Coffee and tea processing

Level-II

Based on May 2019, Version 2

Occupational standards

Module Title: - Manufacturing Tea and Coffee

LG Code: IND CTP2 M09 LO (1-4) LG (**27-30**)

TTLM Code: IND CTP2 TTLM **10**20v1

October .2020

Bishoftu Ethiopia

Table of Contents

LG #27	Prepare the blending, roasting and grinding 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 to meet production specifications
- Identifying and confirming cleaning and maintenance requirement
- Fitting and adjusting machine components and related attachments
- Entering processing/operating parameters
- Loading or positioning materials, ingredients, product and consumables
- Confirming services for operation
- Checking and adjusting equipment performance
- Setting the process
- Carrying out pre-start checks

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:

- Confirm materials to meet specifications and according to standard procedures accordingly
- To Identify and confirm cleaning and maintenance requirement
- Fit and adjust machine components and related attachments
- Enter processing/operate parameters
- Load or position materials, ingredients, product and consumables
- Confirm services for operation
- Check and adjust equipment performance
- Set the process

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”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information sheet 1	Confirming materials to meet production specifications

1.1Confirm materials to meet production specifications

Material is the thing or ingredient that used to produce coffee and tea product. Confirm the ingredient that meets specific standards like moisture content, grading size, defects, cleanness, ripeness, dry, etc.

If the material fills these criteria confirm for coffee process.

1.1.1 Materials or ingredient for coffee and tea process

- ✓ Coffee bean
- ✓ Water
- ✓ Tea leave

These material go through several manufacturing steps before reaching the final consumer, so confirming in standard form is important to avoid the ultimate impact on the national economy is measured.

1.1.2 Equipment used for coffee process is:

- ✓ Basin or plates to roast
- ✓ Analytical balance thermometer
- ✓ **Pycnometer**
- ✓ **Moisture analyzer**
- ✓ Hammer mill
- ✓ filter paper, spatula
- ✓ flask, beaker, funnel
- ✓ heating plate and cups, spoon

1.1.3 Equipment/machine for tea process

Use equipment for tea process like Dryer, Sorting machine, Fiber extractor and the material or ingredient for tea is Green tea Leave.

1.1.4 Varieties and characteristics of green beans and tea

There are two types of coffee beans such as:

- ✓ Coffee Arabica
- ✓ Coffee Robusta and others green coffee bean

These types of coffee bean is very economical in the coffee production varities

Coffee Arabica is produced 60% in the world and Coffee Robusta is 40% in the words consists 0.8 -1.4% caffeine and 1.7-4% caffeine respectively

Tea is an aromatic beverage commonly prepared by pouring hot or boiling water over cured or fresh leaves

1.1.5 Tea leave production type

Tea is traditionally classified based on the degree or period of "fermentation" the leaves have undergone

White tea: Young leaves or new growth buds that have undergone minimal oxidation through a slight amount of withering before halting the oxidation with heat.

Withering of the leaves can last from around one to three days depending on the season and temperature of the processing environment .The young leaf buds processed into white tea are usually dried immediately after withering; some tea is dried directly without withering

Green tea: this tea has undergone the least amount of oxidation. The oxidation process is halted by the quick application of heat after tea picking, either with steam, the Japanese method, or by dry cooking in hot pans, the traditional Chinese method Tea leaves may be left to dry as separate leaves or they may be rolled into small pellets to make gun powder tea.This process is time consuming but is higher quality.

The tea is processed within one to two days of harvesting, and if done correctly retains most of the chemical composition of the fresh leaves from which it was produced.

Oolong tea: This tea's oxidation is stopped somewhere between the standards for green tea and black tea.

The processing typically takes two to three days from withering to drying with a relatively short oxidation period of several hours.

Semi-oxidized teas are collectively grouped as *blue tea*, literally: blue-green tea while the term "oolong" is used specifically as a name for certain semi-oxidized teas.

Common wisdom about lightly oxidized teas is that too little oxidation upsets the stomach of some consumers. Even so, some producers attempt to minimize oxidation in order to produce a specific taste.

Black tea: The tea leaves are allowed to completely oxidize. Black tea is the most common form of tea in Sothern Asia.

Red tea: Red tea which is used by some tea lover

Self check 1: Confirming materials to meet production specifications

Name…… ID…… Date…….
Directions: Answer the following questions below. If necessary to aid some explain /answers.

1. What is material?
2. List the varieties of coffee bean and tea
3. What is criteria to confirm coffee
4. What is the consumable material and equipment of coffee preparation
5. What is tea?
6. What is the composition of tea?

Note: Satisfactory rating 5 points Unsatisfactory below 5 points

Information sheet 2: Identifying and confirming cleaning and maintenance requirement

2.1 Cleaning requirement and maintenance requirement

Cleaning is the removal of gross contamination, organic material, and debris from the premises or respective structures, via mechanical means like sweeping (dry cleaning) and/or the use of water and soap or detergent (wet cleaning). All coffee machines are required to clean from time to time .example blender, roaster, a metal or nylon fine mesh filter and grinder roller machine must be clean before use and after the use at the end of the work Cleaning and sanitizing is an important

2.1.2. Required material for cleaning:

- ✓ Chemicals (Disinfectant, Detergent, Soap, Solvent cleaners, Acid cleaners: use on mineral deposits
- ✓ Municipal Water
- ✓ Safety device (Wear appropriate Personal protective Equipment)

2.1.3. Methods of cleaning

A.CIP (clean in place) is methods of cleaning interior surface of pipes, vessels, coffee equipment,filters,and associated fitting without major disassembles

B.COP (clean out place): methods of cleaning equipment items by removing

2.1.4. Maintenance required for coffee and tea processing machine

- **Checklists (** Date ,Schedule, Cost Material accessory Names of machine, Model of machine, Specification)

Self check 2: Identifying and confirming cleaning and maintenance requirement

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain /answers.

What is cleaning

1. List and explain the chemicals used for cleaning
2. Write cleaning methods
3. What is clean in place (CIP) and clean out place (COP)

Matching

1. Cleaning chemical	A .Soap or detergent
2. Dry cleaning	B.Sweeping
3. Wet cleaning	C. C. personal protective equipment

Note: **Satisfactory rating 6 points Unsatisfactory below 6 points**

Information sheet 3: Fitting and adjusting machine components and related attachments

3.1Fitting and adjusting machine components and related attachments

Fitting is small part on or attached to a piece of machine or equipment.

Adjusting is correction the attachment of the machine component parameters like temperature, time pressure and other adjusting activity in operation. In coffee process operation any spare part must fit and adjustable like Temperature, time and pressure parameter that fit the machine in order to get the final quality product.

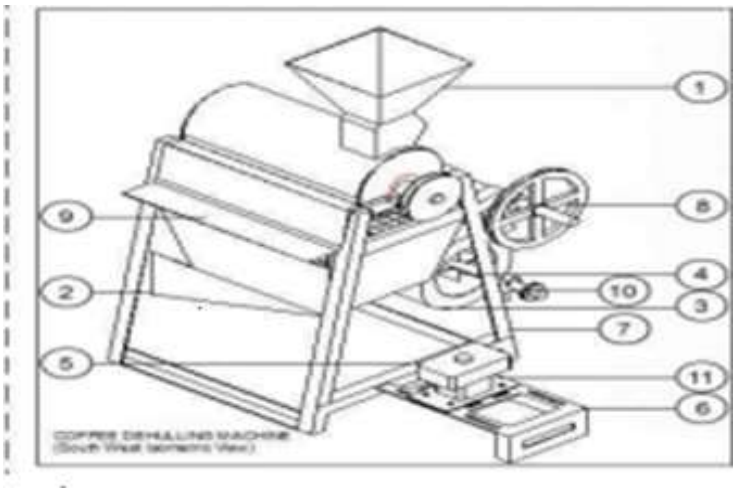
Types of Coffee machines

- Huller (hulling machines)
- Blender
- Roaster
- Roller /grinder and Packer/sealer

3.2. Hulling machine

Coffee huller:-is a machine that removes the hull/husk from the surface of coffee bean Hulling cylinder was designed to use impact and frictional forces caused by its rotation inside a perforated concave. Rubber beaters which are equally arranged in 3 rows along the circumference of a 90 mm hollow metal pipe are bolted to flat metal pegs welded on pipe. The beaters are flat rubber strips cut from side wall of scrapped motor.

Illustration of coffee huller components



1Hopper
2. Grain outlet
3. Fan housing
4. Fan blade
5. Pulley
6. Engine seat
7. Frame
8. Cleaning chamber cover
9. Fan pulley
10. Frame move
11 prime movers

Figure 1 coffee Hulling Machine

Component of coffee roaster

Figure: 2 coffee roasters

Self check 1: Fitting and adjusting machine components and related attachments

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain /answers

1. Write the components of coffee huller and roaster component?
2. Define the word fitting and adjusting?

Information sheet 4: Entering processing/operating parameters

4.1 Entering processing/operating parameters

Operating parameters are the important criteria in the coffee and tea process production or manufacturing. Such as:-

- Temperature
- Time
- pressure
- Moisture content
- Sensory analysis and appearance (colour, size, flavor, aroma)

The higher the temperature and roasting time will accelerate the degradation and formation of other chemical compounds such as caffeol produced from caffeine compounds during the roasting process

When the temperature rises from 205 °C to 220 °C, the color changes from light brown to medium brown and a weight loss to 13% occurs .The resulting chemical process is called pyrolysis and is characterized by a change in the chemical composition of the bean as well as a release of CO_2. The endothermic particles crack or pyrolysis. This pyrolysis occurs between 225-230°C, and the roast color is defined as medium-dark brown.

The pop is much quicker sounding and the beans take on an oily sheen. Higher potential roasting is maximized in roasting when you maximize the sweetness and aroma of the coffee while minimizing the bitterness and acidity.

Most people focus on the latter and therefore roast extremely dark, yet without sweetness and aroma the express will never be palatable. From 170-200°C the sugars in coffee begin to caramelize. From tasting pure sugar versus its caramelized component it is evident that uncaramelized sugar is much sweeter

The dark color of coffee is directly related to the Caramelization of the sucrose in coffee. Therefore, to maximize sweetness you want to minimize the Caramelization of sucrose, yet you do not want to roast too lightly or bitter tasting compounds will not thermally degrade.

Stop the roast somewhere between the end of the first crack and less than half way through the second crack. Do not roast well into or past the second crack. We recommend a roasting

chamber temperature somewhere between 205-215°C. Realizing the danger of the following suggestion we might recommend a color similar to the one below.

It is recommendation to point out that this color is preferable to the almost black color you will frequently observe for drinking. Caffeine is a fast acting stimulant that works on your nervous

Or used to improve mental alertness

4.1.1 Effect of increase temperature and time results.

- ✓ Colour changes
- ✓ Caramelization raised
- ✓ Sweetness decrease as temperature and time increase
- ✓ Appearance observed

Caffeine can acts a taste and aroma founds in coffee in addition to chlorogenic acids, caffeine and trigonelin.

4.2.Other coffee quality parameters are:

Flavor: Flavor is considering how subjective taste can be like ,Unlike other sensory descriptions that have relatively objective descriptions (loud, soft, furry, scaly), taste and smell)

The roast related flavors refer to those characteristics imparted to the bean as a result of the roasting process. Varietal and processing terms refer to those aspects that are inherent in bean, or imparted as a result of the green bean's pre-roast processing. Roasting can substantially affect the intrinsic flavor and aroma of the bean. Roasters will act in order to balance this and to enhance the beans' inherent profile.

Acidity: Acidity describes the level of acidity of coffee. High acidity coffee is thought to be of a higher quality. Low acidity coffee is usually called soar. Acidity is more of a sensation than a taste, and is experienced on the tip of the tongue and/or the roof of the mouth. During roasting, acidity varies to body or bittersweet aspects; as the degree of roast increases, perceived acidity decreases. Coffees without acidity tend to taste flat, lacking a pleasant palate-cleansing aspect. Acidity can often have wine-like aspects, especially it can come across as citrusy. When acidity is extreme, it can feel astringent, as if the moisture has been sucked from your mouth.

Aroma : Related to both roast and variety. Most of our taste perception comes from our sense of smell, so the volatile aromatics emitted from brewed coffee play an important role in its taste. Aroma develops during roasting, but as the roast starts becoming dark, the carbonized sugars become dominant..

Bitter Roast and preparation related. This is not always a defect; up to a point, it can be desirable. Robusta is more bitter than Arabica, but mild coffees can become bitter if over roasted or over extracted during brewing.

Bitter sweet : Roast related, Often mischaracterized as "strong," the bittersweet aspect is created by the Caramelization of sugars in the bean .The longer the coffee is roasted, the greater the Caramelization, until at last the sugars are completely burned, giving the coffee a taste akin to charcoal.

Earthy, or Natural: This defect observed in green coffee bean and brewed coffee after taste a skin to freshly turned soil. Which commonly relates to poor processing, one way this defect can occur is when the beans absorb flavor from the dirt on which they were spread to dry? In more muted degrees, this quality can add interesting notes to a coffee.

Flat: Lacking in taste or aroma; low in acidity. Often occurs when the coffee goes stale.

Grassy*:* Processing related. The aroma and taste of hay. This can result from prematurely picked cherries.

Musty: Moldy, mildew; often the result of some improper storage conditions. Improper aging also can cause mustiness, while proper aging can contribute a desirable flavoring aspect

Sour: unpleasantly acid or sour, as if contaminated by vinegar. This taste can occur in low-growing, unwashed coffees, but commonly occurs in under roasted coffees, or even properly roasted beans that were then brewed with water that was too cool.

4.2 Factor affecting tea processing quality parameter:

- ❖ Temperature
- ❖ Time
- ❖ Relative humidity

4.3 Other tea processing quality parameters

- ❖ Appearance (Flavor, Bitterness ,Colour, Aroma Taste)

4.3 Legislative requirements

Typicall reflected in procedures and specifications. Legislation relevant to this industry includes the Food Standards Code including labeling, weights and measures legislation;
Standards and protocols a number of organizations have published standards, both general and specific for the certification of organic coffee production.
The joint FAO/WHO food standards program via the codex Alimentarius commission has guidelines for the production, processing, labeling and marketing of organically produced foods (CAC 32-199) ;Available at CODEX @ FAO.ORG from the secretariat in Rome.
These guidelines are generalized with respect to food and not specific for coffee.

4.3.1The Food Standards Code

- labeling,
- weights and measures legislation

Labeling is displaying information on the packing material of the coffee product on the outer part of the container
Labeling is to introduce the product for sale by providing information about product to target consumer market for ensure safety standards of regulatory body.

Labeling must be contains:

- ✓ Product name and category of food
- ✓ An ingredient list in describing order of weight
- ✓ Logo of the company
- ✓ Nutritional fact panel or information

- ✓ Shelf life (use by or best before date)
- ✓ Storage conditions
- ✓ Name and address of manufacturer ,packer, seller
- ✓ Weight or volume and Instruction for use

Application of labeling

- ✓ To identify the product
- ✓ Provide ingredient
- ✓ To know use of the product
- ✓ To get the evidence
- ✓ Child safety and To know expiration date

Types of ingredients are:-Preservatives, Sweeteners**,** Color additives**,** Flavors enhancers**,** Emulsifiers Stabilizers

Weight is a relative mass or quantity of the matter contained by it measurement

Mass is a measurement of the amount of matter in an object. The basic unit of mass or weight in the metric system is the gram. The most frequently used units of mass or weight used in the Canadian food industry are the gram and kilogram.

Weights are measured in:-Tone, Kilogram (kg), Gram (g) ,Centigram(cg) and Milligram(mg)

4.3.2 Measures legislation

Legislation covering food safety, Environmental management,

- ❖ **Occupational health safety (OHS)**

Occupational health and safety is 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.

The question of occupational health and safety, as a global issue, is now taking a new turn.The main contributory factors towards to agricultural development that are taking place in the developing countries, and the emergence of new products and product processes from these places

Self check 4: Entering processing /operating parameters

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. Write process parameters of coffee and tea products parameters?
2. At what temperature coffee bean roasted?
3. What is food standard code?
4. What is labeling
5. What is OHS?
6. What is the application of labeling?
7. What is ingredient?

Information sheet 5: Loading or positioning materials, ingredients, product and consumables

5. 1.Loading or positioning materials, ingredients, product and consumables

Load or position Coffee Material and ingredient from different containers or sacks for processing and analysis. During this process takes the recipe of the ingredient for coffee and tea production.

Take materials or ingredients using the following containers:-

- Forklift
- Trolley
- Sample sucker
- flat bags of jute fabric 60kg
- fully largest bags load 300kg
- uck loads 100kg
- plastic container10kg and poly wood

Loading and positioning the coffee and tea products from finished good storage by using the following Transportation

EFSR, Car Railway and others

By using roasting coffee machine, roast green coffee beans and Finally the product is roasted and packed

Information sheet 6: Confirming services for operation

6.1 Confirming services for operation

Service is an intangible items where as products are tangible items that put on the market attention

To operate coffee and tea production use the Power, Steam, Water, Gas and Compressed air

Power is a test rising energy costs, the price of using a coffee machine is not as much as you may think uses an average. Automatic shutdown consumes watts per hours.

Steam is a vapor arising from a heated substance.

Steam is the invisible vapor into which water is converted when heated to the boiling point in which by forcing pressurized water near boiling point.

Water: use water for coffee and tea processing equipment/machine for washing equipment and machine surface and internal surface.

Compressor Air: An air compressor is a device that converts power (using an electric motor, diesel or gasoline engine, etc.) into potential energy stored in pressurized air (i.e., compressed air). By one of several methods, an air compressor forces more and more air into a storage tank, increasing the pressure.

Coffee is steeped for 10–50 seconds (depending on grind and preferred strength) and then forced through a filter by pressing the plunger through the tube.

With a standard, fully-automatic machine, you can simply press a button and the machine will pull a shot of espresso for you. You will probably still have to grind and tamp your beans, but the machine will take care of the actual shot pulling once you get it started.

Gas: Freshly roasted coffee beans give off twice their volume in carbon dioxide.

Therefore, a roaster can do one of two things;

1. Pack the coffee in a bag totally unprotected from the environment (oxygen and moisture are coffee killers),

2. Let the coffee de-gas for a few days (go stale)

Self check 6: confirming service for operation

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is the use of compressor in the coffee machine
2. What is the use of steam in coffee machine?
3. What gas does coffee give off?
4. Does coffee release co2?
5. What is the use of gas?

Information sheet 7: Checking and adjusting equipment performance

7.1. Check and adjust equipment performance

Before setting the process, check the performance of coffee equipment and machine by using equipment machine getting the following criteria to be calibrated. Such as

- ✓ Accuracy of Grading machine ,Roasters,grinder,blender,Refractometer ,thermometer, colorimeter and moisture analyzer
- ✓ availability, maintainability, and reliability levels of components of equipment and machinery
- ✓ Efficiency and effectiveness of machine
- ✓ Correction of working
- ✓ Fitness of the machine
- ✓ Maintenance of the equipment performance
- ✓ The correlation parameters of equipments (variability)
- ✓ Quality parameter grading machine (size in mm)

Self check: 7 Checking and adjusting equipment performance

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. How to check equipment performance?

2.what is the purpose of adjusting equipment performance

Information sheet 8: Setting the Process

8.1 Setting the Process

Set the Process by using the following unit operation or do in step of the following by manual automatical setting of the unit operation.

8.1.1 Manual coffee process (traditional process)

Manual process is most of the time a traditional process operation which is carry out by manpower harvesting, picking, sorting, cleaning and selecting green coffee bean.During coffee processing generally follow the below unit operation such as:

- Ripe berries for green coffee bean
- Harvesting:
- Sort
- Choose bean
- Airing
- Storage
- Hulling
- Cleaning ……packing
- Roasting
- Cooling ……packing
- Grinding/milling
- Tampering/packing
- Distributing/delivering
- Check the ripeness (ripe berries) of coffee. Check the ripeness of green coffee bean using pycnometer instrument the ripe and unripe of bean

Harvesting: -Harvest the fully grown cherries of coffee bean by picking and sorting technique from the mother stocks then choose the coffee beans for coffee production process by measuring the moisture using moisture analyzers then Choose beans based on their quality parameters like colour and size.

Ripeness is the coffee cherry, turns a bright, deep red when it is ripe and ready to be harvested**.**

For maximum freshness, coffee beans should be picked when their colour is the brightest (**red** or **yellow**). If they are a dark **red** or a dark **yellow** colour, then they are over ripe.Once picked and processed, coffee beans are **green** in colour

❖ **Harvest**

Coffee harvesting is the first step of the fully grown cherries coming to our cups.

Harvest the ripe cherries using the wet and dry processing methods from the farm land when the coffee fully ripe. Selective harvesting is the picking of only the ripe **coffee** cherries by hand.

Wet processing to prepare parchment coffee**.**

1. Picking – ripe berries

2. Sorting by hand ripe and unripe green coffee bean. Sorting: sort the harvested cherry for prior to pulping the coffee. Sorting removes extraneous matters for the fully ripe cherries: Plant debris, immature, diseased, pest infested and dry berries, stones, earth .Mechanical equipment- separator, washer, and electronic sorters (color) - but expensive

3. Pulping-

- ✓ It is the mechanical removal of the red outer skin from cherries
- ✓ Requires pulping equipment and clean water – pulper;
- ✓ Cylinder (or drum) coffee pulper – drum type pulper is capable of rejecting the unpulpable fruits and has facility for green cherry separation.
- ✓ Figure .4 pulper

4. Mucilage is rich in pectin, pectinase, and small amounts of sugars and is very hygroscopic

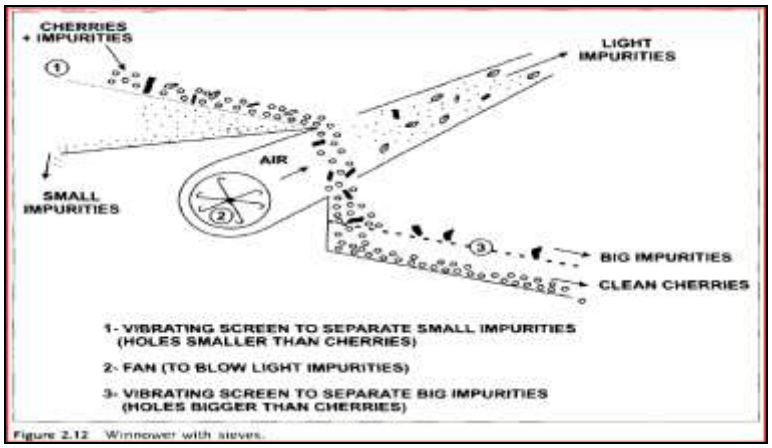


Figure .3 Sorts and clean

Drying process

After the parchment coffee has been washed and drained, it will have a moisture content of 50-60% .In order to lower moisture content in to 12%, 100 kg of water should be removed from 200 kg of parchment coffee to obtain 100 kg of dried coffee

Drying is accomplished by two methods:

- ✓ Solar drying – wooden frame (2x1 m) having fine netting, 1 m from the ground, cement area (1-2% inclined)
- ✓ Artificial drying –dryers

❖ **Choose bean**

Choose bean or select beans based on the right quality bean that exist in commercial and suitable for customer satisfaction.

To pick the best coffee beans:-

- ✓ Know customer preference
- ✓ Pick coffee beans based on your preferred quality criteria.
- ✓ Determine how much caffeine exists in coffee bean you want in your coffee.
- ✓ Choose bean respected to grading system
- ✓ Select based on sensory (colour, flavor, aroma taste)
- ✓ Avoid coffee beans that are labeled 100% Coffee.

❖ **Coffee bean Airing:** To preserve **beans**' fresh roasted flavor as long as possible, store them in an opaque, **air**-tight container at room temperature. Airing increase coffee bean shelf life.

❖ **Hulling:** is the simplest equipment for hulling parchment coffee is the mortar and pestle or removal of the film or husks:

- ✓ Hand operated, horizontal mill stones are also used
- ✓ Now mechanical hullers are commonly used
- ✓ The complete removal of the film requires additional friction – polishers – gives shiny appearance
- ✓ Huller-polisher is the equipment which carries the two operations simultaneously

❖ **Cleaning:** is the removal of husk or films of coffee bean.

- ✓ Winnowing machine is the simplest cleaning and dusting equipment widely used
- ✓ For larger quantities, cleaner-separators equipped with vibrating and ventilated sieves are preferred .Mechanical removal

❖ **Sorting and grading.**

The purpose of sorting is to remove misshapen, unsuitable, black, broken beans, discolored or spotted beans, After cleaning and sorting, beans are homogenized called bulking and to know clearly, accuracy, consistence.

Example Coffee bean is grading according to the size using the grading machine based on size,colour, shape, moisture and density.

Beans are sized by being passed through a series of screen and sorted by air jet to separate heavy from light beans.

Size of green bean

The size of beans are ranged from 8—3 mm (20 –8 inch) or from very large to small

Inch	Mm	Classification	Region	Grade
20	**8**	Very large		AA
29.5	**7.75**	Very large		
19	**7.5**	Very large		
18.5	7.25	Large		A
18	7	Large		
17	6.75	Large		
16	6.5	Medium		B
15	6	Medium		
14	5.5	Small		C
13	5.25	Shells		
12	5			
11	4.5	Shell		-------
10	4			
9	3.5			

8	3	Shell		

Table. 1

Figure 6.Seiver (screener)

- Storage

To preserve your beans' fresh roasted flavor as long as possible, store them in an opaque, air-tight container at room temperature. Coffee beans can be beautiful, but avoid clear canisters which will allow light to compromise the taste of your coffee. Then finally the clean green coffee bean packed in the different in jute bags in kilograms

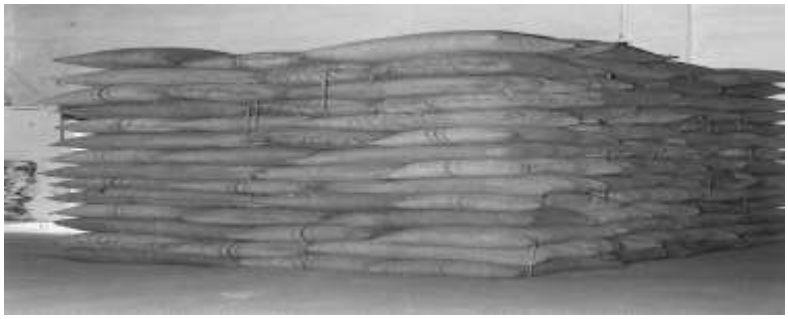


Figure .5 stored bean

- **Roasting**

Roasting coffee transforms the chemical and physical properties of green coffee beans into roasted coffee products till aroma and flavor are ultimately increases solubility.

The purpose of roasting is brings out the aroma and flavor that is locked inside the green coffee beans.

Keep in mind that for the roasting process to be successful, the beans must be heated to temperatures between 205 to 250 ^{O}C for 10 to 20 minute.10 minutes for smaller batches and about 20 minutes for larger batches. When you roast, be sure the beans remain in constant.

- Coffee roasting types

Figure: 7 Roasted

- C**ooling**

The roasted coffee is cooled by spraying a small amount of water, either in the drum or in a separate cooling unit. Cooling temperature of roasted coffee 143ºF (61.7ºC)

- **Grinding**

Grinding is milling the coffee bean

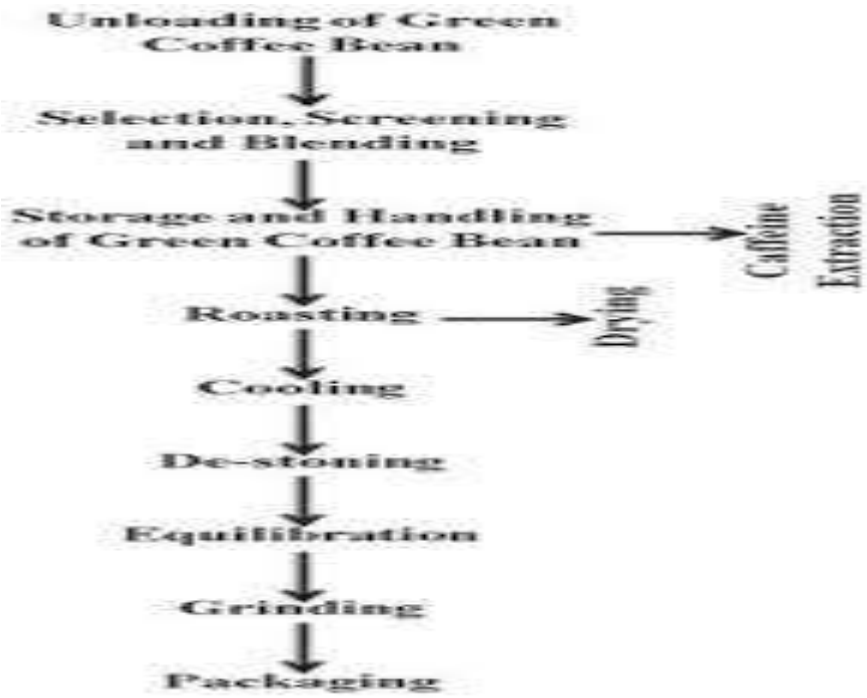
8.1.2. Semi-automated process control system

Semi-Automation is a process or procedure that is performed by the combined activities of man and machine with both human and machine steps typically.

The range includes a basic version with semi-automatic control for small production plants

8.1.3. Fully automated process control system

Automatic process control in continuous production processes is a combination of control engineering and chemical engineering disciplines that uses industrial control systems to achieve a production level of consistency, economy and safety which could not be achieved purely by human manual control.



Flow chart of coffee process

Tea manufacturing process

Take tea leave for tea processing and control the quality parameters and chemical composition of the tea product.

Plucking stage1: In this stage pluck the tea leave and plucking tea by controlling poly phenols, caffeine, essential oils and amino acids which are responsible for aroma and flavor of black tea.

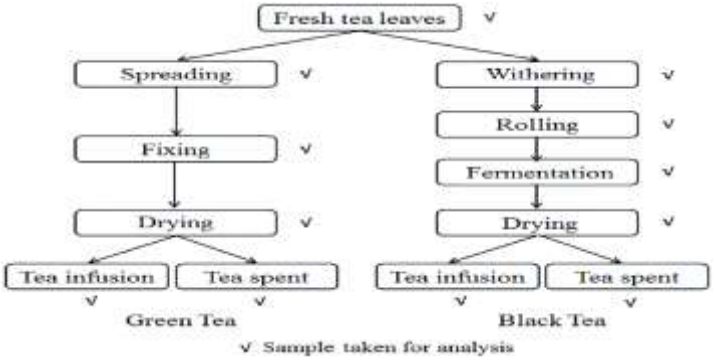
Rolling stage 2: take the leave and roll the leave by oxidation process begins at rolling step and ends at initial stages of drying process until the heat denature the enzymes, which convert tea poly phenols (catechins) to theaflavins and thearubigins; both are responsible for brightness, color and taste of black tea.

TR increased by increasing fermentation period. TF decreased by increasing fermentation period. The essential oils and the amino acids also contribute to characteristic tea taste and aroma. It was found that the essential oils content increased during the withering, rolling and fermentation steps; however this amount decreased during the drying step. But this reduction

is compensated by the Millard reaction which is the reaction of amino acids with the sugars during drying, contributing positively to the tea flavor and color.

Theaflavin, thearubigins and total color content of black tea stored in accelerated storage condition decreased slightly when compared with tea stored under normal conditions. It is concluded that plucking (interval, season and standard), processing steps and storage system plays major role in maintaining black tea quality

Tea processing is the method in which the leaves from the tea plant Camellia sinensis are transformed into the dried leaves for brewing tea.



Flowchart 2 tea process

Self check 1: Setting the Process

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. Write the flow chart of coffee process
2. What is roasting?
3. At what stage coffee bean harvested?
4. What are manual coffee process techniques?
5. What is the difference between sorting and grading?

6 what are the four stage of tea manufacturing?

Information 9	Carrying out pre-start checks

9.1. Carrying out pre-start checks

The pre-operational check is important for the workers safety. It involves a daily check of the machines health. Any warehouse machine that needs repairs, maintenance or is observed to be unsafe to operate has to be taken out until such repair or maintenance has been done. Responsible operator, running a pre-start check on your plant or machinery before you start the day is the best way to ensure the job gets done safely and without delay pre check the work area and prior to the machines.

- **Pre start check activity:**

✓ Visual inspections of important features prior to starting the machine
✓ Visual & function tests while the machine is turned on but stationary
✓ Testing the machine's functions during a short drive

In these steps there are activities that are common to all pre-start checks.Pre-Start Checks for coffee process on the green bean and machine like roaster, grinder, blender and grading machine an important.

- **Advantage of carry out pre-start check**

✓ being an OHS requirement
✓ Reduces the risk of injury to you and other employees
✓ Improves the condition of the lift truck. Increase productivity.

Self check :9	Carrying out pre-start checks

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1.what is the advantages of pre check?

2.what is prestart check?

3.What is prestart activity?

Operation sheet 1:	Fitting and adjusting machine components and related attachments

Procedure

Step 1: identify the component attached to the machine **(describe**

Step 2: check weather use electric cable or not

Step 3: use switch off and on button and as well care the danger

Step: 4 adjust the parameter like temperature, time an pressure

Step5: start the production process(run)

Operation sheet 2	**Operating parameters**

Procedure

Step 1: identify the types of parameters

Step 2: sampling the green coffee beans

Step 3: analyse the moisture content of the beans

Step 4: grading the bean according to the size

Step 5: check sensory analyzing

Step 6: check the quality appearance of bean

Step 7: adjusting the temperature and time processing

Operation sheet: 3	**Checking and adjusting equipment performance**

Procedure

Step: 1 check the performance coffee and tea equipment

Step: 2 check the efficiency of the equipment as its functional or not

Step: 3 compare the performance and efficiency of used machine

Step: 3 identify how to adjusted

Step: 4 adjust and run the performance of equipment

Step: 5 check maintenance required equipment

Operation sheet:4	Setting the Process

Procedure

Step: 1 harvest the green coffee bean

Step: 2 choose special green bean

Step: 3 clean the impurity of the coffee bean properly

Step: 4 hulling the husks or parchments of coffee bean

Step: 5 roasting the bean properly at temperature and time control

Step: 6 grind the roasted bean in required size in fine or coarse form

Step: 7 packing the roasted coffee in container for shelf life

Procedure

Operation sheet: 5	Carrying out pre-start checks

Step1: observe the machine efficiency and effectiveness

Steps 2 - Visual inspections of important features prior to starting the machine

Step 3 - Visual & function tests while the machine is turned on but stationary

Step 4 - Testing the machine's functions during a short drive

LAP Test	Performance Test

Name ……..ID……..

Date…….....

Time started ……...Time finished ……..

Instruction: Give necessary template tools and material you are required to perform the following tasks within 2 hours for each task. The project is expected from each student to do it .

Task 1: Fitting and adjusting machine components and related attachments

Task 2: Operating parameters

Task3: Checking and adjusting equipment performance

Task 4: Setting the Process

Task 5: Carrying out pre-start checks

LG #30	LO 2: Operate and monitor the blending, roasting and grinding process

Instruction sheet

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

- Starting up and operating the roasting and grinding process
- Blending and roasting green beans
- Monitoring the process to meet specifications
- Grinding roasted product
- Monitoring control points
- Roasting and Grinding coffee products
- Monitoring operating equipment
- Identifying Variation in equipment operation and report maintenance requirements
- Monitoring equipment
- Identifying, rectifying and/or reporting out-of-specification product, process and equipment performance
- Maintaining work area
- Conducting work

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:

- Start up and operate the roasting and grinding process

- Blend and roast green beans
- Monitor the process to meet specifications
- Grind roasted beans
- Monitor control points
- Roast and Grind coffee products
- Monitor operating equipment
- Identify Variation in equipment operation and report maintenance requirements
- Monitoring equipment
- Identify, rectify and/or report out-of-specification product, process and equipment performance
- Maintain work area
- Conduct work

Learning Instructions:

1. 1Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Learning Instructions:

- ✓ Read the specific objectives of this Learning Guide.
- ✓ Follow the instructions described below.
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Information sheet 1:	**Starting up and operating the roasting and grinding process**

2.1 Starting up and operating the roasting and grinding process

❖ Key features of the roasting and grinding process

Roasting process coffee is transforms the chemical and physical properties of green coffee beans.

To start the operation process of roasting select the types of coffee roasting machine.

When roasted, the green coffee bean expands to double its original size, changing in color and density. As the bean absorbs heat, its color shifts to yellow, then to a light "cinnamon" brown, and then to a rich dark brown color. During roasting, oils appear on the surface of the bean. The roast will continue to darken until it is removed from the heat source.

A coffee roaster is a special pan or apparatus suitable to heat up and roast green coffee beans.

Keep in mind that for the roasting process to be successful, the beans must be heated to temperatures between 205 ^{O}C to ^{O}C at 10 20 minute. When you roast, be sure the beans remain in constant motion so none of them become scorched.

Roasted coffee grinding:

Grinding coffee is break down the roasted coffee bean to expose the interior of the bean allow to oils and flavors to be extract

- **Purpose of each stage in the roasting and grinding**

The coffee-roasting process follows coffee processing and precedes coffee brewing.

It consists essentially of **sorting**, **roasting, cooling,** and **packaging** but can also include grinding in larger-scale roasting houses. In larger operations, bags of green coffee beans are hand or machine-opened, dumped into a hopper, and screened to remove debris.

The green beans are then weighed and transferred by belt or pneumatic conveyor to storage hoppers. From the storage hoppers, the green beans are conveyed to the roaster.

Initially, the process is

Endothermic (absorbing heat), but at around 175 °C (347 °F) it b **exothermic** (giving off heat).For the roaster, this means that the beans are heating themselves and an adjustment of the roaster's heat source might be required. At the end of the roasting cycle, the roasted beans are dumped from the roasting chamber and air cooled with a draft inducer. During the roasting process, coffee beans tend to go through a weight loss of about 15 to 18% due to the loss of water and volatile compounds. Although the beans experience a weight loss, the size of the beans double after the roasting process due to the physical expansion of the cellulose structure which facilitates the release of carbon dioxide, volatile organic compounds, and water (in the form of steam).

There are several traditional variations in bean roasting in different parts of the world.

For example, coffee is often coated with oil (traditionally clarified butter) and a small amount of sugar prior to roasting to produce a "butter roast". The roasting process results in an additional caramelized coating on the beans.

Self check 1: Starting up and operating the roasting and grinding process

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is roasting process?

2. What is grinding process?

3. Purpose of roasting process

Information sheet 2: Blending and roasting green beans

2.1. Blend and roast green beans

Blending is a process which mixes recipients to ensure there is a homogeneous mixture of the all ingredients for each manufacturing **process**. **Blending** is a **process** that can be carried out in manufacturing **process** when new recipients need to be added to the blend.

Blending coffee is a mixture of two or more different origin coffee beans that mixed together Example mixing of different geographical area of coffee like Wollega, Iluabor, ergacheffe Sidama, Harar they leads the quality of coffee products. Types of bean like coffee Arabica and Robusta are mixes

Other is blending with other substitute like peans, barley, and maize

Self check 2: Blending and roasting green beans

Name…… ID……. Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. Why blending is needed coffee bean with other
2. What is the use of blending?
3 .What is the effect of blending when coffee bean blend with other?

Information sheet 3: Monitoring the process to meet specifications

3.1. Monitoring the process to meet specifications

What is monitoring the process?

Monitoring is the systematic process of collecting, analyzing and using information to track a programme's progress toward reaching its objectives and to guide management decisions.

Process monitoring *is:*

- ✓ infrequent, of any process adjustments
- ✓ manually adjustments
- ✓ Take place due to special causes.

Automatic feedback control is applied continuously by computer systems and makes short-term, temporary changes to the system to keep it at the desired target (set point).

The purpose of monitoring the process is to present and review the current Methods of coffee effluent treatment with the most appropriate technology that takes into consideration all parameters (electiveness, availability, affordability and ecologically friendly) for effective coffee effluent treatment.

Note that process monitoring is often called statistical process control (SPC). This can lead to unnecessary confusion with process control, i.e. the design and implementation of feedback control, feed forward control and other automated control systems. We will not use the term SPC.

A monitoring chart is a display of one value (variable), against time, or in sequence order.

- ✓ a time-series plot, or some sort of sequence,
- ✓ a target value shown,
- ✓ One or more limit lines are shown, they are displayed and updated in real-time, or as close to real-time as possible.

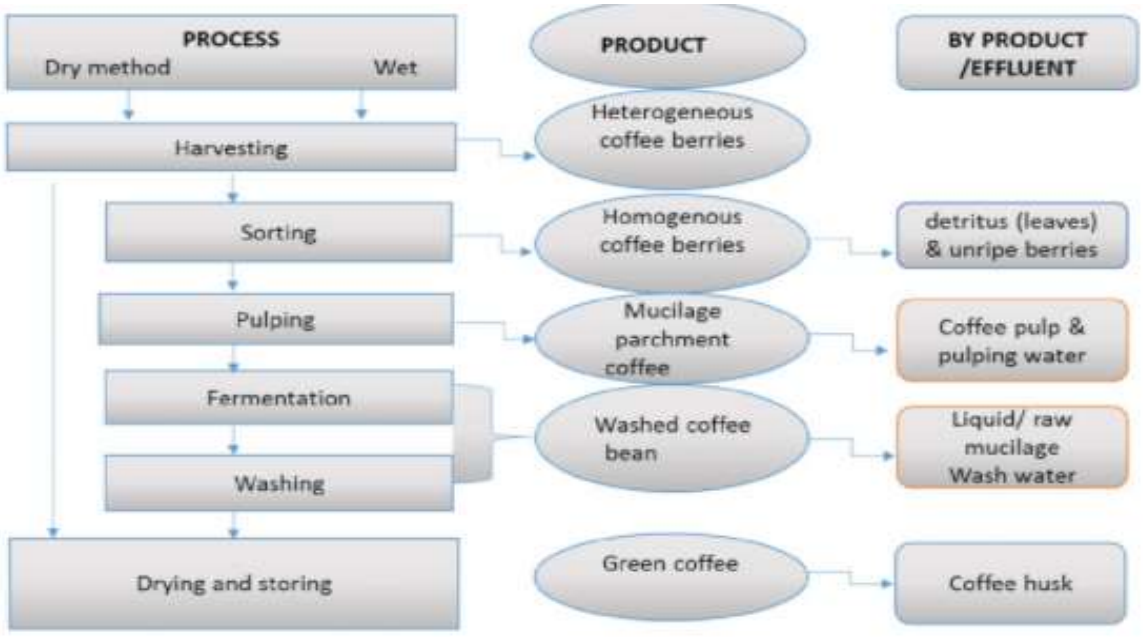

Diagram process monitoring

Self check: 3 Monitoring the process to meet specifications

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is monitoring?
2. What you treat or monitor in a coffee process?
3. Write the byproducts of coffee bean in process monitoring
4. Write two methods of coffee process monitoring

Information sheet 4: Grinding roasted beans

4.1 Grinding roasted beans

The whole coffee beans are ground, also known as milling, to facilitate the brewing process. To facilitate the brewing process

Form of grinding

- ✓ Fine form
- ✓ Coarse form

❖ **Fineness**

The fineness of the grind strongly affects brewing. Brewing methods that expose coffee grounds to heated water for longer require a coarser grind than faster brewing methods. Beans that are too finely ground for the brewing method in which they are used will expose too much surface area to the heated water and produce a bitter, harsh, "over-extracted" taste.

At the other extreme, an overly coarse grind will produce weak coffee unless more is used. Due to the importance of a grind's fineness, a uniform grind is highly desirable; because it take a short brewing time can be used for finely ground coffee.

A fine grind allows the most efficient extraction and flavor but coffee ground too finely will slow down filtration or screening. Ground coffee deteriorates faster than roasted beans because of the greater surface area exposed to oxygen. Many coffee drinkers grind the beans themselves immediately before brewing. Spent coffee grinds can be reused for hair care or skin care as well as in the garden. These can also be used as biodiesel fuel.

There are four methods of grinding coffee for brewing:

- ❖ Burr-grinding,
- ❖ Chopping:
- ❖ pounding and
- ❖ Roller grinding.

Burr mills use two revolving abrasive elements, such as wheels or conical grinding elements, between which the coffee beans are crushed or "torn" with little frictional heating. The process of squeezing and crushing of the beans releases the coffee's oils, which are then more easily extracted during the infusion process with hot water, making the coffee taste richer and smoother.

Figure 1 burr grinding

- **Chopping:** Pounding the beans with a mortar and pestle can pulverise the coffee finely enough.
- **Chopping grinder:-**Coffee beans can be chopped by using blades rotating at high speed.

Figure 2 chopping grinder.

Roller grinding.

In a roller grinder, the beans are ground between pairs of corrugated rollers. A roller grinder produces a more even grind size distribution and heats the ground coffee less than other grinding methods

Figure 3 roller grinding

Self check:4	**Grinding roasted beans**

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is grinding?
2. Write form of grinding?
3. Write types of grinding?
4. Why Roasted coffee bean is ground?

Information sheet 5:	Monitoring Control points

2.5 Monitoring Control points

- Food safety (critical)
- Quality and regulatory control points
- Inspections points

HACCP: A systematic approach to the identification, evaluation, and control of food safety hazards

Seven basic principles are employed in the development of HACCP plans that meet the stated goal. These principles include

- ✓ hazard analysis
- ✓ CCP identification
- ✓ establishing critical limits
- ✓ monitoring procedures
- ✓ corrective actions
- ✓ verification procedures, and
- ✓ record-keeping and documentation

Control: to manage the conditions of an operation to maintain compliance with established criteria.

Control Measure: Any action or activity that can be used to prevent, eliminate or reduce a significant hazard

Control Point: Any step at which biological, chemical, or physical factors can be controlled.

Critical Control Point: A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

- ❖ Food safety (critical) :Traceability, hygiene and control
- ❖ Quality and regulatory control points

Coffee quality of a parcel of **coffee** comes from a combination of the botanical variety, topographical conditions, weather conditions, and the care

- ✓ Food safety: Traceability, hygiene and control
- ✓ Avoid contamination to ensure food safety
- ✓ Extraction solvents — relevant for decaffeinated coffee only
- ✓ General requirements on packaging and liability

- ❖ **Inspections points**

Through the use of an internal control system, coffee producer organizations processes, like internal inspections, Training and product management processing facilities is required, including access and location points.

2.5.2. Confirming equipment status

- ❖ Checking that hygiene and sanitation standards are met
- ✓ safety guards of equipment in a place
- ✓ quality and that collectively ensure that equipment consistently **meets**
- ✓ the correct **procedures** for the collection and disposal of wastes) from equipment
- ❖ **All safety systems**

Pressure systems can range from steam-generating commercial coffee machines

Air Conditioning

Pressure equipment means vessels, piping, safety accessories and pressure accessories. Assemblies I operate a coffee machine which generates steam at pressure.

- ❖ **Temperature system**

Designed to extract the fullest flavor possible. It combines a high brew **temperature** of up to 205 degree Celsius and a faster.

- ❖ **Time systems**

Coffee preparation is the process of turning coffee beans into a beverage. While the particular Coffee can be roasted with ordinary kitchen equipment (frying pan, grill, oven, popcorn popper) or by specialized appliances to the heated water is adjustable, and then a short brewing time can be used for finely ground coffee

Self check:5 Monitoring Control points

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What are important control points?
2. What is critical control point (CCP)
3. What is HACCP?
4. What is food safety?
5. What is Critical Control Point?

Information sheet 6: Grinding and roasting product

6.1 Roasted and Ground products

Most roasters have specialized names for their favored roasts and there is very little industry standardization. This can cause some confusion when you're buying, but in general, roasts fall into one of four color categories:

- ✓ Light roasted
- ✓ medium roasted
- ✓ medium-dark roasted and Dark roasted

Many consumers assume that the strong, rich flavor of darker roasts indicates a higher level of caffeine, but the truth is that light roasts actually have a slightly higher concentration.
The perfect roast is a personal choice that is sometimes influenced by national preference or geographic location. Within the four color categories, you are likely to find common roasts as listed below. It's a good idea to ask before you buy. There can be a world of difference between

Types of roasted coffee bean

- ❖ **Light roasted**

Light brown in color, this roast is generally preferred for milder coffee varieties. There will be no oil on the surface of these beans because they are not roasted long enough for the oils to break through to the surface.

- ❖ **Medium roasted**

This roast is medium brown in color with a stronger flavor and a non-oily surface. It's often referred to as the American roast because it is generally preferred in the United States.

Medium dark roasts

Rich, dark color, this roast has some oil on the surface and with a slight bittersweet after taste.

❖ Dark roasted

This roast produces shiny black beans with an oily surface and a pronounced bitterness. The darker the roast, the less acidity will be found in the coffee beverage. Dark roast coffees run from slightly dark to charred, and the names are often used interchangeably be sure to check your beans before you buy them.

❖ Grinding coffee products

- ✓ Extra coarse grounds. Extra coarse coffee grinds should look like peppercorns.
- ✓ Coarse grounds.
- ✓ Medium-coarse grounds.
- ✓ Medium grounds.
- ✓ Medium-fine grounds.
- ✓ Fine grounds and Super fine grounds

Self check:6 Grinding and roasting product

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What are roasted products?
2. What are grinding products?
3. which types of roasted coffee preferable for drink
4. Write two form of grinding coffee
5. What types of chemical is exist in the coffee roasting
6. When the coffee is roasted what the surface of coffee look like?

Information sheet 7: Monitoring operating equipment

7.1 Monitor operate coffee equipment

Monitoring is the systematic process of collecting, analyzing and using information to track a programme's progress toward reaching its objectives and to guide management decisions

- ❖ For efficiency and reliability of operation.
- ❖ Monitor temperature
- ❖ Monitor pressure.
- ❖ Time recording

Parts of monitor coffee machine/equipment

- ✓ Portal filter. This is the device coffee is ground into before being placed in the group to brew
- ✓ Port filter
- ✓ Filter Spring.
- ✓ Port filters Basket
- ✓ Group Gasket.

Group Screen and Group Dispense Switch and Group Dosing Keypad

Mechanisms of operating equipment

- ✓ Select and operate equipment correctly and safely
- ✓ Complete routine cleaning
- ✓ Perform monitoring and maintenance of heat sealing equipment
- ✓ Use appropriate manual handling when you operate equipment
- ✓ Use ergonomic packing table

Advantage of monitoring equipment

- ✓ To increase efficiency and effectiveness
- ✓ To avoid the fault
- ✓ To safe health of equipment
- ✓ To accurate the correctness of equipment

Self check: 1 Monitoring operating equipment

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. How to monitor?
2. What you monitor?
3. How to operate the equipment?
4. What is advantage of monitoring equipment?

Information sheet: 8 Identifying Variation in equipment operation and report maintenance requirements

8.1 Identifying Variation in equipment operation and report maintenance requirements

Maintenance is defined as efforts taken to keep the condition and performance of a machine always like the condition and performance of the machine when it is still new

Two types of Equipment maintenance

- ✓ planned maintenance activities
- ✓ Unplanned maintenance activities.

8.1 Identify Variation in equipment operation

- ❖ Identify fault equipment
- ❖ Identify Non routine equipment fault
- ❖ **Causes of variation of equipment**
  - ✓ unfit operation
  - ✓ poor product design
  - ✓ poor process design,
  - ✓ unsuitable machine,
  - ✓ untrained operators,
  - ✓ inherent variability and humidity incoming materials from vendor
  - ✓ vibration of machinery
  - ✓ inadequate maintenance of equipment,
- ❖ Equipment flexibility
- ❖ poor temperature and humidity
- ❖ lack of adequate supervision skills,

8.2 Operate Variation in equipment

- ✓ Prevents a production process from being as efficient as it can be
- ✓ Maintaining and repairing immediately

8.3 Identify Report maintenance required

- ✓ Takedown Time
- ✓ Event Time
- ✓ Facility
- ✓ Maintenance Checklist
- ✓ Device Information
- ✓ Name of equipment and model

Form to write maintenance report

- ✓ Write the title of equipment.
- ✓ Cover Letter
- ✓ Device Information.(specification)
- ✓ Cost.
- ✓ Suggestions and Signature

Self check: 8	**8 Identifying Variation in equipment operation and report maintenance requirements**

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is maintenance
2. Write types of equipment maintenance
3. What is the causes of the variation of equipment leads in the equipment performance
4. How to write the report for the maintenance of the equipment

Information sheet: 9 monitoring equipment

9.1 monitoring equipment

Monitoring equipment - display produced by a device that takes signals and displays them on a television screen or a computer monitor. Monitor. Computer, computing device, computing machine, data processor, electronic computer, information processing system - a machine for performing calculations automatically

Types of monitoring coffee equipment by the following markers

- ✓ Drip Coffee Makers (electric)
- ✓ Thermal Coffee Makers (electric)
- ✓ machines (electric)
- ✓ Percolators (electric)
- ✓ Siphon Coffee Makers (electric)
- ✓ Press Coffee Makers (manual)
- ✓ Aero Press (manual)
- ✓ Cold Brew Coffee Makers (Manual)

Self check :9	monitoring equipment

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is equipment monitoring?
2. Why equipment monitoring is needed?
3. How to monitor manual coffee equipment

Information sheet:10	Identifying, rectifying and/or reporting out-of-specification product, process and equipment performance

A. Minimum standards for exportable coffee

- ✓ For Arabica, has in excess of 86 defects per 300 g sample or Robusta, has in excess of 150 defects per 300 g (Vietnam, Indonesia, or equivalent)
- ✓ For both Arabica and Robusta, has a moisture content below 8 percent or in excess of 12.5 percent, measured using the ISO 6673 method
- ✓ Where moisture percentages below 12.5 percent are currently being achieved, Members shall Endeavour to ensure that these are maintained or decreased.
- ✓ Exceptions to the 12.5 percent maximum moisture content shall be permitted for specialty coffees that traditionally have high moisture content, e.g. Indian. Such coffees shall be clearly identified by a specific grade name.

B. Certificates of Origin

Exporting Members shall only issue ICO Certificates of Origin that meet both the minimum defect and moisture standards.

C.Cooperation by importing Members in verifying compliance

- ✓ . Importing Members shall make their best endeavours to support the objectives of the Programme.

D. Measures to be taken in cases of non-compliance

If coffee failing to comply with the above standards is identified through the normal course of trade, importing Members shall Endeavour to notify the ICO of because of defects

E. Measures for controlling the application of the standards in exporting Member countries

Each exporting Member shall develop and implement national measures which ensure that no exports of green coffee fail to meet exportable standards

Self check:10	Identifying, rectifying and/or reporting out-of-specification product, process and equipment performance

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is the use of identifying the product in specification?
2. When the coffee product is not meet the specification or standards what happen?
3. How to identify the specification of the products

Information sheet 11: Maintaining work area

11.1. Maintaining work area

Work is a task that an applying of energy of the specific job or duty on the different activity like maintenance. Maintenance work repair, fix and maintain mechanical equipment, buildings, and machines including plumbing

General **maintenance and repair workers** fix and maintain machines, mechanical equipment, and buildings. They paint, **repair** flooring, and **work** on plumbing, electrical, and air-conditioning and heating systems.

Clean **work** surfaces and **areas** according to the **area** function, health regulations and organizational hygiene procedures. Remove and safely wash the floor surface residue

What are the duties of maintenance?

Responsibilities

- ✓ Perform **cleaning** activities such as dusting, mopping etc.
- ✓ Perform minor fixes such as repairing broken locks, filling gaps on walls etc.
- ✓ Check control panels and electrical wiring to identify issues.
- ✓ Install appliances and equipment.
- ✓ Do garden/yard upkeep by mowing lawn, collecting trash

❖ Maintenance Activity:

- ✓ tests,
- ✓ measurements,
- ✓ replacements,
- ✓ adjustments and
- ✓ repairs can perform its required functions

Self check:11	Maintaining work area

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is work?
2. What is the responsibility in the work?
3. How to maintain the working area?
4. What is hygiene?

Information sheet 12: Conducting work

12.1. Conducting work

Work conduct is manage issues, discipline process might cover two areas: employee performance and general workplace conduct

Conducting work is procedure sets out the steps to be followed for work activities.

You must consult with affected workers when developing procedures for resolving work health and safety issues, consulting with workers on work health and safety, monitoring worker health and workplace conditions, and providing information and training

Work is carried out:

- ✓ Moving vehicles

Moving vehicle is transport material, equipment and machine for heavy machine or carry heavy machine equipment product in the coffee industry.

Loading the

Equipment: the small laboratory equipment like roaster grinder, thermometer,pcycnometer

To Conduct Yourself at Work

- ✓ Punctuality Power. Arriving on time to **work** and for meetings demonstrates commitment to your job.
- ✓ Keep It Positive. Bad days.
- ✓ Dress for the Job You Want
- ✓ Listen Up.
- ✓ Learn From Your Mistakes.
- ✓ Stay in Control

Self check :12	Conduct work

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is conduct work?
2. How to conduct your work?

Operation sheet 1	Starting up and operating the roasting and grinding process

Procedure

Step1: run the equipment or machine for operation

Ste2: adjust the time and temperature at the give range

Step 3: roast the bean at a given temperature and time

Step 4: cool the roasted bean for the time

Step 5: grind the roasted coffee bean in according to the size instructed

Operation sheet 12	Conducting work

Procedure

Step 1 identifies the workloads.

Step 2 – Assess Current schedule.

Step 3 – Identify the activity

Step 4 – Identify Options for the work

Step 5 – Document or record the data.

Step:6 Monitor the overall work

LAP Test	Performance Test

Name ……..ID……..

Date…….....

Time started ……...Time finished ……..

Instruction: Give necessary template tools and material you are required to perform the following tasks within 2 hours for each task. The project is expected from each student to do it .

Task 1: Starting up and operating the roasting and grinding process

Task 2: Conducting work

LG 46	LO 3: Shut down the grinding and roasting process

Instruction sheet

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

- Identifying appropriate shutdown procedure
- Shutting-down the process
- Collecting, treating and disposing or recycling waste by process according to company procedure
- Identifying and reporting maintenance

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 appropriate shutdown procedure
- Shut down the process
- Collect, treat and dispose or recycle waste by process according to company procedure
- Identify and report maintenance

Learning Instructions:

- ✓ Read the specific objectives of this Learning Guide.
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- ✓ Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
- ✓ If your performance is satisfactory proceed to the next learning guide,
- ✓ If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information sheet 1: Identifying appropriate shutdown procedure

3.1. Shutdown procedure

According to “Care and maintenance of Machine manufacturers. It is recommended you turn off the machine at the power source every night to save on electricity.

So we say TURN IT OFF, but it is totally up to you whether you do so or not

- Appropriate Shutdown procedure
  - ✓ High lightly revise the work
  - ✓ Clean the used equipment and machine and also the working area (floor)
  - ✓ Dispose and recycle waste
  - ✓ Switch off the machine used after finished
  - ✓ Manage the waste

Cleaning (in some cases cleaning may be carried out by a dedicated cleaning crew)

- waste disposal and recycling principles and procedures

Manage solid waste

- **Procedure of waste management**

✓ Waste collection

✓ Waste segregation and transfer

✓ Waste treatment

✓ Waste conditioning

✓ Waste storage

✓ Waste disposal

✓ Waste recycling

Grinder Shut Down

✓ Clean your machine in line with a standard deep clean.

✓ Where possible, drain remaining water from the machine. ...

✓ Turn your machine off.

✓ Return turn your machine back on and wait for it to reach user temperature.

✓ Run water through all parts of machine

Self check: 1 Identifying appropriate shutdown procedure

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is a shutdown procedure?
2. What is shutdown maintenance?
3. How to shutdown coffee machine?
4. Write procedure of waste management

Information sheet 2: Shutting-down the process

3.1Shutting-down the process.

Normal shutdown includes steps to render the systems safe, such as removal of hazardous process materials and inert (asphyxiating) gases. The systems might be cleaned as part of the shutdown; cleaning is often a process up to itself requiring its own set of startup, operation, and shutdown procedures

A machine shutdown, or turnaround, is a temporary closure of a building to perform maintenance. The main activities should be preventative in nature with the focus on equipment inspections. This is the best time to replace worn-out or broken process materials and equipment at their useful end-of-life

Finally at the end of the work:

- ✓ Finish the necessary work accordingly
- ✓ Revise the work for the trainees
- ✓ Dispose the wastes
- ✓ Place the equipment and material in their place
- ✓ Clean the area of the work and surface of equipment and machine

Figure 1:- **Coffee Grinder Cleaning Tips**

Information 3: Collecting, treating and disposing or recycling waste by process according to company procedure

Waste management (or waste disposal) includes the activities and actions required to manage waste from its inception to its final disposal.

This includes

- ✓ **Waste collection** is the transfer of solid waste from the point of use and disposal to the point of treatment or waste
- ✓ **Waste Transport** is the movement of waste over a specific area by trains, tankers, trucks, barges, or other vehicles
- ✓ **Waste treatment** is refers to the activities required to ensure that waste has the least practicable
- ✓ **Waste disposal** is monitoring and regulation of the waste management process

Self check	Collecting, treating and disposing or recycling waste by process according to company procedure

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is waste management?
2. What is waste collection?

Information 4	Identifying and reporting maintenance requirement

4.1. Identify and report maintenance requirement

Corrective or Breakdown maintenance implies that repairs are made after the equipment is failed and cannot perform its normal function any more:

- Identify Maintenance requirement(fault equipment)
  - ✓ Maintenance checklist.
  - ✓ name equipment or machine
  - ✓ model of machine
  - ✓ specification
- Report maintenance requirement are: the setup time, Instructions, Event Time, Facility Event

Five **types of maintenance** are: Corrective, Preventive, condition-based, predictive and Predetermined. Each Company has very precise needs and therefore has to implement a specific type of maintenance

Maintenance responsibility

- ✓ Safety is the responsibility of every employee.
- ✓ Protecting the environment is the responsibility of every employee.
- ✓ Quality is the responsibility of every employee.
- ✓ By the same token, Reliability Centered Maintenance is the responsibility of every employee.

Self check	Identifying and reporting maintenance requirement

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is your responsibility in maintenance?

LG 49	LO 4: Record information

Instruction sheet

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

- ❖ Recording workplace information and test results
- ❖ Maintaining Workplace records

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:

- ❖ Record workplace information and test results
- ❖ Maintain Workplace records

Learning Instruction

- ✓ Read the specific objectives of this Learning Guide.
- ✓ Follow the instructions described below.
- ✓ Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
- ✓ Accomplish the “Self-checks” which are placed following all information sheets.
- ✓ Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information 1: Recording workplace information and test results

4,1. Record Workplace information

Workplace information is most requiring students to complete formal training in or at least be aware of organizational policy and procedures to ensure their safety.

Recording is documenting the information or data that used the student in the workplace like flow diagram in work shop, instruction, safety device.

Becoming familiar with the organizational structure prior to placement can be valuable to a student so they understand where their role fits. Most workplaces require students to complete formal training in or at least be aware of organizational policy and procedures to ensure their safety whilst on placement.

- **Workplace information**
  - ✓ standard operating procedures (SOPs)
  - ✓ specifications
  - ✓ production schedules and instructions
  - ✓ manufacturers' advice
  - ✓ standard forms and reports
  - ✓ Batch/recipe instructions
  - ✓ Manufacturers' advice
- Mandatory workplace training may include:
  - ✓ Occupational Health and Safety training
  - ✓ Patient Safety
  - ✓ Infection Control
  - ✓ Workplace buying material
  - ✓ Child Safety

Test Results

Combining the workplace information recording there should test the results of processing coffee roasting and grinding by comparing with the standards such as:-

- ✓ Roast data (internal temperature of bean, time taken
- ✓ Production Data (Information on green coffee purchases, the person who roast, the date of roasting and quantity of the green and roasted coffee bean)
- ✓ Lab Data (any kind of analysis performed on the green, roasted, or finished product like green grading forms, moisture content, bulk density, colour, ground particle size, sensory analysis results, etc.)
- ✓ Sales Data (Who buys, promotion, quantity)

Self check: 1 Recording workplace information and test results

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is workplace information?

2. What is recording?

3. Write workplace result

4. State results of tests from processing coffee roasting and grinding

Information: 2 Maintain Workplace records

2.1 Maintaining Workplace records

Record is documenting of information or data

The employer must ensure that where any machinery has maintenance the log is kept up to date.

A **maintenance record** has been introduced as part of the arrangements for making the employer's health and safety policy effective as regards machinery risks.

Workplace Records is specify the organization's **record** keeping processes and procedures and include one or more of the following:

- **hard copy, such as:**
  - ✓ documents,
  - ✓ images,
  - ✓ Reports and forms.
- **Electronic, such as:**databases and spreadsheets.
- physical, such as samples of products or materials

Documenting every **repair** or **maintenance work** done on your equipment will help you process warranty claims much easier.

Keep a **record** of data.

- ✓ Name of equipment
- ✓ Model or manufacturer
- ✓ Serial number
- ✓ Location or origin and Person responsible for equipment

Self check: 2 maintaining Workplace records

Name…… ID…… Date…….

Directions: Answer the following questions below. If necessary to aid some explain

1. What is record?

2. What is workplace record?

3. What is maintaining workplace?

Reference

Google