CONFECTIONARY PROCESSING

Level II

Based on May 2019, Version 2 Occupational standards

Module Title: Operating Mixing or Blending Process

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Contents

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LG #40	LO 1 # Prepare the mixing or blending 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:

- Conforming availability of raw material and service
- Preparing pre mix.
- Identifying and conforming cleaning maintenance requirement status.
- Fitting and Adjusting machine components and related attachments.
- Entering processing or operating parameters of production.
- Adjusting mixing or blending equipment performance. .
- Carrying out pre start check

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:

- Conform availability of raw material and service
- Prepare pre mix.
- Identify and conforming cleaning maintenance requirement status.
- Fit and Adjust machine components and related attachments.
- Enter processing or operating parameters of production.
- Adjust mix or blend equipment performance
- Carry out pre start check.

Learning Instructions:

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”.

Information sheet 1	Conforming availability of raw material and service

1.1 Conforming availability of raw material and service

The main raw material for the production of flour confectionery products are flour, sugar, fats, milk and egg products. In addition, also used semi fruktovoyagodnye fruits and nuts, disintegrants (yeast or chemical leavening agents), flavoring (essences), food colors and gelling agents (gelatine, agar, agaroid, furcellaran et al.)

Raw and auxiliary materials must meet the requirements of the relevant regulatory and technical documentation. Aromatic and coloring agents, gelling agents, enhancers, surfactants, disintegrants, vitamins, therapeutic and dietary preparations should be approved for use by the USSR Ministry of Health.

Gum Base is a non-nutritive masticatory substance. It is an inert and insoluble non-nutritive product used as a support for the edible and soluble portion of the chewing gum (sugar, glucose, polyols and flavours). The general description “Gum Base”, used on chewing gum products throughout the world, is recognized by The Food Chemicals Codex and most national legislation

Gum base is the non-nutritive, non-digestible, water-insoluble masticatory delivery system used to carry sweeteners, flavors, and any other substances in chewing gum and bubble gum. It provides all the basic textural and masticatory properties of gum.

1.1.1 Characteristics of raw materials

- Chewing Gum Ingredients

Companies carefully guard their recipes for making chewing gum, but all chewing gum has the same basic ingredients. However, specific ingredients, give the gum delicious taste, are kept as secret. The basic ingredients are: gum base, softeners, sweeteners and flavorings. The ingredient that makes your gum 'chewable' is gum base. Gum base is the main ingredient in modern chewing gum.

Originally, chewing gum was made from the latex sap (chicle) of the sapodilla tree or other tree saps. For many years, gum base was made from chicle which was the chief ingredient in chewing gum. Today many modern chewing gums use rubber instead of chicle. In the middle 1900s, chemists learned to make synthetic rubber, which became a substitute for most natural rubber in chewing gums. Most gums are made from a synthetic rubber, or a mixture of artificial and natural bases.

- **Flavorings** The ingredient that makes your gum 'chewable' is gum base. Gum base is the main ingredient in modern chewing gum. Originally, chewing gum was made from the latex sap (chicle) of the sapodilla tree or other tree saps. A flavor ingredient in chewing gum has been found to provide long lasting, high intensity and high quality flavor.
- **Flour**

The confectionery industry is mainly used flour of higher grades and I, and for some grades of cookies, cakes and biscuits - flour grade II. From whole meal produce some dietary variety of confectionery and biscuits.

- **Sugar**

Sugar - the main raw material in the confectionery industry. It is used in the manufacture of all kinds of confectionery. The caramel ,fondant candy, marmalade, jelly beans sugar is 70-80% solids in the candy, chocolate, toffee - 50%. Sugar is nearly chemically pure sucrose (cane sugar) .

1.1.2 Equipment used during mixing /blending chewing gum process

Machines or Equipment, including e.g. hand tools or trays, for preparing, shaping and processing edible dough, namely for mixing, kneading, dividing, working, forming, shaping, cutting, proving, handling the dough before the baking, cooking or prebaking process with optional subsequent freezing.

Many small-scale bakers buy the equipment that is immediately available and don't look carefully at the alternatives. This can lead to them selecting an inappropriate machine.

To maximize efficiency of production, the capacity of each piece of equipment should be matched to the others. This prevents money being wasted on a machine that is larger than necessary, or creating 'bottle necks' caused by one piece of equipment that is too small.

1.1.3 Types of equipment

Some of The basic equipment needed in chewing gum process are:-

- measuring and weighing equipment, such as scales, load cells
- dosing equipment
- mixers
- pumps
- motor
- transporting truck
- in-line homogenizers
- conveyors(bulk materials transfer and materials handling equipment)
- storage facilities

At a larger scale of production, the following additional equipment is also used:

- **Mixing/ Blending**

Mixing is the process of combining different materials to produce a homogeneous product. Homogeneous can be defined as “Uniform in structure or Composition

Why mix or blend is needed:

A homogeneous mixture may be mixed to a certain weight (batch size) with:

- Consistent particle size distribution
- Consistent color
- Consistent texture
- Specific ratios of components

Blends which are very concentrated are often termed “Pre-mixes” or “Master batches”. Mixing and blending are terms which are often interchanged but there are differences. Blending is often a gentle process combining materials whereas mixing often involves a more vigorous combination. Poor mixing can affect the quality of the product resulting in non-homogeneous product which can affect chemical composition, color, reactivity and particle size. Over blending can lead to separation, aeration and with liquids also viscosity increases.

- **Mixer**

When selecting a mixer it must have the following features:

- ability to mix different types of product
- sufficient capacity to meet the intended rates of production
- hygienic design in which no oil or grease from the motor/gearbox can contaminate the product
- good mixing efficiency to produce an acceptable product in a short time with minimum energy consumption

- adequate safety features to protect operators from trapping their hands in the mixer or receiving electric shocks
- mixing bowls should have a smooth internal surface without corners, and all welds should be ground to a smooth finish

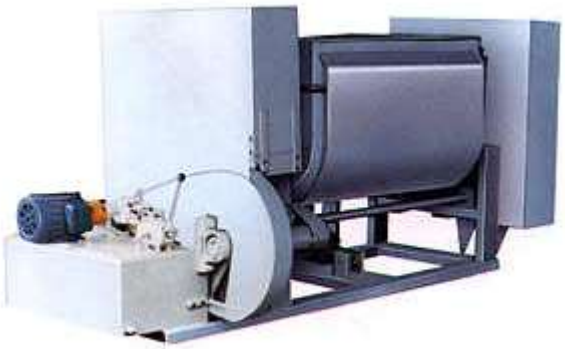

Fig 1.1 Gum base mixing equipment

- **Conical screw mixer**

When you want to mix segregative, free-flowing powders and pastes that require perfect mixing quality and accuracy but require careful treatment, a conical screw mixer is a proven solution.

Fig 1.2 conical screw mixer

1.1.2 Services

Water is present in sufficient quantity in cake batters to dissolve sugar , salt and other solid ingredients. Water adds moisture to the finished cakes and also regulates the consistency of the batter. It develops the protein in the flour to a very limited extent in order to retain better the gas produced by baking powder in the cake formula**.**

Fig 1.3 Ingredients of confectionary

- **Lighting and power**

Where lighting is needed, florescent tubes use less electricity than bulbs, but care is needed when using fluorescent lights above mixer/blender and other equipment that has moving or rotating parts. This is because they can make machinery appear stationary at certain speeds, causing a hazard to operators.

Electricity is preferred for bakery ovens because it is clean, flexible and easily controlled. Electric motors should be fitted with isolators and starters. Plugs should be fitted with fuses that suit the power rating of the equipment and the main supply should have an earth-leakage trip switch. All electric wiring should be of the correct type for the intended purpose and installed by a qualified and competent electrician.

Where a three-phase (440 volt) supply is used in larger mixer, the load should be equally spread over the three phases.

- **Water supply and sanitation**

Water is used in bakeries to make dough and for washing equipment. An adequate supply of potable (safe for drinking) water should be available from taps in the processing room. There are two potential problems with the water quality: sand and contaminating microorganisms.

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (1.5 each)

1. Hygienic design in which no oil or grease from the motor/gearbox can contaminate the product.
2. Mixing is the process of combining different materials to produce a homogeneous product.
3. Mixing and blending are terms which are often interchanged but there are differences.
4. Sugar is the main raw material in the confectionery industry It is used in the manufacture of all kinds of confectionery.

II Choose the best answer from the given Alternative (2 point each)

1. The main raw material for the production of flour confectionery products are :

A. Flour B. sugar C .fats. D .Milk E. all

2. The basic equipment needed in all bakeries and confectionaries are:

A .Mixing bowl B. Hand tool spoon C. oven D .all

Satisfactory rating ≥5 unsatisfactory rating ≤5

Information sheet 2	Preparing pre -mix.

2.1 Preparing pre -mix.

A method of making chewing gum uses the early addition and mixing of liquids. The method comprises the steps of providing a mixture of water and plasticizer; providing a melted gum base; mixing the melted gum base with the mixture of water and plasticizer; and mixing a powdered bulk sweetener with the mixture of gum base, water and plasticizer to form the chewing gum composition.

Complete mix is widely preferred in the foodservice industry, as it requires end users to add water. The food service industry is projected to be a key revenue generator for this type of premix, as it serves as a cost-effective option for them.

The food service industry is expanding both in developed and developing countries, which has encouraged bakery premixes manufacturers.

2.1.1 *Preparing the chicle*

1 If natural latex is to be used, it must first be harvested and processed. The tall 32.79 yard (30-meter) chicle tree is scored with a series of shallow Xs, enabling the chicle to flow down into a bucket. After a significant

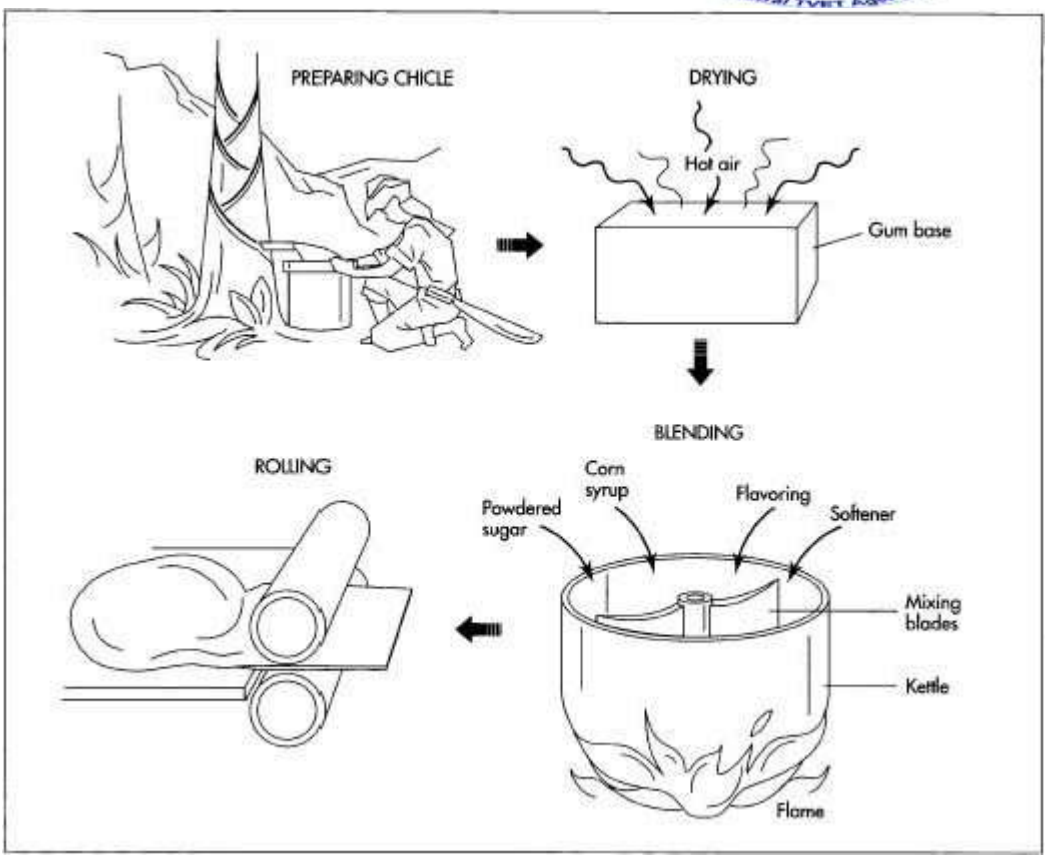

Fig 1.4 gam base process

Chewing gum base consists either of natural latex or a synthetic substitute. Natural latex such as chicle is harvested by making large X-marks on rubber trees and then collecting the substance as it runs down the tree. After grinding the base to form a coarse meal, the mixture is dried for a day or two. Next, the mixture is heated in large kettles while the other ingredients are added. Large machines then pummel, or "knead," the mass until it is properly smooth and rubbery, and it is put on a rolling slab and reduced to the proper thickness.

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I say true or false the following questions (1.5 each)

1 .Blends which are very concentrated are often termed “Pre-mixes.

2 Chewing gum bases consist either of natural latex or a synthetic substitute.

3. A confectionery premix containing at least flour, where in the main ingredients of the flour is soybean flour.

4. A method of making chewing gum uses the early addition and mixing of liquids.

II Explain the following questions briefly? (2 point)

1 .What is the benefit of pre-mix for mixing?

Satisfactory rating ≥5 unsatisfactory rating ≤5

Information sheet 3	Identifying and conforming cleaning maintenance requirement status

3.1 Identifying and conforming cleaning maintenance requirement status

Pre cleaning, by removing heavy accumulations of soil and debris with appropriate tools, will save water during later washing operations. Effective cleaning to eliminate invasive species materials and prevent their spread can be accomplished by thoroughly removing soil and debris using pressurized water. In certain situations, cleaning with compressed air, rather than water, could prevent damage to certain equipment areas such as engine wiring systems and vehicle cabs.

- **During confirming the cleaning:**
  - ✓ Workshop should be kept neat and tidy.
  - ✓ Work areas and equipment are to be thoroughly cleaned.
  - ✓ Ensure that gangways, access routes and exit ways to fire exits are kept clear.
  - ✓ Keep access to fire and emergency equipment clear at all times. Fire doors must never be locked or be difficult to open.
  - ✓ Keep gangways and exit ways clear of rubbish; do not use them as storage area even on a temporary basis.
  - ✓ Avoid tripping hazards such as boxes, trolley handles, trucks and materials
- **Frequency of cleaning**

Once you have established which items and surfaces need to be cleaned, we then need to decide how often these areas will need to be cleaned.

The following terms must be understood when defining frequency:

a. **Daily clean** - These are tasks that need to be done at least once daily. Some areas and items will need to be cleaned several times per day e.g. Public toilets
b. **Task of the day** - The supervisor may instruct you on a specific task of the day that requires extra attention e.g. you may be instructed today to clean all door

frames and their surrounds whilst tomorrow you may need to pay special attention to all chair legs. This ensures that all miscellaneous tasks are attended to, as and when needed

c. **Weekly clean** - These are areas or items that need to be cleaned weekly. This may be scheduled on certain days of the week

d. **Team Cleaning** - This means that there will be a team of people each with their own task working in the same area at once e.g. In a public toilet area one person would clean all the toilet cubicles whilst another will clean all the wash hand basins followed lastly by somebody to clean all the floors. Team cleaning is rare in hotels but in large entertainment venues or offices, this practice is common.

3.1.1 Maintenance

Maintenance is the upkeep of all furniture, fittings and equipment to an exacting standard within the property so that all areas look consistently new and pristine.

3.1.2 Basic types of maintenance

- **Corrective maintenance**

  Maintenance is carried out following detection of an anomaly and aimed at restoring normal operating conditions. This approach is based on the firm belief that the costs sustained for downtime and repair in case of fault are lower than the investment required for a maintenance program. This strategy may be cost-effective until catastrophic faults occur.

- **preventive maintenance**

Maintenance carried out at predetermined intervals or according to prescribed criteria, aimed at reducing the failure risk or performance degradation of the equipment.
The maintenance cycles are planned according to the need to take the device out of service. The incidence of operating faults is reduced.

- **Risk based maintenance**

Maintenance carried out by integrating analysis, measurement and periodic test activities to standard preventive maintenance. The gathered information is viewed in the context of the environmental, operation and process condition of the equipment in the system. The aim is to perform the asset condition and risk assessment and define the appropriate maintenance program.

- **Condition based maintenance**

Maintenance based on the equipment performance monitoring and the control of the corrective actions taken as a result.

The real actual equipment condition is continuously assessed by the on-line detection of significant working device parameters and their automatic comparison with average values and performance. Maintenance is carried out when certain indicators give the signaling that the equipment is deteriorating and the failure probability is increasing. This strategy, in the long term, allows reducing drastically the costs associated with maintenance, thereby minimizing the occurrence of serious faults and optimizing the available economic resources management.

Self-check 3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following questions. (1.5each)

1. Pre cleaning, by removing heavy accumulations of soil and debris with appropriate tools, will save water during later washing operations
2. Maintenance is the upkeep of all furniture, fittings and equipment to an exacting standard within the property so that all areas look consistently new and pristine.
3. During confirming the cleaning Workshop should be kept neat and tidy.
4. Condition based maintenance on the equipment performance monitor the equipment.

II choose the best answer from the given alternative. (**2point each)**

1. Maintenance carried out by integrating analysis, measurement and periodic test activities to standard is:
   A, preventive B. Corrective C. Risk based D. all

2. During confirming the cleaning

A. Workshop should be kept neat and tidy.

B. Work areas and equipment are to be thoroughly cleaned.

C .Ensure that gangways, access routes and exit ways to fire exits are kept clear.

D .All of the above.

.

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 4	Fitting and Adjusting machine components and related attachments

4.1 Fitting and Adjusting machine components and related attachments

Fitting is the process of applying craft methods such as skilled filing to the making and assembling of machines or other products. Fitting means ready, appropriate, or in keeping, whereas proper means suited or acceptable to the purpose or circumstances. Fitting is also known with the meaning: a small part, especially a standardized or detachable part of a device or machine.

Adjusting is the process of setting equipment whether it is ready or not to start the process.

Check to ensure accuracy and dependable operation of the proposed equipment and methods prior to the start of mixing or blending operations and after making any changes in the location or arrangement of the mixer/blender equipment. Plant calibration is the responsibility of the Producer.

Check the general layout of the plant before the equipment is erected to ensure efficient operation and adequate space for stockpiling and handling materials in compliance with specification requirements. Whenever possible, avoid the arrangement and erection of batching plants in congested locations which are not conducive to proper handling of materials. Small stockpiles result in segregation and non-uniformity of materials and very poor control of the concrete. Once mixer/blender equipment is erected in such a location, it is difficult to improve conditions.

Experience has demonstrated that the most uniform concrete is produced when the mixer/blender equipment is favored by adequate space for the maintenance of large stockpiles of materials.

When fitting or adjusting the equipment's follow the following points:

- Check for partially collapsed lines, leaks, or restrictions that would divert or otherwise hamper the flow of water to the meter.
- Inspect gears, pivots, etc., for excessive wear.
- Check legibility of dials, numerals, and pointers.
- Correct any problems noted above before proceeding.
- All power transmission components are shielded by screw fastened guards, in compliance with the EN 593 standard.
- Safety grille which prevents access to the bowl during the work process.
- Safety guard for the electrical system

Self-check 4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following questions (2point each)

1 Fitting is the process of applying crafts methods such as skilled filing to the making and assembling of machines or other products.

2. Fitting is also known with the meaning: a small part, especially a standardized or detachable part of a device or machine.

3. Plant calibration is the responsibility of the Producer.

4 Check the general layout of the plant before the equipment is erected to ensure efficient operation and adequate space

II Choose the best answer from the given alternative. (2.point)

1. When fitting or adjusting the equipment's follow the following points

A. Check for partially collapsed lines,

B .Inspect gears, pivots, etc for excessive wear.

C. Check legibility of dials, numerals, and pointers.

D .all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 5	Entering processing or operating parameters of production

5.1 Entering processing or operating parameters of production

A process for continuously producing a chewing gum base comprises the steps of continuously adding a hard elastomer, a filler and lubricating agents comprising a softening agent into a continuous mixer, subjecting the elastomer, filler and lubricating agents to a dispersive mixing operation and continuously discharging the resulting chewing gum base from the mixer while the adding and mixing steps are in progress. The softening agent is introduced into the continuous mixer at a plurality of spatially separated feed inlets. The softening agent is selected from the group consisting of fats, oils, waxes, emulsifiers and mixtures thereof.

Process parameters like temperature, pressure and flow rate affect the process during production of gum base, so the operator has to take a great care of controlling these parameters through controller.

Chewing gum video

https://youtu.be/3epBRi7yLSQ

Fig 1.5 Gum base mixing equipment

Gum base is the main ingredient for chewing gum. Gum base is what makes your gum chewable.

The chewing gum is made of a "gum base" with addition of flavors, sweeteners, softeners and sometimes food colors. Gum base is what puts the “chew” in gum, allowing it to be chewed. Gum base brings all other ingredients together. Gum base could be natural like wads of spruce gum, the sap of various rubber trees, or some kind synthetic substitute for sap.

Gum base is formed from natural resins like sorva and jelutong. Natural gum bases include latexes like chicle, jelutong, gutta-percha, rosin, etc. Old gum bases were based on latexes, vegetable gums like chicle, spruce gum, or mastic gum. Alternative choices were waxes, paraffin wax and beeswax.

Today most companies use synthetic gum base materials which allow for longer-lasting flavor, improved texture and reduced tackiness.

The gum base ingredients are melted together and filtered. The gum base has to be melted into the form of a thick liquid consistency. Gum base is melted at a temperature of around 115 °C (240 °F) until it has melted into thick syrup. After that the gum base thoroughly cleaned it's added to the mixers. Sometimes the mixture is dried for a day or two. Then the mass is going in a centrifuge and again filtered. Other ingredients are added when this clear base is still hot and in melted form.

5.1.1 Process of chewing gum base production

If we consider the first step in the process, when all the ingredients in the gum formulation need to be mixed, there are two main options: batch mixing or continuous mixing. Batch mixing involves using a double sigma or double-z mixer. The blades can have slightly different designs (eg tangential or overlapping) and generally one of them moves at a faster speed than the other..

A process for continuously producing a chewing gum base comprises: - the steps of continuously adding an elastomer, a filler and a plasticizer into a continuous mixer, subjecting the elastomer, filler and plasticizer to a highly distributive mixing operation followed by a restriction element and continuously discharging the resulting chewing gum base from the mixer while the adding and mixing steps are in progress.

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I say true or false the following questions (2 point each)

1. Batch mixing involves using a double sigma or double-z mixer.
2. A process for continuously producing a chewing gum base comprises the steps of continuously adding an elastomer.
3. The gum base ingredients are melted together and filtered
4. The chewing gum is made of a "gum base" with addition of flavors, sweeteners, softeners and sometimes food colors.

Explain the following question briefly

1 Explain the process parameters during production or mixing. (2 point)

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 6	Adjusting mixing or blending equipment performance

6.1 Adjusting mixing or blending equipment performance

Poor operational practice is also one of the main causes of problems on treatment plants. It is imperative that operators understand why they are performing certain tasks and what the consequences are if the tasks are not carried out as prescribed. It is the responsibility of a treatment plant manager to ensure appropriate training of the operating staff.

Lack of maintenance is the most common reason for plant failure. Mechanical equipment requires regular attention to ensure problem-free operation. Maintenance schedules must be strictly carried out. Good housekeeping and keeping equipment, buildings and civil structures clean and tidy go a long way to minimize operational problems. Work area, materials, and equipment are routinely monitored to ensure compliance with purification requirements.

Materials handled and stored need to be checked can include:

- Gather the tools to clean in the designed area for cleaning.
- Segregate the tools according to the kinds of dirty they have.
- Submerge the tools in the washing pan.
- Use paint brush to remove the dirty from the tools.
- Get the tools from the washing pan and wipe them with rags until dart.
- Clean and keep all materials used for cleaning

- Basic operating principles of equipment, such as

- main equipment components
- status and purpose of guards, equipment operating capacities and applications the purpose and location of sensors and related feedback instrumentation Condition.

Monitoring has historically focused on the acquisition and analysis of measurable parameters that would give useful information as to the condition of machine components and, hence, a forecast of the likely serviceability of the machine.

The wider view of Condition Management must take into account and report on excursions away from previously defined acceptable tolerances

- the performance of the machine
- or the system of which it is a part

6.1.1 The Purpose of Performance Monitoring

There is the classic story of the condition monitoring technician who completed a vibration survey on a pump after it was reported as running erratically. He reported that the pump had the lowest vibration levels ever measured and it was therefore in perfect condition.

Applications for Machinery Performance Monitoring Machines and Systems for which Performance Monitoring surveys may be required on a routine basis include the following items:

- Pumps – due to impeller wear, seal ring wear (re-cycling) or blockage.

- Fan Systems – due to filter blockage, blade fouling or re-cycling.
- Boilers – due to loss of thermal efficiency for many different reasons.
- Heat Exchangers – due to fouling or blockage.
- Steam Turbines – due to blade fouling and numerous other reasons.
- Air Compressors –due to wear, filter blockage, valve leakage (reciprocating), etc.
- Diesel or Gas Engines – due to loss of compression (rings or valve leakage) etc.
- Electrostatic or bag dust filters – due to fouling, shorting or leakage.

6.1.2 Condition Monitoring and Process Analysis

Most machine and process characteristics which affect process are:

- availability
- capacity
- quality
- 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 optimization of safety, quality and high production rates.

There are the obvious functions of monitoring and controlling the process for reasons of safety and product specification. Additionally, there is invaluable information to be gained from the process parameters that can give an understanding of the current health of the asset.

Self-check 6	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following question (2point each)

1. Monitoring has historically focused on the acquisition and analysis of measurable parameters

2. Poor operational practice is also one of the main causes of problems on treatment plants

3. Work area, materials, and equipment are routinely monitored to ensure compliance with purification requirements

II Choose the best answer from the given alternative. (2point each)

1. Most machine and process characteristics which affect process is:

A. availability

B. capacity

C .quality

D .all

2. Monitoring surveys may be required on a routine basis include items:

A. Pumps: - due to impeller wear, seal ring wear (re-cycling) or blockage.

B Fan Systems: - due to filter blockage, blade fouling or re-cycling.

C Boilers:-due to loss of thermal efficiency for many different reasons.

D Heat Exchangers: - due to fouling or blockage.

E. all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 7	Carrying out pre start check

7.1 Carrying out pre-start checks

It is important to carry out a series of checks before using a piece of chewing gum process machinery .This is particularly important in situations in which a number of people use the same machine. Larger companies and organizations usually have a system of checks, and a maintenance department that will deal with reported defects. Individuals working alone or in small teams will be responsible for checking and maintaining their own machines. Operator should be able to follow a checklist to ensure that they complete all the necessary checks

Prestart checks must be made to ensure equipment is not damaged on startup and also to prevent possible injury to personnel during start up, the operational status of safety systems must be checked. Check that equipment is plugged in correctly.

In many industries involving the use of potentially dangerous equipment, it is standard procedure to conduct pre-start inspections.

During pre-start check we should follow the following procedure in gum base processing equipment

- ✓ Check whether the equipment is fit for the process or not.
- ✓ Inspect the mechanical or electrical part of the equipment is connected with the source.

- ✓ If it fulfills the above criteria's, the pre- start check for gum base conical mixer equipment is completed.

1.2.

7.1.1 Importance of Pre-start check

The main goal of regular pre-start inspections is to protect people. Industrial equipment such as various tools, mobile plant, light vehicles and heavy vehicles have the potential to cause serious injury and death if they aren't maintained properly, so regular pre-start inspections form the foundation of their maintenance program and workplace safety. Often it is the small, unseen items that go unnoticed, but by implementing a thorough pre-start checklist all of these aspects can be inspected.

Another key factor for pre-start inspections to be effective; any issues identified need to be address by workers or reported to the relevant person within an organisation (fleet manager, supervisor, etc.) so that they can be adequately addressed. If pre-start inspection checklists are simply filed away and not actioned on then they are of no benefit.

Self-check 7	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

I Say true or false the following questions (2point each)

1. The main goal of regular pre-start inspections is to protect people.
2. Pre-start inspections for industrial equipment is extremely important, they form the basis of equipment maintenance programs
3. Another key factor for pre-start inspections to be effective; any issues identified need to be address by workers.
4. Prestart checks must be made to ensure equipment is not damaged on startup and also to prevent possible injury to personnel during start up.

II Explain the following question briefly? (2point)

1 Explain the benefit of pre start check?

Satisfactory rating≥5 unsatisfactory≤5 rating

Operation sheet 1	Honey gum preparation

Procedure:-

Step 1 Wear the PPE

Step 2 identify the ingredient

Step 3 prepare the mis-en-place

Step 4 dissolves the gum in the sugar and stir with spatula

Step 5 add the sugar with the honey and glucose

Step 6 boil the water and stir

Step 7 add the filtered gum on to the melted sugar

Step 8 heats together and verify

Step 9 dropping a small quantity of mixture in to small mould

Step 10 roll lightly with fine crystal confectioner sugar

Step 11 dry for a few minutes in an oven before being packed

Step 12 pack the honey gum by bottle.

LAP TEST	Performance test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

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

Task: 1 Honey gum preparation

LG #41	LO 2# Operate and monitor the mixing or blending process

Instruction sheet

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

- Delivering *ingredients, additives* and *reprocessed / rework* product to mixer
- Starting and operating the mixing or blending process.
- Monitoring the operating equipment and process
- Identifying and reporting variation of equipment in maintenance
- Monitoring the mixing process
- Identifying ,rectifying and/or reporting out-of-specification product or process outcomes
- Transferring mix to required production
- Maintaining the work area
- Conducting the work
- 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:

- Deliver ingredients, additives and reprocessed / rework product to mixer
- Start and operating the mixing or blending process.
- Monitor the operating equipment and process
- Identify and reporting variation of equipment in maintenance
- Monitor the mixing process
- Identify ,rectify and/or report out-of-specification product or process outcomes
- Transfer mix to required production
- Maintain the work area

- Conduct the work
- Maintain workplace records

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Learning Instructions:

Read the specific objectives of this Learning Guide.

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”.

Information sheet 1	Delivering ingredients, additives and reprocessed / rework product to mixer

1.1 Delivering ingredients, additives and reprocessed / rework product to mixer

What can you tell me about other ingredients in chewing gum.ICGA Members use only safe and legally permissible ingredients in their chewing gum products . Quality controls are in place during all phases of chewing gum production to ensure that the ingredients and the end products comply with the requirements and limits set by regulatory authorities and legislation.

Flavorings and additives consist of many components, all of which are regulated to ensure their safety. Manufacturers ensure that all flavorings and additives used in chewing gum products comply with the comprehensive purity specifications established by applicable regulatory and legislative bodies and that all ingredients are safe to use.

Color is an important property of food, and adds to the enjoyment of eating. Reasons for the use of artificial colors range from enhancement of colors that occur naturally in food, to supplying a visual identity to foods that would otherwise be virtually colorless, to providing a colorful, festive, or fun appearance to certain food, drink, and confectionery items.

These regulatory and health bodies periodically review any new information and re-evaluate the safety and use levels of colors. For example, EFSA is currently revaluating natural and synthetic color use in the European Union, and the United Nation's Codex Alimentarius (CODEX) is updating use levels for colors in its General Standard for Food Additives. ICGA and its members closely follow emerging research and regulation in this area.

- **Aspartame**

Aspartame is a food additive used in chewing gum as a sweetener and flavor enhancer. Aspartame has been safely used for over 20 years by millions of consumers worldwide. Following extensive review of its safety by regulatory and scientific authorities, it is approved for use in over 100 countries around the world.

- **Butyl hydroxyl tolune(BHA)**

BHA is used in a broad variety of foods, including some chewing gum, for its antioxidant properties. Its use in chewing gum is, at all times, consistent with established limitations. Butylated Hydroxyanisole (BHA/E320) has undergone a thorough scientific review and has been legally cleared as a food additive by national and international food safety organizations including the European Food Safety Authority (EFSA) the Joint FAO/WHO Expert Committee on Food

Additives: is defined as: any natural or synthetic material, other than the basic raw ingredients, used in the production of a food item to enhance the final product

.Food Flavours are classified into three major Categories**:-**

❖ **Natural Flavours**

- Herbs- Basil, mint
- Spices- Cardamon, clove, turmeric
- Aromatic Seeds- Anissed, Cumin
- Fruits- Orange, Lemon
- Vegetables- Pees, Onions, Garlic

❖ **Processed Flavour**

- Caramelized
- Roasted

- Fermented
- Toasted
- Baked

❖ **Added Flavour**

- Natural Extracted Flavour
- Essential Oil
- Essence
- Extracts
- Synthetic Flavour
- Fruit Flavour
- Savory Flavour
- Natural Flavours

They are usually extremely complex mixtures of many different substances. Sometimes the flavour of natural flavoring agent may depend upon a single substance. Eg:- Clove oil flavour is because of chemical eugenol. It contributes 85% of clove oil.

Food additives are substances added to food to preserve flavor or enhance its taste, appearance, or other qualities. Some additives have been used for centuries; for example, preserving food by pickling (with vinegar), salting, as with bacon, preserving sweets or using sulfur dioxide as with wines

- **Flavor enhancers**

This is a group of additives that has attracted adverse attention, in particular monosodium glutamate (MSG: E621), which is widely blamed for an intolerance reaction that became known as “Chinese Restaurant Syndrome”.

Flavor enhancers are substances that have no pronounced flavor or taste of their own but which bring out and improve the flavors in the foods to which they are added.

Although salt has a distinctive taste of its own and is not classed as a food additive, it is in fact the most widely used flavor enhancer.

The next best known is glutamic acid and its salts, most commonly found in the form of monosodium glutamate, which has been used for several centuries in the Far East as a condiment in savory products.

Fig 1.6 Gum base mixer machine

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (2point each)

1. Food additives are substances added to food to preserve flavor or enhance its taste, appearance, or other qualities
2. Water transforms flour into viscoelastic dough that retains gas produced during fermentation.
3. The wheat flour is the main ingredient in bread production.
4. Flavors are classified into three major Categories.

II Choose the best answer from the given alternative? 2(point)

1. Which of the following is used as flavor?

A sugar B**.** Essential Oil C. Fruits- Orange, Lemon D .all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 2	Starting and operating the mixing or blending process

2.1 Introduction to Starting and operating the process

Before beginning mixing/blending process make sure you are:

- wearing clean clothes
- your hair is tied back
- your hands are washed
- And you have no jewelry or nail polish on.
- Check all the equipment you will use is clean.

The first processing operation is:

- To measure and place all dry ingredients in a bowl ready to create dough.
- These should be measured accurately to achieve the correct ratio.

When mixing the wet ingredients together:-

- Use lukewarm water to dissolve the sugar and yeast.
- Leave in a warm place on the bench for 5 minutes; if it bubbles in the liquid, then the yeast is active and ready for use.

2.1.1 Starting and operating gum base mixing

In gum manufacturing, aged rework gum added to a gum mixer not only allows for elimination of waste, but also improves the texture of the gum for handling and helps

stabilize the texture during storage. The aged rework gum, whether it be one day aged or longer, has the effect of improving the texture by making it slightly tougher for handling in sheeting, cooling and wrapping.

Conventionally, chewing gum base and chewing gum products have been manufactured using separate mixers, different mixing technologies and, often, at different factories. One reason for this is that the optimum conditions for manufacturing gum base, and for manufacturing chewing gum from gum base and other ingredients such as sweeteners and flavors, are so different that it has been impractical to integrate both tasks.

2.1.2 Standard operating procedures (SOPs)

Work is carried out according to company policies and procedures, regulatory and licensing requirements, legislative requirements, and industrial awards and agreements

Standard operating procedures describe important activities to ensure that anyone can perform those activities correctly and consistently. Standard operating procedures are essential for capturing institutional knowledge and for training new employees. In addition, they help ensure that work procedures are conducted to a consistent quality.

Self-check 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (2point each)

1. Conventionally, chewing gum base and chewing gum products have been manufactured using separate mixers.
2. Ingredients are combined into smooth, uniform ingredients and evenly distributed through the mixer.
3. Work is carried out according to company policies and procedures.

II Choose the best answer from the given alternative (2 point)

1 The process steps during gum base processing include:

A. mixing ingredients B. baking C. rolling D. all

III Explain the following question briefly? 2point

1 What is the importance of mixing?

Satisfactory rating is≥5 unsatisfactory rating is≤5

Information sheet 3	Monitoring the operating equipment and process

3.1 Monitoring the operating equipment and process

A number of analytical methods have been investigated to monitor dough development based on physical or chemical description of dough properties. The most popular in-line process measurements, based on changes in dough physical properties, are that of mixing torque or power consumption of the mixer.

Dough development can also be measured using load cells that measures the force exerted by dough moving around the mixing bowl

A simple and new method was developed for monitoring the dynamic density of dough during fermentation process. In this method digital imaging was applied to determine volume of dough sample in actual proofing conditions, i.e., temperature and relative humidity of the fermentation oven.

The method resulted that the volume increasing profile affected by temperature and relative humidity conditions of the fermentation oven. As when temperature and relative humidity was increased, volume expansion rate was higher. The data also demonstrated that dough density decrease with the investigated proofing temperatures of 25, 30 and 35°C more significantly (**p**<0.01) than proofing relative humidity of 65%, 75% and 85% (**p**<0.05). The new imaging method have the advantage of being low cost and measuring dough density in actual proofing conditions as used in bread making.

During monitoring mixing to meet specifications**:**

- Determine dynamic density of mixer via application of digital imaging method.
- Mixing is affected by proofing time and oven conditions.
- Temperature has more significant effect on density changes as compared with related humidity.

- Control over a mixing process can be demonstrated by a review of all relevant data at specified time increases. Relevant data includes sample results and trending of those results.
- Monitoring the mixing processes ensures the process is performed correctly and also provides an early warning if it is not performing as validated.
- Provides additional reassurance to the visual assessment and conductivity verification that is performed with each mixing.
- Consistent with the lifecycle approach to validation (Design, Formal Validation Studies, and Ongoing Controls) as well as continuous improvement for manufacturing quality and efficiency

❖ **Monitoring mixing Cycles**

- Temperature, flow, pressure, fluid level, drainage, mixing agent concentration, conductivity, and pH may play a role in monitoring the cleaning program and check amount of ingredients and additives added
- The nature of the mixing method will determine the critical parameters to be monitored during cleaning.

Instrumentation for monitoring critical parameters should be accurate and subject to a routine calibration program

Self-check 3	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (2point each)

1. The nature of the mixing method will determine the critical parameters to be monitored during cleaning.
2. Control over a mixing process can be demonstrated by a review of all relevant data at specified time.
3. Instrumentation for monitoring critical parameters should be accurate and subject to a routine calibration program

II choose the best answer from the given alternative. (2 point)

1 Parameters controlled during mixing and blending are:

A. Temperature B. pressure C. Time D. all

Explain the following question? (2point)

1. What are the factors that to be monitored during mixing?

.

Satisfactory rating is≥5 unsatisfactory rating is≤5

Information sheet 4	**Identifying and reporting variation of equipment in maintenance**

4.1 Identifying and reporting the Variation of equipment in maintenance.

Workers have to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors. And they also identify whether A finished product may exhibit several quality characteristics. Quality control (QC) techniques apply by inspecting and measuring the product quality characteristics using inspection equipment and some procedures. By comparing to the standard, the product can be identified whether conforms to requirements or fails, consider as accepted or rejected as well.

- **Lack of maintenance:** is the most common reason for plant failure. Mechanical equipment requires regular attention to ensure problem-free operation. Maintenance schedules must be strictly carried out and conduct routine maintenance.

The main problem areas are related to:

- ❖ poor design,
- ❖ Variations in raw flour quality,.

- lack of maintenance,
- inadequately trained operators,
- inadequate process monitoring,
- poor record-keeping and poor management

Preventative maintenance and operating procedures that is necessary to ensure satisfactory operation.

Self-check 4	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (2point each)

1 Lack of maintenance is the most common reason for plant failure.

2. Quality control (QC) techniques apply by inspecting and measuring the product quality characteristics.
3. Mechanical equipment requires regular attention to ensure problem-free operation.

II Choose the best answer from the given alternative (2point each)

1 .Which of the following is necessary is necessary to ensure satisfactory operation.

A .Preventive maintenance B mixing C. operating D all

2. The main problem areas during processing Is :-

A. poor design,

B. Variations in raw flour quality,.

C .lack of maintenance

C. all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 5	Monitoring the mixing process

5.1 Monitoring the mixing process

Method for continuous chewing gum production, wherein chewing gum ingredients are fed continuously into a mixer and mixed therein continuously on the basis of operational parameters fed into an interface computer, whereby feeding and mixing ingredients fed into a mixer is operated automatically, characterised in that ingredient qualities are monitored with the interface computer and a signal indicating these qualities is transmitted to a programmable controller and ingredient feeding speed is controlled with an ingredient feeder controller, whereby a signal indicating this speed is transmitted to the programmable controller.

System for continuous production of chewing gum, consisting of an operational computer feeding operational parameters into a programmable controller connected with controllers to chewing gum ingredient feeders, ingredient mixer and extruding press controller, characterised in that a feeder temperature controller with an ingredient temperature monitoring indicator and a hopper filling indicator with ingredient feeding speed monitoring indicator are connected to the programmable controller .

5.1.1 Monitoring mixing Cycles

- Temperature, flow, pressure, fluid level, drainage, mixing agent concentration, conductivity, and pH may play a role in monitoring the cleaning program and check amount of ingredients and additives added
- The nature of the mixing method will determine the critical parameters to be monitored during cleaning.

Instrumentation for monitoring critical parameters should be accurate and subject to a routine calibration program

Self-check 5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (2point each)

1. The nature of the mixing method will determine the critical parameters to be monitored during cleaning
2. Instrumentation for monitoring critical parameters should be accurate and subject to a routine calibration program
3. System for continuous production of chewing gum, consisting of an operational computer feeding operational parameters

II Choose the best answer from the given alternatives. (2pointeach)

1. Chewing gum development can also be measured using:-

A. load cells B. mixer C. thermometer D. all

2. The nature of the mixing method will determine the critical ……to be monitored during cleaning.

A. parameters B. Temperature C. pressure D all

Satisfactory rating ≥5 unsatisfactory rating≤5

Information sheet 6	Identifying, rectifying and/or reporting out-of-specification product or process outcomes

6.1 Identifying Rectifying and/or Reporting Out-of-specification product/process outcomes

Confectionery products constitute a very important branch in the food industry. There are several confectionery products: chewing gum, candy, and chocolate among others. Beside chocolate, chewing gum is one of the most consumed products in the world. Chewing gum is a product made with natural or man-made gums, polymers, and copolymers, added with other ingredients and food additives.

Traditionally, chewing gum was made of natural gums, although for reasons of economy and quality, many modern chewing gums use synthetic gums. These have proven beneficial in providing high consistency of chewing quality. To obtain acceptable products, gum properties must be maintained during manufacture of chewing gum. Most chewing gums are manufactured according to the following

The gum base is melted; other ingredients are added and mixed. The blended gum passes onto cooling belts and is bathed in currents of cool air to reduce its temperature;

after this, the gum is extruded and flattened into thinner and thinner sheets. The gum passes into the scoring machine.

In order to assure product quality, specifications for the final product must be met. If the product is out of specifications, losses are generated. During chewing gum Manufacture, several alterations can be presented. Among these are elasticity loss, unsuitable porosity, texture changes, etc. These alterations lead to difficult handling during manufacture, provoking undesirable characteristics of candy-coated pellet gum (deformed or ruptured pellets, inadequate coating, grainy surface, etc.).

6.1.1 Specification of product/processes

The specifications of chewing gum 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.

Removal of the gum base from the mixer after completion of the mix should not, in itself, affect the mixing or the quality of chewing gum, but if this is delayed for any reason there may be temperature difficulties due to the bowl jacket, as mentioned above, leading to non-uniform consistency in the gum base . Also, if complete discharge is not effected, some mixer will remain to be incorporated into the next mix, this may affect quality and will certainly frustrate techniques for process control. Many mixers discharge very badly and need much manual assistance to extract the gum base.

Self-check 6	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I say true or false the following questions (2 point each)

1. Many mixers discharge very badly and need much manual assistance to extract the gum base.
2. Identification of product/processes outcomes is used to check either the products or processes
3. Identifying and rectifying the processes and the products outcomes take place throughout the process.

II Choose the best answer from the given alternative. (2point each)

1 Out of specification process occurs due to:

A. Maintenanc

e problem Equipment problem C. controller error

2 .Controlling mechanism of out of specification is:

A through training B. using equipment's properly C. by preventive maintenance.

D. all

Satisfactory rating ≥5 unsatisfactory rating ≤5

Information sheet 7	**Transferring mix to required operation**

7.1 Transferring the mix to required operation

Most chewing gums are manufactured according to the following steps: The gum base is melted; other ingredients are added and mixed. The blended gum passes onto cooling belts and is bathed in currents of cool air to reduce its temperature; after this, the gum is extruded and flattened into thinner and thinner sheets. The gum passes into the scoring machine. The scored sheets are conditioned ("set" in an air-conditioned room) and then, candy-coated. Finally, the chewing gum is wrapped.

- **How Chewing Gum is made**

Many manufacturers of chewing gum secretly guard specific ingredients in their chewing gum, but they all share the same basic process to reach their finished product. The manufacturing process is considered standard throughout the industry.

Today, the process of making chewing gum is entirely mechanized. Simplified process requires next steps: preparing the gum base, adding flavor, increasing chewiness, cutting and packaging chewing gum. That means that the gum base is mixed with softeners and sweeteners, sterilized and melted in a steam cooker, then pumped through a machine. Other machines then wrap and package the sticks of gum or box and wrap the pellets

Self-check 7	**Written test**

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I say true or false the following questions (2 point each)

1. The making gum begins by preparing gum base
2. To safely get scored dough into the pot I use a piece of parchment paper to drag it in
3. The gum base is melted and other ingredients are added and mixed during chewing gum processing.
4. Mixing facilitate uniformity.
5. Before transferring mix to mixer we have to adjust mixer.

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 8	Maintaining the work area

8.1 Maintaining the work area according to housekeeping standards

Industrial good housekeeping is a term which is often not fully understood. However most be good housekeeping is just good common sense. Everyone is responsible for safety and means that all management and every employee should have an understanding of good housekeeping practice, and how it can help to prevent a large number of accidents at work.

Good housekeeping involves:

- the maintenance of good lighting
- Heating, power supply lines, tools, machinery and the facilities for the efficient storage of materials and equipment.

- Removing of any loses items, particularly when working at height or on grating should be a permanent concern.
- It also means maintaining the necessary standards of domestic cleanliness and tidiness to provide safe, healthy and pleasant places in which to work and live.

The benefits to be derived good housekeeping are:

- Increased efficiency.
- The reduction of accident hazards.
- The reduction of fire hazards.
- Improved morale.
- Compliance with the law.
- Creating a favorable impression to people outside the Company.

Workshop should be kept neat and tidy. Good housekeeping can significantly reduce the risk of an accident and injury, failure to maintain a clean and tidy Workshop can result in accident and injury. Work areas and equipment are to be thoroughly cleaned after use.

Self-check 8	Written test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

ISay true or false the following questions (1point each)

1 Maintaining work environment makes our product effective.

2 Maintaining is the habit of good work environment**.**

II Choose the best answer from the given alternative. (2point each)

1 Quality Control Systems Development Overview to Maintain Work Place:

A. Good manufacturing practices (GMPs)

B. Hazard analysis critical control point (HACCP) program

C. Inspections

D. Sanitation

E. All

2. HACCP **i**s applicable throughout the food supply chain from_____?

A. raw material production

B. through processing and

C. distribution to final use by the consumer and

D. Can also be applied to non-foods such as primary packaging

E. all

3. Primary processors may be_____:-

A. Livestock for the meat & dairy industry B. Fish farmers or harvesters

C. Growers of crops, fruit and vegetables D. Slaughter houses

4. The general conditions in a food plant**,** including _____?

A. The state of repairs C. cleanliness

B. Maintenance D. all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 9	**Conducting the work area**

9.1 Conducting the work Area

This describes the interpreting of schedules and plans, as well as a clear understanding of procedures to be undertaken and the targets to meet chewing gum processing environment.

When the requirements of the standards' met, employees understand the role their work

- plays, in maintaining quality output of confectionary product(chewing gum)
- Motivated work force supports management in detecting, solving, correcting and preventing problems in the production area of chewing gum.
- Identification of the required resource
- Doing any work related with modern dairy production system we have to allocate the necessary resources which, proper and suitable to undertake the general work activities.

It is usually done within routines methods and procedures where some discretion and judgment is required in the selection of equipment and materials, organization of work, services, and actions to achieve outcomes within time and budgetary constraints should be properly allocated.

The resource, which allocated used to achieve the work. Some of the resources are, materials, tools and equipment, financials, labours, machinery, personal protective equipment, etc, have to be allocated so as to run the work properly on chewing gum process environment.

9.1.1 Principles followed on process (chewing gum) environment.

- **Develop Health and Safety Program**

A good, sound health and safety program is an effective way to manage risks and productivity in your operation.

- Accidents are not only costly in human terms, but they can disrupt the flow of work and halt production.
- There are always hidden costs.
- The actual injury to an employee is only the “tip of the iceberg”. A good health and safety program should include the following components:

- **Written Health and Safety Policy**

This simple statement shows your commitment to health and safety for all employees. It only needs to be a few sentences or a short paragraph.

- **Written Safety Rules**

A set of basic rules for your operation as well as specialized safety rules for specific tasks, equipment or processes need to be developed. The list should not be long and

unmanageable. Rules should be simple and easy to understand and may need to translate into a worker's language. The rules should be reviewed with all new employees, as well as posted for all employees to see

- **Safety Director/coordinator**

You need to appoint someone to look after safety as a part of their job. You may also want to have a safety committee or safety representatives from both workers and management. This will keep safety out front all the time.

- **Employee Training**
    - Employees should receive periodic training as necessary to review safety procedures.
    - New employees should receive safety training both before and on the job.
    - Close -calls or accidents should trigger an immediate review of procedures and safety with employees.
- **Workplace Inspection**
- System of workplace inspection should be set up to review hazards and practices in the workplace.
- Any time that there is a new process introduced or new machinery installed, an inspection should take place
- Employees should be encouraged to report hazards, close calls or anything out of the ordinary that could lead to
- Refrigerant gases odor
- Solid Waste
- Damaged product
- Out of date products

Self-Check 9	Written Test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

I say true or false the following questions (2point each)

1. Employees should know what their responsibilities are during an emergency.
2. Plan could include what to do during fires, power failures.
3. A good, sound health and safety program is an effective way to manage risks.
4. Motivated work force supports management in detecting, solving, correcting and preventing problems in the production area.

II choose the best answer (2 point each)

1. Documentation is important:

A. To keep records of training

B. Safety meetings/concerns

C. Corrective actions for accident investigations.

D .all

2 .The resources, which allocated used to achieve the work is

A. Financials

B. labor C. machinery, D .all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 10	**Maintaining workplace records**

10.1 Maintaining Workplace records

Workplace records are an important part of any work environment and should be accurately, reliable, easy to follow, consistent as the basis used and be very simply.maintained within the required timeframes.

Records must be kept to allow proper equipment management and control. Performance records are required for trouble shooting, to identify changes in operating conditions, to identify reasons for process failure or dough quality reduction, for process optimization, to record changes in influent quality and process conditions, etc.

All Records should be:

- legible and clear;
- Dated;

- readily identifiable and retrievable;
- carry authorization status;
- retained for a designated period;
- Protected from damage and deterioration while storage.
- All calculations should be duly recorded

10.1 .1 Types of workplace records

There are different types of records according to workplace guidelines and requirements. Those are which listed below:

A.

a. Staff records

- These are records relating to any and all aspects of staffing the premises. May be divided into overall records and individual staff records. Overall records are those records kept that relate to staff as a whole

Overall records include:

- Staffing rosters
- Training details by operational area
- Annual leave planning chart
- Salary and overtime payments
- Injury records.

Individual staff records include:

- Leave records
- Record of uniform orders
- Training schedule
- Direct salary deduction details
- Injury claims.

10.1.2 Types of records

Staff may be given required to complete records such as:

- Time sheets
- Requisitions
- Internal transfers
- Requests for maintenance
- Daily takings sheets.

❖ **The importance of records**

- For continuous monitoring of quality system
- For specimen tracking throughout process
- To identify failures in equipment
- To revisit information; reference
- For use as a management tool

Workplace information

- batch/recipe instructions
- verbal or written operating procedures
- specifications: detailed description of design criteria for a piece of work
- production schedules

Self-Check 10	Written Test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

I Say true or false the following questions (2 point each)

1. Workplace records are an important part of any work environment..
2. Records must be kept to allow proper equipment management and control.
3. There are different types of records according to workplace guidelines and requirements
4. Performanc e records are required for trouble shooting, to identify changes in operating conditions.

II choose the best answer from the given alternative (2point)

1. The type of records relating to any and all aspects of staffing the premises is:

A. staff record B. Overall records C. Dated D. all

Satisfactory rating≥5 unsatisfactory rating ≤5

Operation sheet 2	Techniques of delivering dough mix to mixer/kneader.

Procedure:

Step1 Combine the warm water, yeast, and 2 cups of fresh whole-wheat flour in a large mixing bowl

Step 2 Allow to sponge for 15 minutes.

Step 3 Add honey, oil, dough enhancer, and salt and 4 .5 cups additional flour until the dough begins to clean the sides of the mixing bowl.

Step 4 Knead the mix by hand 7-10 minutes or until it is very smooth.

Step 5 Form the dough into two loaves.

LAP TEST	Performance test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

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

Task: 2 deliver mix to mixer/kneader

LG #42	LO 3 # shut down the mixing or blending process

Instruction sheet
This learning guide is developed to provide you the necessary information regarding the following content coverage and topics: • Identifying appropriate shut down procedure. • Checking process is shut down according to work place procedure. • Checking maintenance requirement is identified and reported 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 shut down procedure. • Check process is shut down according to work place procedure. • Check maintenance requirement is identified and reported .

Learning Instructions:

1 Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the information Sheets
3. Accomplish the Self-checks
4. Perform Operation Sheets

6 Do the “LAP”.

Information sheet 1	Identifying appropriate shut down procedure

1.1 Identifying the appropriate shutdown procedure(conical screw mixer)

Shut down/isolation means and includes isolation of mechanical, electrical drives, pipework (pressure) rotating equipment etc. utilizing electrical lock-off isolators, mechanical and power driven valves etc. in accordance with standard operating instructions.

Pull plug or throw switch to off position before cleaning or adjusting any machine. Keep fingers, hands, spoons, etc., away from moving parts. Wait until machine stops before moving food.

1.1.2 Principles of screw mixer use and shut down

- Shut-down sequence is undertaken safely and to standard operating procedures.
- Machine/equipment is depressurized /emptied/de-energized/bled to standard operating procedures.

- Safe shut-down of machine/equipment is verified.
- Safety/security lock-off devices and signage are installed to standard operating procedures.
- Do not start a mixer until the bowl is locked in place and the attachments are securely fastened.
- When using a mixer, turn off motor before you scrape down the sides of the bowl.
- Machine/equipment is left in clean and safe stat
- When working with tools at height makes sure they cannot fall
- Do not leave power tools switched on when disconnected from their power as unexpected starting will occur when power is re-connected.
- Ensure that cables, power lines, pipes and hoses are not allowed to trail across gangways or work areas
- Check insulation, switches and fuse boxes for possible hazards. Ensure warning signs are clear and easily seen.
- Ensure that correct type of firefighting equipment
- Remove empty cartons, wrappings and other flammable waste as soon as possible
- Never use any machine you have not been trained to use.
- Check all switches to see that they are off before plugging into the outlet.
- First pull the plug.
- Turn the gauge to zero in order to cover the edge of the blade
- Clean the blade from the center out.
- Clean the inside edge of the blade with a stick that has a cloth wrapped around one end.

-

Fig 1.7 Appropriate shut down

Self-check 1	Written test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

I Say true or false the following questions (2point each)

1. Shut down/isolation means isolation of mechanical, electrical drives
2. Many industries have emergency shutdown systems or “panic buttons
3. When you enter an industry for the first time, locate and learn how to use the emergency shutdown.
4. Do not start a mixer until the bowl is locked in place and the attachments are securely fastened.

II Explain the following question?

1 .List the steps that we follow before shutting machine (**2point)**

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 2	Checking process shut down according to work place procedure.

2.1 Checking process shut down according to work place procedure

An occasion when a large piece of equipment stops operating, usually for a temporary period or the act of closing a factory or business of stopping a machine.

- Reading, interpreting and following information on written job instructions, specifications and other applicable reference documents
- checking and clarifying task-related information
- Entering information onto preforms and standard workplace forms.
- Shutting down machine/equipment.
- Purging/de-energizing equipment.
- Installing safety/security lock-off devices and signage

Mixer Lock-Out Procedure

- ✓ Shut off mixer at stop/start switch.
- ✓ Shut off at disconnect behind mixer.
- ✓ Apply lock to disconnect. Put key in pocket. Do not leave key in lock!
- ✓ Attempt to start mixer, reset or return switch to “off” position.
- ✓ Complete work on mixer.
- ✓ Ensure bowl and mixer are clear of loose pieces, tools, etc
- ✓ Remove lock.
- ✓ Restart mixer and run up to operating speed.

Self-check 2	Written test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

I Say true or false the following questions (2point each)

1 Restart mixer and run up to operating speed is the process of mixer shut down.

2 Ensure bowl and mixer are clear of loose pieces, tools during mixer lockdown.

3 Shut off mixer at stop/start switch is the step of mixer lock down.

4 Restart mixer and run up to operating speed. Is the step of mixer lock down.

II Choose the best answer from the given alternative. (2point)

1 The first step during shut down of dough mixer is:

A. Shut off mixer at stop/start switch.
B. Complete work on mixer.
C. Remove lock.
D. all

Satisfactory rating≥5 unsatisfactory rating ≤5

Information sheet 3	Checking maintenance requirement is identified and reported

3.1 Checking maintenance requirement is identified and reported

Maintenance is the upkeep of equipment and machinery in proper working condition at all times. Maintenance plan in mixing product processing on chewing gum process includes:

- maintenance activities and schedules
- maintenance costs and budget details
- Staff resource and supply requirements
- staff roles and responsibilities
- contingency plan for staff and supply problems
- reporting requirements
- hazard and risk control measures
- OHS procedures, personal protective clothing and equipment requirements
- environmental impact control measures

Enterprise requirements for Quality chewing gum process include:

- Standard Operating Procedures (SOP),
- Industry standards and production schedules,
- Material Safety Data Sheets (MSDS)
- Legislative and licensing requirements
- Work notes, product labels and manufacturers specifications,
- Operator's manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guideline, and OHS procedures

❖ **Reporting for maintenance**

Report to your immediate supervisor any tool or piece of equipment that is broken or does not function properly or unsafe equipment to a responsible individual to prevent serious injury.

Self-check 3	Written test

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers**.**

Name…… ID…… Date…….

I Say true or false the following questions (2 point each)

1. Maintenanc e is the upkeep of equipment and machinery in proper working condition at all times
2. Enterprise requirements include: Standard Operating Procedures (SOP
3. Operator's manuals, enterprise policies and procedures are needed during maintenance.
4. Report to your immediate supervisor if there is any injure during work.

Explain the following question

1 what is the importance of reporting for maintenance? (**2point)**

Satisfactory rating≥5 unsatisfactory rating ≤5

Operation sheet 3	Shut down conical screw mixer

Procedure:

Step 1disconnect the mixer from source.

Step 2 shut off mixer at stop/start switch.

Step 3 Apply lock to disconnect.

Step 4 Attempt to start mixer, reset or return switch to “off” position.

Step 5 Complete works on mixer.

Step 6 Ensure bowl and mixer are clear of loose pieces, tools, etc

Step 7 Remove lock.

Step 8 Restart mixer and run up to operating speed.

LAP TEST	Performance test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

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

Task: 3 shut down conical screw mixer

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