



Oil Seed and Pulse processing Level II

**Based on October 2019, Version 2
Occupational standards**

**Module Title: Operate an Oil Seed Cleaning
Process**

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LG #19

LO #1- Prepare the oil seed cleaning equipment and process for operation

Instruction sheet

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

- Confirming materials and services
- Identifying basic operating principles of equipment
- confirming different ingredients and services
- Identifying and confirming Cleaning and maintenance requirements
- Fitting and adjusting machine components
- Meeting safety and production requirements.
- Entering operation of equipment parameters
- Setup the bin system
- Checking and adjusting oil seed cleaning equipment
- Carrying out Pre-start checks

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

Specifically, upon completion of this Learning Guide, you will be able to:

- Confirm materials and services
- Identify basic operating principles of equipment



- confirm different ingredients and services
- Identify and confirm Cleaning and maintenance requirements
- Fit and adjust machine components
- Meet safety and production requirements.
- Enter operation of equipment parameters
- Setup the bin system
- Check and adjust oil seed cleaning equipment
- Carry out Pre-start checks

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”
7. If your performance is satisfactory proceed to the next learning guide



Information Sheet-1: Confirming materials and services

1.1 Introduction

Oilseeds are the main sources of fat. It is essential to winnow and sieve oilseeds, prior to expelling, to remove as much dirt, dust, sand and small stones as possible. The presence of sand results in high wear on critical components of expellers such as cages, worm shafts and chokes. Using clean oilseed for expelling will greatly increase the time that the expeller can be used before replacement parts are needed. Normally, the oilseeds are mixed with a variety of foreign materials viz, sand, stones, stalks, weed seeds, foliage, etc., during harvesting, handling and transportation. It is ideal to clean seed before putting it into store. Stone, iron and wood pieces mixed with seeds can disrupt mechanical equipment during processing. Foreign matters may lower protein content and increase fiber content of meal residue after extraction of the oil. Moreover, foreign matters mixed with oilseeds may be having high moisture content which may initiate overheating in storage. The local hot spots in the oilseed damage the quality and constitute a fire hazard if not properly detected and corrected by aeration or rotation. Also, cleaning before storage of oils not required further cleaning for processing and saves double handling of seeds. In short, proper cleaning of oilseeds can increase in crushing capacity of oil expelling units, reduce in-plant maintenance and improve the quality of oil and cake.

1.2 Oil seed Cleaning Equipment/materials

There are a great number of impurities in oil bearing materials. Simple equipment, process short, high cleaning efficiency is the aim of oilseed cleaning and selecting. Oilseeds cleaning machine are designed to remove the impurities in the raw materials, such as stones, irons, plant leaves, straws, dust, etc. It usually includes:

- Cleaning sieve
- Destoning machine
- Magnetic selector
- Dust remover machines
- intake equipment
- day bins

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- screens
- aspirators
- scales/weigh
- dampers
- Polishing machine
- Color sorters and etc.....

The cleaning sieve machine is suitable for oil seeds cleaning before grain storage; it is also suitable for cleaning and classifying in the industries of milling, feed, rice, chemicals, food, oil extraction and other industries. This machine can clean raw materials through the replacement of different pore size sieve. The simple structure, small size, light weight, smooth running, low noise, low power consumption, good leak proofness, easy operation and maintenance of the machine are the characters of the machine. Some of important terms used in oil seed cleaning process

- Weighing - stabilizing the flow at the plant inlet
- Cleaning-removing of coarse particles
- Destoning-removing stones and impurities
- Conditioning-reducing the viscosity and adjust the moisture content
- Cracking-reducing the size of the cleaned oilseeds
- Dehulling-removing hulls for modifying the final meal protein content
- Flaking-improving extraction performances for a better percolation into solvent extraction plant.



Figure 1 oil seed screener



Figure.1 Oil seed cleaning machine

Destone machine: are used for the pre-cleaning and cleaning during the processing.

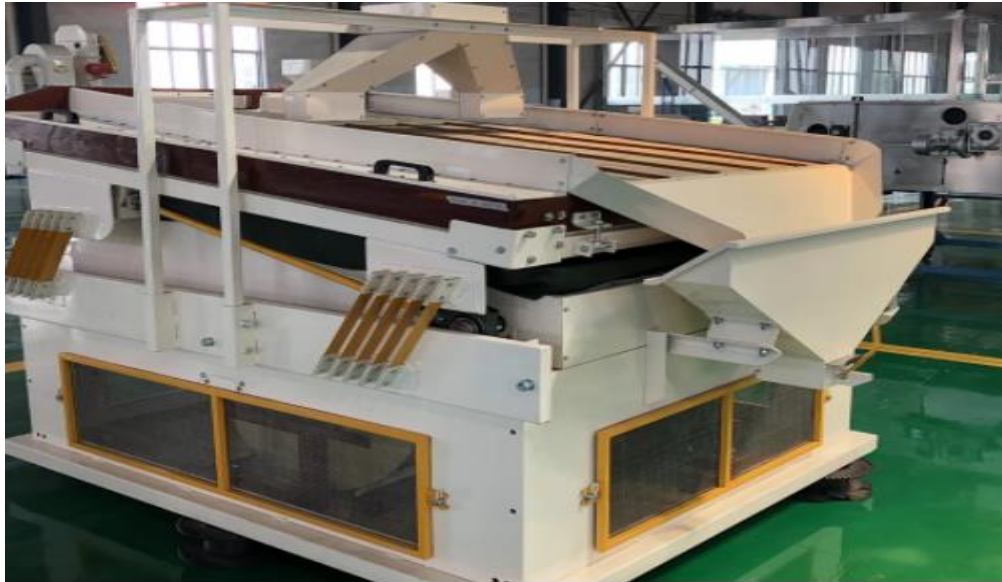


Figure.2 Destoner machine



Figure.3 oilseed grading machine

Polishing machine:

Polisher Machine has many applications in flower, vegetable, field and grass seeds. The scarifying/polishing of seeds is in many cases the first step in the fine cleaning process. removing hairs, ears and wings from seeds. Threshing seeds out of soft pods and buds splitting double seeds Polishing Sunflower Seeds for confectionary industry. Polisher machines have a PLC control system that can set and control all parameters easily i.e.

- In Put Seed amount
- Cylinder Rotating Cycle-Clock wise
- Cylinder Rotating Cycle-Anti Clock wise
- Clock & Anti Clock wise in-between duration cycle
- Cylinder RPM
- Aspiration RPM



Figure 4 Polishing machine



1.3 Purpose of confirming materials availability

- To achieve the exact pre-processing goal/pure oilseed
- To ensure the performance of materials
- To maintain the materials if it is needed

It is necessary pretreatment process in the oil pressing plant. After cleaning, it could increase the oil yield, improve oil and cake quality, improve machines processing capacity, ensure machines safe working and clean working environment. Oilseed cleaning and selecting is great importance in the oilseed pretreatment process and later procedures.



Self-Check 1.

Written Test

Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

TEST I. Write short answer/s

1. Write at least four equipments which are used in oilseed cleaning.(4point)
2. Write the purpose of confirming available materials.(2point)

Note: Satisfactory rating - 3 points Unsatisfactory – below 3 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-2: Identifying basic operating principles of equipment

2.1 Operating Principles of equipment

During starting and operating the oil seed cleaning equipment, the basic operating principles followed may include:

- Selection of Appropriate materials and equipment used in case of oil seed cleaning
- Checking main equipment components,
- Checking status and purpose of guards,
- Maintaining equipment operating capacities and applications,
- purpose and location of sensors and related feedback instrumentation
- The safe operation and maintenance of oil seed cleaning materials and equipment.
- Hazard and risk identification.
- Emergency operating and defensive operating procedures ensuring working loads are secure and within specifications.
- Appropriate use, maintenance and storage of personal protective equipment.
- Outdoor work includes protection from solar radiation, hazardous noise, mechanical vibration and organic and other dusts.
- Protection of people in the workplace.

2.2 Working Principle of the Oilseed Cleaning Machine

It is normally design with two-layer-sieve. The key part, sieve box is supported by hollow rubber springs and it is driven by one or two vibrators. Through the feeder on the up of the machine, oil seeds such as soybean and sunflower seeds are fed in. Then, while the screen vibrating and the air flowing, according to different specific gravity, the materials will be stratified on the pre-separation screen. Light impurities on the top and heavy impurities at the bottom. Final separation of the stones from the seeds materials is accomplished by a countercurrent of air. The stone-free materials

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will be discharged through the squeezed rubber valves. Adjust the inclination of the screens and the air volume to achieve the best cleaning effect.

2.3 Personal precautions and qualifications

Only qualified and trained persons may operate or maintain the machine. They must be physically able to handle the bulk weight, and power of the tool.

2.4 Safety signal words

The safety signal words Danger, Warning and Caution have the following meanings:

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Figure.5 safety signal



Self-Check 2.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

I. Write short answer/s

1. Write the basic principles of operating equipment (2point)
2. Write the safety signal words with their definitions(4point)

Note: Satisfactory rating - 3 points Unsatisfactory – below- 3 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-3: confirming different ingredients and services

3.1 Introduction

During oil seed cleaning for oil production, different ingredients and services are undertaken to facilitate and get high quality and quantity of production.

3.2 Ingredients and services

During the drilling and production of an oil well, many completion liquids are used. The completion saline liquid is placed in the well to prevent damage to the producing zone during the last work prior to production. It is also used during well testing to determine formation pressure and flow. The fluid must be chemically compatible with the reservoir and must be very finely filtered to minimize formation damage.

Some of the major ingredients' used are: salt, white sugar, water aerated sugar, emulsifier flavors /citric acid, skimmed milk, colorant (color developer), sorbic acid, antioxidant. Services may include: Maintaining power, vacuum, compressed and instrumentation, air

2.1 Some of the functions of the ingredients used in oilseed processing industry

An emulsifier acts in the following ways

- It adsorbs at the interface between two immiscible liquids such as oil and water.
- It reduces the interfacial tension between two liquids, enabling one liquid to spread more easily around the other.
- It forms a stable, coherent, viscoelastic interfacial film, which prevents or delays coalescence of the dispersed emulsion droplets.

Molecules that can act as emulsifiers contain both a polar and hydrophilic (water loving) section, which is attracted to water, and a hydrophobic (or water-hating) section, which is attracted to hydrophobic solvents such as oil. Good emulsifiers are able to interact at the interface to form a coherent film that does not break easily. The best emulsifiers are proteins, such as egg yolk (lipoproteins) or milk proteins, because they

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are able to interact at the interface to form stable films, and hence to form stable emulsions. However, many other types of molecules are used as emulsifiers. In some cases, finely divided powders such as dry mustard or spices are used to act as emulsifiers in oil-in-water mixture. The mustard and spices adsorb at the interface and reduce interfacial tension.

A temporary emulsion separates upon standing. The emulsion is not permanent because the hydrophobic oil and hydrophilic water components separate upon standing. A permanent emulsion is formed when two ordinarily non miscible phases, such as water and oil, are combined with an emulsifier.

Thus, the time of separation of oil and water is dependent upon the effectiveness of an emulsifier and the degree of agitation.

Factors Affecting Emulsion Stability

- Type of emulsifier
- Concentration of emulsifier
- Droplet size
- Changing pH or ionic strength
- Viscosity
- Addition of stabilizers
- Heating, cooling, freezing, and/or shaking

2.2 Citric acid

Citric or lemon juice may be used to increase foam stability. Addition of acid reduces the pH, which reduces the charge on the protein molecules and usually brings them closer to their isoelectric point. This generally results in a stronger, more stable interfacial film. Foams make a vital contribution to the volume and texture of many common food products. They give volume and a distinctive mouth feel to products such as whipped cream and ice cream and they give a light, airy texture to baked goods.

2.3 Sugar and salts

Sugar and salts acts as preservative which improve shelf life of an oils.

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2.4 Water

Water facilitates the extraction of oil from oil seeds. It makes some fatty compounds soluble.

3.3 Services under taken during oilseed cleaning

The activities undertaken during oil seed cleaning may include:

- Cleaning the environment/ maintaining the environment,
- Preparing the appropriate equipment and ingredients,
- Preparing winnowers, screeners, weighing materials, destoners, sievers
- Maintaining the work area,
- Checking the power
- Checking the vacuum
- Checking compressed and instrumentation air
- Maintaining vacuum, power, compressor and instrumentation,
- Identifying the foreign materials

**Self-Check 3.**

Written Test

Name _____ ID _____ Date _____

Directions: Answer the questions listed below accordingly:**I. Write short answer**

1. Write the services undertaken during oilseed cleaning (5point)
2. Write the ingredients needed?(5points)

Note: Satisfactory rating - 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-4: Identifying and confirming Cleaning and maintenance requirements

4.1 Introduction

All equipment requires periodic sanitation. Failure to practice proper sanitation or maintenance procedures as noted in the equipment manual can lead to unsafe conditions. Maintain optimum equipment sanitation to promote product quality and safe operating conditions.

4.2 Advantages of cleaning equipment

- Increasing the cooking oil yield, reducing the oil loss in cakes.
- Improving the quality of crude cooking oil, cake and meal.
- Adding processing capacity of cleaning equipment and oil pressing machine.
- Ensuring safe working and clean working environment.

4.3 Different type of Maintenance and their importance

Proper maintenance is critical to personnel safety, smooth equipment operation and lasting performance. A production system or individual piece of equipment requires regular maintenance to help promote equipment safety, provide an optimum end product and to prevent costly down time. Failure to practice proper maintenance procedures lead to unsafe conditions and shorten the life of the equipment. A preventive maintenance program is imperative. Prior to any maintenance procedure, turn the equipment OFF and disconnect all power sources. Follow the lockout procedure. Failure to follow this warning could result in death or severe personal injury.

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Production systems are dangerous during operation. Death or severe personal injury may result if warnings are disregarded. When working on or around all equipment, avoid the use of loose clothing, jewelry or any loose articles that may be caught in moving parts. Keep all extremities away from moving parts. Never operate any equipment while other persons are cleaning, servicing, or performing maintenance. Wear personal protective equipment (safety garments, safety glasses, gloves, etc.) appropriate for the maintenance process to be performed.

4.4 Preventive Maintenance

A preventive maintenance program is critical to promote safety, smooth equipment function and to prevent costly down time. Follow the Preventive Maintenance Schedules for each piece of equipment in the technical manual to properly maintain components. Each piece of equipment will have its own schedule. Depending on the operating environment and the product being processed, the equipment may require more frequent maintenance than the intervals recommended maintaining safety and optimum equipment function. Individual operating parameters will help determine the appropriate maintenance intervals.

Machine maintenance affects every asset and every employee who uses those assets. That's why it's essential to develop a strategy to keep equipment working. Depending on the assets you use, your most effective strategy will include several types of maintenance. Determining the perfect balance isn't always easy and will definitely take some time, but you'll be paid back with healthier equipment, a more productive team, and less cost-inducing inefficiency. Equipment maintenance is the means by which mechanical assets in a facility are kept in working order. Oilseed cleaning machine maintenance involves regular servicing of equipment, routine checks, repair work, and replacement of worn or nonfunctional parts. Machines to be maintained include both heavy duty industrial equipment and simple hand-operated machines.

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Maintenance of equipment is frequently handled reactively (e.g. after a breakdown) though it may also be done proactively, as with preventive and predictive maintenance. Preventive maintenance keeps assets in good repair through regular scheduled service; predictive maintenance relies on equipment monitoring to detect problems before they result in a breakdown. Predictive maintenance techniques are designed to help determine the condition of in-service equipment in order to estimate when maintenance should be performed. This approach promises cost savings over routine or time-based preventive maintenance, because tasks are performed only when warranted. Thus, it is regarded as condition-based maintenance carried out as suggested by estimations of the degradation state of an item.

4.5 Corrective maintenance

Corrective maintenance is a type of maintenance used for equipment after equipment break down or malfunction is often most expensive – not only can worn equipment damage other parts and cause multiple damage, but consequential repair and replacement costs and loss of revenues due to down time during overhaul can be significant. Rebuilding and resurfacing of equipment and infrastructure damaged by erosion and corrosion as part of corrective or preventive maintenance programmes involves conventional processes such as welding and metal flame spraying, as well as engineered solutions with thermoset polymeric materials



Figure.6 cleaning and maintaining oilseed cleaning machine

4.6 Routine maintenance:

Some tools may require daily checks and maintenance after use. Other tools, such as power tools, usually must be checked once in 6 months or so. More complicated power tools would need to be serviced on a regular interval. A maintenance schedule assigns a specific date to specific maintenance tasks. It states what has to be checked and will require that the assigned person signs off the document assuring that the checks were done. If faults are found, the tool must be sent for maintenance and the assigned person that fixes the tool has to report on exactly what was done and when it was completed.



Self-Check 4.	Written test
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Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

TEST.I Write true for the correct statement and false for incorrect statement

1. Failure to practice proper maintenance procedures lead to unsafe conditions and shorten the life of the equipment (2point)
2. A preventive maintenance program is critical to promote safety and smooth equipment function (2point)
3. Prior to any maintenance procedure, turn the equipment off and disconnect all power sources.(2point)

TEST.II write short answer/s

1. What does preventive maintenance mean?(5point)
2. What does corrective maintenance mean?(5point)

Note: Satisfactory rating - 8 points Unsatisfactory – below- 8 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-5: Fitting and adjusting machine components

5.1 Introduction

Regular checks & adjusting equipment performance are important for oilseed cleaning in order to maintain equipment efficiency and avoid frequent breakdowns. Machine tools are capable of producing work at a faster rate, but there are occasions when components are processed at the bench. Sometimes it becomes necessary to replace or repair a component, which must fit accurately with another component on re-assembly. This involves a certain amount of hand fitting. The accuracy of work done depends upon the experience and skill of the fitter.

Fitting is- Make correct and proper the machine/equipment components for the pre-processing of oilseed cleaning.

Adjusting is- Prepare/ checking the cleanliness, power and operation of oilseed cleaning machines, equipment and containers

5.2 General Safety during fitting and adjusting equipment

Ensure that all power sources are turned off when the machine is not in use. This includes electrical and pneumatic power. Understand the LOCKOUT procedure and use it before fitting, adjusting, inspecting, maintaining, servicing or cleaning the equipment to help prevent anyone from accidentally turning on power to the machine. Read the manual for any special operational instructions for each piece of equipment

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Figure. 7 adjusting and fitting equipment



Self-Check 5.

Written test

Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

TEST.I Write short answer/s

1. What does fitting machine components mean?(3point)
2. What does adjusting machine component mean? (3point)
3. Why it is important fitting and adjusting the equipment?

Note: Satisfactory rating - 3 points Unsatisfactory – below- 3 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-6: Meeting safety and production requirements.

6.1 Introduction

Safety in the Process Industries aims to ensure the safety of people involved in process plants, especially those who face its immediate hazards and dangers. Checking workplace safety throughout the day is an easy way to keep the working environment safety. Being safety oriented can help improve the employees' morale, productivity, and even make a good impression on visitors.

6.2 Recommendations for Production System Operation

Any production industry has its own system operation of machine/equipment according to their objectives. Know when the equipment will be started. Ensure that all inspection, sanitation and maintenance procedures have been completed so that the equipment lockout/tag out procedure can be reversed. Emergency stop buttons and/or cables are located at various locations on the equipment. Use these emergency stop buttons/cables to shut down the equipment in an emergency. Know where the emergency stop buttons/cables are located before operating the equipment or machines. Ensure that all tools, cleaning supplies, etc. are removed from the equipment prior to startup. Verify that hose and tubing connections for pneumatics, fluids and flour dust removal systems are connected and prepared for operation. Ensure that all guards, doors and access panels are installed, securely closed and functioning properly prior to startup. Ensure that any connecting bars, pins and brackets between the equipment and conveyors are installed and secured for stability during operation. Verify that the equipment is clean, fully assembled, properly programmed and in the operating position.

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Fill all dusters/dispensers with dry topping prior to startup. Connect all power sources including electricity, pneumatics, hydraulics and water sources. Clear all obstacles and personnel from the operating area. All pieces of equipment that were left in the “on” or “auto” mode when the production system was shut down will start when the production system is started.

6.3 Safety Labels On The Equipment

The purpose of safety labels is to draw your attention to equipment and situations that could affect personal or plant safety. Always pay attention to the safety instructions provided on each label. Each section in the equipment manual lists the safety labels used on that piece of equipment, and includes a diagram of where they are located on the machine.

- Do not alter or remove safety labels.
- Inspect the machine periodically to be certain the appropriate safety labels are in place.
- Replace damaged, worn or missing labels immediately.

6.4 Guards, Safety Switches and Sensors

Guards, safety switches and sensors are intended to provide hazard protection for personnel. All guards and safety switches must be installed on the machine, properly maintained and fully functional. Under no circumstances are these guards, switches or sensors to be removed, bypassed or disabled. Failure to follow this warning could result in death or severe personal injury. Ensure that all doors and guards are installed, closed and secured, before operating the equipment. Generally, three major maintenance rules. Hourly cleaning, Daily cleaning, Weekly Cleaning



Self-Check 6.

Written test

Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

I. Say “true” for correct statement and “false” for incorrect statement

1. Safety labels of equipment helps to save personal and plant/machine safety.(2point)
2. Prior to startup the machine it is better removing all tools and cleaning supplies.(2point)

Note: Satisfactory rating - 2 points

Unsatisfactory – below- 2 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-7: Entering operation of equipment parameters

7.1 Introduction

Meaning of parameter- is inspection or test points (control points) in the process and the related procedures. When starting up equipment, flow rates or throughput should be gradually and steadily built up to the normal operating parameters. Any changes to operating parameters should be made gradually so that the effect of the changes can be monitored and corrective action taken if required. Measuring equipment health by performance monitoring has the potential to give warning of a developing failure through the changing levels of a suitable parameter being measured, thereby indicating a change in condition of a component, machine or system

7.2 Parameter techniques for oilseed cleaning machines

The cleaning sieve machine of oilseed is suitable for oil seeds cleaning before storage; it is also suitable for cleaning and classifying in the industries of milling, feed, rice, chemicals, food, oil extraction and other industries. This machine can clean raw materials through the replacement of different pore size sieve. Which is has the following characteristics

- The simple structure,
- small size,
- Light weight,
- smooth running,
- low noise,
- low power consumption,
- good leak proofness,
- Easy operation and Maintenance of the machine is the characters of the machine.



7.3 Start Up Item of Equipment

When starting up equipment, flow rates or throughput should be gradually and steadily built up to the normal operating parameters. Any changes to operating parameters should be made gradually so that the effect of the changes can be monitored and corrective action taken if required. The following are some of parameters should be checked

- Voltage/power needed
- PH
- Pressure
- Speed
- T°

7.4 Effect of different equipment parameters

A sudden large change in a parameter of equipment can cause a process leading to:

- wastage of raw materials
- production of off special materials
- equipment shutdown
- equipment downtime
- increased production costs
- damage to plant
- environmental damage
- Potential personnel hazard.

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**Self-Check 7****Written test**

Name _____ ID _____ Date _____

Directions: Answer the questions listed below.**I. Write short answer/s**

1. What does operation of equipment parameters mean?(5point)
2. Write effect of sudden change of equipment parameters.(5point)

Note: Satisfactory rating - 5 points**Unsatisfactory – below- 5 points**

You can ask your teacher for the copy of the correct answers



Information Sheet-8 Setup the bin system

8.1 Introduction

Bin is a large container or enclosed space for storing something in bulk, such as oilseed, coal, grain, or wool. There are different bin sizes and structures are used for oilseed storage in oilseed processing factory.

8.2 Solid-wall bins

Solid-wall bins may be anything from a small plastered basket to large steel or concrete silos holding several thousand tons. The traditional bins used by African farmers are small with a capacity of 2–3 tones, including gourds, clay pots, mud-plastered baskets raised off the ground and mud-walled silos ('rumbus'). Many of these solid-wall bins or silos have limitations, particularly in terms of durability and protection against rodents, insects and moisture from ambient air.

Solid-wall bins or silos should be used only in areas where the produce can be dried sufficiently prior to storage. Several attempts have been made to improve on traditional stores to make them more suitable for long-term storage. Improved traditional bins many traditional stores perform excellently in their appropriate climatic conditions and others can be made to do so with minor changes. Efforts should be made to prevent cracking of the surface of the walls and to seal the entrance to the bin. This can be done, for instance, by adding lime or cement to the mud i.e. a stabilized soil technique or by incorporating an airtight lining (e.g. plastic) in the wall. For winter storage, store commercial soybeans at 13% moisture or less. Soybeans with less than 15% moisture can be dried with bin fans. Soybean seed stored over one planting season should be 12% moisture or less. Stores carry over seed at 10% moisture or less. A portable moisture tester can be used for checking moisture content. Pay attention to the tester's temperature compensation method because grain temperature can have a large effect on moisture readings.

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Cold grain generally causes low readings unless moisture has condensed on the surface. All moisture testers show some variability - different readings are obtained when the same sample is tested more than once. To limit this effect, test each sample at least three times and average the readings check the oil seed moisture and condition every day. Resume drying in the spring if necessary. If you detect mold, heating, or foul odors during drying, unload the bin and sell, or dry the beans at high temperatures. Check all stored oil seed weekly so you can identify problems before they become unmanageable. Even oil seed in good condition in the fall can develop problems over the winter. When checking moisture of binned oil seed, use a 6- or 10-foot probe to collect samples from various depths (go as deep as possible) at bin center and several other locations. Do not mix the samples.

Knowing the moisture content at different locations can help you find the drying front in drying bins or the trouble spots in storage bins. If you don't have a probe, at least take some samples at arm's length below the surface.



Figure 8. Acomplete Bin

8.3 Good Bin characteristics

The main points / tips of storage (bin) structure

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- Appropriate level for the bins.
- Avoid using worn augers and mechanical spreaders that will damage the seed while filling.
- Aerate the bin as soon as it is filled to remove the heat, regardless of the moisture.
- Aerate the stored oil seed to maintain temperature at 35° to 40°F in winter and 40° to 60°F in summer.
- Check the bin every couple of weeks throughout the season for signs of crusting, aerate if needed.
- Be sure the bin is ready for unloading. Keep a level seedbed.



Figure 9. Modern bin



Figure 10. Traditional bin

8.4 Cleaning and handling the bin

Any residual grain debris left inside a grain bin can be the source of insect or mould contamination in the new crop. The bins should be swept and vacuumed to remove all traces of dust, mould and old grain. Ensure that all fines, broken pieces of grain and dust are removed from any seams, ledges and flooring. Scrape, brush and thoroughly clean any areas that have caked on grain or mould and let dry thoroughly. Inspect the integrity of the grain bin walls for signs of rust and buckling. Rust caused by wet grain sitting against the grain bin sides can create rapid metal corrosion. Bins showing rust may have structural damage and should be inspected by an expert before the bin is put back in service. Repairs and repainting may be required.

Cleaning and maintaining the oilseed bins early in the season gives the time to handle unexpected issues with long before the frenzy of harvesting and storing the crop bounty. Once bins are empty; then a visual inspection of the entire structure is warranted. Start by walking the perimeter of the bin and assessing the condition of the grain bin base.



Figure 11. Cleaning area of bin

Safety during cleaning the bin

- Never enter a grain bin until it is empty.
- Never enter a grain bin without appropriate breathing protection.
- Use a tag out system on all electrical and powered equipment associated with the bin.
- Before entering an empty bin for cleaning so no one can accidentally turn on equipment while you are inside the bin.

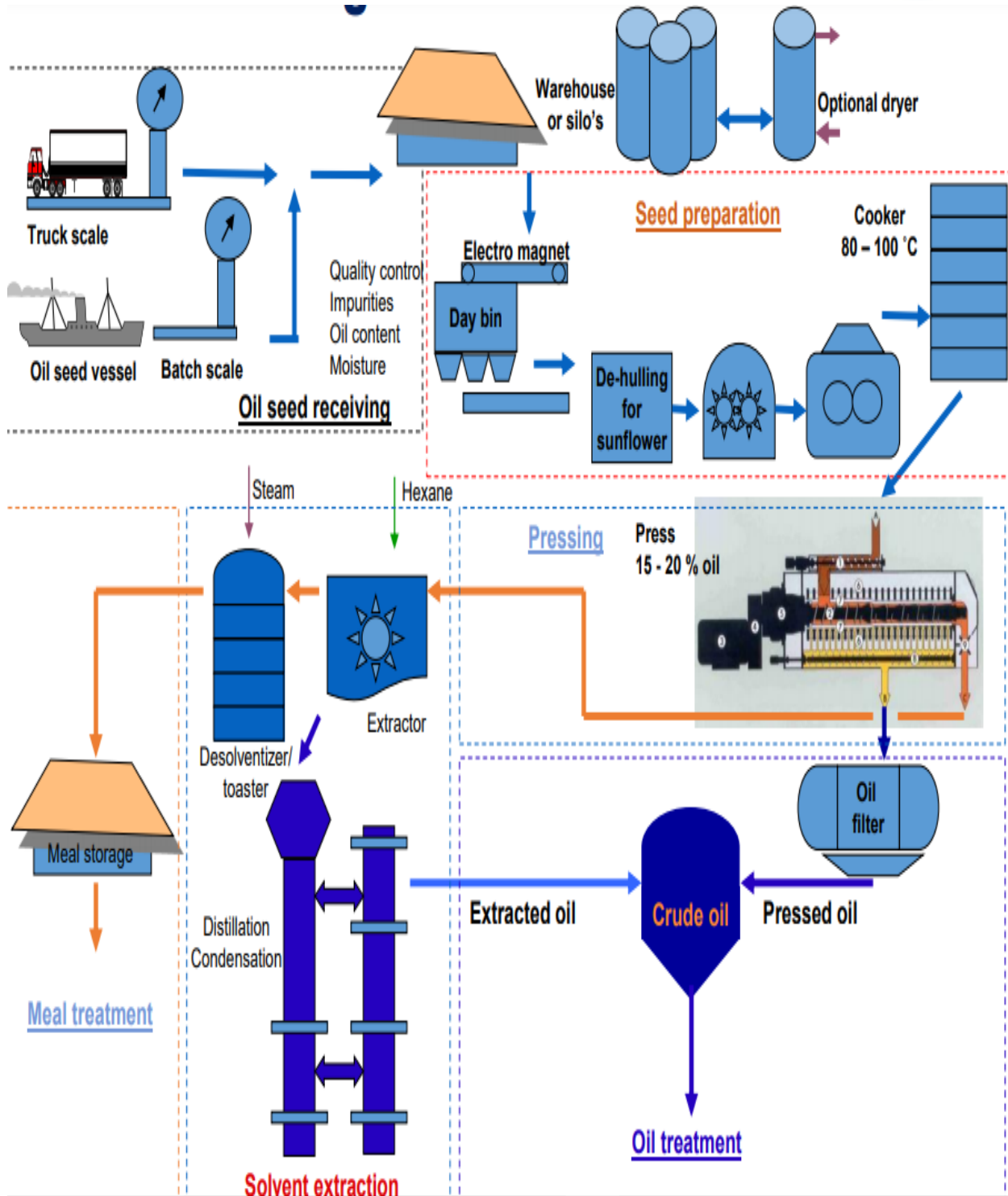


Figure 12. General oil seed processing structure of industry



Self-Check 8.

Written test

Name _____ **ID** _____ **Date** _____

Directions: Answer the questions listed below.

I. Write short answer/s

1. Write the characteristics of good bin structure. (5point)
2. What is the difference between traditional and modern bin equipment? (5point)

Note: Satisfactory rating – 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-9 Carrying out Pre-start checks

9.1 Introduction

Pre starts often involve routine inspections conducted by the machine or equipment operator. Prior to operating any oilseed cleaning equipment, the operator of that equipment completes a visual assessment, check levels, wear, indicator lights, or signs of damage. The Prestart checklist ensures the operators assessments are recorded and saved, this acts not only as a verification that checks are done, but also an accountability measure for operators of that equipment to take responsibility for their equipment.

9.2 Pre operational check

Pre-operational checks of equipment may include-

- Pre-start and safety checks including the service and maintenance system.
- Checking size of sieve, type machine with respective oil seed type, fuel, and lubricants needed, fan belts, lines, connections and transmission.
- Inspection of safety guards
- Checking and confirming equipment calibration settings and operating methods
- Observing and monitoring noise levels for correct operation.
- Preparation of independently powered tools may include cleaning, priming, tightening, basic repairs and adjustments.
- Identify and segregate unsafe or faulty equipment for repair or replacement.



9.3 Safety during Operation

The lockout/tag out procedure is a positive means of securing power sources in the off position, allowing only one person (the person performing the procedure) to have possession of the key. When equipment is being cleaned, serviced, inspected or maintained, a lockout/tagout procedure is required to prevent personal injury or equipment damage from an accidental startup. Follow your company's established procedure.

9.4 Purpose of pre-start checks

- To make the process easy
- To reduce hazards
- To take action



Self-Check 9	Written test
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Name _____ ID _____ Date _____

Directions: Answer the questions listed below.

I. Write short answer/s

1. Write at least four pre operational checks for equipment operation.(6point)
2. Write safety needed during equipment operation. (4point)

Note: Satisfactory rating - 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-10 Checking and adjusting Oil seed cleaning equipment

10.1 Introduction

The purpose of checking is to identify whether work equipment can be operated, adjusted and maintained safely – with any deterioration detected and remedied before it results in a health and safety risk. Not all work equipment needs formal inspection to ensure safety and, in many cases, a quick visual check before use will be sufficient. However, inspection is necessary for any equipment where significant risks to health and safety may arise from incorrect installation, reinstallation, deterioration or any other circumstances. The need for checking and inspection frequencies should be determined through risk assessment.

10.2 Checking and adjusting equipment

Checking can vary in its extent, as the following

- Quick checks before use (e.g. electric cable condition on hand-held power tools, functional testing of brakes, lights)
- Weekly checks (e.g. presence of guarding, function of safety devices, tire pressures, and the condition of windows, mirrors and on mobile plant)
- More extensive examinations, undertaken every few months or longer (e.g. general condition of a ladder, close examination of a safety harness, portable appliance testing)

Work equipment which is exposed to conditions causing deterioration that could result in a dangerous situation should be checked and adjusted at suitable intervals, and after every event liable to jeopardize its safety. The frequency of inspection may vary, depending on environmental conditions. The frequency of inspection should be determined through risk assessment, taking account of the manufacturer's recommendations, industry advice and your own experience.



Figure 13. Checking and adjusting equipment

**Self-Check 10.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.**I. Say true for the correct statement and false for incorrect statement.**

1. The frequency of inspection of equipment may vary, depending on environmental conditions. (3point)
2. Checking/inspection can vary in its extent. (3point)

Note: Satisfactory rating - 3 points**Unsatisfactory – below- 3 points**

You can ask your teacher for the copy of the correct answers.



OPERATION SHEET-1 Conduct pre start check of oilseed cleaning machine

Materials needed: PPE, Note book, caliper (size measure material)

Steps:

- Wear PPE
- Pre-start and safety checks including the service and maintenance system.
- Check size of sieve, type machine with respective oil seed type, fuel, and lubricants needed, fan belts, lines, connections and transmission.
- Inspect safety guards
- Check and confirm equipment calibration settings and operating methods
- Observe and monitor noise levels for correct operation.
- Identify and segregate unsafe or faulty equipment for repair or replacement.
- If needed apply replacement for faulty equipment
- Record and report all activities to the concerned personnel



LAP TEST: Performance Test

Name _____ ID _____

Time started: _____ Time finished: _____

Instructions: Given necessary equipment and materials you are required to perform the following tasks within 1 hour. The activity is expected from each student to do it.

Task-1 Perform pre start (operational) check of oilseed cleaning machine



LG #20

LO#2 Operate and monitor the oil seed cleaning process

Instruction sheet

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

- Starting and operating the process with policies and procedures
- Monitoring operation of equipment and processes
- Operating oil seed cleaning process
- Identifying variation in equipment operation
- Reporting maintenance requirements
- Reporting workplace information requirements
- Monitoring the process to meet seed specification
- Monitoring the process to impurity removal rate
- Identifying and reporting out-of-specification of product and process
- Maintaining the work area according to housekeeping standards
- Conducting work with legislative environmental guidelines
- Maintaining workplace information records

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

Specifically, upon completion of this Learning Guide, you will be able to:

- Start and operate the process with policies and procedures
- Monitor operation of equipment and processes
- Operate oil seed cleaning process
- Identify variation in equipment operation
- Report maintenance requirements
- Report workplace information requirements
- Monitor the process to meet seed specification
- Monitor the process to impurity removal rate
- Identify and report out-of-specification of product and process



- Maintain the work area according to housekeeping standards
- Conduct work with legislative environmental guidelines
- Maintain workplace information records

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: Starting and operating the process with policies and procedures

1.1. Introduction

Operating equipment policies are designed as guidelines for employee behavior, criteria for performance evaluations and ways to make the operating equipment more productive. A variety of policies for the operating equipment will be included in the employee manual.

1.2. Purpose of operating equipment with policies and procedures

Understanding how policies affect employee behavior and production will help to decide which to include in the company guidelines. Moreover, the purposes of knowing the operating equipment policies and procedures by employ increases productivity and improve process efficiency of industry.

1.3. Types of workplace policies and procedures

Work of pre- processing process of oil seed cleaning is carried out according to the following policies and procedures:

- Company policies and procedures
- Regulatory and licensing requirements
- Legislative requirements
- Industrial awards and agreements

1.4. Benefits of Company policies and procedures

Well-written Company policies

- Are consistent with the values of the organization and employment legislation
- Demonstrate that the organization is being operated in an efficient and businesslike manner

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- Ensure uniformity and consistency in decision- making and operational procedures
- Save time when a new problem can be handled quickly and effectively through an existing policy
- Foster stability and continuity
- Maintain the direction of the organization even during periods of change
- Provide the framework for business planning
- Assist in assessing performance and establishing accountability
- Clarify functions and responsibilities.



Self-Check 1.

Written Test

Name _____ **ID** _____ **Date** _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. Why it needs policies and procedures for operating equipment? (4point)

Note: Satisfactory rating - 2 points

Unsatisfactory – below- 2 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-2 monitoring operation of equipment and process

2.1 Introduction

Most machine and process characteristics which affect quality, availability, capacity, safety, risk and cost can be continually evaluated throughout an asset's lifetime. This is essential in identifying impending failure and will be applied to critical areas identified in the reliability plan. The current state-of-health of process plant is important information related to current information, diagnosis and prognosis of various defects, and predicted useful life in the optimizations of safety, quality and high production rates.

2.2 Monitoring operation of equipment and processes

The System Monitor interface provides remote monitoring, a features that helps you to access multiple clients through a single console for remote device management. The System Monitor immediately recognizes equipment and provides real-time equipment maintenance, which improve system stability and reliability. Remote Monitoring monitors the system status of remote devices. The monitored items include hard disk temperature, hard drive health, network connection, and system/CPU temperature and system voltages.

Remote Monitoring also provides support for function logs so that managers can regularly check the status of their remote devices. The System Monitor can display messages when thresholds are exceeded.

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**Self-Check 2.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

II. Write short answer/s

1. Why need oilseed cleaning? (5point)
2. How you monitor the operation of oilseed cleaning equipment. (3point)

Note: Satisfactory rating - 4 points

Unsatisfactory – below- 4 points

You can ask your teacher for the copy of the correct answers.



Information Sheet-3 Operating oil seed cleaning process

3.1 Introduction

Normally, the oil seeds are mixed with a variety of foreign materials like, sand, stones, stalks, weed seeds, foliage, etc., during harvesting, handling and transportation. It is ideal to clean seed before putting it into store. Stone, iron and wood pieces mixed with seeds can disrupt mechanical equipment during processing. Foreign matters may lower protein content and increase fiber content of meal residue after extraction of the oil. Moreover, foreign matters mixed with oilseeds may be having high moisture content which may initiate overheating in storage. The local hot spots in the oil seed damage the quality and constitute a fire hazard if not properly detected and corrected by aeration or rotation. Also, cleaning before storage of oils not required further cleaning for processing and saves double handling of seeds. In short, proper cleaning of oilseeds can increase in crushing capacity of oil expelling units, reduce in-plant maintenance and improve the quality of oil and cake.

3.2 Oilseed Cleaning

Oilseeds should be cleaned either before or following storage and before reaching the press. If a large quantity of foreign material (weed seeds, seed pods, chaff) is present, seeds should be cleaned before storage as the trash contained in the stored pile may be a starting point for molds and heating. Usually time does not permit cleaning all of the seeds before storage, as harvesting and drying equipment commonly can process more volume than cleaning equipment. The seed harvesting operation plays a large part in the effort needed following harvest. Taking the time to be certain the combine is harvesting the cleanest seed possible is time well spent. Seed cleaning is often combined with filling bins directly before pressing. As seed is moved from the storage bin to the pressing bin a step in between can include cleaning. Seed cleaners can be purchased new or used. Seed cleaners have not changed dramatically over the years, and the cleaners of the 1930's look remarkably similar to cleaners built today.

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Seed cleaners use gravity separation (screens) and air separation (fans) to separate seeds and unwanted material by size and density. Seed screens, sized correctly, can eliminate seed both larger and smaller than the desired seed. Running seed first over a screen sized correctly for the desired seed allows seed the correct size and smaller to fall through the screen, keeping gravel and larger seed out of Flowing and shaking this mixture over a screen sized slightly smaller than the desired seed size screens out the smaller seeds, typically weed seeds. Seeds remaining are the desired size, but may still contain weed seeds that are approximately the same size as the desired seed. A last cleaning step blows air through the sized seed and separates the lighter particles, typically weed seed, from the heavier, desired seed. Winnowing such as this is commonly used to separate the wheat from the chaff during grain harvest.

It is ideal to clean seed before putting it into store. Stone, iron and wood pieces mixed with seeds can disrupt mechanical equipment during processing. Foreign matters may lower protein content and increase fibre content of meal residue after extraction of the oil. Moreover, foreign matters mixed with oilseeds may be having high moisture content which may initiate overheating in storage. The local hot spots in the oilseed damage the quality and constitute a fire hazard if not properly detected and corrected by aeration or rotation. Also, cleaning before storage of oils not required further cleaning for processing and saves double handling of seeds. In short, proper cleaning of oilseeds can increase in crushing capacity of oil expelling units, reduce in-plant maintenance and improve the quality of oil and cake.

3.3 Quality Characteristics of cleaned oilseed

Seed quality is also important, as seed harvested either before or after optimal ripeness can impart unwanted flavor or chemical characteristics to the oil produced from that seed. When green (not fully ripened) seed is pressed for oil, the smell it produces when pressed is not the same as the smell of ripe seed being pressed. Oil produced from green seed will not have the characteristics such as smell or taste desired in the finished oil. It is difficult to produce high quality edible oils when strong

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with low quality seed. likewise, seed that contains mold from too much moisture during harvest or storage.

3.4 Reasons for cleaning oilseeds

- Weed seeds present at harvest may interfere with the extraction of oil in the press
- Weed seeds may add unwanted taste or chemicals to the pressed oil
- Dirty seed will wear components more quickly than clean seed
- Stones or other objects picked up at harvest or during handling will damage pressing equipment

3.5 Oilseed cleaning process

Starting and operating the pre-cleaning of the process means checking and making available all necessary equipment and the coming raw-materials. The operation may require making adjustment, maintenance and taking corrective action when and where necessary. The harvested oil seeds are passed over magnets to removal any metal traces, and other impurities are being get rid off by cleaning sieve and destoners. Then the outer covering (hulls) of the seeds are removed to obtain pure seeds. The de-hulled seeds are ground into coarse meal to provide a larger surface area to be pressed. Hammer mills or grooved rollers are used to crush the coarse meal into uniform fine particles. Then the meal is heated to enable oil extraction, though impurities are released with oil during this process and such impurities should be removed before the oil is declared edible.

3.6 Grading

Grading of oilseeds is required to establish their general quality based on soundness, moisture content and freedom from impurities and also to evaluate their oil milling quality based on yield and quality of oil. The grade specifications of different oilseeds are based on a. quantity of non-prime seeds including damaged, insect-infested seeds, slightly damaged seeds, shriveled and immature seeds,

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- b. type and quantity of impurities or foreign matter,
- c. moisture content of seeds,
- d. oil content, and
- e. color, acid value, iodine value and other indices of quality of extracted oil. Although the considerations of oil content and its quality (acid value) in grading and valuation of oilseeds make the method more rational, it requires chemical analysis of all oilseed samples and hence it is not always practicable.

**Self-Check 3.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.**I. Write short answer/s**

1. Write the process of cleaning oilseed?(6point)
2. What is the impact of foreign matter in oilseed has on oil product?(4point)
3. Why it needs cleaning of oilseeds?(4point)

Note: Satisfactory rating - 7 points**Unsatisfactory – below- 7 points**

You can ask your teacher for the copy of the correct answers



Information Sheet-4 identifying variation in equipment operation

4.1 Introduction

The operator may have the skill of identifying and taking the corrective action when failure of equipment is happen before starting the process of cleaning. Whether a manufacturing process uses simple or complex equipment, changes in the equipment can cause variation. Variations occur with the use of more than one piece of equipment to complete the same task because even two pieces of equipment bought at the same time from the same company will not always behave exactly the same over time. Variations are also introduced in the performance of an individual piece of equipment, which can begin to break down or drift from the calibration point.

4.2 Typical equipment faults and related causes

Typical equipment faults and related causes to be identified is divided in to two:-

- Signs and symptoms of faulty equipment and
- Early warning signs of potential problems

4.3 Gathering Information

Identifying variation in equipment operation should followed by gathering and taking records used to give clear information for the supervisor or another person involved in operation. Gathering and recording any fault and even action to be taken has advantages to minimize the time and resources required. Materials and equipment used for different oil seed cleaning faults and related causes

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- Signs and symptoms of faulty equipment and early warning signs of potential problems

- ✓ Leaking fuel
- ✓ Damaged
- ✓ malfunction
- ✓ Noise
- ✓ Over heat
- ✓ colour
- ✓ Light

**Self-Check 4.****Written Test**

Name _____ **ID** _____ **Date** _____

Directions: Answer all the questions listed below.

I. Say true or false

1. Gathering and recording any fault and even action to be taken has advantages to minimize the time and resources required. (2point)
2. Overheating of equipment is one of the signs and symptoms of faulty equipment and early warning signs of potential problems. (2point)

Note: Satisfactory rating - 2 points

Unsatisfactory – below- 2 points

You can ask your teacher for the copy of the correct answers



Information Sheet-5 Reporting maintenance requirements

5.1 Introduction

Reporting maintenance requirements is activity which takes place after identifications of variation in equipment operation. The maintenance requirement should be reported according to work place reporting requirements. Reporting should to be for the responsible person. The common causes of variation to be maintained in equipment should be reported to the supervisor in order to take corrective action required. It may be before, during or after processing. Reporting the maintenance requirement minimize the workplace Hazards and dangers.

5.2 Workplace components

Knowing the workplace components is used to identify the maintenance requirements to be report. These are:-

- Manual material handling (lightening, loading, carrying)
- Equipment and tools
- Environment (ventilation, heat, noise, lighting)

5.3 Maintenance requirement status may include

- take corrective action in response to out-of-specification results
- respond to and/or report equipment failure within level of responsibility
- locate emergency stop functions on equipment



Self-Check 5.

Written Test

Name _____ **ID** _____ **Date** _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. Why reporting of maintenance requirement of equipment is needed? (6points)
2. What are the maintenance requirement are needed at work place?(4point)

Note: Satisfactory rating - 5 points

Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers



Information Sheet-6 Reporting workplace information requirements

6.1 Introduction

Accurate records about workplace by employers /workers will give the information of the oilseed cleaning activities. Different formats shall use to record for each information during oilseed cleaning process. Checklists prepared to guide the recording process.

6.2 Work place records

The following information of condition will maintain in work place records:-

- Work environment (ventilations, lighting, noise and heat)
- Cleaning and Sanitation
- List of Equipment in the workplace
- Guidelines of workplace
- Procedures and policies of workplace

A record is recorded information however recorded whether in:

- Printed form,
- By electronic means
- a memorandum
- a book
- a map
- a drawing,
- a diagram,
- a pictorial or graphic work,
- a photograph,
- a sound recording
- a video tape
- a machine readable record,
- any other documentary material
- Regardless of physical form or characteristics, and any copy.

It further states that any information that is capable of being produced by a machine and subject to the regulations any record that is capable of being produced from a machine readable record under the control of industry by means of computer hardware and software or any other information storage equipment and technical expertise



normally used by the industry. It is important to note that not all records will be released in response to a Freedom of Information Request. Contact your Freedom of Information Coordinator for more information.

6.3 Importance of recording and reporting workplace activities

Records and reports are important for their content and as evidence of communication, decisions and actions. As oil industry, the industries managers and boards are accountable to the industry. Records support openness and transparency by documenting and providing evidence of work activities and by making them available to the industry. Records support quality program and services, inform decision making, and help meet organizational goals.

6.4 Work place information

- Standard Operating Procedures (SOPs)
- specifications
- production schedules and instructions
- manufacturers' advice
- standard forms and reports

a. Standard Operating Procedures (SOPs)

Standard operating procedures are a set of written instructions that document a routine or repetitive activity followed by an organization. The development and use of SOPs are an integral part of a successful quality system as it provides individuals with the information to perform a job properly, and facilitates consistency in the quality and integrity of a product or end-result. A standard operating procedure is a procedure specific to your operation that describes the activities necessary to complete tasks in accordance with industry regulations, provincial laws or even just your own standards for running your business. Any document that is a “how to” falls into the category of procedures. In a manufacturing environment, the most obvious example of an SOP is the step by step production line procedures used to make products as well train staff.

An standard operating procedure, in fact, defines expected practices in all businesses

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where quality standards exist. Standard operating procedures play an important role in your small business. Standard operating procedures are policies, procedures and standards you need in the operations, marketing and administration disciplines within the business to ensure success. These can create:

- efficiencies, and profitability
- consistency and reliability in production and service
- fewer errors in all areas
- a way to resolve conflicts between partners
- a healthy and safe environment
- protection of employers in areas of potential liability and personnel matters
- a roadmap for how to resolve issues and the removal of emotion from troubleshooting allowing needed focus on solving the problem
- a first line of defense in any inspection, whether it be by a regulatory body, a partner or potential partner, a client, or a firm conducting due diligence for a possible purchase
- value added to your business should you ever wish to sell it

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**Self-Check 6.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.**I. Write short answer/s**

1. What are the information recorded at work place(10points)
2. Write the form of recording the information at work place? (5point)

Note: Satisfactory rating -7.5 points unsatisfactory rating– below- 7.5 points

You can ask your teacher for the copy of the correct answers



Information Sheet-7 Monitoring the process to meet seed specification

7.1 Introduction

Monitoring is the process by which the continuous activities to be done from the pre-processing to final point of the processes in industry. Monitoring at this stage focused only the pre-processing activities (oilseed cleaning activities). Monitoring the process will involve the use of quality parameter of oil seed cleaning such as performance pure oilseed. The pure oilseed is a graphical description method provides a picture of the history of the performance of the process. Start, operate and adjust process equipment to achieve required outcomes, including monitoring control points and conducting inspections as required to confirm process remains within specification.

7.2 Techniques used to monitor oilseed cleaning

- Inspecting/checking
- Measuring
- Testing as required by the process
- Visual observation

Inspection or test points (control points) in the process and the related procedures and recording requirements should be recorded to make an adjustment the overall operation.



Fig.14. monitored oilseed

**Self-Check 7.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. What does monitoring mean? (5point)
2. What are the techniques used to monitor oilseed cleaned? (5point)

Note: Satisfactory rating - 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers



Information Sheet-8 Monitoring the process to impurity removal rate

8.1 Introduction

The cleaning of the oil seeds serves two purposes. The first one is the removal of impurities and second one the regulation of the bulk density. Since the preparation process is based on volumetric quantities the latter purpose is of special importance to the flaking process.

The first step of the cleaning is the removal of tramp metal by means of a rotary type magnet separator. This is followed by screening in which the first on-stream cleaner should be provided with a rough scalping screen or perforated metal sheet to separate oversize trash and below that a second sieve to get rid of the sand. To separate light-weight particles, mainly hulls and dust, the second sieve must also be provided with an aspiration channel. As an average one can estimate 1% impurities will be obtained in this cleaning section.

8.2 Terms and definitions

For the purposes of monitoring impurity removal rate, the following terms and definitions apply.

A. impurities in oilseeds

All foreign matter, organic and inorganic, other than seeds of the species under consideration

B. fines in oilseeds

Particles passing through the sieves of aperture sizes, according to the species being analyzed

N.B: In the case of groundnuts, meal from the seeds contained in the fines is not regarded as an impurity.

C. non-oleaginous impurities

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Non-oleaginous foreign bodies, fragments of stalks, leaves and all other non-oleaginous parts belonging to the oleaginous seed analyzed, retained by the sieves of aperture sizes

Example: Bits of wood, pieces of metal, stones, seeds of non-oleaginous plants, and bits of shell, loose or adhering to palm kernels.

N.B: In the case of seeds sold in their shells, for example sunflower seeds (*Helianthus annuus* L.) or pumpkin seeds (*Cucurbita pepo* L.), the loose shells are regarded as impurities only if their proportion is larger than that of the corresponding kernels present in the same sample.

D. oleaginous impurities: Oilseeds other than those of the species under consideration

8.3 Importance of monitoring removal rate of impurity in the oilseed.

In this case, monitoring is used to assess the performance of oilseed quality, set up by cleaners. Its goal is to improve the current and future outputs, outcomes and impact. Monitoring is a continuous assessment of activities based on early detailed information on the progress or delay of the ongoing assessed activities. Evaluation is also used to examine concerning the relevance, effectiveness, efficiency and impact of activities in the light of oilseed cleaning/impurity removal in oilseeds.

In vegetable oil seeds, some impurities are inevitably entrained. In general, the impurities in oil are 1% – 6%, and the highest is 10%. Most of the impurities mixed with oil will adsorb a certain amount of oil in the process of oil production, but exist in the cake, resulting in oil loss and lower oil yield. Mixed with organic impurities in oil will cause oil or oil to deepen the influence of oil sediment quality at the same time, meal quality is poor, affecting the development and utilization of resources of the cake. Using a variety of cleaning equipment will reduce oil loss to remove these impurities, improving oil yield; improving the quality of oil and meal; improving the processing capability of the equipment; ensuring the safety of equipment, and ensuring the sanitation of production environment



After cleaning, the oil cannot contain large impurities such as stone, iron impurity, rope head, Artemisia and so on. The contents of total impurities in oilseeds and oil content in miscellaneous oils should be in accordance with the regulations. Peanut, soybean impurity content shall not exceed 0.1%; cottonseed, rapeseed, sesame and impurity content shall not exceed 0.5%; the amount shall not exceed 0.5% of peanut, soybean, cottonseed oil containing waste clean-up, rapeseed, sesame oil containing cleaning waste amount shall not exceed 1.5%. An efficient vibrating screen is installed to sieve the worst impurities. A suction-style specific gravity destoner is set up to remove stones and mud. In oil seed cleaning section, ling fine also puts in place a dust-cleaning system to make sure a clean work environment. Of course, vibrating sieve is essential equipment during oilseed cleaning. Vibrating sieve adopts advanced technology, is one of oilseed cleaning machines. It is a common machine always used in the oilseed processing plant. Vibrating sieve is widely used to clean the raw material in flour mills, feed works, rice plant, oil plants and chemical plants etc.

**Self-Check 8.****Written Test**

Name _____ **ID** _____ **Date** _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. Why it needs monitoring of impurity removal rate in oilseed cleaning? (5point)
2. What does monitoring mean? (5point)
3. What does a non-oleaginous impurity mean in oilseeds? (5point)
4. What does oleaginous impurity mean in oilseeds? (5point)

Note: Satisfactory rating - 10 points

Unsatisfactory – below- 10 points

You can ask your teacher for the copy of the correct answers



Information Sheet-9: Identifying and reporting out-of-specification of product and process

9.1 Introduction

Identification of product/processes outcomes used to check either the products or processes are out of specification or not because every products or processes have their own specifications and have effects on the outcome after processing. The main objective of Identifying and rectifying out-of-specification product/process outcomes is in order to take corrective action in response to out-of-specification results.

9.2 Specification of product/processes

The specifications of oil seed product have their own specification. Identifying and rectifying the processes and the products outcomes take place throughout the process and take actions when they occur, the processes or products will be out-of-specifications. Broken or Split seed is not included in the Total Defective Seed or Damaged seed category. Where applicable to a particular oilseed a separate tolerance exists for Broken or Split. Broken or split seed is to be determined as a percentage of clean seed retained above the screen and expressed to the nearest 0.1%. Bleaching removes trace metals, colour such as chlorophyll, soaps and oxidation products. Bleached oils are relatively colourless and have a low peroxide value.

Clean seed includes all seed material of the particular oilseed being tested other than that defined as Impurities i.e., material retained above the screen after screening (where applicable) and/or removal of Impurities.

There are a range of quality parameters that cause oilseed commodities to be classified as Defective. The category in which a defect type is classified varies by commodity. Each defect type may:

- Have a separate tolerance (e.g., Broken or Split, Heat Damaged/Bin Burnt, Mouldy)
- Have a nil tolerance
- Be included in the category of Damaged

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- Be included in the category of Defective
- Be included in the category of Defective but within that category have a maximum tolerance
- Not be applicable (e.g., for Peanuts, no Defective quality parameters are applicable)

All quality parameters within the damaged category are to be obtained from the clean seed material retained above the screen and combined. The total Damaged is to be determined as a percentage of the clean seed retained above the screen expressed to the nearest 0.1%, except for Weather Stained in Edible Soybeans. An individual seed may only be classified as one defect type within the damaged category. Where this applies, a seed is to be classified as the defect type with the tightest tolerance in the standard

**Self-Check 9.****Written Test**

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.**I. Write short answer/s**

1. What is the purpose of identifying and reporting out of specification of product and process is needed? (10point)

Note: Satisfactory rating - 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers

Information Sheet-10 Maintaining the work area according to housekeeping standards

10.1 Introduction

Following routine maintenance procedures where relevant cleaning and sanitation where relevant before starting the oilseed cleaning. Working areas in oil seed facilities must be cleaned and sanitized too. In another word, these surfaces should be cleaned to remain free of dust. In that cleaning process, detergent sanitizers can be applied for the proper cleaning. Before oilseed cleaning begins, work areas must have sanitizer available in the right combination to be applied on all working surfaces and given time to act.

10.2 Cleaning and sanitation procedure work area

The correct order of events for cleaning/sanitizing of working area is as follows:

- Rinse
- Clean
- Rinse
- Sanitize.



Fig.15 cleaning workplace



10.3 Cleaning

Cleaning is the complete removal of food soil using appropriate detergent chemicals under recommended conditions. It is important that personnel involved have a working understanding of the nature of the different types of food soil and the chemistry of its removal.

10.4 Sanitization

Sanitization is the process of reducing the number of microorganisms to a level that has been officially approved as safe. 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. Every employer must ensure that regular inspections are made of all workplaces, including buildings, structures, grounds, excavations, tools, equipment, machinery and work methods and practices, at intervals that will prevent the development of unsafe working conditions.



Self-Check 10.	Written Test
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Name _____ **ID** _____ **Date** _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. Write cleaning and sanitization procedures of work place.(5point)
2. What is sanitization mean? (5point)
3. What is sterilizing mean? (5point)

Note: Satisfactory rating – 7.5 points Unsatisfactory – below-7.5 points

You can ask your teacher for the copy of the correct answers



Information Sheet-11 Conducting work with legislative environmental guidelines

11.1 Introduction

Environmental implications associated with oil seed cleaning are identified, assessed and reported to the supervisor. Environmental implications may be negative environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oil seed residues, chemical residues), and hazardous substances (fuel, noise). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities, soil disturbance and dust problems from high activity of oil seed cleaning. Routine oil production activities can have detrimental environmental effects during each of the main phases of exploration, production, and decommissioning. During the exploration phase, impacts can result from indirect (sound and traffic) and direct physical (anchor chains, drill cuttings, and drilling fluids) disturbance. Additional direct physical impacts occur in the production phase as pipelines are laid and the volume of discharged produced water increases. Lastly, decommissioning can result in a series of direct impacts on the sea floor and can re-introduce contaminants to the environment. It is critical that all of the potential impacts of routine operations are accounted for when designing management strategies, whether local or regional, for offshore oil activities.

Workplace policies are designed as guidelines for employee behavior, criteria for performance evaluations and ways to make the workplace more productive. A variety of policies for the workplace will be included in the employee manual. It is still necessary to find ways to conciliate industry development with environmental protection that is with sustainable development.

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11.2 Environmental Protection and Management Requirements

An environmental protection and management requirement prescribes operational requirements with respect to the items listed below:

- Water quality (for operating areas and adjacent areas).
- Aquifers.
- Crossings of streams, wetlands and lakes.
- Deleterious materials into streams, wetlands or lakes
- Operations within wetlands.
- Natural range barriers.
- Invasive plants.
- Forest health.
- Soil conservation.
- Seismic lines.

11.3 Work place environmental guidelines

Checking of work environment should include

- Ventilations
- Lighting
- Noise
- Heat

Definitions of some terms used in work place environmental guidelines

Ventilation: - From the worker should expect to report to his/her supervisor if any occurrence which related to ventilations such as Odors, Dusts, Gases, Vapors, Fumes and Smoke. And ensure that ventilation system conforms to the National Building Code and the Local Fire and Public Health Regulations.

Lighting: - Make sure that your eyes have time to adapt to changes in lighting level as you move from one area to another. We cannot see properly when we first move from a brightly illuminated area to a darker area. The eyes need a few minutes to adjust to the dark area.

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Noise: - The best method of protection is to use quieter equipment, enclosures, and noise reducing materials. Using hearing protection is recommended as required

Heat: - the most serious illness is heat stroke, which may be fatal. Heat stroke occurs as a result of working in very hot environments. The symptoms include poor coordination and abnormal behavior which the person may not be aware of, hot and dry skin, and loss of consciousness.

11.4 Types of workplace policies

Here are some examples of common workplace policies that could assist your workplace:

- Recruitment policy
- Internet and email policy
- Mobile phone policy
- Non-smoking policy
- Drug and alcohol policy
- Health and safety policy
- Anti-discrimination and harassment policy
- Grievance and termination policy



Self-Check 11.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Say true for correct statement and say false for incorrect statement (2points each)

1. There are different policies for the work place included in the employee manual.
2. Environmental protection and management requirement prescribes operational requirements with respect to different items like water quality and forest

Note: Satisfactory rating - 2 points Unsatisfactory – below- 2 points

You can ask your teacher for the copy of the correct answers



Information Sheet-12 maintaining workplace information records

12.1 Introduction

Carefully selected workplace rules can protect your from legal claims and help you maintain an orderly and positive work environment.

12.2 Types of workplace information or records

Workplace information to be records in the pre- oil seed cleaning process may include

- Operation and monitoring the Standard Operating Procedures (SOPs)
- Specifications
- Production schedules and instructions,
- Manufacturers' advice
- Standard forms and reports.

Among the specific expectations and work habits that must be followed and practiced in the work place, the following are very important: -

- Positive attitude,
- Traits of honesty and dependability,
- Work with others,
- Time management,
- Safety on the job,
- Good communication skills,
- Appropriate use of computers and internet,
- Appropriate behavior,
- Health

12.3 Workplace Communication

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. Use of oral communication skills/language

- questioning
- active listening, asking for clarification
- seeking advice from supervisor



Figure.16. Active listening



Self-Check 12.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Write short answer/s

1. What are the expectations and work habits must follow at work place? (5point)
2. What are recorded at work place prior to oilseed cleaning?(5point)

Note: Satisfactory rating - 5 points Unsatisfactory – below- 5 points

You can ask your teacher for the copy of the correct answers



Operation Sheet 1- Under take Oilseed Cleaning process

Under take Oilseed Cleaning process

Materials required:

- magnetic separators,
- destoners,
- Oilseed cleaning machine with its components
- grooved rollers,
- notebook

Procedures:

- Wear appropriate personnel protective equipment.
- Check and make available all necessary equipment and the coming raw-materials.
- Adjust, maintain and take corrective action when and where necessary.
- Pass the harvested oil seeds over magnets to removal any metal traces, and other impurities are being get rid off by cleaning sieve and destoners.
- Remove the outer covering (hulls) of the seeds to obtain pure seeds. .
- Use grooved rollers are to crush the coarse meal into uniform fine particles.
- Grade the cleaned oilseed
- store at appropriate place
- clean and store the equipment at the end of completion of the work
- Record all activities



LAP TEST: Performance test

Name _____ ID _____

Time started: _____ Time finished: _____

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

Task-1 Undertake oil seed cleaning



LG #21	LO #3 shut down the oil seed cleaning process
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"> • Identifying shutdown procedure • Shutting down the process of cleaning • Identifying and reporting maintenance requirements <p>This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:</p> <ul style="list-style-type: none"> • Identify shutdown procedure • Shutdown the process of cleaning • Identify and report maintenance requirements 	
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 	



Information Sheet-1 Identifying shutdown procedure

1.1 Introduction

When shutting down an equipment item for inspection or maintenance, the correct type of shutdown must be used and the Standard Operating Procedures for the appropriate shutdown must be strictly followed. During a shutdown, system checks should be made to ensure the shutdown proceeds safely.

1.2 Principles of shutdown equipment

Start up and shutdown procedures are clearly highly dangerous. Human error during these processes should therefore be avoided at all cost, as the effects can be truly disastrous. They have also implemented mechanical interlocks on a wide scale. Their procedures leave no room for different interpretations and process interlocking quite often is a formal and mandatory provision to ensure strict adherence to procedures on critical operations, such as start-up and shut-down procedures, relief valve change over and pigging operations. Following the installment of these procedures, these companies established excellent safety records and were able to substantially minimize accidents and spills. For example, if shutting down a piece of equipment impacts the ability to carry on with the operation, that's a good indication that it's a critical piece of equipment. The following procedures should be taken into account to identify shutdown procedures.

- Shut down must be conducted using the standard procedures established for the Machine or equipment (not emergency procedures or other shortened/simplified method).
- Pull plug or throw switch to off position before cleaning or adjusting any machine and away from moving parts.



Self-Check 1.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Say true for correct statement and false for in correct statement

1. Before cleaning or adjusting any machine pulling the plug to off position is needed. (3points)
2. Shut down must be conducted using the standard procedures established for the Machine or equipment. (3point)

Note: Satisfactory rating - 3 points Unsatisfactory – below-3 points

You can ask your teacher for the copy of the correct answers



Information Sheet-2 Shutting down the process of cleaning

2.1 Introduction

Shut down is a term used to describe the process of closing all systems of process control systems. Different shutdowns procedures are appropriate to the process and workplace production requirements, including emergency and routine shutdowns and procedures to follow in the event of a power outage. Isolation, lock out and tag out procedures and responsibilities are appropriate. Cleaning may be carried out by a dedicated cleaning crew in some cases.

2.2 Uses of Shutdown Processes

- Safely shut down of the equipment.
- To locate emergency stop functions on the equipment.

2.3 Shut down the process May include:

- Clean and sanitize equipment
- Take samples and conduct test
- Carry out routine maintenance

2.4 Environmental Issues related to Shutting down process

Controls Relevant to the Process Including.

- inclement weather during operations
- machinery breakdowns
- power outages
- storm damage to equipment and site



Self-Check 2.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Say true or false (two points each)

1. Shut down is a term used to describe the process of closing all systems of process.
2. After shut downing process, the equipment should be cleaned and sanitized.

Note: Satisfactory rating – 2 points Unsatisfactory – below- 2 points

You can ask your teacher for the copy of the correct answers



Information Sheet-3: Identifying and reporting maintenance requirements

3.1 Introduction

Machine maintenance is the work that keeps mechanical assets running with minimal downtime. Machine maintenance can include regularly scheduled service, routine checks, and both scheduled and emergency repairs. It also includes replacement or realignment of parts that are worn, damaged, or misaligned. Machine maintenance can be done either in advance of failure or after failure occurs. Machine maintenance is critical at any plant or facility that uses mechanical assets. It helps organizations meet production schedules, minimize costly downtime, and lower the risk of workplace accidents and injuries

3.2 Reporting maintenance requirements

Shut-down procedures for oil seed cleaning equipment are completed to manufacturer's specifications and enterprise requirements. Shut-down of oil seed cleaning machines may include safe dismount procedures (including turning off the power), maintaining a clear thoroughfare, identifying the hazards, securing, cleaning, checking and recording.

- The operational records of machines used for cleaning the oil seed are completed and maintained according to enterprise requirements.
- Report all accidents
- Malfunctions, faults, irregular performance and damage to machines and equipment are detailed and reported according to enterprise requirements.
- At the end, cleaned, secured and stored according to OHS and enterprise requirements.

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3.3 Requirements for an Effective Diagnostic System

- The system must produce diagnostic and failure prediction information in a timely manner before serious problems occur on the machines monitored.
- When equipment shutdown becomes necessary, diagnostics must be precise enough to accomplish problem identification and rectification with minimal downtime.
- The system should be useable and understood well enough by production personnel so that an engineer is not always necessary when urgent decisions need to be made.
- The system should be simple and reliable and cause negligible downtime for repairs, routine calibration and checks.
- The system must be cost effective; namely, it should cost less to operate and maintain than the expenses resulting from loss of production and machinery repairs that would have resulted if the machinery was not under monitoring and predictive surveillance.
- System flexibility to incorporate improvements in the state of the art is desirable.
- System expansion capabilities to accept projected increases in installed machinery or increases in the number of channels must be considered.
- The use of excess capacity in a computer system available at the plant can result in considerable equipment cost savings. System components that mate with the existing computer system may, therefore be a necessary prerequisite.

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Self-Check 3.	Written Test
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Name _____ ID _____ Date _____

Directions: Answer all the questions listed below.

I. Choose the correct answer/s

1. Which one of the following is not correct about reporting and identifying of maintenance equipment of oilseed cleaning machine?

A. Malfunctions, irregular performance of machines and equipment are reported according to enterprise requirements.

B. operational records of machines are completed and maintained according to enterprise requirements.

C. Reporting all accidents in the work area to concerned one

D. Machine maintenance is NOT critical at any plant

E. None

2. One is used for effective diagnostic of equipment for maintenance.

A. Malfunctions

D. Over heating

B. Noise

E. All

C. Leaking fuel

Note: Satisfactory rating – 3 points

Unsatisfactory – below 3 points

You can ask your teacher for the copy of the correct answers



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