

TECH-KNOWLEDGE

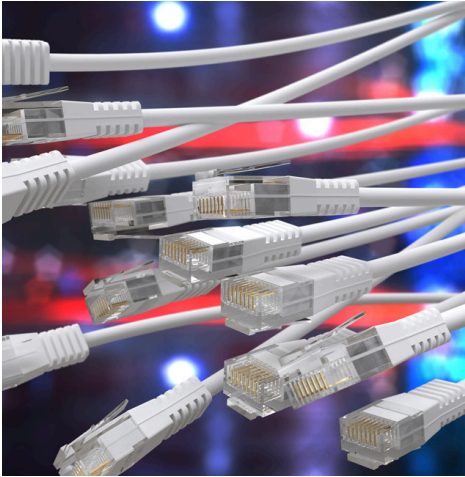
The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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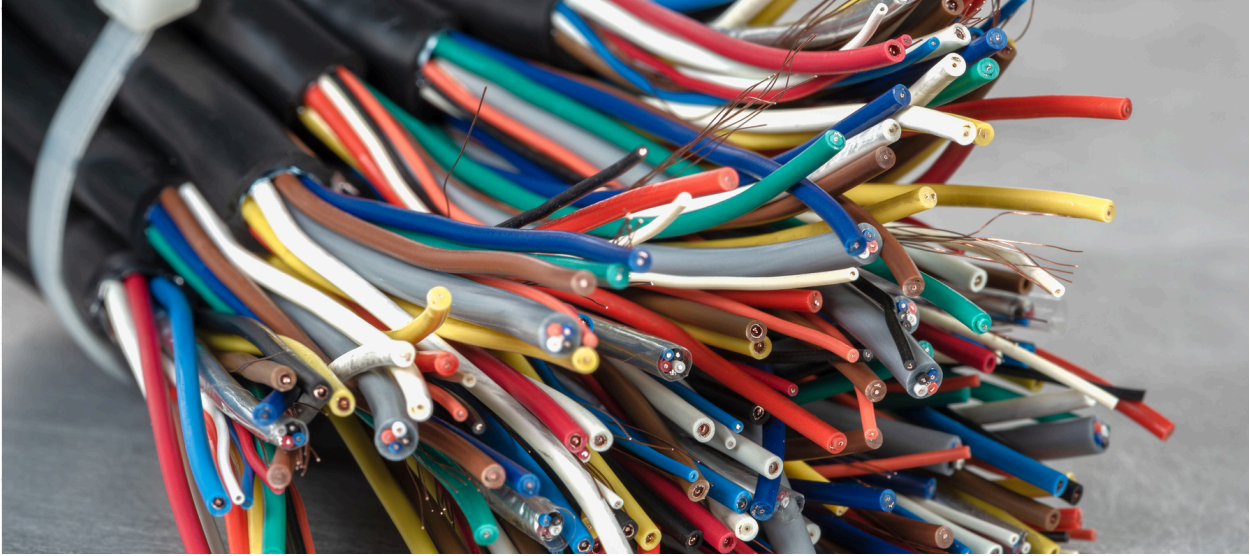
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Cable & types



Introduction

Cable is assembly of two or more than two conductor in running side by side or bundled form. It is used in building wiring and used in industry and commercial places to aim to transmit power or signal from one to another, and it is very important to install wire of good quality; otherwise, it would burn down. It is very careful about selection of cable according to requirement. There are many types of cable that are found in the market according to use. There are also communication cables used to transmit low-power signals and for uses of electronic signal purposes. Fibre optical cables are used for optical data through light sources to receiving devices, and the cable used to transmit electric power is called a Power cable.

Basic parts of power cable

1.Conductor

Copper and aluminium are used as a conductor material in cable because of higher electrical conductivity solid or number of bare wires either made up of aluminium or copper to make a power cable.

2.Insulator

Most used insulators in cables like polyvinyl chloride, impregnated paper, butyl rubber, cross-linked polythene, but the paper-insulated cable is preferred because of their high current capacity and generally reliable and long life.

3.Inner Sheath

It is basically used for protecting the cable from moisture because moisture evaporates the property of insulation. It is made of lead alloy, and these strengths withstand the internal pressure of pressurized cables. The material should have nonmagnetic material in the inner sheath. In power cables there is an aluminium sheath is used because it is cheaper, smaller in weight and high mechanical strength than the lead sheath.

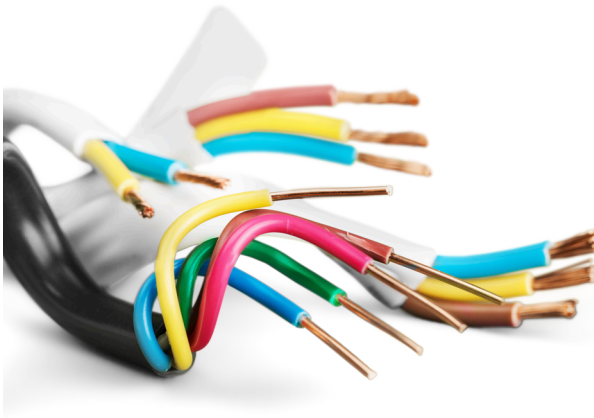
4.Armouring

Armouring is done by galvanized steel wire, or two layers of metal type are applied over the sheath to protect it from mechanical damage. The steel wire is normally used because it has high longitudinal strength.

5.Oversheath

It gives cables mechanical strength and protects them from damage from moisture, corrosion, dirt, dust, and so on. The thermoplastic material is used to make the sheath.

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Types of Cable

1.Ribbon Electric Cable

It consists of multiple insulated wiring running parallel with one another and used for multiple data transmission like this is used to connect the CPU with motherboard. And are generally used for interconnection of networking devices.

2.Shielded Cables

It consists of a solid copper or steel conductor plated with copper, enclosed in a metallic braid and tape. This is entirely covered by with an insulated protective outer jacket. These electric cable types are used for computer networking and audio video networking. It is used in telephone trunk lines ,broadband internet, high speed computer data busses, cable television and connecting radio transmitter.

3.Twisted Pair Cables

It has two or more insulated copper wires which are twisted with each other and are colour coded. These are used in telephone cable and resistance to external interference can be measured by number of wires.

4.Fiber Optical Cable

These types of cables are used to transport optical data through a light source to the receiver. It is assembled similarly to electrical cables but contains one or more optical fibres that are used to carry light. These optical fibre elements are typically individually coated with a plastic layer and contained in protective tubes suitable for the environment.



5.Instrumentation Cable

These are flexible and shielded cables for signal transmission between equipment in industrial installation. Especially suitable for optimum data transmission with high level of electromagnetic interference.

6.Underground Cable

Underground cables are employed to transmit and distribute electrical power where it is impractical to use overhead transmission lines, or this is used in congested areas where it is impossible to use overhead transmission lines. There are kinds of cable used depending upon voltage level and service requirement.

Selection of Cable

For consideration of cable for correct size and for type of application, some factor to be considered such as following:

- a)System voltage
- b)Current carrying capacity
- c)permissible voltage drop
- d)Short circuit rating

Carbonation in Tonic Water



Introduction

Tonic water is carbonated water infused with quinine. This compound, which is extracted from the bark of the Cinchona tree, provides a distinctive bitter taste. For a drink to be called tonic water, a minimum level of quinine must be added. The maximum amount that can be added is also regulated, but it varies from country to country; for instance, it is 57 mg/L in the United Kingdom, 83 mg/L in the USA, and 85 mg/L in Germany. To mask the bitter flavour, sweeteners such as fructose, as well as artificial flavouring agents, are also used in the preparation of tonic water. As tonic water is a moderately carbonated product, the quality of the added carbonated water has a significant impact on the organoleptic properties of the product.

Carbonation process

Carbonation is the impregnation of a liquid with carbon dioxide gas. When dissolved in water, it forms carbonic acid. This acid, in combination with the product, produces the acidic and bitter taste found in CSDs. The carbonation process is the last process while manufacturing tonic water. Soft drinks beverages contain carbonation ranging from 1 to 5 volumes of CO₂ gas per volume of liquid. In tonic water, the level of carbonation is not more than 4 CO₂ gas volumes.

Typically, water alone is often carbonated to ensure minimum contamination of the system by syrup or concentrates. The product is spread over chilled plates such that the product runs down the plates as a thin film. This is carried out in a constant-pressure carbon dioxide atmosphere, the lighter, displaced air being bled off. Chilling the product between 1°C to 5°C as a film maximizes the surface area available to the CO₂, thus promoting effective carbonation. This has the added benefit that at a lower temperature, the gas stays in solution more easily.

Functional Parts of a Carbonation system

1.Deaeration group:

It is composed of a horizontal tank kept to a high grade of vacuum by a liquid ring vacuum pump; the incoming water is added CO₂ and sprayed using high-efficiency nozzles; a second pump recycles the water from the first to the second stage where a second CO₂ addition takes place. The system ensures the removal of the air inside the feeding water, and the addition of CO₂ is manually adjusted with a special needle valve provided with a flow meter variable area.

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2.Dosage group:

It allows the automatic dosage control of the right quantity of syrup in the water; the correct amount is ensured thanks to a control and measure chain consisting of mass flow meters mounted both on the syrup and water line.

3.Cooling group:

A plate heat exchanger cools the mixed product down to 6°C. The thermal exchange is obtained in countercurrent with glycol solution regulated by a pneumatic modulating valve. This valve is controlled by a temperature probe mounted on the drink outlet pipe from the heat exchanger.

3.CO₂:

injection group in line high pressure: It is obtained thanks to the use of a pneumatic modulating valve, a mass flow meter and one injector able to disperse the gas into the liquid.

4.Mixing group:

It is realized using two static mixers with high performance which allows the best mixing of gas into liquid..

5.Storage and final product stabilization group:

It is a buffer tank kept at a constant pressure by means of a CO₂ injection valve and a vent modulating valve. The tank is equipped with a continuous level to manage the various processing phases and adapt the work range to the filler one. A centrifugal pump regulated by an inverter allows the transfer of the final drink to the filler.



Filling of carbonated beverages

The filling of carbonated beverages is achieved under gravity, the rate of flow being dependent on the head difference between the filler bowl and the container.

The rate of flow to fill the container is a function of the overpressure applied to the top of the filling bowl (p), the viscosity of the liquid to be filled (μ), the diameter of the filling tube (d) and the length (d) and the length of pipe (l). This can be expressed mathematically by the following formula:





INDUSTRY BUZZ

The FSSAI releases a new organic food logo.

The Food Safety and Standards Authority of India (FSSAI) just unveiled the new emblem for organic goods. Thanks to this action, customers will find it easier to recognise real food. This new emblem outlines the guidelines for organic and non-organic goods. Organic food goods now require this new logo.

The FSSAI, in partnership with the Ministry of Agriculture and Farmers Welfare's Participatory Guarantee System for India (PGS-India) and the Agricultural and Processed Food Products Export Development Authority (APEDA), created the logo. The Jaivik Bharat line will be positioned at the bottom of the unified logo, which serves as an identity symbol.

The logo is green and features a single circle, a leaf, and a checkmark. The checkmark indicates that the product is FSSAI-certified organic. The green leaf represents nature, and the colour green represents the natural environment.



Asia Fruit Logistica's ticket shop is currently open.

Asia Fruit Logistica's online ticket store is currently operational. From September 4-6, 2024, Hong Kong will host Asia's preeminent fresh fruit and vegetable trade event, which will unite the worldwide fresh produce industry and highlight the full value chain.

Over three jam-packed days, attendees of Asia Fruit Logistica can anticipate an exceptional exhibitor line-up showcasing a diverse range of goods and services from suppliers worldwide.

Included with every ticket is free entry to the Asia Fruit Business Forum and Asia Fruit Congress, which are held at the newly opened Asia Fruit Knowledge Centre on the exhibition floor.

Save up to 40% on your tickets when you buy them online instead of at the box office. In addition to saving money, advance ticket purchases allow guests to avoid on-site wait times.





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Labels and advertisements claiming 100% fruit juice must be removed, per FSSAI directive.

All Food Business Operators (FBOs) are required by an order from the Food Safety and Standards Authority of India (FSSAI) to immediately remove any mention of "100% fruit juices" from the labels and ads of reconstituted fruit juices. Additionally, before September 1, 2024, all FBOs are to use up all of the pre-printed packaging materials already in stock.

FBOs are reminded to adhere to the fruit juice standards outlined in sub-regulation 2.3.6 of the Food Safety and Standards (Food Products Standards & Food Additives) Regulation, 2011 in the clarification regarding the marketing and sale of reconstituted fruit juices as "100% fruit juices." According to this regulation, the Food Safety and Standards (Labelling and Display) Regulations, 2020 must be followed when labelling products covered by this standard.

Concern over purported actions by several parallel channels is expressed by AICPDF.

Concerns have been raised by the All India Consumer Products Distributors Federation (AICPDF) regarding the purported undermining and infiltration of the FMCG industry by several unofficial outlets, notably Metro Cash & Carry.

The Federation said, "We have received numerous complaints from different states regarding these issues, severely disrupting the traditional distribution channels."

The Federation claimed that stock records were manipulated using such parallel routes.

The corporations' field employees are allegedly falsifying closing stock data and putting undue pressure on distributors to fulfil implausible Product Line Incentive Plan (PLIP) targets. Distributors are under pressure to participate in fake billing and push goods to neighbouring areas or states, which distorts the market and creates artificial demand," the statement continued.



According to a conference, FSSAI is working to integrate all food-related rules.

With the goal of improving "ease of doing business," the FSSAI has begun work on integrating all food-related laws in India.

Packaged drinking water served as the initial step in the procedure.

In accordance with the government's vision of "One Nation, One Commodity, One Regulator," Inoshi Sharma, Executive Director of the Food Safety and Standards Authority of India (FSSAI), has stated that the organisation aims to streamline administrative procedures and regulations for companies engaged in the food industry by combining the BIS mark requirement for packaged drinking water within FSSA regulations.

During addressing at the CII Conference on Water Stewardship in the Food and Beverage Sector 2024, the food regulator has also requested that the industry concentrate on water management while producing food and beverages and use resources prudently.

WEEKS HIGHLIGHT



3 JUNE

NATIONAL EGG DAY

Crack open the celebration! It's Egg Day, a time to savor the versatile goodness of eggs. Whether scrambled, poached, or sunny-side up, let's honor these protein-packed delights and all the delicious possibilities they bring to the table.



4 JUNE

NATIONAL CHEESE DAY

How grate is it to celebrate the cheesiest day of the year? 🧀 Let's brie-ze through today with a gouda attitude and cheddar some smiles! Happy Cheese Day! Say Cheese

DID YOU KNOW?



Frozen savory baked goods refer to a wide range of frozen, pre-baked, or par-baked food products that are typically made with flour and savory ingredients such as meats, vegetables, herbs, and spices. These products are intended to be baked or reheated in an oven or microwave before being consumed.

Frozen flour-based desserts include:

1. Frozen pizza:

Made with a variety of toppings and can be cooked in the oven or microwave.

2. Frozen quiche:

Made with eggs, milk or cream, cheese, and vegetables or meat.

3. Frozen pies:

Chicken pot pie or shepherd's pie, are available in the frozen food section of grocery stores.

4. Frozen pastries:

Sausage rolls or spinach and feta rolls can be baked in the oven before being consumed.



Market Scope

- The market scope for custard and jelly powder is expected to continue to grow in the coming years, driven by factors such as changing consumer lifestyles, increasing demand for convenience foods, and expanding distribution channels.

Major players in the Market

- Dr. Oetker
- Jell-O
- Nestle
- Premier Foods
- McCormick



Fact 1

Employing advanced preservation techniques, frozen savory baked goods undergo meticulous preparation to uphold quality. Swift freezing is employed to inhibit microbial growth and maintain texture. Vacuum sealing prevents moisture loss and freezer burn, ensuring product integrity. Precise control over freezing parameters minimizes ice crystal formation, preserving the savory goodness. These technical processes guarantee optimal quality and prolonged shelf life for consumers

OTHER FROZEN BAKED GOODS

1/3

Other frozen baked goods include a wide range of products that are made from dough and baked before being frozen for later consumption.

Commercial Production

- 1. Recipe development:**
Creating and testing recipes for new products or modifying existing recipes to improve quality, taste, or other attributes.
- 2. Ingredient selection and preparation:**
Ingredients, such as flour, sugar, eggs, and other baking ingredients, and preparing them for use in the recipe.
- 3. Mixing and kneading:**
Mixed and kneaded together to form a dough or batter.
- 4. Shaping and portioning:**
Shaped and portioned into the desired size and shape for the product being produced.

2/3

- 5. Baking:**
Baked in ovens or other specialized equipment.

- 6. Cooling and packaging:**
Cooled and then packaged for distribution.

- 7. Freezing and storage:**
Frozen at a temperature of -18°C or lower to ensure that they remain fresh and retain their quality during storage and transport.

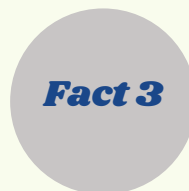
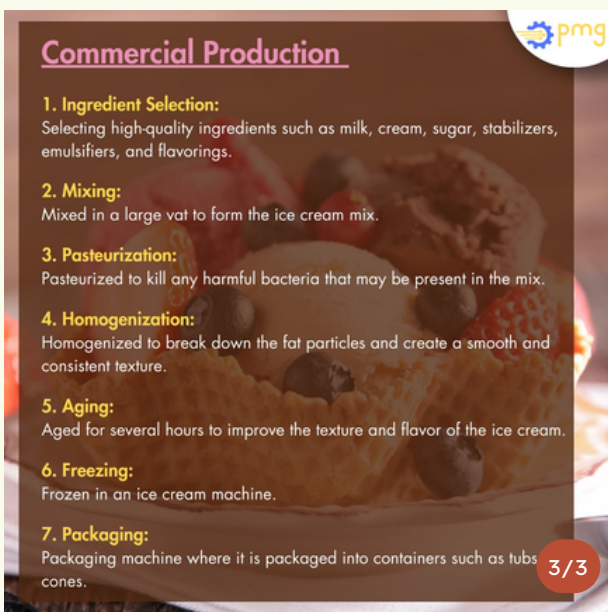
Market Scope

The global market for frozen baked goods is projected to grow at a compound annual growth rate (CAGR) of around 6.5% between 2021 and 2026, driven by increasing demand for convenience foods, the growing popularity of snacking, and the rise of e-commerce and online grocery shopping.

3/3

Fact 2

Other frozen baked goods are meticulously prepared before rapid freezing, ensuring quality preservation. Swift cryogenic methods rapidly lower the temperature, inhibiting microbial growth and maintaining texture. Vacuum sealing prevents moisture loss and freezer burn, safeguarding product integrity. Precise control over freezing parameters minimizes ice crystal formation, preserving the baked goods' texture and taste. These technical processes ensure optimal quality and prolonged shelf life for consumers



Ice cream undergoes precise preparation before rapid freezing, ensuring quality retention. The mixture is cooled and aerated to create a smooth texture. Rapid freezing, typically below -20°C, solidifies the mixture while minimizing ice crystal formation. Advanced overrun control ensures desired consistency. The finished product is packaged and stored at ultra-low temperatures to maintain texture and flavor.

SEMI-FINISHED ICE CREAM PRODUCTS



1/3

Custard and jelly powder are two types of dessert mixes that are commonly used in baking and cooking. Custard powder is a mixture of corn starch, sugar, and flavorings that is used to make custard, a thick, creamy dessert. The powder is mixed with milk and heated on the stovetop until it thickens, then chilled until it sets. Custard powder may be flavored with vanilla, chocolate, or other flavors.



- Known as Jelly or gelatin, is a mixture of gelatin, sugar, and flavorings that is used to make gelatin desserts.
- Powder is mixed with boiling water to dissolve the gelatin, then chilled until it sets and comes in a variety of flavors and colors.
- Custard and jelly powder are popular dessert mixes that can be used to create a variety of different desserts. They are widely available in grocery stores and can be used in a variety of recipes.

2/3

Commercial Production

1. Ingredient selection:

Used in custard and jelly powder include sugar, corn-starch or modified starch, milk powder, and flavorings such as vanilla.

2. Mixing:

Mixed in a specific ratio to create a homogeneous mixture.

3. Heating and drying:

Heated to a specific temperature to activate the starch and create a thick, smooth texture then dried using spray drying, roller drying, or drum drying to remove moisture and create a powder.

4. Packaging:

Packaged in various sizes and forms such as sachets, cans, or jars.



3/3

Fact 4

With meticulous processing, semi-finished ice cream products are crafted to ensure quality. This involves precise mixing, pasteurization, and homogenization, guaranteeing safety and uniform texture. Advanced freezing techniques are then utilized to minimize ice crystal formation. Following meticulous packaging, these products are stored at ultra-low temperatures, preserving their quality. Such methods ensure the optimal texture and taste of the final ice cream products.



Ice cubes are small, frozen cubes of water that are used to chill beverages and food items. They are typically made by filling an ice cube tray with water and placing it in a freezer until the water freezes solid.

Market Scope

- 1. Household:**
Used in homes for personal consumption.
- 2. Commercial:**
Used in restaurants, bars, hotels, and other commercial establishments.
- 3. Industrial:**
Used in various industrial applications such as food processing, chemical manufacturing, and medical industries.

Major players in the Market

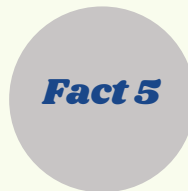
- Arctic Glacier Inc.
- Hoshizaki Corporation
- Scotsman Ice Systems
- Reddy Ice
- Kold-Draft Industries
- GEA Group AG
- The ICEE Company
- The ICEE Company

2/3

Commercial Production

- 1. Water Treatment:**
Used in ice cube production must be treated to remove impurities and contaminants that can affect the quality of the ice.
- 2. Ice Making:**
Pumped into an ice-making machine that freezes the water into ice cubes.
- 3. Harvesting:**
Harvested using an automated process. The cubes may be dropped onto a conveyor belt and then sorted and packaged for distribution.
- 4. Storage:**
Stored in large, insulated containers or ice bins that keep the ice cubes frozen until they are ready to be used.

3/3



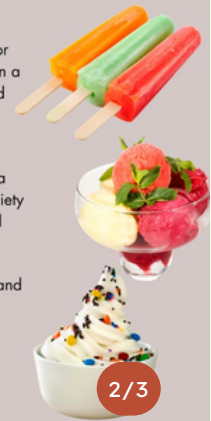
Frozen flour-based desserts undergo meticulous preparation before swift freezing, ensuring quality preservation. Advanced cryogenic methods rapidly lower the temperature to inhibit microbial growth and maintain texture. Vacuum sealing prevents moisture loss and freezer burn, maintaining product integrity. Precise control over freezing parameters minimizes ice crystal formation, preserving dessert texture and taste. These technical processes guarantee optimal quality and shelf life for consumers.



1/3

Other ice products refer to a variety of frozen food products that are made from ice, such as ice pops, ice cream, sorbet, and frozen yogurt. These products are often consumed as desserts or snacks and are popular among people of all ages.

- **Ice pops:** Made from fruit juice, flavored water, or other sweetened liquids. They are often served on a stick and come in a variety of flavors, colors, and shapes.
- **Ice cream:** Made from milk, cream, sugar, and flavorings. It is churned while freezing to create a smooth and creamy texture and made with a variety of flavorings, including fruit, nuts, chocolate, and candy.
- **Sorbet:** Made from fruit juice, water, and sugar and does not contain any dairy products.
- **Frozen yogurt:** Similar in texture and taste to ice cream but is made from yogurt instead of cream.



2/3

Market Scope

The market scope for other ice products is significant, and it is expected to continue to grow due to changing consumer preferences, increasing disposable income, and growing demand for healthy and innovative frozen food products.

Major players in the Market

- Nestle SA
- Unilever
- General Mills Inc.
- The Hershey Company
- Blue Bell Creameries
- Mars Inc.
- Rich Products Corporation
- Agropur Cooperative
- Dean Foods Company
- Dr. Oetker GmbH



3/3

Fact 6

Crafted through meticulous manufacturing processes, other ice products ensure quality. Purified water is frozen under controlled conditions using specialized machines. Advanced techniques regulate freezing, minimizing impurities and ensuring uniform crystal formation. The resulting ice products undergo meticulous packaging and storage in low-temperature environments to maintain quality. These procedures guarantee the production of high-quality ice products for various applications.



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- ENGINEERING MUST CREATE BUSINESS VALUE
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