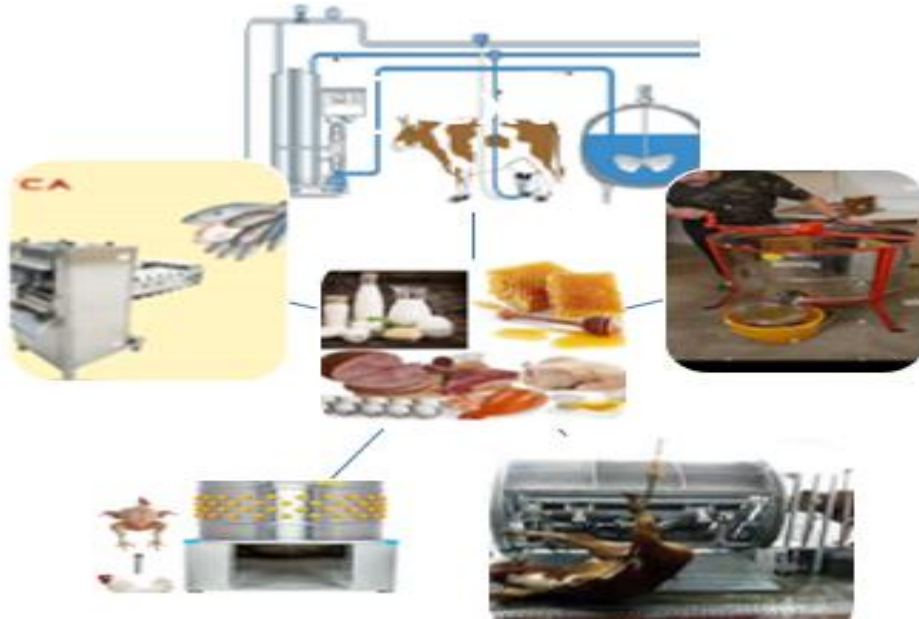


Farm Machinery and Equipment Operation

Level- II



**Based on March, 2022 Version II Occupational
Standard**

**Module title: Module Title: - Operating Animal
Product Processing Machinery**

LG Code: AGR AMO2 M07 0523 LO (1-7) LG (30-36)

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Introduction to the Module

This module covers the knowledge, skills and attitudes required to prepare, Operate, use, clean, basic machinery and equipment used in animal product processing plant and storage.

LG #30	LO #1 Identify type and functional requirement of operating milk processing machinery equipment's
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Instruction sheet	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> • Following and applying Safety rules • Identification of OHS requirements. • Personal protective equipment • Animal products used by human beings • Pre-operational check of milk processing machinery and equipment • Applying product safety and hygiene • Identifying Faulty or unsafe machinery and equipment and segregating for repair or replacement <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> • Follow and apply Safety rules • Identify of OHS requirements. • Apply Personal protective equipment • Use animal products by human beings • Pre-operational check of milk processing machinery and equipment • Apply product safety and hygiene • Identify Faulty or unsafe machinery and equipment and segregating for repair or replacement 	

Learning Instructions:

- 1) Read the specific objectives of this Learning Guide.
- 2) Follow the instructions described below.
- 3) Read the information written in the information Sheets
- 4) Accomplish the Self-checks
- 5) Perform Operation Sheets
- 6) Do the “LAP test”

Information Sheet 1

1.1 . Following and applying Safety rules

Public Health Problems related to milk, meat (e.g., cattle and poultry), egg and honey production and processing embrace working conditions, water, and sewage disposal. In milk and meat production and processing, there are various moments that are of great public health concern. Because of the poor economic status of most workers, they tend to work in risky areas of production that are disposed to public health problems. There are problems ranging from accidents, food borne illnesses and toxic hazards. Toxic hazards are a relatively new problem to meat and milk production and processing have attracted a good deal of attention and legislation. Accidents from mechanical equipment far outnumber those from poisoning. Much trouble seems to stem from the unfamiliarity of workers handling potentially dangerous materials in bulk, one important result of which is wrong disposal of the container with serious results. Food borne illnesses occur as a result of ingestion of raw milk, improper pasteurization, and poor handling/storage leading to contamination. Measures to decrease the threat include:

- Hygienic production practices
- Proper handling and storage and
- proper pasteurization.

Health and safety are a legal requirement. All jobs, including dairy farms, must have a health and safety program to prevent workplace injury and disease. Health and safety programs must meet certain standards, depending on the number of workers on the worksite, and you must exercise due thoroughness in taking steps to meet those standards.

There are components of an effective health and safety program that should be included in an effective health and safety program. They include the following:

- **Health and safety policy:** a brief statement of the employer's commitment to the program, the aims of the program, and the responsibilities of the employer, supervisors, and workers.

- **Hazard identification and risk control:** determine which hazards are present on your farm/ dairy farm processing machine and take steps to eliminate or minimize them.
- **Safe work procedures:** describe in writing how to carry out specific tasks safely.
- **Orientation, education, training, and supervision:** prepare workers for the job, and make sure they continue to work safely. This is particularly important for young workers and new workers.
- **Safety inspections:** identify workplace hazards so you can eliminate or control them.
- **Incident investigation:** Find out why an accident or injury occurred so you can correct the causes.
- **Health and safety meetings:** Communicate with workers and supervisors, and raise any concerns about health and safety.
- **Records and statistics:** Maintain documentation to help identify recurring problems and ensure that hazardous conditions are corrected.
- **First aid:** determine what level of first aid is required for your dairy farm. Make sure everyone knows how to deal with injuries on the job.
- **Emergency response plan:** Develop and implement a plan for
 - responding to workplace emergencies, such as fires, explosions,
 - chemical spills, or natural disasters.
- **Personal protective equipment (PPE):** Make sure appropriate PPE is available to all workers who need it and that workers are trained in its use.

1.2 Identification of OHS requirements

OHS is an acronym with full meaning Occupational health and safety. OHS is the field of public health that studies trends in illnesses and injuries in the worker population and proposes and implements strategies and regulations to prevent them. OHS is a multidisciplinary practice dealing with all aspects of health and safety in the workplace, with a strong focus on preventing workplace accidents. The OHS standards make it possible for workers to be able to carry out their responsibilities in a safe and secure working environment, free from hazards.

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1.3 Identification of OHS requirements

OHS is an acronym with full meaning Occupational health and safety. OHS is the field of public health that studies trends in illnesses and injuries in the worker population and proposes and implements strategies and regulations to prevent them. OHS is a multidisciplinary practice dealing with all aspects of health and safety in the workplace, with a strong focus on preventing workplace accidents. The OHS standards make it possible for workers to be able to carry out their responsibilities in a safe and secure working environment, free from hazards. OHS includes the laws, standards, and programs that are aimed at making the workplace better for workers, along with co-workers, family members, customers, and other stakeholders.

Occupational health and safety are one of the most important aspects of human concern. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. According to labor proclamation No. 377/2003, the Ministry of Labor and Social Affairs of Ethiopia is the organ charged with the responsibility to inspect labor administration, labor conditions, occupational health and safety.

1.4 Personal protective equipment

1.3.1 Definition

A Personal Protective Equipment (PPE) is clothing or equipment designed to reduce employee exposure to chemical, biological, and physical hazards when on a worksite. It is used to protect employees when engineering and administrative controls are not feasible to reduce the risks to acceptable levels.

1.3.2 Function of personal protective equipment

The following below are the benefits of PPEs

- Prevent unnecessary injury in the workplace;
- Protect employees from excessive chemical exposure;
- Prevent the spread of germs and infectious diseases
- Improve employee productivity and efficiency

1.3.3 Types of personal protective equipment's

Among different types of personnel protective equipment's, the followings are used when we are working with animal processing machinery.

- Eye Goggle
- Face shield
- Glove
- Mask
- Rubber apron
- Overall
- Rubber shoes (boots)



Figure 1.1 Personal protective equipment

1.5 Animal products used by human beings

1.4.1 Introduction

As human beings cannot stay healthy for long without adequate food, many people may agree that the human right to health care should include a right to adequate food. Products from animals include:

- Meat and meat products,
- Poultry products (meat and eggs)
- Fish and fish products

- Dairy products (milk, butter, cream, Ghee, yogurt and cheese)
- Non-food products such as fiber (wool, mohair, cashmere, and leather) and
- Bee product; honey, bee bread, beeswax and bee venom are the bee products which are used for medicinal purposes and cosmetic production.

As many animal products are relatively dense in nutrients compared to other foods, some groups of people who might particularly benefit from the consumption of animal products are very young children with limited stomach capacities relative to their energy demands and people living with the human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS), who may have increased nutritional requirements but reduced appetites.

Animal-source foods (ASF) have long been important components of human diets, providing essential macro- and micronutrients. However, ASF production has increasingly been examined as a driver of negative global environmental change, including climate change.

ASF play an important role in reducing the risk of undernutrition among vulnerable groups in resource-poor settings, especially for young children. High consumption of processed red meats has negative health consequences. The evidence for negative health consequences of unprocessed red meat is mixed, but moderation among high consumers would likely bring health benefits. There is little evidence that consumption of other non-red meat ASF, such as fish, poultry, eggs and dairy, has negative health consequences. At the same time, many highly processed foods are fully plant based and should be excluded in language related to the healthfulness of plant-based diets.

1.6 pre-operational check of milk processing machinery and equipment

1.5.1 Definition

Milk processing machine is a set of plants or machines that are used to carry out various processes on milk and other dairy products. commonly milk processing equipment have milk tanks, pasteurizers, cream separators, milk filters, and milk centrifugal clarifiers. They are used in the production of whole milk, yogurt, soft cheeses, and other dairy products. Among these plants are tanks for receiving and processing the initial milk, culture starters, separators, homogenizers, coolers and pasteurizers, emulsifying machines and dispersers, plants for

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producing cheese products, dryers, and evaporators. They can come together to form a production line along with dosing, packaging, and labeling machinery. This equipment is designed to produce high-quality, fresh, and safe products with different fat percentages and characteristics.

These processes include:

- Milking
- Discharging
- Cleaning
- Storage
- Pasteurization
- Separation
- Homogenization
- Dehydration use of cultures and fermentation,
- Bottling or packaging, and labeling

After collecting whole milk from different sources, the milk should pass through different steps for processing. In each step different materials and equipment are required. The materials and equipment's must be cleaned and disinfected properly. The following are materials and equipment used for the processing of milk.

There are so many qualities of milk, and the best is that you can turn it into anything through simple processing. This is why it is an excellent opportunity for those small dairy farmers to provide the customer with a wide range of options for their milk production. [Dairymaid Milking Machine Instructional Video - YouTube](#) (Access date 4/ 5/2023)

Milk tanks

The small-scale farmer uses milk tanks, pre-stack tanks, temporary tanks, and mixing tanks. To store the liquid dairy products, which helps them keep them fresh for as long as possible. This is the reason why it is a crucial piece of equipment in milk processing. If you want to produce fresh, high-quality, and safe products, you should go for milk tanks.

a. Pasteurizers

Pasteurizing is the core of milk processing. Pasteurizers are basically equipment that will help you simplify the steps for you. In this process, the pasteurization unit will heat up the milk and keep it at a set temperature for a particular time. You would have to stick it continuously and then let it cool down to ensure it is ready for storing and further processing.

b. Cream Separators

People use this machine to make low-fat and skin milk cream. You get two products (Milk that has a low Percentage and cream) from this at the same time as the cream separates fat from the milk. Depending on the working time of the cream separator, you can easily produce cream and milk of different fat percentages.

c. Butter churns

It is milk processing equipment that will help you Chun milk into better. This leaves you with two kinds of products- butter and buttermilk. The second product is as popular as the butter, and you can sell it right away or format it to add some other nutrients manufacturers and small farmers.



Figure 1.2 milk tanks, cream separator, churner



Figure 1.3 simple milking machine

Equipment and material needed during milking and process:

- Sieve/filter
- Milking can
- Lactometer
- Refrigerator
- Weighing scale
- Cooking dish
- Homogenizer
- Pasteurizer and the others should be prepared accordingly

1.5.2 Function of pre-operational check of milking machine

Routinely servicing and maintaining your milking machine keeps it working effectively and reliably. It also helps reduce the risk of faults developing and inconvenient breakdowns. The correct vacuum levels, pulsation rate and ratios are essential to remove milk efficiently without damage to the teat or udder. You can check these by performing a static milking machine test.

This service should include:

- Static test monitoring of the system vacuum level
- Pulsation operation
- Effective vacuum reserve

- Vacuum leakage
- Vacuum pump output

The service will probably include service kits for pulsators, milk meters, and milk and vacuum pumps. You should also arrange a test if you notice any abnormalities. Looking at teat condition (teat ends and color) and cow behaviour while you're milking will give you a lot of information about how the milking machine is working.

How often should the milking machine be serviced? A milking parlor will usually need an interim service after 750 operating hours and a more significant service after 1,500 hours. A 250-cow herd milking for seven hours a day will need a major service every 215 days.

A static and dynamic milking machine test should be carried out at least twice a year by an independent, suitably qualified technician to the latest standards relevant to the machine or installation date (currently ISO6690:2007).

The milking machine uses a vacuum to extract milk from the teat. There are four teat cups (comprising shells and liners) attached to the claw piece. The alternating admission of air at atmospheric pressure and under vacuum into the pulsation chamber, between the shell and the liner, causes the liner to open and close.

When the vacuum level between the liner and the shell is greater than the vacuum under the teat, the liner opens and milk flows. When the pulsation chamber contains air at atmospheric pressure, the vacuum under the teat causes the liner to collapse, massaging the teat and mitigating the adverse effects of vacuum.

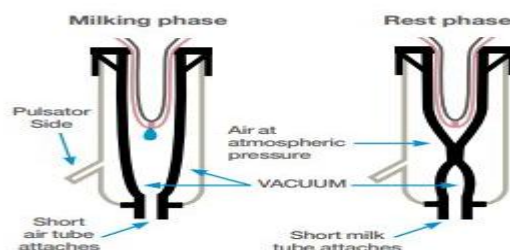


Figure 1.4 milk claw

To make sure your milking machine is working efficiently and not damaging your cows' teats, include these regular daily, weekly and monthly checks in your dairy management.

a. Daily checks

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During daily milking there are several checks that should be completed to ensure that the milking parlor is operating correctly. The vacuum level should be checked and farmers must ensure that there is no fluctuation during the milking.

- Check the vacuum level

Teats can be damaged when the vacuum isn't at the correct level. This should be:

- ✓ Low-level plant – 40–44 kPa
- ✓ High-level plant – 44–48 kPa

You should also be able to hear the vacuum regulator opening and closing when the cluster is attached.

- ✓ **Listen to the pulsators:** Pulsation should be regular. Listen to the pulsators and get the machine tested if they're out of synchronize.
- ✓ **Check air admission holes are clear:** Air admission holes in the claw piece should be unblocked. Otherwise, milk will be removed more slowly from the claw, leading to large fluctuations in the vacuum. Liner slips can occur, and there will be milk in the liners when the cluster is being taken off. Unblock air admission holes using the proper tool.
- ✓ **Check teats as cups come off:** Check cows' teats as clusters are removed. If they're discolored (either red or blue, congested or ringed), there may be a problem such as high vacuum, poor pulsation, over-milking or incorrect liner selection. You should investigate this.
- ✓ **Check cow behaviour:** Watch the cows when they're milking. If they're unsettled, this may indicate a problem with the milking machine.



Figure1.5: milking parts

b. Weekly checks

- ✓ **Check for twisted liners:** Ensure liner markings on the hood and short milk tube are aligned.
- ✓ **Check filters on pulsator airlines:** Keep the filter on the pulsator airline clean and ensure the pulsation characteristics are satisfactory.
- ✓ **Listen to the regulator:** When milking, make sure the regulator is admitting air; you should hear a mocking sound. The volume of air should reduce when clusters are attached.
- ✓ **Check liner condition:** You should change liners every 2,500 milkings or every six months, whichever comes first. Silicone liners have a life expectancy closer to 8,000 cow milkings.

Note: Liners must be in good condition, as they're the only part of the machine that come into direct contact with the cows' teats. When they're worn, they lose their shape and don't massage the teat correctly, resulting in longer milking times and reduced yields. Worn liners are also a source of bacteria, particularly thermophilic bacteria (see our guide to thermophilic management), as they hide in the cracks in the liner.

✓ **Check drain valves on pulsator airlines**

The drain valve on the airline should be opened when the milking machine has stopped working. Any milk or water coming from this airline after milking suggests a cracked liner or pulse tube.

✓ **Check vacuum pump oil level;** The oil in the vacuum pump forms a seal between the rotor and the frame of the motor to stop the vacuum leaking air/vacuum.

c. Monthly checks

You can check the effective reserve by closing the buttons on all the claw pieces and then opening just one. If the vacuum gauge drops by more than 2 kPa, the effective reserve is not adequate. This test is applicable for plants with 16 to 32 units. If there are more than 32 units, open two units and check the vacuum gauge again.

✓ **Check milking times**

The ‘milking time’ is the time it takes to milk one cow. It will depend on cow yields, but from milk let-down to finish, it will usually be 5 to 7 minutes.

✓ **Check liner slip**

During one milking, record the number of liners slips that need to be corrected by the milker. Five or fewer per 100 cows is acceptable, while 10 or more per 100 cows requires investigation.

Another check that farmers should be completing is milking time this will vary from farm to farm, and cow to cow. But on average, from milk let-down to finish, it should usually take five to seven minutes. If your parlor takes longer or is quicker than this, an investigation may be required to determine if there is an issue. During a milking, record the number of liners slips that need to be corrected by the milker. Five or less is acceptable for a 100-cow herd, greater than ten will require an investigation.

1.6 Applying product safety and hygiene

1.6.1. Cleaning and sanitation

Good sanitation is essential in all dairy processing. Equipment should be thoroughly cleaned after each day’s production, using a cleaning schedule that indicates which equipment is to be cleaned, who is responsible for cleaning it, how it should be cleaned, how frequently it is done,

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and who is responsible for checking that cleaning has been done properly. All equipment should be washed with hot water and a cleaning agent that is recommended for use with dairy products, and then rinsed with chlorinated water. Equipment and surfaces should be allowed to dry in the air, because wiping with cloths can re-contaminate them. If they are available, brushes with colored bristles are preferred because the colored material can be seen easily if they are lost in machinery or in the product. At the end of a working day, a slight ‘chlorine’ odor in the processing room indicates that it has been properly cleaned. A summary of guidelines on hygiene and sanitation is given in Technical Brief: Hygiene and safety rules in food processing.

Dairy processing creates large volumes of liquid effluents that contain milk fat, lactose and protein, and this is highly polluting. Some wastes (e.g., whey from cheese-making) should be used as animal feed or to make drinks or whey cheese, rather than being discarded down the drain. Local regulations may require special treatment of dairy effluents and producers should consult local authorities to plan proper effluent disposal. If mains drainage is not available, at small scales of production a soak-away should be constructed in a place that cannot contaminate drinking water supplies or pollute local streams or lakes.

It is important that dairy farmers ensure that:

- Udders are washed using a clean cloth and clean water before milking. They should boil the cloth each day to sterilize it and dry it by hanging on a line in the sun.
- All milking equipment should be thoroughly cleaned and disinfected and after each use.
- People milking animals should wash their hands using clean water, because any bacteria on their hands can contaminate the milk.
- Animals should be inspected each day for disease (especially for mastitis) to prevent bacteria from an infected animal being passed by hands to healthy animals or into the milk.
- Personal hygiene rules are observed
- Milk is kept in containers that are covered and it is cooled as quickly as possible.
- Milk is transported to collection centers in shortest time possible.

Incoming milk in the dairy should be cooled to below 4° C. It should be tested to ensure that it is fresh, safe, has been properly handled, and has not been adulterated with added water. The level of quality assurance in processing depends on the risk associated with the particular product and is assessed by risk (or hazard) analysis using the Hazard Analysis Critical Control Point system. Dairy manufacturers should carry out a hazard analysis for each of their products.

When all cows have been milked, the shed and all milking equipment must be thoroughly cleaned. There are many dairy detergents and chemical sterilizes available, but misuse could lead to ineffective cleaning and sterilizing, or residues appearing in milk.

Good cleaning practice includes:

- Dry clean and remove all loose dirt and debris from the shade and yards
- Rinse or wet the surface, using cold or warm (not hot) water
- Hot wash using a detergent solution that holds contaminants (or soils) in suspension for a short time
- Rinse with cold water and drain
- Apply sanitizer to contact surfaces and allow to dry.

a. Milking shed

Everything within the milking barn, stable or cowshed should be kept clean and tidy. These rooms should be free of dirt and animal droppings. They should be kept free of dust and the floor should be dry, clean and fly and rodent proof. The interior and the surroundings of the barn, stable or cowshed should be kept clean and tidy. The walls, ceilings, windows and equipment should be free of filth, litter and vermin. Animal droppings and manure should be collected and disposed of properly.

b. Tools and Equipment

General guide lines used to clean milk utensils and equipment should include:

- Be cleaned after each usage
- Be washed thoroughly after each usage
- Be sanitized before each usage
- Be protected from contamination and mishandling prior its usage
- Be stored free from flies and other vermin when not in use.

Animal by product safety and your equipment

Your equipment can spread diseases if you don't clean and disinfect it.

You should:

- ✓ check all equipment regularly to make sure it works
- ✓ use trained maintenance staff to fix any broken equipment
- ✓ only use each piece of equipment for a single category of ABP, and color-code accordingly
- ✓ limit the movement of equipment between clean and unclean parts of your site
- ✓ wash and disinfect equipment, especially if you're moving it between clean and unclean sectors
- ✓ use caustic decontamination for equipment that you're moving from category 1 processing sites to category 2 or 3

d. Milk handlers

- Keeping the milk handler level of personal hygiene high
- Washing of hands with detergents before handling milk
- The milk handler should always wear clean garments (PPE) while milking, transporting, storing and processing milk.

1.7. Identifying Faulty or unsafe machinery and equipment and segregating for repair or replacement

The milking machine can have a major effect on the spread of mastitis. It can transfer bacteria from cow to cow, provide a reservoir for bacteria, and create impact forces at the teat end. It can damage cows' teats if vacuum levels are incorrect, if pulsation is not working properly or through over-milking from badly adjusted automatic cluster removers.

We recommend regular checks, maintenance and servicing to keep the milking machine in good working condition, with teat cup liners particularly important as the only part of the machine to come into direct contact with your cows. It's also vital to ensure you have a good milking routine, as this ensures high-quality milk and happy cows, as well as helping prevent the spread

of mastitis among your herd. In these pages, we look at how to ensure your milking equipment and routines are safe and hygienic.

Hyperkeratosis is a thickening of the skin at the teat end. It's caused by excessive growth of the keratin that lines the teat canal. There are many possible causes, including:

- Unsuitable vacuum level
- Over-milking
- Inadequate pulsation
- Excessive liner compression
- Teat shape

Hyperkeratosis increases the risk of new infections, so it's important to find out what's causing it and fix the machine. Other changes in teat condition at the end of milking, such as discoloration, fluid swelling, ringing or wedging, are also reliable signs that there could be a problem with the milking system.

Good cluster position, adequate tube support and well-controlled cows all help to ensure even milking. Uneven or incomplete milking are indicators of poor milking machine operation. It's the most important machine on your dairy farm, but your milking machine is also a potential source of infection spread and under damage. Read why maintenance is critical and learn what checks to carry out each day, week and month.

Meat processing plants should supply personnel with the correct types of hand tools and basic equipment. Such tools and equipment must be subject to simple routine servicing and maintenance to be carried out by the personnel on a regular basis. This does not include the servicing of more sophisticated equipment which has to be undertaken by specialized technicians usually sourced through the equipment supplier.

Seven ways to identify faulty of machinery and equipment are:

- Leakages
- Smoke
- Abnormal sound
- Smell

- High vibration
- Alarm
- Observing problem in connected system

Self-check 1	Written test
--------------	--------------

Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer for the following questions (2point each)

- From the following one was not included under milking process of the machine
 - Cream separation
 - Pasteurization
 - Homogenization
 - Slaughtering
- Which is a set of plants or machines that are used to carry out various processes on milk and other dairy products
 - slant Slaughter
 - Meat processing machine
 - Milk processing machine
 - stunning
- From the following One is different from the others
 - Cheese
 - Butter
 - Cream
 - Honey

Part II: Give Short Answer for the following Questions (2 points each)

- List at least five animal product that used by human beings(5pts)
- What is the personal protective equipment that used for during milking?
(5pts)
- Why we need to check per operational before operating animal processing machinery? (5pts)
- What will happen if the maintenance of animal processing machinery left for above the recommended hours? (5pts)

Note: Satisfactory rating – 12 points

Unsatisfactory - below 12point

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Operation Sheet 1

1.1. Techniques of pre-operational checks of machinery and equipment in milking machine (daily, weekly and monthly)

A. Prepare personal protective equipment and Material

- rubber gloves
- Goggle
- Overall
- rubber apron
- Water
- Disinfectant
- Towel

B. Procedures

Daily checks

- Check the vacuum level
 - ✓ Low-level plant – 40–44 kPa
 - ✓ High-level plant – 44–48 kPa
- Listen to the pulsators:
- Check air admission holes are clear
- Check teats as cups come off

Weekly checks

- Check for twisted liners:
- Check filters on pulsator airlines
- Listen to the regulator.
- Check liner condition.
- Check drain valves on pulsator airlines
- Check vacuum pump oil level

Monthly checks

- Check milking times
- Check liner slip

LAP TEST-1	Performance Test
-------------------	-------------------------

Name.....

ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1: - Perform per operation checks of milking machine (daily, weekly and monthly)

LG #23

LO #2- Operate dairy machine

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Animal product storage equipment
- Animal product processing machinery and equipment
- Industry terminology related to work procedures, equipment and animal management
- Completing daily routines

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify and select animal product storage equipment's is
- Identify and select Animal product processing machinery and equipment
- Identify industry terminology related to work procedures, equipment and animal management is used in work activities.
- Complete daily routines

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the "LAP test"





Information Sheet 2

2.1 . Animal product storage equipment

All dairy equipment should be designed and constructed so that it can be easily dismantled for cleaning. Mixing bowls, boiling pans etc. should have a smooth internal surface without corners, and all welds should be ground to a smooth finish. Ideally, all dairy equipment should be made from stainless steel, but alternatives include polished aluminum, or food grade plastic for containers and equipment that are not heated.

Mild steel cannot be used because it will rust and contaminate products, and brass, iron or copper cannot be used because they promote rancidity in milk fats. The layout of equipment within the room should allow food to move between different stages in a process without the paths crossing. This reduces the risk of contaminating finished products with raw milk. There should also be sufficient room behind equipment for cleaning.

Tables 1. Animal product storage equipment

No	Storage Equipment	Figure	Purpose
1	Stainless Steel milk Storage Can		Used for milk storage
2.	The honey tank		It is metal drum which is serves as a honey tank
3	Egg trays		Are thin, flat, and often rectangular piece of plastic, wood, etc. that are used for holding or carrying of eggs.
4	Meat storage refrigerator (safe meat cold storage and carcass chiller for meat)		Used to store meat to prevent contamination and also to maintain quality of meat

Egg storage equipment

The temperature and relative humidity of storage, as well as the gaseous environment, interact with the fertile egg over time during storage in such a way as to affect the success of incubation either negatively or positively.

Storage Of Eggs

For the successful storage of eggs, the following conditions must be met.

- The eggs placed in storage must be clean; they must not be washed or wet.
- Packaging material used should be new, clean and odorless.
- Loss of water due to evaporation should be reduced to a minimum.
- The storage room must be free from tainting products and materials and should be cleaned regularly with odorless detergent sanitizers.
- The storage room must be kept at a constant temperature and humidity must be checked.
- There should be air circulation in the storage room.
- Eggs should be stored so that they are allowed to breathe.
- As far as possible, interior quality should be monitored; there should be a good proportion of thick white, the yolk should stand up well, and the flavor of white and yolk should be good.
- If all of the above requirements are to be met, refrigerated storage is necessary

Cold storage of eggs

In the tropics, eggs can deteriorate very quickly unless they are stored at low temperatures. The ideal temperature for storage in such climates is 13°C or lower (usually between 10° and 13° C). Here refrigeration is a necessity for successful commercial storage; however, it may be unavailable or the costs too high. The most important factors in successful cold storage are as follows.

- The selection and packaging of eggs.
- The equipment and preparation of the cold store.
- Proper temperature, humidity and air circulation.
- Periodic testing for quality.
- The gradual adjustment of eggs to higher temperatures when removed from storage.

2.2 . Animal product processing machinery and equipment

2.2.1 Cream Processing Equipment

A **milk or cream separator** is a device that removes cream from whole milk. As a result, the whole milk is divided into cream and skim milk after separation. Cream and skim milk have

different densities and therefore they tend to get separated under the impact of gravity. You can test it yourself: Leave cow's milk out for 24 hours and you will see how cream gathers at the top.

How do you separate cream from milk report for the process? The cream is separated from milk by the process of centrifugation. Centrifugation is the process of separating the suspended particles from a liquid. The mixture is rotated at high speed in a centrifuge. When milk is centrifuged, the cream and skimmed milk are separated

How can we separate cream from milk step by step? The process of centrifugation can be easily used to separate cream from milk. To carry out this the milk is rotated at a very high speed in a centrifuge. The cream being lighter floats over the heavier and skimmed milk.



Figures 2.1: manual operated and electric motor cream separator machine

The principle of operation of the device can be considered on the example of the operation of a household separator.

- Milk is poured into the drum of the device. The whole product rotates in a drum at 10,000 rpm.
- As a result of centrifugal force, heavy, fatty fractions (cream) are pressed against the walls of the device (thin layer).
- The skimmed part of the milk is concentrated in the center of rotation (thick layer).

- After stopping the drum, the cream and the fat-free part are drained from the separator through separate channels.

The splitting of milk into individual components is possible due to the special structure of the substance. The product consists of microscopic particles floating in a liquid medium. The density of fat and skim particles is very different. Greasy particles are easier to separate from the milk and, if left on for several hours, the cream will end up in the top of the container. The separator can significantly speed up the process of product splitting.

2.2.2 Butter Processing Equipment

The butter making process involves quite a number of stages. Cream can be either supplied by a fluid milk dairy or separated from whole milk by the butter processor. If cream is separated by the butter manufacturer, skim milk from the separator is usually destined for concentration and drying. Cream is pasteurized at a temperature of 95⁰C or more, to destroy enzymes and microorganisms that would impair the keeping quality of the butter. Cold-aging of cream ensures that the appropriate fat crystalline structure is obtained for optimum churning. From the aging tank, the cream is pumped to the churn via a plate heat exchanger, which brings it to the required temperature.

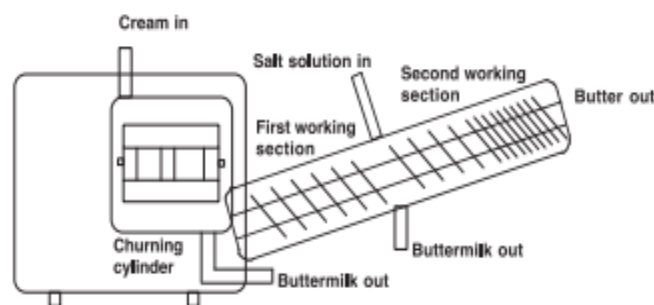


Figure 2.2: continuous butter churn

In the churning process the cream is agitated to cause clumping of the fat globules and production of the butter grains, while the fat content of the remaining liquid, the buttermilk, decreases. Modern continuous churns are capable of processing up to 10,000 kg/h. The cream is first fed into a churning cylinder fitted with beaters that are driven by a variable speed motor. Rapid inversion of the fat globules takes place in the cylinder and, when finished, the butter grains and buttermilk pass on to a draining section. After draining the buttermilk, the butter is

worked to a continuous fat phase containing a finely dispersed water phase. During working, fat moves from globular to free fat. Water droplets decrease in size during working and should not be visible in properly worked butter. The working of the butter commences in the draining section by means of a screw, which also conveys it to the next stage. On leaving the working section the butter passes through a conical channel to remove any remaining buttermilk. Following this stage, salt may be added through a high-pressure injector. The third section in the working cylinder may be connected to a vacuum pump, to reduce the air content of the butter. In the final or mixing section, the butter passes a series of perforated disks and star wheels. There is also an injector for final adjustment of the water content. The finished butter is discharged into the packaging unit, and packaged butter moves on to cold storage.

2.2.3 Cheese processing Equipment

Despite the wide variety that exists in cheeses, there are a number of common steps to the cheese making process. These include coagulation of the milk, cutting of the curd, cooking, whey draining, placing curd in cheese molds, and pressing the molds. The cheese vat is central to the first five of these. Following clarification/standardization of milk and sub pasteurization heat treatment or pasteurization, milk is pumped into jacketed, temperature-controllable vats. Conventional vats are usually rectangular and open top.

Manual manipulation of milk gel (e.g., setting, cutting) and milk curd (e.g., draining, cheddaring) takes place over the side of the shallow tank. Sizes may vary from 500 to 20,000 L. Milk is coagulated in the vat via bacterial fermentation and addition of rennet. Whey is expelled from the cubes, producing curds, which continue to shrink and expel whey with cooking. Once cooking is complete, depending on the cheese variety and desired moisture content of the curd, whey is drained. Curds are allowed to sit together and knit into a structure at warm temperature. This solid curd can then be milled (cut into slices as in cheddar processing), salted, melted and stretched in water, collected into molds (hoops), etc., depending on the cheese variety. Hoops are normally pressed under pressure to complete curd knitting and create curd blocks and to expel further whey from the cheese block.

Modern cheese plants have automated extensively compared with manual vat operations. Performing the cheesemaking operations in stages in setting and finishing vats reduces processing time. Enclosed, cylindrical vats allow for improved automation and control of the

various unit operations while improving hygiene and energy efficiency. Dual-agitators combine both stirring and gel cutting (with the other direction of rotation where sharpened ends of the agitators produce cutting of the gel). Curd fines recovery from whey has been greatly improved, for enhanced yield. Pneumatic curd conveying to curd handling operations reduces curd damage. Draining-matting conveyors with porous belts are employed for continuous operation. In the manufacture of cheddar, milling of curd for salting occurs in-line in the continuous belt system. Automatic block forming, for example, cheddaring towers, can also be utilized. The weight of gravity of the curd in the tower as well as the application of vacuum ensures a tight, uniform block is produced at the bottom. Blocks of 18- 20 kg are cut from the bottom in such continuous block-forming units.

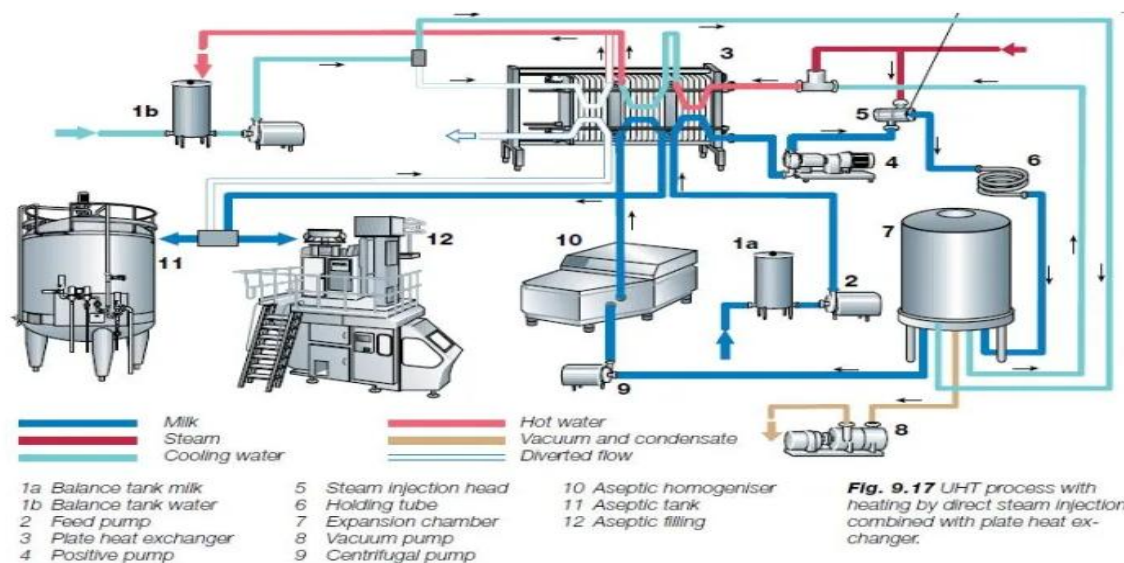


Figure 2.3: Cheese processing Equipment

2.2.4 Lactometer

A lactometer is an application of hydrometer and is used to check purity of cow's milk. It works on the principle of Archimedes' principle. The instrument is graduated into a hundred parts. Milk is poured in and allowed to stand until the cream has formed, then the depth of the cream deposit in degrees determines the quality of the milk. If the milk sample is pure, then the lactometer floats on it and if it is adulterated or impure, then the lactometer sinks.

Note: The relative density of milk does not give a conclusive indication of its composition since milk contains a variety of substances that are either heavier or lighter than water.

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2.2.5 Equipment's and machineries in meat and poultry processing

Meat production involves several processing steps from slaughtering to packing, which needs several machineries. Slaughter and dressing operations require tools to immobilize, slaughter and separate the meat and organs offal from carcass. Conversion of muscle to meat is a highly complex process involving various biochemical and physio-chemical mechanisms. Owing to its highly perishable nature, meat and meat products needs to be handled, processed and packaged properly and preserved at low temperature at every stage. Processing of meat into different convenience, value added meat products needs diverse group of machineries viz., slicer, mincer, bowl chopper, tumbler, massager/mixer etc. Different cooking methods like moist and dry cooking are essential for making the meat products digestible and more palatable.

Availability of cheaper, durable and simple meat processing machineries is a prerequisite to increase the meat production, processing, value addition and consumption. However, very few entrepreneurs in India are presently involved in the manufacture of some of the slaughter and meat processing equipment's. By and large meat processing equipment's are being imported. Imported processing equipment's are costlier, and no qualified service personnel are available for after supply services. In the absence of enough local manufacturers and higher costs involved with imported equipment's it will be difficult to any entrepreneurs willing to venture into meat processing business. This has hampered the growth of meat production, processing and value addition. Further, it has resulted in poor, unhygienic and unscientific ways of processing leading to negative image of meat sector. There is a need to promote meat processing machinery production, which will in turn bring down the input costs and makes it possible for more entrepreneurs to take up production and processing of meat.

2.2.4.1 Poultry Processing Equipment

An equipment that used processing poultry meat, such as large game birds like turkeys and hens' smaller birds like quail. Owning the right equipment makes the job of slaughtering and cleaning poultry easier, such as cones, scalders, and puckers and tools, such as a full set of processing knives and fingertip protection for your hands while plucking chickens. These machine are listed: Table 2: Poultry Processing Equipment

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Table 2: Poultry Processing Equipment



The operation of the equipment is simple and easy to use which can save labor and make the product quality more stable and the capacity higher.

E. Poultry Pluckers

Plucking machine is a machine that used to remove feathers from poultry products, such as chicken breasts, turkey breasts, duck breasts, and goose breasts. End the backache of bending over to pluck poultry post-slaughter.

The equipment helps to ready your birds for the market quickly with these poultry pluckers for farm.



Figure 2.4: poultry plunker

F. Poultry Scalders

A poultry scalding machine is the same device as a plucking machine or poultry plucker. Use this device to remove feathers from poultry products, such as chickens, turkeys, ducks, and geese, in seconds.



Figure 2.5: Rotary poultry scalding machine for poultry abattoir

2.2.4.2 Packaging Materials for Bird Meat

Once you've killed and cleaned your birds, you'll need to package them for the freezer or to sell at market. Our store also offers materials for packaging, including:

- roaster/freezer bags,
- vacuum sealer bags,
- vacuum sealer rolls,
- packaging labels,
- heat shrink bags for turkeys.

Required features of meat processing machineries:

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- Made of rust-free food grade stainless-steel material
- Easy to clean features to avoid contamination
- User friendly, compact and economical
- High efficiency with minimal processing time
- Ability to withstand tough meat fibers

While selecting the meat processing machineries, dimensions (width, height and length), power requirements and minimum room requirement must be kept in mind so as to fit into the assigned place of work.

- Restrainer:** Restrainer is used to restrict the movement of the animal for stunning. The restrainer will have narrow leg space at bottom and broader body space at the top. The trap door should permit only one animal and it should not see the other animal being stunned or slaughtered
- Stunners for meat animals:** Stunning is a welfare requirement to achieve painless killing. It is desirable to render an animal unconscious before it is slaughtered in order to eliminate pain, discomfort and stress from the procedure. Most developed and many developing countries have legislation that requires pre-slaughter stunning e.g., Electrical stunner (voltage not less than 75v and with 10seconds)
- Sticking platform / Bleeding trough:** Used to receive the animal from the restrainer in stunned condition. The platform will be used to slit the throat of the animals for bleeding and collection of blood of the animal.
- Overhead rail system:** Used for carrying the animal in inverted position with the head facing downwards, till all the dressing operations are complete
- Electrical stimulators:** They are used to pass the electrical current through the carcass immediately after slaughter. This accelerates the onset of rigor mortis and ageing and the pH of 6 is reached within 2 to 3 hours. It prevents toughening of meat due to rigor shortening and enables rapid cooling of carcasses. It helps in improving tenderness and color of meat
- Chutes:** Suitable for gravity conveying of disposable parts of the animals at different stages of dressing.
- Carcass wash chamber:** The unit will be used for washing of the carcass by means of high-pressure water jets. The washing cabinet will be formed using two screens on both sides of the rail to completely protect splashing/spilling of wash water.

- h) **Hand wash basin:** For cleaning the hands of the personnel involved in slaughter and dressing of animals. It should be of feet/leg operated type to avoid cross contamination.
- i) **Knife Sterilizer:** For sterilizing knives used in slaughter and dressing of the animals. The hot water temperature should be above 820 C.
- j) **Gambrels with Hooks:** Required for hanging the animal on both rear legs, during the dressing operation on over-head rail system. Gambrel should be provided with galvanized hook with roller for free movement on rail network.
- k) **Air Curtain:** The air curtain should be installed at the entrance of the slaughter hall for preventing aerosol contamination.
- l) **Fly Catchers / Insecticutors:** They are units with ultra violet lamps to destroy flies. The unit should be hanging type from the roof and placed at relent places to control flies' menace.
- m) **Hose reel with gun:** The hose reel with gun will be used for cleaning of the floor, walls and also the equipment's after slaughtering is completed.
- n) **Knife Sharpener:** The knife sharpener is electrically operated one and its grinding stone is periodically used for sharpening of the knives in the slaughterhouse.
- o) **Weighing balances:** Required for weighing live animals, carcasses, meat and byproducts



Figure 2.4.: Electrical stunning, head only stunning and knife sterilizer respectively

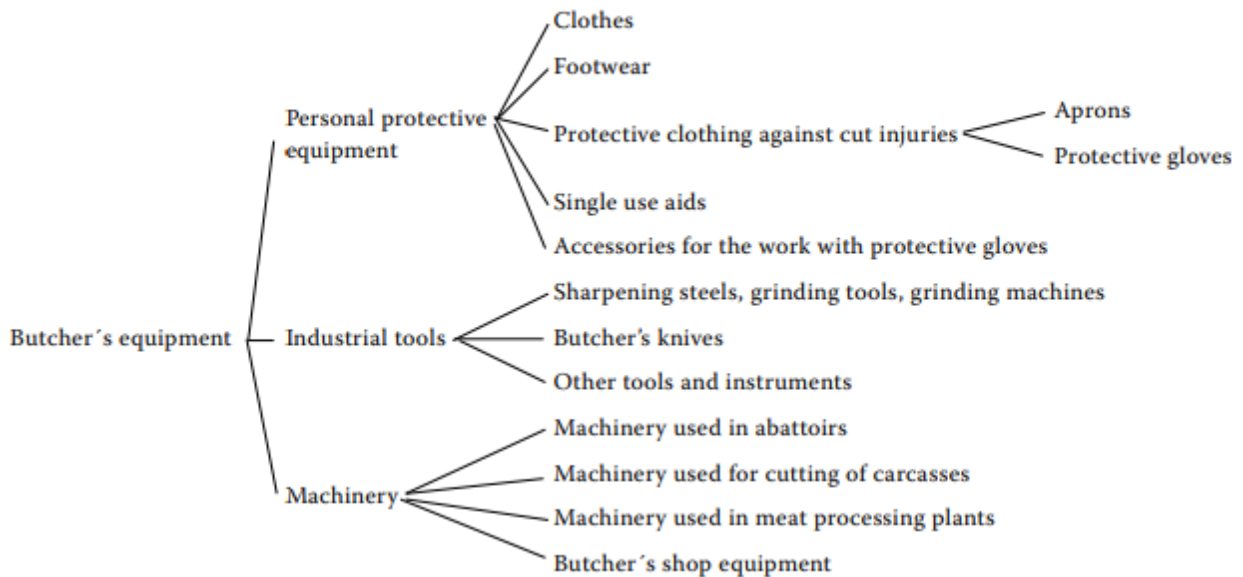


Fig 2.5. Butcher equipment diagram

Machinery used in abattoirs the butchers use several types of machinery. These are chiefly electric stunners and movable conveyers to hang the bodies of slaughtered animals. The cutting rooms are equipped with machinery for skinning and surface treatment of cadavers (e.g., steam baths and brushes to remove bristles, hairs and skin).



Figure 2.6: Model small ruminant slaughterhouse of Meat

2.3 Industry terminology related to work procedures, equipment and animal management

2.3.1 Terminology

Baler: machine used to bale animal's forage

Milking machine is a mechanical device which is used to extract milk from the cow by vacuum.

Churner: machine used to produce butter

Milk pasteurizer: machine used to preserve milk and milk products

Refrigerator: machine used to preserve animal products

Thermometer: tool used to measure temperature of animals

Cream separator: used to separate cream from milk

Lactometer is a little glass instrument that tests the purity of milk based on density/buoyancy and works on the principle of the specific gravity.

Hoof trimmer: tool used to trim/cut extra or deformed hoof of animals.

Pasture: A land with grasses and other vegetative covers used for grazing of livestock.

Breed: A stock of animals within a species having a distinctive appearance and typically having been developed by deliberate selection.

Slicer: Meat and meat products are cut in the form of thin slices for different requirements.

Mincer: It is used for reducing the size of meat into different particle sizes. With the help of grinder plates of different hole sizes (3, 5, 8 & 13 mm), meat can be minced into required particle size as per the product requirement.

Bowl chopper: Chopping of meat is done with bowl chopper consisting of sharp multiple blades with revolving bowl.

Tumbler: It helps in penetration of curing ingredients and extraction of meat proteins to the surface of meat chunks through fragmentation of meat fibers due to the pressure impact caused by dropping of the meat chunks. It consists of a drum with paddles inside.

Mixer/Massager: Used in the manufacture of ground meat products.



Figure 2.5: Different small meat processing machine

2.4 Completing daily routines

Sanitation and hygiene are most important requirement in meat machinery and equipment operations. Meat product quality, shelf life and consumer acceptability are directly influenced by the sanitary conditions under which the meat is processed and hygienic practices followed in a meat machinery. Hygiene is the practice of keeping self and living and working areas clean in order to prevent illness and diseases. Sanitation and hygienic programs have become integral part of meat processing operations.

a. Cleaning: Physical removal of all visible soil and debris by chemical and or/physical means.

b. Sanitizing: Process used to reduce the number of microorganisms on a surface to safe levels. Sanitizer is a chemical which kills bacteria on animal processing equipment surface

General cleaning and sanitizing procedure Step:

- Remove all exposed products Step
- Dry clean/sweep area Step
- Wet area to be cleaned Step
- Clean and scrub area Step
- Rinse Step
- Sanitize Step
- Air dry/store properly

Self-check 2	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer form the following question (2 point)

1.From the following one is an instrument glass that used to tests the purity of milk based on density/buoyancy and works on the principle of the specific gravity.

- A). Hoof trimmer
- B). Bowl chopper
- C). Lactometer
- D). Refrigerator

2. Which is mechanical device that used to extract milk from the cow by vacuum?

- A) Milking machine
- B). Slicer
- C). Tumbler
- D). Cream separator

3. What are the factors used for successful of cold storage?

- A) The selection and packaging of eggs.
- B) The equipment and preparation of the cold store.
- C) Proper temperature, humidity and air circulation.
- D) Periodic testing for quality.

Test II: Short Answer Questions (3 for each point)

- 1. Define scader and plunker
- 2. What are the required features of meat processing machineries? List them
- 3. List the mechanical separation by centrifugal force depending on physical state of the components being separated.

Operation sheet 2

2.2. Techniques to test milk density and purity using lactometer in milking processing

A. Material and personal protective equipment

✓ Material:

- Milk
- Towel
- Lactometer
- Aluminum Can or glass equipment

B. Procedure

- Fill milk in to the can bottle
- Insert lactometer in to milk
- Read the level of on the lactometer

LAP TEST-2	Performance Test
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Name.....

ID.....

Date.....

Time started: _____ **Time finished:** _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1 Hour**. The project is expected from each student to do it.

Task-1: - Techniques to test milk density and purity using lactometer in milking processing

LG #24	LO #3- Operate Fish and poultry processing machinery and Equipment
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Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Operating slaughtering machine
- Fish skin removing, descaling and deboning machinery and equipment
- Operating poultry meat processing equipment
- Operating Fish and poultry processing machine

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Operate slaughtering machine
- Remove, descale and debone fish skin, and operate machinery and equipment
- Operate poultry meat processing equipment
- Operate fish and poultry processing machine

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 3

3.1 Operating slaughtering machine

3.1.1 Introduction

Animal slaughter is the killing of animals, usually referring to killing domestic livestock. The animals most commonly slaughtered for food are cattle and water buffalo, sheep, goats, pigs, horses, poultry (mainly chickens, turkeys, ducks and geese), insects (a commercial species is the house cricket), and increasingly, fish in the aquaculture industry (fish farming).

A pure slaughterhouse will just do the dispatch of animals. Some of these places will process horses for example, with no intent of it entering any form of food supply. An abattoir does slaughter and meat processing. By the time an animal has gone through it has been reduced to carcasses, bones, offal, blood and skin.

The slaughter of livestock involves three distinct stages:

- Pre slaughter handling,
- Stunning, and
- Slaughtering.

a. Pre slaughter handling

Pre slaughter handling is a major concern to the livestock industry, especially the pork industry. Stress applied to livestock before slaughter can lead to undesirable effects on the meat produced from these animals. Pre slaughter stress can be reduced:

- ✓ By preventing the mixing of different groups of animals,
- ✓ By keeping livestock cool with adequate ventilation, and
- ✓ By avoiding overcrowding.

Before slaughter, animals should be allowed access to water but held off feed for 12 to 24 hours to assure complete bleeding and ease of evisceration (the removal of internal organs).

b. Stunning

As the slaughter process begins, livestock are restrained in a chute that limits physical movement of the animal. Once restrained, the animal is stunned to ensure a humane end with no pain. Stunning also results in decreased stress of the animal and superior meat quality.

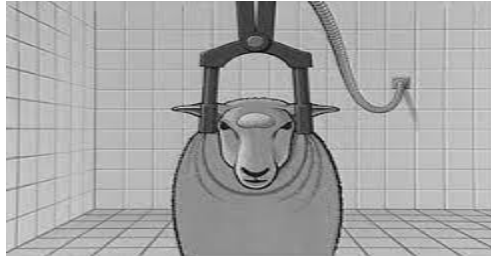


Figure 3.1: Electric stunning

c. Slaughtering

After stunning, animals are usually suspended by a hind limb and moved down a conveyor line for the slaughter procedures. They are typically bled by the insertion of a knife into the thoracic cavity and severance of the carotid artery and jugular vein. This method allows for maximal blood removal from the body. At this point in the process, the slaughtering procedures begin to differ by species.

The three most common methods of stunning are: -

- ✓ Mechanical stunning
- ✓ Electrical stunning and
- ✓ Carbon dioxide (CO₂) stunning gas

Mechanical stunning: involves firing a bolt through the skull of the animal using a pneumatic device or pistol.

Electrical stunning: passes a current of electricity through the brain of the animal.

CO2 stunning: exposes the animal to a mixture of CO2 gas, which acts as an anesthetic.

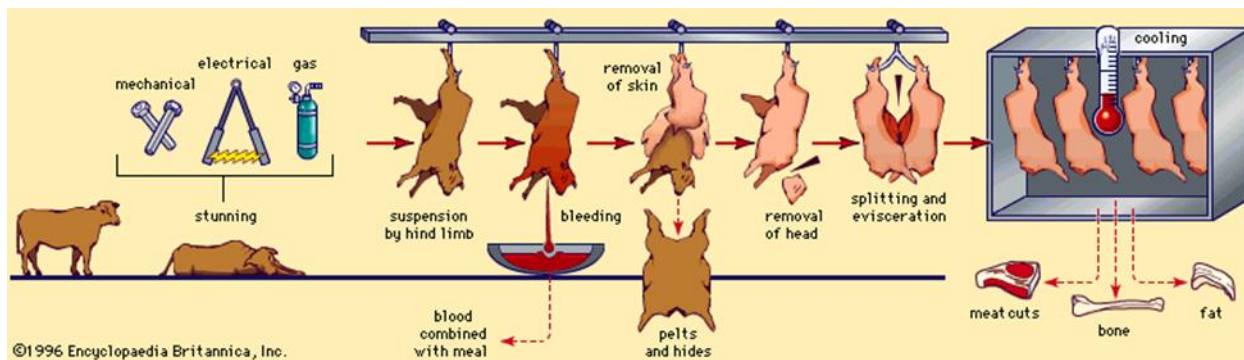


Figure 3.2: Basic slaughtering process; meat processing

3.1.2 Facilities and equipment for slaughtering

Facilities and equipment are inspected to ensure that they meet safety requirements. Facilities must have sufficient cooling and lighting, and rails from which carcasses are suspended must be high enough to assure that the carcasses never come in contact with the floor.

Equipment must be able to be properly cleaned and must not adversely affect the wholesomeness of the products.



Figure 3.3: Tools for ensuring slaughter personnel safety and meat hygiene

3.2 Fish skin removing, descaling and deboning machinery and equipment

Fish slaughter is the process of killing fish, typically after harvesting at sea or from fish farms. At least one trillion fish are slaughtered each year for human consumption. Some relatively humane slaughter methods have been developed, including percussive and electric stunning. However, most fish harvesting continues to use methods like suffocation in air, carbon-dioxide stunning, or ice chilling that may not optimize fish welfare in some instances.

With this compact manual devices made from stainless steel, you can cut fast and easy the Y-bones in fillets from bony rich fishes. With this cutting in small distances (every 3-4 mm), the numerous Y-bones are chopped in very small pieces, so that they are no longer detected or dangerous in the fillets and can be eaten comfortably with the meat.

3.2.1 Pin bone Removers for Fish Filets

For removing of small and unwanted pin-bones from larger fresh, de-frosted or smoked filets up to 150g different pin boners, from compact handheld devices to automatic band machines, are available. All machines (motor: 220-240 V, 50-60 Hz) are building from non-corrosive material to the quality and work with the same principles. The deboning unit can be adjusted in height, angel and speed. The belt can also be adjusted in speed. During operation, the machine units are kept clean with water or air. The unique mechanical picking action of these pin boners gently removes neck- and pin-bones (90-95 % at single and 95-100 % at twin-systems), leaving fillets looking their best. Pin boning is not only removing the pin bones, but important is also not to break pin bones, not to bleach the fillet by water, and keep the fillet without gaping. They are very user and maintenance friendly and allow fast working. Optionally all machines are available as twin models (with 2 heads after each other). As accessories also a vacuum system is available which sucks away the bones and water from the fillets



Figure 3.4: Pin bone Removers for Fish Filets

3.2.2. Skinning Machines for Fish Filets

The fish skinning machine are made of rust-free stainless steel, the transport belts and rolls are made of plastic. Additional plates inside guarantee a very long live of the robust machines, which have no electronic parts which could become defect. All machines are easy to use and very maintenance friendly, which saves additional costs.

All models work with an 230/400 V (50/60 Hz) 0.75 kw (1.0 HP) motor and are equipped with a foot-switch, turntable plate, adjustable knives and a water spray unit. With all machines the filets can be either skinned with stump blade or also with sharp blade. At skinning with stump blade (silver skinning) nearly no waste is generated, at working with sharp blade (deep skinning), the skinning depth can be adjusted from 0 to 4 mm. Types CF are equipped with a cog-roller (for fish with a tough or thick skin) and types with cleaning-centrifuge (for fish with a soft or thin skin).

The Stand-models are open and have a bearded knife-holder and fixable turning-wheels. The Band-models are suitable for large quantities and guarantee highest security during working, because they are switched off if the cover is opened. They have a beared and from outside adjustable pressure unit (opening height max. 70 mm), which adapts automatically to the filets and is available with different performance depending on the fish species. Optionally, the band-models can be equipped with special designed curved blades, which allow in one working process to skin and remove the red-brown muscle segments along the sides of the sensory canal

from fresh or smoked filets completely which was one of the most difficult problems during normal skinning by hand. Additionally, they have a removable charging and forwarding belt. Freeze-drum skimmers on request.



Figure 3.4: Skinning Machines for Fish

3.2.3. Slicing Machine for Fish Fillets

These slicers are based on a proven combination of a durable ground machine and a perfect slicing glide. The plate and glide are from stainless steel, the other parts are made from polished and oxides aluminum. The blades are made of specially chromed steel and last very long. All these features allow a very economic operation for the processing fillets of various fish species. There are different slicing machines available, from the simple manual to the controlled automatic slicer (portion or double lane slicer on request).



Figure 3.4: Fish Fillet Production Line

3.3 Operating poultry meat processing equipment

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In global meat production poultry meat is taking the second place after pork. Due to its widespread availability and popularity and its mostly very competitive production cost, poultry meat has an increasing share as a raw material in processed meat. Turkey and chicken meat is very suitable for further processing purposes.

3.3.1. Industrial method

In large industrial operations, chicken is usually cut in the hanging position. Carcasses are suspended by the neck on a conveyor and pass through working stations. At each station a specific cut is made and a certain part removed, until finally only the bone-carcass structure remains.

The following is a widely practiced industrial cutting method: First the skin is incised around the body above the legs. Then the wings are loosened, by cutting between wings and carcass through the wing joint. Following minor incisions using a knife, the wings are pulled-off together with the breast meat. The legs are then pulled off the carcass and finally the fillets are removed. Only the bone-carcass structure with neck remains.

Figure 3.5: Cut-up in vertical position and Chicken parts in industrial cutting respectively

3.4 Operating fish processing machine

3.4.1 Equipment For Defrosting and Washing Fish Blocks and Other Raw Materials.

Most of the canned fish are made not only from chilled or fresh fish, but also use ice cream. The exception is only natural products, which are made from whitefish or salmon. In view of the use of raw material ice cream, when it enters production, the fish must be defrosted (thawed). From the correctness of this process depends the quality of the finished canning products.



Figure 3.6: Defrosting

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The defrosting process is constantly monitored by temperature sensors in the body, on the surface of the product, as well as in the chamber. The process of defrosting is terminated automatically upon reaching a predetermined temperature in the body

The defrosting process is constantly monitored by temperature sensors in the body, on the surface of the product, as well as in the chamber. The process of defrosting is terminated automatically upon reaching a predetermined temperature in the body.

Self-check 3	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Write Short Answers for the following Questions (3 points each)

1. What are the three common methods stunning? list them and select the best for animal slaughtering to decrease pain
2. How slicing machine can do for fish fillets in fish processing machine?

Note: Satisfactory rating 6 points

Unsatisfactory – below 6 points

Operation sheet 3

1.1. Methods for slaughtering animals

A. personal protective equipment:

- ✓ Glove
- ✓ Overall
- ✓ Plastic Apron
- ✓ Plastic hamlet

Materials:

Electric stunning
 Mechanical stunning
 Carbon dioxide gas
 Full set of Kinfе

LAP TEST-3	Performance Test
-------------------	-------------------------

Name.....

ID.....

Date.....

Time started: _____ **Time finished:** _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 hour. The project is expected from each student to do it.

Task-1: - perform animals slaughtering process

LG #33

LO # 4- Operate honey processing

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Operating honey extractor machinery and equipment
- Wax molding
- Performing Packaging

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Operate honey extractor machinery and equipment
- Perform wax moulding
- Performing Packaging

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 4

4.1 Operating honey extractor machinery and equipment

Before using the machine, carefully read the instruction manual and follow the instructions contained therein. The manufacturer is not liable for damages caused by the use of the device for unintended purposes, or inappropriate handling.

Honey extractor is used for centrifugation of honey from the frames. Honey extractor before centrifugation should be thoroughly washed with hot water and a small amount of preparation put into washing machines intended for contact with food or with a pressure washer. Keeping in mind the security of electronic components and bearings from getting wet.

Designed complete honey extracting lines for the production operations of different scale. The capacity of available lines is 24-200 frames. Small honey extracting lines with slide feed opening machine. The frames are lifted into the slide feed magazine. The mixture of wax and honey drops into the hopper cone and is separated by the screw. The extracting lines are designed to be operated by one person, but in the largest lines optimal capacity can be reached with two persons. All lines are similar by their operating principles. The configuration and the increasing of the line size will increase the extracting capacity

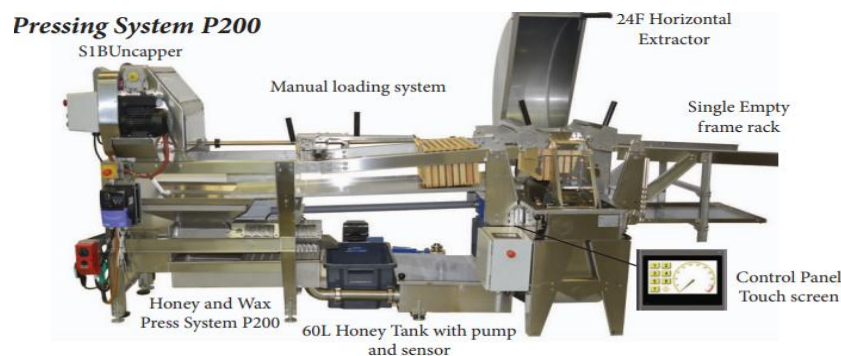


Figure: 4.1: Horizontal Honey Extracting Line with Star Uncapper and Honey and Wax

Electrical Safety

- a. Installation of electrical supply must be fitted with a residual current device with a rated tripping current in no more than 30mA. Periodically check the operation of overcurrent circuit breaker.
- b. If the detachable power cord or connection cable is damaged and needs to be replaced, the operation should be performed at the guarantor or by a qualified service or by a qualified person in order to avoid a hazard. Do not use honey extractor if the power cord or connection is broken!
- c. Before turning on the machine to a network, make sure that the control is turned off. Switch "0/1" on the control panel should be set to "0".
- d. Make sure that the rated voltage of honey extractor and power are compatible.
- e. When connecting to the network with caution. Hands must be dry! The substrate on which stands the centrifuge needs to be dry!
- f. At the time of the launch honey extractor "Emergency Stop" should remain off (to be turned so that he jumped). Pressing the "Emergency Stop" allows you to immediately stop operating.
- g. Cover of honey extractor during operation must be closed! Do not open the lid of honey extractor during spinning.
- h. Honey extractor should not be switched during centrifugation.
- i. Protect your engine and control against moisture (including storage).
- j. It is prohibited to pull the cord.
- k. Keep the power cord away from heat, sharp edges and ensure its good condition.

Safety

- a. This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Pay attention to children not to play with the honey extractor.

- b. In case of damage honey extractor, in order to avoid a hazard, repairs can be carried out only specialist repair shop or a qualified person.
- c. Do not run any maintenance or troubleshooting during operation or when the honey extractor is hooked up to the network!
- d. All shields during operation must be permanently attached to the honey extractor.
- e. In the event of any emergency, you must immediately use the safety switch. Honey extractor restart only after the elimination of risk.
- f. These devices are not intended for outdoor use, can only be operated indoors.
- g. V-belt on the pulleys is to remain loose. Do not tighten it
- h. Do not turn on the device and stored at temperatures below 0 ° C. Do not turn on honey extractor when the ambient temperature is below 5 ° C. Before starting honey extractor, when it was moved out of the room at a lower temperature to a higher temperature, wait until it reaches ambient temperature.

Terms of use

1. Honey extractor is used for centrifugation of honey from the frames.
2. Honey extractor before first use and after honey harvest wash according to instructions in Section Maintenance of honey extractor.
3. Place pre-made frames in basket of honey extractor, paying particular attention to their correct orientation. Errors in the positioning of frames can cause damages that is not covered by the warranty!
4. Before starting honey extractor, you must: - Make sure that the frames are well placed in the basket of honey extractor - Check if the security button is not pressed - Then plug it into an outlet and switch on the control box on the "0/1" switching control, from "0" to "1".

4.2 Wax molding

The wax is pumped from the pre-cooler to the automatic wax molding machine. A highly accurate mass flow control scheme fine-tunes the liquid wax flow into silicone glazed stainless steel pans. The pans pass through the refrigeration system and the solidified blocks are discharged onto a stainless-steel slat conveyor

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Figure 4.2: simple wax molding machine

Powerful continuously operating honey and wax screw press for capping honey and wax treatment. The mix drop into the hopper cone and are pushed forward by the screw. The constantly increasing pressure forces the honey to flow through the holes in the mantle into the honey sump. The dry wax is carried forward to the end of the screw where the dry wax is collected in a basin. Strainer is operating as a prefilter. All the models have inverter force and capacity control for the best performance for different honey quality. You can save energy and time. You will get more high-quality honey. Honey and Wax Pressing System

- Includes:
 - ✓ plastic wax tank
 - ✓ honey tank
 - ✓ wax strainer
 - ✓ Outlet SMS connection 51mm
- Specifications:
 - ✓ Gear motor
 - ✓ Capacity
 - ✓ Power Supply:
 - ✓ Weight



Figure 4.2: Honey and Wax Pressing machine

4.3 Performing Packaging

For most retailing of pure honey, the preferred packing material is glass followed by plastic or, for large quantities, metal containers coated with materials appropriate for contact with acidic food. In any case, the containers have to have a secure air tight lid. Screw top lids on glass jars are the most secure.

Honey packaging procedure should be possible in different configurations as per the necessities of the manufacturing company; Turpack, in fact, can design, as indicated by the prerequisites, diverse kinds of machinery, reasonable for the manufacturing of:

A. Stick pack Honey Filling Machines

Stick pack honey filling machines can fill honey into the pack up to 10 grams and is a great choice for producing much faster. Single use 10 grams of honey is fully automatically filled into food compatible aluminum barrier packaging films.

Stick honey packs are commonly 30mm or 35mm width and 100 mm length. Stick pack filling machines produce a pack that is 3 sides seal. Honey stick packs are a functional promotional product. Since you can print your company logo, name and contact details on the stick packages. Particularly reasonable for travel purposes. Economical and disposable.

Honey can be damaged over a certain degree. Considering this, the chamber is kept at a temperature of 40 or 45 degrees. This temperature is the threshold of making honey liquid without damaging honey.

Self-check 4	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

1. What is honey extracting machine mean and its purpose? (3pt)
2. What is the purpose of wax molding with stick pack honey filling machines? (3)

Note: Satisfactory rating -8- points

Unsatisfactory – below 8 points

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Operation sheet 4

4.1. Techniques use in electrical safety applied in honey extraction machine

A. use personal protective equipment and material

- ✓ Overall
- ✓ Fire extinguisher
- ✓ Honey collecting material
- ✓ Cleaning towel

B. Procedures

- Installation of electrical supply must be fitted with a residual current device with a rated tripping current in no more than 30mA.
- If the detachable power cord or connection cable is damaged and needs to be replaced
- Before turning on the machine to a network, make sure that the control is turned off. Switch "0/1" on the control panel should be set to "0".
- Make sure that the rated voltage of honey extractor and power are compatible.
- When connecting to the network with caution. Hands must be dry!
- At the time of the launch honey extractor "Emergency Stop" should remain off (to be turned so that he jumped).
- Cover of honey extractor during operation must be closed!
- Honey extractor should not be switched during centrifugation.
- Protect your engine and control against moisture
- It is prohibited to pull the cord.
- Keep the power cord away from heat, sharp edges and ensure its good condition.

Lab Test-4	Performance Test
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Name.....

ID.....

Date.....

Time started: _____ **Time finished:** _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **2** hours. The project is expected from each student to do it.

Task-1: perform use in electrical safety applied in honey extraction machine

LG#34	LO # 5- Finish Advanced animal Product processing machinery
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Instruction sheet	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> • Checking machinery and equipment for contamination • Using appropriate machinery and equipment • Using Basic machinery and equipment for handling of animal product efficiently and economical • Making safe machinery and supporting equipment for check • Identifying legislation or operating procedures and inspecting for contamination <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> • Check machinery and equipment for contamination • Use appropriate machinery and equipment • Use basic machinery and equipment for handling of animal product efficiently and economical • Make safe machinery and supporting equipment for check • Identify legislation or operate procedures and inspecting for contamination 	

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information sheet 5

5.1 Checking machinery and equipment for contamination

Hygienic design refers to those building design features that may be unique to a meat processing machinery and are intended to reduce the risk of contamination by:

- Biological
- Physical and
- Chemical hazards from meat processing operations.

The task of hygienic design is to minimize risks of contamination and to make easier the challenges of cleaning and maintaining the plant and equipment.

Meat and poultry products that are contaminated with foreign materials are adulterated under the Federal Meat Inspection Act (FMIA) and Poultry Products Inspection Act (PPIA) regardless of the physical characteristics of the foreign material (e.g., shape, size, hardness, etc.).

5.2 Using appropriate machinery and equipment

How to select Dairy Farming Equipment?

The number of cattle will determine the milking system. Selecting the best quality dairy machinery is extremely important for your business to grow. Equipment which cut down the operational cost, labour, and time should be considered.

Look for options like space, range of features, automated, quicker output, or manual. You need to make sure the equipment has spare parts for easy replacement. From pasteurization to storage everything needs to be done correctly.

5.2.1. Dairy Farming Equipment

Basic milk processing equipment is pasteurizers, separators, homogenizers, and tanks. The primary equipment is milking machines. There are different designs, specifications, and functionality.

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This machine is used to separate cream and skimmed milk. Used to produce milk products and all these components are made from plastic, aluminium, and stainless steel.

The machinery type depends on the operation size. If you are going to start with a small setup then you need to make the changes accordingly and get the machinery accordingly. The machinery can be manual, automated, and semi-automated. Temperature control is important and for that utility vehicle is needed for supplies. For running a smaller farm, then feed grinder, loader tractor, and milking cans are needed

- Fodder truck
- Tractor implements
- Fodder compacting press
- Fodder block machine
- Administrative office equipment
- Milking equipment
- Baler
- Pressure washer
- Fodder mill
- Generator
- tractor
- Tanks
- Moveable fence
- Fodder harvester
- reapers
- Feed basket
- Loader tractor
- Feed grinder
- Milk cans
- Borewell with motor
- Electric fencing

Different types of machinery and equipment are there to have the profit you are looking for. Common processes are fully automated, hand milking, and robotic milking. There is the pipeline included which makes the entire functioning of the milking process smoother and the vacuum bucket milking system is effective.

Different Types of Milking Processes

- Hand milking
- Fully automated robotic milking
- Rotary parlours
- Automated milker take-off system
- Parallel parlours
- Milking pipeline system
- Vacuum bucket milking system

The Fully Automated Robotic System

With an automotive milking system, the working of the entire milking process will be done smoothly. This is great for increasing production and helps your business to get the benefits they are looking for.

5.3 Using Basic machinery and equipment for handling of animal product efficiently and economical

Hygienic handling practices of milk and closely engage with local communities to improve their understanding of milk safety to facilitate change in practices. Educating pastoralists on good milk production practices should be given priority. One of the ways to do this could be by strengthening the integration of milk hygiene in research and development programs as an entry point for behavioural change towards the safe handling and consumption of milk and milk products.

5.3.1. Meat, poultry and fish handling and consumption

Meat, poultry and fish handling storage requires:

- Keep raw meat, poultry, fish, and their juices away from other food.
- After cutting raw meats, wash hands, cutting board, knife, and counter tops with hot soapy water. Marinate meat and poultry in a covered dish in the refrigerator.

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- Prepare the meat on a separate surface from other cooking materials.
- Place well wrapped raw meat, poultry, or fish in the meat drawer or the coldest section of your refrigerator.
- If freezing, place the meats in a freezer bag.
- Keep meat, poultry, and seafood in its original packages until just before using.
- Wash your hands thoroughly after handling raw meats and poultry or before handling produce and other food items.
- Clean any surface raw meat and poultry packages may have come in contact with. Adjust your refrigerator temperature

The food safety inspection service recommends 3 ways to thaw meats

- Refrigerator
- Cold water
- Microwave

Important: Be sure to thoroughly wash your hands immediately after handling raw meat, poultry and fish. Clean and disinfect surfaces or utensils raw meat, poultry and fish have come in contact with.

- Choose foods processed for safety.
- Cook food thoroughly.
- Eat cooked foods immediately.
- Store cooked foods carefully.
- Reheat cooked foods thoroughly.
- Avoid contact between raw foods and cooked foods.
- Wash hands repeatedly
- Keep all kitchen surfaces meticulously clean.
- Protect foods from insects, rodents and other animals
- Use safe water

5.3. Making safe machinery and supporting equipment for check

5.4.1 Equipment maintenance and checks for safety

A maintenance schedule should be in place to ensure that you maintain your equipment regularly. You should check equipment as often as suggested by the manufacturer or more often if indicated by the risk assessment. Any daily checks should be undertaken as recommended by the manufacturer. This will help prevent problems such as blockages, leaks or breakdowns, which can increase risks. You'll also need to maintain safety devices around the equipment such as guards, alarms, safety cages and warning signs.

The duty to maintain work equipment and take measures to manage the risks from maintenance builds on the general duties of the health and safety at work act, which requires work equipment to be maintained so that it is safe, and work to be undertaken safely, so far as reasonably practicable.

If you use heat-producing equipment you should regularly check the environment around it. You must keep floors clear. There must be adequate ventilation at all times. You also need to remove all combustible materials from the area and regularly maintain and check fire detectors.

5.4.2. Equipment checks required by law

Some types of equipment - require examinations by law in addition to normal repair and servicing. This is known as thorough examinations by a competent person, Examples include gas appliances, lifting equipment, pressure systems and power presses. You need to keep the certificates and records of such checks, detailing the findings and any repair work.

How to check equipment safely

If any equipment is to be checked or repaired, it should always be turned off and isolated so no one can start it in error. Most equipment now comes with guidelines for maintenance. This includes advice on how to carry out equipment checks safely.

Many businesses use documented procedures for maintenance and repair work, such as a permit to work scheme. You can also use warning signs to remind workers that equipment is

temporarily out of use. You could also use a lock out system. This means the person doing the maintenance work has a key that prevents the equipment starting up while they work on it.

5.4. Identifying legislation or operating procedures and inspecting for contamination

Inspection: An inspection checking something, i.e., examining and assessing something.

Cleaning: A process that removes dirt, dust, large numbers of microorganisms and the organic matter using detergent and warm water or disposable detergent wipes, such as blood or faces that protects them. Cleaning is a pre-requisite to disinfection or sterilization.

Disinfection: This is a process of removing or killing most, but not all viable organisms. The aim of disinfection is to reduce the number of micro-organisms to a level at which they are not harmful. Spores are not destroyed

Decontamination: A general term used to describe the destruction or removal of microbial contamination to render an item or the environment safe. The term decontamination includes sterilization, disinfection and cleaning.

Detergent: is a surfactant or a mixture of surfactants with cleansing properties when in dilute solutions.

The fifth stage of cleaning is to remove any disinfectants from the previous stage using clean, hot water. This step may not always be carried out however, depending on the disinfectant and surface you're cleaning. As stated in the previous stage, follow the manufacturer's guidance and seek further advice if needed.

Self-check 5	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Short answer question (8pts)

1. Define the word inspection (1pts)
2. What is the purpose of inspection in contamination area? (3pts)
3. How to check equipment safely (2pts)
4. Write at list 3 type of milk process? based on your selection which is practice in your area.
Why? (3pts)

Operation sheet 5

5.1 Basic method for selection milk processing equipment? Let if the work shop have its own different milking machinery .

A. criteria

- ✓ Designs (hit terms of stay, comfortable or not, movable or stationary)
- ✓ Specifications
- ✓ Functionality.
- ✓ Plastic, aluminium, and stainless-steel material.
- ✓ Size
- ✓ Durability

B. Procedure

- ✓ Check machinery type based on your operation size.
- ✓ Check the machinery can be manual, automated, and semi-automated.
- ✓ Check temperature control is important and
- ✓ Check stationary or not
- ✓ Check if the need utility vehicle is needed for supplies

Lab Test 5	Performance Test
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Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1: - Perform Basic method for selection milk processing equipment?

LG# 35	LO # 6- Clean machinery and equipment
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Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Making safe machinery and equipment for cleaning
- Selecting appropriate equipment for cleaning
- Checking and relacing Guards safely
- Identifying , inspecting and cleaning area accumulate contaminant

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Make safe machinery and equipment for cleaning
- Select appropriate equipment for cleaning
- Check and relacing Guards safely
- Identify , inspect and clean area accumulate contaminant

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information sheet 6

6.1 Making safe machinery and equipment for cleaning

Machinery can cause injuries in many ways:

- People can be struck and injured by moving parts of machinery or ejected material. Parts of the body can also be drawn in or trapped between rollers, belts and pulley drives.
- Sharp edges can cause cuts and severing injuries, sharp-pointed parts can cause stabbing or puncture the skin, and rough surface parts can cause friction or abrasion.
- People can be crushed, both between parts moving together or towards a fixed part of the machine, wall or other object, and two parts moving past one another can cause shearing.
- Parts of the machine, materials and emissions (such as steam or water) can be hot or cold enough to cause burns or scalds, and electricity can cause electrical shock and burns.
- Injuries can also occur due to machinery becoming unreliable and developing faults or when machines are used improperly through inexperience or lack of training.

6.1.1. Before they start

Before they start using any machine, they need to think about what risks may occur and how these can be managed. They should therefore do the following:

- Check that the machine is complete, with all safeguards fitted, and free from defects. The term ‘safeguarding’ includes guards, interlocks, two-hand controls, light guards, pressure-sensitive mats etc. National legislation often requires the supplier to provide the right safeguards and inform buyers of any risks (‘residual risks’) that users need to be aware of and manage because they could not be designed out.
- Produce a safe system of work for using and maintaining the machine. Maintenance may require the inspection of critical features where deterioration would cause a risk. They should also look at the residual risks identified by the manufacturer in the information/instructions provided with the machine and make sure they are included in the safe system of work.
- Ensure every static machine has been installed properly and is stable

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- d. Choose the right machine for the job and do not put machines where customers or visitors may be exposed to risk.

6.1.2. Make sure the machine safe

- Safe for any work that has to be done when setting up, during normal use, when clearing blockages, when carrying out repairs for breakdowns, and during planned maintenance;
- Properly switched off, isolated or locked off before taking any action to remove blockages, clean or adjust the machine
- Electrical, hydraulic or pneumatic power supplies
- Badly designed safeguards. These may be inconvenient to use or easily overridden, which could encourage their workers to risk injury and break the law. If this is happening employers should find out why workers are doing it and take appropriate action to deal with the reasons/causes.

6.1.3 Preventing access to dangerous parts

- Employers should think about how they can make a machine safe. The measures they use to prevent access to dangerous parts should be in the following order. In some cases, it may be necessary to use a combination of these measures:
- Use fixed guards to enclose the dangerous parts, whenever practical. Use the best material for these guards' plastic may be easy to see through but may easily be damaged. Where you use wire mesh or similar materials, make sure the holes are not large enough to allow access to moving parts.
- If fixed guards are not practical, they should use other methods, e.g., interlock the guard so that the machine cannot start before the guard is closed and cannot be opened while the machine is still moving. In some cases, trip systems such as photoelectric devices, pressure-sensitive mats or automatic guards may be used if other guards are not practical.
- Where guards cannot give full protection, use jigs, holders, push sticks etc. if it is practical to do so.
- Employers should control any remaining risk by providing the worker/operator with the necessary information, instruction, training, supervision and appropriate safety equipment.

6.1.4. Other things employers should also consider

- If machines are controlled by programmable electronic systems, changes to any programmes should be carried out by a competent person (someone who has the necessary skills, knowledge and experience to carry out the work safely). It is good practice if employers' keep a record of such changes and check to ensure they have been made properly.
- Ensure control switches are clearly marked to show what they do.
- Have emergency stop controls where necessary
- Make sure operating controls are designed and placed to avoid accidental operation and injury, use two-hand controls where necessary and shroud start buttons and pedals.
- Don't let unauthorized, unqualified or untrained people use machinery – never allow children to operate or help at machines
- Adequate training should ensure that those who use the machine are competent to use it safely. This includes ensuring they have the correct skills, knowledge and experience – sometimes formal qualifications may be needed.
- Supervisors must also be properly trained and competent to be effective. They may need extra specific training and there are recognized courses for supervisors.
- Ensure the work area around the machine is kept clean and tidy, free from obstructions or slips and trips hazards, and well lit

6.1.5. Dos and don'ts of machinery safety for workers

Machinery safety for workers do

- Check the machine is well maintained and fit to be used, i.e., Appropriate for the job and working properly and that all the safety measures are in place guards, isolators, locking mechanisms, emergency off switches etc
- Use the machine properly and in accordance with the manufacturer's instructions;
- Make sure operators are wearing the appropriate protective clothing and equipment required for that machine, such as safety glasses, hearing protection and safety shoes.

Machinery safety for workers do not

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- Use a machine or appliance that has a danger sign or tag attached to it. Danger signs should only be removed by an authorized person who is satisfied that the machine or process is now safe
- Wear dangling chains, loose clothing, rings or have loose, long hair that could get caught up in moving parts;
- Confuse people who are using machines;
- Remove any safeguards, even if their presence seems to make the job more difficult

6.2 Selecting appropriate equipment for cleaning

6.2.1 cleaning and sanitizing program

Since cleaning and sanitizing may be the most important aspects of a sanitation program, sufficient time should be given to outline proper procedures and parameters. Detailed procedures must be developed for all food-product contact surfaces (equipment, utensils, etc.) As well as for non-product surfaces such as non-product portions of equipment, overhead structures, shields, walls, ceilings, lighting devices, refrigeration units and heating, ventilation and air conditioning systems, and anything else which could impact food safety. Cleaning frequency must be clearly defined for each process line (i.e., daily, after production runs, or more often if necessary). The type of cleaning required must also be identified. The objective of cleaning and sanitizing food contact surfaces is to remove food (nutrients) that bacteria need to grow, and to kill those bacteria that are present. It is important that the clean, sanitized equipment and surfaces drain dry and are stored dry so as to prevent bacteria growth. Necessary equipment (brushes, etc.) Must also be clean and stored in a clean, sanitary manner. Cleaning/sanitizing procedures must be evaluated for adequacy through evaluation and inspection procedures. Adherence to prescribed written procedures (inspection, swab testing, direct observation of personnel) should be continuously monitored, and records maintained to evaluate long-term compliance.

The correct order of events for cleaning/sanitizing of food product contact surfaces is as follows:

- Rinse
- Clean
- Sanitize.

Definitions cleaning

Cleaning is the complete removal of food soil using appropriate detergent chemicals under recommended conditions.

Cleaning methods

Equipment can be categorized with regard to cleaning method as follows:

- Mechanical cleaning.: requires no disassembly or partial disassembly.
- Clean-out-of-place (cop).; Can be partially disassembled and cleaned in specialized cop pressure tanks.
- Manual cleaning.; requires total disassembly for cleaning and inspection.

Sanitization, It is important to differentiate and define certain terminology:

- ✓ **Sterilize** refers to the statistical destruction and removal of all living organisms.
- ✓ **Disinfect** refers to inanimate objects and the destruction of all vegetative cells (not spores).
- ✓ **Sanitize** refers to the reduction of microorganisms to levels considered safe from a public health viewpoint.

General types of sanitizations include the following:

- **Thermal sanitization** involves the use of hot water or steam for a specified temperature and contact time.
- **Chemical sanitization** involves the use of an approved chemical sanitizer at a specified concentration and contact time.
- **Water chemistry and quality**

Water comprises approximately 95–99% of cleaning and sanitizing solutions. Water functions to do the following:

- Carry the detergent or the sanitizer to the surface
- Carry soils or contamination from the surface.

The impurities in water can drastically alter the effectiveness of a detergent or a sanitizer. Water hardness is the most important chemical property with a direct effect on cleaning and sanitizing

efficiency. (Other impurities can affect the food contact surface or may affect the soil deposit properties or film formation.)

Water pH ranges generally from pH 5 to 8.5. This range is of no serious consequence to most detergents and sanitizers. However, highly alkaline or highly acidic water may require additional buffering agents.

Water can also contain significant numbers of microorganisms. Water used for cleaning and sanitizing must be potable and pathogen-free. Treatments and sanitization of water may be required prior to use in cleaning regimes.

Cleaning

Properties of food soils

Food soil is generally defined as unwanted matter on food-contact surfaces. Soil is visible or invisible. The primary source of soil is from the food product being handled. However, minerals from water residue and residues from cleaning compounds contribute to films left on surfaces. Microbiological biofilms also contribute to the soil buildup on surfaces.

Many films and biofilms require more sophisticated cleaners that are amended with oxidizing agents (such as chlorinated detergents) for removal.

Soils may be classified as the following:

- Soluble in water (sugars, some starches, most salts);
- Soluble in acid (limestone and most mineral deposits);
- Soluble in alkali (protein, fat emulsions);
- Soluble in water, alkali, or acid.

The physical condition of the soil deposits also affects its solubility. Freshly precipitated soil in a cool or cold solution is usually more easily dissolved than an old, dried, or baked-on deposit, or a complex film. Food soils are complex in that they contain mixtures of several components. A general soil classification and removal characteristics are presented.

The surface characteristics

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The cleanability of the surface is a primary consideration in evaluating cleaning effectiveness. Included in surface characteristics are the following:

Surface composition

Stainless steel is the preferred surface for food equipment and is specified in many industries and regulatory design and construction standards. For example, 3-a sanitary standards (equipment standards used for milk and milk products applications) specify 300 series stainless steel or equivalent. Other grades of stainless steel may be appropriate for specific applications (i.e., 400 series) such as handling of high fat products, meats, etc. For highly acidic, high salt, or other highly corrosive products, more corrosion resistant materials (i.e., titanium) is often recommended.

Other "soft" metals (aluminum, brass, copper, or mild steel), or nonmetallic surfaces (plastics or rubber) are also used on food contact surfaces. Surfaces of soft metals and nonmetallic materials are generally less corrosion-resistant and care should be exercised in their cleaning.

Aluminum is readily attacked by acids as well as highly alkaline cleaners, which can render the surface non-cleanable. Plastics are subject to stress cracking and clouding from prolonged exposure to corrosive food materials or cleaning agents.

Hard wood (maple or equivalent) or sealed wood surfaces should be used only in limited applications such as cutting boards or cutting tables, provided the surface is maintained in good repair. Avoid using porous wood surfaces.

Surface finish

Equipment design and construction standards also specify finish and smoothness requirements. 3-a standards specify a finish at least as smooth as a no. 4 ground finish for most applications. With high-fat products, a less smooth surface is used to allow product release from the surface.

Surface condition

Misuse or mishandling can result in pitted, cracked, corroded, or roughened surfaces. Such surfaces are more difficult to clean or sanitize, and may no longer be cleanable. Thus, care should be exercised in using corrosive chemicals or corrosive food products.

Environmental considerations

Detergents can be significant contributors to the waste discharge (effluent). Of primary concern is ph. Many publicly owned treatments work limit effluent ph to the range of 5 to 8.5. So, it is recommended that in applications where highly alkaline cleaners are used, that the effluent be mixed with rinse water (or some other method be used) to reduce the ph. Recycling of caustic soda cleaners is also becoming a common practice in larger operations. Other concerns are phosphates, which are not tolerated in some regions of the u.s., and the overall soil load in the waste stream that contributes to the chemical oxygen demand (cod) and biological oxygen demand (bod).

Chemistry of detergents

Detergents and cleaning compounds are usually composed of mixtures of ingredients that interact with soils in several ways:

- Physically active ingredients alter physical characteristics such as solubility or colloidal stability.
- Chemically active ingredients modify soil components to make them more soluble and, thus, easier to remove.

In some detergents, specific enzymes are added to catalytically react with and degrade specific food soil components.

Physically active ingredients

The primary physically-active ingredients are the surface-active compounds termed surfactants. These organic molecules have general structural characteristic where a portion of the structure is hydrophilic (water-loving) and a portion is hydrophobic (not reactive with water). Such molecules function in detergents by promoting the physical cleaning actions through emulsification, penetration, spreading, foaming, and wetting.

The classes of surfactants are as follows:

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- Ionic surfactants that are negatively charged in water solution are termed anionic surfactants.
- range of properties depending upon the ratio of hydrophilic/hydrophobic balance
- It is a common practice to blend surfactant ingredients to optimize their properties.

Chemically active ingredients

- **Alkaline builders**

Highly alkaline detergents (or heavy-duty detergents) use caustic soda (sodium hydroxide) or caustic potash (potassium hydroxide). An important property of these highly alkaline detergents is that they saponify fats: forming soap. These cleaners are used in many chip systems or bottle-washing applications.

Moderately alkaline detergents include sodium, potassium, or ammonium salts of phosphates, silicates, or carbonates. Tri-sodium phosphate (tsp) is one of the oldest and most effective. Silicates are most often used as a corrosion inhibitor. Because of interaction with calcium and magnesium and film formation, carbonate-based detergents are of only limited use in food processing cleaning regimes.

- **Acid builders:**

Acid detergents include organic and inorganic acids. The most common inorganic acids used include phosphoric, nitric, sulfamic, sodium acid sulfate, and hydrochloric. Organic acids, such as hydroxy acetic, citric, and gluconic, are also in use. Acid detergents are often used in a two-step sequential cleaning regime with alkaline detergents. Acid detergents are also used for the prevention or removal of stone films (mineral stone, beer stone, or milk stone).

- **Water conditioners**

Water conditioners are used to prevent the build-up of various mineral deposits (water hardness, etc.). These chemicals are usually sequestering agents or chelating agents.

Thermal sanitizing

As with any heat treatment, the effectiveness of thermal sanitizing is dependent upon a number of factors including initial contamination load, humidity, ph, temperature, and time.

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Steam

The use of steam as a sanitizing process has limited application. It is generally expensive compared to alternatives, and it is difficult to regulate and monitor contact temperature and time. Further, the byproducts of steam condensation can complicate cleaning operations.

Hot water

Hot-water sanitizing through immersion (small parts, knives, etc.), spray (dishwashers), or circulating systems commonly used. The time required is determined by the temperature of the water.

The primary advantages of hot-water sanitization are relatively inexpensive, easy to apply, and readily available, generally effective over a broad range of microorganisms, relatively non-corrosive, and penetrates into cracks and crevices. Hot-water sanitization is a slow process that requires come-up and cool-down time; can have high energy costs; and has certain safety concerns for employees. The process also has the disadvantages of forming or contributing to film formations and shortening the life of certain equipment or parts thereof (gaskets, etc.).

Chemical sanitizing

The ideal chemical sanitizer should:

- Be approved for food contact surface application.
- Have a wide range or scope of activity.
- Destroy microorganisms rapidly.
- Be stable under all types of conditions.
- Be tolerant of a broad range of environmental conditions.
- Be readily solubilized and possess some detergency.
- Be low in toxicity and corrosivity.
- Be inexpensive.

No available sanitizer meets all of the above criteria. Therefore, it is important to evaluate the properties, advantages, and disadvantages of available sanitizer for each specific application.

Regulatory considerations

The regulatory concerns involved with chemical sanitizers are antimicrobial activity or efficacy, safety of residues on food contact surfaces, and environmental safety. It is important to follow regulations that apply for each chemical usage situation. The registration of chemical sanitizers and antimicrobial agents for use on food and food product contact surfaces and on nonproduct contact surfaces is through the use environmental protection agency

Factors affecting sanitizer effectiveness

Physical factors

- Surface characteristics.
- Exposure time.
- Temperature.
- Concentration.
- Soil.
- Ph.
- Water properties
- Inactivators.

Biological factors

The microbiological load can affect sanitizer activity. Also, the type of microorganism present is important. Spores are more resistant than vegetative cells. Certain sanitizers are more active against gram positive than gram negative microorganisms, and vice versa. Sanitizers also vary in their effectiveness against yeasts, molds, fungi, and viruses.

Specific types of chemical sanitizers

- Chlorine compounds.
- Chlorine dioxide.
- Iodine

6.3 Checking and relacing Guards safely

Safety should be the most important thing in every workplace. There are far too many unguarded or inadequately guarded machines that employees are exposed to daily in workplaces throughout

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the country. At Delong's, we want to stress the importance of properly guarding your machinery and keeping the safety and general well-being of employee's top priority.

What to Guard?

Machines in the poultry processing industry are highly specialized and necessary for production. They require proper instruction and safety measures to be used. Machines must be guarded if there are hazards related to point of operation, ingoing nip points, rotating parts, flying chips, and sparks. If there is not a possibility to attach the guard to the machine, it must be attached to surrounding areas and ensure machine cannot harm an employee.

According to OSHA, the following machines also need to be guarded at all times:

- Guillotine Guards
- Alligator Shears
- Power Presses
- Milling Machines
- Power Saws
- Jointers
- Portable Power Tools
- Forming Rolls and Calendars
- Barrels Drums
- Blades

Anchoring machinery so that it cannot move or harm an employee is essential to maintaining a safe working environment. Without recognizing these hazards, they cannot be addressed. Guarding machines, staying alert to hazardous conditions and listening to employee concerns are all essential elements to a safe workplace.

Why Do Machine Injuries Occur?

Machine guarding is one of the most important things to consider when working with heavy and dangerous machinery. Even when applied, injuries still occur. Here are some of the most common ways these injuries take place:

Pressuring Demands – When employees are pressured to increase their work pace and rate of production, they may remove the machine guards. Production incentives may also cause workers to take a faster, but riskier approach.

Old Machinery – New machinery is often designed with guards built in to the construction of the machine. However, older machines need to be retrofitted with guards. Unfortunately, many factories and production plants keep using their old, outdated machines until they no longer work properly; this poses many safety threats in itself. If a machine is too old to be fit with guards, look for alternatives to safeguard it.

Adjusting and Fixing – If a machine has a problem that needs to be adjusted or fixed, the guards are likely to be taken off during maintenance. The guards *must* be replaced after maintenance is done to the machine to ensure safety of workers. If not replaced, workers will be exposed to dangerous parts of machinery.

Jams: If the production line, or a specific machine jam, make sure to completely turn off the machine before working on unjamming it. Employees often remove or bypass guards to clear the jam, and if the machine isn't properly disabled it could recommence its action when you're in a danger zone.

Cleaning: When a machine needs to be cleaned, guarding is often removed for adequate cleaning. The machine guards should always be put back on immediately following the completion of sanitation.

How Can Proper Management Help?

Production speed is important, but employee safety is more important. Management should never encourage workers to cut corners on safety, in order to produce at a faster rate.

Employees should be properly trained on how and why machine guards are used. They should be trained to:

- Identify, describe, and recognize potential hazards associated with the machine

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- Understand the type of guard they will be working with and how it protects them from danger
- Know when to, how to, and who can remove the guard on their machine.
- Know what to do if a guard is damaged, missing, or not working to its full efficiency.
- Not take independent action in machine guard related matters, and to involve supervision if necessary.

Understanding what it takes to create a safe work environment is the first step to having one. For further safety education and tips on creating a safe workplace, check out our latest free guide, Poultry Plant Safety Checklist

6.4 Identifying , inspecting and cleaning area accumulate contaminant

6.4.1. Milking machine contamination

Milking machine is a machine which extracts milk from the cow.

Sources of contamination

- Contamination from human discharge and wastes
- Contamination from air borne dust and droplets
- Contamination from animal bodies, hides, udder and teats
- Milk containers (contamination from milking utensils and dirty water)
- Cow and contamination from diseased animals
- Silage, faeces, animal bedding and soil contain.
- Bacterial fungal and viral contamination
- Improperly cleaned milking and storing equipment

a. Churning machine contamination

Churner is a machine which produces butter from milk.

The butter churn process used to make butter by shaking up the yogurt. The agitation of yogurt is done by mechanical motion, which disrupts fat globules and changes emulsion from oil in water to water in oil. Butter grains are formed by breaking down the milk fat globules membrane.

Sources of contamination

- Contamination from human discharge and wastes
- Contamination from air borne dust and droplets

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- Contamination from animal bodies, hides, udder and teats
- Milk containers (contamination from milking utensils and dirty water)
- Cow and contamination from diseased animals
- Silage, faces, animal bedding and soil contain.
- Bacterial fungal and viral contamination.

6.4.2. Checklist for an effective dairy hygiene

Pre-milking hygiene

- Clip hair on tails post-calving, mid-lactation and at drying off (minimum).
- Clip hair on udders once per year, post-calving or near the end of lactation.
- Maintain entry and exit to paddocks, areas around troughs and gates, and the collecting yard in a clean condition and without surface water.
- Keep the milking parlor and dairy tidy, clean and hygienic.
- Ensure cubicle beds are clean and dry.

Udder hygiene

- Wash your hands and preferably wear gloves during milking.
- Inspect foremilk for signs of clinical mastitis.
- It is considered 'best practice' to wash and dry cows before milking, however, it is strongly recommended to wash and dry cows when cows are indoors or on out-wintering pads.

If teats are washed, it is absolutely necessary to dry teats with a paper towel.

- Teats should not be hosed as the cows are coming into the parlor.

Milking machine hygiene

An effective cleaning routine for the milking plant may be an automatic or manual system, it may involve a hot wash system consisting of at least one hot circulation cleaning per day or a cold circulation cleaning with one hot circulation cleaning carried out per week. Larger plants and those with accessories, e.g., milk meters should receive hot circulation cleaning.

Manual hot circulation cleaning of milking machine

- Wash jetters and outside of clusters and attach clusters to jetters.
- Rinse plant with 14 liters of cold water per cluster.
- Remove milk filter post-rinse.
- Mix an approved alkaline chlorine detergent-sterilizer at the recommended use rate in hot water at 75-80oC allowing 9 liters of solution per cluster.
- Circulate the solution for 10 minutes.
- After the circulation wash, rinse the plant with 14 liters of rinse water per cluster.
- Ensure that milk lines are drained completely before milking

Self-check 6	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer (6 point)

1. From the following one is machinery safety for workers do not need to perform during operation?
 - A. Use a machine or appliance that has a danger sign or tag attached to it.
 - B. Wear loose clothing, rings or have loose, long hair that could get caught up in moving parts;
 - C. Confuse people who are using machines;
 - D. Install safeguards
2. What the required criteria during Pre-milking hygiene?
 - A. Clip hair on tails post-calving, mid-lactation and at drying off (minimum).
 - B. Clip hair on udders once per year, post-calving or near the end of lactation.
 - C. Maintain entry and exit to paddocks, areas around troughs and gates, and the collecting yard in a clean condition and without surface water.
 - D. Keep the milking parlor and dairy tidy, clean and hygienic.
 - E. Ensure cubicle beds are clean and dry.

Operation sheet 6

6.1. Techniques used to clean in manual hot circulation cleaning of milking machine

A. Personal protective equipment

- ✓ Glove
- ✓ Google
- ✓ Overall
- ✓ Apron
- ✓ Helmet
- ✓ Earmuffs

B. Material

- ✓ alkaline chlorine detergent-sterilizer
- ✓ Water
- ✓ Pressure cleaning equipment

C. Procedure

- ✓ Wash jetters and outside of clusters and attach clusters to jetters.
- ✓ Rinse plant with 14 liters of cold water per cluster.
- ✓ Remove milk filter post-rinse.
- ✓ Mix an approved alkaline chlorine detergent-sterilizer
- ✓ Circulate the solution for 10 minutes.
- ✓ Rinse the plant with 14 liters of rinse water per cluster.
- ✓ Ensure that milk lines are drained completely before milking

Lab Test 6	Performance Test
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Name..... ID.....

Date.....

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1: - perform to clean by manual hot circulation milking machine

LG #36	LO # 7- Safe storage of Machinery and equipment
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Instruction sheet	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> • Disposing of waste materials and infected material • Cleaning and storing equipment • Separating malfunction and damage equipment in storing area • Recording records of cleaning on appropriate forms <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> • Dispose of waste materials and infected material • Clean and storing equipment • Separate malfunction and damage equipment in storing area • Record records of cleaning on appropriate forms 	
Learning Instructions:	
<ol style="list-style-type: none"> 1. Read the specific objectives of this Learning Guide. 2. Follow the instructions described below. 3. Read the information written in the information Sheets 4. Accomplish the Self-checks 5. Perform Operation Sheets 6. Do the “LAP test” 	

Information sheet 7

7.1 Disposing of waste materials and infected material

The most common sources include dairy shed effluent (containing urine, dung, wash water, residual milk, and waste feed), dairy manure, poultry litter (a mix of manure, water, spilled feed, feathers, and bedding material), renderings, and other wastes from livestock finishing operations. Waste is a material that is unwanted by its producer in the workplace. The unwanted materials may be by-products of a production process. Waste is any solid, liquid, or contained gaseous material that is discarded by being disposed of, burned or incinerated, or recycled. (There are some exceptions for recycled materials.) It can be the by-product of a manufacturing process or simply a commercial product that you use in your workplace such as a cleaning fluid or battery acid—and that is being disposed of. Even materials that are recyclable or can be reused in some way (such as burning solvents for fuel) might be considered waste.

Animal by-products are divided into three categories according to their potential risk to human and animal health. There are different rules for disposing of waste in each category. All three categories of animal by-products must be kept separate at all times. If material from one category is mixed with material from another category, the whole mixture must be treated as being in the higher risk category.

Category 1 animal by-products

Category 1 is for very high-risk material and includes: animals and materials suspected or confirmed to be infected by transmissible spongiform encephalopathies (TSEs), such as scrapie in sheep, or bovine spongiform encephalopathy (BSE) in cattle animals that have been experimented on zoo and pet animal carcasses wild animals suspected of having an infectious disease catering waste from international transport, i.e. aircraft and ships specified risk material (SRM), i.e., tissues from cattle, sheep or goats that might be infected with TSEs, or carcasses that have not had SRM removed animal tissue collected when treating waste water from category 1 processing plants.

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Category 2 animal by-products

Category 2 is for high-risk material and includes: animals that are slaughtered to prevent the spread of disease manure and digestive tract content animals and parts of animals which die by means other than slaughtering, e.g., fallen stock animal tissue collected when treating waste water from category 2 processing plants.

Category 3 animal by-products

Category 3 is for low-risk material and includes: meat and fish from food manufacturers and retailers' former foodstuffs of animal origin, or containing products of animal origin - this includes food that is waste due to manufacturing or packaging defects catering waste, other than catering waste from international transport eggs and other by-products that do not show signs of infectious disease milk fish and other sea animals shells hooves, horns and feathers.

Further information If you have animal by-products, you must send them to approved premises for treatment or disposal. Ideally, different categories of animal by-product should be handled at different sites.

Category 1 material must be disposed of by: direct incineration rendering - followed by incineration or landfill. International catering waste may be disposed of at a landfill site authorized by the Divisional Veterinary Office in Northern Ireland or Animal Health in Scotland.

Category 2 material must be disposed of by:

direct incineration rendering or other authorized treatment process - followed by incineration, landfill, composting or biogas treatment. Some category 2 material - such as manure - may be recycled without pre-treatment, egg for biogas, composting, oleo-chemical products, or used as a fertilizer if other requirements are met. Unprocessed category 2 material cannot go to landfill.

Category 3 material must be disposed of by:

Incineration rendering - followed by incineration or landfill anaerobic digestion alkaline hydrolysis plant composting or biogas plant. In some cases, category 3 material can be used in an approved pet food manufacturing plant or technical plant. Category 3 material cannot be taken to landfill, except for catering waste.

7.2 Cleaning and storing equipment

7.2.1. Milking machine cleaning

Soak all parts of the milking machine in the detergent/water solution at a temperature of 120-135 °F for at least 5 minutes. Once the entire claw is inside the detergent/water solution, turn on the pump to get the solution into the claw, tubes and the milking bucket. This will wash the entire milking unit.

When finished milking, rinse equipment in hand-hot water, then wash with hot soapy water (if you use dairy soap, it dissolves better and leaves less residue). Rinse with hot water then re-sanitize with bleach water, warm or cold. Your milk should taste fresh and clean for one week if you follow these guidelines.

7.2.2. Cleaning solutions for meat processing equipment

Cleaning solutions for meat processing equipment are vital to keeping your equipment clean and sanitary. There are a variety of cleaning solutions available on the market, so it is important to choose one that is right for your needs. Different types of meat processing equipment require different cleaning solutions. Our cleaning and sanitizing solutions are essential to keeping your food processing equipment clean and sterile, ensuring a smooth operation.

Sterilization systems

A sterilization system is the perfect solution for cleaning meat processing equipment. This system ensures top cleaning results, reducing handling as well as water and energy consumption. Additionally, the system is easy to operate and requires minimal maintenance.

If you are looking for an efficient and reliable sterilization system for your meat processing equipment, look no further than the system from. This cleaning and sanitizing system will provide you with the cleanest results possible, while also reducing your water and energy consumption. The sterilization system is easy to operate and requires minimal maintenance, making it the perfect solution for your needs. Contact us today to learn more about this sterilization system and how it can benefit your business.

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Storage, cleaning and sterilizing of knives

The ITEC knife holder cleaning systems offer ideal solutions for the cleaning, sterilization and disinfection as well as the storage of knives, sharpening steels, safety gloves and safety aprons. Various systems offer individual overall solutions depending on the size of the company.

Knife holder sterilizer

The ITEC knife-holding system provides a solution for storing, cleaning and sterilizing knives, sharpening steels and safety gloves. Knife holder sterilizers permit hygienic and safe storage of knives.



Figure 7.1: Minimum facilities for hygienic meat production

7.3 Separating malfunction and damage equipment in storing area

The term "machinery failure" or "malfunction" usually implies that the machine has stopped functioning the way in which it was intended or designed. This is referred to as “loss of usefulness” of the machine or component.

Generally, eight mechanisms lead to component failures in industrial machinery: abrasion, corrosion, fatigue, boundary lubrication, deposition, erosion, cavitation and electrical discharge. These mechanisms are driven by various forces, reactive agents, the environment, temperature and time. The term "machinery failure" or "malfunction" usually implies that the machine has stopped functioning the way in which it was intended or designed. This is referred to as “loss of usefulness” of the machine or component.

7.4 Recording records of cleaning on appropriate forms

Good record keeping; In this top the effects and consequences of good and poor record keeping will be discussed. Good record keeping will:

- Improve information sharing
- Support communication
- Be proof of care delivered
- Demonstrate best practice

Cleaning hot detergent-sterilizer cleaning detergent-sterilizer (Sodium Hydroxide and Sodium Hypochlorite)

- Wash outside of clusters, attach jettors and remove milk filter
- Rinse plant with 14 liters (3gls) of water per unit (cold or warm)
- Add liquid detergent-sterilizer at the manufacturers recommended usage rate to hot water (65-75oC), allowing 9 liters (2gls) per unit
- Circulate the hot solution for 8-10 min, allowing first 5 liters to run to waste, the solution may be retained for the 2nd daily wash (if retained; discard solution after the second daily wash)
- Rinse the plant immediately after the main wash cycle with 14 liters (3gls) of cold water per unit
- Ensure the system is drained before the next milking Once weekly: After step 2, add an acid descale (milk stone remover)

Self-check 7	Written test
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Name..... ID..... Date.....

Directions: Answer all the questions listed below.

Test I: Choose the best answer (6 point)

1. Good record keeping will result the following **except one**: _____
 - A. Improve information sharing
 - B. Reduce communication
 - C. Be proof of care delivered
 - D. Demonstrate best practice
2. Why we use hot detergent-sterilizer for cleaning in fish, meat and milk processing machine?
 - A. To remove fat from processing machinery
 - B. To clean properly
 - C. Detergent has high quality to remove fatty dirty from machine
 - D. Because of detergent has low cost

Test II: Short Answer Questions

1. Define machinery failure" or "malfunction
2. What are the eight mechanisms lead to component failures in advance machinery?

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