

TECH-KNOWLEDGE

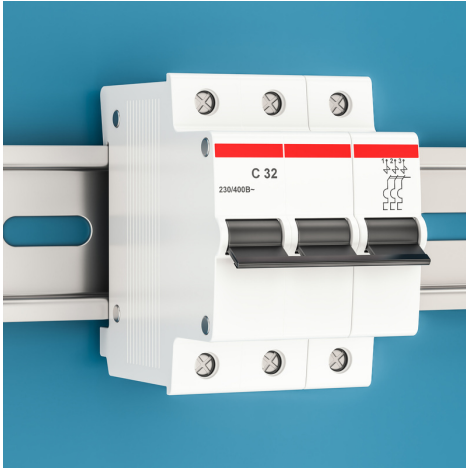
The Official PMG Engineering Newsletter

FOOD & BEVERAGE
INDUSTRY

ENGINEERING
& DESIGN

SCIENCE &
TECHNOLOGY

CONTENTS



1. WHITE PAPER

- A. Vacuum Circuit Breaker
- B. Earthing

2-5

2. INDUSTRY BUZZ

Latest Food Industry News Updates

6-7



3. WEEKS HIGHLIGHT

A Look Into The Main Events Of The Week

8

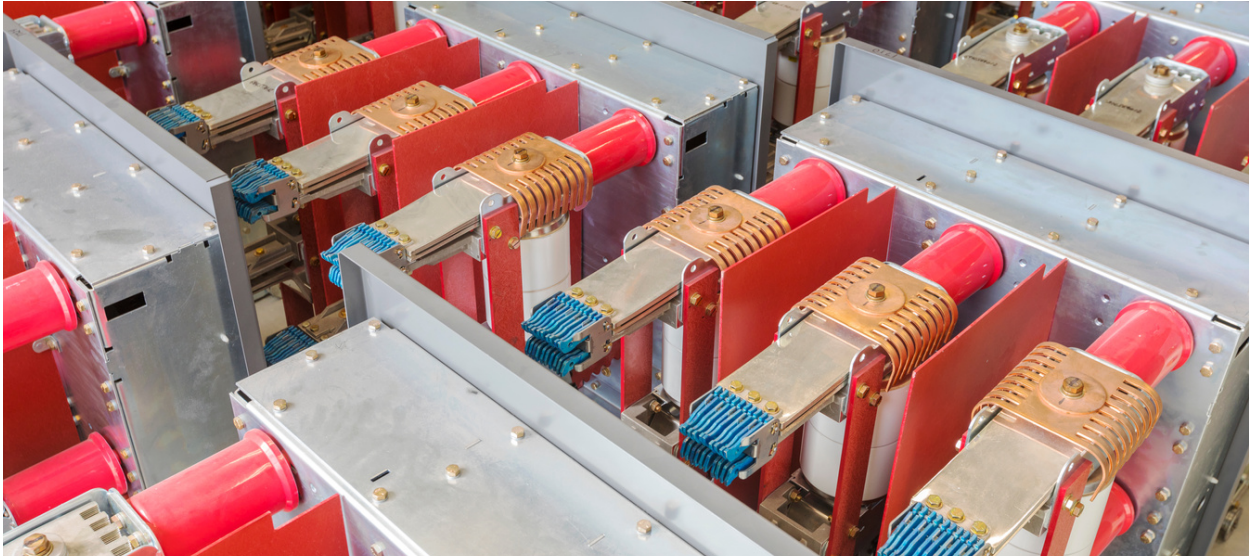
4. DID YOU KNOW?

Fascinating Food Facts To Expand Knowledge

9-13



VACUUM CIRCUIT BREAKER



Introduction

The vacuum interrupter technology was first introduced in the year of 1960 but still is a developing technology. A circuit breaker is a device that interrupts an electric circuit to prevent unwarranted current caused by short circuit, typically resulting from overload. It's basically functionality is to interrupt current flow after a fault is deducted. This is kind of circuit breaker where arc quenching takes place in a vacuum medium. The operation of switching on and closing of current carrying contacts and interrelated arc interruption takes place in vacuum chamber in a breaker is called vacuum interrupter. Vacuum offers high insulating strength.

Construction

The vacuum circuit breaker consists of fixed contact, moving contact and an arc shield mounted in a vacuum interrupter. The outer insulating body is made with glass and has high vacuum capacity. The movable part is connected to control mechanism by stainless steel bellows. Arc shield prevents deterioration of internal dielectric strength by preventing metallic vapours from falling on inside surface of outer insulating body. To reduce possibility of leak, permanent or tight sealing is done.

Working principle

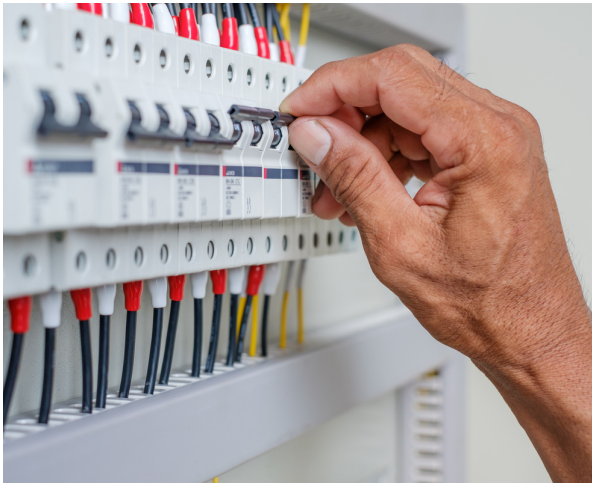
When breaker operates, the moving contact separates from fixed contact and an arc is struck between the contacts. The production of arc is due to ionization of metals ions and depend very much upon materials of contact. The arc is quickly extinguished because metallic vapours, electrons, and ions produced during arc are diffused in a short time and seized by surface of moving and fixed member and shields. Since vacuum has very fast rate of recovery of dielectric strength because dielectric strength of vacuum is eight times greater than air and four times greater than sf₆.

Contact materials must have following properties:

- High density.
- Contact resistance must be less.
- High arc resist capability.
- A boiling point must be high to diminish arc erosion.
- Thermal conductivity is high to dissipate quickly the large heat produced throughout arcing

Ratings and specification of vacuum circuit breaker

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The rating of circuits breakers is generally given in MVA. VCB comes a wide variety ranging from 250 to 1500MVA. According to European standard, the commonly available preferred values for rated current are 25A, 32A, 40A, 50A, 63A, 80A, 100A, 125A

Advantages

- It does not require any additional filling of oil or gas.
- The VCB is fast in operation so ideal for fault clearing and suitable for repeated operation comfortably
- Vacuum circuit breaker is almost maintenance free and minimum maintenance required as compared to other circuit breakers.
- No exhaust of gas to atmosphere and noiseless operation.
- No fire hazards
- The dielectric strength of vacuum is greater than air and sf6 circuit breaker. High dielectric strength makes possible to quench a vacuum arc within very small gap.

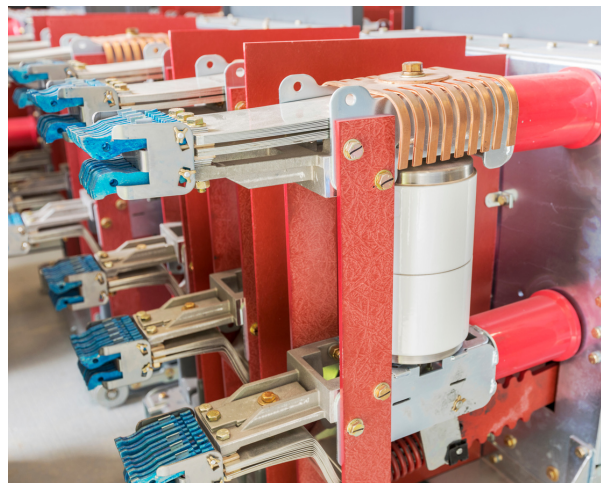
Disadvantages

- The main disadvantages of this circuit breaker is that it become uneconomical at voltage exceeding 38kv because at more than 38kv, two number of vacuum circuit breaker are required to be connected in series.
- VCB production is uneconomical if produced in small quantities.

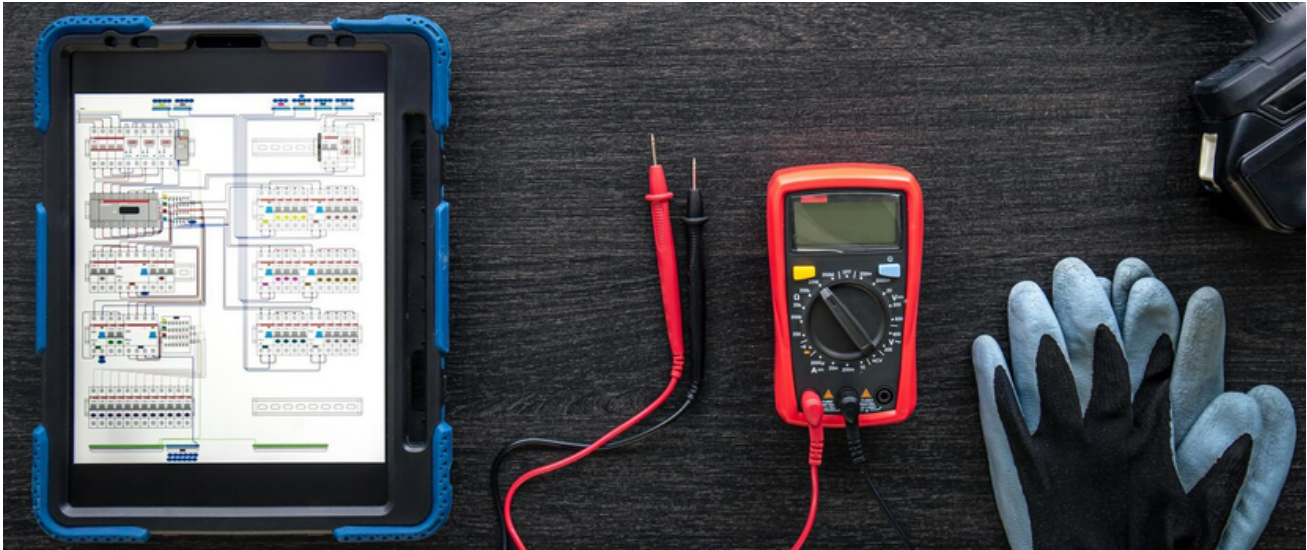


Conclusion

Now a days, vacuum circuit breakers applications to not only medium voltage power systems but also for in high voltage transmission systems. It is because it has so many advantages characteristics such as high interruption capability, long operation life, safety and high-cost performance. After Kyoto protocol in 1997, sf6 circuit breaker is one of major problem of global warming gases, since then vacuum circuit breaker uses become widespread.



EARTHING

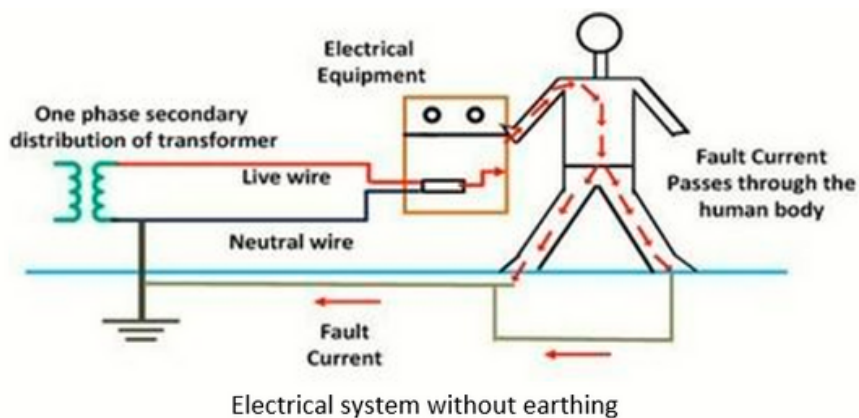


Introduction

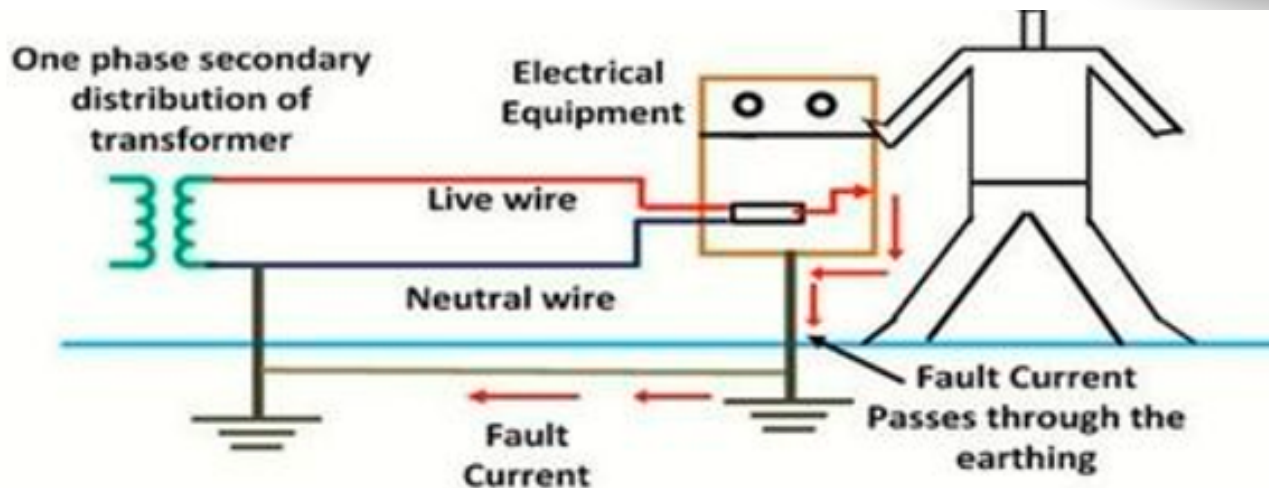
Earthing is arrangement by which an electrical installation is connected to means of earthing. This is usually for safety purposes although sometimes also for functional purposes, for example in case telegraph lines which use earth as conductor to save cost of return wire over a long circuit. If there is fault in electrical installation, a person could get an electric shock by touching a live metal part because electricity uses the body as path to earth.

Earthing provides an alternate path for fault current to flow of earth. It can be seen in power system networks, industries, domestic homes, commercial buildings.

In this below diagram, we can easily see that equipment body leakage current leakage from equipment body, pass to a human body as there is no grounding of equipment or device. This increases the risk of electrical shock. Hence earthing play an immense important role in industries, commercial building, home etc.



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Electrical system with earthing

Method of earthing

1.Earthing mat

It is done by number of joining of rod through copper conductor and it reduces overall grounding resistance of system. Such type of earthing helps to limiting the potential. This type of earthing used in where there is a high fault current is to be experinced. While designing this system following points must consider.

2.Earthing electrode

In this earthing, we may use wire, rod, pipe and inserted verically or horizontally into ground and In distribution system there is rod of nearly 1m is used and inserted vertically into ground but in generating substations there is earthing mat is used rathan than this.

3.Pipe earthing

This type of earthing is mostly used and this is considered best method as comared to other type of earthing for same soil condition. In this earthing, the galvanized steel or perforated pipe of approved length and diameter depend upon types of soil and current carried by that rod is placed upright in wet soil as shown in figure normally size of pipe is of 40mm diameter and 2.5m in length for ordinary soil but for dry soil length may increase. When there is summer then moisture of soil decrease which cause increase in ground resistance some arrangement of water is done for water accesible or 3 or 4 buckets of water is put into a pipe which is connected to soil pit. In soil pit, there is mixed of charcoal and salt around the pipe to reduce the effective resistance of soil.

4.Plate earthing

In this earthing, either copper plate of 60cm×60cm×3mm or galvanized iron rod of 60 cm× 60 cm×6mm is buried in ground with it face vertically to ground and depth is not less than 3m from ground level. The ground wire connected to copper plate through nut or bolt. Copper wire is not used mostly because of high costing. The layer of soil and coke is placed in soil pit.

5.Earthing through water mains

In this type of grounding, the copper or GI wire is connected to water mains through water pipe and water pipe is directly connected to earth as shown in fig. when the fault condition occurs the whole leakage current passes through water steel pipe and earthed.



INDUSTRY BUZZ



The new KHS aseptic block with bottle sterilization offers increased hygiene, safety, and capacity.

KHS is introducing a new aseptic block for bottle sterilization that raises the bar for safety and cleanliness. However, beverage bottlers don't have to sacrifice performance in this case because the block's rotational filler provides three times the output of a linear filler.

Its linear aseptic fillers have a long history of success when filling delicate liquids into PET bottles with the utmost safety in mind. Thus, the Dortmund systems provider is now pleased to offer a rotating aseptic filler with sanitary qualities that raise the bar for larger capacity. Here, the maker of the equipment and systems is purposefully emphasizing bottle sterilization, which, in contrast to preform sterilization, may also be used in conjunction with the FreshSafe PET coating system, which offers extra product protection for delicate drinks.

Experience a new cuisine when The Patio, Ganga Lahari, Haridwar, presents it.

Haridwar, well-known for its spiritual significance and beautiful scenery, is welcoming a new culinary landmark: The Patio at Ganga Lahari Hotel, which has just released an intriguing new menu. Encircled by the vibrancy of Devbhoomi, The Patio's alfresco dining area overlooks the glorious Ganges, providing guests with an unmatched dining experience.

It is ideally situated close to the well-known "Har ki Pauri," where taking a plunge in the river is thought to relieve one's soul of material troubles. It offers travellers and spiritual searchers a charming and easily accessible haven.

This open-air cafe epitomises Haridwar's serene serenity. The Ganges may be seen flowing past the ghat below, and you can listen to the sounds of the market below and the chiming of temple bells to calm your senses.





Blume and Omnivore provide \$10 million in seed funding for Optimo Loan.

Optimo Loan, an innovative MSME lending-tech company operating in rural India, has declared its successful completion of a \$10 million seed investment round. Blume and Omnivore led the round, and Prashant Pitti, the company's founder, contributed.

Optimo seeks to close the \$530 billion credit gap in MSME lending by giving MSMEs easier access to flexible, rapid, and hassle-free funding choices. With this investment, it hopes to use a phygital distribution model and state-of-the-art technology to transform MSME lending in rural India. The startup is developing a co-lending platform with a distinct underwriting process for MSMEs. It can obtain deeper insights into the financial health of MSMEs thanks to this innovative technique, which facilitates financing decisions and encourages entrepreneurship and economic growth in rural areas.



The FSSAI requests that States create an antimicrobial resistance surveillance plan.

The FSSAI presented its anti-microbial resistance action plan during the 43rd Central Advisory Committee (CAC) meeting in Coimbatore, Tamil Nadu.

According to FSSAI, discussions were held to educate farmers on the prudent use of antibiotics in livestock, aquaculture, and poultry.

According to a statement from the FSSAI, plans were discussed for monitoring antimicrobial susceptibility in the food matrix, and States were advised to create plans and hold frequent meetings with State labs. In addition, at the CAC meeting, FSSAI representatives talked about the significance of hygienic marketplaces and the creation of health clubs in schools.



Tata Starbucks introduces popular refreshers around the world.

Tata Starbucks has announced the launch of its highly anticipated handcrafted Starbucks Refreshers Strawberry Açaí Lemonade and Mango Dragon Fruit Lemonade, which are globally beloved. This innovative range of vibrant, iced, fruity beverages will set the tone for an unparalleled summer experience for Indian customers. Arriving in India after making its global debut and capturing the attention of the Instagram community with its vivid hues, these drinks are modeled after the tantalizing bursts of flavor from passionfruit, strawberry, acai, and mango.

The novelty behind it is the use of green coffee extracts derived from unroasted arabica coffee beans and promise a blast of freshness with fruits. This gives a distinctive twist to the regular coffee ritual. Thanks to the category launch, the brand can now penetrate deeper into younger, newer consumer groups and demand areas, which is helping it maintain its current growth trajectory.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT

MARCH



15 MARCH

WORLD SLEEP DAY

World sleep day is celebrated on 15 March to spread awareness about the importance of regular sleep for achieving an ideal quality of life and improve health globally.



8 MARCH

INTERNATIONAL DAY OF HAPPINESS

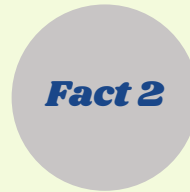
The International Day of Happiness is celebrated throughout the world on 20 March to make people around the world realize the importance of happiness within their lives.

DID YOU KNOW?



Fact 1

Nuts are nature's tiny powerhouses, packed with essential nutrients like healthy fats, protein, vitamins, and minerals. From almonds to walnuts, they offer a flavorful crunch and versatile culinary use. Whether enjoyed as a convenient snack or incorporated into meals, nuts contribute to heart health, weight management, and overall well-being. Embrace the wholesome goodness of nuts for a delicious and nutritious dietary boost.



Indulge in the exquisite delight of pralines—a harmonious blend of creamy sweetness and crunchy nuts, crafted to perfection. With every bite, experience the rich heritage and culinary artistry that defines this timeless treat. Elevate your senses with the luxurious flavor and irresistible texture of pralines, a true embodiment of gourmet indulgence.



GRINDING, SIFTING AND SIEVING PLANTS FOR MACHINES FOR MILLING



Grinding, sifting, and sieving plants are machines that are used in the process of milling grains and other food products. These machines are typically used in commercial or industrial settings, where large quantities of grains need to be milled and processed.

- Grinding machines are used to crush and break down the grains into smaller particles. They use a variety of mechanisms, such as rollers or grinding plates, to grind the grains into a fine powder.
- Sifting machines are used to separate ground grains into different sizes. They use screens or mesh to sift the grains, with the smaller particles passing through the screens and the larger particles being retained.
- Sieving machines are similar to sifting machines but are used to remove impurities from the milled grains. They use screens or mesh to separate the grains from any unwanted materials, such as debris or stones.
- Together, these machines form a complete milling system that can produce a range of different products, such as flour, cereal, and animal feed. They are commonly used in food processing plants, flour mills, and other industrial settings where large quantities of grains need to be processed efficiently and quickly.

Uses

1. Flour - The most common product that is produced using grinding, sifting, and sieving plants is flour, which is used in a wide range of baked goods, such as bread, cakes, and pastries.
2. Cereals - Grinding, sifting, and sieving plants are used to process grains like corn, wheat, oats, and barley into cereals, which is a popular breakfast food.



3. Animal feed - Grinding, sifting, and sieving plants are used to process grains into animal feed for livestock, such as cows, pigs, and chickens.
4. Pasta - Some types of pasta, such as spaghetti and macaroni, are made from wheat flour that has been processed using grinding, sifting, and sieving plants.
5. Snacks - Some types of snacks, such as crackers and chips, are made by grinding grains into a fine powder and then mixing them with water and other ingredients.

Working principle

1. Grinding: The first stage of the process involves grinding the raw material into a fine powder or granular form. This is typically done using a grinding machine, such as a roller mill, hammer mill, or pin mill. The grinding process can be adjusted to produce different textures and particle sizes depending on the desired final product.
2. Sifting: Once the material has been ground, it is passed through a sifting machine to separate the different grades of flour or meal. This is typically done using a combination of sieves and air currents, which help to remove any impurities or foreign materials from the product.
3. Sieving: The final stage of the process involves sieving the material to further refine the particle size and remove any remaining impurities. This is typically done using a vibrating sieve or screen, which separates the product into different grades based on particle size.

The working principle of grinding, sifting, and sieving plants involves a series of mechanical processes that work together to transform raw materials into various food products. The quality and characteristics of the final product depend on the type of raw material, the milling equipment used, and the milling process employed.

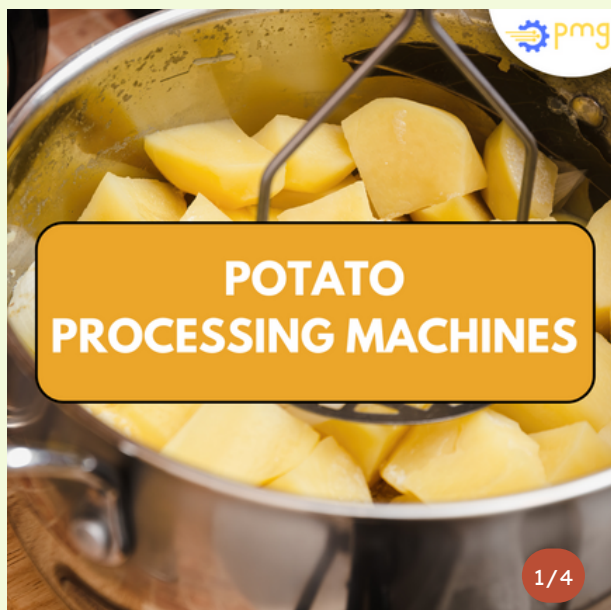


Market scope

- Grinding, sifting, and sieving plants are critical components of many industries, including food processing, pharmaceuticals, and chemical manufacturing. These plants are used to break down raw materials into smaller, more manageable sizes and to separate out impurities.
- From a market perspective, the demand for grinding, sifting, and sieving plants is driven by several factors, including the growth of the food and beverage industry, the need for higher-quality products, and the increasing demand for automation in manufacturing processes.
- One key trend in the market is the growing use of advanced technologies, such as computerized systems and sensors, which enable manufacturers to improve the efficiency and accuracy of their processes. In addition, there is a growing demand for more flexible and versatile grinding, sifting, and sieving plants that can handle a wide range of materials and processing requirements.
- Another important factor influencing the market for these plants is the increasing emphasis on sustainability and environmentally friendly manufacturing practices. Manufacturers are seeking out solutions that are more energy-efficient and reduce waste, while still delivering high-quality products.
- The market for grinding, sifting, and sieving plants is expected to continue to grow, driven by the increasing demand for processed foods and other products, as well as the need for more efficient and sustainable manufacturing practices.

Fact 3

Machines known as grinding, sifting, and sieving plants play a crucial role in the milling process of grains and various food items. They find application predominantly in commercial or industrial environments where there's a requirement to mill and process substantial volumes of grains efficiently.



POTATO PROCESSING MACHINES

1/4



Potato processing machines are industrial equipment used to process potatoes into various products such as chips, French fries, and mashed potatoes. These machines are designed to perform various functions such as cleaning, peeling, slicing, frying, and packing.

The main types of potato processing machines include:

1. Potato washing and peeling machines are used for cleaning and peeling potatoes. They typically consist of a drum with abrasive material that removes the outer skin of the potato.
2. Potato cutting machines: These machines are used for slicing or cutting potatoes into various shapes and sizes, such as chips or French fries. They can be manual or automatic and are available in different capacities to suit the needs of different processing facilities.
3. Potato blanching machines: These machines are used for pre-cooking the sliced potatoes to improve their texture and color. They typically use hot water or steam to blanch the potatoes.
4. Potato frying machines: These machines are used for frying sliced or pre-cooked potatoes. They can be either batch or continuous fryers and are designed to ensure consistent frying results.
5. Potato packaging machines: These machines are used for packing processed potatoes into bags, containers, or boxes. They can be manual or automatic and are designed to handle different packaging materials.

Uses

Some of the food products that are processed using potato processing machines include:

1. French fries: Potato processing machines are commonly used to produce French fries, which are popular fast food items. The machines can peel, cut, and fry the potatoes to produce consistent, high-quality fries.
2. Potato chips: Potato processing machines can also be used to produce potato chips, which are popular snack food. The machines can slice the potatoes into thin, uniform slices and then fry them to produce crispy chips.

2/4



3. Mashed potatoes: Potato processing machines can be used to mash cooked potatoes to produce mashed potatoes, which are a popular side dish.
4. Potato flour: Potato processing machines can also be used to produce potato flour, which is used as a gluten-free alternative to wheat flour in various food products.
5. Hash browns: Potato processing machines can be used to shred potatoes and form them into patties for the production of hash browns, which are a popular breakfast food.

Potato processing machines play an important role in the food industry by providing a versatile ingredient that is used in a wide range of products. The demand for processed potato products is expected to grow in the coming years, driven by increasing demand for convenience foods and changing consumer preferences.

Working principle

1. Receiving: Potatoes are first received in bulk and stored in a hopper or storage area.
2. Cleaning and grading: The potatoes are then cleaned and graded to remove any impurities, dirt, and debris. This may involve using a water-based washing system, brush or abrasive rollers, and/or air jets.
3. Peeling: For potato products that require peeling, such as French fries or mashed potatoes, the potatoes are fed into a peeling machine. These machines typically use abrasive rollers or brushes to remove the outer skin of the potato.
4. Slicing and cutting: Potatoes are then sliced or cut into the desired shape and size, depending on the product being produced. This can involve using a manual or automatic cutting machine.
5. Pre-treatment: In some cases, the sliced potatoes may be pre-treated using a blanching machine or soaked in water to improve texture and flavor.

3/4



6. Frying: For products such as potato chips or French fries, the sliced potatoes are then fed into a frying machine, which typically uses oil or hot air to cook the potatoes until they are crispy and golden.
7. Cooling and seasoning: The finished product is then cooled and seasoned with salt or other flavourings and may be packaged or shipped directly to customers.

Market scope

- The growing demand for processed potato products such as chips, french fries, and mashed potatoes primarily drives the global market for potato processing machines. The market is expected to grow at a steady pace in the coming years due to the increasing popularity of convenience foods and the rising demand for potato-based snacks.
- The Asia-Pacific region is the largest market for potato processing machines, with China and India being the major producers and consumers of potato products. The demand for potato processing machines in this region is driven by the growth of the food and beverage industry, increasing population, and changing food habits.
- North America and Europe are also significant markets for potato processing machines, with the United States, Canada, and Western Europe being major producers and consumers of potato products. The demand for potato processing machines in these regions is driven by the increasing demand for convenience foods and the growing popularity of potato-based snacks.
- The key players operating in the global potato processing machine market include J.R. Simplot Company, The Murren Company, McCain Foods, Lamb Weston Holdings, Inc., and Agriato NV. These companies are focusing on developing new products and technologies to improve the efficiency and productivity of potato processing machines. Additionally, companies are also investing in research and development activities to develop new potato products that can cater to changing consumer preferences and demands.

4/4

Fact 4

Revolutionizing potato processing, our advanced machines streamline production, enhancing efficiency and quality. From peeling to slicing, our state-of-the-art technology ensures precision at every stage, maximizing yield while minimizing waste. Designed for versatility and reliability, our machines cater to diverse processing needs, empowering businesses to meet demands with ease.

POTATO CRISP PRODUCTION PLANTS

1/4

- Potato crisp production plants are factories that manufacture potato chips, also known as potato crisps, on a large scale. These plants typically have specialized equipment and processing lines that are designed to slice, fry, and season potatoes to create crispy and flavorful chips.
- The process of potato crisp production involves several steps, including selecting high-quality potatoes, washing and peeling them, slicing them into thin, even slices, and frying them in oil until they are crispy and golden brown. The chips are then seasoned with various flavors, such as salt, barbecue, sour cream, and onion, and packaged for distribution and sale.
- The main raw material for potato crisp production plants is potatoes, which are usually sourced from farms or potato suppliers. Other ingredients such as oil, seasoning, and preservatives are also used in the production of potato chips. Packaging formats for potato crisps can vary depending on the specific plant and the market they are catering to.

Common packaging formats

1. Bag: Potato crisps are often packaged in bags made of various materials such as paper, plastic or foil. These bags are usually sealed with heat or adhesive to ensure freshness and prevent moisture from entering.
2. Box: Some potato crisp production plants may package their chips in cardboard boxes that are designed to protect the chips during shipping and storage.
3. Canister: Some companies may package their potato crisps in cylindrical canisters made of metal or plastic. These canisters are often resealable and are designed to keep the chips fresh.
4. Individual packs: Potato crisps may also be packaged in individual portion packs, which are ideal for on-the-go snacking or for use in vending machines.

The packaging formats used in potato crisp production are designed to protect the chips from damage and ensure that they remain fresh and flavorful for as long as possible.

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Equipments used

1. Potato washing and peeling machine
This machine is used to wash and peel the potatoes, removing any dirt or debris from the surface.
2. Slicing machine
The potatoes are then sliced into thin, even slices using a specialized slicing machine. The thickness of the slices can be adjusted based on the desired texture and crispiness of the chips.
3. Blancher
The potato slices are blanched in hot water or steam to remove excess starch and ensure that they cook evenly during the frying process.
4. Fryer
The blanched potato slices are fried in oil at high temperatures until they are crispy and golden brown.
5. Seasoning machine
The chips are then coated with various flavors using a seasoning machine. The seasoning can be applied in different forms such as powder, liquid or spray.
6. Packaging machine
The finished potato chips are then packaged using a specialized packaging machine, which can fill, weigh, seal, and label the bags or containers.

Other equipment used in potato crisp production plants may include conveyors, elevators, mixers, and quality control systems to ensure that the chips meet the required quality standards. The precise equipment used in a particular plant will depend on the scale of production, the desired product specifications, and other factors specific to the plant.

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Key manufacturers

- **Heat and Control, Inc.:** Heat and Control is a global manufacturer of food processing and packaging equipment, including potato chip production lines.
- **Kiremko B.V.:** Kiremko is a Netherlands-based manufacturer of potato processing equipment, including potato chip production lines.
- **TOMRA Sorting Food:** TOMRA Sorting Food is a leading manufacturer of sorting and peeling equipment for the food industry, including potato chip production lines.
- **GEA Group:** GEA Group is a global manufacturer of equipment and systems for the food processing industry, including potato chip production lines.
- **Bühler AG:** Bühler is a Swiss-based manufacturer of equipment and solutions for the food processing industry, including potato chip production lines.

These manufacturers offer a wide range of equipment and solutions for potato crisp production, including complete production lines, individual machines, and custom solutions tailored to specific plant requirements.



4/4

Fact 5

Potato crisp production plants utilize cutting-edge technology to transform fresh potatoes into crispy snacks. From washing and peeling to slicing and frying, each step is meticulously controlled to ensure quality and consistency. These facilities prioritize food safety and hygiene standards, employing stringent measures to deliver delicious and satisfying potato crisps to consumers worldwide, meeting the demands of a growing snack industry.



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