

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

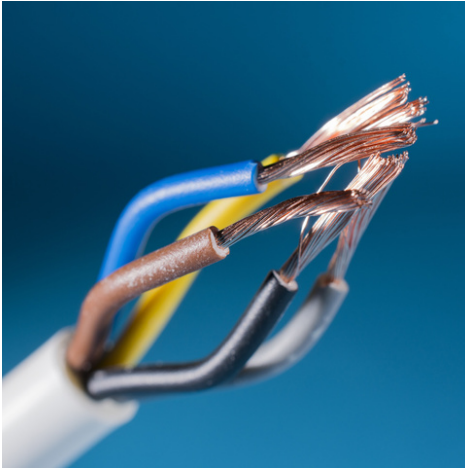


**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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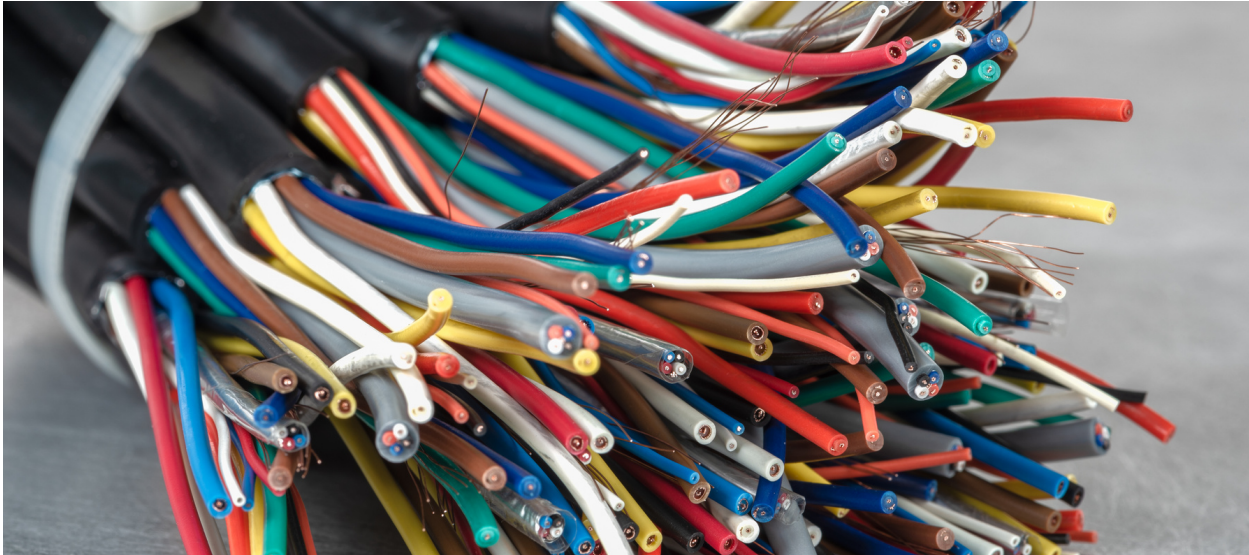
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CABLE & TYPES



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 of 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 market according to use like there are also communication cable used to transmit low power signal and for uses of electronic signal purposes and Fibre optical cable used for optical data throufg light source to receiving devices and the cable which is used to transmit electric power is called 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 insulator in cable like insulated like poly vinyl chloride, impregnated paper, butyl rubber, cross linked polythene but paper insulated cable is preferred because of their high current capacity and generally reliable and having a long life.

3.Inner Sheath

It basically used for protecting the cable from moisture because moisture evaporate the property of insulation. It made of lead alloy, and these strengths withstand the internal pressure of pressurized cables. The material should have nonmagnetic material in 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.

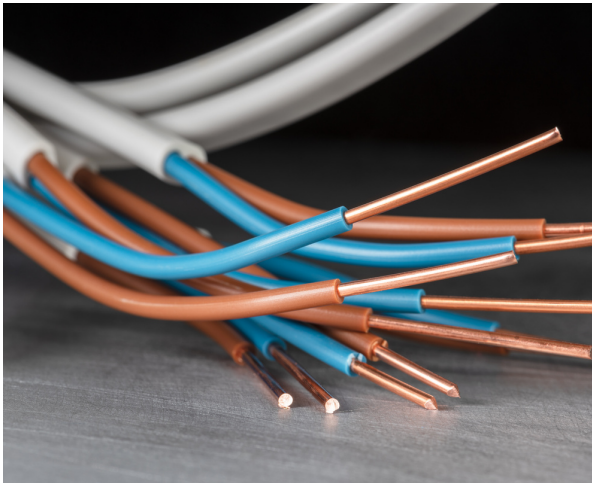
4.Armouring

Armouring is done by galvanized steel wire, or two layer of metal type are applied over sheath for protecting it from mechanical damage. The steel wire nis normally used because it has high longitudinal strength.

5.Oversheath

It gives the mechanical strength to cables. It protects from all over damage like moisture, corrosion, dirt, dust and so on. The thermoplastic material is used making over 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 device.

2. Shielded Cables

It consists of one or two insulated which are covered by a woven braided shield or aluminium foil for better signal transmission and removing irregularities in frequency and power and external interference in radio. These cables are also used to transmit high voltage and are protected by shield.

3. Coaxial Cable

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

4. 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.



5. Fiber Optical Cable

These types of cable are used to transport optical data through light source to the receiver. It is assembled similar to electrical cable but containing one or more optical fibre that are used to carry light.

6. Instrumentation Cable

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

7. Underground Cable

Underground cables are employed to transmit and distribution of electrical power where there is impractical to use overhead transmission line, or this is used in congested area where there is impossible to use overhead transmission line.

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

CHANGE ROOM AND ANTE ROOM IN FOOD INDUSTRY



Introduction

The advancement in process technologies and engineering has made the process of scaling up a food production unit easy and cost-effective. The major concern which prevails in the current scenario is the hygienic and sanitary design for a food factory and its essential premises. Change Room and Ante Room play a critical role in reassuring the focus on quality and hygienic design and ensures to lessen/nullify the contamination from man-material movement.

Requirements on Hygiene & Sanitary Practises

Changeroom and Ante Room are essential requirements in reinforcing the Hygiene and Sanitary practices in any food industry. All processing operations should be carried out in such a way that the risk of contamination of the product or packaging materials by any hazard is avoided. Such hazards may include:

- Physical/foreign matters (e.g., metal, glass, plastic, insects, dust/dirt, etc.)
- Chemicals (e.g., allergens, cleaning agents, disinfectants, lubricants)
- Spoilage/ pathogenic micro-organisms.

Change Room and Ante Room

Entrance from non-production to production areas is practiced via Change rooms. Entrance into 'high-risk' areas is through a further Ante-room specifically designed for high-risk operations (Hygiene station etc.). A single one-way flow of production operations from raw materials at the beginning to finished products at the end minimizes the possibility of contamination.

Functional requirement of Changing room

- Air Curtain to be provided as a barrier between external side and Changeroom 1.03 Self-closing doors, proper lighting, and ventilation.
- First aid kit to be made available.
- The informative boards/poster about required personal hygiene practices and fire/emergency exits to be displayed.
- Cross-over barrier/bench provided before entry into production area from the change room.
- Work clothing should be changed at the entrance of the unit and given to the laundry at the end of the day. Employees should not come to work (from home) in their work clothing nor launder their work clothing themselves.

READ MORE....



- Before putting on factory clothing, the staff is required to undertake hand hygiene procedures to reduce the risk of cross-contamination to the food manufacturing area. This requires the provision of hand-wash sinks with detergent and hand drying facilities.
- Hand washbasins to service a single hand wash. Hand washbasins must have automatic or elbow/foot-operated water supplied at a suitable temperature.
- Suitable hand-drying equipment, e.g., paper towel dispensers or hot-air dryers. Closed-circuit television (CCT)/cameras/sensors as a potential monitor of hand wash compliance may be installed.
- Ensure availability of Sanitizer dispensers adjacent to the high-risk production area.

Ante Rom/Ante Area

Engineering proper HVAC systems for critical environments often involve distinct areas of room pressure control and directional airflow. An anteroom between a primary room and corridor ensures a safe airflow buffer zone between the controlled pressurized space and an unclean area. The two spaces are separated by a completely walled area with a door. However, in some applications, an ante area without walls or a door can achieve the same effect.

Hygiene Stations for High-risk food processing areas

- Hand washing and hand disinfection devices.
- Sole cleaning and sole disinfection equipment.
- Shaft cleaning and shaft sole disinfection devices.



- Hand drying system.
- Non-contact sensor-controlled soap dispenser: doses an adjustable amount of liquid hand cleaner for hand cleaning.
- Non-contact sensor-controlled hand wash basin with hot water supply is activated by a sensor for an adjustable time, integrated with paper towel dispenser followed by a hand dryer.
- Non-contact sensor-controlled hand sanitizer dispenser for 2- hand wetting, doses an adjustable amount of disinfectant into the hands for better hygiene.

Conclusion

Personnel hygiene regimes are critical in reducing the potential for food contamination incidents. Whilst much can be done to design suitably hygienic and cleanable changing rooms and equipment that facilitate these regimes and allow them to minimize cross-contamination to operatives and the environment, the success of such regimes is still dependent on the actions of the operative. Future changing room designs, therefore, must concentrate on aiding the compliance and consistency of implementing these personnel hygiene regimes, perhaps by incorporating the results of psychological assessments as to why operatives do, or do not, undertake tasks.

A photograph showing two clear plastic bottles of juice, one dark red and one orange, with green labels. Next to them are two cardboard boxes, one small and one large, also with green labels. They are on a wooden surface.

INDUSTRY BUZZ

NACIN holds training on the food import clearance system.

Recently, in Lucknow, the National Academy of Customs, Indirect Taxes and Narcotics (NACIN) held a crucial Food Import Clearance System training session for its officers, underscoring the significance of this knowledge in their roles.

The training was specifically on Food Import Clearance for Authorized Officers with the collaboration of FSSAI for Trainee Inspectors at NACIN, Lucknow. The officials called it an integral part of CBIC's (Central Board of Indirect Taxes and Customs) Induction Training Program for Inspectors.

Manvesh Kumar, Director (Import), and Dr Sujata Singh, AD (Import), FSSAI, New Delhi, visited the trainee inspectors.

The government orders NAFED and NCCF to start the procurement of 5 lakh tonnes of onions.

Since the Rabi-2024 harvest has begun to arrive in the market, the government has instructed NCCF and NAFED to begin procuring 5 lakh tonnes of onions directly from farmers to meet the buffer need. To guarantee that payments to the onion farmers are sent by Direct Benefit Transfer to their bank accounts, NAFED and NCCF are required to pre-register the farmers prior to the purchase.

Because they make up between 72% and 75% of the nation's annual crop, rabi onions are essential to the availability of onions in the nation. Due to their longer shelf life than Kharif onions and their ability to be stored for supplies until November or December, Rabi onions are also essential for guaranteeing year-round availability of onions.





NRAI Pune Chapter presents an enlightening session on data-driven innovation and the implications of AI.

The impact of AI on hospitality was the topic of a successful panel discussion sponsored by the Pune Chapter of the National Restaurant Association of India (NRAI), ushering in a new age in hospitality. Prominent speakers at the event were Ayush Awasthi from RenoApp, Vijayan Parthasarathy from ReserveGo, and Jaytesh Calpakkam from The Internet Generation.

The panel discussion aimed to highlight how artificial intelligence is revolutionizing the hospitality sector. In the end, everyone agreed that data and AI are revolutionizing every industry and providing previously unheard-of efficiencies and opportunities. The conversation emphasized how important AI and data analytics are to understanding and improving customer services.

Creative packaging options: A 9.2% CAGR for food and beverage is predicted by the BCC study.

According to the most recent BCC Research report, the market for Active, Controlled, and Intelligent Packaging for Foods and Beverages is expected to rise at a compound annual growth rate (CAGR) of 9.2% from 2023 through 2028, from \$37.8 billion in 2023 to \$58.8 billion.

The study comprehensively analyses the global market for active, controlled, and intelligent packaging in the food and beverage sector, emphasizing segmentation based on type and application. Both global and regional levels of analysis are covered; the base year 2022 is used, and projections from 2023 to 2028 are shown exclusively in terms of revenue.

Active packaging" encompasses technologies such as temperature control and antimicrobial agents.



Parle Agro will spice up festivities this summer with a new campaign from Appy Fizz.

Parle Agro introduces a dynamic 360-degree multimedia campaign to enhance its well-known effervescent beverage, Appy Fizz. This latest advertisement, which stars Kriti Sanon as the brand spokeswoman, is a visually spectacular experience. The ad emphasizes Gen-Z's demand for an exceptional experience at all times.

Turning any moment into an amazing one is central to the commercial film. Young people who are looking for unique experiences that are both aspirational and social media-worthy find resonance in the ad, which reflects the brand's attitude of bringing excitement and vitality into the lives of its customers. This idea is made real by the TVC, which exudes confidence, attitude, and aspiration. The ad, which sets the upbeat and thrilling tone for the celebrations, encapsulates the essence of the lively party with its upbeat music, dynamic imagery, and lyrics in both Hindi and English.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



22 MARCH

WORLD WATER DAY

World Water Day reminds us of the critical importance of safeguarding our planet's most precious resource. Access to clean water is a fundamental human right, yet millions still lack this basic necessity. Let us pledge to conserve, protect, and ensure equitable access to water for all.



23 MARCH

HOLI

Holi is a Hindu festival celebrated in India and Nepal, marking the arrival of spring. Participants joyfully smear each other with colorful powders and water, symbolizing unity and the triumph of good over evil. It's a time for fun, forgiveness, and the renewal of relationships, accompanied by music and sweets.

MARCH

DID YOU KNOW?



POTATO STARCH PRODUCTION EQUIPMENT



1/4

Potato starch production equipment refers to the machinery and equipment used to extract starch from potatoes. The process of potato starch production typically involves several stages, including cleaning and washing, crushing and grinding, starch extraction and purification, and drying.

Process

- 1. Potato cleaning and washing equipment:** This equipment is used to remove dirt, stones, and other impurities from the potatoes. It may include machines such as potato washing machines, stone removers, and designers.
- 2. Potato crushing and grinding equipment:** This equipment is used to break down the potatoes into small pieces or particles to facilitate the extraction of starch. It may include machines such as potato crushers, rasping machines, and grinders.
- 3. Starch extraction and purification equipment:** This equipment is used to separate the starch from other components of the potato, such as fiber and protein. It may include machines such as centrifuges, sieves, hydro cyclones, and decanters.
- 4. Starch dewatering and drying equipment:** Once the starch has been extracted and purified, it must be dried to remove moisture and create a fine, powdery consistency. This may be done using equipment such as flash dryers, rotary drum dryers, or fluidized bed dryers.

Additional equipment that may be used in potato starch production includes storage silos for raw potatoes and finished starch, conveyors and elevators for moving materials between stages of the production process, and various pumps, valves, and piping systems for transferring liquids and slurry.

2/4

Working principle

- The working principle of potato starch production equipment is to separate the starch from other components of the potato and then dry it to create a final product that is suitable for use in various applications, such as food processing, pharmaceuticals, and industrial products. The specific equipment and processes used may vary depending on the scale of the operation, the desired level of automation, and other factors.

Equipments used

Potato starch production equipment typically consists of several components and machines, which work together to extract starch from potatoes. The major components in potato starch production equipment include:

- 1. Raw material handling equipment:** This equipment is used to transport and store potatoes before they are processed. It may include machines such as conveyors, elevators, and storage silos.
- 2. Cleaning and washing equipment:** This equipment is used to remove dirt, stones, and other impurities from the potatoes. It may include machines such as potato washing machines, stone removers, and designers.
- 3. Crushing and grinding equipment:** This equipment is used to break down the potatoes into small pieces or particles to facilitate the extraction of starch. It may include machines such as potato crushers, rasping machines, and grinders.
- 4. Starch extraction and purification equipment:** This equipment is used to separate the starch from other components of the potato, such as fiber and protein. It may include machines such as centrifuges, sieves, hydro cyclones, and decanters.

3/4

Key manufacturers

1. GEA Group AG
2. Alfa Laval AB
3. Andritz AG
4. Bühler AG
5. Nijhuis Industries
6. Myande Group Co. Ltd.
7. Zhengzhou Jinghua Industry Co. Ltd.
8. Shuangfeng Nongjiabao Machinery Technology Co. Ltd.
9. Arrowroot Technologies Pvt Ltd.
10. Swastik Microfab.



4/4

Fact 1

Cutting-edge potato starch production equipment integrates advanced processing technologies, optimizing yield and quality. Through precise washing, grinding, and separation, it efficiently extracts pure starch from potatoes. Automated controls ensure consistent performance, while modular design facilitates scalability and customization. Committed to sustainability, these systems minimize resource usage and waste, meeting stringent industry standards for eco-friendly production.



LONG-GOODS PRODUCTION PLANTS

1/4



Long-goods production plants are facilities that specialize in the production of long-cut pasta, such as spaghetti, linguine, fettuccine, and tagliatelle. Long-cut pasta is characterized by its long, thin shape and is commonly used in a variety of dishes, including spaghetti with meatballs, carbonara, and seafood pasta.

- Long-goods production plants typically use durum wheat semolina flour, water, and sometimes eggs to make the pasta dough, which is then extruded through a die to give it its long, thin shape. The pasta is then dried, packaged, and sold to consumers or food service providers.
- Long-good production plants may vary in size and level of automation, with some using traditional methods of pasta-making and others utilizing advanced technology to produce large quantities of pasta efficiently.

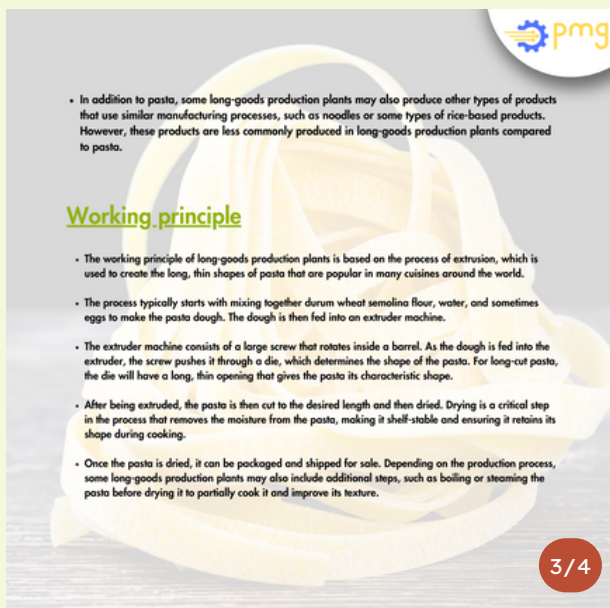
Long-goods production plants are primarily used to produce various types of long-cut pasta, such as:

1. Spaghetti: long, thin, cylindrical pasta
2. Linguine: long, thin, flat pasta
3. Fettuccine: long, flat, ribbon-like pasta
4. Tagliatelle: long, flat, ribbon-like pasta that is wider than fettuccine

Other long-cut pasta shapes that can be produced by long-goods production plants include bucatini, vermicelli, and angel hair pasta.

In addition to pasta, some long-goods production plants may also produce other types of products that use similar manufacturing processes, such as noodles or some types of rice-based products. However, these products are less commonly produced in long-goods production plants compared to pasta.

2/4



- In addition to pasta, some long-goods production plants may also produce other types of products that use similar manufacturing processes, such as noodles or some types of rice-based products. However, these products are less commonly produced in long-goods production plants compared to pasta.

Working principle

- The working principle of long-goods production plants is based on the process of extrusion, which is used to create the long, thin shapes of pasta that are popular in many cuisines around the world.
- The process typically starts with mixing together durum wheat semolina flour, water, and sometimes eggs to make the pasta dough. The dough is then fed into an extruder machine.
- The extruder machine consists of a large screw that rotates inside a barrel. As the dough is fed into the extruder, the screw pushes it through a die, which determines the shape of the pasta. For long-cut pasta, the die will have a long, thin opening that gives the pasta its characteristic shape.
- After being extruded, the pasta is then cut to the desired length and then dried. Drying is a critical step in the process that removes the moisture from the pasta, making it shelf-stable and ensuring it retains its shape during cooking.
- Once the pasta is dried, it can be packaged and shipped for sale. Depending on the production process, some long-goods production plants may also include additional steps, such as boiling or steaming the pasta before drying it to partially cook it and improve its texture.

3/4



Market scope

- The market for long-goods production plants is driven by the popularity of long-cut pasta, which is a staple food in many countries around the world. The global pasta market was valued at approximately \$14.8 billion in 2020 and is expected to continue to grow in the coming years, according to a report by Mordor Intelligence.
- Long-cut pasta, such as spaghetti and linguine, is particularly popular in Italy, where it is a traditional staple food. However, it is also popular in other regions, including North America and Asia, where it is used in a variety of dishes.
- The market for long-goods production plants is highly competitive, with many manufacturers operating in the market. Some of the key players in the market include Barilla Group, De Cecco, Nestle SA, and Buitoni. To remain competitive, manufacturers are increasingly investing in advanced technologies to improve efficiency, reduce costs, and increase production capacity.
- In addition to traditional wheat-based pasta, there is also a growing demand for alternative pasta made from alternative grains, such as brown rice, quinoa, or legumes. This trend is driven by the increasing popularity of gluten-free and plant-based diets. Some long-goods production plants are adapting to this trend by diversifying their product lines and incorporating these alternative grains into their pasta products.
- The market for long-goods production plants is expected to continue to grow in the coming years, driven by the continued popularity of long-cut pasta and the growing demand for alternative pasta products.

4/4

Fact 2

Long-goods production plants are specialized facilities dedicated to crafting long-cut pasta varieties like spaghetti, linguine, and tagliatelle. Renowned for their slender, elongated form, these pasta types feature prominently in a diverse array of dishes, from classic spaghetti with meatballs to indulgent carbonara and flavorful seafood pasta creations. These plants cater to the global demand for high-quality, versatile pasta staples.



DOUGH PRESSES, DOUGH EXTRUDERS INCL. CUTTING EQUIPMENT



1/4

Dough presses and dough extruders are pieces of equipment used in the food processing industry to create a variety of dough-based products. A dough press is a machine that is used to flatten or compress dough into a specific shape or thickness.

- This equipment is commonly used to make pizza dough, tortillas, and other flatbreads. The dough is placed in the press, and pressure is applied to flatten the dough into the desired shape and thickness. Dough presses can be manual or automated and come in a range of sizes and configurations.
- A dough extruder, on the other hand, is a machine that is used to shape dough by forcing it through a die. The dough is typically fed into a hopper and then pushed through a screw or piston that applies pressure to the dough and forces it through a die of a specific shape and size. Dough extruders can produce a variety of shapes, including tubes, sheets, and long, thin strands.
- Cutting equipment is often used in conjunction with dough extruders to cut the extruded dough into specific lengths or shapes. These machines use blades or rollers to cut the dough as it emerges from the extruder, creating products such as pasta or noodles of a specific length or shape.
- Dough presses, dough extruders, and cutting equipment are essential pieces of equipment in many food processing operations, particularly those that produce dough-based products on a large scale. These machines improve efficiency and consistency while reducing labor costs, making them an important investment for many businesses in the food industry.

Dough presses, dough extruders and cutting equipment are versatile machines that can be used to process a wide variety of food products made from dough, including:

2/4

1. **Pizza dough** - Dough presses are commonly used in pizzerias to flatten and shape pizza dough into a consistent size and shape.
2. **Tortillas** - Dough presses are also used in the production of tortillas, where they are used to flatten and shape the dough into round, flat shapes.
3. **Pasta** - Dough extruders are used in the production of various types of pasta, including spaghetti, fettuccine, and macaroni. Cutting equipment is often used in conjunction with the extruder to cut the pasta into the desired length or shape.
4. **Bread** - Some types of bread, such as bagels, are made using dough extruders. The extruder is used to shape the dough into the distinctive circular shape of a bagel.
5. **Cookies and crackers** - Some types of cookies and crackers are made using dough presses, which are used to flatten and shape the dough into consistent shapes and sizes.
6. **Asian noodles** - Dough extruders are used in the production of various types of Asian noodles, such as udon and soba noodles.

- Dough presses, dough extruders, and cutting equipment all work on the principle of applying pressure to dough to shape it into a specific form or size. A dough press typically uses two plates or rollers to flatten and shape the dough. The dough is placed between the plates, and pressure is applied to compress and shape the dough into the desired form, such as a pizza crust or tortilla.
- Dough extruders use a screw or piston to push the dough through a die of a specific shape and size. The dough is fed into a hopper, and as it is pushed through the extruder, it is shaped into the desired form. The extruded dough is then cut into the desired length or shape using cutting equipment.

3/4

Market Scope

- The market for dough presses, dough extruders, and cutting equipment is driven by the growing demand for processed food products around the world. These machines are essential for producing a wide variety of dough-based products, including pizza crusts, tortillas, pasta, and Asian noodles.
- The market for dough processing equipment is highly competitive, with a large number of manufacturers operating globally.
- Some of the key players in the market include Rheon Automatic Machinery Co. Ltd., The Middleby Corporation, GEA Group AG, and Bühler AG. These companies offer a range of dough processing equipment, from small-scale machines suitable for artisanal bakeries to large-scale industrial machines capable of processing large volumes of dough.
- One of the key trends in the dough-processing equipment market is the development of automated machines that can produce high-quality dough-based products with minimal human intervention. These machines are equipped with advanced sensors and software that can monitor and control the dough processing process, ensuring consistent quality and reducing waste.
- Another important trend in the market is the increasing focus on sustainability and energy efficiency. Many manufacturers are developing machines that use renewable energy sources or are designed to reduce energy consumption and waste.
- The market for dough presses, dough extruders, and cutting equipment is expected to continue to grow in the coming years, driven by the increasing demand for processed food products and the development of advanced, automated machines. However, manufacturers will need to continue to innovate and develop more sustainable and efficient equipment to stay competitive in the market.

4/4

Fact 3

Dough presses, extruders, and cutting equipment are indispensable tools in the food industry, streamlining the process of shaping and cutting dough with precision and efficiency. From crafting uniform pizza bases to creating intricate pasta shapes, these machines offer consistency and speed, ensuring high-quality products while saving time and labor.



DRYING AND COOLING PLANTS

1/4



• Drying and cooling plants are industrial facilities used in the food processing industry to dry and cool a variety of food products. These plants typically use a combination of heat, airflow, and sometimes moisture control to remove excess moisture from food products and bring them down to a suitable temperature for storage or further processing.

• The drying process is essential for preserving the quality and shelf life of many food products, particularly those that are perishable or have high water content. Some of the food products commonly processed using drying and cooling plants include fruits, vegetables, grains, nuts, meats, and dairy products.

• The specific design and components of a drying and cooling plant can vary depending on the type of food product being processed and the specific requirements of the processing operation. Some common components of these plants may include conveyor systems, dryers, coolers, air filtration systems, and control systems.

Drying and cooling plants are used to process a wide range of food products. Some of the most common food products that are processed using these plants include:

1. **Fruits and vegetables:** Drying and cooling plants are used to remove moisture from fruits and vegetables, allowing them to be preserved for longer periods of time. Some common examples include dried fruits such as raisins, apricots, and cranberries, as well as dried vegetables such as tomatoes and peppers.

2. **Grains and nuts:** Drying and cooling plants are used to dry grains and nuts, such as rice, wheat, corn, and almonds, to improve their shelf life and prevent spoilage.

3. **Meat and poultry:** Drying and cooling plants are used to cool and dry meat and poultry products after they have been processed. This helps to remove excess moisture and prevent bacterial growth, improving the safety and shelf life of the products.

2/4



4. **Dairy products:** Drying and cooling plants are used to dry and cool dairy products such as milk, cheese, and yogurt. This helps to remove excess moisture and improve the quality and safety of the products.

5. **Snack foods:** Drying and cooling plants are used to dry and cool a variety of snack foods, such as potato chips, popcorn, and pretzels. This helps to improve the texture and shelf life of the products.

Working principle

• The process typically involves a conveyor system that moves the food product through the plant, while various stages of drying and cooling are achieved using a range of equipment and technologies.

• *For example,* some plants use heated air to dry the food product, while others use a vacuum to remove moisture. Some plants may use a combination of technologies to achieve the desired level of drying and cooling.

• The control system of a drying and cooling plant is also an essential component, as it helps to regulate the temperature, humidity, and airflow throughout the plant to ensure consistent and optimal processing conditions. This may involve the use of sensors, monitoring systems, and automated controls to maintain the desired processing parameters.

• The working principle of a drying and cooling plant is to use a combination of technologies and equipment to remove excess moisture from food products and achieve a suitable temperature for storage or further processing, while also maintaining the quality and safety of the products.

• Drying and cooling plants are essential components of many industrial processes, such as food processing, chemical manufacturing, and materials handling. These plants use various technologies to remove moisture and reduce the temperature of products, ensuring their quality and shelf life.

3/4



Market insights

1. **Market size and growth:** The global drying and cooling equipment market was valued at USD 2.71 billion in 2020 and is projected to reach USD 3.80 billion by 2027, growing at a CAGR of 4.8% from 2021 to 2027. The growth is mainly driven by the increasing demand for processed food products, rising environmental concerns, and advancements in drying and cooling technologies.

2. **Application areas:** Widely used in industries such as food processing, pharmaceuticals, chemicals, and materials handling. In the food industry, these plants are used to dry fruits, vegetables, grains, and meat products, while in the pharmaceutical industry, they are used to dry and cool medicines and chemicals.

3. **Technology trends:** The drying and cooling equipment market is witnessing significant technological advancements, such as the development of hybrid dryers that combine different drying methods, such as air, vacuum, and infrared drying. Other trends include the use of heat pumps for energy-efficient drying and the integration of smart sensors and control systems for process optimization.

4. **Key players:** Some of the major players operating in the drying and cooling equipment market include GEA Group, Bühler AG, ANDRITZ AG, ThyssenKrupp AG, Carrier Vibrating Equipment, Inc., and Comessa. These companies are focusing on product innovation, strategic partnerships, and mergers and acquisitions to expand their market share and stay competitive.

4/4

Fact 4

Drying and cooling plants utilize innovative technologies to efficiently remove moisture and reduce temperatures in various industrial processes. These plants employ methods such as air drying, evaporation, and refrigeration to achieve optimal conditions for product preservation and quality.



PMG ENGINEERING

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