



Daffodil
International
University

**AN EXPLORATION OF THE IGLOO ICE-CREAM AND MILK UNIT
INTERNSHIP**

AN INTERNSHIP REPORT

BY

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfilment of B.Sc.
in Nutrition and Food Engineering

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APPROVAL

This internship report entitled “**An exploration of the igloo ice-cream and milk unit internship**”, submitted by **MD HABIBUR RAHMAN**, has been accepted by the department of Nutrition and Food Engineering at Daffodil International University as meeting the necessary requirements for the partial fulfilment of the B.Sc. degree in Nutrition and Food Engineering. The style and contents of the work have also been approved. The presentation was conducted in August of 2023.

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DECLARATION

The undersigned affirms that the present internship was conducted under the guidance of **Tasmia Tasnim**, Assistant Professor at the Department of Nutrition and Food Engineering, Daffodil International University. The author of this project affirms that it has not been previously submitted for the purpose of obtaining any degree or diploma, nor has any portion of it been utilized for such purposes.

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EXECUTIVE SUMMARY

The internship was conducted at the **Igloo Ice-Cream and Milk Unit** in Shampur, Kadamtali, Dhaka, from **1st to 31st August, 2023**. The primary product of this plant is various kinds of ice cream. Fruit pulp, butter oil, coconut oil, sugar, stabilizer, emulsifier, water, food-grade taste, skim milk powder, glucose, and food-grade color are all needed to make ice cream. For quality control, they primarily examine physical, chemical, and microbiological testing. The creation of several certified, risk-free items is the foundation of my report. I've seen the many varieties of milk and ice cream. The report includes details about the company, a flowchart showing the production process, various industrial operations, concepts related to the manufacturing of machinery, and more.

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CHAPTER 1

ABOUT COMPANY

1.1 Company Profile

IGLOO - A World of Great Taste!!

In Bangladesh, Igloo is among the most well-known ice cream brands. The leading ice cream brand in the nation, Igloo, is produced and marketed by Abdul Monem Limited. Founded in Chittagong in 1964, Igloo is the original ice cream brand in Bangladesh.



Later, with the expansion of market, a new factory was established in Shampur Industrial Area, in Dhaka to cater the market demand. Presently, Abdul Monem Limited used the state of the art-straight-line technology for manufacturing the ice cream. Actually, Abdul Monem Limited is the first in the South East Asia to introduce this technology. The facility is producing nearly 20,000 liters of ice cream each day that is distributed throughout the country.

Igloo is the only ice cream manufacturer in Bangladesh to have installed extrusion, demonstrating our commitment to quality and flavor. We also use only the greatest ingredients and highly trained labor, and we never skimp on any of these two things.

More than 20,000 retail stores, supermarkets, and hypermarkets around the country carry Igloo ice cream, which is also popular with corporations. The assortment of Igloo ice cream products is expanding daily as we maintain our market share lead. The Bangladesh Brand Forum recognized Igloo as the top ice cream brand in Bangladesh in 2015.

1.2 Company Mission and Vision

Company's Mission	Company's Vision
"A world of Great Taste" which means the country's best Ice Cream ensuring best quality and service to the consumers so that best can be served to stakeholders and country as well	To make every moment remarkable with great taste.

1.3 Abdul Monem Ltd.

Abdul Monem Limited (AML) is a well-known and diversified business conglomerate in Bangladesh. Abdul Monem Limited (AML) is a prominent conglomerate in Bangladesh with diversified interest and established in 1956 by Abdul Monem. Abdul Monem Limited (AML) is the parent company that owns and operates the popular ice cream brand "Igloo" in Bangladesh. "Igloo" is one of the well-known product lines of AML, specializing in ice cream and frozen food

products. The brand has gained recognition for its quality frozen desserts and is a significant part of AML's diversified business portfolio, contributing to the company's success in the food and beverage sector. AML has played a significant role in various facets of the Bangladeshi economy, including infrastructure development, food production, and more. AML is involved in various sectors of the economy, including:

Food and Beverage: AML operates a popular brand called "Igloo," which is known for its ice cream products, frozen food items, and beverages. Igloo has a significant presence in the market and offers a wide range of frozen food and dessert options.

Construction: AML has a strong presence in the construction industry. They are involved in building infrastructure projects, including roads, bridges, buildings, and other construction-related activities. The company has a subsidiary named "Abdul Monem Ready Mix Concrete" that provides ready-mix concrete for construction projects.

Real Estate: The group is also involved in real estate development, including residential and commercial projects. They have contributed to the development of the real estate sector in Bangladesh.

Automobiles: Abdul Monem Limited is involved in the automobile industry, representing renowned brands like TATA Motors and CASE New Holland in Bangladesh. They distribute and sell commercial vehicles and construction equipment.

Logistics and Transportation: The company has interests in logistics and transportation services, including operating a fleet of trucks for cargo transportation.

Agribusiness: AML has agricultural operations, including farming and food processing, under the brand "Farm Fresh."

Retail: The group operates convenience stores and retail outlets in Bangladesh.

Employment Generation: AML provides employment opportunities to a significant number of people in Bangladesh. Its presence in sectors like construction, manufacturing, agriculture, and retail creates jobs for both skilled and unskilled workers.

AML has played a significant role in various facets of the Bangladeshi economy, including infrastructure development, food production, and more.

1.4 Plant Layout

The term "plant layout" in the context of an ice cream factory refers to the arrangement and organization of various components, equipment, and workspaces within the manufacturing facility dedicated to producing ice cream. This layout is carefully designed to optimize the production process, ensure product quality, adhere to food safety standards, and improve operational efficiency. A well-planned plant layout takes into account factors such as workflow, safety, hygiene, and space utilization. Here are some key which we find out from the plant layout of an ice cream factory:

Processing Area: This area houses the main production processes for ice cream, including mixing, pasteurization, homogenization, and freezing. The layout is designed to facilitate the efficient movement of raw materials and the production of ice cream mix.

Flavor Addition and Inclusion Area: Depending on the type of ice cream being produced, this section is equipped for adding flavorings, fruits, nuts, and other inclusions during or after the freezing process.

Packaging Area: A dedicated space for filling ice cream into containers (e.g., packet, plastic container, cups, cones) and for packaging, sealing, and labeling the finished ice cream products.

Cold Storage: Facilities with temperature control to store finished ice cream products before distribution, ensuring they remain frozen and keep temperature below -20 degree C and maintain quality.

Ingredient Storage: Proper storage areas for raw materials such as milk, cream, sugar, flavorings, and inclusions. Temperature control may be necessary to preserve ingredient quality.

Quality Control and Laboratory: An area for conducting quality control checks and product testing to ensure consistency, safety, and adherence to quality standards.

Utilities and Maintenance: Spaces for boiler rooms, generator rooms, compressor rooms, and maintenance workshops to ensure the efficient operation of equipment and machinery.

Sanitation Facilities: Areas designated for cleaning and sanitizing equipment, utensils, and production surfaces to maintain food safety and hygiene standards.

Employee Facilities: Break rooms, locker rooms, restrooms, and changing areas for factory workers to support their comfort and well-being.

Traffic Flow and Accessibility: Carefully planned traffic flow for the movement of raw materials and finished products, with convenient access points for delivery trucks.

Office and Administrative Areas: Offices for administrative staff, including management, quality control personnel, and administrative support.

This specific plant layout of this factory meets the needs and align with industry regulations and food safety guidelines. It is efficient production, maintaining product quality, and adhering to safety and hygiene standards.

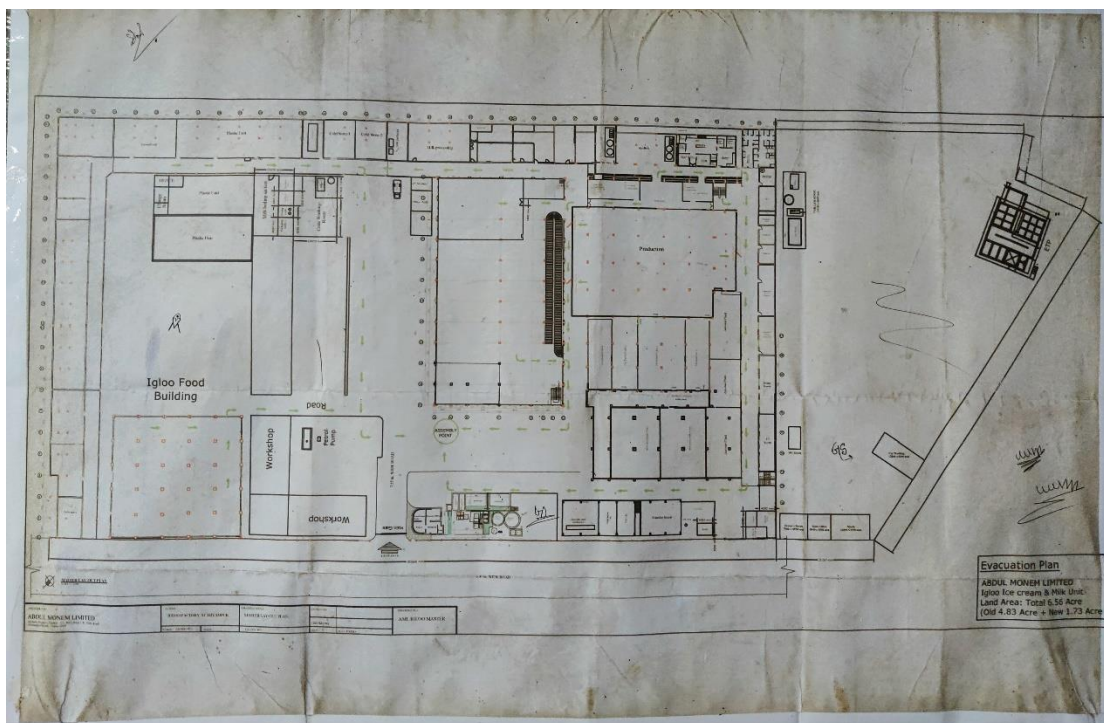


Figure 1: Plant Layout of Igloo Ice-cream & Milk Unit

1.4.1 Plant Layout

The plant layout plays several essential roles in ensuring efficient and effective operations. Here are some key roles of a well-designed plant layout for this factory:

- Optimizing workflow
- Minimizing material handling
- Enhancing productivity
- Maintaining food Safety
- Quality control
- Enhance and ensure safety
- Cost reduction
- Flexibility and scalability
- Space Utilization
- Employee comfort and efficiency
- Distribution and logistics
- Environmental considerations

A well-designed plant layout for an ice cream factory plays a crucial role in optimizing operations, ensuring food safety, reducing costs, and enhancing overall efficiency. It is a vital component of a successful ice cream manufacturing facility that contributes to the quality and competitiveness of the products produced.

1.5 Departments and Their Works

There are some several departments to accomplish and handling the various activities of this factory, these are:

Administration: The Administration Department provides administrative and technical support in the areas of human resources (HR), budgetary, strategic planning, legal affairs, calls for tenders, facilities and security.

Accounts: The accounting department is in charge of tracking and accounting for cash payments by customers for goods sold and services rendered. It is also responsible for creating and tracking invoices.

VAT: Maintain all VAT related works and deduction of VAT & TAX at source. Submit VAT returns and other documents to VAT authority on time. Prepare VAT Challan according to approve price.

Production: The food production department, involves the preparation of food products.

Quality Control: Quality control (QC) is a process through which a business seeks to ensure that product quality is maintained or improved. Quality control involves testing units and determining if they are within the specifications for the final product.

Maintenance: Maintenance is directly responsible for repair and upkeep of all district buildings. Specifically, Maintenance is responsible for the operation and repair of all heating, air conditioning, ventilating, plumbing, central steam and chilled water plants, and their associated distribution systems.

Store: The stores department has many functions that include: Inspection and acceptance of incoming products. Identification and temporary storage. Movement of goods where needed.

Distribution: Distribution departments are departments charged with the responsibility of receiving items that are ordered from vendors, and directing those items to the proper division or department within a company.

Marketing: It serves as the face of your company, coordinating and producing all materials representing the business. It is the Marketing Department's job to reach out to prospects, customers, investors and/or the community, while creating an overarching image that represents your company in a positive light.

Research & Development: The role of an R&D department is to keep a business competitive by providing insights into the market and developing new services / products/recipes or improving existing ones accordingly. The future growth of the business sits in a large part with the R&D department.

CHAPTER 2

INTRODUCTION

2.1 Internship Profile

Information for this research was gathered during a 31-day internship program at Abdul Monem Limited's Igloo Ice-cream and Milk Unit, located in Shampur, Kadamtali, Dhaka, from August 1st to 31st, 2023. I have included information on their final goods, various equipment, production flowchart, QC testing, raw materials, various units, and many other facts that the reader may find out by reading my internship report. I made an effort to make my report as readable as possible so that the reader could easily understand the conclusions I reached. I have gained knowledge about new goods, various tests, procedures, and the workings of the company throughout my internship. I also got to observe a few real-world industrial challenges during this period. General details regarding the members of my group, the designated production line, and the time frame are shown in the table below.

Table 1: Internship routine

SL No.	Department	Timetable	Participants
1	Quality Assurance	01.08.2023-08.08.2023	Md. Habibur Rahman
2	Production Unit	09.08.2023-15.08.2023	
3	Engineering Section	16.08.2023-21.08.2023	S.M. Mosfique Alam Zidan
4	Milk Unit	22.08.2023-23.08.2023	
5	Plastic Unit	24.08.2023-27.08.2023	Md. Shameem Hossain
6	General Store	28.08.2023	Esha Moni
7	Distribution	29.08.2023	
8	Administration and HR	30.08.2023	Sadik Rahman Swapnil
9	Evaluation	31.08.2023	

2.2 Factory Unit

The factory has eight units which are working continuously for making something new and binding their consumer. The departments are mentioned in below:

- Quality Assurance
- Production Unit

- Engineering Section
- Milk Unit
- Plastic Unit
- General Store
- Distribution
- Administration and HR
- Evaluation

CHAPTER 3

QUALITY ASSURANCE DEPARTMENT

3.1 Quality Assurance

Quality assurance (QA) is a systematic process or set of activities and procedures that are implemented to ensure that products or services meet specified quality standards and criteria. The primary goal of quality assurance is to prevent defects, errors, or issues in the production process and to ensure that the final output consistently meets or exceeds the desired quality levels. Quality assurance (QA) involves with establishing clear quality standards as well as controlling and monitoring production processes. Besides, it focuses on customer satisfaction and collect feedback for continuous improvement. QA involves with various testing methods and validation processes to confirm that the output meets quality requirements. This can include product testing, software testing, or validation of service deliverables.

3.1.1 QA Department's Organogram

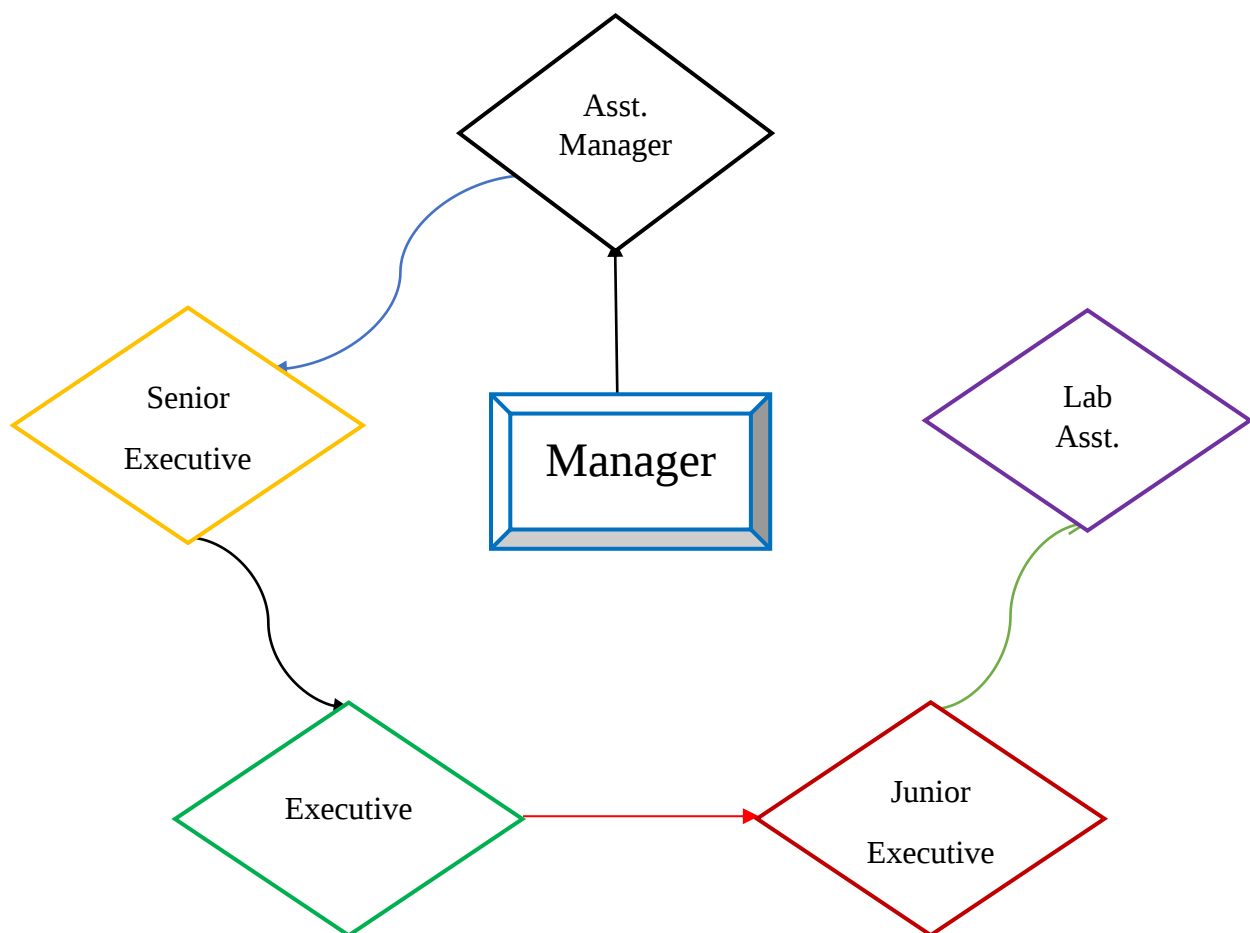


Figure 2: Organogram of QA Department

3.1.2 QC Laboratory Instruments

1. **pH meter:** pH meter, electric device used to measure hydrogen-ion activity (acidity or alkalinity) in solution.
2. **The Milk Lab Pro Analyzer:** It is a specialized instrument used for the rapid and precise analysis of milk and dairy products. It measures various parameters like fat content, protein content, lactose, and more, helping dairy producers maintain quality and consistency in their products.
3. **Brix meter (Refractometer):** Brix meters are devices used for an assortment of jobs across many industries, but most notably in the food and beverage industry. They provide a quick and accurate measurement of Brix in almost any liquid sample.
4. **Micro oven:** Microwaves are produced inside the oven by an electron tube called a magnetron. The microwaves are reflected within the metal interior of the oven where they are absorbed by food. Microwaves cause water molecules in food to vibrate, producing heat that cooks the food.
5. **Laminar air flow:** Laminar air flow systems are used in various applications such as life science research, mushroom cultivation, microbiology, IVF, IUI and plant tissue and cell culture and pharmaceutical and electronics industry and many more.
6. **Digital autoclave:** Autoclave sterilization works by using heat to kill microorganisms such as bacteria and spores. The heat is delivered by pressurized steam.
7. **Colony counter:** Colony counters are used to estimate a liquid culture's density of microorganisms by counting individual colonies on an agar plate, slide, mini gel, or Petri dish. Typical applications include Ame's testing, bacterial mutation assays, and E. coli bacterial colonies.
8. **Micro-scope:** A microscope is an instrument that can be used to observe small objects, even cells. The image of an object is magnified through at least one lens in the microscope. This lens bends light toward the eye and makes an object appear larger than it actually is.
9. **Thermometer:** A thermometer measures temperature through a glass tube sealed with mercury that expands or contracts as the temperature rises or falls. The tiny size of the bulb and micro-fine size of the tube help the mercury reach the temperature of what it is measuring very rapidly.
10. **Water bath:** A water bath is laboratory equipment made from a container filled with heated water. It is used to incubate samples in water at a constant temperature over a long period of time.
11. **Digital Analytic balance:** Analytical scales measure the force needed to counter the mass of a sample rather than using actual masses. They use an electromagnet to generate a force to counter the sample and output the result by measuring the force needed to achieve balance.
12. **Magnetic Hot plate stirrer:** The primary use of magnetic stirrer or hot plate with magnetic stirrer is to conduct biological and chemical experiments by mixing two components. It is equally suitable for solids or liquid samples to obtain a consistent liquid mixture.

13. **Moisture analyzer:** Moisture analyzers utilize Loss on Drying (LOD) method to measure moisture. In this method, the moisture analyzer weighs a sample, heats it up to dry it, and weighs it again once it's dry.
14. **Viscometer:** A viscometer is an instrument used to measure the viscosity of a fluid. For liquids with viscosities which vary with flow conditions, an instrument called a rheometer is used. Thus, a rheometer can be considered as a special type of viscometer.
15. **Vortex mixture:** In a vortex mixer, the motor drives the rubber cup in a circular motion to create a vortex, or spiral flow, in a sample.
16. **Lab refrigerator:** Laboratory refrigerators are used to cool samples or specimens for preservation.
17. **Drying oven:** A Drying oven is designed to remove moisture from the oven chamber so to dry the samples as quickly as possible.
18. **Centrifuge machine:** A centrifuge is used to separate particles suspended in a liquid according to particle size and density, viscosity of the medium, and rotor speed.

3.2 Type of QC Parameter Test

Quality Assurance (QA) plays a crucial role to get a best quality product. This department ensure the quality of raw materials, finished goods and many others things by some test or method which are involved with product. Some of test are mentioned in below which we have done during internship day:

- **Fat Test: Further divided into two categories-**
 1. For fresh milk
 2. For Tone milk
- Acidity Test
- Density/CLR Test
- Viscosity Test
- TS Test
- Brix Test
- Specific Gravity Test
- Lactose/Protein/Solid/Water/Salt/Temperature/Freezing Point Test
- Microbiological Test

3.3 Procedure of Quality Control Parameter Test

3.3.1 Calculating Fat Content (For Tone Milk)

Equipments:

1. A butyrometer
2. Centrifuge machine (1100 RPM)
3. Stopper
4. Pipette

Reagents:

1. 95% Sulphuric acid
2. Pentanol/Amyl alcohol
3. Distilled water

Procedure:

1. Firstly, we have to take 10ml of 95% Sulphuric acid (H_2SO_4) by pipette.
2. Then we have to add 5ml sample by pipette again.
3. We have to add 2ml of Amyl alcohol ($\text{C}_5\text{H}_{11}\text{OH}$).
4. After that we have to add 5ml water.
5. The material was gently centrifuged for five minutes at 1100 RPM.
6. The fat percentage (10.8%) was ascertained.

***Fat standard maintained for Ice-cream 10-12%**

- **Amyl Alcohol:** In the Gerber method, amyl alcohol is used as a reagent to dissolve the milk fat during the fat content analysis, allowing for the separation and quantification of fat from the milk sample.
- **Sulphuric Acid:** It works as burning agent and it is used to increase specific gravity of milk serum which makes greater difference between milk serum and fat globules.

3.3.2 Determination of Fat (For Fresh Milk)**Apparatus:**

1. Butyrometer-8%
2. Centrifuge machine (1100 RPM)
3. Stopper
4. Pipette

Reagents:

1. 95% Sulphuric acid
2. Amyl alcohol

Procedure:

1. Firstly, we have to take 10ml of 95% Sulphuric acid (H_2SO_4) by pipette.
2. Then we have to add 10.75ml sample.
3. We have to add 2ml of Amyl alcohol ($\text{C}_5\text{H}_{11}\text{OH}$).
4. For five minutes, the material was gently centrifuged at 1100 RPM.
5. The 3.65% fat content was found.

- **Amyl Alcohol:** In the Gerber method, amyl alcohol is used as a reagent to dissolve the milk fat during the fat content analysis, allowing for the separation and quantification of fat from the milk sample.
- **Sulphuric Acid:** It works as burning agent and it is used to increase specific gravity of milk serum which makes greater difference between milk serum and fat globules.

3.3.3 Determination of Acidity

Apparatus:

1. Conical Flask
2. Burette Stand
3. Burette
4. Electrical balance

Reagents:

1. 0.1N NaOH (Sodium Hydroxide)
2. Phenolphthalein Indicator
3. Distilled water

Procedure:

1. First, we have to weigh out sample (1.50-2.0) g in conical flask by electrical balance.
2. We have to add distilled water as required in it.
3. After that we have to add 1 or 2 drops phenolphthalein.
4. Now we have to titrate with 0.1N NaOH and rolling it until turns into pink color.
5. Burette reading have to note.
6. Calculation.

Formula:

$$\text{Percentage of Acidity} = \frac{(\text{B.R} \times \text{Normality of NaOH} \times \text{Equivalent weight} \times 100)}{\text{sample weight} \times 1000}$$

- **Acidity standard maintained for milk is 0.12**
- **Acidity standard maintained for Ice-cream is 0.22**

3.3.4 Determination of Density

Apparatus:

1. Lactometer
2. Water bath
3. Thermometer

4. Cylindrical flask

Reagents:

1. Milk sample

Procedure:

1. At first, we have to take sample poured in cylindrical flask as required for test.
2. Then we have to heat the sample by water bath until reach 20° C.
3. We have to check the temperature of sample by thermometer and we have to stop heating when it will reach at 20° C.
4. If the temperature determined more than 20° C, then we have to add some sample to balance the temperature or decrease the temperature.
5. Finally, we have to sink the lactometer and note the reading.

Density standard maintained for milk is 29%

3.3.5 Determination of Viscosity

Apparatus:

1. Brookfield viscometer
2. Spindle
3. Beaker

Procedure:

1. At first, we have to take sample in a beaker as required for test.
2. Then we have to take appropriate spindle and set with Brookfield viscometer.
3. Now, we have to insert the spindle in the sample of beaker.
4. Then we have to revolute the sample and take the reading.
5. Calculation.

Calculation:

Viscosity = Viscometer reading × Value of spindle

Viscosity Standard 100-120

3.3.6 Determination of TS (Total Solid)

Apparatus:

1. Moisture analyzer
2. Foil paper
3. Electrical balance

Procedure:

1. Firstly, we have to weigh the foil paper by electrical balance.
2. After that we have to pour the sample on foil paper and weigh out sample through electrical balance, (0.5) g.
3. Then we have to dry it through moisture analyzer at 180°C for 5minutes.
4. Finally, we have to note the accurate reading.

- | |
|--|
| • TS standard for milk is (20-22) % |
| • TS standard for Ice-cream is (35-38) % |

3.3.7 Determination of Brix**Apparatus:**

1. Hand refractometer
2. Dropper
3. Tissue

Procedure:

1. We have to clean the prism of refractometer by water and wipe it by tissue to make prism dry.
2. Now we have to pour 1 or 2drops of sample.
3. After that we have to see the scale of meter.
4. Brix percentage must be noted.

3.3.8 Determination of Specific Gravity**Apparatus:**

1. Pycnometer
2. Electrical balance

Procedure:

1. At first, we have to measure the empty wight of pycnometer.
2. Then we have to filled the pycnometer with water and take weight.
3. Now, we have to fill the pycnometer with sample and measure the weight of pycnometer.
4. Calculation

***Note: Both (water and sample) temperature should be same.**

Formula:

Here,

Empty pycnometer weight = W_2

Sample filled pycnometer weight = W_1

Water filled pycnometer weight = W_3

$$\text{So, Specific Gravity} = \frac{W_1 - W_2}{W_3 - W_2}$$

3.3.9 Determination of Protein by MLP (Milk Lab Pro)**Apparatus:**

1. Milk lab pro (MLP)
2. Beaker
3. Water bath

Reagents:

1. Hot water

Procedure:

1. At the beginning of the test, we have to heat the water (mild heating).
2. Then we have to set the mild hot water by pipe line of MLP.
3. After that we have to clean the MLP by pressing B button.
4. Now we have to insert the rod of MLP into the sample.
5. Note the result from the MLP screen.

***Note:** Lactose/Solid/Water/Salt/Temperature/SNF/Freezing Point Test are processed by same method.

3.3.10 Microbiological Test

Table 2: Microbial test

Microbiological Parameters	Objectives
Standard plate count	To determine how many microbes are present in a product overall.
Coliform count	to determine the coliform count responsible for diarrhea, UTIs, wound infections, appendicitis, gallbladder infections, etc.
Salmonella	To measure the Salmonella strain.

*According to BSTI approval the bacterial load should be less than <1lakh for Ice-cream

3.3.11 Overrun

In the context of ice cream production, overrun refers to the increase in volume that occurs when air is incorporated into the ice cream mixture during the freezing process. This aeration is achieved by churning the mixture as it freezes. The amount of air added is typically expressed as a percentage of the ice cream's final volume.

Overrun plays a significant role in determining the texture and consistency of ice cream. Higher overrun results in lighter and fluffier ice cream, as it contains more air. Conversely, lower overrun produces denser, creamier ice cream with a smoother texture. Manufacturers carefully control overrun to achieve the desired characteristics for each ice cream product they produce, whether it's a light and airy gelato or a rich and dense premium ice cream.

Formula:

Sample weight = Sample with container – Container weight

$$\text{Overrun} = \frac{\text{Volume of mix} \times 1.1 - \text{Sample Weight}}{\text{Sample Weight}}$$

According to BSTI approval overrun for Ice-cream 110%
--

CHAPTER 4

PRODUCTION UNIT

4.1 Introduction

During our internship, we visited the production facility from August 9th to 15th August, 2023. They talked about labor management, the pasteurization system, ice cream processing, manufacturing equipment, and other details pertaining to the production unit. Important factors for the production process are 4M, which are:

- Machine
- Manpower
- Materials
- Methods

The ice-cream production department plays a crucial role in the manufacturing of ice cream products. This department is responsible for several key tasks and functions throughout the production process including:

- Recipe Formulation
- Ingredient Sourcing
- Mixing and blending
- Homogenization
- Flavoring and Inclusions
- Freezing
- Packaging
- Storage
- Cleaning and Sanitization
- Packaging Design and Labeling
- Batch Record Keeping
- Equipment Maintenance
- Research and Development
- Compliance with Regulations
- Waste Management
- Labor Management

The ice cream production department plays a pivotal role in delivering high-quality ice cream products to consumers, and its activities are critical in maintaining product consistency, safety, and appeal in a competitive market.

4.1.1 Organogram of Production Department:

I just show here the organogram of the production unit of Igloo ice-cream which is visual representation of the hierarchy and reporting structure within the production department. It

illustrates the chain of command and the roles and responsibilities of personnel involved in the production process.

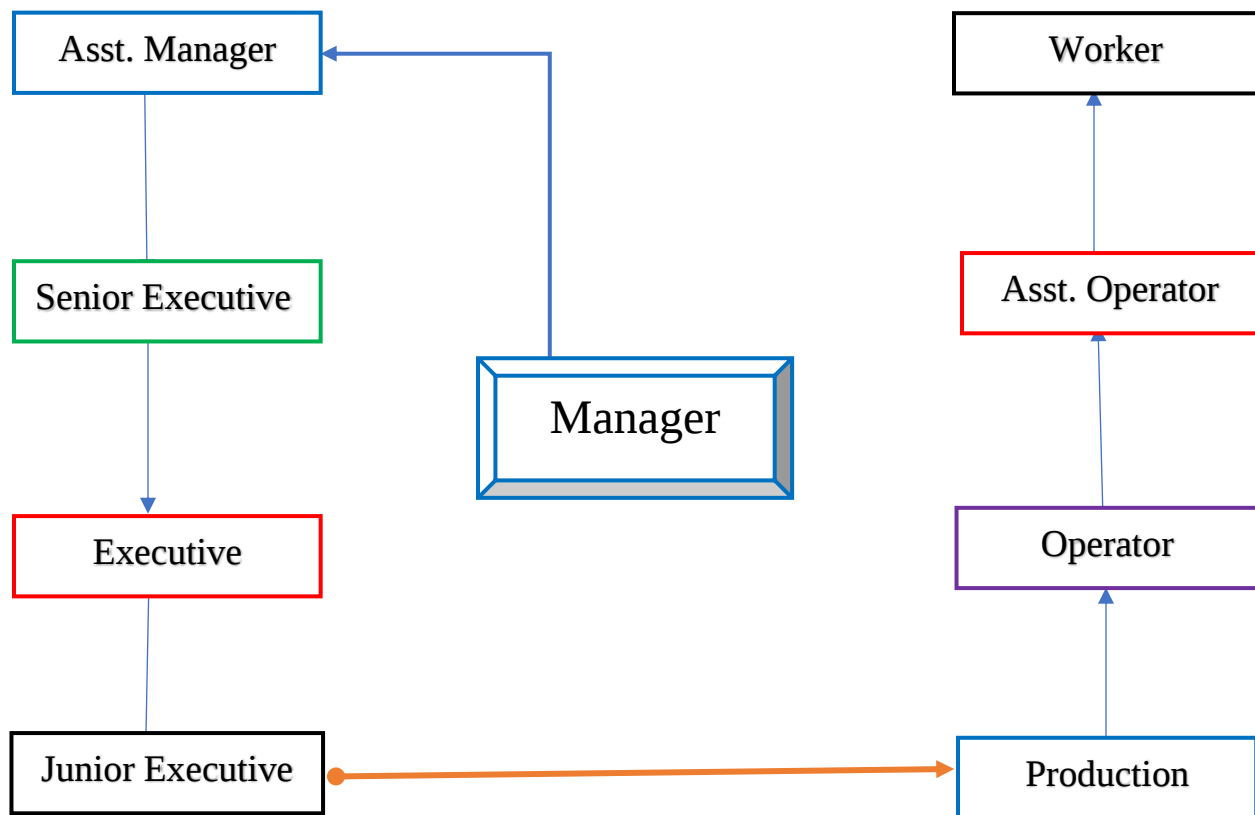


Figure 3: Organogram of Production Department

4.2 Raw Materials

Raw materials are basic, unprocessed substances used in manufacturing or production processes to create finished products. They serve as the foundation for creating goods and can include natural resources like wood, minerals, or agricultural products, as well as synthetic materials like chemicals or plastics.

The raw materials for making ice cream typically include milk or cream, sugar, flavorings (such as vanilla or chocolate), stabilizers and emulsifiers, and sometimes eggs. These ingredients are mixed and processed to create the ice cream base, which is then frozen to make the final product.

Here are discuss in below about some raw materials in below which are used to make ice-cream:

Refined Water: Refined water refers to water that has undergone a purification or treatment process to remove impurities, contaminants, and minerals, resulting in a cleaner and more purified form of water suitable for various applications, including drinking, industrial processes, or

laboratory use. Common methods for refining water include distillation, filtration, and reverse osmosis.

Sugar: Sugar is a sweet-tasting carbohydrate, typically in the form of granulated or powdered sucrose, used to sweeten foods and beverages. Sugar is used in ice cream to provide sweetness and improve its texture by lowering the freezing point of the mixture, resulting in a smoother and more enjoyable frozen treat.

Glucose: Glucose is a simple sugar and a primary source of energy for living organisms. Glucose is used in ice cream as a sweetener and to enhance texture by reducing the formation of ice crystals, resulting in a smoother and creamier consistency.

Skimmed Milk Powder (SMP): Skimmed milk powder is a dairy product obtained by removing the fat from milk and drying the remaining liquid to form a powder. Skimmed milk powder is used in ice cream to improve its texture and contribute to a creamier consistency while reducing the overall fat content.

Full Cream Milk Powder: Full cream milk powder is a dairy product made by drying milk that contains the full fat content, resulting in a powdered form of milk with a higher fat content compared to skimmed milk powder. Full cream milk powder is used in ice cream to enhance its richness, creaminess, and flavor due to its higher fat content, resulting in a smoother and more indulgent frozen treat.

Enzyme Methyl Dairy Ingredient (EMDI): Enzyme methyl dairy ingredients refer to dairy products that have undergone enzymatic modification to improve their functional or nutritional properties, often used in food processing. Enzyme-methylated dairy ingredients are used in ice cream to enhance its texture and stability, resulting in a smoother and creamier product.

Stabilizer: A stabilizer is an additive in ice cream that helps maintain its texture and prevent the formation of ice crystals by binding water and fat molecules together. It works by increasing the viscosity of the ice cream mix and inhibiting the separation of water and fat, resulting in a smoother and creamier frozen dessert.

Emulsifier: An emulsifier is a substance added to ice cream and other food products to blend and stabilize two or more typically unmixable ingredients, such as water and fat, creating a homogeneous mixture with improved texture and consistency. Common emulsifiers in ice cream include lecithin and mono- and diglycerides.

Vegetable Fat: Vegetable fat is a type of fat derived from plant sources, such as oils and fats obtained from plants like soybeans, palm, and sunflower. It is often used in food production, including ice cream, as a substitute for or in combination with dairy fat to achieve specific texture and flavor characteristics in products.

Color and Flavor: Color in ice cream refers to its visual appearance, impacting consumer appeal. Natural colors from ingredients like fruits are often used, enhancing the overall experience. Flavor

in ice cream involves its taste and aroma, achieved through ingredients like vanilla or fruit extracts, creating the unique and enjoyable taste sensation that defines the ice cream's character.

Color and flavor are used in ice cream to make it visually appealing and delicious, enhancing the overall sensory experience for consumers.

Chocolate: Chocolate is used in ice cream to add a rich and indulgent flavor, creating a popular and satisfying variety of ice cream loved by many.

Chocolate Coating: Chocolate coating is used in ice cream to provide a delicious, protective shell around the ice cream, enhancing its taste and texture while preventing it from melting too quickly when exposed to air or higher temperatures.

4.3 Ice-Cream

The term "Ice-cream" refers to a frozen dairy product that is created by properly blending and processing cream or another milk product with sugar and taste, either with or without stabilizer or color, and adding air during the freezing process. Ice-cream combines a variety of tastes and creamy textures to create a pleasant combination. Ice cream is a mainstay in the dessert industry since it is a delicious treat that is enjoyed by people of all ages. Ice cream, whether served plain or in complex sundaes, is still a beloved pleasure for all people.

4.3.1 Type of Ice-Cream

In this factory, we found out variety of ice-cream items which are categorized based on their characteristics, aroma and color. The ice-cream items are categorized in below with table:

Table 3: Type of ice-cream

Stick Item	Premium Family Pack Item	Cup Item	Cone Item
Chocolate bar	Combo Caramel	Vanilla	Belgian Cone
Mini Choc-bar	Cheers Chocolate	Strawberry	Cornelli Classic
Dudh Malai	Melody Mango	Single Sundae	Cornelli Premium
Macho Ice-cream	Pistachio Passion	Black Forest	Belgian Big
Mega Ice cream	Sparkle Strawberry	Mango Cup	
Sell & Core	Ripple Cake	Nutrics	
Sweet Heart	Butterscotch	Kheer Malai	
Exotic-Almond Split	Ambrosia		
Ego Ice-cream	Nawabi Mithai		

4.3.2 Flowchart of Ice-cream

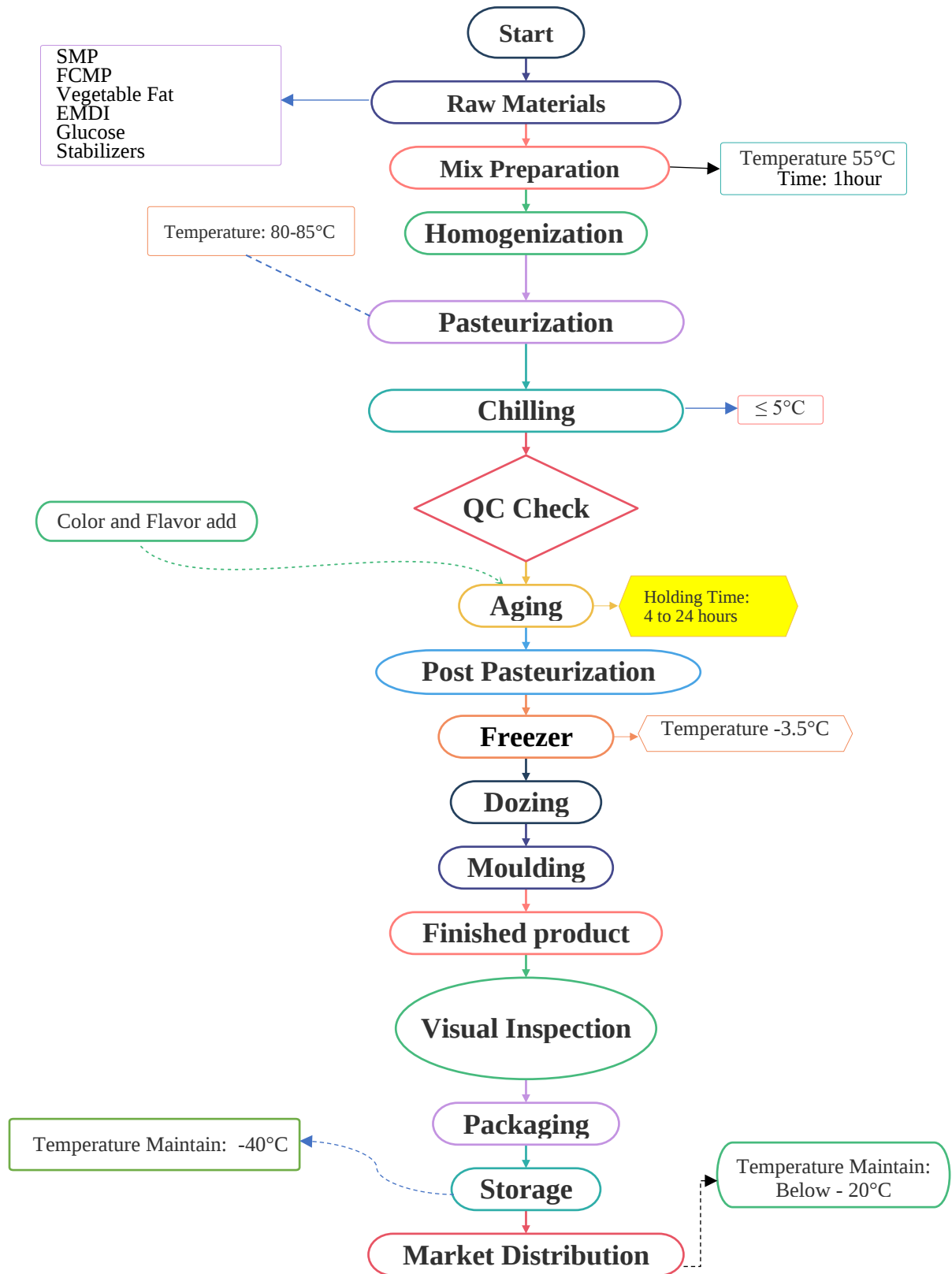


Table 4: Family pack items

Family Pack Item	Kids Item	Stick and lolly Item
Chocolate	Mango Magic	Lemon Lolly
Mango	Snowball	Orange Lolly
Strawberry		
Vanilla		

4.4 Machineries and Manufacturing Flowchart

4.4.1 Machineries

Machineries are mechanical equipment which is designed to perform various tasks. They are very essential tools in various industries and applications such as manufacturing, transportation, construction and more. There are many machineries owned Igloo Ice-cream factory to accomplish their specific task like manufacturing. They are using Rollo-27, Choice Filler, Comet C2, SL-600, FM-6000 and few freezers which are the brand of Tetra pak.

4.4.1.1 Rollo-27

The Tetra Pak Rollo 27/ Tetra Packaging machine is designed to freeze stick novelty products; both ice cream and water ice. This particular model has fully automatic controls and is complete with stick inserter, extractor and chocolate coating device. Its can-do one-color water ice and one-color ice cream sticks. There are two types of Rollo-27, they are:

1. Rollo-27 (New)
2. Rollo-27 (Old)

Rated Capacity: 18000 pcs/hour

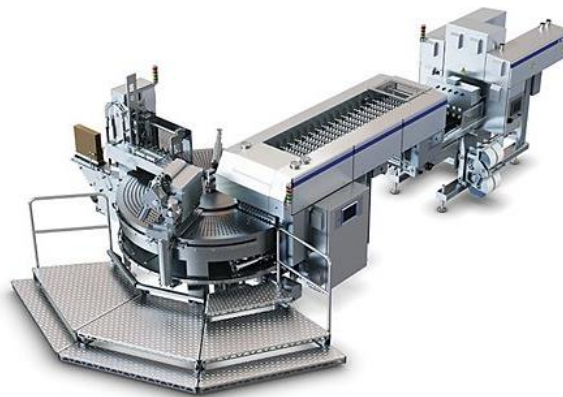


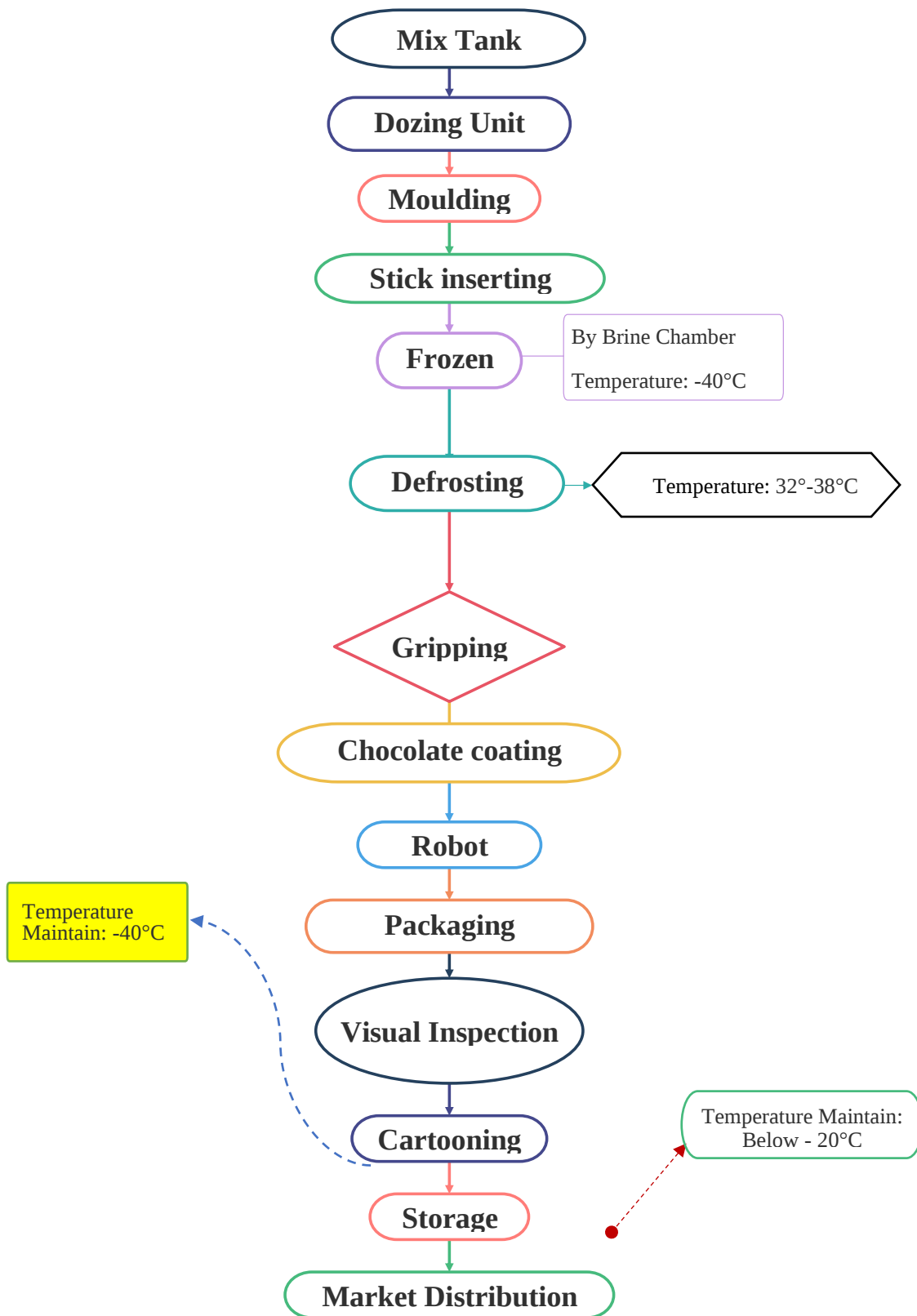
Figure 4: Rollo-27

4.4.1.2 Manufacturing Products of Rollo-27 (New)

Table 5: Manufacturing products of rollo-27 (new)

Name	Choc-bar	
Brand	Igloo Ice-cream	
Category	Regular	
Volume	70 ml	
Carton Size	24 pcs/carton	
Carton weight	1.68 Liter	
Type	Stick	
Name	Shell & Core	
Brand	Igloo Ice-cream	
Category	Regular	
Volume	58 ml	
Carton Size	25 pcs/carton	
Carton weight	1.45 Liter	
Type	Stick	
Name	Ego	
Brand	Igloo Ice-cream	
Category	Premium	
Volume	75 ml	
Carton Size	12 pcs	
Carton weight	0.90 Liter	
Type	Stick	

4.4.1.3 Manufacturing Flowchart of Rollo-27



4.4.1.4 Manufacturing Products of Rollo-27 (Old)

Table 6: Manufacturing products of rollo-27 (old)

Name Brand Category Volume Carton Size Carton weight Type	Dudh Malai Igloo Ice-cream Regular 58 ml 20 pcs/carton 1.16 Liter Stick	
Name Brand Category Volume Carton Size Carton weight Type	Lemon Lolly Igloo Ice-cream Regular 58 ml 25 pcs/carton 1.45 Liter Stick & lolly	
Name Brand Category Volume Carton Size Carton weight Type	Orange Lolly Igloo Ice-cream Regular 58 ml 25 pcs/carton 1.45 Liter Stick	
Name Brand Category Volume Carton Size Carton weight Type	Shell & Core Igloo Ice-cream Regular 58 ml 25 pcs/carton 1.45 Liter Stick	

4.4.2 Choice Filler

Rated Capacity: 28800 pcs/hr



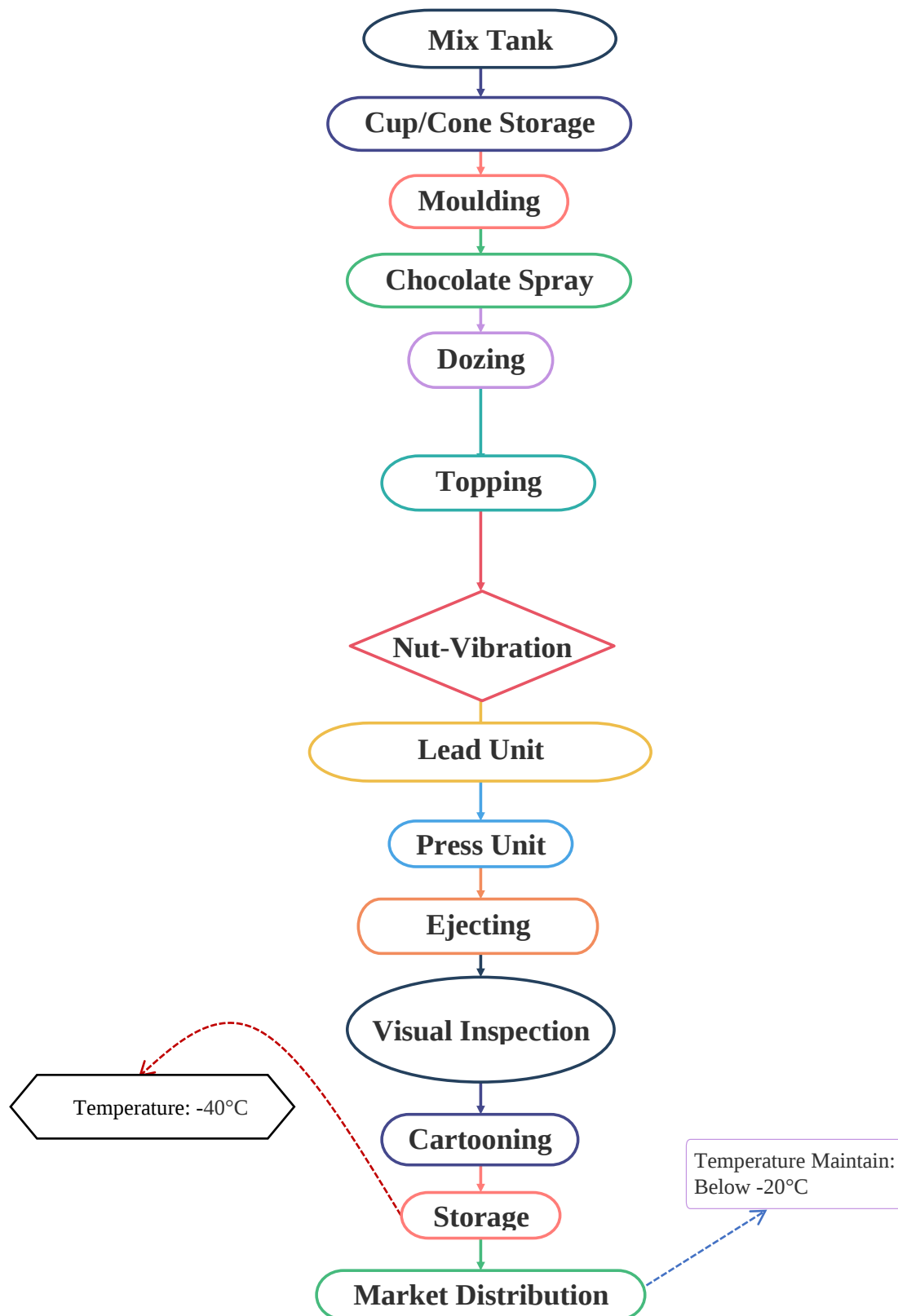
Figure 5: Choice Filler

4.4.2.1 Manufacturing Products

Table 7: Manufacturing products of choice filler

Name	Vanilla Cup	
Brand	Igloo Ice-cream	
Category	Regular	
Volume	100 ml	
Carton Size	18 pcs/carton	
Carton weight	1.80 Liter	
Type	Cup Ice-cream	
Name	Cornelli Classic big	
Brand	Igloo Ice-cream	
Category	Premium	
Volume	115 ml	
Carton Size	14 pcs/carton	
Carton weight	1.61 Liter	
Type	Cone Biscuit	
Name	Belgian Big	
Brand	Igloo Ice-cream	
Category	Premium	
Volume	115 ml	
Carton Size	14 pcs/carton	
Carton weight	1.61 Liter	
Type	Cone Biscuit	

4.4.2.2 Manufacturing Flowchart of Choice Filler



4.4.3 SL-600 (Rated Capacity: 600 Liter/hour)

4.4.3.1 Manufacturing Flow Diagram of SL-600



4.4.3.2 Manufacturing Products of SL-600

Table 8: Manufacturing products of SL-600

Name Brand Category Volume Carton Size Carton weight Type	Mega Igloo Ice-cream Premium 100 ml 16 pcs/carton 1.60 Liter Stick	
Name Brand Category Volume Carton Size Carton weight Type	Macho Igloo Ice-cream Regular 100 ml 16 pcs/carton 1.60 Liter Stick	
Name Brand Category Volume Carton Size Carton weight Type	Exotic Almond Split Igloo Ice-cream Regular 100 ml 10 pcs/carton 1.00 Liter Stick	
Name Brand Category Volume Carton Size Carton weight Type	Exotic-Swiss Chocolate Igloo Ice-cream Premium 100 ml 10 pcs/carton 1.00 Liter Stick	
Name Brand Category Volume Carton Size Overall weight Type	1 Liter Cake Igloo Ice-cream Cake 1000 ml Not required 1 Liter Container	

4.4.4 FM-6000

Rated Capacity: 6000 pcs/hr



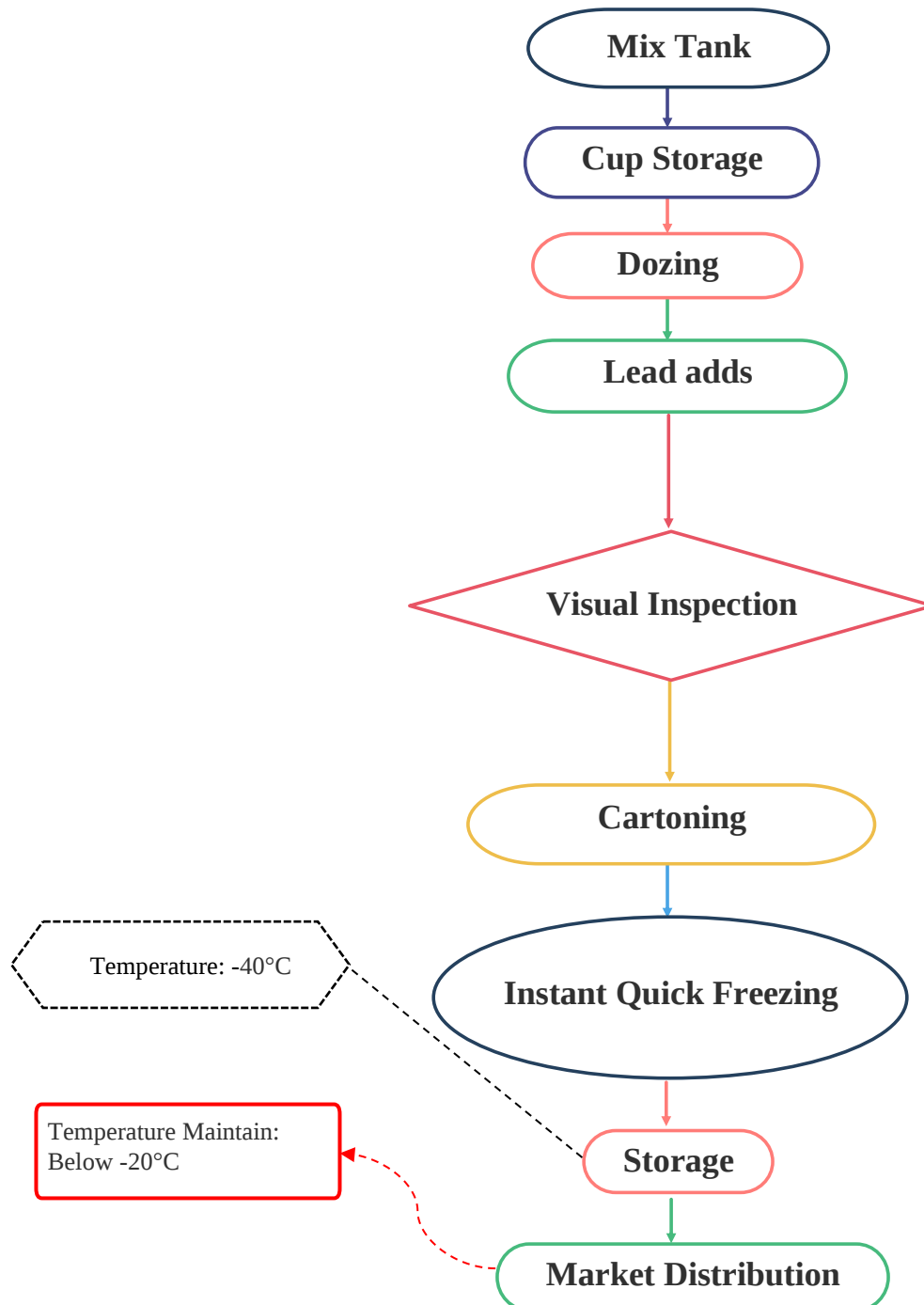
Figure 6: FM-6000

4.4.4.1 Manufacturing Products

Table 9: Manufacturing products of FM-600

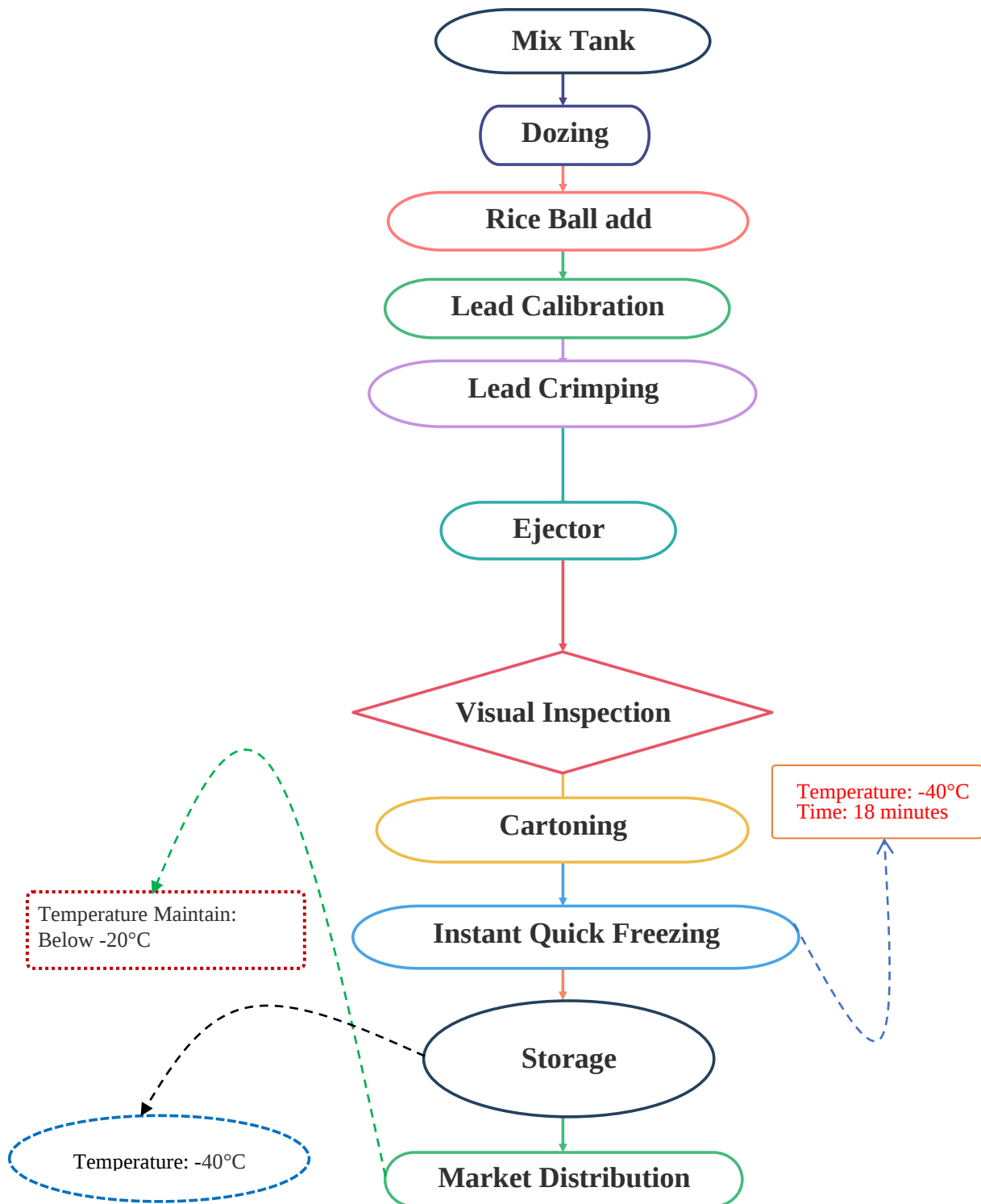
Name	Chocolate Cup	
Brand	Igloo Ice-cream	
Category	Regular	
Volume	100 ml	
Carton Size	18 pcs/carton	
Carton weight	1.80 Liter	
Type	Cup Ice-cream	
Name	Mango Cup	
Brand	Igloo Ice-cream	
Category	Premium	
Volume	100 ml	
Carton Size	18 pcs/carton	
Carton weight	1.80 Liter	
Type	Cup Ice-cream	
Name	Strawberry Cup	
Brand	Igloo Ice-cream	
Category	Regular	
Volume	100 ml	
Carton Size	18 pcs/carton	
Carton weight	1.80 Liter	
Type	Cup Ice-cream	

4.4.4.2 Manufacturing Flow Diagram of FM-6000



4.4.5 COMET-C2

4.4.5.1 Process Flow Diagram of Comet C2 Manufacturing



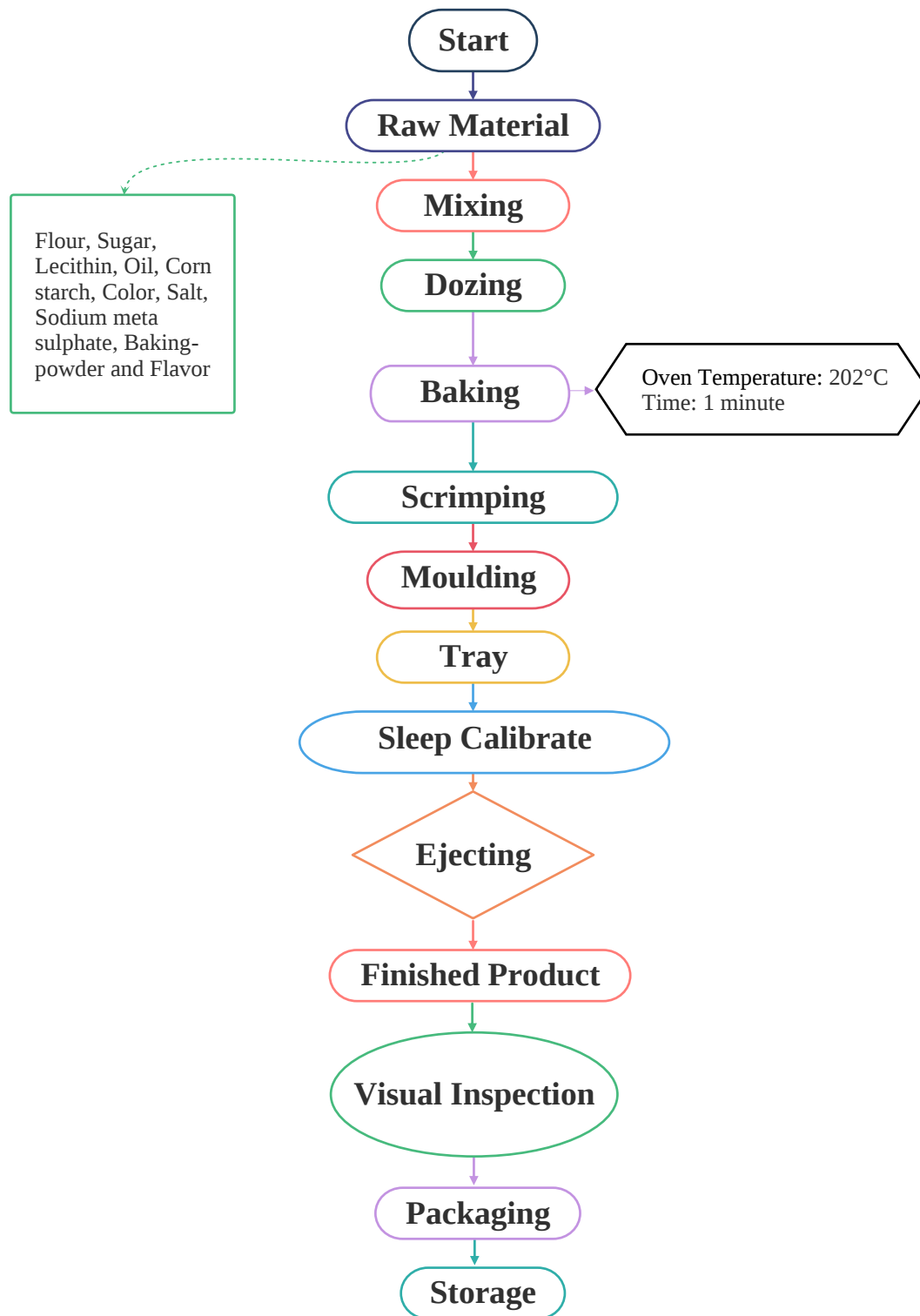
4.4.5.2 Manufacturing Products of COMET-C2

Table 10: Manufacturing products of COMET-C2

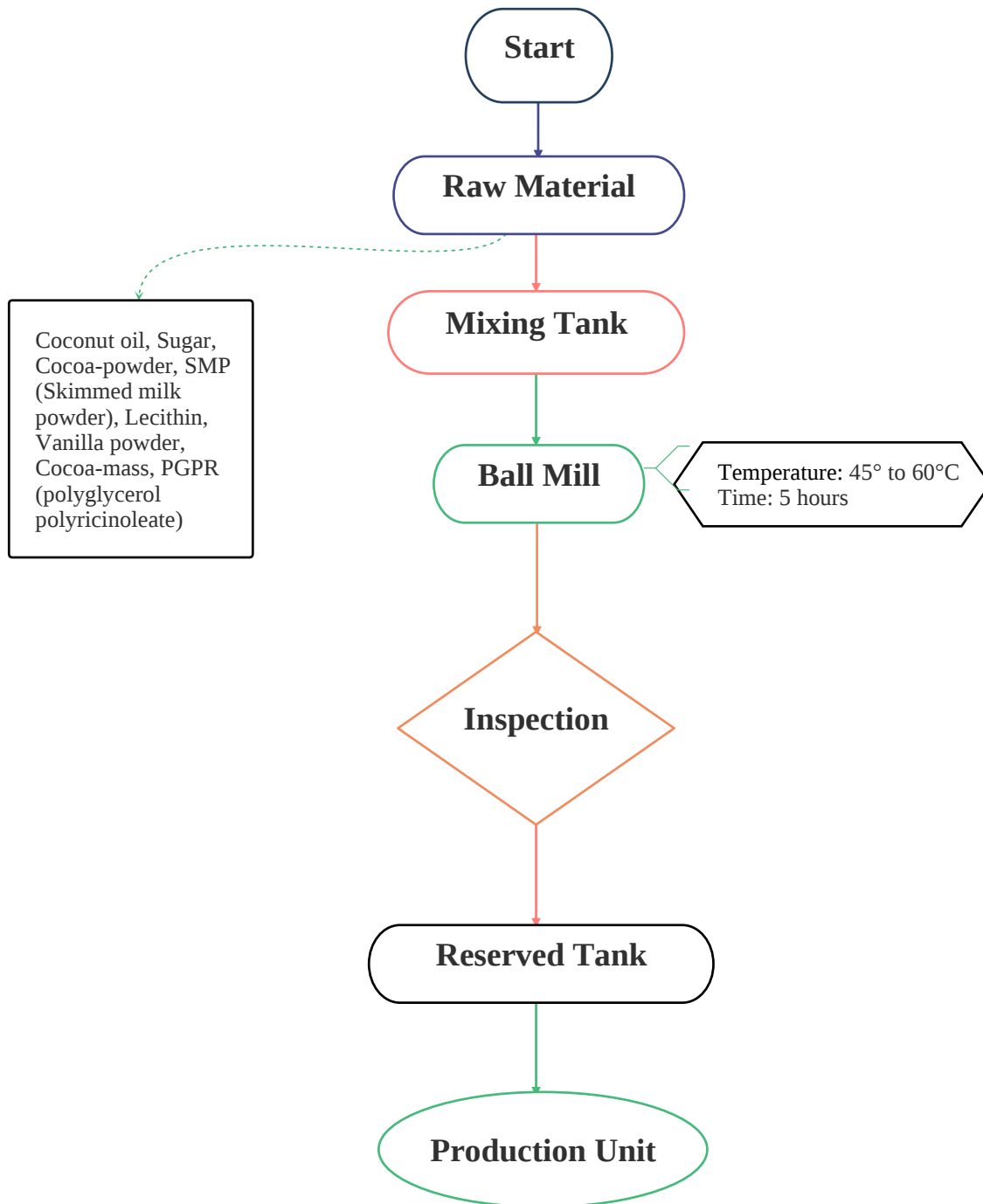
Name Brand Category Volume Carton Size Carton weight Type	Belgian Big Igloo Ice-cream Premium 115 ml 14 pcs/carton 1.61 Liter Cone Biscuit	
Name Brand Category Volume Carton Size Carton weight Type	Cornelli Classic big Igloo Ice-cream Premium 115 ml 14 pcs/carton 1.61 Liter Cone Biscuit	
Name Brand Category Volume Carton Size Carton weight Type	Chocolate Cup Igloo Ice-cream Regular 100 ml 18 pcs/carton 1.80 Liter Cup Ice-cream	
Name Brand Category Volume Carton Size Carton weight Type	Mango Cup Igloo Ice-cream Premium 100 ml 18 pcs/carton 1.80 Liter Cup Ice-cream	
Name Brand Category Volume Carton Size Carton weight Type	Vanilla Cup Igloo Ice-cream Regular 100 ml 18 pcs/carton 1.80 Liter Cup Ice-cream	

4.5 Cone Biscuit and Chocolate Unit

4.5.1 Process Flow Diagram of Cone Biscuit



4.5.2 Process Flow Diagram of Chocolate Making



CHAPTER 5

ENGINEERING DEPARTMENT

5.1 Preface

We have visited this department during internship 16th to 21st August, 2023 at Igloo Ice-cream factory. We first meet Mr. Ahmed Sharif Pasha, Asst. General Manager of Engineering department who gave us a brief outline about the Engineering section, their responsibility and task. Engineering department divided into five units:

- Production Unit
- Refrigeration Unit
- Electrical Unit
- Automobile Unit
- Mechanical Unit

5.2 Units of Engineering Department

5.2.1 Production Unit

From this unit, we have learned and able to know about the freezer, IQF (Instant quick freezer) and many others machineries which are using for manufacturing in the factory.

5.2.1.1 Freezer

A freezer is a cold storage device used to keep food and other perishable items at low temperatures to prevent spoilage. A freezer for ice cream is a cold storage appliance designed to maintain extremely low temperatures, allowing ice cream to be stored and preserved in its frozen state. It keeps ice cream solid and prevents it from melting. I have found 15 freezers in the factory which are categorized according to their capacity by a table chart.

Table 11: List of freezers and their capacity

SL. No	Capacity	Freezer Number
01	500 Liter/hour	6 and 7
02	600 Liter/hour	9, 10, 11 and 12
03	700 Liter/hour	14 and 15
04	1200 Liter/hour	1, 2 and 5
05	1500 Liter/hour	8 and 13
06	1600 Liter/hour	3 and 4

5.2.1.2 IQF

IQF means-Instant Quick Freezer. We can also call it individual quick freezing based on the drum segment of IQF. There are two types of IQF we have found out which is using continuously during production in Igloo Ice-cream factory, they are:

- 1. IQF-5000 L:** There are three compressors used in 5000L IQF. This IQF capable to produce near -50°C . Rollo-27 machines are get cold supply from under this IQF for storing products.
- 2. IQF-3000L:** It has less compressor comparative IQF 5000L. There are only two compressors used in it and capable to produce temperature 1°C to 5°C . All the activities of factory regulate IQF 3000L under this temperature, such as-chilling water supply.

5.2.1.3 Storage

Storage is an important thing to preserve or store finished products and protect products from insect infestation and make longer shelf life. Cold chain is the most necessary thing for ice-cream to protect from melting which can get form storage. In Igloo Ice-cream factory, storage temperature maintains -35°C to -40°C

5.2.2 Refrigeration Unit

This is the most important unit among all the unit of engineering department. Because, Ice-cream production depend on cold chain. Without cold chain we can't imagine ice-cream manufacturing. The cold chain maintained by this unit.

Refrigeration unit works on refrigeration cycle and supplying cold temperature continuously for ice-cream.

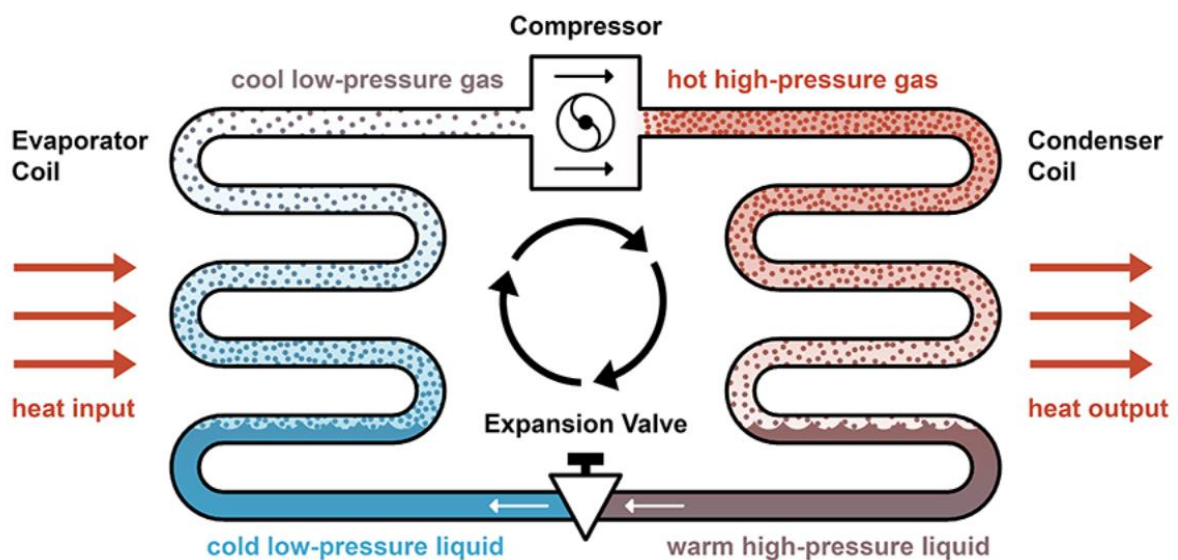


Figure 7: Refrigeration Cycle

5.2.3 Electrical Unit

Electrical unit leading the electricity supply for that factory. They are using two types of media to get electricity supply for industrial activities, they are:

- Direct electricity, and
- Generator

Why are they using generator for producing electricity instead of direct electricity?

They are using generator to reduce their electricity cost. Because generator is less cost comparative to use direct electricity. Besides, the electricity which is generated through generator is available for 24 hours. They are using total 3 generators to generate electricity.

There are two types of generators using for generating electricity, they are:

Table 12: List of generators

SL. No.	Name of Generator	Capacity of Generator
01	Gas Generator	i) 1500 kw
		ii) 2063 kw
02	Diesel Generator	525 kw

5.2.4 Automobile Unit

Approximately 150 cars are being used to distribute ice cream. A car facilitates the transportation of ice cream to various locations. To acquire and maintain such items, they have several agents throughout our nation. They are worried about keeping up their cold chain, which is essential for distributing ice cream. The Automobile Department is in charge of maintaining the vehicles and handling a variety of transportation-related issues.

5.2.5 Mechanical Unit

A factory may experience many kinds of mechanical issues. The mechanical section under the engineering department is responsible for maintaining those systems and addressing a wide range of issues related to industrial operations.

CHAPTER 6

MILK UNIT

6.1 Introduction

On August 22nd and 23rd, 2023, we paid a visit to the milk facility. We encountered Mr. Md. Fardous Ali, the manager of this unit, together with the production officer and the milk unit workers, who all made a sincere attempt to assist us. They provided us with knowledge on dairy and talked about the processing of dairy products, the pasteurization system, related machinery, and labor management.

The two main kinds of milk produced in a milk unit are as follows:

1. Milk that is fresh
2. Mango and chocolate flavored milk

In addition to the things listed below, they are also made in milk units:

- Curd that is sweet
- Curd that is sour

6.1.1 Ingredients of Fresh and Flavored Milk

Fresh milk: Fresh milk is raw milk that has not undergone any processing or pasteurization, typically obtained directly from cows or other mammals, and is safe for consumption in its natural state.

Skim milk powder: Skim milk powder is a dairy product made by removing the fat content from milk, resulting in a dry, powdered form of milk that is low in fat but retains its protein and other nutrients.

Sugar: Sugar is a common carbohydrate found naturally in many plants, particularly sugar cane and sugar beets.

Stabilizer: A stabilizer is a substance or ingredient added to food to prevent separation, settling, or deterioration of the product's quality over time.

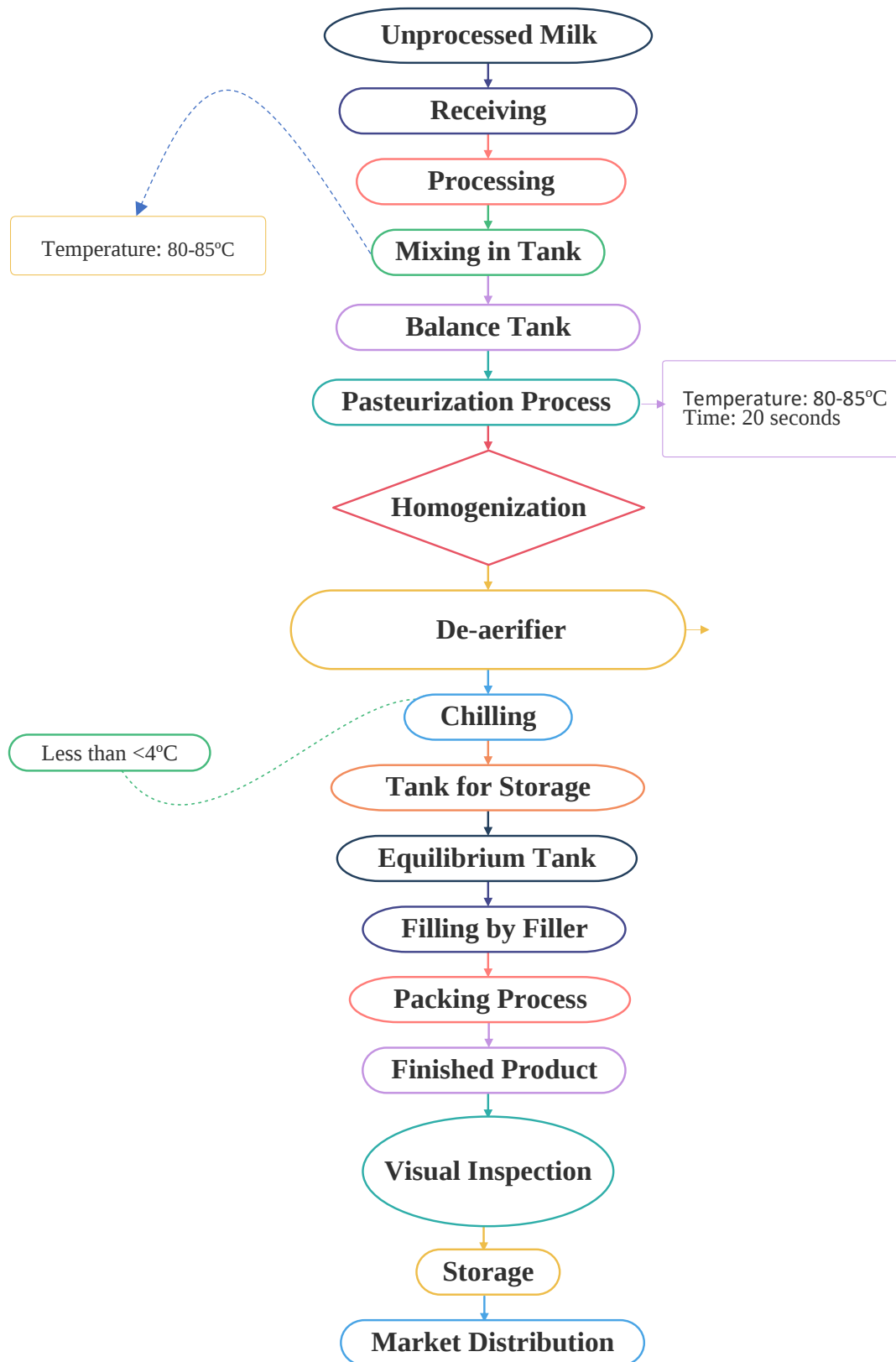
Color: Color additives are substances used to provide or enhance colors in various products like food, cosmetics, and drugs.

Mango pulp: Mango pulp is the soft, fleshy part of a mango fruit that has been extracted and processed into a smooth and thick puree.

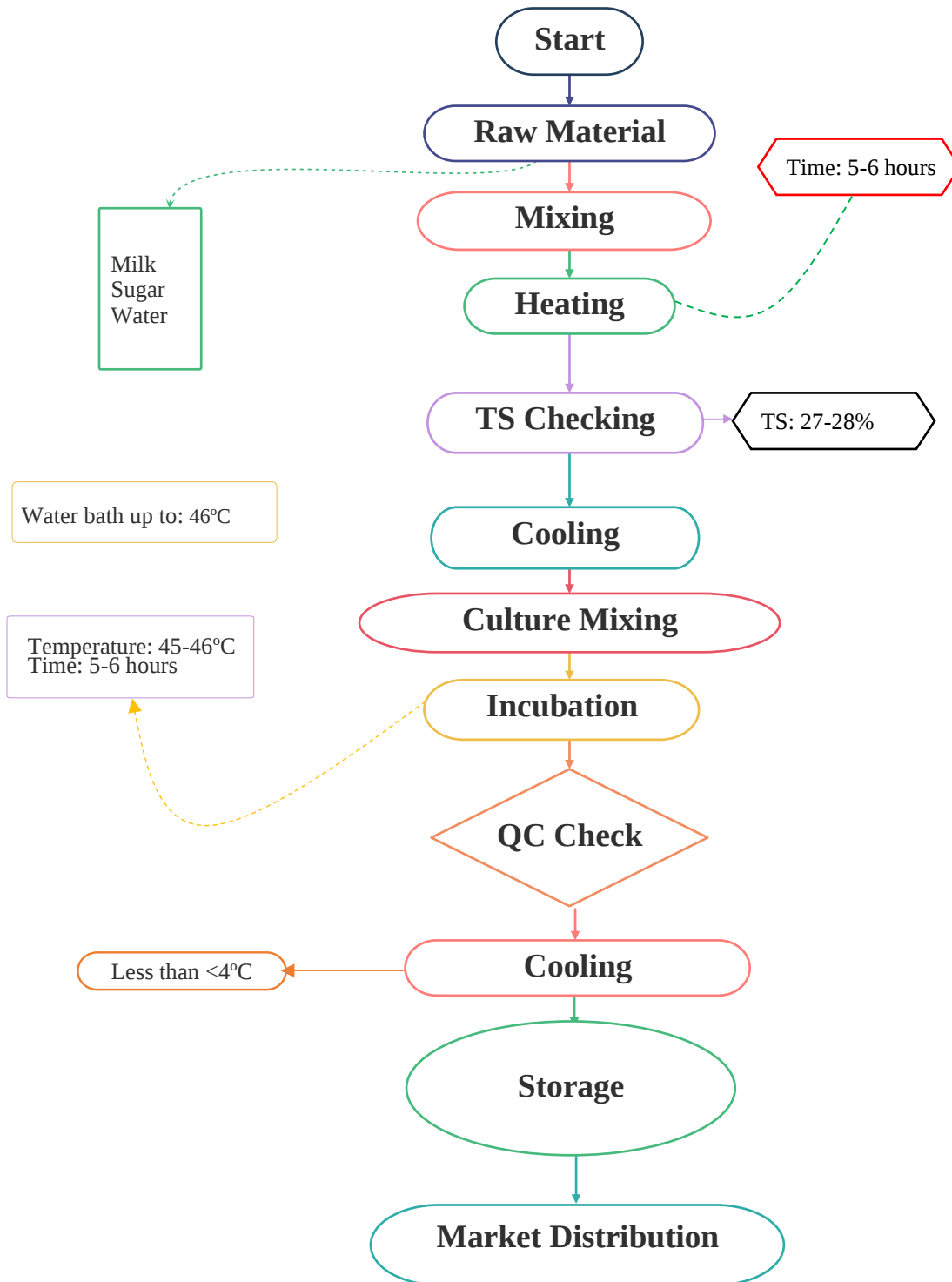
Flavor: Flavor additives are substances added to food, beverages, or other products to enhance or impart specific tastes or aromas.

Chocolate: Chocolate is often used in milk to create a rich and indulgent beverage known as hot chocolate or chocolate milk, combining the creamy goodness of milk with the sweet, cocoa flavor of chocolate.

6.1.2 Flowchart of Milk Processing



6.2 Yoghurt Manufacturing Flowchart



CHAPTER 7

PLASTIC UNIT

7.1 Foreword

We have visited in this unit 24th to 27th August, 2023. In Igloo ice-cream factory, they manufacture their own plastic packaging, such as- all plain cup, and containers. It helps to reduce cost and make more profit. They use three types of raw material to manufacture those plastic packaging. Besides, they have owned some machineries by which they are manufacture continuously as required. Three types of plastic raw materials are:

1. **HIPS:** High Impact Polystyrene (HIPS) is a versatile plastic material commonly used in various applications. It's a type of thermoplastic polymer known for its toughness and impact resistance, making it suitable for products like disposable cutlery, food packaging, toys, and computer housings. HIPS is often chosen for its ease of processing through methods like injection molding and extrusion.
2. **K-Resin:** K-Resin is a brand name for a specific type of styrene-based transparent copolymer resin. It is known for its clarity, high gloss, and excellent impact resistance, making it a popular choice for various packaging applications, such as clear containers, blister packaging, and disposable cutlery.
3. **Color:** Colorants for plastic container manufacturing can be in the form of pigments or dyes specifically designed for plastics. These colorants are added to the plastic resin during the manufacturing process to achieve the desired color for the containers.

7.2 Machineries of Plastic Unit

In Igloo factory, they are using various types of machineries to reach their purpose. Now let's discuss about those machineries:

Injection Molding Machine: An injection molding machine is a specialized industrial machine used in the manufacturing process of plastic products. It works by melting plastic resin pellets and injecting the molten material into a mold cavity under high pressure. Once the plastic cools and solidifies within the mold, it takes the desired shape of the product.

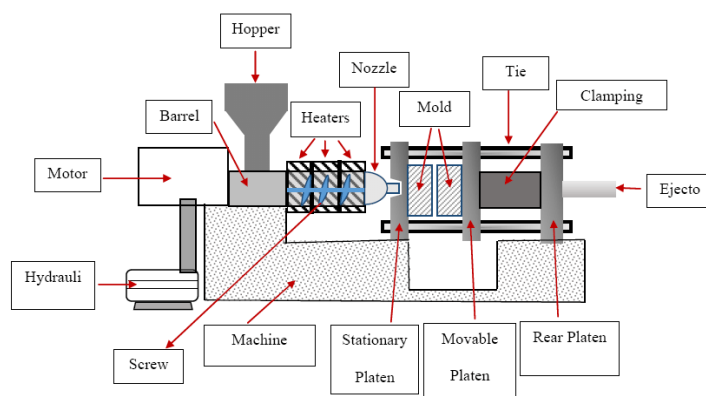


Figure 8: Injection Molding Machine

Thermoforming Machine: A thermoforming machine is a manufacturing device used to shape thermoplastic sheets into specific molds or forms by heating the plastic until it becomes pliable and then applying vacuum or pressure to create products like trays, containers, and packaging. This process is commonly employed in industries such as packaging, automotive, and consumer goods for producing cost-effective and customized plastic parts. Thermoforming machines can vary in complexity, from simple manual setups to high-speed automated systems.

Extruder Machine: An extruder is a mechanical device used in manufacturing to shape and form materials, typically thermoplastic resins or food products, by forcing them through a die or nozzle under pressure. It's widely employed in industries like plastics processing for creating various profiles, pipes, and films, as well as in the food industry for making pasta, snacks, and more. Extruders come in different types, including single-screw and twin-screw models, each suitable for specific applications.

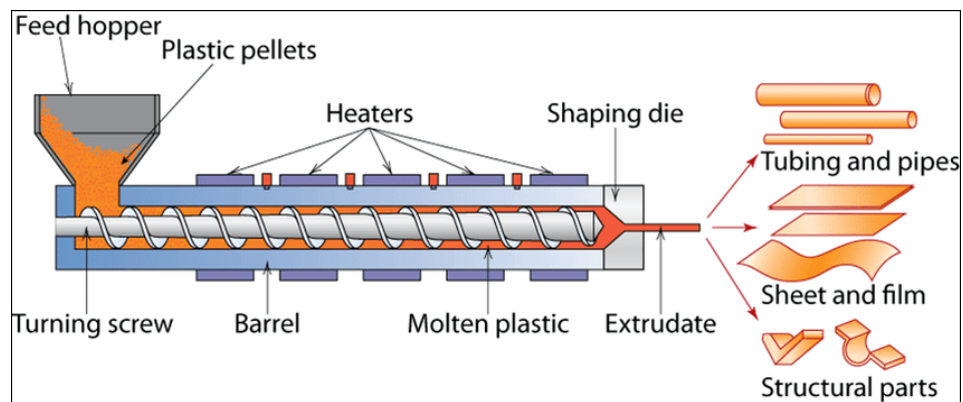


Figure 9: Extruder Machine

Plastic Cutter Machine: A plastic cutter machine is a piece of equipment designed for cutting and shaping plastic materials. It typically employs various cutting methods such as blades, lasers, or routers to precisely cut plastic sheets, pipes, or profiles to specific dimensions. These machines are used in industries like packaging, signage, and construction for producing custom plastic parts or products. They vary in size and complexity, from small desktop cutters for hobbyists to large industrial machines for high-volume production. The choice of a plastic cutter machine depends on the type of plastic material, thickness, and the desired cutting precision for the application.

CHAPTER 8

OTHERS UNIT

8.1 General Store Unit

I have got only one day to visit the general store unit and the day was 28th August, 2023. I have completed all the task within that day. I went the store room and I see the store room is about three floors. There are many raw materials stored in there. Now I am going to show a list some of those raw materials through a table chart in below:

Table 13: Product list of store unit

General Materials	Flavors	Chemical Materials	Packaging Materials	Colors
Butter oil	Caramel	Lecithin	Paper Stickers	Chocolate
Sugar	Toffee	Vanillin Powder	Paper Cartons	Caramel
Skim Milk Powder	Cream	Icing Sugar	Wrapping Cup	Apple
Vegetable Fat	Chocolate	Sorbitol	Plastic Container	Orange
Chocolate Chips	Vanilla	Guar Gum	Tin Container	Strawberry
Toffee Coating	Mango	Butter Corn Strach	Plastic Cup	Lemon
Red Cherry Fruit	Strawberry	Glucose	Cone sleeve	Vanilla

8.2 Distribution Unit

I made a visit on 29th August in 2023. Distribution unit is responsible for the efficient and organized flow of materials, components, and finished products within the manufacturing facility. Its principal duties consist of:

- Receiving demand from several sources
- Clearing of accounts
- Car loaded with excursion pass, vat, and chalan
- Goods delivered to the deposit officer
- Sub dealer contact

8.3 Administration Department

I have completed a schedule 30th August, 2023 which was the last departmental visit of this factory. The department also known as HRM or human resource management. This department is conducting and responsible for various administrative functions, managing personnel and compliance. Here are some key responsibilities and functions of this department:

Recruitment and Staffing: HR is responsible for recruiting and hiring employees at all levels, from production line workers to management positions. They ensure that the workforce is adequately skilled and meets industry-specific requirements.

Employee Onboarding: This department conducts orientation programs for new hires, familiarizing them with company policies, safety regulations, and industry-specific food handling guidelines.

Training and Development: HR coordinates training programs to enhance employee skills, especially in areas like food safety, sanitation, and quality control.

Labor Relations: HR manages relationships between management and labor unions or employee associations, if applicable, to ensure fair labor practices and dispute resolution.

Benefits Administration: They oversee employee benefits such as health insurance, retirement plans, and leave policies, ensuring compliance with industry standards and labor laws.

Safety and Compliance: HR and Administration departments collaborate to enforce workplace safety measures and ensure compliance with food safety regulations, including HACCP (Hazard Analysis and Critical Control Points) standards.

Payroll and Compensation: HR handles payroll processing, salary adjustments, and compensation reviews to ensure fair and competitive wages within the industry.

Employee Relations: They manage employee grievances, performance evaluations, and disciplinary actions, promoting a healthy work environment.

Administrative Support: The Administration aspect of the department manages facilities, office space, equipment, and general administrative tasks to maintain an efficient workplace.

Record Keeping: They maintain personnel records, compliance documentation, and other administrative records necessary for audits and inspections.

The HR and Administration department in this factory plays a crucial role in ensuring that the workforce is well-trained, compliant with industry regulations, and capable of producing safe and high-quality food products. Their efforts contribute to the overall success and reputation of the company.

CHAPTER 9

CIP AND ETP

9.1 CIP (Clean-In-Place)

Clean-in-place (CIP) is a cleaning method used mainly in the pharmaceutical manufacturing industry. CIP can be implemented to clean vessels, interior surfaces of pipes, filters, process equipment, and fittings, without disassembly.

9.1.1 Regarding the Same Item:

Step 1: Give it a five-minute pre-rinse with regular water.

Step 2: Flashing for ten minutes at 50°C, or warm water.

Step 3: Circulate a caustic solution (1.5–2% NaOH) at 80°C for 15–20 minutes.

Step 4: Give it one more rinse by giving it a 10-minute blast of warm water (50°C).

Step 5: Use RO cold water to do a sanitizing rinse.

9.1.2 For Various Item:

Step 1: Perform a five-minute pre-rinse with regular water (RO).

Step 2: Flashing at 50°C, or warm water, for 10 minutes.

Step 3: For 15 to 20 minutes, circulate a caustic wash (1.5–2% NaOH solution) at 80°C.

Step 4: Use intermediate grade nitric acid (1% HNO₃ solution) to rinse after 15 to 20 minutes of 80°C circulation.

Step 5: Run warm water (50°C) over the area for 10 minutes to give it one more rinse.

Step 6: Rinse with sanitizing RO cold water.

***Note:** The CIP system is stopped after the pH of the line is determined to be neutral (6.4–7.4) by comparing the pH of the pre-rinse water with the pH of the drain out water (step: sanitizing rinse).

9.1.3 Some Advantages to CIP Systems:

- Much faster than manual cleaning
- Less labor intensive, no disassembly or reassembly
- Highly repeatable results
- Documentation
- Safer for workers, less chemical exposure
- Effectively helps to manage water and chemical costs

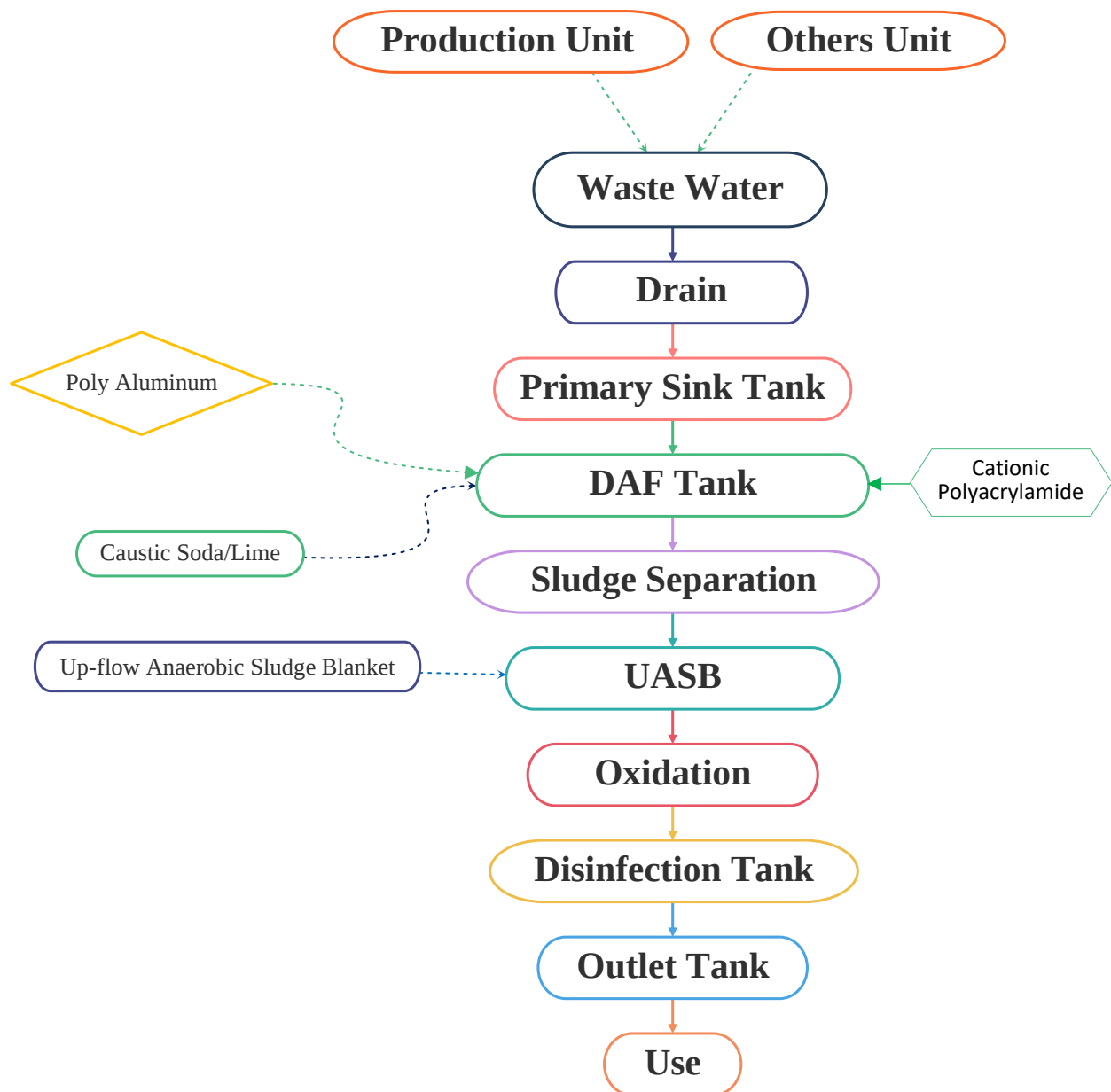
9.1.4 Some Disadvantages to CIP Systems:

- CIP systems tend to have higher initial costs.
- CIP systems can be complex to design, install, and operate.

- The use of cleaning chemicals in CIP systems may raise concerns about chemical safety and environmental impact.
- IP cycles can be time-consuming, leading to downtime in production. This may affect overall productivity, especially in industries where continuous production is critical.

9.2 Effluent Treatment Plant (ETP)

Effluent Treatment Plant (ETP) are a sort of waste water treatment process that is specifically developed to purify industrial waste water for reuse, with the goal of releasing clean water to the environment that is free of the detrimental effects of effluent. Depending on the industry, industrial effluents contain a variety of elements.



CHAPTER 10

LEARNING OUTCOME

10.1 Conclusion

Igloo Ice-cream and Milk Unit is the only ISO 9001:2000 and HACCP-certified ice cream company in Bangladesh. Igloo Ice Cream is a popular ice cream brand known for its wide range of flavors, high-quality products, and maintaining hygiene and product safety. With a focus on quality ingredients and innovative flavors, Igloo has carved a niche for itself in the competitive ice cream market. Their commitment to customer satisfaction and product safety is evident in their adherence to food safety standards and quality control measures.

During my internship in the food industry, I achieved several significant learning outcomes that have contributed to my personal and professional growth. First and foremost, I developed a comprehensive understanding of food safety and hygiene protocols, ensuring that all operations complied with industry standards and regulations. We (me and my teammates) have learned lots of things since the end of this internship. We have developed our work habits and attitudes through this internship, which are necessary for job success. Through this internship, we have also developed our communication, interpersonal, and other critical skills. Besides, we are able to learn about various proximate analysis methods. This knowledge will bolster my confidence. Furthermore, I gained invaluable hands-on experience in various aspects of food production. This included tasks such as ingredient sourcing, preparation, and quality control, which provided me with a holistic view of the entire production process. It was fascinating to witness the transformation of raw ingredients into finished dishes, and this experience greatly expanded my culinary knowledge and skills.

I feel very proud and glad to be a part for a while (1st to 31st August, 2023) of the “Industrial Training Program.” I am very lucky that I got a chance to compare my theoretical knowledge with practical knowledge about raw materials, product manufacturing, product management systems, manufacturing machines, space utilization, good manufacturing practices, quality assurance procedures and methods, as well as their techniques, etc.

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