

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

FOOD & BEVERAGE
INDUSTRY

ENGINEERING
& DESIGN

SCIENCE &
TECHNOLOGY

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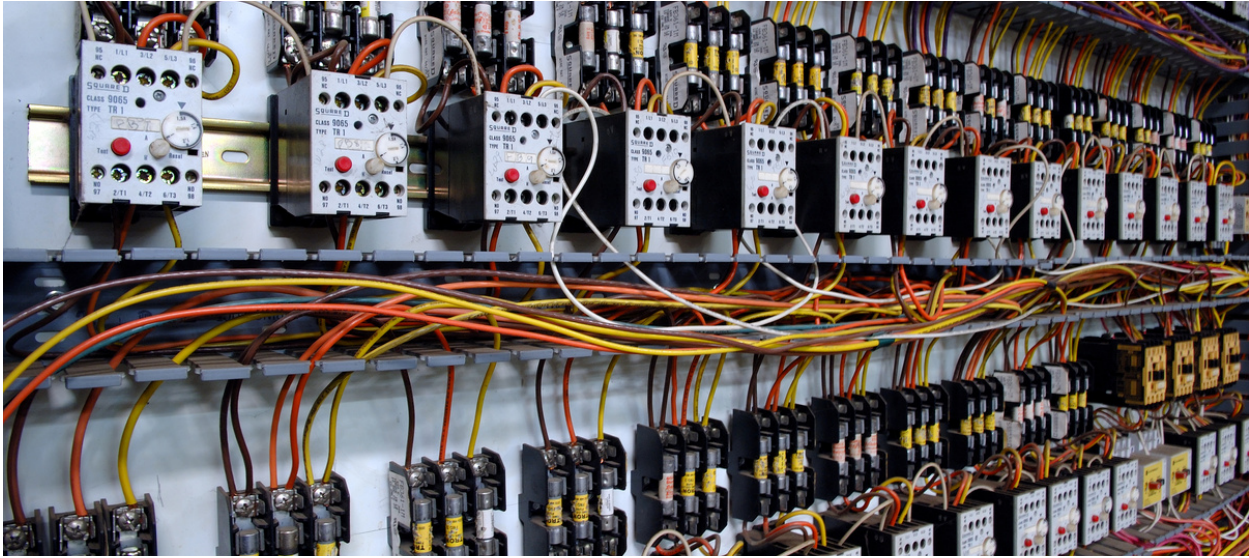
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ELECTRICAL PANEL



Introduction

Electrical panel is a combination of electrical devices which uses electrical power to control various mechanical function of industry equipment or machinery.

An electrical panel includes two main categories

1.Panel Structure

The structure of an electrical panel is a combination of enclosure and back panel. The enclosure is a type of metal box which varies in size and is typically made of an aluminium or stainless steel. The number of doors usually one or two needed on enclosure. Enclosure have following properties like waterproof, dust proofing and indoor and outdoor use purpose and Hazardous condition rating and back panels a sheet mounted inside the enclosure that provide structure support for DIN rail mounting and wiring ducts.

2.Electrical component

There are eight types of mainly electrical component within an electrical panel enclosure which define and organize a several different functions carried out by panel.

This component includes:

1. Main circuit breaker
2. Surge arrestors
3. Transformer
4. Terminal blocks
5. Programmable logic control
6. Relays and contractors

Types of Panels

1.HT panel

HT Panel are generally used to supply power to various electrical devices and distribution board. HT panels are installed for both outdoor and indoor application mostly used in every substation for controlling the power flow.

2.Power control centre panel

It take directly supply from transformer and used to control power supply in large industry as well as commercial units. The power supplied into heavy machineries, equipments , transformer are controlled according to need of electrical load using these PCC panels. It is used in every industry like chemical, plastic, paper, power, oil, and natural gas, dairies.The main function of panel is to protect and control power distribution for large manufacturing industries.

3.Main LT panel

These are used as low voltage panel to obtain power from generator or transformer and distribution electricity to various electrical devices and distribution board. LT panel are designed to function at lower voltage upto 430V with low insulation level.

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4.MCC panel

These panels are an assembly of starters, circuit breakers, fuses, relay and variable frequency drive to control drives from centre location. It consists of multiple enclosed section having a common power bus and with each section containing combination starter, which in turn consist of motor starter, fuses or circuit breaker and power disconnect. Motor control centre also includes push button, indicator, variable frequency drive, logic controller and starters and metering equipment. These panels are used in large commercial building, industry and where there are multiple drives that need to be controlled from a central location, such as mechanical room or electrical room.



Conclusion

The electrical panel serves as a vital component in controlling and distributing power for industrial machinery. Comprising enclosure structures and essential electrical components, such as circuit breakers and transformers, it facilitates safe and efficient power management. Different types, including HT panels for substations and MCC panels for centralized control, cater to diverse industrial needs. Overall, electrical panels play a crucial role in ensuring operational safety and efficiency across various industries.



Frozen Dessert



Introduction

Walking past a dessert shop and pulling down parents for getting an ice cream, kulfi or a sherbet would have been one of the most blissful childhood memories for most of us. But when it comes to business it is an issue of huge lawsuits and technical issues happening in the backdrop while you are buying an ice cream or a frozen dessert. An issue began in India the early 2010s between two dairy and food giants of the nation, due to a disparity claimed by the latter in Bombay High Court. Later Labelling was made essential by the food regulatory authority to mention the product is an Ice cream or a Frozen dessert.

FSSAI (Food Safety And Standards Authority of India) defines frozen dessert as a product obtained by freezing a pasteurized mix prepared with edible vegetable oils or fats, having a melting point of not more than 370C or vegetable protein products, or both. It may also contain milk fat and other milk solids with the addition of nutritive sweeteners and other permitted non-dairy ingredients. The said product may contain incorporated air and maybe frozen hard or frozen to a soft consistency.

Frozen dessert/ Ice Cream is a colloidal emulsion made with water, ice, milk fat, milk protein, sugar, and air. Water and fat have the highest proportions by weight creating an emulsion that has dispersed phase as fat globules. The emulsion is turned into foam by incorporating air cells which are frozen to form dispersed ice cells.

The triacylglycerols in fat are non-polar and will adhere to themselves by Van der Waals interactions. Water is polar; thus, emulsifiers are needed for dispersion of fat. Also, ice cream has a colloidal phase of foam which helps in its light texture. Milk proteins such as casein and whey protein present in ice cream are amphiphilic, can adsorb water and form micelles which will contribute to its consistency.

The proteins contribute to the emulsification, aeration, and texture. Sucrose which is disaccharide is usually used as a sweetening agent. Lactose which is sugar present in milk will cause freezing point depression. Thus, on freezing some water will remain unfrozen and will not give a hard texture. Too much lactose will result in a non-ideal texture because of either excessive freezing point depression or lactose crystallization.

Components

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The essential components for a frozen dessert are:

1. Raw Material

- Milk and/or milk products.
- Vegetable oils or fats.
- Vegetable protein products.

2. Permitted ingredients

- Sugar and other nutritive sweeteners (e.g. jaggery, dextrose, fructose, liquid glucose, dried liquid glucose, high maltose corn syrup, honey, etc.)
- Potable water
- Starch provided it is added only in amounts functionally necessary as governed by Good Manufacturing Practice, taking into account any use of the permitted stabilizers or thickeners.
- Other non-dairy ingredients - fruit and fruit products, eggs and egg products, coffee, cocoa, chocolate, confectionery, condiments, spices, ginger, and nuts; bakery products such as cake or cookies.



Ice Cream and Frozen Dessert

The simplest way to explain the difference between ice cream and a frozen dessert is that ice cream is made from milk/cream (dairy) and frozen desserts are made with vegetable oils. Considering the fact in detail, a frozen dessert contains vegetable oil and may or may not contain milk fat. On the other hand, an Ice cream contains only milk fat and no vegetable oil as the fat portion. An important issue with vegetable oil if they are hydrogenated is that they are rich in trans-fat, which is considered unhealthy, and inferior compared to milk fat. Ice cream and frozen desserts have come a long way since the first snow cone was made.

Innovations in a variety of areas over the past century have led to the development of highly sophisticated, automated manufacturing plants that churn out pint after pint of ice cream. Significant advances in fields such as mechanical refrigeration, chilling and freezing technologies, cleaning and sanitation, packaging, and ingredient functionality have shaped the industry.

Parameter	Frozen Dessert/ Frozen Confection	Medium Fat Frozen Dessert/ Confection	Low Fat Frozen Dessert/ Confection
Total Solids% (min)(m/m)	36	30	26
Weight (min)(m/m)	525	475	475
Total fat%(min)(m/m)	10	$2.5 < x < 10$	2.5
Protein (min)(m/m)	3.5	3.5	3.0



INDUSTRY BUZZ

Food Cold Chain Track & Trace Technology sales are expected to surpass \$7 billion.

The worldwide food sector is expected to invest heavily in temperature and humidity monitoring systems due to growing requirements for traceability reporting. This trend is further exacerbated by the US Food Safety Modernization Act (FSMA), which requires stricter reporting requirements for various food products and affects all US food supply chains, including exports. The global technology intelligence firm ABI Research predicts that by 2032, hardware sales and recurring SaaS subscriptions will account for more than \$7 billion in income from food cold chain track and trace operations worldwide.

According to Adhish Luitel, senior analyst for supply chain management and logistics at ABI Research, "Technological solutions are essential for ensuring the quality and safety of food products, and they must be enabled for cold chain management to be effective."

The FSSAI starts a food safety awareness campaign at Delhi's well-known markets.

In partnership with the Food Safety Department, Delhi, the Food Safety and Standards Authority of India (FSSAI) has initiated a comprehensive awareness and sensitization campaign aimed at major marketplaces in the nation's capital.

The awareness campaign, which will begin on April 8, 2024, in Delhi's well-known Khan Market and INA Market, will concentrate primarily on identifying and removing pesticide residue and other contaminants from food items.

Market groups and vendors were actively involved in spreading awareness about the negative impacts of pesticide residue, particularly in fruits and vegetables, and the significance of testing for it. In addition, attendees learned about the innovative "Food Safety on Wheel" mobile lab project by FSSAI. This lab is outfitted with multiple quick testing kits to identify up to 50 pesticide residues in various food matrices, including cereals, fruits, and vegetables. These tests yield results in a matter of hours, allowing for prompt action to guarantee food safety.



CUSTOMER EXPECTATIONS



FOOD SAFETY



A potent ally in the fight against climate change and for food security is millets.

Today, the terrifying statement made by Professor Wally Broecker, "Climate is an ill-tempered beast, and we are poking it with sticks," is more relevant than ever. With rising temperatures, unpredictable weather patterns, and food shortages, climate change threatens our survival. These problems aren't hypothetical; they're happening right before us as extreme weather events like droughts and floods become more frequent. We must make a dramatic shift to resilience-based agriculture to combat these threats.

This means using agroecological practices to work with nature, not against it. This critical requirement is emphasized in the 2022 IPCC report, adopted by 195 nations and focused on regionally appropriate crops and sustainable methods.

To advance, the Indian food processing industry must prioritize research and development.

The Indian agriculture industry is experiencing strong growth with record production levels, according to Anita Praveen, secretary of the Ministry of Food Processing, Government of India. The food processing sector has emerged as one of the priority sectors for growth. "With the resources we have, we have already reached high levels of growth," she stated. Research and development (R&D) is needed to advance the food processing industry.

The secretary, speaking at the FICCI Scientific Symposium on "Processed Foods for Purpose," stated that the food processing industry is one of the major sources of investment, especially for micro and small businesses, and that it can attract more private capital.



India's Codex expertise is to be strengthened through the FSSAI workshop.

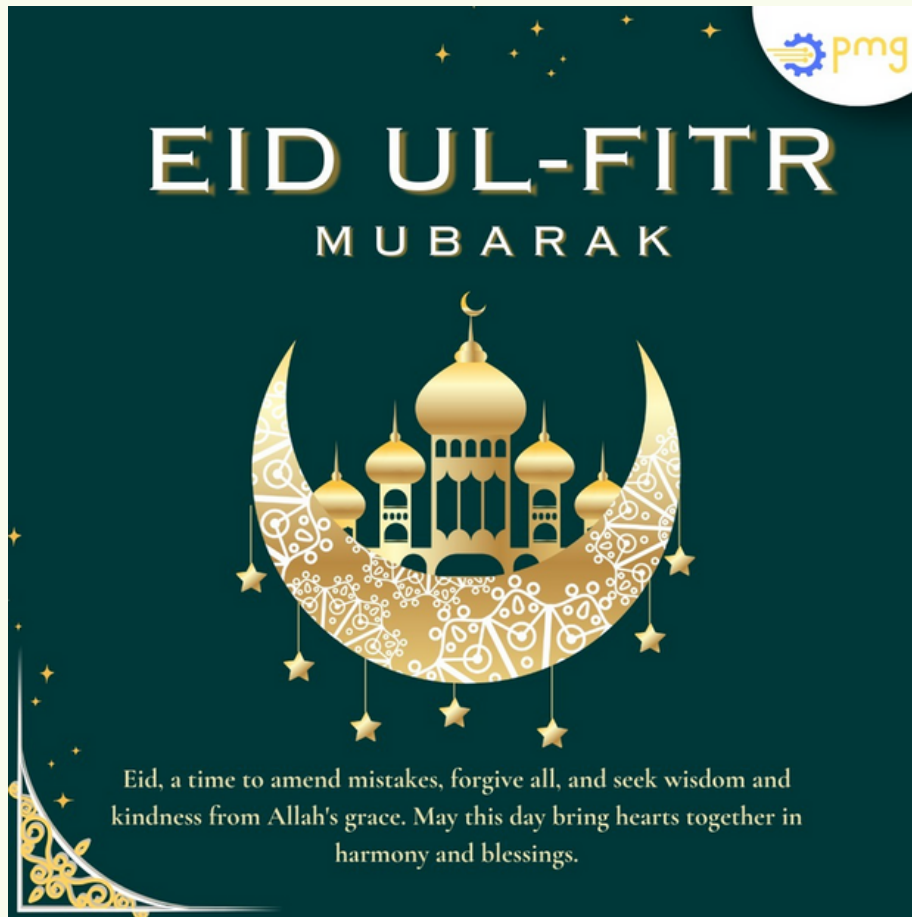
The Codex Contact Point at FSSAI headquarters arranged a three-day training at FSSAI headquarters to enhance India's Codex proficiency.

The program, as per FSSAI, not only enlightened the officers about the Codex Alimentarius Commission (CAC) and its purpose but also significantly amplified India's influence on global food standards.

A top FSSAI official claims that this kind of workshop aids in the ongoing improvement of knowledge and the scaling up of research to establish policies in India based on international best practices.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



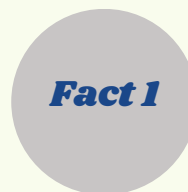
11 APRIL

EID UL-FITR

Eid al-Fitr, the "Festival of Breaking the Fast," is a significant Islamic holiday celebrated at the end of Ramadan. It involves special prayers, communal meals, giving of charity (Zakat al-Fitr), exchanging of gifts, and spending time with loved ones. It signifies joy, gratitude, and spiritual renewal for Muslims worldwide.

APRIL

DID YOU KNOW?



Other confectionery refers to a diverse range of sweet treats beyond traditional chocolates and candies. This category encompasses items such as marshmallows, gummies, licorice, and specialty sweets like Turkish delight. Offering a variety of textures, flavors, and shapes, other confectionery delights cater to different tastes and preferences, providing indulgent options for satisfying cravings and enjoying moments of sweetness.



1/3



2/3



3/3

Fact 2

Frozen fruit undergoes rapid freezing to preserve its nutritional content and natural flavors. This process involves subjecting the fruit to low temperatures, typically below -18°C , which inhibits enzymatic activity and microbial growth, extending its shelf life. Flash freezing techniques minimize ice crystal formation, preserving the fruit's texture and structural integrity. Frozen fruit offers convenience and year-round availability while maintaining its nutritional value.



Frozen fruit products are food items that are made from fruits that have been frozen and packaged for retail sale.

Types

- 1. Whole frozen fruit:**
Berries, grapes, cherries, and pineapple can be frozen whole and sold as individual fruits.
- 2. Frozen fruit blends:**
Blends are mixtures of different fruits that have been blended and frozen.
- 3. Frozen fruit purees:**
Blending fruit until it is smooth and then freezing it.
- 4. Frozen fruit desserts:**
Made from frozen fruit and other ingredients such as sugar, cream, or milk.



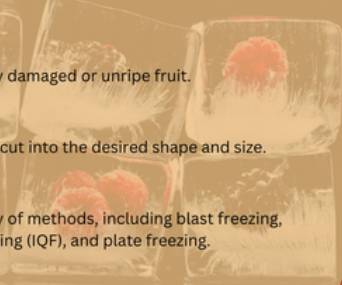
5. Frozen fruit snacks:

Made by freezing individual pieces of fruit, such as grapes or berries, and then packaging them for sale.



COMMERCIAL PRODUCTION

- 1. Sourcing:**
Made from fresh fruit that is sourced from farms and orchards around the world.
- 2. Sorting:**
Sorted to remove any damaged or unripe fruit.
- 3. Processing:**
Washed, peeled, and cut into the desired shape and size.
- 4. Freezing:**
Frozen using a variety of methods, including blast freezing, individual quick freezing (IQF), and plate freezing.
- 5. Packaging:**
Packaged into bags, cartons, or other containers.



Fact 3

Frozen fruit products offer the convenience of fresh fruit year-round. Harvested at peak ripeness, fruits are flash-frozen to preserve their natural flavors and nutrients. From succulent berries to tropical delights, these products provide versatility for smoothies, desserts, and snacks.



Frozen vegetable products are a variety of vegetables that have been harvested, cleaned, blanched, and frozen to preserve their flavour, texture, and nutrients. These products come in a range of forms, including whole, sliced, diced, chopped, or mixed vegetables.

Types

- | | | |
|---|--|--|
| 1. Green peas
 | 2. Corn
 | 3. Broccoli
 |
| 4. Cauliflower
 | 5. Spinach
 | 6. Carrots
 |
| 7. Green beans
 | 8. Brussels sprouts
 | 9. Edamame
 |

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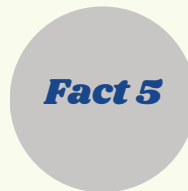
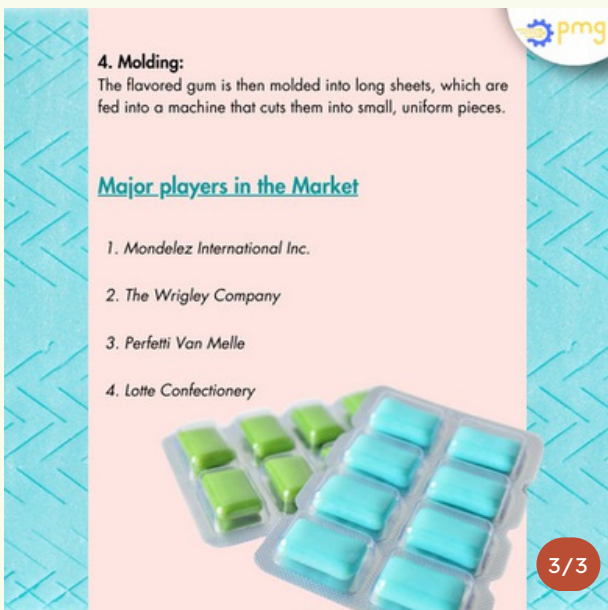
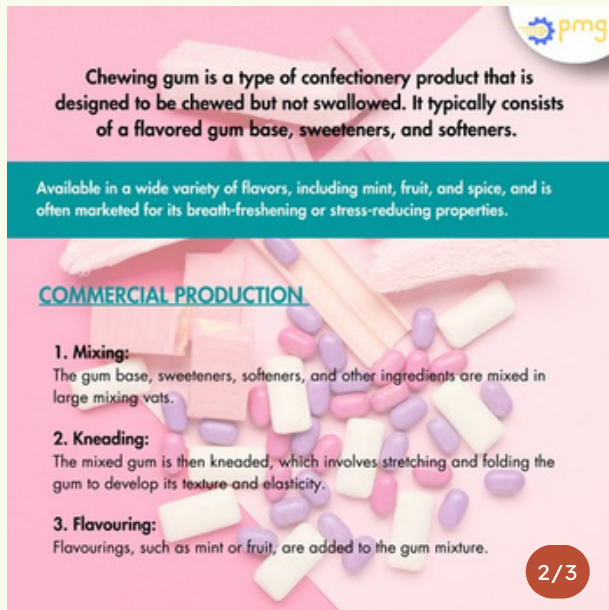


COMMERCIAL PRODUCTION

- 1. Harvesting:**
Harvested at the peak of their freshness and ripeness.
- 2. Washing:**
Washed to remove any dirt, debris, or other impurities.
- 3. Blanching:**
Blanched by briefly exposing them to hot water or steam.
- 4. Freezing:**
The blanched vegetables are then rapidly frozen to -18°C or lower.
- 5. Packaging:**
Packaged in plastic bags, trays, or containers.

Fact 4

Frozen vegetable products offer a convenient and nutritious alternative to fresh produce. Harvested at peak ripeness, vegetables are quickly frozen to lock in their flavor and nutrients. From vibrant broccoli to tender corn, these products provide versatility for cooking or snacking.



Frozen potato products are meticulously prepared through several technical steps to uphold quality standards. After washing and peeling, potatoes undergo precise cutting and blanching to deactivate enzymes and preserve texture. Flash freezing at ultra-low temperatures prevents ice crystal formation, safeguarding cellular integrity. Advanced packaging techniques, such as vacuum sealing, protect against oxidation and freezer burn, ensuring optimal quality and taste upon consumption.



PMG ENGINEERING

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