticks of cattle.

*More than 90 % effective against susceptible roundworms. Persistency = period between treatment and re-infection
 #The efficacy of Cydectin Anti-parasitic Pour-on for Cattle is not adversely affected if applied when the hide is wet, or if rain occurs shortly after application. However, treatment of animals under these conditions is not recommended practice.*

- References:
1. Stromberg BE, Gasbarre LC. Gastrointestinal nematode control programs with an emphasis on cattle. *Vet. Clin. Food Anim.*, 2006;22:543-565.
 2. Rapiya M *et al.* Rotational grazing approaches reduces external and internal parasite loads in cattle. *African Journal of Range & Forage Science*, 2019; 36(3): 151-159.
 3. Charlier J, Hoglund J, Von Samson-Himmelstjerna G, Dormy P, Vercuryse J. Gastrointestinal nematode infections in adult dairy cattle: impact on production, diagnosis and control. *Veterinary Parasitology*, 2009;164: 70-79.
 4. Geunden T *et al.* A multi-country study to assess the effect of a treatment with moxidectin pour-on during the dry period on milk production in dairy cows. *Veterinary Parasitology*, 2017;237:101-109.
 5. Wardhaugh IC, Longstaff BC, Morton R. A comparison of the development and survival of the dung beetle, *Onthophagus latans* (Schreb.) when fed on the faeces of cattle treated with pour-on formulations of eprinomectin or moxidectin. *Veterinary Parasitology*, 2001;99:155-168.
 6. Murphy AW. The effect of treatment with Moxidectin, a long-acting endectocide, on milk production in lactating dairy cows. *World Biometrics Congress Sydney* 1998.
 7. Clymer BC, Guerinio F, James T, Barton W. Evaluation of the wash-off potential of Cydectin Pour-On from cattle following simulated rainfall. *American Association of Bovine Practitioners*, 1998.
 8. Data on file

FOR ANIMAL USE ONLY

Cydectin® Antiparasitic Pour-on for Cattle: Reg. No. G2678 (Act 36/1947). Contains 5 mg / ml Moxidectin.

For full prescribing information refer to the package insert approved by the medicines regulatory authority. Full product information available from Zoetis South Africa (Pty) Ltd | Co. Reg. No.: 2012/001825/07 | 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. PostNet Suite 53, Private Bag 9976, Sandton, South Africa, 2146. RSA Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). www.zoetis.co.za
 RU/DH/06/21/04



CHAPTER 1



1.1 INTRODUCTION

Maintaining high standards of compliance for raw milk requires a consistent, integrated approach towards good agricultural practices (GAP). These practices are fundamental to the dairy industry and critical to ensure that milk is produced by healthy animals in a manner that is sustainable and responsible from animal welfare, social, economic, and environmental perspectives.

In respect of sustainability, GAP offers good risk management for individual milk producers in the short and long term. This *Code of Practice* encourages dairy farmers to adopt 'proactive' preventative practices rather than waiting for problems to occur.

Food safety and quality of raw milk at the primary level is of paramount importance towards integrated management and sustainability and serves as a measurement of the successful implementation of GAP. Due to its overarching nature, it serves as primary discussion point in this code.

Primary milk producers or dairy farmers need to ensure that the safety and quality of their raw milk will comply with legislation and will satisfy the highest expectations of dairy product manufacturers and, ultimately, the consumer.

Various actions can be undertaken to improve the safety and quality in the dairy supply chains. The focus should be on preventing or reducing the likelihood of introducing a hazard that may adversely affect the safety of milk or its suitability for consumption at later stages in the food chain, rather than solving it after it has occurred.

Raw milk may contain micro-organisms that are pathogenic to humans and their source may lie within or outside the udder. The milking procedure, handling, storage equipment, and transportation carry the further risk of contamination of raw milk from humans, and the environment or growth of the inherent pathogens. Quality defects of milk products may, for example, be the result of heat-stable enzymes produced by micro-organisms present in the raw milk. Chemical contaminants may originate from cleaning chemicals, veterinary medicine, pesticides, and feed.

Integrated chain management for food safety is an important tool in ensuring the hygienic safety of milk and milk products. It is important to note that food safety is a shared effort among all role-players in the food chain, including, but not limited to, competent authorities, feed manufacturers, milk producers, veterinary practitioners, feed and raw material suppliers, processors, and distributors.

Control measures implemented along the food chain should be interconnected to ensure effective food safety and risk management. These control measures should be integrated in such a way that the outcome at one point in the food chain, can be related to the outcome at another.

No individual step in the food chain should be managed without consideration of what takes place in the chain of events prior to the particular measure being applied or what will take place subsequent to a particular step. The implementation of systematic approaches and systems that are targeted to ensure the maintenance of the

integrity of suppliers' milk, is necessary in today's terms as a measure to prove due diligence.

Adulteration of farmers' milk is a major threat against food safety and compositional integrity, and the selection of a practical proactive approach is required. As part of a risk-based approach, the following leading principles are fundamental in efficiently maintaining the integrity of suppliers' milk and managing the supply chain:

- Establishment of effective communication with other key players operating in the same chain.
- Demonstration of food safety skills and in-depth understanding of the hazards that need to be controlled at the step(s) for which the farmers are responsible.
- The use of reliable suppliers of high quality and safe products (ingredients or raw materials) and services.
- Understanding the importance of sharing responsibility by meeting the requirements with regard to the food safety of products supplied to the subsequent step in the food chain.
- Cooperation between individuals and organisations using industry-specific codes of conduct and food safety management systems to address hazard control at points in the food chain where cost-effectiveness is optimised, should be encouraged.

FOOD SAFETY HAZARDS

Food and food products are expected to meet minimum safety requirements as required by customers, consumers, and regulatory authorities. It is therefore essential that levels of undesirable substances should be sufficiently low and that their concentration in the food meant for human consumption, is consistently below the level of concern. Undesirable substances are normally referred to as food safety hazards, which may harm the consumer immediately at consumption, as an injury, or over a longer period of time leading to long-term illness or even death.

These undesirable substances may be:

- Biological (pathogens, insects, pests, etc.).
- Chemical (allergens, lubricants, cleaning chemicals, pesticide residues, antibiotics, melamine, heavy metals, etc.).
- Physical (glass, wood splinters, metal pieces, stones etc.).

The undesirable substances or hazards may be introduced into raw milk during inappropriate and uncontrolled food-handling practices.

CONTROL MEASURES

A control measure includes any action or activity used to eliminate a hazard or reduce it to an acceptable level. In addition, the term also refers to any action or activity taken to reduce the likelihood of the occurrence of a hazard in milk or milk products. Thus, control measures include both process controls, e.g. cooling, as well as other activities such as general hygiene and pest-control programmes.

OBJECTIVES

Primary milk production should be managed in such a way as to ensure that milk and milk products are safe and suitable for consumption. The following objectives should be met:

- Avoiding areas where the environment poses a threat to the safety of milk.
- Controlling pests, animal diseases and plants.
- Controlling contaminants from the environment, facility, equipment, personnel, animals, feed and water.
- Controlling and managing the diseases of animals and plants in such a way that it doesn't pose a threat to milk safety.
- Adopting practices that ensure safe milk production.

RATIONALE

Milking usually takes place at least twice a day. Milk is recognised as a highly perishable foodstuff that is easily susceptible to microbial contamination. Contamination of raw milk can vary widely due to milk-handling practices, environmental factors, cleaning and disinfection procedures and general hygiene practices. The quality of pasteurised milk and milk products is influenced significantly by the production, collection and handling methods on the farm. It is of the utmost importance to reduce the risks which may adversely affect the safety of milk.

ENVIRONMENTAL HYGIENE

Potential sources of contamination from the environment should as far as possible be identified. Primary milk production should not be conducted in areas where the presence of potentially harmful substances would lead to unacceptable levels of such substances in milk, e.g. dust. Producers should, as far as it is practical, implement measures to control contamination from air, soil, water, feedstuffs, fertilisers (including natural fertilisers), pesticides, veterinary drugs, or any other agent used in primary production.

HYGIENIC PRODUCTION OF MILK

Primary production activities should aim to ensure the production of safe and high-quality raw milk at all times. This includes identifying any specific points where a high probability of contamination may exist. The following measures are needed to minimise the probability of contamination:

- Avoid or eliminate unhygienic practices, e.g. dirty equipment.
- Ensure effective cleaning and disinfection procedures.
- Take specific measures to minimise the probability of contamination.
- Control plant and animal health so that it does not pose a threat to human health through food consumption, or adversely affect the suitability of the product.
- Protect milk from faecal and other contamination, e.g. good milking practices, waste management and appropriate storage of harmful substances.

CLEANING, MAINTENANCE AND PERSONNEL HYGIENE

Appropriate facilities and procedures should be in place to ensure that:

- All cleaning, disinfection and maintenance is carried out effectively.
- An appropriate level of personal hygiene is maintained.

FOOD SAFETY MANAGEMENT SYSTEM (FSMS)

Food safety may be achieved by implementing food safety and quality programmes based on hazard analysis and critical control points (HACCP) principles, especially pre-requisite programmes. The general requirement for an FSMS is a well-documented, fully

implemented and well-maintained system that is continuously recorded and improved. The FSMS should also be supported with records (documented) on corrective actions on non-conformities that are identified or occur. The documentation system may be in an electronic or printed version, and needs to be readily available and legible.

Management commitment is of the utmost importance and evidence of communication of the FSMS to all personnel, needs to be available. The requirements for the FSMS are based on regulatory, statutory, and compulsory specifications, as well as industry standards and customer requirements. Refer to reference regulations, standards, and guidelines.

The basis of the FSMS is pre-requisite programmes (PRPs), including good agricultural practices (GAPs), good farming practices (GFPs), good hygiene practices (GHPs), good milking practices (GMPs), good veterinary practices (GVPs) and good laboratory practices (GLPs).

REGULATIONS AND STANDARDS

Requirements for the hygienic and safe production of milk are obtained from legislation, South African National Standards (SANS), Codex Alimentarius, the Food and Agricultural Organisation (FAO) and the International Dairy Federation (IDF).

The dairy industry in South Africa is regulated by various acts, regulations and guidelines. The departments responsible for the execution of food safety and quality-related matters, are the Department of Health (DOH), the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Trade and Industry (DTI).

DOH

Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972)

- Regulations relating to hygiene requirements for milking sheds, the transport of milk and relating matters (R961/2012).
- Regulations relating to milk and dairy products as amended.

DAFF

Agricultural Products Standards Act, 1990 (Act 119 of 1990)

- Regulations relating to dairy and imitation dairy products, as amended.

Animal Disease Act, 1984 (Act 35 of 1984)

Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)

DTI

Consumer Protection Act, 2008 (Act 68 of 2008)

Information in this Code of Practice was based on legislation, voluntary standards and guidelines and must be interpreted according to the contents of all referenced material.

References to **legislation** will be indicated in **RED**, references to **SANS documents** will be indicated in **BLUE**, references to **ISO/TS 22002-3** will be in **PURPLE**. **Dairy Standard Agency** requirements, recommendations and guidelines are in **BLACK**.

South Africa is not a third-world country with elements of the first world, nor a first-world country with elements of the third world. It is both at the same time, sometimes in the same place. The implementation of an on-farm safety and quality programme, therefore, needs to be applicable across all sectors in the South African dairy industry, that is in the established, emerging and subsistence sector.



1.2 DEFINITIONS

cleaning

action(s) dealing with the removal of soil, food residue, dirt, grease or other objectionable matter.

cleaning in place / CIP

cleaning of equipment by circulation of cleaning and rinse solutions without the dismantling of equipment.

clean water

water that does not compromise food safety in circumstances of its use or purified water that does not contain micro-organisms, harmful substances in quantities capable of directly or indirectly affecting the safety of food.

competent person

person, qualified by knowledge and practical experience, with the necessary skills and ability to perform an assigned task.

contamination

introduction or occurrence of a contaminant in food, feed or in food and feed environment.

contaminant

any biological or chemical agent, foreign matter or other substances not intentionally added to food or feed which may compromise food safety.

cross-contamination

contamination produced when a food process, a food product or a raw material contaminates other processes, food products or raw materials indirectly from one source to another, either with food safety hazards or odour and flavour.

disinfection

application of disinfectants or physical agents and processes that are suitable for use in the food industry to kill most vegetative forms of pathogenic and other micro-organisms (but not necessarily all bacterial and fungal spores, mycobacterium, Rickettsia or viruses).

disposal system

a subterranean or ground level tank or other vessel, sewerage system, dam or farmland into or onto which effluent may be discharged.

effluent

means any liquid, liquid or solid waste or liquid or solid manure emanating from a milking shed.

food safety management system

A food safety management system (FSMS) is interrelated elements that combine to ensure that food does not cause adverse human health effects. These elements include programmes, policies, procedures, work instructions, practices, processes, goals, objectives, methods, controls, responsibilities, relationships, documents, records, and resources. A FSMS is often one part of a larger management system.

feed

any single or multiple materials, whether processed, semi-processed or raw, which is intended to be fed directly to food-producing animals.

feed additive

any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed or animal products.

feed ingredient

component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal's diet, including feed additives.

food handling organisation

business which, during its operations, produces, processes, prepares, manufactures, stores, transports, distributes or sells foodstuffs or is engaged in any activity which might impact on the safety of such foodstuffs.

food safety hazard

a food safety hazard is an agent or condition that could potentially cause an adverse human health effect. Hazards may be either biological, chemical, or physical. The condition of the food itself can also be hazardous.

Food safety hazards can also be found in or on animal feed and feed ingredients. Since these may be transferred to food through the consumption of animal products, they can also cause adverse human health effects.

medicated feed

any feed which contains veterinary drugs.

pest

unwanted species of plant or animal that may have a detrimental effect on humans, their activities, or the products they use or produce, or for animals or for the environment. The term refers to small animals, birds, and insects that destroy crops, spoil food, or spread disease in fields or on farm premises.

potable water

water of sufficiently high quality that can be consumed or used with low risk of immediate or long-term harm. (Refer to SANS 241.)

prerequisite programme / PRP

basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end food products and safe food for human consumption. Examples of equivalent terms are: Good Agricultural Practice (GAP), Good Hygiene Practice (GHP), Good Laboratory Practice (GLP), Good Manufacturing Practice (GMP), Good Distribution Practice (GDP), Good Veterinarian Practice (GVP), Good Production Practice (GPP), and Good Trading Practice (GTP).

record

document that provides objective evidence of actions undertaken or results achieved.



veterinary drug

any substance applied or administered to any food-producing animal, such as meat or milk-producing animals, poultry, fish or bees, whether used for therapeutic, prophylactic or diagnostic purposes or for modification of physiological functions or behaviour.

withholding / withdrawal period

time during which a crop, an animal or its products cannot be used for human consumption following the last application of a plant

protection product to the crop (including pastures), or the last application or administration of a veterinary drug to the animal, that ensures that the foodstuff does not contain any residues in quantities in excess of established maximum residue limits.

waste

unwanted or undesired material, including hazardous substances and food product that is not fit for human consumption or that does not comply with food safety requirements.



CHAPTER 2

2.1 GENERAL REQUIREMENTS FOR THE MILKING SHED

Milking sheds range from structures where a few cows are milked in the open, to modern herringbone and rotary sheds milking many hundreds of cows more than once a day. A milking shed, however, must be approved by the relevant local health authority before milk may be produced for human consumption.

It is important to ensure that a milking shed should only be used for the milking of dairy animals and that special attention should be given to the hygienic and safe handling and storage of raw milk.

Regulation R961:
"Approved milking shed" means a milking shed in respect of which a certificate of acceptability has been issued and is enforced.

6. (7) A milking shed shall not be used for any other purpose except the production and handling of milk.

2.1.1 Approved milking shed

The minimum requirements that a milking shed must comply with are found in Regulation R961.

Regulation R961: **PROHIBITION ON THE PRODUCTION OF MILK, EXCEPT IN AN APPROVED MILKING SHED**

2. (1) No person shall use a milking shed for the purpose of milking dairy stock in order to produce milk for human consumption, unless the milking shed in which the dairy stock are milked is an approved milking shed and such milking shed is used in accordance with the provisions of these regulations and the conditions of the certificate of acceptability issued in respect of that milking shed.
- (2) The provisions of sub-regulation 1 shall not be applicable to a milking shed in which milk is produced solely for own use.
- (3) If a local authority is of the opinion that a milking shed is being used in a way which constitutes a health hazard or that a situation has developed in the milking shed constituting such hazard, the local authority may order in writing the owner or possessor of an existing milking shed not to remove any milk for human consumption from the milking shed until the hazard or situation has been rectified to the satisfaction of the local authority.

2.1.2 Certificate of acceptability

The first step in establishing a primary milk production facility referred to as a milking shed is to obtain a certificate of acceptability from the local authority.

Regulation R961:

- 3 (1) Any person wishing to apply for a certificate of acceptability in respect of a milking shed shall apply for it in writing to the local authority in whose area of jurisdiction the milking shed is situated on a form containing at least the particulars that are substantially the same as these contained in the form in Annexure A to these regulations.

(2) Such an application shall be submitted to the local authority in whose area of jurisdiction the milking shed is located or will be erected, together with:

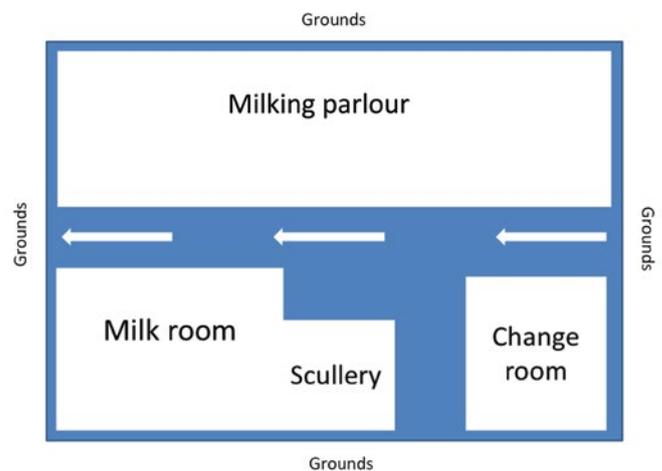
- (a) A site plan with north indicated and with an indication of all adjacent and bordering buildings and their uses.
- (b) A layout sketch to a scale of 1:100 of all the milking shed or milk production facilities referred to in Regulation 6, consisting of a floor or ground plan, a sectional view and a vertical elevation.

(3) Upon receipt of an application referred to in Regulation 3, the local authority shall without delay refer the application to an inspector or any employee of the local authority concerned for consideration.

2.1.3 Design of a milking shed

According to regulation R961 an approved milking shed shall consist of the following structures:

- Milking parlour.
- Milk room.
- Change room.
- Scullery (may be part of the milk room).



Regulation R961 **STANDARDS AND REQUIREMENTS**

Milking sheds

6. (1) (a) An approved milking shed shall consist of at least:
- (i) A milking parlour referred to in paragraph 2.
 - (ii) A milking room referred to in paragraph 3 where milk shall be received from the milking parlour, and such milk shall be stored and where it may be treated, processed and packed, provided that where due to the design and construction of a milking shed all the requirements included under paragraph 3 cannot be situated within the milking room, it should be otherwise provided on the premises.
 - (iii) A change room referred to in paragraph 4.
 - (iv) A scullery for the washing, cleaning, disinfection and sterilisation of milk containers and other unfixed apparatus

and equipment used in the handling of milk.
 (b) (i) The facilities referred to in paragraph (b) shall, subject to the provisions of sub-paragraph (ii) be erected as separate rooms in one building complex or as separate detached buildings.
 (ii) A scullery referred to in paragraph (a)(iv), may be erected as an integral part of a milk room or as a separate room.

2.1.4 Grounds of the milking shed, including outside structures, roads and animals

Environmental contaminants have a negative influence on the quality and safety of raw milk. The environment of the milking shed shall be assessed to determine if sources of possible contamination may be present.

Recommendation:
 Ideally, there should be a pathway of width at least one metre around the milking shed. The pathway should be kept clean and clear of materials.

ISO/TS 22002-3

5.2 Location

- The organisation shall implement measures that minimise the likelihood of introducing harmful contaminants from environmentally polluted areas.
- The organisation shall identify potential sources and the nature of such contamination in the neighbouring environment.
- The organisation shall identify water sources and reserves used for farming activities, e.g. springs, rivers and wells.
- The organisation should identify on a map water sources and reserves, and locate sources of potential contamination.
- Local authorities can assist in the identification of water sources and reserves. Monitoring local district development plans is useful to foresee and prevent future problems.

5.3 Construction and layout of the premises

Farm premises shall be designed and constructed in such a way as to maintain an appropriate degree of hygiene and to minimise the likelihood of cross-contamination.

Good hygiene and farming practices are needed to control possible sources of contamination. Access to the milking shed grounds shall be managed by a perimeter fence to prevent animals and/or unauthorised persons access to the milk shed.

Although it is recognised that dogs and animals are part of the milking shed environment, the access of these animals to the milking parlour needs to be restricted to guard/security dogs only, while all animals must be prevented from entering the milk room. All possible precautions shall be taken to prevent birds from nesting or perching in the milking parlour, with total exclusion from the milk room, while complying with the regulations on the conservation of wildlife.

The grounds and premises shall be kept free of conditions that could lead to the contamination of the milk. The grounds shall be kept free from uncut weeds and grass, litter, waste and miscellaneous materials. Prevention of the breeding or harbourage of micro-organisms, insects, rodents or birds can be obtained by the orderly storage of equipment and materials, with waste stored in suitable

containers that can be thoroughly cleaned. If waste containers are not stored in an enclosed area, they must be fitted with tight-fitting lids.

There should be no stagnant water and special attention must be paid to gutters, open drains, potholes and pools. Inadequate drainage or incorrectly sloped surfaces can cause water to become stagnant.

The design and construction of buildings and facilities and the building materials used, must permit easy and adequate cleaning and disinfecting, which will ensure that a high level of good hygiene is maintained. Roofs, valleys and gutters must be kept clear of debris, including insects and dead birds, and must be inspected at appropriate defined intervals. Outside structures shall be kept clear of debris, bird droppings, etc. as these can contaminate food (milk). Unused buildings, outhouses, service buildings, etc. shall be kept clean and tidy to eliminate sites where micro-organisms, insects, rodents and birds can be present and/or multiply.



SANS 10049

7.2.1 Location, size, hygienic design and conditions

7.2.1.3 The premises of the food-handling organisation shall be well-drained and adequately fenced to keep out larger animals, such as cats and dogs, as well as unauthorised persons and vehicles.

7.2.1.4 Outdoor work areas, roads and pathways on the premises shall have a permanent surface of concrete, brick, bitumen or any other durable material.

7.2.1.8 The food-handling organisation's premises and equipment shall be designed to permit the processing of raw materials without undue delay. The buildings shall be designed and constructed to prevent the entry and harbouring of insects, birds, rodents and other vermin.

7.2.1.9 Buildings of the food-handling organisation shall be located away from areas subject to flooding, prone to infestations of pests and micro-organisms, and where waste, either solid or liquid, cannot be removed effectively.

7.2.1.10 Sewage and effluent lines shall be constructed in such a manner to avoid the contamination of potable water supplies, of food handling areas and of the food product.

2.1.5 Waste management

Solid waste should be handled in such a manner to prevent contamination of products (milk), animals and/or the environment. Milking animals must be kept away from areas where effluent/manure or waste is stored, to minimise exposure. Milking animals should not be exposed to human waste or any other waste likely to contain pathogens of significance to human health. Special attention and care should be paid to pest control in waste collection areas.

Facilities for the storage of waste should be designed to preclude the entry and harbourage of pests and to avoid the contamination of food, potable water, equipment, buildings and roadways on the premises and the environment in general.

Clearly demarcated and marked waste containers should be used for the disposal of waste. These containers should be marked in such a manner that they cannot be mistaken for food containers.

Skips or containers that contain waste material should be covered and emptied at least once a week, or more frequently, to minimise the risk of infestation. Skips or containers for waste should be located as far as practical from the milking parlour and milk room.

Combustible waste, if incinerated, must be burned in an area that is located at an adequate distance from the milking shed, to avoid a fire hazard, contamination of the air supply or environment.

All floor drains shall be fitted with effective traps and shall be covered with a suitable grid for liquid waste. The floor drains shall be kept clean and shall be cleaned or disinfected (or both) at appropriate intervals to prevent the risk of contamination of the milking equipment and milk.

Regulation R961

6. (5) Any effluent originating from a milking shed shall:
- (a) Not be stored, treated or dumped in any place except in or on a suitable disposal system.
 - (b) Not be conveyed to or dumped in or on a suitable disposal

system in any other way than by means of a pipeline, cement ditches or in a container.

(c) Not be dumped so that a water source is or may be polluted by it.

(d) Not constitute a nuisance or cause a condition that is a health hazard.

SANS 10049

7.2.5.4 Drainage channels shall be of the open type with, where necessary, removable covers, and shall be designed to cope with the maximum expected flow of liquid without overflowing or causing flooding.

7.2.5.6 There shall be no installations in a drainage channel that could obstruct the flow of water or the activities of cleaning.

7.2.5.7 Floor drains or channels shall be of hygienic design suitable to the operations of the food-handling organisation and shall be discharged appropriately. Floor drains or channels shall be covered appropriately, allowing easy removal for frequent cleaning and maintenance. Floors and drains shall be maintained in a good condition and repair.



7.2.5.8 Drains shall be vented to atmosphere, outside the food-handling areas, before entering the sewer or joining any sewer. A water trap shall be provided between the vent and the main sewer.

7.2.1.10 Sewage and effluent lines shall be constructed in such a manner to avoid the contamination of potable water supplies, of food handling areas and of the food product.

7.2.15 Waste facilities

7.2.15.1 Separate, suitable waste facilities shall be provided on the premises.

7.2.15.2 Facilities for the storage of waste shall be designed to preclude the entry and harbourage of pests and to avoid the contamination of food, potable water, equipment, buildings and roadways on the premises and the environment in general.

8.8.5 Waste shall be so stored to avoid the contamination of food or the environment. This waste shall be safely removed from the food-handling areas as soon as possible.

2.1.5.1 Hazardous waste

Hazardous waste may include pesticides, cleaning chemical containers, medicine containers and needles. The hazardous waste should be disposed of in such a manner that no humans or animals will be harmed or that the environment will not be contaminated. Needles need to be stored in a dedicated and clearly marked container which needs to be disposed of at a veterinary office or clinic.



SANS 10049

7.4.5.3 The food-handling organisation shall establish documented emergency procedures for dealing with the accidental contamination of food, personnel and the environment as a result of spillage of hazardous substances during handling.

7.4.5.5 Hazardous substances shall be disposed of in an environmentally appropriate manner and shall be disposed of after consultation with the relevant health authorities, and in accordance with the relevant requirements of the relevant national legislation.

2.1.6 Water

Water is a universal cleaning agent that comes into contact with all milk contact surfaces. The quality of water is therefore of the utmost importance and effective measures should be implemented to ensure that it is free from contaminants. Water tests should be done at least quarterly until the water complies with the specifications in SANS 241, and thereafter annual tests will be sufficient. Two consecutive results need to comply. Borehole, river and canal water should be tested more frequently.

Regulation R961:

“Water” means water that complies with the microbiological requirements set out in SANS 241.

An ample supply of clean water that is free from any substance that might be detrimental to human health and that is adequately protected from contamination, must be available at the point of use. The water should comply with the requirements of SANS 241. The microbiological and chemical quality of all water used in milking sheds shall be checked regularly and the results shall be recorded. Where water is chlorinated on-site, a routine checking procedure should be implemented and the results recorded.

Storage tanks and reservoirs for water should be covered to preclude the contamination of water by birds, rodents, organic and inorganic matter, and should be inspected weekly. The air vents to these tanks and reservoirs should be insect- and rodent-proof.

Flexible hoses, if used, should be suitable for food use, e.g. made of food-grade material, should not be immersed in liquids unless designed for this purpose and, if immersed, should be included in the cleaning programme. When not in use, it should be properly stored on a reel or equivalent.

SANS 10049

7.2.1.10 Sewage and effluent lines shall be constructed to avoid the contamination of potable water supplies, food-handling areas, food ingredients and the food product.

7.4.1.2 Every food-handling area shall have an adequate supply of clean potable water that is free from suspended matter and substances that could be deleterious to the food product or harmful to health. Non-potable water shall have a separate, identified system that is not connected to and is prevented from reflux into the potable water system.

7.4.1.4 Flexible water hoses shall be made of a suitable material for food safety and reels for their storage shall be provided.

7.4.1.7 Where filters are used, they shall be effectively maintained in a hygienic manner.

2.1.7 Protection of the environment

Activities in and around the milking shed, particularly in relation to water and waste management, should be in accordance with any regulations or guidelines to protect the environment.

Effluent must be managed to ensure appropriate disposal with no contamination of water sources. If dairy effluent is applied to pasture, e.g. through irrigation, it must be done under a suitable, documented management plan. There must be at least 21 days between application and grazing or harvesting of feed. The milking animals and the farm dairy environment must not be exposed to spray drift when effluent is being spray-irrigated.

SANS 241-1

This is water that contains no *Escherichia coli* organisms per 100ml, ≤ 10 coliforms per 100ml and is free from any substance in concentrations detrimental to human health.

According to the *FAO/IDF Guide to Good Dairy Farming Practices*, primary milk producers need to implement systems to avoid the potential contamination of the local environment. Storage facilities for oil, silage liquor, soiled water and other polluting substances

must be located in a safe place and precautions must be taken to ensure that accidents do not result in the pollution of local water supplies.

Measures include:

- Avoid disposing of agricultural or veterinary chemicals where there is potential for them to enter the local environment.
- Protect the environment by only using approved agricultural and veterinary chemicals and medicines according to the directions on the label.
- Ensure the safe and secure storage of farm chemicals, preferably away from the milk storage areas.

- Ensure the safe disposal of expired and defective chemicals and chemical containers.
- Apply integrated pest management practices where appropriate.
- Apply fertilisers in a manner that minimises the risks of off-site nutrient impacts.
- Avoid using fertilisers that contain toxins, heavy metals or other contaminants.
- Ensure the safe disposal or reuse of empty fertiliser bags.

Milk production should be managed in balance with the environment surrounding the milking shed and farm.

Good dairy farming practices: Environment		
Good dairy farming practice (GFP)	Examples of suggested measures for achieving GFP	Objectives
Implement an environmentally sustainable farming system.	<ul style="list-style-type: none"> • Use farm inputs such as water and nutrients efficiently and sustainably. • Minimise the production of environmental pollutants from dairy farming. • Manage livestock to minimise adverse environmental impacts. • Select and use energy resources appropriately. 	Dairy farming practices meet statutory, environmental and community expectations.
Have an appropriate waste management system.	<ul style="list-style-type: none"> • Implement practices to reduce, reuse or recycle farm waste as appropriate. • Manage the storage and disposal of wastes to minimise environmental impacts. • Manage pastures to avoid water sources being contaminated by effluent. • Implement appropriate waste management for hazardous waste. 	<p>Limit the potential impact of dairy farming practices on the environment.</p> <p>Dairy farming practices comply with relevant regulations.</p>
Ensure that dairy farming practices do not have an adverse impact on the local environment.	<ul style="list-style-type: none"> • Manage dairy effluent on-farm. • Use chemicals (agricultural and veterinary chemicals, fertilisers, pesticides, etc.) appropriately to avoid contamination of the local environment. • Ensure that the overall dairying operation is appropriate for a facility in which high quality and safe milk is produced. 	<p>Minimise the impact of milk production on the local environment.</p> <p>Present a positive image of dairy farming.</p>

2.2 REQUIREMENTS FOR THE MILKING PARLOUR

The milking parlour is the area where the dairy animals are milked. Although the design will vary between the different milking sheds, the requirements in Regulation R961 need to be complied with.

A systematic approach between the structure of the parlour, equipment used and practices followed by personnel needs to be implemented to ensure the hygienic and safe production of milk.

Structures need to be visibly clean without accumulated dirt, manure or feed. It shall be clear of products, chemical substances or other items not used daily in the parlour.

2.2.1 Structure

All measures to ensure good hygiene practices and to prevent contamination of milking equipment and milk, need to be taken. Structural design should provide for smoothly finished, non-absorbing and corrosion-resistant material, and must be free of any open seams and cracks. Design should also facilitate easy and effective cleaning to prevent unnecessary dirt, e.g. dust and manure, from accumulating.

Adequate standing room for animals with provision for the effective removal of effluent shall be in place. The milking parlour shall not have any direct connection with a room where gases, smoke, vapours, dust or a soot deposit are present or may originate, e.g. an emergency generator, diesel fumes, poison rooms or feed mixers.

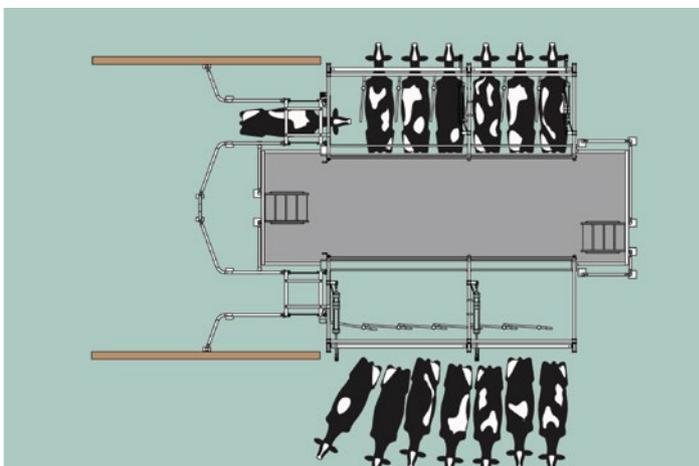
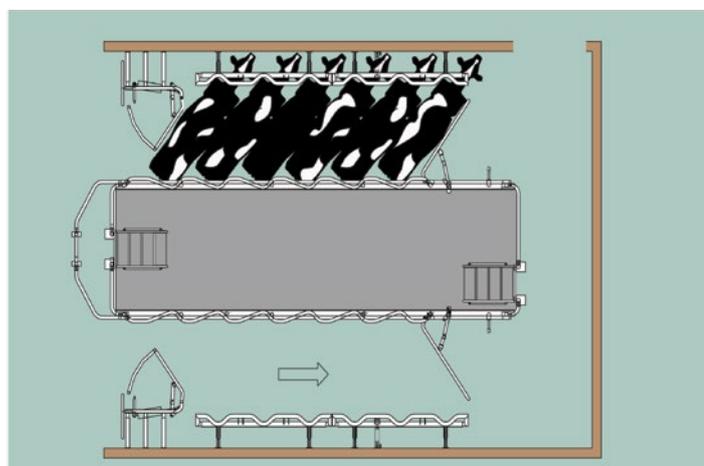
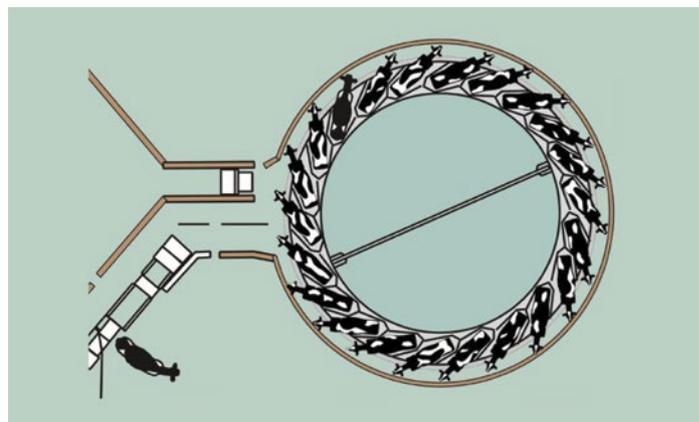
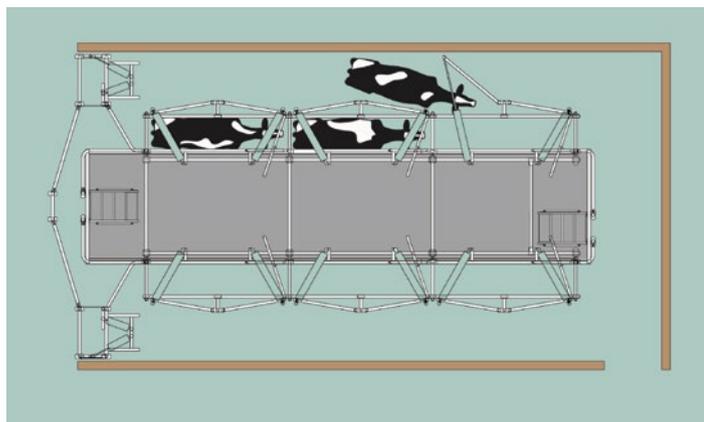
Regulation R961

6. (2) In the case of a milking parlour:

- (a) There shall be no direct connection with a latrine or with a room where gases, smoke, vapours, dust or soot deposit are present or may originate owing to the nature of the activities in such a room.
- (b) When providing standing room of more than one row of dairy stock parallel with one another, there shall be a dividing corridor of at least one metre wide between the rows.
- (c) The partitions, if any, that separate dairy stock from each other when they are being milked, shall be of smoothly finished, non-absorbing and corrosion-resistant material, free of any open seams and cracks.
- (d) Mangers shall be arranged so that fodder which accumulates behind the mangers can be removed and be disposed of appropriately.
- (e) Where walls are provided, the exterior walls:
 - (i) Shall be at least 2,4 metres high on the inside.
 - (ii) Shall, at places where dairy stock are milked, extend to at least 2,1 metres above the level on which the dairy stock stand.

SANS 10049

7.2.1.1 The location of the food-handling organisation shall be such that the buildings can be kept acceptably free from objectionable odours, smoke, dust and any other sources of contamination, in order to comply with the relevant national legislation for hygiene.



ISO/TS 22002-3

5.3 (e) Construct buildings with non-toxic and cleanable materials.

2.2.1.1 Walls, overhead structures and floors

Acceptable wall finishes include sealed surfaces such as:

- Undamaged, close-fitting plastic sheeting.
- Non-flaking painted finishes.
- Good quality, sealed, cement rendering.
- The door leading from the parlour to the milk room must be clean (parlour side).

Regulation R961:

“adequately ventilated and illuminated” means ventilated and illuminated by means of windows with an uninterrupted transparent area equal to at least ten percent of the floor area and with an area which can be opened equal to at least 5 percent of the floor area and so placed that cross ventilation is facilitated.

Regulation R961

6. (2) In the case of a milking parlour:

- (f) The interior surfaces of the walls, if provided, shall be made of impervious materials with no toxic effect in intended use.
- (g) The ceilings, if provided, or overhead structures and fixtures shall be constructed and finished to minimise the build-up of dirt and condensation, and the shedding of particles.
- (h) The floors shall be constructed to allow adequate drainage and cleaning.
- (j) Such parlour shall be provided with at least one water tap with running water to which a flexible pipe may be connected for washing purposes.
- (k) The entrances and exits for dairy stock shall have a floor covering with an impenetrable surface connected to a disposal system, and this floor covering shall be installed in such a way that any milk animal entering or leaving the milking parlour shall walk on it for a distance of at least four metres.

6. (10) As soon as milk animals have left a milking shed, all manure shall be removed from the milking shed and from the floor, and all entrances and exits of the milking shed shall be cleaned.

SANS 10049

7.2.5.7 Floor drains or channels shall be of hygienic design suitable to the operations of the food-handling organisation and shall be discharged appropriately. Floor drains or channels shall be covered appropriately, allowing easy removal for frequent cleaning and maintenance.

2.2.1.2 Lighting and ventilation

SANS 10049

7.2.8.1 The ventilation shall ensure adequate circulation of air, remove excess water vapour and prevent the build-up of excessive heat, the formation of condensate and the growth of mould. Natural ventilation shall be augmented, where necessary, by mechanical means.

ISO/TS 22002-3

5.3 (d) Design buildings in accordance with the required level of hygiene, by providing adequate ventilation, lighting and cleanability, to minimise the exposure of food-producing animals and their products to contaminants and pests.

The design of the milking parlour shall provide protection from the wind and draughts, but shall allow adequate ventilation. The parlour shall be adequately lit and lighting levels in the parlour should be of such a level to permit:

- The reading of tag numbers or freeze brands.
- Allow for the milk to be inspected.

All lights shall be in a working condition and shall be regularly cleaned. Lights shall be fitted with protective covers when breakage may cause a safety hazard, e.g. above feed or basins.

Regulation R961

6. (2) In the case of a milking parlour:

- (i) Such parlour shall be adequately ventilated and illuminated.

2.2.1.3 Drainage and effluent handling

Effective drainage and removal of liquid and solid waste from the milking parlour are essential in preventing disease transmission and controlling pests. Micro-organisms in manure may lead to mastitis or may contaminate the milk. All entrances, exits and gathering points near the milking parlour also must be free of accumulated manure.

Regulation R961

- 6. (2)(d) Mangers shall be arranged so that fodder which accumulates behind the mangers can be removed and be disposed of appropriately.
- (h) The floors shall be constructed to allow adequate drainage and cleaning.
- (5) Any effluent originating from a milking shed shall:
 - (a) Not be stored, treated or dumped in any place except in or on a suitable disposal system.
 - (b) Not be conveyed to or dumped in or on a suitable disposal system in any other way than by means of a pipeline, cement ditches or in a container.
 - (c) Not be dumped so that a water source is or may be polluted by it.
 - (d) Not constitute a nuisance or cause a condition that is a health hazard.

Regulation R961:

“Effluent means any liquid, liquid or solid waste or liquid or solid manure emanating from a milking shed.

Regulation R961:

“Disposal system” means a subterranean or ground-level tank or other vessel, sewerage system, dam or farmland into or onto which effluent may be discharged.

SANS 10049

7.2.5.7 Floor drains or channels shall be of hygienic design suitable to the operations of the food-handling organisation and shall be discharged appropriately. Floor drains or channels shall be covered appropriately, allowing easy removal for frequent cleaning and maintenance.

ISO/TS 22002-3

5.3 (k) Design and equip facilities to collect and maintain away from animals and foods the effluents and waste waters that may result in food contamination.

2.2.1.4 Pest prevention

Pests such as insects and rodents are known vectors for the introduction of human and animal diseases into the production environment.

Measures implemented should emphasise pest prevention.



All efforts should be made to minimise the presence of insects, rats and mice. Although milking parlours attract such pests, good preventive measures such as proper building construction and maintenance, cleaning, removal of waste and manure can minimise the presence of pests. Manure accumulations should not be allowed to develop close to milking areas. Mice and rats are also attracted to animal feed stores, therefore any such feed stores should be located at a suitable place and feed kept in containers that provide adequate protection against such pests.

If it is necessary to resort to chemical pest control measures, such products should be approved for use on food premises and used in accordance with the manufacturer's instructions. Any pest control chemical should be stored in a manner that will not contaminate the milk or the milking environment. Such chemicals should not be stored in wet areas or close to feed stores. It is preferable to use solid baits, wherever possible. No pesticides should be applied during milking.

Pest control measures may be physical, chemical or biological.

SANS 10049

7.4.6.1 An effective pest control programme that is not limited to pest control chemicals shall be documented and implemented. All food-handling areas shall be pest-free.

7.4.6.2 Pesticides and cleaning chemicals shall at no time be allowed to come into contact with wrapping material, containers, raw materials or the food product. Insecticides and rodenticides that look similar to the food being handled, or are in similar containers to these used for packaging, shall not be used.

7.4.6.3 Only registered pesticides shall be used in accordance with the manufacturer's instructions and shall only be applied by a pest control operator that is suitably qualified and trained. The current certified copy of the pest control operator's qualification shall be held by the food-handling organisation.

7.4.6.5 The room in which pesticides are stored shall be kept locked and the materials contained in it shall only be handled by employees trained in their use.

7.4.6.6 Bait stations shall be of a lockable type, and shall not be placed in food-handling areas where food could be contaminated.

ISO/TS 22001-3

5.11 Pest control on farm premises

When pest access and proliferation on the farm can result in contamination of food, the organisation shall establish and maintain a pest control system to monitor and control pest access and proliferation on the farm in a manner that does not result in contamination of food with pest remains or anti-pest substances.

Only pest control chemicals that are authorised by the competent authority shall be used. These products shall not come into contact with food and feed products or livestock.

Pest control chemicals shall be used following the manufacturer's instructions and their effectiveness shall be verified by visual inspection of premises.

The parlour should be bird- and vermin-free

Ideally, steps should be taken to prevent the entry of birds and vermin. However, it is necessary to recognise the difficulties that farmers may have in attaining these standards where the parlour is part of an integrated system.

Birds, fowls and poultry

The following should be considered:

- Feed hoppers should be kept clean and covered.
- Removal of nests from overhead structures in the milking parlour.
- Domestic fowl or poultry should not be allowed entry to the parlour area.

Vermin

The focus should be on the elimination of entry points:

- Drains/drainpipes.
- False ceilings.
- Pipelines from the parlour to the milk room.
- Wiring holes.

The following factors should also be addressed:

- Support rails from the parlour to the tank room should be inspected for the presence of small gaps that may permit the entry of vermin into the bulk tank room.
- Be on the lookout for evidence of a problem, e.g. rat droppings.
- Implement an effective vermin control/pest control programme.
- Clean the milking parlour after milking.

Records of bait-changing dates may be used to confirm the implementation of a dairy farmer's vermin control programmes. Farmers may contact a private pest control company for information.

Insect control and prevention

The area surrounding the milking parlour should be kept clean and the grass short, to limit breeding and hiding places for insects and other pests. Effective manure handling should be adhered to. Fans, fly strips, sprays or insect electrocutors will assist in the control of insects. Measures may include the use of:

- Fly sprays – these insecticides should be approved for use in food premises.
- Fly strips – replaced regularly.
- An insect electrocutor.

Regulation R961

6. (6) A holder shall see to it that:

(a) In or at a milking shed:

- (i) A nuisance or a condition that is a health hazard is not caused or does not arise.
- (ii) No poisonous or hazardous substances or gases are stored.
- (iii) No activity is carried out which can pollute, harm, contaminate or spoil the milk.
- (iv) Appropriate storage conditions to avoid feed contamination.

(b) Rodents and flies, cockroaches and other insects on the premises of the milking shed are controlled.

(9) No person shall smoke, use or handle tobacco in any form or eat in a milking shed, except in the change room or dining room of a milking shed.



While security is important on farms, guard dogs will only be allowed in the milking parlour.

All milking equipment shall be clean and disinfected before being used. If mobile milking equipment is used, this may mean cleaning between each use.

2.2.2 Milking equipment

Milking equipment is not limited to milking machines, buckets or cans, but includes all equipment used in the milking parlour, e.g. hoses.

Materials used for milking equipment that come into contact with milk, and with cleaning and disinfecting agents, should be made from adequately resistant and food-grade materials. Manufacturers' recommendations should be followed for construction, installation, performance and maintenance of the equipment used for milking.



SANS 10049

7.3.1.2 All food-handling equipment and utensils that come into contact with the food shall be smooth-surfaced, light-coloured and of a suitable corrosion-resistant, non-absorbent material coated surface suitable for use with food, but should preferably be made of stainless steel.

7.3.1.3 The materials, design and construction of machinery and equipment, including hoses, shall be suitable for food-handling processes and shall prevent the contamination of the food product during operations. The materials, design and construction of machinery and equipment shall also be suitable for their intended use.

7.3.1.4 The equipment and utensils for food handling shall be of hygienic design with no open joints or crevices and shall be constructed to facilitate their cleaning and disinfection. The food-handling organisation and its equipment shall be designed to facilitate the cleaning and disinfection of the areas under such equipment. Open ends and curled edges shall be satisfactorily sealed to prevent the accumulation of organic material and dirt. Where necessary, as in the case of equipment that cannot be cleaned *in situ*, it shall be possible to dismantle the equipment for cleaning and disinfection.

7.3.1.5 The design and materials of food contact surfaces shall be hygienic and, where applicable, shall take the following into consideration:

- a) Surface texture.
- b) Cleaning and inspection.
- c) Disinfection, pasteurisation and sterilisation.
- d) Microbial ingress.
- e) Draining.
- f) Dead spaces.
- g) Joints.
- h) Coatings.
- i) Internal angles.
- j) Corners and grooves.
- k) Seals and gaskets.
- l) O-rings and joint-rings.
- m) Fasteners.
- n) Intrusions.
- o) Sensor, sensor connections and other connections.
- p) Shafts and bearings.
- q) Openings and covers.

7.3.1.6 The design and construction of food contact surfaces and non-food contact surfaces shall be appropriate to the requirements of the food-handling process and shall be cleanable. These surfaces shall prevent ingress of moisture and, where necessary, shall be capable of being disinfected. Permanent metal-to-metal or non-metal joints shall be continuously welded or bonded to prevent ingress of unwanted material.

7.3.1.7 Equipment shall be designed, fabricated and installed to prevent the ingress of unwanted fluids (for example, lubricating and hydraulic fluids, as well as signal transfer liquids) into the food product. Where equipment failure can result in these fluids coming into contact with the food product, these fluids shall be non-toxic and compatible with the food product.

7.3.1.8 All parts of stationary equipment or equipment that is not readily movable shall be installed away from the walls and ceilings at distances sufficient to allow access for cleaning and inspection.

All permanently mounted equipment shall be either installed high enough above the floor to allow access for cleaning and inspection, or shall be completely sealed to the floor.

7.3.1.10 Copper, lead and their alloys (other than solder), and other metals or materials detrimental to health, shall not be used in the construction of equipment that comes into contact with the raw materials or with the unprotected food at any stage of its handling.

7.3.1.12 The use of solder in equipment shall be minimised.

ISO/TS 22002-3

5.4 Equipment suitability and maintenance

The organisation shall design, install and use equipment in such a way to maintain an appropriate degree of hygiene. Equipment shall not itself constitute a source of food contamination.

The organisation shall install and use equipment in accordance with the conditions of use provided by the manufacturer or, if not available, technical standards.

Depending on the operations and where appropriate to minimise the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) Use food contact equipment (e.g. a milk tank) that is:
 - 1) Made of materials that do not increase the likelihood of chemical contamination of foods.
 - 2) Designed to allow appropriate sanitary inspection, cleaning and, if necessary, disinfection.
 - 3) Designed to allow complete drainage and, where necessary, the prevention of post-disinfection contamination from the environment.

Regulation R961

Milk containers and milking machine

7. (1) A milk container shall:

- (a) Be designed and constructed in such a way that it has a smooth finish, free from open seams, cracks and rust stains to ensure that, where necessary, it can be adequately cleaned, disinfected and maintained to avoid the contamination of milk.
- (b) Not be made wholly or partly of copper, or any copper alloy or any toxic material.
- (c) Be constructed in such a way that any surface that comes into contact

with milk is accessible for the purpose of washing and disinfection.

(d) Not be used for any other purpose except the handling of milk.

(2) A milking machine shall:

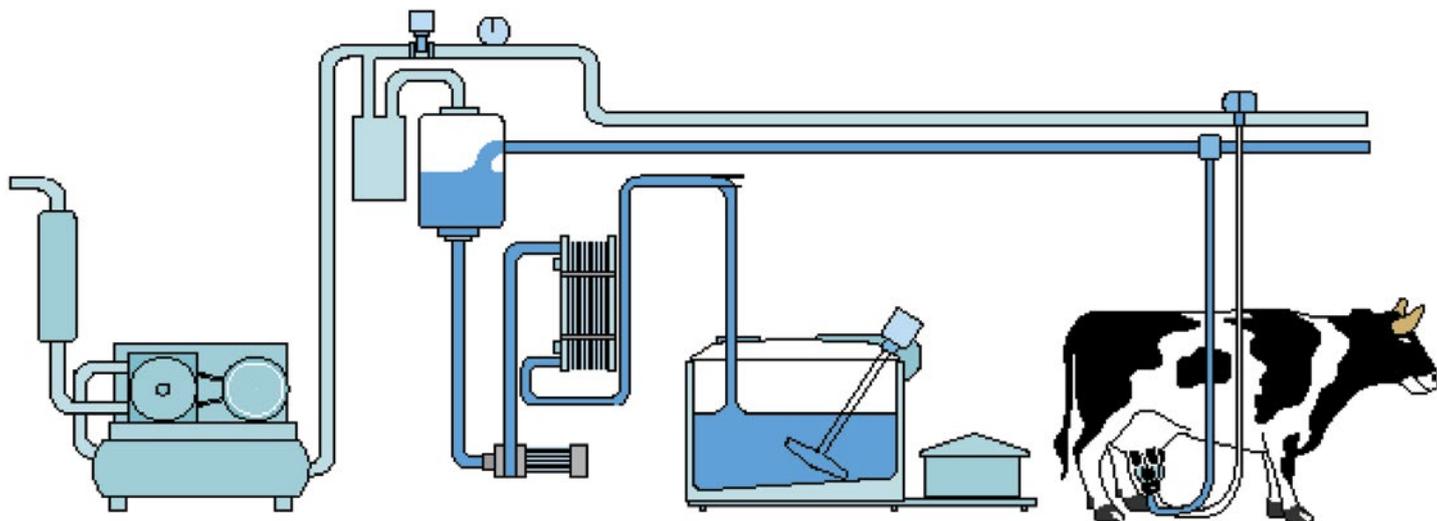
- (a) Be designed, constructed or manufactured in such a way that:
 - (i) The vacuum pipe of the machine can be drained to remove all the moisture.
 - (ii) It can be adequately cleaned, disinfected and maintained to avoid the contamination of milk.
 - (iii) It is equipped with a device rendering visible the milk flow from each milk animal.
 - (iv) It complies with sub-regulation (1) (a), (b), (c) and (d).
- (b) It is durable and movable or capable of being disassembled to allow for maintenance, cleaning, disinfection, monitoring and to facilitate inspection.

2.2.2.1 Maintenance of equipment

Milking equipment should be well-maintained, inspected and regularly serviced. Regular testing and maintenance of milking equipment are essential to maintain good mechanical performance. Inspect and replace perishable components if evidence of wear is found. The teat cup liners need to be in excellent condition, e.g. not perished and without cracks, to avoid the build-up of micro-organisms.

Monitor and check milking equipment on a regular basis and if continuous problems are experienced, e.g. with high bacterial counts, somatic cell counts or herd health, the manufacturer or service provider needs to be contacted to service the milking machine. Damaged or poorly maintained milking equipment may lead to poor milking practices and may negatively impact animal well-being and production.

A pre-planned maintenance schedule should be available to ensure regular maintenance on all equipment and to ensure optimum conditions. Internal as well as external maintenance need to be recorded. One of the major problems for primary producers who perform much of the maintenance themselves is that it is often not performed on time and may eventually be skipped altogether. The milking machine and components shall be serviced at least once a year by a specialist or trained technician who shall examine, at least, the vacuum level, pulse frequency and state of the rubbers. The adjustment of the machine must allow the respect of the norms.



Regulation R961

(2) A milking machine shall:

(a) (ii) Be adequately cleaned, disinfected and maintained to avoid the contamination of milk.

SANS 10049

7.3.2 Maintenance of equipment

7.3.2.1 An effective maintenance programme shall be implemented to ensure the hygienic integrity and proper functioning of buildings (both interior and exterior), equipment, vehicles and services.

7.3.2.2 Equipment that is critical to food safety shall be identified and an appropriate maintenance programme implemented. Records of maintenance shall be kept by the food-handling organisation.

7.3.2.3 Maintenance shall be carried out by suitably trained personnel that are equipped with the correct tools maintained in an appropriate hygienic state. Specialized maintenance for equipment such as boilers and retorts shall be conducted by suitably qualified personnel to ensure compliance with the relevant national legislation (see foreword).

7.3.2.4 Maintenance activities shall not cause any form of contamination to the food-handling materials or to the food.

ISO/TS 22002-3

5.4 Equipment suitability and maintenance

b) Verify, calibrate, maintain or replace equipment regularly, and, in all cases, in accordance with the manufacturer's instructions.

Information supplied by the manufacturer of a milking machine should include:

- Vacuum level at the regulator or vacuum gauge.
- Milking vacuum level (average vacuum in the claw at peak milk flow).
- Pulsator rate and ratio with a check of each pulsator.
- Effective and manual reserve airflow.
- Air injector timing.
- Water flow rate through each milking unit during the wash cycle.
- Recommended cycles for cleaning.
- Recommended chemical concentrations for each cycle.

Proposed maintenance check on a milking machine and equipment

All checks need to be performed according to the manufacturer's instructions.

Frequency	Daily	Weekly	6 - 12 Monthly	Routine actions/replacements
Checks	<ul style="list-style-type: none">• Vacuum regulator operating properly.• Vacuum level at desired level.• Check for air leaks in liners and hoses.• Pulsators operating properly.• Check that air admission hole in each claw is open.	<ul style="list-style-type: none">• Clean vacuum regulator.• Ensure vacuum pump oil level is satisfactory.• Check belt tension and belt condition on vacuum pump.• Check lines, couplings and inlets for leaks.• Clean air filters.• Clean interceptor, check seal and drain plug.	<ul style="list-style-type: none">• All other service checks as specified by the manufacturer.• Service by a technical competent person.	<ul style="list-style-type: none">• Replace milking machine liners.• Replace long milk tubes.• Replace long pulse tubes, rubber elbows and connectors when damaged.• Break down pipelines and connections, e.g. check for milk stone.• Hand-clean problem areas and re-evaluate cleaning procedure.

2.2.2.2 Cleaning and disinfection

The hygienic quality of milk affects the quality and safety of the end-product and the health of the consumer. The primary producer has the responsibility to produce milk under clean and hygienic conditions, employing approved techniques and procedures to clean and disinfect the milking parlour and milking equipment.

Cleaning and disinfection are complementary processes: Neither process alone will achieve the desired end result. Milk with low bacterial and somatic cell counts cannot be produced unless milking equipment is effectively cleaned and disinfected between milkings. Relatively simple and inexpensive cleaning and disinfection procedures can effectively remove and prevent milk contact surfaces as a source of contamination.

The cleaning and disinfection routine of milking machines may differ because of the different manufacturers and suppliers of cleaning

chemicals. It is best to consult with the supplier of cleaning chemicals and the machine manufacturer to compose the best cleaning routine for each specific milking parlour and equipment. It is thus of utmost importance to use a reliable supplier of cleaning chemicals that will offer this very important service.

The supplier of cleaning chemicals should assist in supplying and implementing cleaning and disinfection programmes as well as material safety data sheets for each product in their range.

The following should be available:

- Sufficient hot running water to facilitate cleaning for the size of the milking machine.
- Cleaning chemicals and disinfectants must be registered by the SABS.
- A documented cleaning procedure for the milking machine.
- A documented cleaning procedure for manual cleaning.
- Clearly marked cleaning equipment for the milking parlour.

Good dairy farming practices: Milking parlour

Good dairy farming practice (GFP)	Examples of suggested measures for achieving GFP	Objectives
Ensure that the milking parlour structure promotes hygiene.	<ul style="list-style-type: none"> • Ensure that structures are made from smooth-finished, non-absorbing and resistant-free material. • Ensure that structures are well-maintained and cleaned. • Implement effective pest control. • Ensure that the structures adhere to the requirements of regulation R961. 	Dairy farming practices meet all regulatory and industry requirements.
Ensure milking is carried out under hygienic conditions.	<ul style="list-style-type: none"> • Implement an effective drainage and effluent disposal system. • Ensure a sufficient supply of clean water. • Ensure the milking parlour area is clean and tidy. • Ensure milking equipment is correctly installed and maintained. • Ensure milking equipment is cleaned and disinfected after each milking. • Ensure that all milking equipment is constructed of food grade materials. • Ensure that personnel hygiene is adhered to. • Implement effective security at the milk room. 	<p>Limit the potential negative impact of dairy farming practices in the milking parlour.</p> <p>Dairy farming practices comply with relevant regulations.</p>

2.3. GENERAL REQUIREMENTS FOR THE MILK ROOM

The milk room is also known as the bulk tank room and is the area where the milk is stored and cooled after milking. It should only be used for the cooling and storage of milk, and for cleaning and storing milking utensils. All other activities, including storage of any chemicals or veterinary medicine, associated with the milking operation should be performed in other areas. The location of the milk room must allow easy access to the milking operations and the milk tanker.

Although the design will vary toward the different milking sheds, the requirements in regulation R961 need to be complied with. The milk tank room shall not have a direct connection with any room where gases, smoke, vapours, dust or a soot deposit are present or may originate, e.g. the milking machine pump, emergency generator, diesel fumes, poison rooms and feed mixers.

A systematic approach towards the structure of the milk room, equipment used and practices followed by personnel, need to be implemented to ensure the hygienic and safe production of milk.

A dedicated and accessible hand-washing and drying facility shall be available in the milk room, e.g. basin, antibacterial soap and paper towels.

Structures need to be visibly clean without accumulated dirt, manure or feed. The milk room shall be pest-proofed and clear of products, chemical substances or other items not used daily in the milk room.



2.3.1 Structure

Take all measures necessary to ensure good hygiene practices and to prevent contamination. Structures made from a smoothly finished, non-absorbing and corrosion-resistant material that are free of any open seams and cracks, will assist in effective cleaning and unnecessary dirt accumulation.

Regulation R961

6. (3) In the case of a milking room:

(a) Such milking room shall comply *mutatis mutandis* with the provisions of sub-regulation (2 (e), (i), (f), (g), (h) and (i).

(d) Such milking room shall be erected so that a milk tanker can be connected to a bulk farm tank through a suitable opening and the distance between the two connection points shall not exceed six metres.

(e) Such milking room shall be rodent-proof.

(f) The doors should have smooth, non-absorbent surfaces, and should be easy to clean and, where necessary, disinfected.

(g) Windows should be easy to clean, be constructed to minimise the build-up of dirt and, where necessary, be fitted with removable and cleanable insect-proof screens. Where necessary, windows should be fixed.

(h) Such milking room may be equipped with a farm tank referred to in regulation 7(3) for the storage of milk.

2.3.1.1 Milking parlour and milk room

The milking parlour and milk room shall be physically separated by a closed door. During milking this door shall be kept closed. The following factors shall be addressed:

- The door shall be undamaged and well-fitting.
- Soundness of the door surface.
- Well-maintained wooden surfaces are acceptable.

The door separating the milking parlour and the milk room shall be locked when unattended or at night if the milk room is not otherwise secured from the parlour entrance, e.g. if the parlour itself is not secured from the outside.

2.3.1.2 Scullery

Provision shall be made for the cleaning of containers and unfixed apparatus and equipment which shall prevent possible cross-contamination.

Regulation R961

6.(1) (a) (iv) A scullery for the washing, cleaning, disinfection and sterilisation of milk containers and other unfixed apparatus and equipment should be used in the handling of milk.

(3) In the case of a milking room:

(b) Where the scullery forms an integral part of the milking room as referred to in sub-regulation (1) (b) (ii), there shall be sufficient space to allow for the cleaning and disinfection of all milk containers and the storage of milk.

(c) Such milking room shall be provided with at least one sink, with hot and cold water (or temperature-controlled water), and running water with the run-off connected to a disposal system.

2.3.1.3 Doors, walls and floors

Doors and walls must be complete and undamaged with a washable finish. Acceptable finishes include any sealed surfaces such as:

- Good quality, sealed, cement rendering.
- Non-flaking painted finishes.
- Tiles used shall be well-maintained and sealed, grouting must be sealed properly.

- Undamaged, close-fitting plastic sheeting.
- Painted or galvanised doors.
- The door leading from the milk room to the parlour must be clean on the milk room side.

Milk room (bulk tank room) walls shall be well-maintained, undamaged and shall be covered by a washable, sealed surface.

Attention shall be paid to any lintels around the entrance to the milk room as these are often permeable. Dirt and mould shall not be allowed to accumulate. The hose port or hose pipe opening used during milk collection must be located in an exterior wall and fitted with a tight self-closing door.

Regulation R961

6. (2) (e) The exterior walls:

(i) Shall be at least 2,4 metres high on the inside.

(f) The interior surfaces of the walls, if provided, shall be made of impervious materials with no toxic effect in intended use.

SANS 10049

7.2.3.9 Doors and door frames shall be sheathed with, or made from, a suitable corrosion-resistant material and shall have a smooth seamless, light-coloured, water-impermeable and readily cleanable surface. If wood is used, it shall be sheathed to render it impermeable to water. Doors and their frames shall be of a material and construction which meets the same functional requirements as internal walls.

7.2.3.10 Doors shall be rodent-proof and tight fitting.

7.2.3.11 All doors that open directly from the outside into the food-handling areas shall be provided with effective screens or shall, as far as it is practical, be self-closing and tight-fitting.

7.2.3.12 External doors shall be so constructed to prevent the entry of rainwater into the food-handling areas and shall be kept closed when not in use.

Floors shall be well-maintained and effectively sloped to ensure effective drainage. Standing water will lead to the growth of unwanted microorganisms. Damaged and uneven floors will negatively impact dust and pest prevention as well as adequate cleaning.

Regulation R961

6. (2) (h) The floors shall be constructed to allow adequate drainage and cleaning.

SANS 10049

7.2.5 Floors and drainage

7.2.5.1 Floors shall be constructed of concrete or any other material that is water-impermeable, corrosion-resistant and easy to clean, and shall be laid to an even surface that is smooth but not slippery, and is free from cracks, crevices and open joints.

7.2.5.2 Floors in the food-handling areas shall be suitably sloped and shall drain into external gullies, sumps and sewers.

7.2.5.3 Each outlet shall have, immediately outside the walls of the food-handling area, a trap that prevents the entry of rodents.

7.2.5.7 Floors and drains shall be maintained in a good condition and repair.

7.2.5.7 Floor drains or channels shall be of hygienic design suitable to the operations of the food-handling organisation and shall be discharged appropriately. Floor drains or channels shall be covered appropriately, allowing easy removal for frequent cleaning and maintenance.

7.2.5.10 In food-handling areas, joints between walls, ceilings and floors shall be coved and appropriately sealed.

2.3.1.4 Ceilings, roofs and overhead structures

Ceilings, roof linings, girders and/or beams shall be designed and maintained to minimise the accumulation of dirt and dust and any risk of creating space for vermin.

Attention must be paid to false ceilings. These are a potential source of dust and can provide vermin with an entry point into the storage room. There should be no gaps in ceilings or around pipelines entering the milk room.

Ceilings must be visibly clean (e.g. free from mould, cobwebs and fly excretions). Beams and girders shall be free from rust and dust.

Regulation R961

6. (2) (f) The ceilings, if provided, or overhead structures and fixtures shall be constructed and finished to minimise the build-up of dirt and condensation, and the shedding of particles.

SANS 10049

7.2.2.1 Roofs shall be weatherproof and made of non-absorbent material, and shall be well-maintained to prevent the contamination of the food product and to prevent other structures from becoming damp.

7.2.2.2 Roofs and, where applicable, ceilings, shall fit tightly to the walls and shall be at least 2,4m above the floor. In the food-handling areas, the roof and, where applicable, the ceiling, shall be at least 300mm above any equipment and high enough to allow the free movement of mobile equipment and moving parts of other equipment.

7.2.2.3 The ceiling (or where no ceiling is provided, the roof) shall be dustproof and faced with a suitable corrosion-resistant, light-coloured and impermeable material that is constructed and finished to minimise condensation, mould development, flaking of paint and the lodgement and accumulation of dirt, and shall be capable of being cleaned without damage.

7.2.2.4 Where there is no access to the space above the ceiling, the ceiling shall be totally sealed. Openings in ceilings for conveyors, vents, piping, etc. shall be smooth and sealed.

2.3.1.5 Windows

Windows must be well-fitting, intact and weatherproof. Window frames must be free from cracks, rust, flaking paint or loose putty. Windowsills must be intact and preferably sloped. All windows that are not permanently secured shall have fly screens fitted, which shall be regularly cleaned.

SANS 10049

7.2.3.8 Windows shall ideally be non-opening. Any glass windows in food-handling areas (including those used for the storage of components) shall be protected against breakage.

7.2.3.8 In the event where windows have been previously designed to be opened for ventilation purposes, they shall be appropriately screened to prevent the ingress of pests. The screens shall be easily removable for cleaning and shall be made from a suitable corrosion-resistant material and kept in good repair.

2.3.1.6 Lighting and ventilation

Regulation R961:

“Adequately ventilated and illuminated” means ventilated and illuminated by means of windows with an uninterrupted transparent area equal to at least 10% of the floor area and with an area which can be opened equal to at least 5% of the floor area and placed in such a way that cross-ventilation is facilitated.

Lights shall be in a working condition and shall have protective covers to minimise the risk of contamination if glass breakage occurs. Lights should, as far as possible, not be located directly above the bulk tank. Plastic covers or sleeves are acceptable and no bulbs shall be exposed. Covers shall be regularly cleaned to remove dead flies and cobwebs.

Regulation R961

6. (2) (i) Shall be adequately ventilated and illuminated.

(6) A holder shall see to it that:

(i) A nuisance or a condition that is a health hazard is not caused or does not arise.

SANS 10049

7.2.8.1 The ventilation shall ensure adequate circulation of air, shall remove excess water vapour and shall prevent the build-up of excessive heat, the formation of condensate and the growth of mould. Natural ventilation shall be augmented, where necessary, by mechanical means.

ISO/TS 22002-3

5.3 (d) Design buildings in accordance with the required level of hygiene, by providing adequate ventilation, lighting and cleanability, to minimise the exposure of food-producing animals and their products to contaminants and pests.

2.3.1.7 Pest prevention programme in the milk room

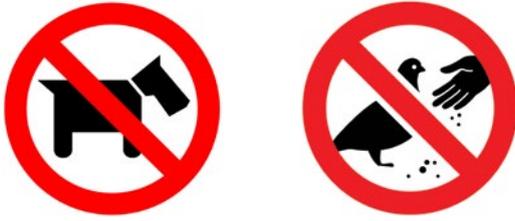
No pests shall be allowed in the milking room. Buildings shall be kept in good repair to prevent access of pests and eliminate possible locations for their reproduction. Holes, openings, drains and other ways that render pests to enter shall be meticulously sealed.

The following measures should be taken:

- Doors leading to the exterior must fit tightly without any openings.
- Windows towards the exterior should be equipped with removable and washable protection fly screens.
- Pipe, drain or wire openings must be protected to avoid entrance of pests.
- The milk room must be kept clean and free from waste.

Inside the buildings all potential refuge for pests, such as holes and crevices in walls and floors, obsolete material and equipment, etc., must be eliminated. Other elements such as electrical panels, routes for pipes and cables between adjacent premises should be sealed.

The presence of food and water attracts pests and permits their reproduction. Nourishing substances and garbage must not be left unprotected, and stagnant water must be avoided. Pesticides or insecticides should not be stored in the milking room.



No cats, dogs or domestic fowl should be allowed in the milk room.

2.3.1.8 Security

The milk room must be kept totally secure at night or when unattended, and shall be totally inaccessible and locked. This includes any doors from the parlour to the milk room that can be accessed from outside.

2.3.2 Milk storage and cooling equipment

All equipment must be properly located in the milk room for easy access to all areas for cleaning, inspection and maintenance. The storage and cooling equipment will only be used for milk and no other purpose. The bulk tank must not be located over a drain. Where possible, no lights should be placed directly over the bulk tank.

SANS 10049

7.3.1.2 All food-handling equipment and utensils that come into contact with the food shall be smooth-surfaced, light-coloured and of a suitable corrosion-resistant, non-absorbent material coated surface suitable for use with food, but should preferably be made of stainless steel. Surfaces with which the food comes into contact shall not be painted.

7.3.1.3 The materials, design and construction of machinery and equipment, including hoses, shall be suitable for food-handling processes and shall prevent the contamination of the food product during operations. The materials, design and construction of machinery and equipment shall also be suitable for their intended use.

7.3.1.4 The equipment and utensils for food handling shall be of hygienic design with no open joints or crevices, and shall be constructed to facilitate their cleaning and disinfection. The food-handling organisation and its equipment shall be designed to facilitate the cleaning and disinfection of the areas under such equipment. Open ends and curled edges shall be satisfactorily sealed to prevent the accumulation of organic material and dirt. Where necessary, as in the case of equipment that cannot be cleaned in situ, it will be possible to dismantle the equipment for cleaning and disinfection.

7.3.1.5 The design and materials of food contact surfaces shall be hygienic and, where applicable, shall take the following into consideration:

- Surface texture.
- Cleaning and inspection.
- Disinfection, pasteurisation and sterilisation.
- Microbial ingress.
- Draining.
- Dead spaces.

- g) Joints.
- h) Coatings.
- i) Internal angles.
- j) Corners and grooves.
- k) Seals and gaskets.
- l) O-rings and joint-rings.
- m) Fasteners.
- n) Intrusions.
- o) Sensor, sensor connections and other connections.
- p) Shafts and bearings.
- q) Openings and covers.

7.3.1.6 The design and construction of food contact surfaces and non-food contact surfaces shall be appropriate to the requirements of the food-handling process and shall be cleanable. These surfaces shall prevent ingress of moisture and, where necessary, shall be capable of being disinfected. Permanent metal-to-metal or non-metal joints shall be continuously welded or bonded to prevent ingress of unwanted material.

7.3.1.7 Equipment shall be designed, fabricated and installed to prevent the ingress of unwanted fluids (for example, lubricating and hydraulic fluids, as well as signal transfer liquids) into the food product. Where equipment failure can result in these fluids coming into contact with the food product, these fluids shall be non-toxic and compatible with the food product.

7.3.1.8 All parts of stationary equipment or equipment that is not readily movable shall be installed away from the walls and ceilings at distances sufficient to allow access for cleaning and inspection. All permanently mounted equipment shall be either installed high enough above the floor to allow access for cleaning and inspection, or shall be completely sealed to the floor.

7.3.1.9 Equipment shall preferably not be sunk into the floor, but if this is unavoidable, the installation of the equipment shall be such as to be acceptable. Sunken areas shall be well-drained.

7.3.1.10 Copper, lead and their alloys (other than solder), and other metals or materials detrimental to health, shall not be used in the construction of equipment that comes into contact with the raw materials or with the unprotected food at any stage of its handling.

7.3.1.11 Where applicable, equipment shall be exhausted to the outside to prevent excessive condensation.

7.3.1.12 The use of solder in equipment shall be minimised.

2.3.2.1 Milk containers

A milk container must be made of a material that is non-toxic and that won't contaminate the milk or taint the milk. Materials that can be used include:

- Stainless steel of an AISI 316/304.
- Aluminium (only for milk cans).

Milk containers should have a smooth finish and be free of open seams, cracks and rust stains. Seams, cracks, rust and rough surfaces act as a breeding ground for bacteria. It also prevents proper cleaning and disinfection of containers.

Regulation R961

7. (1) A milk container shall:

(a) Be designed and constructed in such a way that it has a smooth finish, free from open seams, cracks and rust stains, to ensure that,

where necessary, it can be adequately cleaned, disinfected and maintained to avoid the contamination of milk.

(b) Not be made wholly or partly of copper, or any copper alloy or any toxic material.

(c) Be constructed in such a way that any surface that comes into contact with milk is accessible for the purpose of washing and disinfection.

(d) Not be used for any other purpose except the handling of milk.



The levelness of the tank shall be verified and the manner of mounting of the bulk tank shall be such that the mounting cannot inadvertently be disturbed.

2.3.2.2 Bulk milk tank

The bulk tank should be designed and constructed to ensure the most hygienic conditions of milk handling, storage and cooling. According to SANS 708, stainless steel of an AISI Type 304 shall be

used in the construction of a farm bulk tank. Metals for cooling coils and other components that will come into contact with water should be such to prevent corrosion or rust. Rubber components will comply with the relevant requirements regarding hardness, tensile strength, compression set, resistance to butterfat and steam.

Main covers for open tanks must be fitted with hinges, which shall enable them to be removed or to maintain the cover in a half-open position. The manhole should be covered in such a way that it will adequately overlap and seal the manhole. A closed tank shall be fitted with a ventilator that will ensure effective drainage and sealing of the tank.

The blades of the agitator must be welded to the shaft and the shaft must be fitted with a coupling that facilitates the removal of the agitator. There shall be a movable deflector of acceptable material that will prevent the entry of moisture and contaminants into the bulk tank. The switch of the agitator needs to be clearly visible, e.g. to the tank driver. A contents chart verified against the dipstick graduations in millimetres should be available for each bulk tank.

Each bulk tank must have an acceptable temperature-indicating device and a thermostat. The position of the temperature dial shall be such that the indicated temperature can be easily read by everyone, e.g. the tanker driver. In the case of a digital thermometer, the figures shall be of at least 6mm.

The thermometer of the milk cooling tank must be calibrated on an annual basis. Verification of the thermometer can be done in collaboration with the milk buyer/processor. The use of glass and mercury thermometers is prohibited as this is a serious food safety risk.

Regulation R961

7. (a) Be designed and constructed in such a way that it has a smooth finish, free from open seams, cracks and rust stains to ensure that, where necessary, it can be adequately cleaned, disinfected and maintained to avoid the contamination of milk.
- (b) Not be made wholly or partly of copper, or any copper alloy or any toxic material.
- (c) Be constructed in such a way that any surface that comes into contact with milk is accessible for the purpose of washing and disinfection.
- (d) Not be used for any other purpose except the handling of milk.

7. (3) A bulk farm tank shall:

- (a) Be designed, constructed or manufactured in such a way that it:
- (i) Has a drainage incline leading directly to the outlet point.
 - (ii) Is fitted with an outlet pipe made or manufactured and fitted in a way that all liquid can drain out of such a tank, and the end of such an outlet pipe shall be screw-threaded and fitted with a screw-on cap permitting such end to be shut off.
 - (iii) Is fitted with an automatic operated stirring mechanism capable, within five minutes of being put into operation, of mixing the milk in such a tank.
 - (iv) Is fitted with a thermometer capable of measuring the temperature of the milk in such a tank accurately to the nearest two degrees Celsius.
 - (v) Is equipped to cool the milk in such a tank to five degree Celsius or a lower temperature within three hours, and is capable of keeping such cooled milk at a required temperature of between one and five degrees Celsius effectively.

(vi) Is installed at a minimum distance of 0,5 metres from any roof, ceiling or wall to effectively keep the milk cool.

(vii) Is insulated in such a way that when no cooling takes place, the temperature of the milk in such a tank shall not increase by more than 3 degrees Celsius in twelve hours if the surrounding temperature is 32 degrees Celsius.

(c) Be able to allow for maintenance, cleaning, disinfection, monitoring and to facilitate inspection.

2.3.2.3 Handling and storage of milk

Immediately after milking, the milk must be stored in milk storage equipment which should be properly designed, maintained, cleaned and disinfected. Time and temperature control is important during the storage of the milk. The milk must be cooled down to <5°C within three hours of milking and must be kept at this temperature until milk collection. Care should be taken that the milk does not freeze.

Regulation R961

8. (3) Milk shall not be transferred from one container to another by means of a third container.

(4) Milk shall be protected from direct sunlight.

(5) Milk shall be transferred to the milking room immediately after the stock has been milked.

(6) Except when milk is being pasteurised or undergoing some other heat treatment process, the milk shall be cooled to a temperature of 5 degrees Celsius or lower, but above freezing point and kept at that temperature until it is removed from the milking area.

2.3.2.4 Maintenance

The bulk tank must be included in a maintenance schedule. Internal and external maintenance will be indicated. This will include the annual calibration of the temperature-indicating

devices, and may include the servicing of compressors and performance tests on the cooling system and agitators.

2.3.2.5 Cleaning, disinfection and cleaning equipment

Cleaning and disinfection are complementary processes: Neither process alone will achieve the desired end result. Milk with low bacterial and somatic cell counts cannot be produced unless milking storage equipment is effectively cleaned and disinfected between milk collections. Relatively simple and inexpensive cleaning and disinfection procedures can effectively prevent milk contact surfaces from becoming a source of contamination.

The cleaning and disinfection routine of milking storage equipment may differ because of the different manufacturers and suppliers of cleaning chemicals.

The supplier of cleaning chemicals should be an integrated part of the cleaning routine by supplying cleaning programmes and material safety data sheets for each product in their range.

Keep records of bulk tank temperatures as well as cooling times to prevent ineffective cooling.

The following must be available:

- Sufficient hot running water to facilitate cleaning.
- Cleaning chemicals and disinfectants must be registered by the SABS.
- A documented cleaning procedure for the milk storage equipment.
- Clearly marked cleaning equipment for the milk room.

Cleaning equipment must be placed on special wall brackets in order to increase their durability, and optimise their application and hygiene. The placement of the cleaning equipment should be carefully considered so that:

Good dairy farming practices: Milking room		
Good dairy farming practice (GFP)	Examples of suggested measures for achieving GFP	Objectives
Ensure that the milk room structure promotes hygiene.	<ul style="list-style-type: none"> • Ensure that structures are made from smooth-finished, non-absorbing and resistant-free material. • Ensure that structures are well-maintained and cleaned. • Implement effective pest control. • Ensure that the structures adhere to the requirements of regulation R961. 	Dairy farming practices meet all regulatory and industry requirements.
Effectively handle and store milk.	<ul style="list-style-type: none"> • Ensure that the milk storage area is clean and tidy. • Ensure that the milk is cooled to <5°C within the specified time after milking. • Ensure that milk storage equipment is adequate to hold milk at the specified temperature. • Ensure that milk storage equipment is cleaned and disinfected after each milk collection. • Ensure that general and personnel hygiene is adhered to. 	<p>Limit the potential negative impact of dairy farming practices on the handling and storage of milk.</p> <p>Dairy farming practices comply with relevant regulations.</p>

- It is clearly demarcated for use and available in the area where it is needed.
- The cleaning equipment is adapted to the type of work to be performed and to the persons using it.
- The use of wall brackets will assist in keeping cleaning tools dry and reduce possible bacterial growth. Wall brackets may further prolong the life of cleaning equipment due to less abuse during storage.

This will further assist in:

- Differentiating between cleaning equipment used on floors and inside of milk storage equipment.
- Reducing the risk of cross-contamination.
- Increasing the lifespan of the cleaning equipment and contribute to the reduction in cleaning costs.
- Assisting the personnel in having a responsible attitude towards hygiene measures.

All brooms and hand brushes used for cleaning in the milk room area must be made of material other than wood and should have nylon bristles, which should ideally be coloured to enable the detection of detached bristles, should be kept clean and in good condition and, when not in use, must be hung up with bristles facing downwards, to

aid drying. Cleaning equipment must be marked by colour-coding or other means so that the equipment used for specific purposes can be easily identified, e.g. brushes used for cleaning the floors shall not be used on equipment surfaces (inside or outside of equipment).

When using cleaning cloths and scouring pads, care shall be taken to ensure that they are not a source of contamination, e.g. by being contaminated themselves or by being a source of foreign materials. Cleaning cloths of a woven fabric shall only be used if they are laundered, disinfected or sterilised according to a documented schedule. Alternatively, disposable or paper towels can be used. Cleaning chemicals and disinfectants, other than those used on a daily basis, may not be stored in the milk room.

Regulation R961

7. (5) Milk containers, and other fixed and unfixed apparatus and equipment, shall be washed and disinfected after use so that they are clean, that fats and milk residues are dissolved and removed, and that the bacteriological count on surfaces coming into contact with milk does not exceed ten bacteria per 100 square millimetres of such surfaces after disinfection. The swabbing of the contact surfaces shall be conducted according to the SABS Standard Test Method 763: Efficacy of Cleaning Plant, Equipment and Utensils: Swab Technique.

IF SHE CAN'T STAY PREGNANT, WHAT ELSE WILL SHE DO?



Bovi-Shield
GOLD FP

Keep your cows pregnant and on the job. **BOVI-SHIELD GOLD FP[®] 5** is the only* viral combination vaccine that demonstrates a 12-month duration of immunity against IBR-induced abortion and persistently infected calves caused by BVD Types 1 and 2.

FOR ANIMALS. FOR HEALTH. FOR YOU

For Animal Use Only

Bovi-Shield Gold FP[®] 5, Reg. No.: G3837 (Act 36/1947). The freeze-dried vaccine is a preparation of Modified Live Virus (MLV) strains of IBR, BVD (Types 1 and 2), PI³ and BRSV propagated on an established cell line. An adjuvant sterile diluent is provided to rehydrate the freeze-dried component.

For full prescribing information refer to the package insert approved by the medicines regulatory authority.

Zoetis South Africa (Pty) Ltd, Co. Reg. No.: 2012/001825/07, 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196.

Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847).

www.zoetis.co.za

*Vs competitor viral combination vaccines in South Africa as per IVS Desk Reference

Ref no. RU/PR/07/21/03

zoetis

CHAPTER 3

3.1 GOOD MILKING PRACTICES

Animals whose milk is unfit for human consumption need to be clearly identified and milked separately with the milk disposed of in such a manner as to ensure that the milk does not contaminate the bulk tank milk. Clean milking utensils, clean hands and short nails are essential parts of good milking practices.

ISO / TS 22002-3

7.4 The activity of milking shall be conducted in such a way that it minimises the likelihood of contaminating the milk. The organisation shall identify and implement measures that minimise the likelihood of contaminating the milk when milking.

NOTE: Examples of events that increase the likelihood of contaminating the milk are urination and defecation related to stress and animal discomfort during milking, which can easily cause these body wastes to enter the teat suction cups.

The colostrum and milk that do not appear normal shall be excluded from the food chain.

If the organisation discovers that milk intended for human consumption has been contaminated during milking, it shall take appropriate action to prevent such milk from entering the food chain.

The udders and teats must be clean and dry prior to milking. Disposable cloths should be used to ensure single usage and prevent cross-contamination between animals.

Regulation R961

9 (7) All flanks, udders, bellies and tails of visibly dirty milk animals shall be cleaned before the milking process, and, if necessary, dried with a disposable or clean towel.

ISO / TS 22002-3

7.4 (b) Clean and, where necessary, disinfect all teats before milking, by appropriate means.

Implement effective control over and inspection of the milk of individual cows before milking starts, e.g. strip cup, California Mastitis Test (CMT) or an electronic system. The foremilk needs to be checked for any abnormality, e.g. clots or pus signifying mastitis. It is good practice to discard the first few drops of milk as these contain a large number of micro-organisms. Care needs to be taken that the foremilk shall be collected in a cup or utensil and not be thrown on the floor, where it will lead to contamination.

Regulation R961

8 (1) The first/foremilk from every teat shall be taken as a sample to be tested for visual examination and shall be disposed of after testing in such a manner that it prevents contamination of the area. If such testing reveals any signs of abnormality in the milk, the milk of the animal concerned shall be kept separate and shall not be mixed with other milk or used for human consumption.

ISO / TS 22002-3

7.4 (a) Conduct, prior to milking a cow, an evaluation of the milk by visual examination or physicochemical indicators, after careful observation of the cow behaviour and the aspect of its udder and teats, to allow verification of whether the milk appears normal and is not likely to contaminate food.

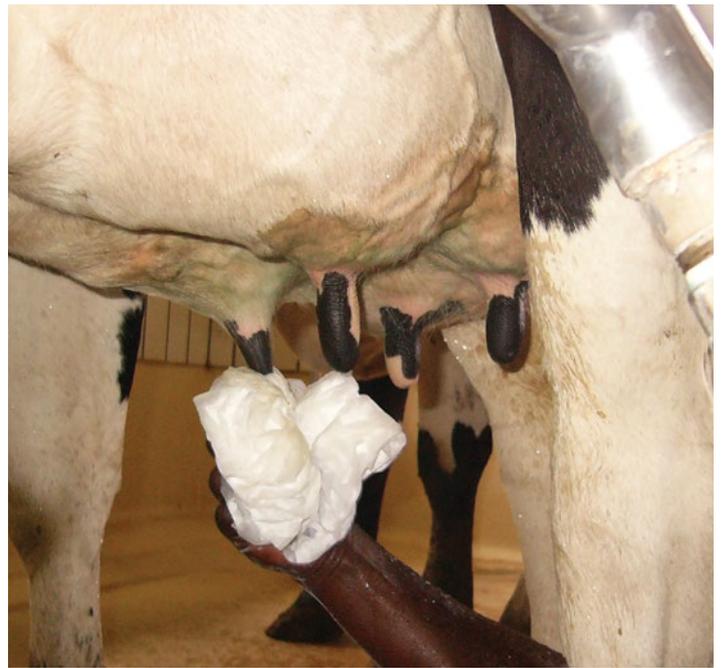
Proper control must be exercised over any lubricants (e.g. teat dip or cream) used during the milking process.

Regulation R961

9 (6) Substances and materials used in the milking process or on dairy stock shall be kept in containers that are free of foreign or toxic matter and dirt, and such containers shall be covered with tight-fitting lids when not in use. Where applicable, such substances and materials shall be approved in terms of the *Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)*.

3.2 MILKING PROCEDURES

Proper milking procedures, a positive attitude and a clean environment are required to minimise mastitis and maximise the production of quality milk from a herd. Management factors can add significantly to the benefit of good milking procedures. The order in which cows are milked can have an impact on controlling the spread of mastitis. By milking first lactation cows first, second and later lactation cows with low somatic cell counts second, cows with high somatic cell counts third and cows with clinical mastitis last, the chance of spreading mastitis organisms from cow to cow is reduced.



Drop hoses are convenient for spraying teats.

Good management dictates that the milker must be constantly alert to conditions that may spread mastitis organisms from cow to cow. Correcting such conditions assists in the production of high-quality milk from healthy udders. Milking must be done by people who are responsible and trained.

3.3 RECOMMENDED MILKING PROCEDURES

Provide a clean, low-stress environment for cows

A consistent operating milking routine is essential. Hormones released into the bloodstream during periods of stress may interfere with normal milk let-down, and frightened or excited cows may not have a normal milk let-down response despite an effective preparation routine. A milking environment that chronically stresses cows may predispose cows to a greater rate of mastitis.

Removing hair from udders reduces the amount of dirt and manure that may adhere to the udder and contaminate milk. Udders with long hair are difficult to clean and dry. A common method of preparation in milking parlours is to use a hose and hands to remove debris from teats. Only the teats shall be washed, as wetting the entire udder makes it difficult to adequately dry the udder before milking machines are attached.

Milking wet and/or dirty teats increases the risk of high bacterial counts in milk and also increases the probability of new intramammary infection. Paper towels need to be used to dry the teats and the base of the udder. Use paper towels only once to prevent the spread of mastitis-causing organisms from cow to cow.

Pre-dipping works best when teats are relatively clean. The entire length of the teat must be immersed in the sanitiser. Pre-dip must remain in contact with the teat for 30 seconds and then be thoroughly wiped off prior to attaching the milking unit.

Personal hygiene

Before milking begins, hands must be thoroughly washed with soap and water and then dried. If hands become soiled during milking, they must be washed and dried again. All cuts or wounds must be treated and adequately covered. Clean, dry and healthy hands minimise the spread of mastitis-causing organisms from cow to cow.



Check the foremilk

Mastitis can be detected by using the hand to physically examine the udder and by using a strip cup to examine foremilk prior to each milking. Correct usage of a strip cup can be a valuable aid in detecting mastitis symptoms, which include clotty, stringy or watery milk. This observation should be made on each quarter of every cow at each milking.

Because organisms may be spread by using dirty strip cups, strip cups must be cleaned and sanitised after each milking. The milk in the strip cup should not be disposed of on the floor of the milking parlour to prevent cross-contamination. Milk must never be stripped into the hand because this routine spreads organisms from cow to cow.

Attach the milking unit

The milking machine must be attached as soon as possible after milk let-down occurs. Attachment must be done carefully to prevent excessive air from entering the milking system. Milk let-down causes maximum udder pressure approximately one minute after the first stimulation and lasts about ten minutes. Most cows are milked out in five to ten minutes. Therefore, attaching machines within two minutes after first stimulation makes maximum use of the let-down effect.



There should be a consistent sequence of udder preparation and attachment of milking units so that units are attached within two minutes after the start of udder stimulation.

Adjust units for proper alignment

Observe units while they are attached to the udder to ensure correct adjustment and to help prevent liner slip. If teat cups are seated excessively high on teats, irritation to the lining of the teat may result. Improperly aligned units may block milk flow and increase the amount of milk remaining in the udder at the end of milking.

Of greatest concern is slipping or squawking teat cups. Only about one-third of slips produce audible squawks. Such occurrences can result in an increase in infected quarters. The majority of new infections resulting from liner slips occur near the end of milking. Towards the end of milking, when a teat cup liner slips and the liner opens, small droplets of milk may be propelled back against

the end of the teat. These droplets may contain mastitis-causing organisms which in some instances may enter the udder.

Since milk flow near the end of milking is minimal, chances of the organisms being flushed out of the quarter are reduced and an infection may result.

Shut off vacuum before removing the unit

The unit must be removed as soon as the last quarter milks out. In parlours equipped with automatic detachers, care should be taken to ensure that they are properly adjusted. A minute or two of over-milking with a properly functioning milking machine is not a major cause of mastitis. However, the risk of liner slip and a possible new infection is the greatest during over-milking. The manner in which teat cups are removed is usually as important as when they are attached.

Vacuums should always be shut off before teat cups are removed. The practice of pulling the unit off under vacuum must be avoided because it may result in liner slip and a new infection in one of the other quarters. The incorrect removal of units constitutes a very significant threat to udder health.

Hand-milking

The correct technique for hand milking is to restrain the animal to be milked using a method that does not cause pain or injury. Ensure that the milker's hands are clean and dry. Prepare the teats for milking, ensuring they are clean and dry. Handle the teats gently, ideally using the 'fist-grip' method, avoiding any discomfort, pain or injury to the animal. Use buckets that are non-corrosive, easy to clean and disinfect, and do not taint the milk. Avoid

contaminating the collected milk with foreign material such as dust, dirt, soil, urine, manure and flies.

The use of teat dip

Teat disinfectant may be applied after milking when necessary. Dip at least the lower one-third of each teat in a commercial teat antiseptic product after every milking. A good teat dip destroys organisms on teats, prevents teat canal colonisation of organisms and eliminates existing teat canal infections. A variety of teat dip products are available.

Maintain teat dip cups in a clean and sanitary manner, and never pour the remaining dip back into the original container. Teat spraying is an alternative to teat dipping. Results may be acceptable if done correctly with a suitable spray device that provides adequate coverage of each teat. A common problem frequently observed with spraying is that only a portion of the teat is sprayed.

3.4 TEAT AND UDDER HEALTH

Teat and udder health directly influences the quality of milk. Anything that compromises the health of the teat end potentially weakens the ability of the sphincter muscles to properly close the streak canal or the ability of the keratin lining to seal off the canal.

Chapped teats during winter, teats that are traumatised by being stepped on or from improper milking machine function, improper or repeated insertion of teat cannulas for intra-mammary infusion of antibiotics or other intra-mammary treatments for draining milk from teats that are damaged, inadequate vacuum level and pulsation rate and ratio or teat dipping all may compromise the health of the teat.

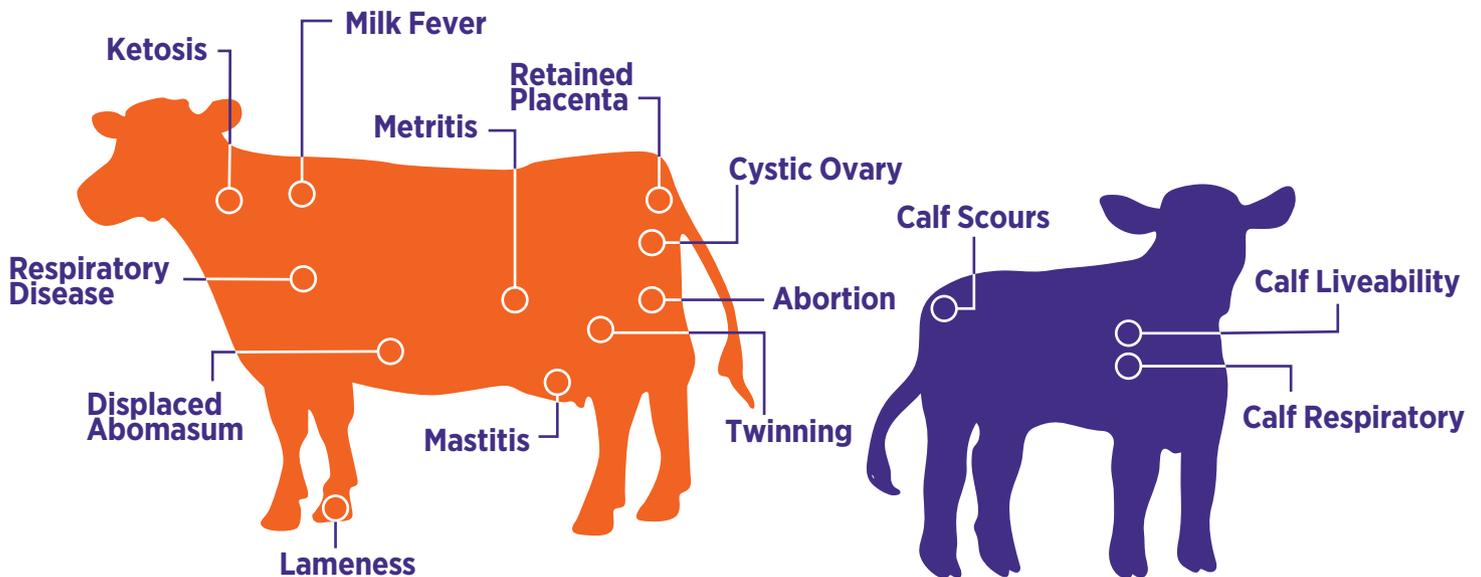
Good dairy farming practices: Milking

Good dairy farming practice (GFP)	Examples of suggested measures for achieving GFP	Objectives
Ensure milking routines do not injure the animals or introduce contaminants into milk.	<ul style="list-style-type: none"> Identify individual animals that require special milking management. Milk animals regularly using consistent milking techniques. Ensure appropriate udder preparation for milking. Ensure proper milking machine attachment and detachment. Ensure adequate and hygienic hand milking. Use only approved dips, sprays and lubricants. Segregate milk harvested from sick or treated animals for appropriate disposal. 	Dairy farming practices ensure good udder preparation and milking practices.
Effectively hygiene practices	<ul style="list-style-type: none"> Ensure that the milking area is clean. Ensure that the personnel adhere to hygiene practices, e.g. clean protective clothing and effective hand-washing techniques. Ensure that the personnel do not have any communicable disease or cuts or wounds on their hands. 	Limit the potential of poor hygiene practices to prevent contamination of the milk.



Life's about balance, shouldn't your heifers be too?

CLARIFIDE® Plus is the only genomic test that provides the ability to reliably select your heifers for production and wellness using the **Dairy Wellness Profit Index (DWP\$®)**



WELLNESS IS NOW A PROFITABLE CHOICE!

Find out more about CLARIFIDE® today
at www.zoetis.co.za



In partnership with World Wide
Sires South Africa

Full product information available from Zoetis South Africa (Pty) Ltd., Co. Reg. No.: 2012/001825/07,
6th Floor, North Wing, 90 Rivonia Road, Sandton, South Africa, 2196.
PostNet Suite 53, Private Bag 9976, Sandton, South Africa, 2146.
Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). www.zoetis.co.za

Ref. No.: RU/BVH/05/20/10

CHAPTER 4

The *OIE Terrestrial Animal Health Code*, the *SPS Agreement* and the *Codex Alimentarius* are the three most essential reference documents to guide decision-making for the formulation and evaluation of sanitary measures for the control of animal diseases.

The Code is not a textbook on animal diseases but identifies and recommends standards and guidelines not only to facilitate trade in milking animals and their products, but also to help countries to protect their dairy industries against the introduction of trade-sensitive diseases of dairy animals.

The following diseases are listed in the Code that concern milk and milk products:

- Foot-and-mouth disease.
- Rinderpest.
- Lumpy skin disease.
- Enzootic bovine leucosis.
- Paratuberculosis (Johne's disease).
- Peste des petits ruminants.
- Sheep and goat pox.
- Caprine arthritis/encephalitis.
- Contagious agalactia.
- Rift Valley fever.
- Anthrax.
- Leptospirosis.
- Tuberculosis.
- Brucellosis.

In all these diseases, milk or milk products are implicated as a means of transmission of pathogens between animals or between animals and humans.

SANS 1694:2018 contains written protocols for a number of issues that relate to the health of dairy animals:

- Annexure A: Euthanasia.
- Annexure B: Body condition score charts.
- Annexure C: Teat scoring.
- Annexure D: Lameness/locomotion scoring index.
- Annexure E: Water intake of dairy cattle.
- Annexure F: Acceptable handling procedures.
- Annexure G: Milking intervals.
- Annexure H: Preventative machine maintenance.
- Annexure I: Space requirements for housing and shelter.

In addition, it has been determined that 62% of the 1 415 human infectious agents known to man, can be transmitted between animals and humans and are therefore called zoonoses. Zoonoses transmitted through milk and dairy products can either originate from the dairy cow directly or from the environment at any stage from production to consumption. Foodborne illnesses can be caused by infectious or toxic agents and usually account for many of all cases of intestinal disease reported.

Zoonoses of particular interest to the dairy industry include, but are not limited to, brucellosis, tuberculosis, leptospirosis, viruses, mycoses as well as bacteria and rickettsia causing mastitis, some of which are able to produce toxins with varying heat stability.

4.1 HERD HEALTH

Disease control is critical to profit, regardless of whether the overall financial outlook is optimistic or at its lowest point. Healthy cattle are profitable cattle. For this reason, each herd should develop a strategic and effective herd health programme. Disease control methods are only effective when incorporated into an overall herd health programme that includes nutritional management, cow management, mastitis management, parasite control, immunisation for infectious diseases, environmental sanitation, reproductive management including improved genetics, individual treatment programmes including foot care and record keeping.

Each of these factors are interdependent. A comprehensive immunisation programme has no use if the cattle have a high parasite burden or are fed a sub-optimal ration. With a compromised immune system, even vaccinated animals may be unable to mount a response to the disease they have been exposed to.

Prevention is far superior to cure or treatment of a disease. Vaccinating against the most economically devastating diseases is added insurance against disease outbreaks in a herd. All immunisation programmes need to be custom designed for the specific herd. Working with your herd veterinarian to establish a complete, personalised vaccination programme, is a good investment.

Up to date detailed records are essential for the management of a dairy farm. These records will give you insight into emerging and sub-clinical diseases. Higher calving intervals, for example, could be an indication of a sub-clinical viral disease, or an elevation in the somatic cell count of the milk could be an indication of underlying mastitis in your herd.

You need to rely on your herd veterinarian in making a definitive diagnosis by conducting a full post mortem on all dead animals, sending appropriate specimens to competent diagnostic laboratories and to interpret results from the laboratories. This will also assist in the development of a strategic and effective immunisation programme.

It is essential to have a herd health management plan in place that specifies the preventive actions necessary to prevent new infection and deal with existing inadequacies in animal health. Such a programme will address national and regional requirements, and the needs of the milk buyer.

Measures must be taken to prevent disease from being introduced into a herd. These measures may include:

- Having a closed herd.
- Acquire animals with known health status, e.g. TB, brucellosis, mastitis.
- Place new animals under quarantine and perform the necessary tests.
- Prevent contact with neighbouring animals and prevent communal grazing.
- Implement a protocol for visitors and vehicles.
- Ensure water and feed quality.
- Implement a protocol for immunisation.

- Minimise the susceptibility of animals to disease by implementing good farming practices, e.g. good milking practices and good hygiene practices.
- Implement a good recordkeeping system as part of the herd or animal health management.

Furthermore, food safety requirements and the requirements of customers with regards to food safety issues, e.g. *E. coli* O157, *Listeria monocytogenes*, *Campylobacter* spp. and *Salmonella* spp. outbreaks, need to be taken into consideration.

Regulation R961

Health status of dairy stock

9. (1) Every milk animal shall be marked with a distinguishing and indelible mark which could identify the animal.

(2) A register shall be kept of each separate milk animal's diseases, each withdrawal from the dairy herd and each return to the dairy herd for milking purposes, and all veterinary examinations and treatment records with the name of the veterinarian, if involved in such examinations or treatments.

(3) Each individual milk animal shall be examined by a veterinarian at a minimum of at least once in every two-year cycle, provided that milk animals shall be further examined as required, and a report shall be obtained from the veterinarian after each examination.

(4) The milk of any milk animal that is or appears to be ill shall not be made available for human consumption until such time as the holder has made sure that the animal is not suffering from a disease mentioned in sub-regulation (5).

(5) The milk of dairy stock that suffer from mastitis, indurations of the udder, a secretion of bloody or rosy milk or milk otherwise abnormal, tuberculosis, salmonellosis, acute fever with the inclusion of anthrax, anaplasmosis, redwater, ephemeral fever and lumpy skin disease, septic metritis, septic multiple mange, serious tick infection or brucellosis, or that have any open or septic wounds which may contaminate milk, milk containers, or apparatus or equipment or people who work with the milk animals, shall not be made available or used for human consumption unless steps have been taken to the satisfaction of the local authority to eliminate such health hazard.

ISO /TS 22002-3

5.6 Working animals

Working animals used for farming activities shall not increase the likelihood of contaminating foods.

The organisation shall identify and implement measures to minimise the likelihood of transferring contaminants from working animals to foods, directly or indirectly through food-producing animals.

Depending on the operations and where appropriate to minimise the likelihood of food contamination, examples of PRPs that shall be implemented are to:

(a) Keep working animals in good health by appropriate check-ups, treatment or vaccination by or upon recommendation of a veterinarian or similarly recognised competent person in animal health.

4.2 DISEASE TREATMENT

Many cattle that become sick with common diseases on dairy farms are treated routinely by the producer or farm personnel rather than a veterinarian. Examples of diseases that are often routinely treated by producers include diarrhoea, milk fever and mastitis. Because any treatment increases the risk of residues in milk, treatments should be given according to pre-determined preferably written protocols. These should be developed by the veterinarian in consultation with the producer. They should be readily available and written so that they are easily understood by the people who will be implementing them.

Animals under treatment will usually produce milk unsuitable for consumption by man or any other animal on the farm. Both infected animals and the milk from infected animals, and those under treatment, may need to be separated to minimise the transmission of infection and danger of contaminating the wholesome milk being produced on the farm.

To ensure full compliance with these obligations, the treatments applied shall be recorded for each animal. These should be written records to allow proper traceability, to ensure safe and suitable milk and to allow all involved in managing the animals to act properly.

Treatment records should include Identification of the animal, date of treatment, medicine used, dosage, withdrawal period, date of end of withdrawal period and person responsible for treatment.

Treatment protocols can be in several formats such as cow cards, electronic and/or diary format. Treatment protocols for diseases or conditions should contain:

- Information on how to recognise affected cattle.
- Information on separate action steps that are related to the severity of the illness.
- Detailed treatment and management recommendations.
- Actions to be taken if the animal's health does not substantially improve or becomes worse.



Immunisation differs from region to region. Your herd veterinarian will be able to provide you with the necessary information.

4.3 IMMUNISATION

The following factors ought to be considered when working with your herd veterinarian in developing an immunisation programme:

- First focus on protecting the calf, then the replacement stock and finally the adult herd (maintain foundation and herd immunity).
- Next consider the compulsory vaccines (i.e. brucella and anthrax in cattle) and then the essential vaccines.
- Maternal antibody interference with the vaccination, the impact of stress, nutrition and infectious organisms, the importance of boosters and adverse reactions should also be taken into consideration.

With regard to the vaccines, ensure that you have the right label claim for your cattle operation, ensure demonstrated safety and efficacy as well as duration of immunity (preferably in peer reviewed publications), ensure that the vaccine protects against genetically diverse strains as well as the foetus when required (i.e. BVD virus) and last but not least, ensure that you are using a vaccine from a reputable company with sales and technical support.

4.4 CHEMICALS AND VETERINARY MEDICINES

Regulation R961

Health status of dairy stock

9 (6) Substances and materials used in the milking process or on dairy stock shall be kept in containers that are free of foreign or toxic matter and dirt, and such containers when not in use shall be covered with tight-fitting lids. Where applicable, such substances and materials shall be approved in terms of the *Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)*.

4.4.1 Antibiotics

Antibiotics are especially valuable in maintaining the high health status of today's highly efficient cattle, pigs, sheep, and goats. But while it has played a critical role in keeping livestock healthy and productive, antibiotics also need to be used with caution.

Like all useful management tools, antibiotics should be used in concert with other good management practices. Correct diagnoses, a clean environment, sound nutrition, and maximum livestock comfort will optimise the benefits of antibiotics. Lack of attention to these factors will set up antibiotics for failure. This is important because antibiotics represent a sizable investment for any stock operations.

Two other key factors – both related to food safety – also play into the need for responsible antibiotic use:

- The risk of creating antibiotic residues in milk and meat from animals that exceed the maximum allowable limits: Violative residues in edible animal products can cause severe allergic reactions in antibiotic-sensitive humans, contribute to the development of resistance, and interfere with product manufacturing.
- Antibiotic resistance of bacterial organisms in human medicine: While no conclusive evidence has proved a direct link between the two, this issue reinforces the need for everyone in the livestock industry to practice and promote judicious use of antibiotics.

When properly used, antibiotics contribute to assure that the world's food supply is of a high quality, nutritious, safe, and affordable. Here is why:

- Antibiotics help keep potentially harmful bacteria, such as *E. coli*, *Campylobacter* and *Salmonella* out of the food chain.
- Antibiotics positively affect the efficiency and productivity of food-producing animals, and the resources necessary to raise them.
- Culling due to infection is greatly reduced. The average annual cull rate in for example commercial dairy operations is about 30%.

Your herd veterinarian is a vital player in ensuring that antibiotics are used safely and most effectively. As a part of the veterinarian's role, he or she should:

- Obtain the most accurate diagnosis possible of the organism(s) being treated before an antibiotic is prescribed or used.
- Participate in the long-term health and performance of the herd.
- Label all prescription drugs according to established guidelines.
- Work within a valid veterinary-client-patient relationship (VCPR).

R1555

Restrictions

2. No person shall use or sell raw milk intended for further processing which:

(a) Contains the following:

- (i) Antibiotics or other antimicrobial substances in amounts that exceed the maximum residue levels stipulated in the *Regulations governing Maximum Limits for Veterinary Medicine and Stock Remedy Residues that may be present in Foodstuffs (Government Notice No. R1809 of 3 July 1992, as amended, hereafter referred to as the Maximum Limits for Veterinary Medicines and Stock Remedy Residues Regulations)*, or which virtue of a presumptive test is suspected to contain antibiotics or other antimicrobial substances in amounts that exceed such maximum residue levels.

4.4.2 Over-the-counter products

Some antibiotics, parasiticides (dip and dosing products) in South Africa do not require a veterinarian's prescription and are available over the counter (OTC or so-called Act 36 of 1947 products). However, the fact that a veterinarian does not have to be involved in their use does not diminish their potency and risk.

Your veterinarian should be aware of any OTC products you are using in your operation, and treatment records should be maintained when they are used. OTC products also come with the same risks for adulterating meat and milk if they are used improperly, and their misuse can lead to product resistance. In short, OTC products carry no less risk or responsibility than prescription medications, and a veterinarian should be involved in their use.

Legal requirements with which you and your veterinarian must comply may sometimes seem like a hindrance to your ability to access drugs and work expediently with him or her. However, following these requirements will help keep antibiotic residue violations from happening and help achieve the best response from your investment in antibiotics and veterinary services.

4.4.3 Extra-label drug use

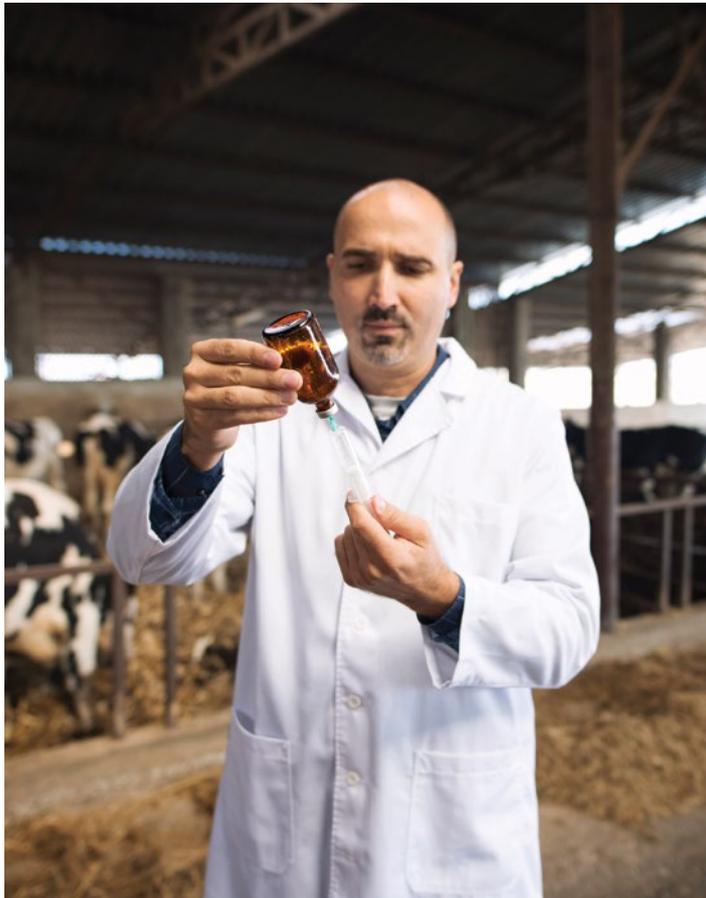
There may be instances when an approved drug is not available to solve a veterinary medical problem. For these circumstances, there is a provision of 'extra-label' drug use, which can be prescribed only by licensed veterinarians.

The extra-label drug use provision allows veterinarians to prescribe drugs for use in a manner not specified on the drug's approved label. This could be a deviation from the labelled:

- Species.
- Disease or condition being treated.
- Dosage level.
- Frequency of dosing.
- Route of administration.

When a veterinarian prescribes drugs extra-label, he or she must comply with additional regulations, including placing a more comprehensive label on the drug, and keeping clinic records on such prescriptions. A significantly extended time period also must be assigned for drug withdrawal prior to marketing meat or milk. Steps must be taken to assure that the assigned time periods are met, and that no illegal residues occur.

It is important to note that before a veterinarian prescribes a drug extra-label, he must determine that there is no marketed drug specifically labelled to treat the condition diagnosed, or that drug therapy at the dosage the labelling recommends has been found to be clinically ineffective. Preference for an extra-label drug over an available labelled drug based solely on cost does not justify extra-label drug use.



4.5 ON-FARM ANTIBIOTIC MANAGEMENT

When an antibiotic is prescribed for your operation, it is up to you to make sure it is stored and administered properly. Store all drugs according to guidelines. All medications must be stored so that they

do not come into contact with milk or milking equipment. A locked storage cabinet is a good way to ensure that antibiotics are not accidentally misused. Storage areas must be specifically labelled for lactating and non-lactating animals.

Regulation R961

Health status of dairy stock

9 (6) Substances and materials used in the milking process or on dairy stock shall be kept in containers that are free of foreign or toxic matter and dirt, and such containers when not in use shall be covered with tight-fitting lids. Where applicable, such substances and materials shall be approved in terms of the *Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947)*.

- Administer all antibiotics according to their prescribed dosage, frequency and route of administration, and follow withdrawal times accordingly. Doing so will prevent accidental adulteration of meat and milk.
- Allow your veterinarian to make the correct diagnosis when animals are sick.
- Clearly identify all treated animals.
- Educate everyone on the farm about antibiotic treatment and identification.
- Keep ongoing records of diagnostic results and treatments, as well as the outcome of the treatments.
- Minimise the number of antibiotics stored on the farm. Do this by taking a regular inventory of your drug storage areas and discard any old or outdated products.
- Follow standard treatment protocols.

4.5.1 Antibiotic resistance (AMR)

It is universally agreed that overuse or misuse of antibiotics speeds up the development of resistance. It is the responsibility of the dairy producer and his/her veterinarian, to ensure that as much antibiotic resistance (AMR) as possible is prevented.

The following guidelines will assist veterinarians and dairy producers in limiting AMR:

- Reduce the number of sick animals by managing the environmental, genetic, nutritional, husbandry and preventive medicine programmes for the herd.
- Know the bacteria you are attempting to treat and determine effective antibacterial choices by using treatment-response records and susceptibility testing.
- When it is necessary to treat sick animals, choose a single, narrow-spectrum antibiotic as first choice.
- Treat infections for as long as necessary to affect a cure.
- Avoid random overuse.
- Use antibiotics only when meaningful therapeutic responses can be obtained.
- Match the drug to the bug.
- Maintain records concerning antibiotic use and review them for ideas to reduce use, modify regimens or switch to narrower-spectrum antibiotics.
- Do not routinely switch antimicrobials on a random basis.

4.5.2 Test the tank, not the cow

The fear of creating a violative drug residue in milk has risen to the top of most dairy producers' list of concerns. Strict regulations have made it virtually impossible for violative Beta-lactam, Tetracycline and Sulphonamide antibiotic residues to reach the

human food chain, but the challenge still lies in preventing residue accidents from occurring on the farm.

Left untreated, bacterial infections will spread to other animals and hurt the productivity of your cattle. This is especially true for mastitis caused by *Streptococcus uberis*. Without antibiotic treatment, this organism, over time, can engulf a herd and cause a serious mastitis outbreak and decreased milk quality.



The testing of individual treated cows is not the best approach because today's commercially available milk screening tests are not tested nor approved for individual-cow samples. In addition, the cows being tested after treatment are almost never the ones that cause residue violations.

4.6 SPECIFIC DISEASES

4.6.1 Tuberculosis (TB)

Tuberculosis is a chronic, contagious disease which that spread from humans to cattle and vice versa. TB can spread through air, manure, saliva, blood, and milk. Children under the age of six years are very susceptible to TB and infection can lead to the death of the child. Therefore, it is of utmost importance to ensure that your herd is TB-free.

It is furthermore a legal requirement in terms of R961 that dairy farmers put measures into place to ensure that dairy animals of which the milk is destined for human consumption, are free from contagious diseases such as TB. A TB-test can only be conducted by a registered veterinarian.

Obtaining a declaration: The first declaration issued by the state veterinarian indicating that all animals tested are free from bovine tuberculosis, is issued after two negative intradermal tests within a three-month interval. This may differ between provinces.

Maintaining the declaration: The declaration is valid for a period of two years from the date of the last test. This declaration is maintained with a single intradermal test performed by a private veterinarian with a two-year interval. The cost of the maintenance test is for the producer's account.

4.6.2 Brucellosis (CA)

Brucellosis is a chronic but not deadly disease. Humans can be infected by the *Brucella* bacterium if they drink contaminated milk, which may cause a disease called rock fever, also known as brucellosis. Symptoms in humans include aching joints, fever, and headaches.



As with TB, all farmers supplying milk for human consumption must have a brucellosis-free herd. Brucellosis can be tested with a blood test, but this blood must be drawn by a registered veterinarian or veterinary paraprofessional.

Obtaining the declaration

The first declaration is issued by the state veterinarian after two negative serological tests with a two- to three-month interval, on condition that all the female cattle over 18 months of age of all the owners on the farm, test negative from the start. If there are any positive reactions at any stage, further serological tests will be done and possible other samples will be collected (milk, lymph nodes, cotyledons) to establish the status of the herd.

A positive or suspected herd must test negative as follows before a declaration can be issued:

- First negative test: Re-test after 60 days.
- Second negative test: Re-test after 60 days.
- Third negative test: Re-test after six months while monthly milk ring tests are performed. If any MRT-positive result is obtained, re-testing must be performed immediately.
- Forth negative test: If heifers from infected cows are slaughtered, the declaration can be issued. If not, a negative test after a year is required before the declaration can be issued while monthly milk-ring tests are performed. If any MRT-positive result is obtained re-testing should be performed immediately.

Maintaining the declaration

The declaration is valid for a period of two years from the date on which the last negative test was performed. Should brucellosis occur in the herd, the producer must adhere to the following:

- Annual serology test performed by a private veterinarian. Declaration issued after a negative serological test result is obtained.

OR

- Monthly bulk milk sample for the brucellosis milk-ring test (MRT). A declaration is issued after twelve negative milk-ring test results, not more than 30 days apart. A declaration will only be issued on MRT results if it has been done according to prescripts and if there is no gap between the previous declaration and the start of negative milk-ring tests.

It is recommended that a monthly bulk tank milk sample for a milk-ring test should be implemented in areas where high incidences of brucellosis occur. If the declaration has been issued previously and has lapsed, one negative serological test shall be done on condition that all the female cattle over 18 months of age of all the owners on the farm, tested negative.

IMPORTANT: It is the responsibility of the milk producer to ensure that a monthly milk-ring test is done or to ensure that his milk buyer does it on his behalf. This is very important for maintaining and re-issuing of the declaration. Milk-ring test results must also be forwarded to the relevant state veterinarian's office on a monthly base.

Issuing of brucellosis and tuberculosis declarations

The provincial state veterinarian will issue the declarations after he received the results from the private veterinarian. It is the responsibility of the private veterinarian who performed the tests, to forward the results to the relevant state veterinarian's office.

It is of utmost importance that milk buyers and processors ensure that milk is obtained from a milk producer that can provide TB and CA declarations. These declarations are requirements in terms of the:

- Notifiable and controlled animal diseases in the *Animal Diseases Act, 1984 (Act 35 of 1984)*.
- Regulations of the *Foodstuffs, Cosmetics and Disinfectants Act 1972 (Act 54 of 1972)*.

What happens when a herd tests positive for CA?

All positive herds are under the control of the government – provincial directorate of veterinary services, state veterinarian of that area. All tests are done at government expense, provided they are done by their staff. If an owner prefers to use a private veterinarian, it will be at the owner's expense. When a milk producer has a positive MRT, an animal health technician of the area will bleed the herd as soon as possible.

All positive herds are under the control of the state veterinarian of that area. The state veterinarian will manage the CA according to protocol, which will include:

- Vaccination protocol.
- Bleeding of the herd on a two-monthly basis for serology tests up to first negative serology test.
- Identification of positive animals according to guidelines and protocol.

Before a positive herd can be declared negative, the following negative tests shall be obtained:

- First negative test: Re-test after 60 days.
- Second negative test: Re-test after 60 days.
- Third negative test: Re-test after six months with monthly MRTs performed to monitor the situation.
- Fourth negative test: A declaration can be issued if heifers from infected cows are culled. If not:
- Fifth negative test after 12 months. A declaration can then be issued.

What happens when a herd tests positive for TB?

As in the case of a positive herd for CA, a positive TB herd is also the responsibility of the state veterinarian of the area to handle it according to protocol. After the herd has been identified as TB-positive, a declaration will be issued if two negative test results are obtained within a three- month interval.

What must the milk buyer do in the case of a TB or CA positive dairy herd?

Milk from a CA-positive herd can still be purchased and processed. It is, however, important that the milk is effectively pasteurised. It is also important that co-operation is given by a dairy producer to the state veterinarian for the effective handling of the herd.

4.6.3 Mastitis

Mastitis is the most costly and common disease on a dairy farm and is a production, quality and food safety issue. Undetected at a subclinical level, it may not be effectively prevented or controlled. Mastitis causes significant losses through reduced milk production and lower milk quality. Profit loss is real and could mean the difference between the success and failure of a dairy operation, e.g. an udder quarter chronically infected with subclinical mastitis and with a somatic cell count (SCC) of 300 000 cells/ml will lead to a 6% average loss of potential milk production.

Mastitis is an inflammation of the milk-producing tissue of the udder. It presents either as subclinical or clinical mastitis. Subclinical mastitis is not noticeable to the naked eye, while clinical mastitis is recognised when flakes or clots are seen in a milk sample and swollen, painful and/or hot-to-touch udders with an abnormal milk secretion, e.g. the milk appears thin, discoloured or watery, are observed. The cow may have a rapid pulse and loss of appetite. Any increase in SCCs, which is a normal constituent of cows' milk at a rate of about 100 000 cells/ml in bulk herd milk, is caused by compromised udder health.



Mastitis is recognised as the costliest disease in dairy cattle and prevalence in dairy cattle approach or exceeds 25% of quarters at any time. Decreased milk production is associated with subclinical or clinical mastitis. This accounts for approximately 70% of the total cost of mastitis. Some 10-26% of total milk loss occurs in quarters with subclinical mastitis.

4.6.4 Contagious mastitis

Pathogenic micro-organisms that most frequently cause mastitis can be divided into two groups based on their source: environmental pathogens and contagious pathogens. The major contagious pathogens are *Streptococcus agalactiae*, *Staphylococcus aureus*, and *Mycoplasma* spp. With the exception of some mycoplasma infections that may originate in other body sites and spread systemically, these three organisms gain entrance into the mammary gland through the teat canal.

Contagious organisms are well adapted to survival and growth in the mammary gland and frequently cause infections lasting weeks, months or years. The infected gland is the main source of these organisms in a dairy herd and transmission of contagious pathogens to uninfected quarters and cows occurs mainly during milking time.

Transmission of pathogens that cause contagious mastitis from infected cows to uninfected herd mates, most generally occurs at milking time. Management factors important in transmitting contagious pathogens include the milking machine, milkers' hands, teat washing materials and treatment procedures. Spread of contagious pathogens can be greatly reduced by good udder hygiene and post milking teat dipping.

Other management factors which may influence susceptibility to mastitis pathogens, including those that cause contagious mastitis are:

- **Injury:** The cause of teat injuries should be quickly identified and eliminated. In cold climates, frostbite and chapped teat skin constitute injury and such injuries have been shown to harbour *Staph. aureus*.
- **Nutrition:** Research indicates that diets deficient in vitamins A, E or the trace minerals selenium and copper can lead to increased incidence of mastitis.
- **Milking system:** The role of machines as a carrier of bacteria to uninfected cows can be minimised by segregating and milking cows with known infection or those with high SCC last. Properly designed and functioning milking equipment will prevent movement of air and milk droplets from one quarter to another and may reduce these infections. Abrupt reduction in milking vacuum can cause movement of air toward the teat end, and droplets of milk may strike the teat end (impacts). If the droplets are contaminated with bacteria, the impact may force bacteria into the teat duct and may increase the rate of new infection. Research has shown that high new infection rates were associated with vacuum fluctuations only when accompanied by liner slip, a condition known to generate teat end impacts.

4.6.4.1 Control procedures

Contagious organisms, for which the primary source is the mammary gland of the cow, are transferred primarily by events associated with milking. Good milking procedures, including cleaning and sanitising teats before milking and post milking teat dipping, help reduce the spread of infection from infected to uninfected cows.

In *Mycoplasma* infected herds, the use of rubber or plastic gloves when milking is recommended. Ideally, gloved hands should be disinfected between cows and dried off with paper towels.

Streptococcus agalactiae can be controlled and eradicated from a herd by identifying and treating infected animals. This can be done by obtaining milk samples for microbiological culture from all cows in the herd, and by treating the *Strep. agalactiae* infected udders with an appropriate intramammary infusion product. Once *Strep. agalactiae* has been eliminated from a herd, careful control measures should be maintained to prevent reinfection, including monitoring bulk tank milk by monthly cultures for at least six months to assure clearance of infections. A closed herd is required to maintain it free from this pathogen.

Staphylococcus aureus commonly produces long-lasting infections that can persist through the lactation and into subsequent lactations. To prevent *Staph. aureus* intramammary infections, milk from infected cows should never come in contact with uninfected cows. Infected cows should be identified and milked last, or milked with a separate unit from those used on uninfected cows.

There is no effective treatment for *Mycoplasma* mastitis, but the disease can be controlled by identifying infected animals by sampling and culturing milk samples from all cows in the herd, followed by segregation and/or culling the infected animals. If *Mycoplasma* spp. infected cows remain in the herd, they should be milked last or with a separate unit from those used on uninfected cows. Improper intramammary treatment of lactating or dry cows for other mastitis pathogens provides a good opportunity for spreading mycoplasma infection from cow to cow, and even from herd to herd. Rigid sanitary precautions must be followed.

In a nutshell:

- Prepare teats properly prior to milking.
- Use adequately sized, properly functioning milking equipment.
- Disinfect teats.
- Assess clinical cases for treatment decisions.
- Use dry cow therapy.
- Consider culling chronically infected cows.
- Maintain a closed herd.
- Establish an active milk quality program with the herd veterinarian.

4.6.5 Environmental mastitis

The primary environmental pathogens are the so-called coliform bacteria and other species of streptococci. The main source of these organisms is the environment of the cow.

Environmental streptococci are *Streptococcus uberis* and *S. dysgalactiae*. The rate of infection is higher in the dry period compared to during lactation. Without dry-cow therapy the rate of infection will increase dramatically in the first two weeks after dry-off and then again two weeks pre-calving. With every subsequent dry period, the rate of infections will increase.

The coliform bacteria causing environmental mastitis are *Escherichia coli* (*E. coli*), *Klebsiella* species and *Enterobacter* species. The rate of infection is four times higher during the dry period compared to during lactation. The rate is higher in the first two weeks after dry-off and then again two weeks prior to calving. During lactation the incidence is also higher early in the lactation period. Coliform udder infections usually don't last very long.

Cows in housing are more at risk for environmental mastitis compared to cows on pastures. Sources of the bacteria will include faeces, bedding, dust, mud, and water. The number of bacteria in the bedding will fluctuate according to the degree of infection, available moisture, and temperature. Low moisture organic material is preferred above fine organic material such as wood shavings, peanut hulls, chopped straw, etc.

Too many animals in an area, poor ventilation, access to ponds and muddy areas, dirty calving camps and a general lack of basic hygiene also contribute to the incidence of environmental mastitis.

In a nutshell:

- The prevention of environmental mastitis can only be successful if the exposure of the teat openings to possible pathogens are kept to a minimum.
- Post milking teat dip is recommended to reduce the incidence of environmental *streptococci*, but will have almost no effect on coliform infections.
- Dry cow treatment with the correct antibiotic at dry-off is recommended, especially if there is a high incidence of coliform mastitis in the first weeks after calving.
- Up to 60% animals treated during lactation are usually due to environmental streptococci. Most of the antibiotics registered to be used in lactating cows, are unfortunately not effective against the coliform organisms.
- Slipping of the teat liners during the milking process or dysfunctional milking machine can lead to more environmental mastitis.
- Wet dirty udders will increase the incidence of environmental mastitis and should be washed if necessary and then dried with a single disposable paper towel. Water used in the parlour should be evaluated on a regular basis and treated if indicated.
- Research has indicated that premilk teat dipping with a registered product will reduce environmental mastitis with more than 50%.
- There are vaccines available which can be used to reduce the incidence of environmental mastitis.
- Vitamin A and E as well as zinc and selenium deficiencies may play a role in the higher incidence of environmental mastitis.
- The environment of the cows must be as dry and clean as possible.

R1555

Restrictions

2. No person shall use or sell raw milk intended for further processing which:

(a) Contains the following:

(i) Pathogenic organisms, extraneous matter or any inflammatory product or other substances which for any reason whatsoever may render the milk unfit for human consumption.

4.7 FEED AND WATER

The safety of food of animal origin begins with safe animal feed. Feed manufacturers, producers and food operators are primarily responsible for food safety. Potential hazards associated with animal feed include mycotoxins (aflatoxins), infectious agents such as *Salmonella*, *E. coli* and transmissible spongiform encephalopathies (TSEs), residues of veterinary drugs, antimicrobials, melamine, environmental and industrial contaminants. The feed chain includes the sourcing, processing, and storage of feed raw materials, all posing some degree of risk towards contamination or quality deterioration.

4.7.1 Potential hazards

Animals should be given feed and water in sufficient quantities, and with products of suitable quality and safety. The nutritional needs of the animals shall be met, while good quality water supplies shall be provided. The water source should be regularly checked and maintained. Regularly inspect and, when necessary, clean and disinfect feeding and watering facilities such as drinkers and troughs. Ensure that effluents are managed in such a way that drinking water sources are not contaminated.

Different equipment must be used for the handling of chemicals and feedstuffs. All pesticides used on pastures and forage crops shall be approved and recorded. Appropriate withdrawal times shall be implemented for grazing. If medicated feed is used, ensure that approved chemicals were used. Ensure that melamine is specified on the certificate of analysis. Obtain a melamine declaration from the feed supplier.

Owners or managers of livestock should ensure that antibiotics are not used in feed for growth promoting purposes in the absence of any public health safety assessment and recommendations and that ruminant protein is not fed to ruminants. Separate feeds are intended for different species.

Ensure traceability of purchased feedstuffs by maintaining records of all feed or feed ingredients received on the farm, e.g. specified bills or delivery notes. All suppliers of animal feeds should have an approved quality assurance programme in place. Manage the feed chain (transport, storage and feeding) in such a way that it protects feed from contamination (biological, chemical and physical hazards) and minimises deterioration. Feeds should be used as soon as possible and, if applicable, in accordance with label instructions.



Keep records of all feeds and dates of acquisition and feeding, and where possible, the animals/groups of animals fed should be clearly recorded. Self-mixed feeds should have their ingredients and mixes recorded, as well as dates of feeding and animals fed as specified above.

Feed storage areas must be constructed to protect as far as practical against entrance and harbouring of domestic animals, wildlife, and vermin. Efforts should be made to protect feedstuffs from soiling and contamination. Evidence of faecal contamination or stale feed at the point of presentation to dairy cattle is not acceptable. An appropriate vermin control programme with suitable records shall be provided for stored feed. Moldy feed must be rejected.

Where appropriate, manage pastures by stocking rate and rotation to maintain healthy and productive livestock and reduce parasite burdens. Keep records of pasture rotation and other on farm animal movements between e.g., pens and sheds.

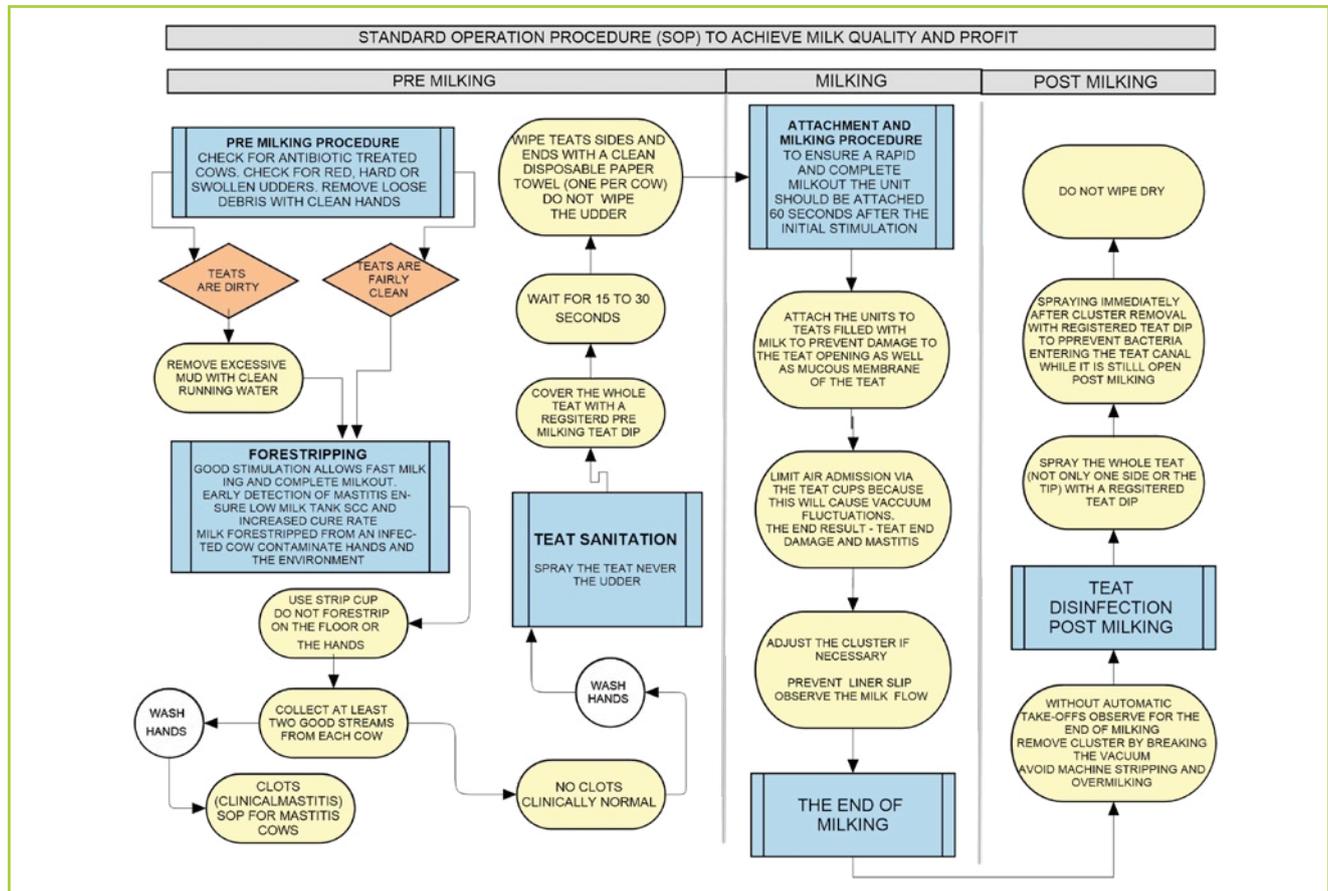
Regulation R961

6. (6) A holder shall see to:

(a) In or at a milking shed:

(iv) Appropriate storage conditions to avoid feed contamination.

Figure 1: Suggested standard operation procedure (SOP) to achieve milk quality.



Good dairy farming practice (GFP)	Animal health: Examples of suggested measures for achieving GFP	Objectives
Prevent entry of diseases onto the farm.	<ul style="list-style-type: none"> Have secure boundaries/fencing. Avoid direct contact of visitors with animals and take safety measures in precaution of spreading of diseases. Have biosecurity measures in place to minimise the risk of spread of diseases within the farm. Utilise disinfectant as a means of undertaking cleaning and disinfecting of boots/clothing, vehicles and facilities. Source animals of known disease status and control their introduction onto the farm. Compile a policy for introducing animals of unknown disease status. 	Dairy farming practices ensure the prevention of introducing disease into a herd.
Implement an effective herd health/disease health management programme.	<ul style="list-style-type: none"> Use a recognised system that allows all animals to be identified individually from birth to death. Develop an effective herd health management programme focused on prevention. Regularly check animals for signs of disease. Attend to sick animals with contagious diseases quickly and in an appropriate way. Isolate sick animals. Keep written records of all treatments and identify treated animals appropriately. Manage animal diseases that can affect public health (zoonoses). 	Dairy farming practices ensure effective animal health through the implementation of a herd health management programme.

<p>Use all chemicals and veterinary medicines as prescribed.</p>	<ul style="list-style-type: none"> • Use chemicals according to directions, calculate dosages carefully and observe withholding periods. • Only use veterinary medicines as prescribed by veterinarians and observe withholding periods. • Store chemicals and medicines securely, respect expiry date, dispose of correctly. 	<p>Dairy farming practices ensure the prevention of residue in milk.</p>
---	--	--

<p>Good dairy farming practice (GFP)</p>	<p>Feed and water: Examples of suggested measures for achieving GFP</p>	<p>Objectives</p>
<p>Feed and water for all animals to be of suitable quality and safety.</p>	<ul style="list-style-type: none"> • Ensure that the nutritional needs of the animals are met. • Ensure that good quality water supplies are provided, regularly checked and maintained. • Use different equipment for handling chemicals and feedstuffs. • Ensure chemicals are used appropriately on pastures and forage crops. • Only use approved chemicals for treatment of animal feeds or components of animal feeds and observe withholding periods for grazing. • Separate feeds intended for different species. • Water provided to animals shall comply with SANS 241. • Water storage vessels shall be inspected regularly and shall prevent possible contamination. 	<p>Dairy farming practices ensure adequate and safe feed and water to all animals.</p>
<p>Control feed storage conditions.</p>	<ul style="list-style-type: none"> • Feed storage areas must be constructed to protect as far as practical against entrance and harbouring of domestic animals and vermin. • Efforts must be made to protect feedstuffs from soiling and contamination, e.g. faecal contamination or stale feed. • An appropriate vermin prevention and control programme shall be provided for stored feed. • Moldy feed should be rejected due to the danger of aflatoxins. 	<p>Dairy farming practices ensure controlled storage conditions for feed to prevent the introduction of contaminants.</p>
<p>Ensure traceability of feedstuffs.</p>	<ul style="list-style-type: none"> • All suppliers of animal feeds should have an approved quality assurance programme in place. • Maintain records of all feed or feed ingredients received on the farm (specified bills or delivery notes). • Address melamine with the feed supplier. 	<p>Dairy farming practices ensure full traceability of animal feed.</p>



DSA Lab Services

Setting the standard for independent dairy testing

**Fully equipped independent laboratory facility
committed to harmonised standards for the
calibration of FTIR laboratory equipment – raw milk
and final product parameters.**

**Standard operating procedures aligned
with the ISO/SANS 17025.**



For more information on our laboratory services,
contact Riana Erlank at 012 665 4250
or dsalab@dairystandard.co.za

Proudly managed by
the Dairy Standard Agency.

CHAPTER 5

5.1 THE CONCEPT OF ANIMAL WELFARE

As farming resources, the value and importance of animals are derived from what they contribute to the economic output of the production process.

Although we use animals for economic purposes and to ensure food security, we have the fundamental, moral and ethical responsibility to ensure their wellbeing (welfare) and health. Therefore, the dairy industry should constantly strive to improve and evolve its farm animal husbandry practices, bearing in mind that good animal welfare is highly correlated with productivity and therefore profitability.

The South African Bureau of Standards (SABS) in 2018 developed a standard for dairy animal welfare, *SANS 1694:2018 (Edition 1)* in conjunction with the dairy industry and other stakeholders. This standard is based on the internationally acknowledged five freedoms of animals, namely:

- Freedom from thirst, hunger and malnutrition.
- Freedom from discomfort.
- Freedom from pain, injury and disease.
- Freedom to express normal behaviour.
- Freedom from fear and distress.

In its introduction, *SANS 1694:2018* states: "The dairy cow carries the double burden of producing large quantities of milk while at the same time trying to maintain body condition, and carry her next calf. This imposes great metabolic demands that can compromise the welfare of the dairy cow. Lameness and mastitis are significant indicators of poor dairy cow welfare, as are reproductive, metabolic and behavioural disorders."

The *SANS 1694:2018* recommendations are concerned with lactating or non-lactating dairy cows, calves and retained heifers, but also notes that the welfare of dairy bulls and bobby calves is an important concern. Where applicable, standards set by *SANS 1694:2018* in this chapter are indicated in **blue**.

Animal rights vs. animal welfare

Animal rights advocate that animals should not be exploited in any manner and that the only interaction between animals and humans should be those that occur by coincidence or those initiated by the animals.

Animal welfare is the application of sensible and sensitive animal husbandry practices to the livestock on a farm. This is strongly linked to animal health, which similarly depends on good animal husbandry.

Good dairy farming practice (GFP)	The five freedoms: Example of suggested measures for achieving GFP	Objectives
Ensure that all animals are free from hunger, thirst and malnutrition.	<ul style="list-style-type: none"> • Provide sufficient feed (forage and/or fodder) and water every day. • Provide sufficient space at the feeder and water to avoid competition among animals. • Protect animals from toxic plants and other harmful substances. • Provide adequate water supplies of good quality that are regularly checked and maintained. 	Dairy farming practices ensure healthy and productive animals.
Ensure that all animals are free from discomfort.	<ul style="list-style-type: none"> • Design and construct buildings to be free of obstructions and hazards. • Provide adequate space allowances and dry bedding. • Protect the animals from adverse weather conditions and the consequences thereof. • Provide housed animals with adequate ventilation. • Ensure that the floors provide adequate traction. • Protect animals from injury and distress during loading and unloading and provide appropriate conditions for transport. 	Dairy farming practices ensure protection of animals against extreme climate conditions and provide a safe environment.
Ensure that all animals are free from pain, injury and disease.	<ul style="list-style-type: none"> • Have an effective herd health management programme in place and inspect animals regularly. • Protect the animals against injury. • Do not use procedures and practices that cause unnecessary pain. • Follow appropriate calving and weaning practices. • Have appropriate procedures for transporting calves and young dairy animals. • Protect against lameness. • Milk lactating animals regularly. • Avoid poor milking practices that may injure dairy animals. • When animals must be euthanised on-farm, avoid unnecessary stress or pain. 	Dairy farming practices ensure humane action, good hygiene conditions, the prevention of pain, injury and disease, the prompt treatment of pain, injury and disease, humane destruction of badly injured or incurably diseased animals.

<p>Ensure animals are free from fear.</p>	<ul style="list-style-type: none"> • Consider animal behaviour when developing farm infrastructure and herd management routines. • Provide competent stock handling and husbandry skills and appropriate training. • Use facilities and equipment that are suitable for animal handling. 	<p>Dairy farming practices ensure that animals are less fearful of people, their handling facilities and their environment, and ensure the safety of animals and people.</p>
<p>Ensure animals can engage in relatively normal patterns of animal behaviour.</p>	<ul style="list-style-type: none"> • Have herd management and husbandry procedures that do not unnecessarily compromise social activity. • Adequate space to move around, eat and sleep. 	<p>Dairy farming ensures freedom of movement and preserves gregarious behaviour and other behaviours, such as preferred sleeping position.</p>

5.2 ANIMAL WELFARE IN PRACTICE

The welfare of an animal is determined by its capacity to avoid suffering and sustain fitness. Fitness describes physical welfare, e.g. freedom from disease, injury and incapacity. This is particularly important when these problems can be directly attributed to the conditions in which the animals are reared, for example lameness attributable to unsatisfactory housing.

In South Africa the *Animal Protection Act, 1962 (Act 71 of 1962)*, lists the offences. The Farm Animal Unit of the NSPCA operates nationally under this *Act* and provides a dual role with proactive and reactive work, with their main aim to uplift the welfare of animals.

In most intensive dairy farming systems, most of the physiological and behavioural needs of the animals are provided by the system, so that the quality of welfare is determined by the quality of the farming practices. This includes the provision of appropriate resources, skilled and trained personnel, and clear records of strategic planning, actions, and consequences.

In essence, animal welfare is the application of sensible and sensitive animal husbandry practices to the livestock on the farm. This requires good stockmanship.

SANS 1694:2018

4.2.4 Knowledge of the normal appearance and behaviour of dairy cattle is essential for monitoring their health and welfare. It is important that those in charge of dairy cattle should be able to recognize early signs of distress, disease and injury, so that prompt action is taken or advice is sought. There shall be sufficient staff to deal with the number of animals. However, it is acknowledged that stockmanship abilities and available unit(s) may determine the number of dairy cattle that can be cared for by an identified individual.

5.3 WELFARE AND MANAGEMENT PROCEDURES

When addressing management on a dairy farm it is important to describe the procedure, train the procedure, document the completion of the training, and monitor it over time.

A written herd health plan as well as training and protocols for handling, transportation and movement, euthanasia of cattle of all ages and health conditions, should form the premise of animal health

and welfare on any dairy farm. A standard treatment protocol for common ailments must be drawn up and documented with the help of a veterinarian.

The following should be in place, implemented, revised annually, and considered best practice.

5.3.1 Veterinarian-Client-Patient relationship (VCPR)

A business relationship with a dairy veterinarian is essential in safeguarding animal care. A written VCPR, signed by the owner and his manager/s and the herd veterinarian is essential.

To correctly diagnose, treat and prevent disease, a VCPR should exist between the farm and a registered veterinarian. The veterinarian will assume the responsibility for making medical health judgments regarding the health of individual animals as well as the health of the herd. The client also needs to agree to follow the veterinarian's instructions.

The veterinarian should be personally acquainted with the keeping and care of animals on a specific farm. Timely visits to individual sick animals as well as herd visits will form the basis of a VCPR. No diagnosis or prescription of medicine should be done by a veterinarian not acquainted with a specific farm.



The veterinarian should also be available for follow-up evaluations and provide an oversight of treatment, compliance, and outcome and at the same time ensure that patient records are maintained. Treatment protocols and antibiotic stewardship principles or programs should be revisited yearly.

SANS 1694:2018

4.3.1 All dairy units should be physically assessed for welfare in accordance with this standard by a veterinarian who is registered in terms of the relevant national legislation at least once a year. The animals and dairy units shall be inspected by the responsible person and competent person from the dairy units at least once a day but preferably twice per day.

5.3.2 Employee training

All employees with animal care responsibilities should be trained (preferably in their understood language) in basic animal handling and stockmanship as part of their induction programme when they start their tenure.

After the initial training, staff should be retrained annually. Employees, especially those taking care of animals, must know and understand the negative consequences of deliberate disregard for animal care policies developed by the farmer.

SANS 1694:2018

4.2.2 Responsible persons shall have the relevant knowledge and training, or appropriate supervision and support to ensure that the health and welfare needs of the dairy cattle in their care are met. Experienced supervisors shall train the personnel either formally, or on the job.

5.3.3 Written protocols

Written protocols should provide sufficient detail to ensure that all employees assigned a specific animal care assignment, can routinely and consistently perform their animal care duties. These protocols should be reviewed annually and updated, as necessary.

These protocols must include the newborn calf, vaccinations, daily observation, diseased and injured animals, lameness prevention, dystocia management, culling and transportation, pain management and the milking routine. On all protocols, where applicable, emergency contact numbers should be available to all employees.

SANS 1694:2018 contains written protocols for the following instances and producers are encouraged to obtain a copy of the standard along with its annexures:

- Annexure A: Euthanasia.
- Annexure B: Body condition score charts.
- Annexure C: Teat scoring.
- Annexure D: Lameness/locomotion scoring index.
- Annexure E: Water intake of dairy cattle.
- Annexure F: Acceptable handling procedures.
- Annexure G: Milking intervals.
- Annexure H: Preventative machine maintenance.
- Annexure I: Space requirements for housing and shelter.

5.3.4 Identification and recordkeeping

Animal identification and recordkeeping form the basis of all on-farm management decisions. Each animal should be permanently identified and permanent, easily accessible drug treatment records must be maintained, denoting how all drugs were used and disposed.

Production and reproduction records help monitor an animal's performance and well-being. Important recorded information should be:

- The average daily gain (ADG) of calves and heifers.
- Milk production and composition.
- Breeding and calving dates.
- Identification of calves as well as ultimate reason for disposing of animals.
- Important animal health information including vaccination dates, parasite control measures, blood and other test results and detailed records of animals treated by the herd veterinarian, by the owner or by one of the employees.

5.3.5 Milking routine

A specific written protocol and routine for milking should be in existence and must be followed to ensure low-stress handling and well-being. Establish a milking procedure that takes into consideration waiting time, a stress-free environment and proper maintenance of milking equipment.

SANS 1694:2018

6.1 Lactating dairy cows shall be milked regularly in accordance with Annexure G, unless otherwise advised by a veterinarian. Post-milking movement shall be carried out humanely to create a stress-free environment for the cow.

Annexure G to **SANS 1694:2018** determines that cows that are milked twice a day, should be milked at intervals of approximately 12 hours, preferably during early morning and early evening. Where milking takes place three times per day, eight-hour intervals should apply. In the case of three milkings per day, two teams of labourers working in shifts are essential.

Annexure H to **SANS 1694:2018** provides a maintenance schedule (preventative machine maintenance) and stipulates actions to be taken after each milking, daily, weekly, monthly, half-yearly and yearly.

5.4 NEWBORN AND MILK-FED DAIRY CALVES

The development of the immune system of the young calf in utero, starts as early as day 40 after conception. Depending on the stage of gestation, a calf's immune system can respond to a challenge by an infectious organism, especially if the dam has been vaccinated. Usually, exposure to an infectious organism in utero will lead to the death and subsequent resorption (less than 40 days pregnant), abortion (between 40 and 260 days pregnant) or premature birth (between 260 days pregnant and term).



Calves are (usually) born without an immunity or resistance to any disease and it is therefore imperative that the calf receives the correct volume (about 10% of bodyweight) of a high-quality colostrum (from a cow immunised correctly) within 4 to 6 hours after birth. Colostrum is manufactured in the last few weeks before calving and, for that reason, a strategically vaccinated cow should receive a diet optimised to support her immune system to enable her to produce the highest quality colostrum.

Identified animal caretakers trained in calf care, nutritional requirements and feeding techniques, including the use of esophageal tube feeders, is one of the best investments on any dairy. Dairy farmers should work with their herd veterinarians to ensure good colostrum management practices, and are encouraged to perform some of the training on calf and calf management offered by the IDT.

Water is the second most important substance a calf should be fed. Clean and fresh water to maintain proper hydration from the first day of life, is non-negotiable. Feeding milk or a milk replacer should not be a substitute for water. Access to fresh, palatable water that is free of any contaminants should be available from day one of the calf's life.

The goal of calf nutrition is to promote healthy, efficient, rapid growth with milk or milk replacer and enhance rumen growth and function by initiating feed intake. The optimal amount of milk/milk replacer will vary based on a number of factors, of which the environment can have a substantial impact on calf growth.

A clean environment will help limit the influence of infectious organisms on calf growth. Steps should be in place to limit the intake of manure and the infectious agents it may carry. This should not be done at the expense of high-quality bedding. Attention should be paid to cleaning and disinfection of all calf feeding equipment.

If fresh milk is not fed, high quality milk replacers should be given. The appropriate weight of milk powder, volume, and temperature of the water to ensure consistency is not negotiable. Clean feeders and sanitary practices will further contribute to the health and welfare of a calf. A high-quality starter concentrate should also be introduced in the first week after birth.

Feeding mastitis milk or milk from cows treated with antibiotics is a no go, and all withdrawal times for medicated feed or after treatment of calves should be adhered to.

SANS 1694:2018

8.3.1 Colostrum and milk for suckling calves shall be from a healthy cow.

8.3.2 Suckling calves living in groups shall be fed milk or milk replacer no less than twice a day.

8.3.3 All calves shall have continuous access to high quality fresh concentrate from 7 days of age onwards.

8.3.4 All calves shall also have continuous access to high quality roughage from birth onwards.

5.5 NUTRITION AND WELFARE

Nutrition management is greatly improved when dairy producers take the time to observe their animals regularly and give attention to animals that are underperforming. All animals need to have access to adequate feed and clean water on a daily basis in accordance with their specific requirements for maintenance, growth, lactation, health and pregnancy. Body condition scoring (BCS) is usually used to monitor energy balance and nutritional condition of the herd.

SANS 1694:2018

5.2 Feeding levels shall be adjusted by monitoring body condition score in accordance with the stage of lactation.

Body condition score (Mulvany scale).

Score	Observation	Description
1	Emaciated	The individual vertebrae of the spine are prominent. The short ribs are sharp to the touch and give a shelf-like appearance to the loin. The hook and pin bones of the pelvis are well-defined. The anal area of the cow is receded displaying a prominent vulva. The cow is considered unfit to travel.
2	Thin	The short ribs can be felt but are less outstanding. The hook and pin bones are still well-defined, though the area around the anus is less sunken and the vulva is prominent.
3	Average	The short ribs are palpable with less pressure. There is no shelf-like appearance to this area. The spine, hook and pin bones are all rounded and smoothed over. The anal area is filled out, and there is no evidence of fat deposits.
4	Heavy	The short ribs are rounded over with no evidence of a shelf-like appearance and may only be felt with firm palpation. The ridge of the backbone is flattened over the loin and rump areas. The hook bones are smoothed over and the area around the pin bones show some fat deposits.
5	Fat	The bone structures of the spine, hook and pin bones, and short ribs are not discernible. There are fat deposits around the tail head and over ribs. The thighs curve out and the brisket and flanks appear to be very full and heavy.

Water intake of dairy cattle (litres per day).

Mass (kg)	Milk (kg)	Ambient temperature		
		4°C (l)	< 16°C (l)	27°C (l)
Heifer/ calf				
90	–	9,0	11,3	14,9
180	–	16,7	20,1	27,5
360	–	28,4	35,6	47,7
540	–	39,1	48,6	65,3
Dry cow*				
630	–	43,1	54,0	72,9
720	–	46,8	57,6	77,9
Lactating cow**				
630	9,0	54,0	55,3	80,6
	27,0	99,0	117,5	138,2

SANS 1694:2018

5.3 All dairy cattle shall have continuous access to adequate supplies of potable water in accordance with Annexure E (here contained in Table 3), except during medical procedures, during herding or on the advice of a veterinarian. Automatic watering systems shall be cleaned regularly and checked daily to see that they are in proper working order.

Dairy calves should have continuous access to water starting on the first day of life, and this should persist while they are being milk-fed.

SANS 1694:2018

5.4 Feed and water shall be free of visible inedible materials, mould, and other contaminants. Feed and water must be fresh and palatable, and delivered in clean, well-maintained containers that offer easy access to all animals. Sudden changes in diet should be avoided.

It is very important to ensure easy access for the animals to feed and water troughs that are clean, accessible, and allows for sufficient feeding space. Troughs must preferably be placed where it is under shelter, as this will encourage consumption and reduce spoiling of the contents. Aggression and competition can be minimised or eradicated by using the correct size troughs and by positioning it correctly. Extra space must be provided in the case of horned animals.

Dairy managers should check that feed and feed ingredients are formulated according to the animals' dietary requirements, carefully mixed and fed based on the recommendation of a qualified nutritionist. Adjustments should be made to rations and water



availability due to environmental or other challenges. The dry-matter intake of all groups should be assessed periodically, and rations adjusted to ensure that the correct protein, energy, fibre, macro- and micro-minerals are fed.

The daily removal of feeds not consumed will ensure freshness of feed, prevent mould and spoilage, and aid in insect control. In TMR systems feed should be pushed up several times. A smooth feeding surface will facilitate cleaning.

Bulk supplies of properly labelled feed should be stored in areas designed to keep it free from moisture, vermin, and bacterial and fungal contamination. Medicated feeds labelled properly should be stored separately and potential toxic compounds should be stored away of the feed storage area, without access by any animals.

5.6 HERD HEALTH PLAN

Every dairy herd should have a written herd health plan emphasizing prevention, rapid and correct diagnosis and quick decision-making on necessary treatment of all sick or injured dairy cattle on the farm. A herd health program should include a strategic and effective vaccination as well as ecto- and endo-parasite treatment programme. These programmes should be re-evaluated on a yearly basis and adjusted based on the disease patterns in the country and the area.

A standardised treatment protocol for all common ailments for all classes of animals (calves, heifers, lactating, non-lactating etc.) should be completed in collaboration with your herd veterinarian, kept on file, and be readily available to all. A list of antibiotics, dosages, route of injection, withdrawal periods etc. should also be on file.

5.6.1 Newborn and milk-fed calves

A written herd health programme should be compiled and developed in consultation with the herd veterinarian and which includes specific protocols for calves, for example the disbudding or dehorning of calves before eight weeks of age, with pain mitigation as prescribed by the herd veterinarian. Other procedures in young calves such as castration or extra teat removal in heifers, should also be documented.

Perhaps not a direct welfare issue, is navel dipping directly after birth. As the umbilical cord is a direct port of entry for pathogens directly after birth, navel dipping should also be addressed in the herd protocols.

5.6.2 Painful medical procedures

Together with the herd veterinarian, the producer should have a protocol in place and animal handlers should be frequently trained to minimise any effects associated with procedures where pain or stress could play a role. Disbudding and dehorning, castration and branding should receive specific attention.

SANS 1694:2018

8.6.1 Disbudding of calves after two months of age is prohibited unless an appropriate analgesia and sedation is applied under the supervision of a veterinarian or competent person. Calves, two months or younger, may be disbudded using hot iron cauterization by a competent person. Chemical cauterization shall not be carried out as it is a painful protracted process. The paste can leak caustic chemicals from the site of application, damaging the skin and eyes of the calves, the udder of mother cows, and even other calves.

8.6.2 Tail amputation is not allowed in all cases.

SANS 1694:2018

4.4.1 Dairy cattle shall be managed so as to minimize the incidence of lameness. This will require that procedures for moving dairy cattle do not place unnecessary pressure on feet and legs, and that lane ways, yards and facilities are designed and constructed with good cow flow and appropriate surfaces in mind.

4.4.3 Hooves shall be inspected frequently and hoof care shall be carried out in a timely manner using professional assistance as appropriate.

Wet environments tend to create soft feet, whereas very dry environments can result in brittle hoofs predisposing feet to cracking. Cows should be allowed access to well-drained, debris-free earth for at least part of the day. This also holds true for cows on pasture – ensure adequate drainage in the areas where the cows are kept.

Flooring that is too rough should be smoothed out and cows should not stand on concrete surfaces for extended periods, such as lengthy waits in holding areas before milking.

5.7.5 Light

If housed cattle do not have sufficient access to natural light with periodical exposure to sunlight, vitamin D supplementation can be considered. Artificial lighting at entrances or exits should be positioned to prevent injury. Never move an animal into a crush with the sunlight directly in its eyes – it will not be able to see and may be injured.

SANS 1694:2018

11.6 Shelters and housing shall allow natural light to enter.

11.7 Dairy cattle shall not be subjected to dim or continuous lighting (or both), or kept in permanent darkness.

11.8 In the daytime, dairy cattle shall always be able to see each other, their food and water sources, as well as their surroundings clearly.

11.9 Artificial light is permitted as long as it does not exceed a maximum day-length of 16 hours.

5.7.6 Noise

Cattle are adapted to various levels and types of noise. Sudden, unexpected noise such as shouting or cracking of whips should be minimised to prevent stress and fear reactions. From a sensory perspective, loud, distracting noise can be one of the greatest stressors to dairy cows and their well-being. Research even indicated that slow music, e.g. classical music, played in the parlour increased cows' milk production by 3%.

5.8 HANDLING AND WELFARE

Dairy cattle should always be handled in a calm, controlled and gentle manner. When handling dairy cattle, it is important to have a thorough knowledge of the behavioural patterns of the animals so as to minimise stress and injury to the animal, but also injury to operators. The more humane they are treated, the tamer they will become and the easier it would be to handle them.

SANS 1694:2018

15.1 Efforts should be made to develop positive relationships between the handlers and animals through gentle handling. Dairy cattle shall be handled in a calm, quiet and effective manner. Shouting, hitting, tail twisting, kicking, unnecessary chasing and beating of livestock shall not be allowed. Abuse or maltreatment of animals are prohibited.

15.2 The use of prodders is prohibited.

5.8.1 Visual perception

Cattle and humans differ in terms of their visual perception. The most obvious difference is that cattle have a circle of vision of

almost 360 degrees – there is only a small area behind the tail which the animal cannot see. Depth perception on the other hand is only possible in a restricted area in front of the animal; this is the reason they are reluctant to cross shadows and areas with sharp contrast lighting. It was always believed that cattle cannot see colour – this is not true. By painting facilities and buildings, we can prevent the appearance of contrasts and possible injuries.

5.8.2 Personal space

Cattle have their own personal space, a critical distance that must be maintained between animal and animal, and animal and human. This distance varies from about one metre in show animals to about 50 metres in free ranging animals. For the efficient movement of cattle, handlers should position themselves at the boundary of the animals' personal space and keep moving towards the animal. If an animal runs, the handler is too close and should stand still until the critical distance is reinstated.

Cattle are herd animals and it is always better to move animals in groups. Groups of 5 to 20 animals can be herded by a single person walking about 45 degrees behind them at the edge of their personal space. Whips and sticks should not be used and shouting should be prohibited. Dogs should not be allowed. Animals should not be separated but must be bunched together when moved. The social order is also important – the dominant cow will usually take the lead. If you know your animals, you will know who she is.

SANS 1694:2018

8.1.1 All groups of animals shall be sorted in accordance with age, size, and behaviour to ensure the welfare of less dominant animals.

8.1.3 The use of prodders or goads is unacceptable.

5.8.3 Learning

Animals can be taught to be tame. Animals allowed to walk unhindered a few times, will in future enter a crush or the dairy portal readily. They also have a particularly good memory: if they are hurt in a crush, for example, they will refuse to enter next time.

5.8.4 Calf handling

Newborn animals are left with the cow for 36 to 48 hours to ingest at least 10% of bodyweight of a high-quality colostrum. Moving calves after this important first 48 hours to their calf pens is usually done in a calm, controlled and gentle manner by lifting or walking them or moving them with a professionally designed mechanical device. Calves can be injured if they are dragged, pulled, or caught by the neck, ears, limbs, tail, or any other extremities.

5.9 TRANSPORTATION AND WELFARE

Compared to some years ago, transportation of animals has become a routine management practice on some dairies. The following elements are involved in transportation:

- Loading and unloading.
- Mixing of animals from different origins.
- Confinement, including space limitations.
- Feed and water removal.
- The motion of the vehicle during transit.

Because of the physical needs of animals at different stages, close attention should be paid to the needs of the specific group of animals. Good management pre, during and post transportation is essential to support the animals to overcome the stress factors associated with transportation.

SANS 1694:2018

8.2.2 Calves shall be at least ten days old before transportation and be fed at least four hours before being loaded and shall not be transported for a period longer than eight hours at a time. (At the time of publication, authorities were negotiating to lower this age to possibly seven days.)

15.4 With respect to the loading and transportation of dairy cattle, the provisions mentioned in SANS 1488 shall apply.

The method of transport varies with age and distance to be transported. Young calves may be transported in calf carts or slings or in covered pick-up trucks, and adults are generally transported by various trailer types and trucks. Within these types of transport, consideration must be given to the type of ramp and incline appropriate for the age of the animal, space allocation, flooring, ventilation and temperature and air quality.

Stocking density is important for minimal movement and preventing falls in adult animals. Younger animals will prefer to lie down and will require a relative bigger space compared to adult, standing animals.

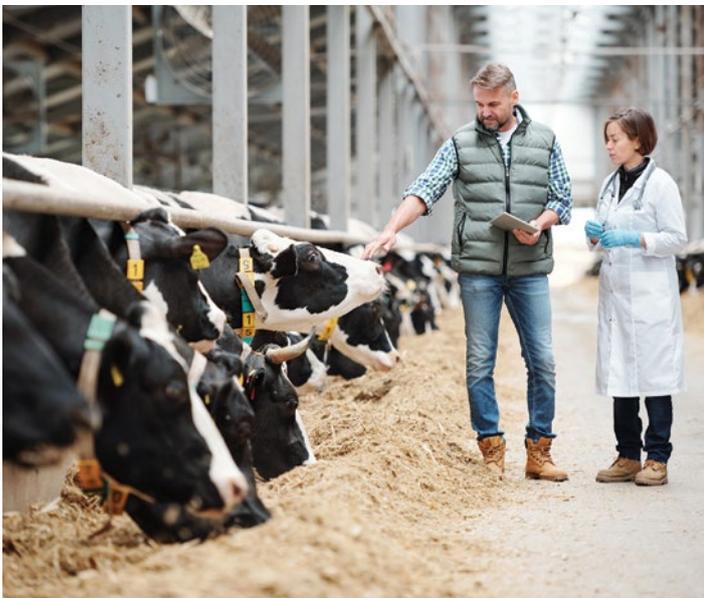
Readers are referred to the website of the Livestock Welfare Coordination Committee for more information on the transport of animals in general and more specific for dairy animals: <http://lwcc.org.za/approved-codes/general/transport/>.

5.10 THE WELFARE OF SICK AND INJURED ANIMALS

Sick or injured animals must always have access to feed and water. Separation of animals from the rest of the herd in a hospital camp is stressful and they should be returned to their group as soon as possible. If it is a lactating cow, she should also be milked on site in the hospital camp. The ration should be adapted depending on the animal's feed intake abilities.

Sick or injured animals should also be protected from inclement weather. Shade, especially in summer, is non-negotiable.

As part of a written herd health protocol developed in consultation with the herd veterinarian, a written protocol for the handling of non-ambulatory animals should also be available. Movement, including



the use of special equipment, should be an important consideration along with the prompt treatment of these animals.

Some of the factors to consider when deciding on euthanasia as a last resort, would be the pain and distress of the animal, the likelihood of recovery, ability to reach food or water, drug withdrawal time, economic considerations, condemnation potential and diagnostic information. If warranted with a poor or guarded prognosis and after consultation with the veterinarian, humane euthanasia should be performed. It is always good to have a veterinarian perform a post-mortem to prevent similar cases in future. The dead animal should be disposed of in a manner that will prevent cross contamination to animals, feed or water.

A facility to segregate sick or injured animals and to ensure maximum comfort should be available on every farm. The hospital area should be protected from heat and cold through shade, fans, water cooling and windbreaks where applicable.

Non-ambulatory animals must be carried or moved with an appropriate sled, sling, or bucket. Downer cows should never be pulled, dragged, or otherwise moved through mechanical force directly applied to the animal.

SANS 1694:2018

4.6 Downer cows

Downer cows are usually observed post-partum with multifactorial causes, for example, metabolic (such as milk fever, hypomagnesemia, ketosis) or a disease such as mastitis or metritis. The initial cause of the downer cow needs to be diagnosed and treated by a veterinarian. If treatment does not resolve the problem within 14 hours, the failure to rise could be attributed to muscle or nerve damage. If prognosis is poor, humane euthanasia shall be considered.

5.11 AUDITING OF ANIMAL WELFARE

In South Africa, the organised dairy industry is exposed to significant risks that vary from public criticism of corporate responsibility to issues such as sustainability relating to animal welfare, biosecurity, biotechnology, environment, food safety and more. Animal welfare, in particular, has been gaining a lot of momentum in the global agenda.

According to the World Organization for Animal Health (OIE) an animal is in a good state of welfare if it is healthy, comfortable, well-nourished, safe, able to express its innate behaviour, and is not suffering from negative states such as pain, fear and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling, transport and, eventually, humane slaughter.

While this definition is accepted internationally, what people interpret to be acceptable animal welfare can be influenced by many factors including personal values, religion, nationality, gender, previous experiences, age, socio-economic status, and education.

Animal welfare is directly related to the health of animals, sustainable livestock management and market assurances.

Why it is important

The health and welfare of an animal are closely linked and as the health status of an animal influences its welfare, the welfare influences its health. Animal welfare refers to an animal's physical and mental state, and how it is coping with its situation.

Animal welfare is fundamentally linked to animal health and production. Both clinical and subclinical disease states will compromise the welfare of animals. In addition, stressful situations will result in physiological and behavioural changes in the animal that are aimed at helping it to deal with the stress.

Public perceptions of farm animal welfare issues have the potential to significantly affect the security/sustainability of the dairy industry. Nationally and internationally, these societal pressures are playing increasing roles in determining how dairy animals are managed and products are marketed, while scientific findings assist development of welfare assessment, practice and improvement.

As responsible role-player in the agro processing sector, the South African organised dairy industry is committed to implementation of best practices to ensure animal welfare based on scientific evidence. As a member of the International Dairy Federation (IDF) and by consulting the *IDF Guide to Good Animal Welfare in Dairy Production 2.0 of April 2019, ISO/TS 34700:2016 – Animal welfare management – General requirements and guidance for organisations in the food supply chain and the latest SANS 1694:2018 – The welfare of dairy cattle*, the Dairy Standard Agency with the assistance of the Milk Producers Organisation (MPO), South African Milk Processors Organisation (Sampro) and other stakeholders developed auditable criteria to measure compliance with relevant animal welfare standards at milk production level.

SANS 1694:2018

4.2.5 An audit by an external independent skilled and knowledgeable auditor should be performed at least annually, and appropriate corrective measures should be implemented according to the identified concerns.

The purpose of this outcome-based driven auditable and assessment criteria is mainly to assist dairy farmers in the process of identifying risk areas, to evaluate these risks, and to implement management practises regarding the improvement of the welfare of dairy cattle.

The development and implementation of documented animal welfare systems and auditing are beneficial in view of the following:

- If applied effectively, it is a key to the proactive identification of animal health and welfare risks as well as the evaluation and control thereof.
- Communication between input suppliers and role-players, including veterinarians and milk buyers improve.
- Communication between management and personnel based on sound documented information improve quality decision making processes.
- Measureable criteria have a direct influence on the improvement of heard health and animal welfare when remedial actions are consistently implemented on non-conformities.
- Compliance with auditable criteria of high standards automatically leads to compliance with legal requirements.
- Sale of livestock and/or certification for export purposes are far more achievable.

enviracor™ J-5



DRY COW VACCINATION

- against *E. coli* mastitis

BENEFITS:

- Aids in preventing **clinical coliform mastitis** caused by *E. coli*.
- Reduces the **duration of *E. coli* mastitis** and provides the cow with an opportunity to receive appropriate treatment.¹



References:

1. Zoetis Technical Bulletin No.: ENV-00020; 2017. ENVIRACOR™ J-5 aids in the control of clinical signs associated with *Escherichia coli* (*E. coli*) mastitis.

FOR ANIMAL USE ONLY

Enviracor™ J-5, Reg. No.: G3544 (Act 36/1947). Each 5 mL dose of Enviracor™ J-5 contains inactivated *Escherichia coli*, J-5 mutant strain, min. 6×10^9 cells.

Full product information available from Zoetis South Africa (Pty) Ltd. Co. Reg.No.: 2012/001825/07, 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. Postnet Suite 53, Private Bag 9976, Sandton, 2146, South Africa. Tel: +27 11 245 3300 or 0860 ZOETIS (0860 963847), www.zoetis.co.za

Ref. No.: RU/BVH/07/21/12

zoetis



CHAPTER 6

6.1 INTRODUCTION

Producers who farm with dairy cattle, are exposed to daily biosecurity risks, particularly the risk of disease which may lead to substantial losses. Managing a dairy cattle herd without a biosecurity programme and bio-containment methods is not a risk worth taking.

Biosecurity: A system of management practices used to prevent the entry of disease-causing agents. It therefore protects the health of the herd and the quality of the product produced for the consumer.

Bio-containment: A system of management practices used to prevent the spread of disease between groups of animals on a cattle farm. A good bio-containment plan can limit the spread of disease already present on the cattle operation and serve to back up the biosecurity plan if a new disease is introduced to a cattle operation.

Biosecurity and bio-containment measures are both necessary to reduce the potential impact of a disease outbreak. Generally, the biosecurity issues that receive the most attention are access control, the process of introducing new animals to the operation and hygiene protocol, which include:

- Knowing the source and health history of new animals.
- Isolating or quarantining new animals from the main herd and test them for appropriate diseases.
- Designing strategic immunisation programmes.
- Sanitation practices including milking procedures, disinfection of equipment, and manure management.

Many other key components of disease control are often overlooked. For example, minimising stress helps animals to resist and overcome disease challenges.

Animal stress can be reduced by providing a comfortable and clean environment, sufficient housing space, adequate bunk space, and by segregating cattle into appropriate age and/or size groups. Providing quality feed and water, maintaining a balanced ration with proper nutrient levels, and providing transition diets to cows around the time of calving/lambing also help decrease nutritional stress and ensures optimal immune function for disease resistance.

Managing and regulating visitors, service personnel, employees, and animal traffic are also essential aspects of biosecurity. Finally, controlling animals' exposure to wildlife, insects, and wind-borne pathogens are other areas to be taken into consideration.

6.2 BIOSECURITY DEFINED

Biosecurity refers to measures that protect against the inadvertent, inappropriate, intentional, and malevolent introduction, spread or use of (potentially) dangerous biological material (including pathogens and their products), or the malevolent use of biotechnology against humans, livestock, or crops. This also includes the protection of infectious biological material (adapted from the World Health Organization, 2006.)

In general, biosecurity refers to management systems designed to protect society and the environment against potentially harmful organisms and biological materials. It can, however, have different meanings, depending on the context in which it is used.

6.2.1 Importance of biosecurity

Biosecurity measures should be implemented on the farm to prevent and minimise the risk of illness spreading on the farm or between farms. Virtually every infectious disease result in productivity losses. Some losses can be substantial, particularly in larger operations where more animals are at risk.

Reproductive efficiency can decline, compounding financial strain by increasing days open and cull rates. As a result, calf numbers are negatively affected and replacement costs will rise. Furthermore, treatment expenses, debilitated animals and increased mortalities certainly have financial implications but can also limit animal marketing options.

Finally, depending on the nature of the pathogen (disease-causing organism), public health issues may arise, such as the spread of zoonoses, antimicrobial resistance, drug residues, and impaired or reduced food safety.

At a national level, biosecurity programmes are crucial in keeping the country free from numerous animal diseases exotic to South Africa. Whether motivation stems from the risk of decreased productivity in individual operations or producer responsibility to exclude or eradicate disease at a national level, the net benefit of biosecurity is improved animal and public health.

6.3 BIOSECURITY AND DAIRY FARMING: THE BASICS

It is important to have a good understanding of how biosecurity can positively impact a dairy cattle operation and help reduce the impact of disease, increase overall herd health, and boost profitability.

6.3.1 The animals

The first component of a biosecurity programme focusses on the animals in the cattle operation. It consists of two key actions: isolating new animals and testing for disease. This would include purchased animals or any animals not in close contact with the home herd.

If you are expanding and purchasing animals from an external source, make sure you know the history of the animals. Ask if they are in eradication or testing programmes first for bovine brucellosis and tuberculosis (TB), then BVD, enzootic bovine leukosis (EBL) in cattle, or Johne's disease.

Obtain verification of their vaccination programme including dates of administration and vaccines used. Avoid purchasing animals from unknown sources (i.e. at the local weekly auction) or animals that have encountered other cattle or small stock prior to arriving at your operation. Beware of buying in resistant parasites and finally, be sure to quarantine new animals.

6.3.1.1 Isolating new animals

The practice of isolation prevents contact between new cattle and the home herd, which is crucial to preventing the spread of disease. It is also important to recognise that diseases can work through and between these groups. When expanding, both the home herd and new arrivals are therefore at risk.

Upon arrival, animals may have been exposed to disease, but not yet showing clinical signs. This is the incubation period and for most diseases, this lasts around seven to ten days. Consider the following important aspects concerning isolating new animals:

- Dairy animals should be isolated for a minimum of three to four weeks with a preferred isolation period of one month to confirm whether diseases are present.
- Isolation areas should be located downwind and downflow from the home herd and should be separated from other cattle by at least 20 to 30 metres.
- No feed bunks or water sources should be shared by the two herds.
- When purchasing dairy cattle, try to buy heifers that are at least a month from calving. This allows for more convenient quarantine facilities.
- In this period, many tests can be done to ensure that you are not bringing any diseases into your herd. Your veterinarian will be able to tell you which tests are essential, and which are optional.

6.3.1.2 Testing for disease

Another key component of a biosecurity programme is testing for new diseases. This is mostly done by taking blood and skin samples from the animal to determine whether it is carrying infectious agents, even if clinical signs are not present. Routine blood tests are a good investment and an indication of the status of an animal's health.

Ideally, testing should be completed before bringing animals onto the property. However, the isolation period can allow time for testing to occur and results to be analysed before the animal is introduced into the herd.

Diseases for which all cattle should be tested.

Essential tests	Optional tests
<ul style="list-style-type: none"> • Tuberculosis. • Brucellosis. • BVD. • Leptospirosis. • Johne's disease. • Neosporosis. • Sexually transmitted diseases, i.e. trichomonosis and vibriosis. 	<ul style="list-style-type: none"> • Infectious bovine rhinotracheitis (IBR). • Salmonellosis. • E. coli. • Rota-/coronaviruses. • Bovine leucosis (EBL). • Cryptosporidiosis. • Mycoplasmosis. • Pasteurellosis.

6.3.2 The people

Biosecurity plans should address the role that employees and farm visitors play in preventing the spread of disease:

- Training employees about biosecurity issues is crucial to maintaining a healthy herd.
- Limit the number of people who enter the facilities to make an area more secure and to decrease the opportunity for new diseases to be introduced to your herd.
- Enforce sanitation practices for individuals such as veterinarians, hoof trimmers and nutritionists, such as 'showering in' before and 'showering out' after completing their work.
- When hosting on-site visitors, offer footwear to individuals who may have visited other farms.
- Implement the use of footbaths and wheel baths at entrances and exits of high-risk areas such as quarantine facilities and calf pens on your farm. Make sure that everyone uses them, and regularly clean and refill it with an appropriate product to ensure effectiveness.
- Ensure that all overalls are washed on a regular basis.
- Restrict access to secure areas on the farm by using appropriate signage and arranging appointments.
- Control vehicle traffic, particularly rendering or delivery trucks. Restrict access to feed or animal areas by rendering trucks.
- Keep all feed ingredients clean and dry, and as free as possible of rodents, which are notorious disease-carrying pests.
- Never use the same equipment to feed animals as you do for other chores.
- Where practicable, use disposable protective clothing such as disposable overshoes for footwear. Ensure that everyone washes their hands regularly.

6.3.3 The programmes

The last component of the biosecurity programme involves a structured vaccination or immunisation programme – a final biosecurity safeguard. Vaccinating against the most economically devastating diseases is added insurance against disease outbreaks.

Consider the following:

- Vaccinating young animals helps build a well-protected herd.
- New additions to the herd should be vaccinated before arrival, with the final dose in a vaccination regimen administered at least seven days prior to transport. If vaccination history (computer or written records) is not available, assume the animals are not vaccinated.
- If vaccinating new arrivals is the best available option, vaccination should be postponed until the animals have been in the pen for 24 hours. This allows them to adapt to their new environment and reduces the impact transport stress may have on their immune systems.

6.3.3.1 Developing an immunisation programme

All immunisation programmes need to be custom designed for the specific herd. The following factors ought to be considered when developing an immunisation programme:

- First focus on protecting the calf/lamb/kid, then the replacement stock and finally, the adult herd (maintain foundation and herd immunity).
- Next consider the compulsory vaccines (i.e., brucella and anthrax in cattle), then the essential vaccines.

- Maternal antibody interference with the vaccination, the impact of stress, nutrition and infectious organisms, the importance of boosters and adverse reactions should also be taken into consideration.



There are many vaccines available to help protect animals against diseases. So, how do you choose?

- Ensure that you have the right label claim for your cattle operation.
- Ensure that you have demonstrated safety and efficacy as well as duration of immunity (preferably in peer reviewed publications).
- Ensure that the vaccine protects against genetically diverse strains as well as the foetus when required (i.e., BVD virus).
- Ensure that you are using a vaccine from a reputable company with sales and technical support.

6.4 ASSESSMENT OF YOUR BIOSECURITY STATUS

Assessing the biosecurity status of your farm is critical to identify the most prominent areas that require attention. Each farm will differ in the range of risks that are present. However, after completing checklists of each quality control point, you will have a better understanding of your

'at risk' areas. These can be discussed with an animal health expert.

Consider the following important aspects when assessing your biosecurity status:

- Evaluate your current management system. Utilise the *#8 Point Biosecurity Audit* to do a baseline on your current biosecurity situation.
- Sit down with your herd veterinarian on a yearly basis and complete it together.
- Identify existing or new risks to your operation.
- Determine how and to what degree a biosecurity programme should be implemented to improve health, prevent other infectious diseases, and increase production on your farm.
- Discuss biosecurity plans with your veterinarian on a regular basis.
- Train employees to be aware of biosecurity issues. To achieve success through management, you must depend on them to implement the programme and enforce it throughout all areas of the operation.
- Then execute the plan.
 - How does it fit into your operation?
 - Are you noticing results?
 - Are there things you can do differently to make the programme more effective?
 - If there are things that do not seem to be working, re-evaluate the situation.
 - Consult your veterinarian for assistance in making this programme fit your needs and your operation.

The following quality control points will help you to identify areas of potential risk on your farm so you can better address them.

6.4.1 #1 – Quality is an important part of my profit

Profit from quality on a cattle operation starts and ends with a commitment by you, the manager. Unless management is committed to improving quality, in this case limiting infectious pathogens on your operation, little will be accomplished – neither by your nutritionist, nor your veterinarian, your buyer, your AI technician, or anyone else.

A commitment to a biosecurity plan is an important first step forward in your march to quality. Keeping pathogens out of your herd improves production, reduces risks to your employees and family, and lowers costs.

6.4.2 #2 – Keeping infectious diseases off my farm

Most producers find that maintaining a closed herd is almost impossible. Use the checklist to guide discussion with your veterinarian on how to keep infectious diseases off your farm.

Best management practices checklist	Yes	No	Comments
I purchase or board animals from or for others.			
My veterinarian talks to the seller's veterinarian prior to me buying animals.			
My animals attend shows, use community grazing, or are placed in performance evaluation centres.			
My animals share fence lines with my neighbour's cattle*.			
I purchase, borrow, or use loaner bulls from other farms.			
I always buy animals from a certified TB, CA Johne's disease negative farm.			
I always know the health status of animals brought into my herd.			
I sometimes bring in animals without knowing their vaccination history.			
I buy animals from a herd that has mixed origin cattle.			
I limit my purchases to open animals.			
I transport animals in my own clean vehicle.			
Introducing new arrivals to my farm	Yes	No	Comments
I quarantine new animals for three to four weeks before allowing them to come into contact with my current animals.			
My quarantined area is designed to prevent: <ul style="list-style-type: none"> Quarantined animals from sharing airspace with my healthy animals. Quarantined animals from touching my cattle. Sharing of feeders, waterers, and so on. 			
Isolation – my facilities	Yes	No	Comments
Allow me to check a quarantined animal's temperature each day.			
Provide a medicated footbath.			
Provide separate handling and other equipment or easy sanitisation after working with quarantined animals.			
Allow me to handle (including milking) quarantined animals last.			
Controlling farm traffic	Yes	No	Comments
I limit people's access to my animals.			
I post the area asking visitors to keep out.			
I provide clean boots and coveralls for visitors.			
I provide a method for bull calves or other animals to leave my farm without allowing dealers or transporters to enter my cattle operation.			
I have dead animals picked up without anyone from off the farm entering my camps.			
I keep a record of visitors to my farm.			
I manage rendering trucks' access to feed or animal areas.			
I manage and plan the flow of movement of farm vehicles and workers according to the level of the vulnerability of animals.			

6.4.3 #3 – My use of strategic vaccinations

The cost of many infectious diseases in cattle animals can be effectively reduced by strategic vaccinations. Vaccines do not always prevent diseases; however, they may modify the severity of diseases.

Best management practices checklist	Yes	No	Comments
I have a written strategic vaccination plan along with a veterinarian for my cattle. If yes: <ul style="list-style-type: none"> I have a list of diseases against which I routinely vaccinate. I have determined which animals benefit from vaccinations. I know when my animals need the protection of vaccinations. 			
I protect against abortion by using a pre-breeding vaccination programme as indicated by a veterinarian.			
I am concerned about clostridial diseases, such as blackleg and botulism on my farm.			
I try to remove carriers of BVD in cattle as their presence can overcome the protection provided by vaccination.			
I use modified live vaccines when appropriate or necessary.			

6.4.4 #4 – Calf/heifer management as a special part of biosecurity

Replacement heifers commonly come from the home herd but may come from other herds. Proper care by calf growers is of vital importance if you are to contain infectious diseases.

Best management practices checklist	Yes	No	Comments
All calves receive colostrum from mothers that have been tested free from infectious diseases.			
I ensure that there is no stagnant water in the replacement heifer pens.			
Replacement heifers have access to their own separate source of water.			
I consult with my veterinarian annually about calf care.			
Calves are permanently identified prior to any grouping.			
I have a strategic deworming practice plan in place.			
I routinely dip the entire navel of newborn animals with strong iodine or other disinfectant.			
Replacement heifers are kept separate from other animals for at least six months (and kept away from manure of adult animals).			

6.4.5 #5 – Biosecurity includes testing

Testing measures your effectiveness at keeping diseased animals out of your herd and identifies the incidence of those diseases with a long incubation interval (i.e., Johne's disease in cattle). Permanent identification and testing are the foundation of strategic culling. Consider the following checklist for various diseases:

6.4.5.1 Brucellosis

Best management practices checklist	Yes	No	Comments
All heifers between the age of three and eight months are vaccinated with the S19 (or alternative) <i>Brucella</i> vaccine.			
Are needles and syringes used exclusively per animal for <i>Brucella</i> vaccinations?			
The whole herd is tested using blood samples for brucellosis (state interval).			
Animals testing positive are branded with a 'C' and culled.			
All new introductions are tested for brucellosis prior to introduction to the herd.			

6.4.5.2 Bovine viral diarrhoea (BVD)

BVD is a viral disease of cattle of any age. Its clinical signs can vary from pneumonia to abortions, stunted calves, stillbirths, weak calves, and full-blown disease with a watery diarrhoea that leads to death. BVD is primarily a reproductive disease.

Best management practices checklist	Yes	No	Comments
I understand persistently infected (PI) animals as they relate to BVD.			
I am willing to live with one or more PI calves in my herd.			
I might keep a PI calf as a replacement heifer.			
I am committed to finding BVD PI animals in my herd (PI immunoperoxidase testing).			
I have discussed killed versus modified live virus (MLV) vaccines for BVD with my veterinarian.			

6.4.5.3 Bovine leucosis

Testing purchased animals during quarantine is very important, especially for viral diseases.

Best management practices checklist	Yes	No	Comments
Do you use a needle for more than one animal?			
Are examination sleeves (gloves) discarded between animals?			
Are cows which provide colostrum for your animals tested for bovine leucosis?			

6.4.5.4 Neosporosis (*Neospora caninum*)

Neospora caninum (*N. caninum*) is a protozoal parasite that is associated with abortion in cattle. Herd testing can provide information on the baseline prevalence of exposure or help in understanding and/or differentiating the cause of abortions in your herd.

Best management practices checklist	Yes	No	Comments
I am aware that abortions may be caused by <i>N. caninum</i> infection.			
I understand how <i>N. caninum</i> infection is transmitted.			
Replacements are tested prior to introduction to the herd.			
Embryo recipients are candidates for testing.			
Infection with <i>N. caninum</i> can influence milk production.			
I keep dogs out of areas frequented by cattle through proper fencing and ensuring that staff who live on the farm that have dogs keep them contained in their yards.			

6.4.5.5 Mastitis

Best management practices checklist	Yes	No	Comments
Are cows with clinical mastitis tested on a regular basis to determine the causative organisms and treated accordingly with the correct antibiotics?			
As a routine, is the bulk tank tested for bacteria such as <i>Staphylococcus aureus</i> and for somatic cell counts weekly after adding new heifers to the milking string?			

6.4.5.6 General hygiene practices

Best management practices checklist	Yes	No	Comments
Do you use a needle for more than one animal during treatments or vaccinations?			
Are examination sleeves (gloves) discarded between animals?			

6.4.6 #6 – Bio-containment

Bio-containment involves control of enteric (intestinal), reproductive, and respiratory pathogens within each segment of the herd.

Best management practices checklist	Yes	No	Comments
My facilities provide a clean area for restraint, treatment, and isolation.			
My facilities prevent cross-contamination of water, manure, feed, or equipment between groups of animals.			
I have a plan to manage group size, age, distribution, and animal flow to reduce the risk of disease outbreaks.			
I do chores with the highest health status animals first (young animals, then older and sick animals last).			
Myself and my family members or employees use strict sanitation practices if we must go back to any group or animal.			
I have all animals that die of unknown causes examined by a veterinarian (necropsy or post-mortem).			
My veterinarian collects blood samples from all animals that abort.			
I have visitors observe our strict sanitation practices, paying special attention to their feet.			
I send all aborted fetuses to a diagnostic laboratory to determine the cause of abortion.			

6.4.7 #7 – Equipment

An important part of biosecurity is the management of equipment used for manure disposal, feeding and other normal day-to-day material movement operations.

Best management practices checklist	Yes	No	Comments
I use equipment dedicated to a specific group.			
I walk or drive through manure while doing routine feeding operations.			
I routinely clean and disinfect feeding equipment (between usage between groups or herds of animals).			
I routinely clean and disinfect other handling equipment.			

6.4.8 #8 – Sanitation

How can you control infectious pathogens? Clean, clean, clean!

Best management practices checklist	Yes	No	Comments
I always avoid allowing my cattle access to ponds or streams, especially if the microbial and chemical status is unknown.			
Are there any opportunities (such as manure) to contaminate instruments, feed supply, and so on?			
If something has accidentally contaminated the feed or water, I treat this as a major problem (provide immediate remedy).			

6.5 DEVELOPMENT OF A BIOSECURITY PLAN

Developing a formal biosecurity plan is an exercise in risk assessment. As such, there are four steps to include in the assessment process.

Step 1: Hazard identification

The preliminary step in designing a biosecurity plan is to assess the specific risks for the operation. Wells (2000) suggested that the operation first identifies its chief source of income. For example, on most dairy farms, milk is the primary product. Diseases cause decreased dairy production and quality, result in early culling, and should be the highest priority.

Step 2: Exposure assessment

Operations must identify which specific diseases are most likely to be hazards on their farms and identify the most probable means by

which animals would be exposed. Many factors should be considered, including the addition of new animals, disease history, proximity to other livestock operations, potential contact with wildlife, prospective visitors, off-farm animal travel, geographic location, rodent, insect and bird populations, and wind and weather patterns.

Step 3: Risk characterisation

Once potential hazards have been assessed, the degree of risk must be characterised for the operation. This qualitative assessment can be done simultaneously with the exposure assessment.

Operations that purchase replacement animals have a higher risk of introducing infectious diseases to the premises than those that do not make off-site animal purchases. In addition, dairy farms that allow the same employees to work with young, sick, and adult animals have

a higher potential risk of transferring disease agents between groups of animals, than operations that assign employees to one specific group of animals.

The risk of transmitting *Mycobacterium avium* subspecies paratuberculosis (the causative agent of Johne's disease) is higher in operations that are not certified free from Johne's disease.

Another component of characterising an operation's greatest risks is evaluating the potential means of disease control and how the mitigation plan will be implemented on the operation.

Vaccine availability and efficacy for certain diseases also must be considered. Vaccination is relatively effective for diseases such as infectious bovine rhinotracheitis, but vaccines are not generally available for other diseases, such as Johne's disease.

Step 4: Mitigation plan

All information obtained from Steps 1 through 3 should be assimilated into a final plan for mitigation. The mitigation plan should include the diseases of utmost importance, where control efforts are to be directed, a detailed plan to assess the current levels of disease on the operation (serologic or faecal testing, for example), and written strategies detailing what will be done to prevent the introduction or spread of these.

6.5.1 Preparing for an on-farm biosecurity plan

When devising a plan for your farm, the biosecurity essentials are a good place to start. The essentials of a biosecurity plan include the following:

- Farm inputs.
- Farm outputs.

6.5.2.1 Farm inputs

Almost anything moved onto your property can be a potential source of pests and diseases for livestock and plants. Monitor animals or plant materials that enter the property, as well as sources of water, feed, and fertiliser.

- People, vehicles, and equipment.
- Production practices.
- Ferals, pests and weeds.
- Training, planning, and recording.

When developing a biosecurity plan, management activities that can be considered include the following:

- Think about what you can do to minimise the risk of introducing diseases, pest and weed seeds at each of the checkpoints. If you build your plan around daily monthly, or yearly farm routines, then biosecurity should become a habit.
- The actual management practices you choose to use will vary from site to site, depending on the size of your property or properties, the physical facilities available, and the day-to-day management of operations.
- With each action, set out the steps needed to achieve the task – this is especially helpful if a group is working on the plan. A responsible person will need to be appointed to oversee the implementation of the actions.
- Good practices need not be expensive, but they do need to be easy to follow.
- They may also take a bit of time, but they are beneficial in the long run.
- After you have ranked your priorities, think about which ones you can achieve in the short and long term. Go back to the plan periodically and check progress towards your goals.

6.5.2 Essentials of a biosecurity plan

The following section provides a checklist for each essential part of a biosecurity plan.

Inputs	Potential risk	Actions to reduce the risk	Action(s) to take	√ / x
New plants or animals	Introducing new plants and animals onto your property can allow unwanted diseases, pests, and weeds to enter. Isolating new plants or animals for a quarantine period limits the risk of exposing your entire stock to new pests and diseases and spreading weeds into production areas.	When possible, isolate new plants or animals away from production areas for 21 days before mixing them with your existing stock. This provides animals a chance to shed weed seeds they may have ingested with feed and allows time to show signs of disease that were not obvious when purchased. Regularly check newly planted areas and stockholding areas for the presence of pests (internal and external parasites) and weeds and treat before they become established.		
Animal feed	Animal feed can harbour diseases, pests, and weed seeds.	Always request a commodity vendor declaration and ensure any feed you purchase is fit for purpose.		

Banned animal feed	Feeding restricted animal materials (RAM), i.e., bloodmeal to ruminants, is illegal in South Africa as it is linked to the spread of certain diseases.	Always read the label of any stockfeed you purchase and store feed containing RAM separate from feed for ruminants. Always read the label of any purchased stockfeed to ensure compliance with these laws.		
Water resources	Many pests and disease-causing organisms can survive for a long time in water sources until they find a suitable host.	Ensure water sources are secure from contamination by wild animals and pests. Prevent algal blooms by aerating or treating water that is stored in dams and is high in nutrients.		
Fertiliser	Organic fertilisers such as manure and compost can be a source of weeds if not composted thoroughly.	Ensure that animal manure and green waste are aged and thoroughly composted to destroy weed seeds and disease-causing organisms present in the material. Maintain a record of the source of organic fertilisers, the application dates, and where applied.		

6.5.2.2 Farm outputs

Responsibility for biosecurity doesn't end when plant products or animals leave the farmgate. The measures in place on your property support biosecurity in your region.

Outputs	Potential risk	Actions to reduce the risk	Action(s) to take	√ / x
Moving plants and animals off the property	Crops and livestock can spread diseases, pests, and weeds from your property and put the status of productivity of the entire region or industry at risk.	Ensure plant products and animals are fit to travel, your records are up to date, and that the transport vehicle is clean. Provide copies of supporting paperwork such as National Vendor Declarations, Animal Health Statements, or other certification assurances. Update the National Livestock Identification System database if moving dairy cattle.		
Shows and sales	Events where animals are brought together are an opportunity for disease to spread directly from animal to animal, or via contact with contaminated soil, food, and water. Stock can be exposed to disease by mixing with other plants or animals, or encountering contaminated pens, vehicles, people, or equipment.	Only take healthy plants, produce, or livestock to shows, sales and markets. When possible, isolate returning stock as you would for any new stock entering the property. Do not share equipment with others and have a separate supply of feed and water for livestock.		

Product transport	Dirty bins used for harvesting can transfer insect pests and diseases to subsequently harvested crops.	Ensure no soil, waste plant material, or pests are left on or in bins or transport containers by removing organic matter and disinfecting the bins.		
Product packing	Soil and plant material adhering to harvested crops can carry insect pests and disease organisms.	Remove loose soil and plant material from harvested crops. Minimise post-harvest contamination.		

6.5.2.3 People

If it can move, it can carry diseases, pests, and weeds. For this reason, people, vehicles, and equipment pose a high biosecurity risk and should be managed accordingly.

People	Potential risk	Actions to reduce the risk	Action(s) to take
Property access	Multiple, unsecured entry points to your property make it difficult to control visitor access and manage high-risk visitors such as those who visit multiple properties each day.	Limit the number of access points to your property. Lock unused gates. Use signs to direct visitors to designated parking areas or reception and movement areas. Access to production areas (fields, paddocks, or sheds) should be limited to a restricted range of personnel only.	
Signage	Never assume that people know what to do when they arrive at your property. Without signage, visitors and staff may be unaware of the biosecurity procedures enforced on your property.	Erect signs to instruct visitors. Use clear instructions and provide relevant contact details.	
Visitor risk assessment	Visitors can unknowingly carry diseases, pests, and weeds on their clothes and personal items. The risk is greater if they've been in contact with other livestock or crops or have recently been interstate or overseas.	Conduct a risk assessment before you allow a visitor onto your property. If required, provide hand washing facilities, footbaths, cleaning equipment or a change of clothing or footwear to reduce the risk. If you cannot reduce the risk, refuse entry to high-risk visitors.	
Visitors to the property	If you don't know where visitors have come from or what they have been doing, it will be hard to track in the event of an incursion or disease outbreak.	Direct all visitors to a designated parking area away from livestock or crops and ask them to report to management and sign a visitor register.	
Visitors contact with plants and animals	Visitors can unknowingly carry diseases, pests, and weeds on their clothes and personal items.	Limit access to and contact with crops and livestock and eliminate any unnecessary contact altogether.	
General hygiene	Pests, disease-causing organisms, and weed seeds can be present on hands, clothing, footwear, and personal items of people.	Provide hand-washing facilities, footbaths, or alternative clothing and footwear for visitors to use while on-site.	

6.5.2.4 Vehicles and equipment

Diseases, pests, and weeds can enter a farm and spread via equipment and vehicles, either directly or in plant material, soil, or manure. It is important to maintain equipment hygiene and ensure all vehicles that visit your property are clean and well maintained.

Aspect	Explanation of risk	Actions to reduce the risk	Action(s) to take	√ / x
Equipment hygiene	Tools and equipment can carry diseases, pests, and weeds seeds. The risk for disease spread is higher when equipment is borrowed, lent, or bought second-hand from other properties.	Clean and disinfect tools and equipment before and after use on crops or livestock. Clean and disinfect equipment between groups or herds of animals. Clean and disinfect second-hand, borrowed, or lent equipment before and after use.		
Dedicated equipment	Practically, it may be best to have dedicated tools, clothing, and footwear for use on crops or livestock affected by pests or diseases. This equipment should never be used in clean areas of your property.	Have dedicated tools, clothing, and footwear available for use in production areas or on animals and plants affected by pests or disease. Always work with older and hospitalised animals last (work from clean to dirty). Do not use common shovels or other equipment to feed animals and to clean out manure. Clean and disinfect equipment after handling manure.		
Storage areas	Some pests and diseases can live in the natural environment for months or years.	Clean and disinfect equipment storage areas regularly.		
Vehicle entry points	Multiple, unsecured entry points to your property make it difficult to control access and manage high-risk visitors such as utility providers who visit multiple properties every day.	Encourage visitors to enter the property via one or two routes only. Use signs to inform visitors about property access points.		
Vehicle movement and parking	All parts of a vehicle can carry disease-causing organisms, pests, and weed seeds. Without restricting parking and vehicle movements within the property, it is difficult to control and monitor the spread of diseases, pests, and weeds.	Minimise the number of vehicles you allow onto the property and restrict them to designated visitor parking areas. Monitor areas next to parking facilities for signs of diseases, pests, or weeds. If possible, use your own farm vehicles to transport visitors around the property. Have vehicles for on-site use only. Is the flow of vehicle movement based on risk? (Healthy before sick, feed before manure.)		
Vehicle hygiene and washes	All parts of a vehicle can carry disease-causing organisms, pests, and weed seeds.	Provide a wash area for vehicles that need to enter production areas or before moving crops or livestock. If possible, use a high-pressure wash/blowdown facility located well away from crops or livestock for cleaning vehicles and equipment. For maximum protection, disinfect after washing.		
Roads and tracks	When vehicles travel off or divert from established roads and tracks, the risk of introducing diseases, pests, and weeds increases.	Ask visitors to stay on established roads/tracks. Check areas next to roads and tracks for signs of diseases, pests, and weeds, and treat before becoming established.		
Run-off from wash areas	Run-off from vehicle washing can contain diseases, pests, and weed seeds.	Collect run-off from vehicle wash areas in a dump or direct it away from production areas. Monitor areas next to cleaning facilities for signs of pests and diseases and treat weeds before setting seed or becoming established.		

6.5.2.5 Production practices

Good on-farm hygiene reduces the risk of spreading pests and diseases. Implement simple hygiene practices for feed and water, product packaging, storage facilities, livestock husbandry, waste materials and plant propagation activities.

Aspect	Explanation of risk	Actions to reduce the risk	Action(s) to take	√ / x
Water management	<p>The management of water supplies is important for the maintenance of healthy plants and animals.</p> <p>If water sources become contaminated, they can spread pests throughout production areas.</p>	<p>Prevent algal blooms by aerating or treating water that is high in nutrients and is stored in dams.</p> <p>Make sure livestock cannot drink from waste-water storage dams.</p> <p>Prevent young and vulnerable livestock from grazing pastures irrigated with recycled effluent during the “withholding period” after each irrigation.</p>		
Plant waste	<p>Leaf material or fallen fruit, abandoned orchards or vineyards can attract or harbour pests and diseases. It is important to break the life cycle of insect pests.</p>	<p>Collect all plant waste that shows signs of pests or disease and dispose of it by deep burial or burning, well away from water sources, nurseries, and production areas.</p> <p>For cuttings or healthy waste plant material, use a dedicated waste management facility or compost it thoroughly.</p>		
Animal manure and waste	<p>Effluent, waste, and dead animals can harbour disease-causing organisms.</p> <p>Disease agents in effluent can contaminate pastures, stock feed and water sources.</p> <p>Effluent, waste, and dead animals can harbour disease-causing organisms.</p> <p>Disease agents in effluent can contaminate pastures, stockfeed and water sources.</p>	<p>Dispose of animal carcasses and waste as soon as practical in a segregated area that cannot be accessed by livestock, or wild and feral animals.</p> <p>Select disposal areas to avoid the potential spread of contaminants by water, wind, or animals.</p> <p>Manage effluent dispersal to minimise disease spread through the contamination of pastures, stockfeed and water.</p> <p>Maintain grazing intervals (21 days) between applications of these materials to paddocks and grazing of livestock.</p> <p>Always ensure you adhere to government and industry requirements for carcass, effluent, and waste management.</p>		
Feed storage	<p>Poor feed storage encourages pests and diseases which may contaminate feed or reduce its usefulness.</p> <p>Old feed can harbour disease organisms and pests that may be harmful to your livestock.</p> <p>Wet and mouldy feed is a potential source of disease or poisoning.</p>	<p>Keep feed in a clean, dry storage area.</p> <p>Regularly inspect feed supplies for insects, pests, mould, and damage and ensure they remain secured and fit for purpose.</p>		
Feed and water troughs	<p>Contaminants can accumulate in animal feed and water troughs if they are not cleaned regularly.</p> <p>Old feed or water left in the trough can contaminate new feed or water.</p>	<p>Clean feed and water troughs regularly to prevent the build-up of contaminants.</p> <p>Implement a cleaning roster to ensure they are always clean.</p> <p>Provide cover for animal feed and water where possible and keep the troughs high enough so they cannot be contaminated by animal faeces.</p>		

Monitoring and surveillance	<p>Early detection of pests and diseases gives you the best chance of preventing pests or diseases from establishing on your property and ongoing additional expenses for their control. It also increases the chances of eradicating a new pest or disease.</p> <p>Recording the absence of pests or diseases is just as important as recording the things you do see.</p>	<p>Regularly monitor your crops and livestock. Become familiar with pests and diseases commonly found in your region so you will know if you see something different.</p> <p>Sentinel plants or livestock can provide early warning of emerging pest problems.</p> <p>Display posters showing common pests and diseases to help staff with identification.</p>		
Monitoring frequency	<p>The optimum frequency of monitoring depends on the type of crop or livestock being managed, and the production intensity.</p>	<p>Increase the frequency of inspections of crops and livestock during periods of higher risk, such as known disease outbreaks, increased insect (seasonal presence) and wildlife activity or growing periods for weeds. This can minimise the chance of diseases, pests and weeds entering and spreading on your property.</p>		
Silo storage of grain	<p>Spilled grain around grain storage areas can attract insect pests and vermin.</p> <p>Silos need to be gas-tight to ensure fumigation treatments are effective and to prevent insects becoming resistant to treatments. The first grain to pass through harvesters at the start of the season may likely contain pests.</p>	<p>Maintain good hygiene around your storage areas. Clean and pressure test sealable silos and repair any faulty rubber seals before filling with grain.</p> <p>Separate the first grain to pass through harvesters at the start of each season.</p>		
Fencing	<p>Damaged fences can allow livestock to stray. It could also allow your neighbour's livestock to mix with your stock.</p>	<p>Ensure fences prevent livestock from straying onto/off your property.</p> <p>Use double fencing, if possible, to prevent livestock from making direct contact with neighbours' animals.</p> <p>Fenced off vegetation planted as windbreaks or corridors can also act as a buffer zone between properties.</p>		
Feed spills and disposal	<p>Spilled feed can be spread around the property by wind or other means.</p>	<p>Dispose of spilled, old, or contaminated feed safely and promptly, keeping it away from livestock and pests.</p>		
Product storage	<p>Stored products, feed, and equipment can attract or harbour pests and diseases. Soil and plant material adhering to harvested crops can carry insect pests and disease organisms.</p>	<p>Clean equipment before storage. Remove loose soil and plant material from harvested crops before storage.</p> <p>Products, feed, or equipment should be stored securely to avoid attracting pests.</p> <p>Minimise post-harvest contamination.</p>		

Agricultural and veterinary chemicals	Chemical residues on plant or animal products can result in rejection from international and domestic markets and can pose a risk to human health. The misuse of chemicals can also lead to the development of resistance by pests, which can create new biosecurity risks and management challenges.	Be sure to follow the instructions on the label and observe withholding periods after treatments. Where necessary, seek training in appropriate use of agricultural chemicals.		
Insect resistance to chemicals	Inappropriate use of chemicals can cause insects to become resistant, making control difficult. This can cause more widespread and ongoing biosecurity problems.	If you suspect insects in your stored grain are resistant to chemicals, contact the registration holder of the product as well as your nearest extension officer.		
Vaccination	Some organisms that cause disease in animals can infect humans.	Ensure all personnel working on-farm are vaccinated for identified risk diseases (e.g., rabies and tetanus). Where necessary, vaccinate livestock against zoonotic (animal to human) diseases (e.g., brucellosis and <i>leptospirosis</i>).		

6.5.2.6 Ferals, animals, and weeds

Feral animals, plant pests, and weeds are a widespread nuisance and can cause harm to your business, so they need to be actively controlled.

Aspect	Explanation of risk	Actions to reduce the risk	Action(s) to take	√ / x
Wild and feral animals	Wild or feral animals and vermin may carry disease-causing organisms.	Develop a wild and feral animal-control programme to protect livestock and cropping land. Ensure farm buildings are in a good condition and that feed and water sources are free from contamination. Work with neighbours and other producers in your local area to implement a co-ordinated approach to feral animal control.		
Boundary fences	Wild or feral animals may carry disease-causing organisms.	Ensure boundary fences are secure.		
Property cleanliness	Spilled food, rubbish dumps and carcasses can attract pests or wild animals that carry diseases onto the property.	Remove or contain anything that is likely to attract vermin, insect pests or wild animals.		
Weeds	Weed species are significant biosecurity problems, as well as being alternative hosts of some agricultural and horticultural pests. Some weeds can also make livestock sick. Grain export markets have zero tolerance for weed seeds and may cause shipments to be rejected.	Establish a weed management plan for your property, including plans for eradicating, containing, or managing current weeds on your property, and preventing the introduction of new species. Control weeds along dirt tracks and roads, in areas used to isolate new stock, and next to vehicle parking or cleaning areas. Look for outbreaks of weeds, especially after drought, fire, or flooding.		

<p>Property and land destruction</p>	<p>Property and land destruction through excavation activities, fire, flooding, or storms provide an opportunity for pests and weeds to become established and for feral animals to enter your property.</p>	<p>Control weeds in fields and paddocks after flooding, drought, or fire. Inspect any areas that have recently been landscaped (e.g., new roads or dams) or have been affected by land destruction (e.g., fences), and treat weeds before they have a chance to set seed and become established.</p>		
---	--	--	--	--

6.5.2.7 Train, plan, and record

Ensure that staff members are well trained and that you can trace where animals or plants have come from and where they went. Keep accurate records of purchases, sales, and movement of all products entering or leaving the property.

Aspect	Explanation of risk	Actions to reduce the risk	Action(s) to take	√ / x
<p>Biosecurity planning</p>	<p>An on-farm biosecurity plan will help you prioritise the implementation of biosecurity practices relevant to your property.</p>	<p>Devise a plan for your property, prioritise actions, and update the implementation table as you achieve goals.</p>		
<p>Record-keeping</p>	<p>A property owner or manager should be able to 'trace back' and 'trace forward' if there is a disease, pest, or weed incursion on their property.</p>	<p>Keep records of purchases and sales, health certificates and declarations, and pest and disease monitoring activities.</p>		
<p>Vendor declarations and statements</p>	<p>Animals and plants entering your property can carry pests, disease-causing organisms or weed seeds. Simple visual inspection of plants or animals may not be enough to know whether they are healthy.</p>	<p>Always request history and supporting paperwork, such as a national vendor declaration, commodity vendor declaration, and animal health statements.</p>		
<p>Staff training</p>	<p>Anyone working on the property (including friends and family) may not know how easily diseases, pests, and weeds can spread or how to prevent this from happening.</p>	<p>Inform staff of the biosecurity standards required on-site. Provide biosecurity training or information sessions for staff. Have posters to remind staff of the importance of farm biosecurity.</p>		
<p>Monitoring and surveillance</p>	<p>Active monitoring and surveillance can provide early warning of potential or emerging problems with pests and diseases. Monitoring data can be used to support continued access to domestic and international markets. Recording the absence of pests or diseases is just as important as recording what you do see.</p>	<p>Keep a record of all crop or livestock monitoring, even if you don't see anything.</p>		



Suspect diseases, pests, and weeds	You have a responsibility to report unusual diseases, pests, or weeds to an agronomist, state veterinarian, or herd veterinarian.	Know who to call if you suspect you have an emergency animal disease or plant pest.		
---	---	---	--	--

6.6 REFERENCES

- *Farm Biosecurity Action Planner – The essentials.*
- *The State of Biosafety and Biosecurity in South Africa*, Academy of Science of South Africa, May 2015.
- *National Farm Biosecurity Reference Manual: Grazing Livestock Production*, August 2012. (www.farmbiosecurity.com.au).
- *Dairy 2007 – Biosecurity Practices on US Dairy Operations, 1991 to 2007*. United States Department of Agriculture, May 2010.
- *Tiakina Aotearoa. Protect New Zealand. The Biosecurity Strategy for New Zealand*, August 2003. (www.maf.govt.nz/biosecurity-strategy).
- *Dairy Australia. Dairy Biosecurity: Healthy Farms* (www.dairyaustralia.com.au).
- *AgriLIFE Extension. Biosecurity Practices for Dairy Operations*. (<http://AfriLifesbookstore.org>).
- Van Schaik et al., 2001. *An Economic Model for On-Farm Decision Support of Management to Prevent Infectious Disease Introduction into Dairy Farms*. *Prev.Med* 51:289-305.
- Wallace R L. *Practical and Sensible Dairy Farm Biosecurity*. Proceedings of the sixth Western Dairy Management conference. March 12 to 14, 2003. Reno, Nevada, United States.
- *Biosecurity – A practical approach*. PennState extension.

INFORCE™ 3

Respiratory Vaccine

Reg. No.: G4044 (Act 36/1947)

A STRONG START IN THE FACE OF STRESS

INFORCE™ 3

Respiratory Vaccine

PROTECTS
WHERE THE
DISEASE
BEGINS



BRSV



IBR



PI₃



SUPERIOR PROTECTION FOR BEEF AND DAIRY CATTLE RIGHT FROM THE START

FOR ANIMALS. FOR HEALTH. FOR YOU.

zoetis

FOR ANIMAL USE ONLY

Inforce™ 3: Reg. No.: G4044 (Act 36/1947). Infectious bovine rhinotracheitis (IBR), Bovine respiratory syncytial virus (BRSV), Parainfluenza type 3 virus (PI₃).

For full prescribing information refer to the package insert approved by the medicines regulatory authority.

Full product information available from Zoetis South Africa (Pty) Ltd., Co. Reg. No.: 2012/001825/07, 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. PostNet Suite 53, Private

Bag 9976, Sandton, 2146, South Africa. Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). www.zoetis.co.za.

RU/PR/08/20/04

CHAPTER 7

Milking should be carried out in such a manner that it minimises contamination of the milk being produced.

Effective hygienic practice during milking is an important element in the system of controls necessary to produce safe and suitable milk and milk products.

Failure to implement and maintain effective hygiene and employee hygiene practices, has been shown to contribute to the contamination of milk with undesirable micro-organisms, pathogens as well as chemical or physical hazards.

7.1 INTRODUCTION

Cleaning procedures should effectively remove milk and other residues that may contain micro-organisms or promote microbiological growth on milk contact surfaces. A surface may be chemically, physically or microbiologically clean.

- **Chemically clean:** When chemicals which can have an adverse effect on food safety have been removed by cleaning operations. This may include the breakdown/removal of chemicals used for cleaning and/or disinfection.
- **Physically clean:** When all visible “soil” or residues are effectively removed from surfaces. Physical cleanliness is usually judged visually and it is important to note that milk contact surfaces may be physically clean without necessarily being microbiologically clean.
- **Microbiologically clean:** When numbers and types of micro-organisms are reduced to an acceptable level. Microbiological cleanliness is accomplished by effective cleaning and disinfection.

Definitions for chemically, physically and microbiologically clean can be:

- **Chemically** – The breakdown/removal of chemicals used for cleaning and/or disinfection. Water used for rinsing must be potable, e.g. of such chemical and microbiological quality that it is wholesome and fit for human consumption.
- **Physically** – When all “soil”, scale or residues have been removed by cleaning. This is usually judged visually and it is important to remember that a surface which looks clean physically is not necessarily microbiologically clean.
- **Microbiologically** – When the numbers and kinds of micro-organisms are reduced to an acceptable level.

The cleanliness of milk contact surfaces may be determined by various methods, e.g. swabs. These monitoring tests contribute towards the production of high quality raw milk as well as ensuring compliance with legal requirements. Water used for rinsing must be potable, e.g. of such chemical and microbiological quality that it is wholesome and fit for human consumption.

7.2 GENERAL HYGIENE

An effective cleaning and disinfection programme for the milking shed is essential to ensure the production of high quality and safe milk. The cleaning and disinfection programme is one of the pre-requisite programmes required for the implementation of an effective food safety system.

ISO/TS 22002-3

5.9 Cleaning

In farming facilities, the organisation shall maintain the degree of hygiene that is necessary to minimise the likelihood of food

contamination. It shall maintain the cleanliness of the surfaces of all premises and equipment including transport containers, which may constitute a source of food contamination (e.g. surfaces in direct contact with food). Cleaning shall not result in food contamination. Cleaning and disinfection shall be effective in achieving the degree of cleanliness required.

Regulation R961

Milking sheds

6. (1) (iv) A scullery for the washing, cleaning, disinfection and sterilisation of milk containers and other unfixed apparatus and equipment used in the handling of milk.

Milk containers and milking machine

7. (5) Milk containers and other fixed and unfixed apparatus and equipment shall be so washed and disinfected after use that they are clean, that fats and milk residues are dissolved and removed and that the bacteriological count on surfaces coming into contact with milk does not exceed ten bacteria per 100 square millimetres of such surfaces after disinfection. The swabbing of the contact surfaces shall be conducted according to SABS Standard Test Method 763: Efficacy of Cleaning Plant, Equipment and Utensils: Swab Technique.

SANS 10049

7.2.11.5 Storage facilities for substances used for cleaning and disinfection

Substances used for cleaning and disinfection, and the equipment for their application, shall be stored in a room in which no foodstuff, food-handling equipment, packaging materials or food containers are stored, and shall at no time come into contact with food containers, packaging materials, raw materials or the food product. All substances used for cleaning and disinfection shall be prominently and distinctly labelled.

7.2.14 Facilities for cleaning and disinfection

7.2.14.1 Facilities with proper drainage shall be provided for the cleaning and disinfection of the premises of the food-handling organisation and its portable equipment and utensils, and shall be made available at convenient and acceptable points.

7.2.14.2 Equipment for the cleaning and disinfecting facilities shall be constructed of corrosion-resistant materials and shall be of a design that is easily cleanable.

7.2.14.3 Such facilities shall be located in a separate room or in a designated area where there is an ample supply of cold potable water and hot water, where required, or saturated steam.

7.2.14.4 Materials used for cleaning and disinfection, hot and cold running water or saturated steam, hose pipes, spray nozzles, brushes, scrapers and any other equipment needed for the cleaning of the food-handling organisation, and its equipment and utensils shall be made available.

7.2.14.5 These materials and equipment (see 7.2.14.4) shall not be stored in a room where food-handling equipment is stored and shall at no time come into contact with raw materials, the food or their containers or packages.

7.2.14.6 Where used, cleaning in place (CIP) systems shall be designed with sufficient flow rates, contact time and temperature control to allow proper cleaning of the equipment. Where sections of the food contact areas are cleaned during food handling, there shall be a suitable break to atmosphere designed into the piping to prevent the contamination of the food by CIP liquids.

7.4.4 Cleaning and disinfection

7.4.4.1 The food-handling areas shall be maintained in an appropriate and suitable state of cleanliness at all times. These areas shall include food storage areas and waste areas.

7.4.4.2 A documented cleaning and disinfection programme for the premises, equipment, containers and vehicles shall be established and implemented.

7.4.4.3 Special precautions shall be taken when cleaning machinery or equipment is used for moist and semi-moist food in order to avoid fungal and bacterial growth.



7.2.1 Cleaning and disinfection programme

A written cleaning and disinfection programme should be available to specify the following:

- Area and items/equipment to be cleaned.
- Frequency of cleaning.
- Person responsible.
- Cleaning equipment used.
- Specific work instruction (WI) or standard operating procedure (SOP) to be used.

The procedures for cleaning and disinfection should be properly established by after-consultation with the chemical supplier of detergents and disinfectants. The procedure for cleaning and disinfection should be designed to meet the particular needs of the specific milking shed and should be set out in written schedules that should be made available for the guidance of employees and management. Procedures should be established not only for cleaning and disinfecting the facilities and equipment, but also for the cleaning and disinfecting of the equipment that is used for cleaning, such as brooms and buckets.

There should be adequate supervision by management to ensure that the procedures set out are carried out in an effective manner at all times. An individual who is a permanent staff member should be appointed to be responsible for cleaning and disinfection procedures and for supervision. The effectiveness of the programme must be verified and records of effective cleaning and implementation of the cleaning programme shall be maintained.

ISO/TS 22002-3

5.9 Cleaning

The organisation shall:

- a) Identify premises and equipment that need to be cleaned.
- b) Appoint competent personnel to perform cleaning.
- c) Establish operating procedures for the cleaning of surfaces that are potentially in contact with food products and feed — the operating procedures shall include, depending on the operations carried out, the nature of the product and type of surface material:
 1. A description of the cleaning process (e.g. steps involved, temperatures, times).
 2. The cleaning frequency appropriate to the use of the area, equipment, etc.
 3. The names (e.g. trade names) of cleaning and disinfecting products used and which have been approved for food contact usage.
 4. The quality of the water used, which depends on the equipment cleaned and on the type of products likely to be contaminated.
 5. The verification criteria that determine the cleanliness required.

The organisation shall follow the manufacturer's instructions when using sanitisers (e.g. method of preparation, including concentration, temperature of use, mechanical action required, i.e. turbulence, scrubbing) to remove soil and biofilm, waiting time before rinsing, if any, and withholding period before contact with food or food producing animals, if any).

Depending on the operations and where appropriate to minimise the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) Clean the milking equipment (lines and teat suction cups) after every milking and the milk storage containers after each emptying, when there is a likelihood of milk contamination from milk residues or biofilms.
- b) Rinse the milking equipment and storage containers with potable water when there is a likelihood of contamination with residues of detergents used for cleaning.
- c) Use clean water for disinfection activities.
- d) Clean equipment that could act as vectors of cross-contamination with chemicals.

- e) Prevent containers, equipment and facilities that have been used for storing, transporting, mixing or spreading potentially hazardous material (e.g. plant protection products or medicated feed) from being reused for food or feed, unless a cleaning procedure validated to be effective in removing the hazardous material has been applied.
- f) Clean and, where necessary, disinfect buildings once all animals in the building concerned have been moved to another rearing location or slaughterhouse, to ensure an effective maintenance of an appropriate degree of hygiene and protection against the transmission of animal diseases.
- g) Prevent animals from being introduced into the facilities during an appropriate drying out period after cleaning or disinfection.
- h) Maintain troughs and automatic feeders at an appropriate level of hygiene.

Documentation should include operating procedures for the cleaning of surfaces that can come in contact with food products and feed. If the organisation detects quality problems in farm end-products that may be caused by failure in or ineffective cleaning, the cleaning operating procedure in question shall be reviewed and amended as necessary.

SANS 10049

7.4.4.5 Cleaning and disinfection programmes shall include as a minimum:

a) Areas and equipment to be cleaned and disinfected

b) Frequency of cleaning and disinfection

For example, cleaning and disinfection could be carried out daily, weekly, monthly, quarterly, hourly or during shutdown periods. The frequency of cleaning and disinfection shall be sufficient to ensure the maintenance of the required standard of hygiene.

Note: Clean-as-you-go practices may be applied.

c) Methods of cleaning and disinfection

1. A pre-determined sequence of cleaning shall be established. Cleaning methods shall include removal or disassembly requirements, dry cleaning, wet cleaning, and disinfection at the recommended contact time, temperature and concentration of the disinfectant as stipulated by the disinfectant manufacturer.
2. When cleaning and disinfection take place during food handling, these areas being cleaned and disinfected shall be physically separated from the food-handling areas in order to prevent the contamination of the product with cleaning and disinfecting agents.
3. Where appropriate, recommended cleaning materials (especially related to the fabric and chemical resistance) shall be specified. Where dismantling is required, specific instructions shall be provided.
4. In food-handling areas, compressed air shall not be used for cleaning purposes.

d) Cleaning and disinfecting agents

1. All cleaning and disinfecting agents used shall be appropriate for their intended purpose and shall be suitable for use in food-handling areas.

2. Household cleaning chemicals and chemicals from non-reputable suppliers shall not be used. Disinfectants shall be registered by an appropriate regulatory authority.
3. The current Material Safety Data Sheets (MSDS) of cleaning chemicals and disinfectants shall be made available on the premises of the food-handling organisation, and acids and alkalis shall be stored and handled in accordance with these documents.

Note: SANS 1828 and SANS 1853 give details on the requirements and safety of cleaning chemicals, disinfectants and detergent-disinfectants used in the food industry.

e) Cleaning tools and equipment

1. Cleaning tools and equipment shall be clearly distinguishable for different areas, shall be of hygienic design, and shall be made of suitable impervious material that will not present a potential source of contamination. All cleaning equipment shall be cleaned and stored properly when not in use.

f) Monitoring and verification procedures

1. The food-handling organisation shall be responsible for establishing a procedure for the monitoring of all cleaning at defined frequencies.
2. The effectiveness of the cleaning and disinfection procedures shall be verified by appropriate methods.
3. The efficacy of the cleaning and disinfection process shall be tested in accordance with SANS 5763. When scored by the system set out in SANS 5763, the determined percentage efficacy of cleaning and disinfection in the sample shall be deemed acceptable.
4. Effective measures shall be taken to inhibit mould growth and to remove dust, flaking paint and other loose or detachable material likely to fall onto the food product from walls, ceilings or overhead structures in the preparation, processing, packaging and storage areas.

g) Cleaning programme records

Records of effective cleaning and implementation of the cleaning programme shall be maintained.

7.3 CLEANING AND DISINFECTION IN THE MILKING PARLOUR

The parlour shall be clear of products, cleaning chemicals, disinfectants or other items not used on a daily basis.

After each milking the parlour should be washed and cleaned. A water point with running water and attached hose, specific to the parlour or an alternative method (e.g. a power washer), must be available in order to allow for the washing of the entire milking parlour area.

- Troughs shall be free from any build-up of cake and/or mould.
- Rails shall be cleaned.
- Collecting yard, close to the parlour entrance and walls, shall be cleaned.
- All walls and overhead structures within the parlour shall be cleaned.

Airborne and accumulated dust

The parlour should be free from dust, cobwebs and rust. A thin film of dust is acceptable, although evidence of ingrained or caked dust/dirt does not indicate irregular or ineffective cleaning. Checks for cleanliness and absence of dust should also be considered on:

- Jars.
- Transfer pump.
- Pipe work.
- Vacuum lines.
- Feeders.

Ducts, jars and pipe work should be clean and properly maintained.

- Clusters and hoses must be clean both internally and externally.
- The interior cleanliness of the milk machine will be reflected by lower total bacteria and coliform counts.
- Dung should be washed from surfaces and equipment after each milking.
- Rubber ware must be checked regularly for signs of perishing. Effective cleaning will not take place if equipment is not well-maintained.
- Milk stone remover should be used as dictated by local conditions to prevent build-up of lime scale.

The cleaning and disinfection routine of milking machines may differ due to the different manufacturers and suppliers of cleaning chemicals. It is best to consult with the supplier of cleaning chemicals and the machine manufacturer to compose the best cleaning routine for the parlour shape, size and make. It is therefore of the utmost importance to use a reliable supplier of cleaning chemicals that will offer this very important service.

The supplier of cleaning chemicals should be an integrated part of the cleaning routine by supplying cleaning programmes and material safety data sheets for each product in his range. The following shall be available:

- Sufficient hot running water to facilitate cleaning for the size of milking machine.
- SABS-registered cleaning chemicals and disinfectants.
- A documented cleaning procedure for the milking machine.
- A documented cleaning procedure for the manual cleaning or cleaning out of place (COP).
- Records for the effective implementation of the cleaning programme.

Records shall include evidence of:

- The concentration of cleaning chemical or disinfectant.
 - The water temperature used.
 - The contact time.
- Inspection performed after cleaning.

7.4 CLEANING AND DISINFECTION IN THE MILK ROOM

After each milking the milk room and the equipment should be cleaned and disinfected. All walls, doors, ceilings, overhead structures, windows, fly screens and wash basins shall be cleaned. The milk room should be free from dust, cobwebs and rust. The cleaning and disinfection routine of the bulk tank may differ due to the different manufacturers and suppliers of cleaning chemicals. It is best to consult with the supplier of cleaning chemicals and

the bulk tank manufacturer to compose the best cleaning routine. The milk room should be clear of products, cleaning chemicals, disinfectants or other items not used on a daily basis.

The following shall be available:

- Sufficient hot running water to facilitate the cleaning of the bulk tank and other equipment.
- SABS-registered cleaning chemicals and disinfectants.
- A documented cleaning procedure for the bulk tank, including the exterior of the bulk tank and manual cleaning of other equipment.
- A documented cleaning procedure for the manual cleaning or cleaning out of place (COP).
- Records for the effective implementation of the cleaning programme.

7.5 CLEANING PROCEDURES

Cleaning operations must be performed strictly according to a carefully worked out procedure in order to attain the required degree of cleanliness. This means that the sequence must be exactly the same every time. The cleaning cycle in a dairy comprises the following stages:

Pre-rinsing with water

Pre-rinse with water to remove loose dirt and milk residues immediately after milking or after milk was removed from bulk tank. Milk fat residues are more easily flushed out if the pre-rinsing water is warm, but the temperature should not exceed 55°C to avoid the deposit of proteins. Pre-rinsing must continue until the water leaving the system is clear, as any loose dirt left will increase detergent consumption and inactivate chlorine, if used, in the detergent.

Cleaning with detergent

Cleaning is usually performed with alkaline (removal of milk residue) and acid detergents (removal of milk stone). The detergent must also be capable of dispersing dirt and encapsulating the suspended particles to prevent flocculation. A number of variables must be carefully controlled to ensure satisfactory results with a given detergent solution. These are:

- **The concentration of the detergent solution.**

The amount of detergent in the solution must be adjusted to the correct concentration before cleaning starts. During cleaning, the solution is diluted with rinsing water and milk residues. Some neutralisation also takes place. It is therefore necessary to check the concentration during cleaning. Failure to do this can seriously affect the result.

Checking can be done either manually or automatically. The dosage must always be according to the detergent supplier's instructions, as increasing the concentration does not necessarily improve the cleaning effect – it may indeed have the reverse effect due to foaming, etc. Using too much detergent simply makes cleaning needlessly expensive. Records of the verification of the concentrations should be kept.

- **The temperature of the detergent.**

Generally speaking, the effectiveness of a detergent solution increases with increasing temperature. A blended detergent

always has an optimum temperature which should be used. The ideal temperature for using a chlorinated detergent is $\pm 60^{\circ}\text{C}$. If the temperature drops below 40°C , milk fat may redeposit or a film could form on the surface. The temperature must always be according to the chemical supplier's instruction. The temperature needs to be determined during and at the end of the wash cycle. Records should be kept.

- **The mechanical effect on the cleaned surfaces.**

The turbulence of the solutions moving through the milking machine areas must be strong enough to remove residue sticking to the surfaces of the equipment. In manual cleaning, scrubbing brushes are used to produce the required mechanical scouring effect. In mechanised cleaning of pipe systems and tanks, mechanical effect is supplied by the flow velocity. The circulating pumps must be according to the specifications of the milking machine manufacturers.

- **The duration of cleaning (time).**

The duration of the cleaning procedure is important and must be indicated on the cleaning programmes. The rate at which the cleaning solution's temperature decreases will be affected by the washing time and the temperature difference between winter and summer seasons.

The duration of the detergent cleaning phase must be carefully calculated to obtain the optimum cleaning effect. At the same time the costs of electricity, heating, water and labour must be taken into consideration. It is not sufficient to flush a pipe system with a detergent solution. The detergent must circulate long enough to dissolve the dirt. The time depends on the thickness of the deposits and the temperature of the detergent.

A ten-minute treatment with alkaline detergent, at the correct temperature and concentration, is usually sufficient to dissolve the milk residue and soil on the walls of a milk tank.

Rinsing with clean water

After cleaning with detergent the surfaces must be flushed with water long enough to remove all traces of the detergent. Any detergent left in the system after cleaning may contaminate the milk. All parts of the system must be thoroughly drained after rinsing.



The equipment and pipe systems are practically sterile after the treatment with strong alkaline and acid solutions at a high temperature. It is then necessary to prevent overnight growth of bacteria in the residual rinsing water in the system. This can be done by acidifying the final rinse water to a pH of 5 by adding phosphoric or citric acid. This acid environment is not favourable for the growth of most bacteria.

Disinfection

Properly carried out cleaning with acid and alkaline detergents renders the equipment not only physically and chemically but also, to a large extent, lowers the bacteriological count. The bacteriological cleaning effect can be further improved by disinfection which leaves the equipment virtually free from bacteria. Other factors influencing the effectiveness of the cleaning programme include:

Use	Product	Code	Hazard-Neat	Dilution
Detergent	Chlorpower	Chlorinated Alkali		1% or 1cup per Litre
Sanitiser	Perasan	Acid		0.5% or 1 cup per 25L

1. Water quality

Safe, clean water must be available for cleaning. The water must be tested to indicate compliance with SANS 241 standards. Water quality and hardness determine the type of cleaning agents required:

- Total water hardness $< 120\text{ppm}$.
- pH 7.
- Low organic content.
- A microbial count of $< 1\ 000\text{cfu}$.

2. Solubility of soil

Soil types are soluble in varying conditions:

- Water soluble, e.g. sugars and some salts.
- Soluble in alkali cleaning chemicals, e.g. fats and proteins.
- Soluble in acids, e.g. mineral deposits.

Most soils are complex and contain all three types of solubility.

SANS 10049

7.4 Hygienic operating requirements

7.4.1 Water

7.4.1.1 Water used as a food product ingredient, including as ice and steam, or in contact with food contact surfaces, shall comply with the requirements of SANS 241 (regardless of the source of the water). Appropriate facilities for the storage, distribution and, where needed, temperature control of the water, ice and steam shall be provided.

7.4.1.2 Every food-handling area shall have an adequate supply of clean potable water that is free from suspended matter and substances that could be deleterious to the food product or harmful to health. Non-potable water shall have a separate,

identified system that is not connected to and is prevented from reflux into the potable water system.

Cleaning-in-place systems

Cleaning-in-place (CIP) means that rinsing water and detergent solutions are circulated through tanks and pipes without the equipment having to be dismantled. CIP can be defined as circulation of cleaning liquids through machines and other equipment in a cleaning circuit. The passage of the high-velocity flow of liquids over the equipment surfaces generates a mechanical scouring effect which dislodges dirt deposits. This only applies to the flow in pipes, heat exchangers, pumps, valves, etc.

The normal technique for cleaning large tanks is to spray the detergent on the upper surfaces and then allow it to run down the walls. The mechanical scouring effect is then often insufficient, but the effect can to some extent be improved by the use of specially designed spray devices. Tank cleaning usually requires large volumes of detergent, which must be circulated rapidly.

Descaling must be done with an acid once a week between step 4 and 5. The same washing programme can be used to clean and disinfect an auto-cleaning bulk tank.

Example of a cleaning and disinfecting procedure for milking machines

1. Remove milk pipe from the milk bulk tank.
2. Rinse complete milk line and milking units with clean, lukewarm water until no milk residue is present.
3. Circulate a 5-10% chlorinated detergent solution through the system for 30 minutes at 60°C (do not allow the temperature to drop below 40°C).
4. Rinse out with clean water to remove all residue.
5. Circulate a cold disinfectant solution for 2-4 minutes. Leave overnight.
6. Rinse with clean water after step 5 or before the next milking session.

7.6 MANUAL CLEANING OF EQUIPMENT, CANS, TRANSPORT TANKS, BULK TANKS AND HAND MILKING EQUIPMENT

1. Rinse out with clean water.
2. Hand-wash with a chlorinated detergent, leave for five minutes and rinse off.
3. Rinse or hand-spray all surfaces with a cold disinfectant solution and leave to air-dry.
4. Rinse with clean water before using the equipment again.
5. Remember to inspect all areas before disinfecting after cleaning.

The concentrations, temperatures and contact time should be determined by the chemical supplier.

7.6.1 Cleaning equipment

All cleaning equipment should be in a good condition, clean and well-maintained. No wooden equipment should be used. The equipment should be stored in such a manner that it prevents contamination and to increase the durability of the equipment after cleaning, e.g. on special wall brackets.



Clear differentiation should be made between cleaning equipment used in the milking parlour and those used in the milking room to prevent cross-contamination. The equipment used in the different areas will be stored separately and in such a manner to ensure availability where it is needed. The equipment should be suitable for the area or equipment where it will be used, e.g. bulk tank brush.

The implementation of such a storage system will assist in:

- Reducing the risk of cross-contamination.
- Contributing to a reduction in cleaning costs.
- Increase the lifespan of the cleaning equipment.
- Assisting the users with a responsible attitude towards hygiene problems.
- Separating the different areas, e.g. by means of colour coding.
- Differentiate between cleaning equipment used on floors and those used for cleaning the inside of equipment.

The use of cleaning cloths and scouring pads is not advised due to the risk of cross-contamination, e.g. by being contaminated themselves or by being a source of foreign materials. If cloths are used, care should be taken to ensure that they are used only if they are laundered and disinfected or sterilised according to a documented schedule. Alternatively, disposable cloths or paper towels can be used.

SANS 10049

7.4.4.5 e) Cleaning and disinfection programmes shall include cleaning tools and equipment as follows:

1. Cleaning tools and equipment shall be clearly distinguishable for different areas, shall be of hygienic design and shall be made of suitable impervious material that will not present a potential source of contamination. All cleaning equipment shall be cleaned and stored properly when not in use.
2. Sufficient tanks for the complete immersion of loose pieces of equipment and hoses shall be made available.

Equipment shall not be cleaned in the milking machine basin due to the risk of cross-contamination.

7.6.2 Cleaning chemicals and disinfectants

Cleaning chemicals and cleaning procedures should not be a risk for food safety or product quality. Chemicals should adhere to the relevant legislation. Cleaning chemicals and disinfectants used in the milking shed shall be SABS-approved for use in the food industry. SANS 1828 (Cleaning chemicals for use in the food industry) and SANS 1853 (Disinfectants and Detergents-Disinfectants for use in the food industry) give details on the requirements and safety of cleaning chemicals, disinfectants and detergent-disinfectants used in the food industry. No household chemicals or chemicals from non-reputable suppliers shall be used. The material safety data sheets (MSDS) and/or technical data sheets (TDS) shall be available.

The following guideline will give an indication of the basic requirements:

1. All cleaning chemicals and disinfectants must comply with the following standards:

SABS (SANS) permit to apply the mark, SABS schedule with the names of the cleaning chemicals and disinfectants, SABS certificates shall be valid, all disinfectants must be registered in terms of the compulsory registration requirements.

2. Product containers and labelling:

Bulk product containers must be labelled to reflect the contents. All individual containers must be labelled with the supplier's name, registration numbers, SABS code (SANS 1828 and/or SANS 1853 certification) and instructions for use as well as safety details.

3. No fragrant products may be used.

4. Material safety data sheets must be available for all products used.

5. Chemical suppliers must provide the following training:

- Correct use of chemicals.
- Safety handling of chemicals.
- Personal hygiene.
- Cleaning practices.
- Cleaning schedules.
- Cleaning methods (CIP, hand cleaning).

6. An operations manual must be compiled by the chemical supplier. The file must contain the following information:

- *Occupational Health and Safety Act 85 of 1993* (acceptance letter).
- Copies of SABS registration certificates.
- Product data and safety sheets.
- Training record for personnel.

Safe storage of chemicals

The chemical storage area should be locked, well-lit, ventilated and clearly demarcated for chemical storage. All acidic products should be isolated from chlorinated, alkaline and neutral products.

All documents regarding the chemicals issued must be available. The different containers must not be stacked upon one another, leaving space between them. Ensure that all the drum lids are placed back and that bags are wrapped closed. Oxidising agents should be stored away from organic material such as wood and cardboard.

No flammable material and other farm chemicals are allowed in the same storage room. The dosing cups must be stored close to the containers. Access to the chemical room should be limited to trained personnel. Monitor the use of chemicals. Chemicals should be ordered in time to ensure that the wrong chemicals are not used. All chemicals need to be issued by a dedicated person.

SANS 10049

7.2.11.5 Storage facilities for substances used for cleaning and disinfection

Substances used for cleaning and disinfection, and the equipment for their application, shall be stored in a room in which no foodstuff, food-handling equipment, packaging materials or food containers are stored, and shall at no time come into contact with food containers, packaging materials, raw materials or the food product. All substances used for cleaning and disinfection shall be prominently and distinctly labelled.

7.4.4.5 (d)

1. All cleaning and disinfecting agents used shall be appropriate for their intended purpose and shall be suitable for use in food-handling areas.

2. Household cleaning chemicals and chemicals from non-reputable suppliers shall not be used. Disinfectants shall be registered by an appropriate regulatory authority.

3. The current Material Safety Data Sheets (MSDS) of cleaning chemicals and disinfectants shall be made available on the premises of the food-handling organisation, and acids and alkalis shall be stored and handled in accordance with these documents.

7.7 PERSONAL HYGIENE

Personal hygiene deals with the requirements on hand washing, prohibitions on spitting, smoking and eating in food-handling areas as well as the wearing of protective clothing. It also deals with the aspect of specified diseases and inspections on employees for cuts or sores. Management must ensure that effective personal hygiene procedures and practices are implemented. The most effective way to deal with this is to present all new employees with an induction programme and then to reinforce it through means of posters, clear instructions in ablution blocks, changing rooms and hand-washing facilities in the processing facility. There must be sufficient ongoing supervision of personal hygiene procedures to ensure that everyone complies with these procedures. Management itself must set a good example in order to achieve the proclaimed standards.

Regulation R961

Personnel hygiene – Milkers and handlers of milk

10. (1) In addition to sub-regulation 6(4), personnel hygiene facilities shall be made available to ensure that an appropriate degree of personal hygiene can be maintained and to avoid contaminating milk, where appropriate facilities shall include:

- (a) Adequate means of hygienically washing and drying hands, including hand-wash basins and a supply of hot and/or cold water, soap and disinfectant.
 - (b) Toilets of appropriate hygienic design.
 - (c) Adequate changing facilities for personnel.
- (2) Such facilities shall be suitably located and designed.
- (3) The hands and fingernails of every milker or handler of milk shall be washed thoroughly with soap and water, and there shall be no accumulation of grime under the nails when milk is handled.
- (4) Each person handling milk, shall daily before the commencement of activities or work put on clean and undamaged over-clothes and gumboots and wear them continuously while he is handling milk in the interests of milk safety and suitability to use.
- (5) Milk shall not be handled by any person:
- (a) Who has on his or her body a suppurating abscess, sore, cut or abrasion, unless such abscess, sore, cut or abrasion is covered with a moisture-proof dressing which is firmly secured to prevent contamination of the milk.
 - (b) Who is suspected of suffering from or bring a carrier of a disease or condition in its contagious stage that can be transmitted by food or animals, unless any such person immediately reports the disease or condition to the person in charge and a certificate by a medical practitioner stating that such person is fit to handle food is submitted.
 - (c) Whose hands or clothing are not clean.

ISO/TS 22002-3

5.5 Personnel hygiene

Personnel shall maintain an appropriate degree of personal cleanliness and behave and operate in a manner that is appropriate to the required degree of hygiene. The organisation shall maintain a level of personal competency that is sufficient to implement this requirement.

The organisation shall:

- a) Establish and communicate practices for personal cleanliness, behaviour and operation that are appropriate to the operations carried out.
- b) Maintain communication and personal competency (including temporary personnel) that implement and maintain these practices.
- c) Whenever appropriate, maintain practices to ensure that visitors do not represent a source of contamination.

Depending on the operations and where appropriate to minimise the likelihood of food contamination, examples of PRPs that should be implemented are designed for personnel to:

1. Wear suitable protective clothing, head coverings and footwear that are cleaned or changed regularly.
2. Wash hands frequently, with or without specifying when (e.g. after visits to toilet, prior to handling of food, milking or collection of eggs).
3. Promote the voluntary reporting of personal health conditions that may contaminate foodstuffs and animals.

4. Cover injuries on hands or forearms with suitable waterproof dressings.
5. Prohibit smoking in areas where food products are handled.
6. Restrict personal belongings brought into food-handling areas.
7. Restrict entry to the farm.
8. Train on the use of chemical products (e.g. plant protection products).
9. Train on harvesting and handling of specific products (e.g. milking, fish harvesting, placing poultry into crates, egg handling, handling of fragile fruits).
10. Ensure effective communication on hygiene practices, e.g. graphical display of hand-washing technique.

Documentation should include a description of the personal hygiene practices applicable.

SANS 10049

7.6.3 Personnel hygiene and personal effects

7.6.3.1 Food-handling personnel shall, at all times, maintain a high degree of personal cleanliness and conform to hygienic practices while on duty. They shall be trained and educated in personal cleanliness and hygienic practices. Adequate control shall be exercised to ensure that employees are in compliance with the hygienic requirements (such as supervision at the hand-washing facilities) before commencing work at the beginning of a work shift and after breaks.

7.6.3.2 Before starting work, after each absence from the food-handling areas, at regular intervals during food handling or at any time when necessary, food-handling personnel shall wash their hands with warm water and an acceptable unscented liquid soap or hand-cleaning detergent (see 7.2.9), and rinse them in clean, running water. Disinfection of hands shall be implemented where necessary.

7.6.3.3 Hygiene facilities shall be suitably maintained in a functional state and supplied with soap, soap dispensers, disinfectors, drying equipment and waste receptacles at all times.

7.6.3.4 Containers used in the preparation, processing or packaging of the food product shall not be used for any other purpose.

7.6.3.5 Neither personnel's personal effects nor their food shall be present in any area where the food product and its ingredients and packaging materials are handled and stored. Their personal effects, including their personal clothes, shall be kept in lockers or hangers provided for this purpose in the change rooms (see 7.2.12.1).

7.6.3.6 The use of chewing gum and tobacco (in any form) shall not be permitted within areas where the food product and its ingredients and packaging materials are handled or stored. Spitting shall not be allowed anywhere within the premises of the food-handling organisation. Notices to that effect shall be posted strategically (see 7.5.4).

7.6.3.7 Neither varnish nor lacquer shall be used on fingernails, and fingernails shall be kept short and clean. False eyelashes and false fingernails shall not be worn.

7.6.3.8 Artificial eyelashes shall not be worn.

7.6.3.9 When hair extensions, dreadlocks or any artificial hair is worn, it shall be adequately covered to prevent any contamination to the food handling areas.

7.6.3.10 Jewellery, except for plain wedding bands which need to be suitably covered, shall not be worn by employees who handle raw materials or the unprotected food product (or both). Types of jewellery which may be worn, taking into account religious, ethnic, medical and cultural imperatives, shall be specified. Control measures to minimise the risks presented by permitted jewellery shall be in place.

7.6.3.11 Sanitary bins shall be provided and shall be managed and maintained to ensure safe and hygienic conditions.

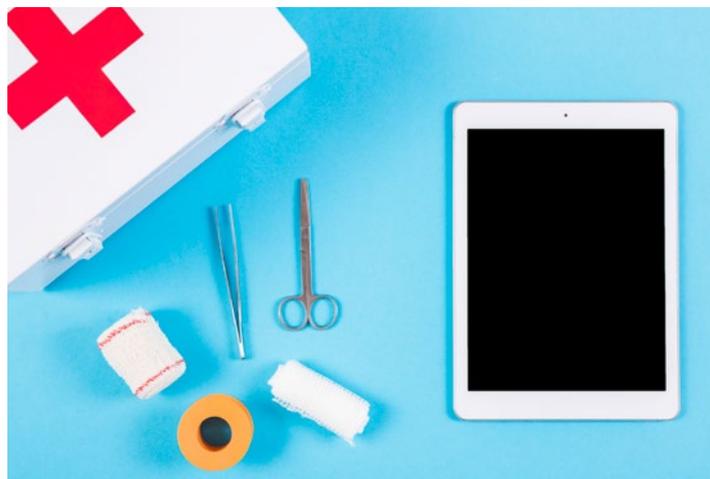
7.4.6.9 Pets shall not be permitted on the premises of a food-handling organisation.

7.7.1 Illness and injuries

People known, or suspected, to be suffering from or to be a carrier of a disease or illness likely to be transmitted through milk, should not be allowed to enter any milk-handling area if there is a likelihood of them contaminating food. Any person affected should immediately report illness or symptoms of illness to the management. A medical examination of a food handler should be carried out if clinically or epidemiologically indicated.

Conditions which should be reported to management so that any need for medical examinations and/or the possible exclusion of personnel from milking and milk handling can be considered include:

- Jaundice.
- Diarrhoea.
- Vomiting.
- Fever.
- Sore throat with fever.
- Visibly infected skin lesions (boils, cuts, etc.).
- Discharges from the ear, eye or nose.
- TB, coughing.



An illness agreement should be explained to and signed by all personnel. Annual medical examinations shall be conducted to ensure that all personnel are fit to handle milk. A daily hygiene inspection

must be implemented. Hands should be inspected for sores, cuts and infections. If personnel have sores, cuts or infections, it needs to be cleaned and a waterproof plaster should be issued.

Should the facility issue gloves with the plaster, effective management of the gloves must be implemented, e.g. washing and/or disinfection, and inspection to ensure that the gloves are still intact. The plaster, and glove when applicable, must be issued and be replaced with every milking. All gloves must be safely disposed of when leaving the production area. Plasters need to be readily available at the milking shed, e.g. in first-aid kits. These first-aid kits must be clearly displayed and labelled, and must be kept fully stocked with adequate first-aid equipment and instructions.

Records of illnesses, cuts and sores should be implemented.

ISO/TS 22002-3

5.5 Personnel hygiene

People known to be infected with, or carrying, a disease or illness transmissible through food or food-producing animals shall be prevented from handling food-producing animals, foods and materials which come into contact with food.

SANS 10049

7.7 Medical conditions

7.7.1 A documented procedure shall be established for the proactive identification, monitoring, communication and management of controls required for the administration of health conditions of personnel that can have an influence on food safety.

7.7.2 The documented procedure shall as a minimum include the following:

- a) Appointing of a nominated person or persons to manage this documented procedure. This person(s) shall have the responsibility and authority to make decisions and to take the most appropriate action.
- b) Supplying information and knowledge to personnel on health conditions.
- c) Reporting health conditions prior to starting work and then after returning from leave or sick leave (or both).
- d) Maintaining of records of the procedure.

7.7.3 Management shall ensure that no person with the following conditions shall be allowed to enter an area where exposed food or food contact materials is handled until free of the following symptoms:

- a) Infection of the eyes or eyelids.
- b) Discharge of the ears, mouth, nose.
- c) Vomiting.
- d) Diarrhoea.
- e) Skin disorders such as boils, infected wounds on the face, neck, forearms and hands.
- f) Flu and its related symptoms such as coughing, sneezing, runny nose or sweating (or both).
- g) Sufferers or carriers of a disease likely to be transmitted through food.

7.7.4 Clean cuts, scratches or spots not infected shall be covered with a water-proof dressing in a colour different from the food being handled

and the wound and its dressing shall be covered so as to ensure that the infection or the contamination of the food product is no longer possible.

7.7.5 Appropriate first-aid equipment shall be provided. First-aid personnel shall be made available and shall be appropriately trained.

7.7.2 Personal cleanliness

Food handlers should maintain a high degree of personal cleanliness and, where appropriate, wear suitable protective clothing, head coverings and footwear. Cuts and wounds, where personnel are permitted to continue working, should be covered with suitable waterproof dressings.

Personnel should always wash their hands when personal cleanliness may affect food safety, for example:

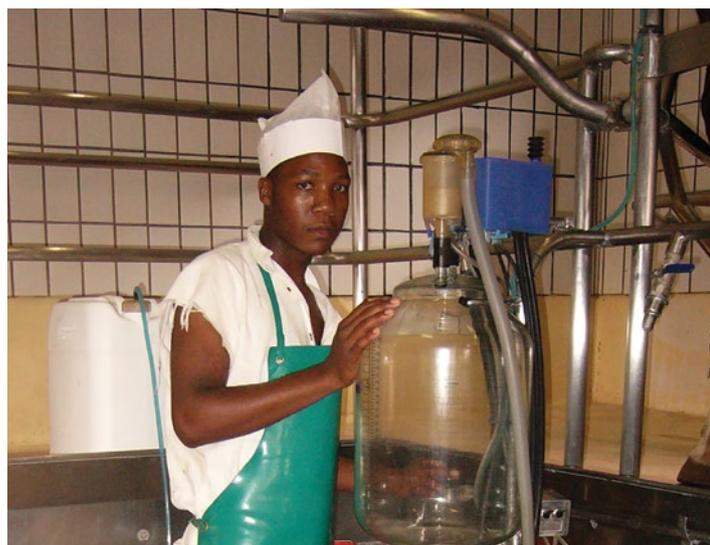
- At the start of food-handling activities.
- Immediately after using the toilet.
- Before udder preparation.
- After a dirty udder had been cleaned.
- After handling raw food or any contaminated material.

7.7.3 Personal behaviour

People engaged in food-handling activities should refrain from behaviour, which could result in the contamination of food, for example:

- Smoking.
- Spitting.
- Chewing or eating.
- Sneezing or coughing.
- Wearing jewellery.

No smoking, eating, drinking and jewellery signs should be posted in the milk room and milking parlour.



7.7.4 Protective clothing

It is the responsibility of management to provide personnel with clean and well-maintained protective clothing. The protective clothing should not be removed from the milking shed premises by

the personnel to be washed and should not be worn while doing any other work on the farm. Protective clothing should include, as a minimum, gumboots, an apron and overalls, preferably a two-piece. This should preferably be white. A dedicated area for the hygienic storage of the protective clothing and gumboots should be available. This area should ensure that the protective clothing will not be contaminated during storage. These clothes should stay at the parlour and should be washed on site with clean hot water.

Cleaning equipment must be provided for the effective cleaning of the gumboots. Gumboots should be kept clean and in good repair. It is considered best practice that such footwear is not worn outside the milking parlour or milk room. If possible, dedicated personnel should enter the milk room and not the milkers.

Regulation R961

Personnel hygiene – Milkers and handlers of milk

10. (4) Each person handling milk, shall daily before the commencement of activities or work put on clean and undamaged over-clothes and gumboots and wear them continuously while he is handling milk in the interests of milk safety and suitability to use.

7.7.5 Change room

Regulation 1256

6 (4) A change room shall:

- (a) Comply mutatis mutandis with sub-regulation (2)(e), (i), (f), (g), (h) and (i).
 - (b) Have at least one hand basin and shower provided with hot and cold running water, soap disinfectant and disposable towels, and the used water from such hand-wash basin and shower shall adequately drain into a disposal system.
 - (c) Be within easy reach of the milking parlour and milking room.
- (2) (e) Where walls are provided, the exterior walls:
 - (i) Shall be at least 2,4 metres high on the inside.
 - (f) The interior surfaces of the walls, if provided, shall be made of impervious materials with no toxic effect in intended use.
 - (g) The ceilings, if provided, or overhead structures and fixtures shall be constructed and finished to minimise the build-up of dirt and condensation, and the shedding of particles.
 - (h) The floors shall be constructed to allow adequate drainage and cleaning.
 - (i) Shall be adequately ventilated and illuminated.

7.7.6 Personnel hygiene facilities

Regulation R961

Personnel hygiene – Milkers and handlers of milk

10. (1) In addition to sub-regulation 6(4), personnel hygiene facilities shall be made available to ensure that an appropriate degree of personal hygiene can be maintained and to avoid contaminating milk, where appropriate facilities shall include:

- (a) Adequate means of hygienically washing and drying hands, including

hand-wash basins and a supply of hot and/or cold water, soap and disinfectant.

- (b) Toilets of appropriate hygienic design.
- (c) Adequate changing facilities for personnel.

(2) Such facilities shall be suitably located and designed.

(3) The hands and fingernails of every milker or handler of milk shall be washed thoroughly with soap and water, and there shall be no accumulation of grime under the nails when milk is handled.

Appropriate ablution facilities must be provided to all personnel. Hand-washing facilities should be provided for personnel entering the milk room and milking parlour. The tanker driver must also have access to these hand-washing facilities. These hand-washing facilities should only be used for hand washing and should adhere to the following requirements:

- Instruction sign.
- Hand washing only.
- Hot and cold water.
- Anti-microbial soap.
- Drying facilities such as disposable paper towels.
- Bin used solely for the purpose of paper towel disposal.

SANS 10049

7.2.9 Hand-washing facilities

7.2.9.1 The following shall be provided at the entrances to the food-handling areas that are used by employees, at other conveniently situated places within easy reach of the employees and at the toilet exits:

- a) A sufficient number of hand-wash basins, troughs or washing fountains with an abundant supply of hot and cold or warm potable running water, in the temperature range 40°C to 50°C, that complies with the requirements of 7.4.1.
- b) A sufficient supply of unscented liquid soap or hand-cleaning detergent and, where appropriate, a hand disinfectant, and to dry hands, single-use disposable paper towels.
- c) A suitable means to hygienically dry hands.
- d) Refuse bins of hygienic construction.

7.2.9.2 Hand-washing facilities shall, at all times, be unobstructed by equipment and operating activities. Hand-wash basins shall be of a suitable corrosion-resistant water-impermeable material, shall have a smooth finish, shall be easy to clean and shall drain directly into drainage channels.

7.2.9.3 Disinfectant hand dips are not recommended but where in use, they shall be of such design that they can be adequately cleaned.

7.2.9.4 Hand basins shall not be used for any other purpose.

7.4 Hygienic operating requirements

7.4.1 Water

7.4.1.1 Water used in contact with food-contact surfaces, shall comply with the requirements of SANS 241 (regardless of the source of the water). Appropriate facilities for the storage, distribution and, where needed, temperature control of the water shall be provided.

7.4.1.2 Every food-handling area shall have an adequate supply



of clean potable water that is free from suspended matter and substances that could be deleterious to the food product or harmful to health. Non-potable water shall have a separate, identified system that is not connected to and is prevented from reflux into the potable water system.

7.8 TRAINING

Regulation R961: Personnel hygiene – Milkers and handlers of milk

10 (6) All employees shall be subjected to personal and food hygiene training relevant to the production and handling of milk and in the case of new employees prior to the commencement of handling milk. Records of such training must be made available to an inspector on request.

(7) The holder of a certificate of acceptability for a milking shed shall undergo training on food safety and hygiene aspects of the production and handling of milk by an accredited service provider.

ISO/TS 22002-3

5.5 Personnel hygiene

Personnel shall maintain an appropriate degree of personal cleanliness and behave and operate in a manner that is appropriate

to the required degree of hygiene. The organisation shall maintain a level of personal competency that is sufficient to implement this requirement.

The organisation shall:

- a) Establish and communicate practices for personal cleanliness, behaviour and operation that is appropriate to the operations carried out.
- b) Maintain communication and personal competency (including temporary personnel) that implement and maintain these practices.

SANS 10049

7.6 Requirements for personnel engaged in the handling of the food product

7.6.1 Training

7.6.1.1 Personnel engaged in the handling of the food product shall possess sufficient knowledge and expertise to carry out assigned tasks. All personnel shall be competent in the handling and production of safe food.

7.6.1.2 In order to provide personnel with the necessary competencies, training shall be provided, taking into account:

- a) The technical competencies required for the position or operation.
- b) Current skill levels and experience of trainees.
- c) The nature of the food product and food-handling activities.

7.6.1.3 Appropriate training regarding the safe handling of food, in accordance with food safety requirements, shall be conducted at the beginning of employment and this training shall be documented.

7.6.1.4 Periodic assessments of the effectiveness of training programmes shall be carried out in addition to routine supervision and checks that procedures are being followed. Records thereof shall be maintained.

7.6.1.5 Records of experience, expertise, educational qualifications and training of the employees concerned shall be maintained.

7.6.1.6 Managers and supervisors shall have the necessary knowledge of food hygiene principles and practices, as well as of the relevant food safety requirements, to enable them to judge potential hazards and to take the necessary action(s) to remedy non-conformities.

Implementing a training programme for the food handlers working on a dairy farm is essential for the implementation of an effective food safety system. Every farmer and every employee of a dairy farm must have the technical knowledge necessary to perform his job correctly. It is essential that every milk producer regularly ensures that all the personnel operate at a sufficient competency level. This will include all internal training, training provided by cleaning chemical suppliers, milking equipment suppliers as well as other relevant external training.

Objective of training programmes

Those staff members who are engaged in milking operations and come directly or indirectly into contact with milk, should be trained and/or

instructed in food hygiene to a level appropriate to the operations they are going to perform. Training is fundamentally important to any food safety system. Inadequate hygiene training, and/or instruction and supervision, of all people involved in food-related activities pose a potential threat to the safety of food and its suitability for consumption.

Awareness and responsibilities

- All personnel should be aware of their role and responsibility in protecting food from contamination or deterioration.
- Food handlers should have the necessary knowledge and skills to enable them to handle food hygienically.
- Those who handle strong cleaning chemicals or other potentially hazardous chemicals should be instructed in safe handling techniques.

Training programmes

Factors to take into account when assessing the level of training required include:

- The nature of milk, in particular its ability to sustain growth of pathogenic or spoilage micro-organisms.
- The manner in which the milk is handled, including the probability of contamination.
- The conditions under which the milk will be stored.
- Hazards that may be introduced to the milk.

Instruction and supervision

Periodic assessments of the effectiveness of training and instruction programmes should be made, as well as routine supervision and checks to ensure that procedures are being carried out effectively. Assessment may be an observation.

Managers and supervisors of milk production facilities should have the necessary knowledge of food hygiene principles and practices to be able to identify and judge potential risks and take remedial action.

Refresher training

Training programmes should be routinely reviewed and updated where necessary. Systems should be in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food. The following minimum training should be done in the milking shed:

- Personal hygiene.
- Agreement to illness report.
- Hand-washing procedures.
- Cleaning schedules.
- Handling of cleaning chemicals.
- Milking procedures.
- Milk testing (mastitis test).
- Animal health, treatment and welfare.
- Milk storage.
- Corrective actions.

Records of the training must be kept.



Good dairy farming practices: Hygiene		
Good dairy farming practice (GFP)	Examples of suggested measures for achieving GFP	Objectives
Implement effective general hygiene practices.	<ul style="list-style-type: none"> • Compile and implement an effective cleaning and disinfectant programme for the milking shed, including the milking parlour and milk room. • Obtain work instructions from a reputable cleaning chemical supplier. • Ensure that all cleaning chemicals and disinfectants are SABS-approved. • Store cleaning chemicals in a locked facility. • Implement separate cleaning equipment for the milking parlour and milk room, and differentiate between equipment used on the floor and these used for milk equipment. • Water for cleaning and disinfection should comply with SANS 241. • Provide training in the cleaning and disinfection procedures. • Implement records. 	<p>Ensuring the effective implementation of a cleaning and disinfectant programme.</p> <p>Secure storage of chemicals and separation of cleaning equipment limit the risk of contamination.</p>
Implement effective personnel hygiene practices.	<ul style="list-style-type: none"> • Implement medical screening, illness and injury reporting. • Effectively address personal behaviour and cleanliness. • Provide clean and well-maintained protective clothing to personnel. • Provide adequate change-over and ablution facilities which comply with all requirements. • Provide adequate hand-washing facilities with warm water and soap 	<p>Dairy farming practices ensure the effective implementation of personal hygiene.</p> <p>Effective personal hygiene practices limit the risk of cross-contamination.</p>
Implement an effective training programme.	<ul style="list-style-type: none"> • Provide training on personal hygiene, SOPs, animal health and treatment, handling of chemicals, milk testing, milk storage and corrective actions. • Ensure that the responsibilities of all personnel are determined and communicated. • Choose competent sources for advice and interventions. • Knowledge and awareness of charters for good dairy practice and guidelines should be promoted. • Implement records. 	<p>Knowledge of the hygiene, animal health and milking practices strengthen the implementation of the food safety system.</p>

OrbeSeal[®]

INTERNAL TEAT SEALANT



**ORBESEAL[®] HAS PROVEN
TO BE EFFECTIVE IN
REDUCING CLINICAL
MASTITIS BY AN
AVERAGE OF 34 %.¹**



References:
1. Rabiee AR, Lean LJ. 2013. The effect of internal teat sealant products (Tealseal and OrbeSeal) on intramammary infection, clinical mastitis, and somatic cell counts in lactating dairy cows: A meta-analysis. J. Dairy Sci 96:6915-6931.

FOR ANIMAL USE ONLY
OrbeSeal[®], Reg. No.: G4174 (Act.36/1947). Each 4 g syringe contains an intramammary suspension with 65 % Bismuth Subnitrate.

For full prescribing information refer to the package insert approved by the medicines regulatory authority.
Full product information available from Zoetis South Africa (Pty) Ltd., Co. Reg. No.: 2012/001825/07, 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. PostNet Suite 53, Private Bag 9976, Sandton, 2146. South Africa. Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). www.zoetis.co.za
Ref. No.: RU/BVH/04/21/03

zoetis

CHAPTER 8

A food safety system is the structure used by an organisation to indicate the required responsibilities, procedures, processes and resources. Documents used in a food safety system should be kept in a controlled area and dedicated personnel shall be responsible for the keeping of master copies, distribution of copies, completion and filing of records. The basis for the food safety system is the management responsibility and commitment policy in which the owner displays the responsibility for the food safety system and the production of high-quality and safe milk.

8.1 GUIDELINES FOR THE DEVELOPMENT OF A DOCUMENTATION SYSTEM

- Identify the requirements and define whether or not a document is required.
- Write a policy/procedure/work instruction that will accurately demonstrate the needs of the organisation in meeting the requirements.
- Ensure that records are kept and maintained which will demonstrate that the requirements are being met.
- Policies must be communicated to all personnel and appropriate training must be given to all staff members during the

implementation of a procedure/work instruction.

- Personnel must sign the training records to demonstrate their commitment and awareness.

8.2 BENEFITS OF DOCUMENTATION

- A documentation system ensures that a standard working procedure is developed.
- Activities can be carried out in a structured way and the effectiveness can be evaluated and corrected.
- Documented procedures and work instructions assist in meeting legislation pertaining to the employer's liabilities.
- Documentation must reflect the day-to-day activities.
- The documentation system must be simple and efficiently controlled.
- Documents require records to prove that procedures and work instructions were performed and that corrective actions were implemented effectively.

The following are the minimum documentation and records recommended by the DSA:

Document	Reference
Management responsibility and commitment policy.	SANS 10049
Milking shed acceptability certificate as per Regulation R961.	R961
List of animals with identification numbers.	R961
TB declaration.	R961
CA declaration.	R961
Register kept of each separate milk animal's: <ul style="list-style-type: none"> • Diseases. • Each withdrawal from dairy herd. • Each return to the dairy herd for milking purposes. • Veterinary examinations done. • Veterinary treatment (antibiotics). • Name of veterinary surgeon (if applicable). 	R961
Register of vaccinations and anti-parasitic products used.	SANS 10049
Master cleaning schedule and cleaning work instructions.	SANS 10049
Safety data sheets from chemical supplier and SABS certificates.	SANS 10049
Record of water temperature during cleaning programme.	SANS 10049
Post-cleaning checklist.	SANS 10049
Records of all external maintenance done on equipment: <ul style="list-style-type: none"> • Date. • Type of repair. • Person responsible for repair. (All equipment that come into contact with milk are included, e.g. milking machine, milk tank, thermometers, etc.) Evidence of the vacuum of the milking machine being tested at least once a year by a technically competent person.	SANS 10049
Records of all internal maintenance done on equipment: <ul style="list-style-type: none"> • Date. • Type of repair. • Person responsible for repair. (Equipment may include teat cup liners.)	SANS 10049

Pest-control programme. Records of all pesticides and insecticides used, as well as date administered.	SANS 10049
Waste management programme.	SANS 10049
Records of daily milk bulk tank temperatures. Evidence that the bulk tank and ancillary equipment are capable of cooling the milk to the required temperature (4°C within 60 minutes).	SANS 10049
Records of microbiological and chemical analyses of all water that comes into contact with food contact surfaces (coliforms \leq 10 cfu/100ml, <i>E.coli</i> 0 cfu/100 ml). Two conforming test results demonstrate compliance.	R961 SANS 10049 SANS 241
Records of microbiological analyses done on raw milk (total plate count \leq 200 000 cfu/ml, coliforms \leq 20 cfu/ml, <i>E. coli</i> absent).	R1555
Records of somatic cell counts.	R1555
Records for inhibitory substances, e.g. antibiotics.	SANS 10049
Records for melamine testing.	SANS 10049
Records for aflatoxin testing.	SANS 10049
Delivery documents or stock registers of all purchased animal feed.	SANS 10049
Training schedule and records.	SANS 10049
Medical certificate for personnel working in the milking shed.	SANS 10049
Illness agreement in place. Records of illness reports and inspections done on personnel.	SANS 10049
Records of corrective actions performed on non-conformities.	SANS 10049

Audit or inspection format for milking sheds as recommended by Dairy Standard Agency

Categories				
1. Documentation				
2. Milk parlour				
3. Milk room				
4. Staff				
5. Grounds				
TOTAL:				

Documentation

Farm/owner/herd details	
Name and registration number of farm	
Co-ordinates of farm	
District	
Name of owner	
Postal address	
Telephone/cellphone number	
Total number of animals	
Number of animals in lactation	
Total annual milk production	
Milk quota per year	
Number of workers	
On-farm production products	
Type of milking parlour	
Milking times per day	
Frequency of milk collection	

Frequency of milk sample collection			
Water source	Local authority	Borehole	Surface water
Name of attending veterinarian			
Frequency of visits			
Last two visits (dates)			
Local authority			
Name of health inspector and telephone number			
Last two visits (dates)			

Documents and records		Yes	No
1	Certificate of acceptability per Regulation 961		
2	Register of animal examination every two years by veterinary surgeon		
3	Animal health certificates for TB-free animals		
4	Animal health certificates for BM-free animals		
5	Register of vaccinations		
6	Register of anti-parasitics used		
7	Register of antibiotics used		
8	Register of antibiotic withdrawal periods before rejoining the herd		
9	Records of separate milking of cows being treated with antibiotics		
10	Records of other treatments of cows		
11	Milk bulk tank room protected from insects and other pests (e.g. effective pest control programme)		
12	Register of daily milk bulk tank temperatures		
13	Milk collection on a daily/second day basis		
14	Daily milk bulk tank samples taken		
15	Udder washing		
16	Teat dipping		
17	General hygiene – cleaning schedule for premises, structure and equipment		
18	Records of maintenance programme for equipment		
19	General hygiene – cleaning schedule for equipment milking shed and milking room		
20	Records of inspections in hand-washing procedures		
21	Water source – water originates from a river/farm dam		
22	Water source – register of microbiological analysis of treated water		
23	Water source – register of chemical analysis of treated water		
24	Water source – register of daily chlorine analysis of treated water		
25	Register of total bacterial counts, coliforms and <i>E.coli</i> (one year results)		
26	Register of total somatic cell counts (one year results)		
28	Register of staff reporting illnesses and communicable diseases		
29	Records of inspections on staff members for sores, abscess on hands, necks etc.		
30	Written contract with milk buyer/processor		
31	List of animals with number identification		
32	Maintenance programme and records of equipment		

Milking shed inspection list

2 Milking parlour		Yes	No	Comment
1	Clean and tidy (free from accumulating dung)			
2	Washable finish for doors, floors and walls			
3	External doors and windows well-fitting and weatherproof			
4	Floors are well-drained, complete and undamaged			
5	Ceilings or roof linings minimise accumulation of dirt and dust and space for vermin			
6	Adequately lit			
7	Protective coverings for lights (physical contamination)			
8	Clean and properly maintained equipment (e.g. pipelines, jars, clusters)			
9	Free as possible from dust			
10	Clear of products, chemicals and items not in use			
11	Chemicals and medicine stored separately in a locked/controlled facility			
12	Effective pest-control programme			
13	Waste bins			
14	Access to running water			
15	Access to paper towels			
16	Hand-washing facilities			
17	Hand-washing soap			
18	Not in contact with toilet, gaseous substances, etc.			
Milking practice				
19	Teat dip/spray sanitiser (Name of product:.....)			
	Approved?			
20	Pulsator rate: 40-60 per minute			
21	Cleaning of milking machine			
22	Maintenance of utensils (e.g. brushes)			
23	Cleaning of utensils			
Cleaning and disinfection of milking equipment				
24	Cleaning programme (temperature and time)			
25	CIP cleaning			
26	Manual cleaning of utensils			
27	Manual cleaning of bulk tank			
28	Disposal of effluent			

3	Milk room	Yes	No	Comment
1	Clean and tidy (free from accumulated dirt)			
2	Separated from milking area			
3	Washable finish for doors, floors and walls			
4	External doors and windows well-fitting and weatherproof			
5	Windows that can open, fitted with fly screens			
6	Well-drained, complete and undamaged floors			
7	Ceilings or roof linings minimise accumulation of dirt, dust and space for vermin			
8	Adequately lit			
9	Protective coverings for lights (physical contamination)			
10	Effective pest-control programme			
11	Clean and properly maintained equipment			
12	Free as possible from dust			
13	Clear of products, chemicals and items not in use			
14	Free from foul smells			
15	Access to running water			
16	Access to paper towels			
17	Hand-washing facilities and soap			
18	Waste bins			
19	Externally cleaned bulk tank with routinely closed lid			
20	Bulk tank thermometer			
21	Well-drained concrete or similar surface collection area			
22	Well-cleaned collection area			
23	Length of pipeline from bulk tank to tanker < 6m			
24	Unobstructed access enabling safe milk collection			
25	Disposal system for effluent (pipelines/cement ditches)			
Milk cooling equipment				
26	Thermometer			
27	Recording of bulk milk temperature three hours after milking < 5°C			
28	Length of time stored			
29	Temperature during inspection			
30	Cooling system used:			
	<i>Plate cooler</i>			
	<i>Cooling through agitation</i>			
31	Effective agitation			

Cleaning and disinfection of milk cooling equipment				
32	Cleaning equipment stored on rack marked for floors/ inside of equipment/outside of equipment			
33	Cleaning programme (temperature and time)			
34	CIP cleaning			
35	Manual cleaning of utensils			
36	Manual cleaning of bulk tank			
37	Chemicals store in dedicated area with cups marked for dosages			
38	Disposal of effluent			

4 Milking shed staff and staff facilities				
1	Daily provision of clean protective clothing			
2	General hygiene (smoking, eating, coughing, etc.)			
3	Cuts and wounds covered with appropriate waterproof dressing			
4	Clean hands and arms during milking			
5	Clean and tidy			
6	Hand-washing facilities and soap			
7	Paper towels for hand drying			
8	Appropriate restroom facilities			
9	Waste bins			
10	Access to clean water			

5 Grounds (outside area)				
1	Grass cut short, no weeds and litter			
2	Gutters clean from leaves and branches			
3	Litter and waste stored away from milking shed			
4	No stagnant water			
5	Access permitted with a fence			
6	No birds nesting on roof			
7	Engineering equipment and materials stored in orderly manner			

8.3 STANDARD FOR RAW MILK

The standard for raw milk as described in Act 54 of 1972.

Regulation R1555 (Antibiotic Residues)

2. No person shall use or sell raw milk intended for further processing which:

(a) Contains the following:

(i) Antibiotics or other antimicrobial substances in amounts that exceed the maximum residue levels stipulated in the Regulations governing Maximum Limits for Veterinary Medicine and Stock Remedy Residues that may be present in Foodstuffs (Government Notice No. R. 1809 of 3 July 1992, as amended, hereafter referred to as the Maximum Limits for Veterinary Medicines and Stock Remedy Residues Regulations) or which by virtue of a presumptive test is suspected to contain antibiotics or other antimicrobial substances in amounts that exceed such maximum residue levels.

Regulation R1555 (Microbiological Quality)

2. No person shall use or sell raw milk intended for further processing which:

(a) Contains the following:

(ii) Pathogenic organisms, extraneous matter or any inflammatory product or other substances which for any reason whatsoever may render the milk unfit for human consumption.

(c) Gives a standard plate count of more than 200 000 colony forming units per 1,0ml when subjected to the standard plate count test described in paragraph 7 of Annex A or the dry rehydrated film method for standard colony count described in paragraph 10 of Annex A.

Regulation R1555 (Somatic cell counts)

(g) In the case of raw milk, on subjection to the Standard Method for Counting Somatic Cells in Bovine Milk, is found to contain an average of 500 000 or more somatic cells per 1,0ml of bovine milk or an average of 750 000 or more cells per 1,0ml of goat's or sheep's milk after three successive readings at intervals of at least seven days during the test period, or which shows any other signs of abnormal secretory activity of the mammary gland(s).

8.4 RECOMMENDED TESTS ON THE FARM

Mastitis test

Each animal should be tested for signs of mastitis before each milking. Extra care should be taken to ensure that each animal is

Criteria for on-farm milk collection

Organoleptic (smell)	No taints or odours
Temperature	< 4°C
Alizarol	68% v/v or as required by processor
Sediment/insects	Absent
Clot on boiling test	No clot

tested properly and that all quarters are tested individually, using the California Mastitis Test (CMT). With this test a pink-coloured reagent is poured into a CMT plate with four dishes. The milker then squirts milk from each udder into a specific dish, swirls to mix the milk and reagent and observes the reaction.

Positive: Sample turns purple with a slime texture.

Negative: No colour change.



The mastitis cup test

With the mastitis cup test a milker will again squirt milk from each quarter into a cup with a grid. If the cow has mastitis, there will be thickened milk parts that will stick to the grid. If the grid is clean after the milk has been squirted onto it, the test is negative for mastitis.



Somatic cell counts, total bacterial counts, coliforms and *E. coli*

Total bacterial counts, coliforms and *E. coli* must be tested at least weekly and somatic cell counts monthly. Although many processors do these tests for their producers, it remains the responsibility of the producer to have these tests done. Records of these tests must be kept for inspections.

Aflatoxins, melamine and pesticides

Some processors perform these tests for their producer, but it remains the responsibility of the producer to have these tests done at least once a year.

Temperature

The temperature of the milk in the bulk tank must be recorded three hours after milking to check whether appropriate cooling has taken place, with follow-up checks every five hours until the milk is collected. On collection the tanker driver must take the temperature of the milk before it is accepted (the temperature should be $<4^{\circ}\text{C}$). The producer may request the tanker driver to enter this temperature in the milk shed records as well.

Taste and smell

Milk should look like milk, taste like milk and smell like milk with no off flavours or taints.

Ethanol stability test

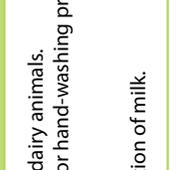
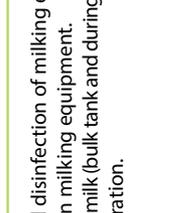
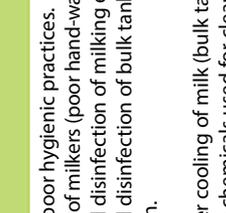
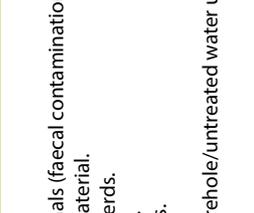
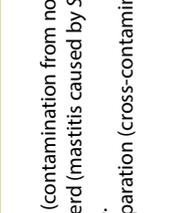
Alizarol 68% or 72% (v/v) is required by the processor. The tanker driver performs this test before accepting the raw milk. The test indicates the heat stability of milk and protein stability for further processing.



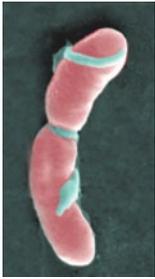
Criteria for the Alizarol test

Milk	Ph	% Ta	Flocculation	Colour
Fresh milk	6,60 – 6,75	0,14 – 0,16	None	Light purple
Slightly sour	6,30 – 6,50	0,17	Possible small flakes	Brownish-pink
Sour	6,00 – 6,20	0,18 – 0,19	Small flakes	Brownish-yellow
Very sour	$<6,00$	0,20+	Big/large flakes	Yellow
Sweet coagulation	6,60 – 6,75	0,14 – 0,16	Big/large flakes	Light purple
Mastitis	6,80 +	NA	Small flakes	Violet
Added alkaline	6,80 +	NA	None	Violet

1. Possible problem areas referring to micro-organisms in raw milk

Analyses	Organism	Source or reason
<p>*Cfu = colony forming units</p> <p>Violet red bile MUG agar</p> 	<p>Petrifilm</p> <p>Escherichia coli (E. coli): This organism is an indicator organism of faecal contamination due to poor hygienic practices as well as poor milking practices. It is also a pathogen that may cause illnesses and may not be present in the milk according to regulations.</p>	<p>Source or reason</p> <ul style="list-style-type: none"> Faecal contamination from dairy animals. Poor hygienic practices (poor hand-washing practices – human faeces). Poor milking practices. Poor water quality. Poor hygiene during collection of milk.
<p>Standard plate count agar</p> 	<p>Total plate count (TPC) or standard plate count (SPC): This is a basic quality test that is a measure of the total number of bacteria in the milk. It reveals general sanitation and herd health conditions.</p> <p>Legislation: ≤ 200 000 *cfu/ml for raw milk intended for further processing. ≤ 50 000 cfu/ml for raw milk intended for final consumption.</p>	<p>Source or reason</p> <ul style="list-style-type: none"> Improper cleaning and disinfection of milking equipment. Lack of maintenance on milking equipment. Improper cooling of the milk (bulk tank and during transportation). Improper udder preparation. Poor animal health. Poor water quality.
<p>Analyses</p> <p>Violet red bile agar (can be performed in combination with <i>E. coli</i> on VRB MUG Agar)</p> 	<p>Organism</p> <p>Coliforms: This procedure is a more specific bacterial test for the quality of the milk. It is an indicator of proper sanitation. High counts can be caused by poor herd hygiene, improperly washed and maintained equipment, or a contaminated water supply.</p> <p>Legislation: ≤ 20 cfu/ml raw milk for final consumption.</p>	<p>Source or reason</p> <ul style="list-style-type: none"> Indicator organism of poor hygienic practices. Poor hygiene practices of milkers (poor hand-washing practices). Improper cleaning and disinfection of milking equipment. Improper cleaning and disinfection of bulk tank. Poor udder preparation. Poor water quality. Absence of or improper cooling of milk (bulk tank and during transportation). Sub-standard cleaning chemicals used for cleaning.
<p>Various methods for pathogens</p> 	<p>Salmonella: There is a widespread occurrence of the organism in animals, especially in poultry and swine. Environmental sources of the organism include water, soil, insects, factory surfaces, animal faeces and raw animal products. <i>Salmonella</i> may cause salmonellosis in consumers. Although the illness is commonly referred to as food poisoning, the resulting gastro-enteritis is an infection of the small intestine with no involvement of pre-formed toxins.</p> <p>Legislation: absent in raw milk for final consumption.</p>	<p>Source or reason</p> <ul style="list-style-type: none"> People, birds and animals (faecal contamination). Contaminated plant material. Poor health status of herds. Poor personal hygiene. Poor hygienic practices. Poor milking practices. Poor water quality (borehole/untreated water used in cleaning equipment).
<p>S. aureus on Baird Parker agar</p> 	<p>Staphylococcus aureus: Certain staphylococci produce enterotoxins, which may cause food poisoning at numbers exceeding 106/ml milk or dairy product. This ability to produce enterotoxins is usually limited to these strains that are coagulase-positive. <i>S. aureus</i> is also a major causative agent of mastitis.</p> <p>Legislation: absent in raw milk for final consumption.</p>	<p>Source or reason</p> <ul style="list-style-type: none"> Poor personal hygiene (contamination from nose excretions, boils). Poor health status of herd (mastitis caused by <i>S. aureus</i>). Poor hygiene practices. Poor udder health/preparation (cross-contamination between cows). Poor milking practices.

E. coli means there is human or animal faeces in the milk.



Listeria monocytogenes:

This is a bacterium common to the environment that is capable of causing serious human disease. Listeriosis is the general name given to a variety of illnesses caused by *L. monocytogenes*. Certain individuals are at higher risk of serious illness, e.g. pregnant women (cause of miscarriages), toddlers, the elderly and people with weakened immune systems.

Legislation: absent in raw milk for final consumption.

- Contaminated plant material, feed.
- Poor environmental status – organism present in the air.
- Poor hygienic practices.
- Poor milking practices.
- Poor water quality (e.g. borehole/untreated water for washing equipment).
- Stagnant water.

2. Antibiotics or inhibitory substances in raw milk

Various methods are used to determine the presence of antibiotics or inhibitory substances in milk, e.g. Delvotest, Charm, Rosa, betaStar, Copan Milk Test. These substances enter milk mostly through animal therapeutic substances/treatments.

Legislation: Amounts not exceeding the Maximum Limits for Veterinary Medicine and Stock Remedy Residues Regulations.

Origin/cause

A. RAW MILK

Milk from treated animals enters bulk tank before end of withdrawal time:

- No permanent written records of treatments.
- Forgetting animal was treated.
- Poor identification of treated animals.
- Poor communication between the person who treated and the person who milks animals.
- All milk from all quarters of treated animals not kept out of bulk tank.
- Milk line used as a vacuum source to milk treated animals when using trap bucket to withhold milk.
- Separate milker unit for treated animals not used.
- Milker unit not cleaned properly between treated and untreated animals.
- Dry and treated animals not separated from the milking herd.

Solution

- The primary producer (farmer) has to be informed of the problem.

On the farm:

- Keep a permanent record of all treatments.
- Mark all treated animals in an easily recognised manner.
- Post-treatment information on a message or bulletin board to ensure people milking are aware of treated animals and appropriate withdrawals.
- Discard milk from all quarters of treated animals.
- Check with equipment supplier whether present pulsator can be adapted to provide vacuum to trap bucket.
- Milk treated animals last or with separate equipment to ensure no contaminated milk can enter the milk supply.
- Thoroughly clean milker unit between treated and untreated animals.
- Use antibiotic test where appropriate.
- Separate dry cows from the milking herd.
- Make a permanent record of all medicines, use only approved livestock medicines, and use only according to label instructions or according to a veterinarian's prescription.
- Use appropriate antibiotic tests.
- Medicated feeds for non-lactating dairy cattle should be stored separately from the milking herd feeds.

Prolonged drug withdrawal time because antibiotics used in extra-label fashion:

- Antibiotic drugs used at a higher dosage and/or more frequently than label instructions.
- Administering of other livestock medicines.
- Administered by a route different from label recommendations.
- Use of antibiotic drugs that are not approved for use in lactating dairy cattle.
- Feeding medicated feeds.

Animals/udders treated with antibiotic ointments, dips and sprays.

- Use only approved products.
- Follow recommended withdrawal times.

3. Off-flavours in raw milk

Sensory evaluation is sometimes used to determine the acceptability of the milk. The following can be used as guidelines to determine the possible source of the off-flavours.

Type of off-flavour	Origin/cause	Solution
Malty/sour	<p>Bacterial action because of:</p> <ul style="list-style-type: none"> Poor cooling. Unclean milking equipment. <p>Oxidation of milk fat:</p> <ul style="list-style-type: none"> Water used for cleaning that is high in iron, copper or sulphur (>0.1ppm). Excessive use of chlorine sanitisers or equipment that was inadequately drained. Milk was exposed to sunlight and/or artificial light. Unclean milk contact surfaces. Excessive air incorporation, agitation and foaming. 	<ul style="list-style-type: none"> Cool milk down quickly to <5°C (first milking is especially critical). Keep all milking and cooling equipment clean and sanitised. Replace old rubber parts. Change water source or treat the water if necessary. Do not exceed 200ppm chlorine in the sanitising solution. Ensure proper drainage of equipment. Store and transport milk away from direct sunlight/artificial light. Ensure an effective cleaning and sanitising programme for milk contact surfaces. Adjust speed of bulk tank stirrer, repair air leaks of inlet valves on pipelines and milk pumps, avoid oversize air inlets on milking claws, check that milk is not being pumped excessively from receiver jar.
Rancid	<ul style="list-style-type: none"> Slow cooling. Milk freezing in the cooler. Excessive air incorporation, agitation and foaming. Large number of stale animals (e.g. over 300 days in milk). Ration low in protein. 	<ul style="list-style-type: none"> Check cooling time of bulk tank – avoid milk freezing in the bulk tank. Adjust bulk tank paddle (if possible) to reduce speed. Repair air leaks of inlet valves on pipeline, receiver jar and milk pump. Avoid oversize air inlets on milking claws. Check that milk is not being pumped excessively from receiver jar. Dry off stale animals. Balance ration for adequate protein.
Unclean, barny, cowy, mouldy	<ul style="list-style-type: none"> Poorly ventilated sheds. Dirty cattle and/or sheds. Coliform, mould or yeast contamination. Unclean milking equipment. Poor milking practices. Cattle feed is musty or mouldy. 	<ul style="list-style-type: none"> Ventilate barn properly. Keep stables clean, including calf pens and maternity/sick pens, but do not clean them out while milking. Keep cattle clean and clipped, especially flanks and udders. Keep all equipment clean and well maintained. Do not feed dusty/mouldy feeds.
Bitter	<ul style="list-style-type: none"> Weeds, rancidity. Old ensiled feeds (e.g., old silage/haylage at the bottom of silos). 	<ul style="list-style-type: none"> Keep feed as weed-free as possible. Do not feed old ensiled feeds to the milking herd.

4. Abnormal freezing points in raw milk

The freezing point is determined using a cryoscope and a lactometer can be used to check the solids. The adulteration of milk with water is not allowed by legislation. This may negatively influence the quality of the milk or dairy product.

Origin/cause	Solution
<p>Additional water in raw milk due to:</p> <ul style="list-style-type: none"> The deliberate addition of extraneous water to milk. Negative or inadequate pipeline slope. Incomplete draining of milking equipment (receiver jars, milk hoses, claws, meters, wash manifolds, jetter cup assemblies etc.) before milking. Incomplete drainage of bulk tank. Inadvertent addition of water by “chasing” or “sweeping through” with water at end of milking. Water pipeline connected to bulk tank during wash cycle. Careless dipping of clusters between milking of cows. Accidental onset of automatic cleaning-in-place system before the bulk tank is emptied or the pipeline is diverted. Poor milking practices. 	<ul style="list-style-type: none"> Address problem with primary producer (farmer). Adjust pipeline to a positive slope. Check all equipment before milking to ensure all water has drained out. Check that the bulk tank is fully drained before closing end-valve. Remove pipeline from bulk tank before rinsing. Install safety switch to ensure that CIP starts after bulk tank is emptied. Review post-milking practices.

ScourGuard® 4KC:

PROTECTING CALVES FOR GENERATIONS

Vaccine for Calf Diarrhoea

ScourGuard® 4KC is for vaccination of healthy, pregnant cows and heifers as an aid in preventing diarrhoea in their calves caused by bovine rotavirus (serotypes G6 and G10), bovine coronavirus, enterotoxigenic strains of *Escherichia coli* having the K99 pili adherence factor, and *Clostridium perfringens* type C.



ScourGuard® 4KC

FOR ANIMALS. FOR HEALTH. FOR YOU.

zoetis

FOR ANIMAL USE ONLY.

ScourGuard® 4KC: Reg. No.: G3841 (Act 36/1947). Inactivated bovine rotavirus (serotypes G6 and G10), coronavirus, K99 *E. coli* bacterin and *Clostridium perfringens* Type C toxoid.

For full prescribing information refer to the package insert approved by the medicines regulatory authority.

Full product information available from Zoetis South Africa (Pty) Ltd., Co. Reg. No.: 2012/001825/07.

6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. PostNet Suite 53, Private Bag 9976, Sandton, 2146, South Africa.

Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). www.zoetis.co.za RU/PR/02/21/01

CHAPTER 9

9.1 INTRODUCTION

The export of milk and other dairy products can be a long and difficult journey if the necessary procedures and protocols are not followed. The competent authority dealing with certification of dairy export facilities is the Directorate: Department of Agriculture, Land Reform and Rural Development (DALRRD), supported by the provincial veterinary authorities.

These guidelines aim to assist those dairy producers who wish to apply for dairy export certification, by providing information paths indicating the correct procedures and relevant role-players.

The export of milk and other dairy products, whether to non-EU or EU countries, is subject to compliance with the following veterinary procedural notices (VPNs):

- VPN/20/2010-01 – applies to establishments wishing to be registered for export.

The following notes are extracts from VPN/20/2010-10 and reflect on some of the important aspects applicants need to adhere to.

9.2 REGISTRATION PROCEDURES

Firstly, registration must be done in writing by the applicant on the prescribed application form. A detailed plan that includes the structures and process flow must accompany the application and must be signed by the official veterinarian. If the dairy establishment does not comply with the requirements upon inspection, the veterinary official must provide the applicant with a detailed report setting out the reasons why the establishment cannot be approved.

Once the deficiencies have been rectified, a copy of the application and all supporting documents must be forwarded to the Director: Animal Health, upon which the Directorate will issue an original certificate to the applicant. Registration is only valid for one year, after which the dairy establishment must be reregistered. Review of registration is, however, applicable to cases where there have been changes in ownership or physical address. A list of all veterinary-approved dairy export establishments is regularly updated by the department and an updated list is kept by the Directorate: Animal Health.

In order to avoid deregistration, it is important that applications for re-registration reach the office of the Directorate: Animal Health before the registration certificate expires. For export to the European Union, the export establishment must complete a specific application. This is due to the fact that South Africa must be approved for export to the EU, in order for individual establishments to be approved and recommended for export. When products are exported via a storage facility in a province other than the one where the supplying establishment is located, a certificate of origin must be obtained from veterinary services. If a health certificate of origin was not issued, the state veterinarian at the storage/final export facility may not sign the export certification.

A vet-approved establishment

Applications to register a dairy export establishment are categorised as follows:

- Export of pasteurised dairy products to countries where the requirements can be met, with the exclusion of the EU.
- Exports to the EU.
- Export of raw milk.

9.3 MINIMUM REQUIREMENTS

The minimum requirements comprise, amongst others, the following:

Management requirements

- Correct completion of all registration documents as well as availability of a valid certificate of acceptability issued by the local environmental health department (municipal health authority).
- Acceptable hygiene and a food safety management system of which the relevant South African National Standards (SANS 10049) are the norm.

Structural requirements

This relates to aspects such as access control, maintenance of grounds and premises, ablation and staff facilities, processing equipment, separation of raw and processed products, cold storage, storage and packaging, and dispatch of the final product.

Hygiene, housekeeping and sanitation

These requirements involve protective clothing, cleaning and disinfection of structures and equipment, personal hygiene, waste removal, pest control, water quality, etc.

Records

Comprehensive standard operating procedures and records are pre-requisites to ensure proof of:

- Effective cleaning and sanitation.
- Product traceability and recall.
- Control over all incoming raw materials including milk as legislated.
- Production and process control.
- Supporting documents confirming production and process control, safety of products and cold chain maintenance must be available for inspection by any veterinary official.

Laboratory practices

- Microbiological and chemical testing of raw, in-process and final products must be done as prescribed in the VPN.
- Corrective actions must be implemented and recorded for all products which do not comply with product specifications.
- Records of tests conducted must be kept for at least six months.

Training

Initial and on-going training of personnel must provide for induction, hygiene and technical training in important aspects, milking procedures, milking and cooling equipment, animal health, cleaning schedules, maintenance of equipment and pest control. Training records must be kept.

Condition of equipment

Equipment must be in good working order, clean, well-maintained and must be regularly monitored. Equipment includes the milking machine, bulk tank and thermometers used. Calibration and verification of thermometers is necessary to ensure accurate measurement during cooling of the milk.

Farms supplying milk

The owner/manager of the dairy export establishment must provide a list of all farms supplying milk to it. All farms on the list must comply with the minimum requirements stipulated below and must be audited by the inspecting veterinary official. The official may check the details of every supplying farm or, if the list of supplying farms is extensive, a representative sample of the farms may be audited.

Milk shed approval

- All farms must have a valid certificate of acceptability from the local health authority in terms of Regulation R961.
- Veterinary officials may accept a certificate of acceptability as proof that a milking shed complies with R961 and do not have to visit all farms supplying milk to the export facility.
- Should a veterinary official visit a milking shed and find that the facility does not meet the requirements of R961, in spite of having a valid certificate of acceptability, the veterinary official may insist that the farm be excluded from the list of farms supplying milk to the export facility.
- In the case of export approval to the EU, the requirements for the farm of origin differ significantly and farms must comply with the latest requirements of the Directorate Animal Health.

Tuberculosis and brucellosis status

- Proof must be provided of regular TB and CA testing on all farms supplying milk to the export facility.

- Testing for TB and CA can be performed by either a private veterinarian or a state veterinarian. However, declarations that a facility is TB- or CA-free, must be issued by the state veterinarian.
- In the case of TB, the farm must be tested every second year.
- In respect of CA, negative herd status can be declared on ten consecutive milk ring tests or annual blood tests.
- If there are animals testing positive for TB or CA, the decision whether to include or exclude the farm from the list of farms supplying the export facility, will depend on the nature of further processing done at the export facility. However, milk from individual TB or CA positive animals must be completely excluded from the export chain.
- If the establishment exports pasteurised milk, TB or CA positive farms do not have to be excluded from the list. Farms testing positive should receive follow-up visits by the provincial veterinary services in terms of the *Animal Disease Act* regulations.
- In the case of establishments exporting raw milk, only farms that are declared TB and CA free may be included on the list of supplying farms.
- If positive reactions are found during testing at collection points, this should be followed up by the provincial veterinary services in terms of the *Animal Diseases Act* regulations.

Records

The following records from each farm of origin must be checked by the owner of the establishment to ensure that the requirements of R961 and R1555 are adhered to:

- The temperature of raw milk in the bulk tank must be below 5°C. This must be checked upon collection on the farm and records must be provided to the export facility upon arrival of the milk (R961).
- Somatic cell count tests must be conducted regularly (R1555).
- Samples collected must be traceable so that results can be linked to a specific farm (R961).
- The alizarol test must be done on individual samples before accepting milk into the tanker (R961).

For more information, refer to the following legislation:

- Regulation R961: Regulations Relating to Hygiene Requirements for Milking Sheds, the Transport of Milk and Related Matters, in terms of the *Foodstuffs, Cosmetics and Disinfectants Act, 1972*.
- Regulation 1555: Regulations Relating to Milk and Dairy Products, in terms of the *Foodstuffs, Cosmetics and Disinfectants Act, 1972*.

1: FARMER'S INITIATIVE

The farmer contacts the liaison officer at the processing plant if he wishes to produce milk for the export market



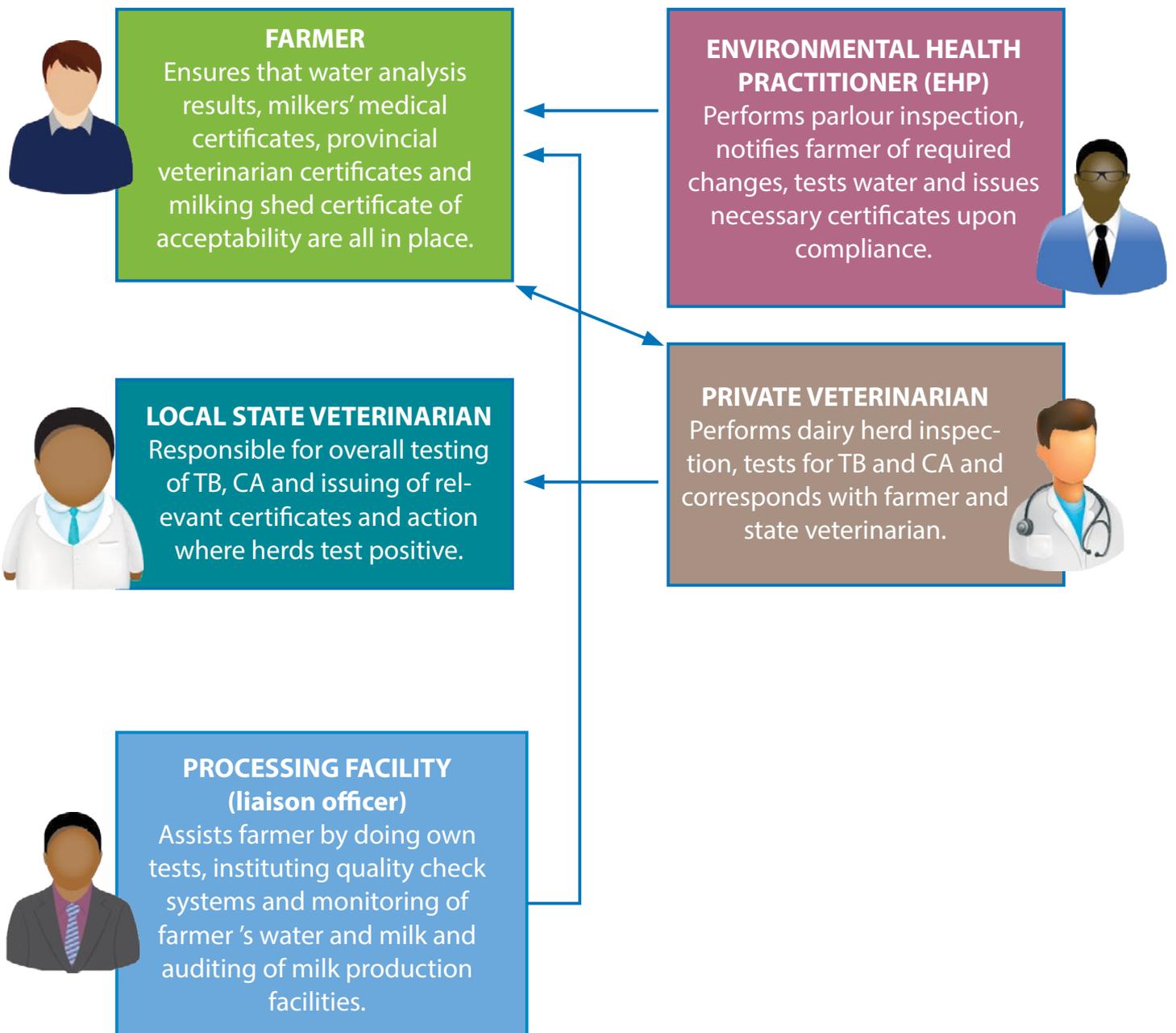
Farmer (applicant)



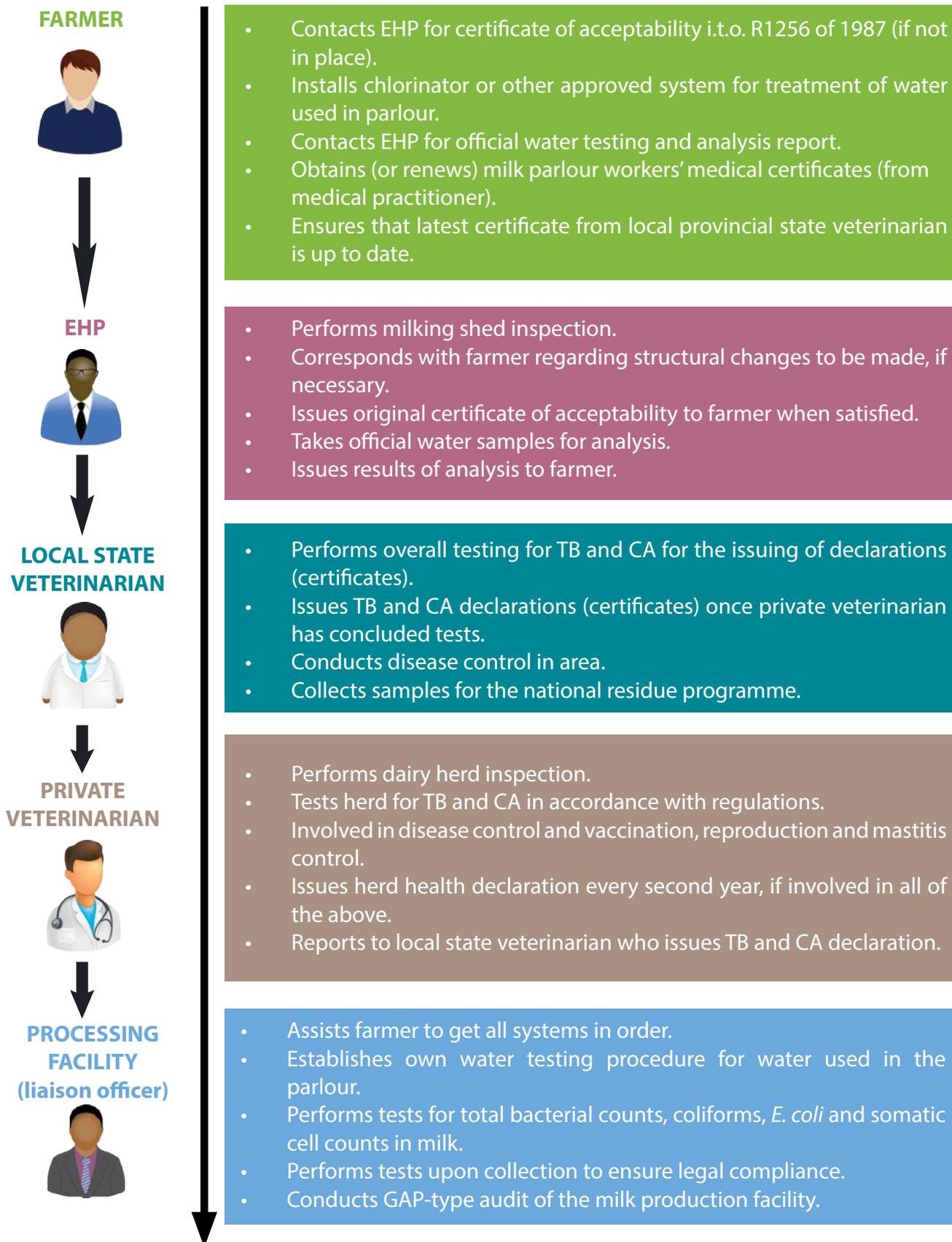
**Liaison officer
(represents processor) at
processing facility**



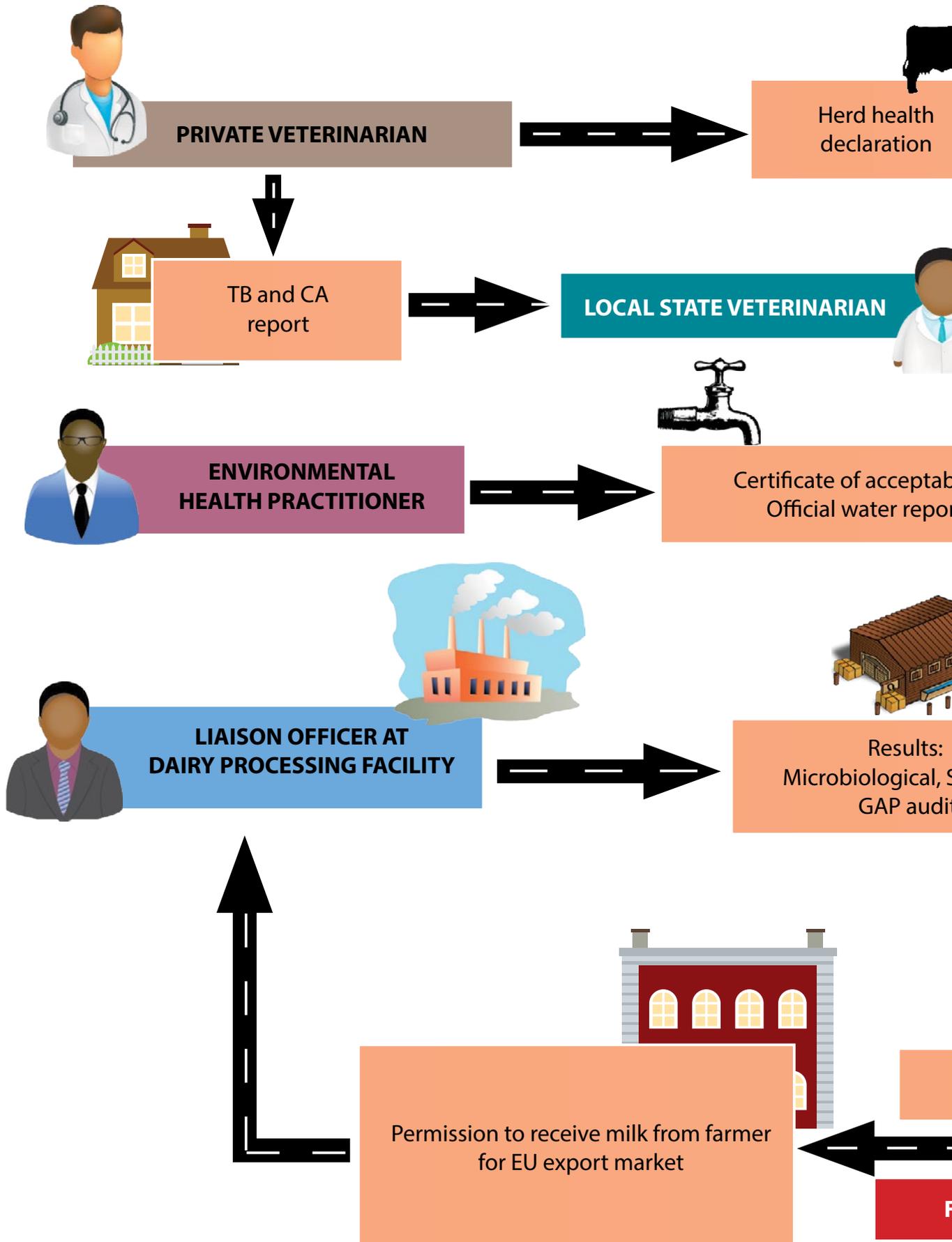
2 (a): OVERVIEW OF RESPONSIBILITIES



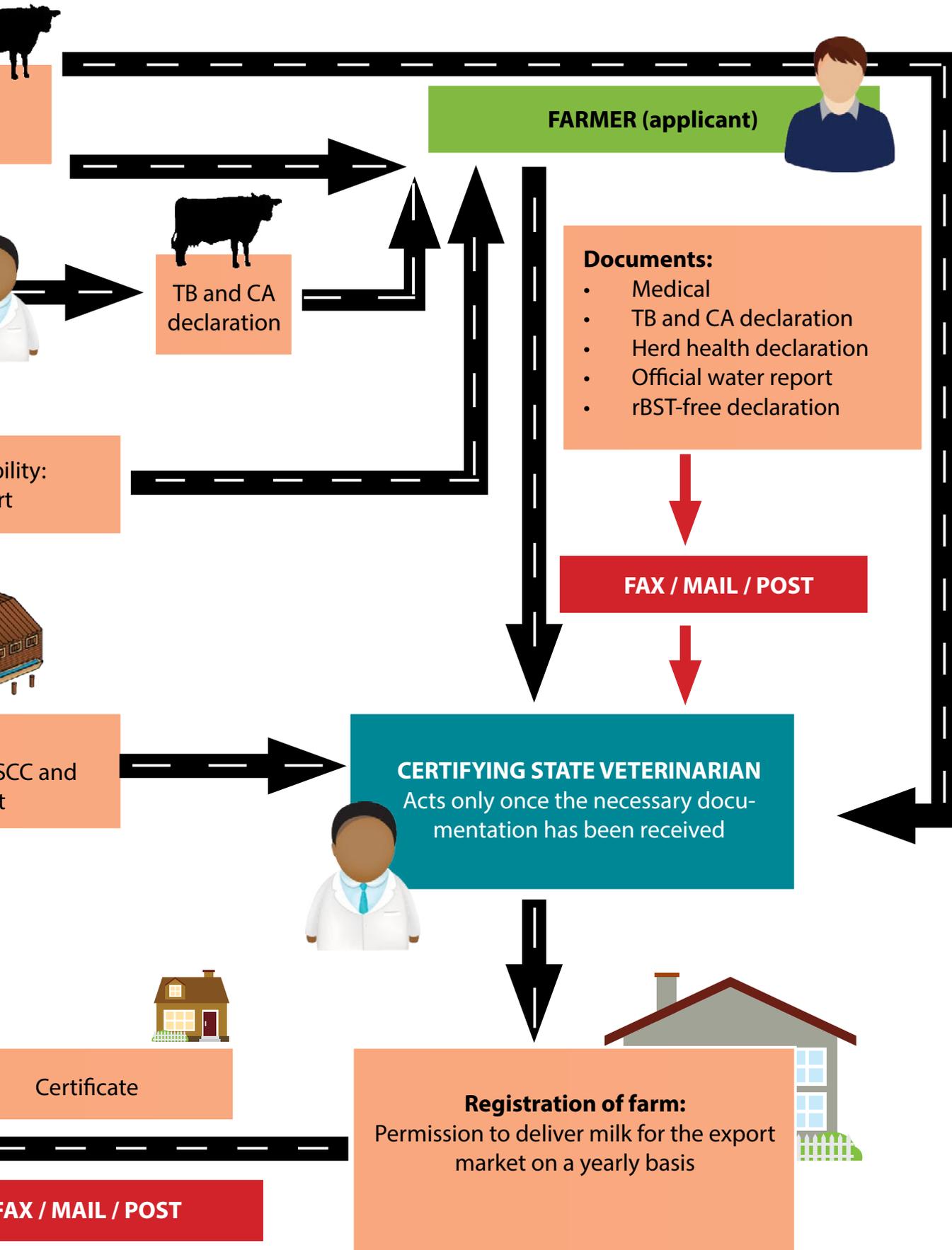
2 (b): DETAILS OF RESPONSIBILITIES



3: THE ROAD TO ACHIEVING EXP

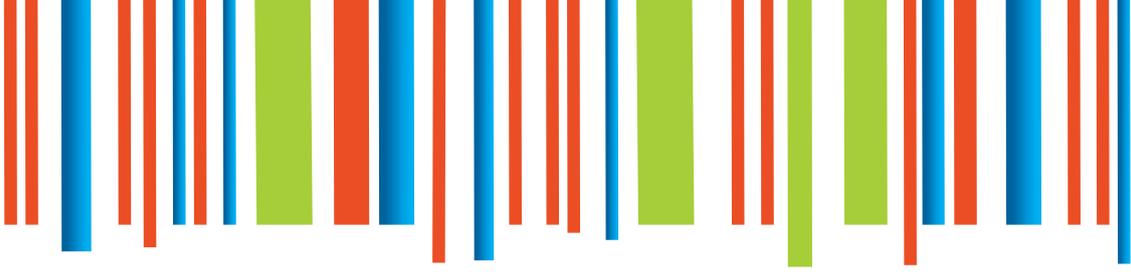


EXPORT CERTIFICATION FOR A MILKING SHED



4: SYNOPSIS OF DOCUMENTATION AND PROCEDURES REQUIRED FOR MILKING SHED CERTIFICATION

DOCUMENT	YES	NO
Milking shed – certificate of acceptability		
List of animals with number identification		
Valid TB certificate of herd health		
Valid CA certificate of herd health		
Register for every milk animal with: - records of diseases - withdrawal period from milking herd - reintroduction of animal to the milking herd - examinations by veterinarian - veterinary treatments (antibiotics) - name of veterinary surgeon (where applicable)		
Register of vaccinations		
Register van anti-parasitic products in use		
Safety data sheets of cleaning chemicals from supplier		
Records of internal and external maintenance done on equipment e.g. milking machine (teat liners), bulk milk tank and thermometers.		
Pest control programme. Records of all pesticides and insecticides as well as dates of treatment		
Weekly register / records of bulk milk tank temperatures		
General hygiene / cleaning records of the facility, structures and equipment (milking machine and bulk milk tank)		
Records of microbiological and chemical quality of water used in the milking shed (bore-hole, river, canal and or municipal water)		
Records of microbial analysis performed on raw milk (total plate count, coliforms and <i>E. coli</i>)		
Records of somatic cell counts		
Records of inhibitory tests done e.g. antibiotics, cleaning chemicals		
Records of corrective actions on non- conformances e.g. antibiotics in milk, water in milk, water quality and somatic cell counts		
Records of delivery notes or register of all purchased feeds		
Medical certificates for staff working in the milking shed		
Records of illness agreement and records of treatment of staff		
Records of inspections on staff regarding sores, abscesses on hands, neck ect.		
Written contract with milk buyer/ processor		



Dairy Standard Agency
Tel: 012 665 4250
Email: info@dairystandard.co.za
www.dairystandard.co.za