

Puffed Food Production Line: The Integration of Technological Innovation and Quality Assurance

Detail Introduction :

I. Mixer: The Key to Precise Blending

II. Screw Conveyor: The Efficient Guarantee for Material Transfer

III. Twin - Screw Extruder: The Core Technology of Puffed Food

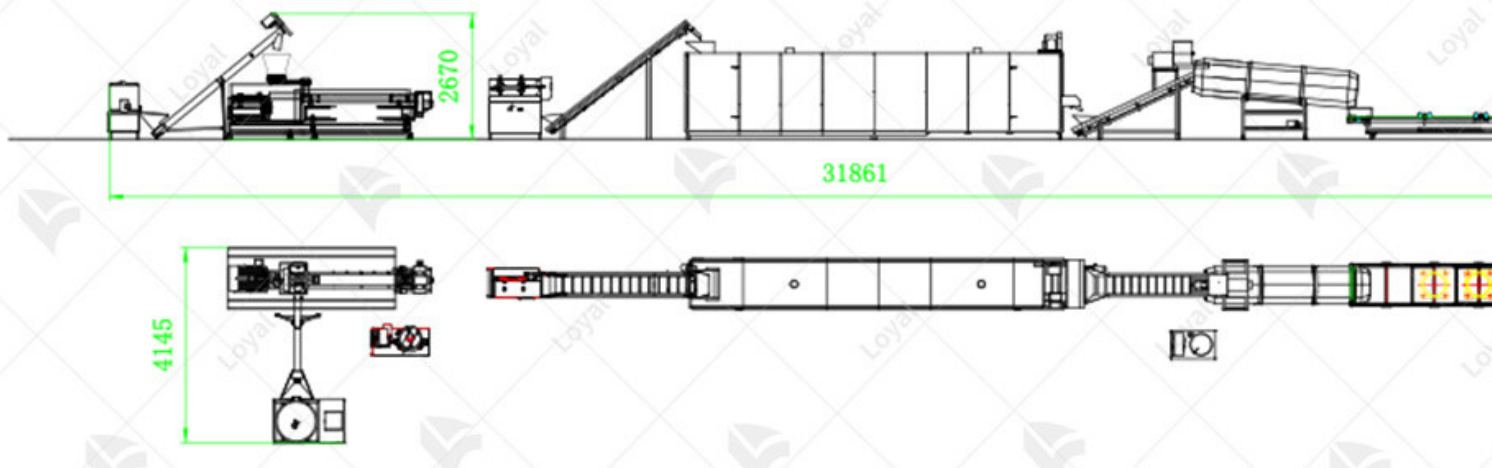
IV. Oven and Seasoning Line: Key Links for Quality Improvement

V. Cooler and Filling Machine: The Perfect Presentation of Innovative Technology

The parameter of the machine

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In today's food industry, the development of **puffed food production lines** has been no short of revolutionary. The transition from traditional hand - made methods to highly automated production processes has not only significantly increased production efficiency but also ensured the quality and safety of products. This article delves into the various components of puffed food production lines, analyzing their technological features, development trends, and profound impact on the food industry.



I. Mixer: The Key to Precise Blending

At the very beginning of the puffed food production line, the mixer plays a crucial role. As senior engineer Li Ming in the industry pointed out, "The performance of the mixer directly determines the uniformity of raw material blending, which in turn affects the quality of the final product." The mixer achieves thorough blending of raw materials through high-speed rotation of the mixing shaft driven by a motor. Raw materials typically include a variety of

cereal powders such as rice flour, cocoa powder, wheat flour, corn flour, and bean flour, as well as a small amount of water and chemical additives like calcium carbonate, baking powder, and food coloring. The proportion of these raw materials is adjusted according to different product requirements.

The design details of the mixer are also of great importance. The mixing shaft is closely fitted to the inner wall of the mixing drum, effectively reducing the accumulation of material and ensuring the efficiency of the mixing process. In addition, the mixer is equipped with a funnel for adding liquid ingredients such as water and oil. This design avoids the dust problems caused by directly adding liquids and also enhances operational safety. The mixer comes in different capacities, ranging from 25kg per batch to 60kg per batch, to meet the production needs of various scales.

In actual production, the mixing time of the mixer is usually controlled at around 7 minutes to ensure the thorough blending of raw materials. This time setting is based on a large amount of experimental data and production experience. As Li Ming emphasized, "Accurate time control is a key factor in ensuring the consistency of product quality." By precisely controlling the mixing time, the mixing effect of each batch of raw materials can be optimized, thereby laying a solid foundation for the subsequent production processes.



II. Screw Conveyor: The Efficient Guarantee for Material Transfer

The screw conveyor is an essential link in the puffed food production line, connecting the mixer and the twin-screw extruder. It is responsible for efficiently and safely transferring well-blended raw materials from the mixer to the feeder of the extruder. The design

operational efficiency of the screw conveyor are of vital importance for the smoothness of the entire production line.

The screw conveyor is driven by a motor that rotates the screw to transfer materials from one end to the other. Its hopper capacity can be customized according to specific customer requirements, which makes the screw conveyor adaptable to different production scales. The screw conveyor is not only capable of horizontal material transfer but also able to transfer materials at any angle. This flexibility provides more options for the layout of the production line and also improves the efficiency of material transfer.

During the transfer process, the screw conveyor uses a stainless - steel drum to ensure the sealing of materials, preventing material leakage and dust pollution. This is particularly crucial for food production, as the hygiene and safety of food are fundamental requirements of the industry. As industry expert Zhang Hua pointed out, "In food production, any potential source of contamination must be strictly controlled, and the screw conveyor's design is excellent in this regard."

Moreover, the operating speed of the screw conveyor can be adjusted through a frequency converter. This adjustment function not only enables the transfer speed of materials to be adapted to production needs but also achieves energy - saving effects. By precisely controlling the transfer speed, a stable supply of materials to the feeder of the extruder can be ensured, thereby improving the operational efficiency of the entire production line.



III. Twin - Screw Extruder: The Core Technology of Puffed Food

The twin - screw extruder is the core equipment in the puffed food production line. It is responsible for the cooking and puffing of the blended raw materials through the action of high temperature and high pressure. This process is a key link in the production of puffed food and directly affects the texture, shape, and quality of the product.

The twin - screw extruder consists of several systems, including the feeding system, extrusion system, cutting system, heating system, lubrication system, control system, and cooling system. These systems work together to ensure that the raw materials are fully cooked in the high - temperature and high - pressure environment inside the barrel and extruded into the desired shape through the die. The design of the twin - screw extruder's screws and dies plays a decisive role in the final shape of the product.

During the extrusion process, when the raw materials enter the barrel, the high - temperature and high - pressure environment is created due to the screw's helical structure and the friction inside the barrel. This environment promotes the cooking of the raw materials, and the puffing occurs as the materials are extruded through the die. The control system of the twin - screw extruder is equipped with multiple frequency converters to

the cutting speed, screw speed, and feeding speed. These frequency converters not only achieve energy - saving effects but also improve the process level and product quality, and extend the service life of the equipment.

Industry expert Wang Qiang pointed out, "The technological level of the twin - screw extruder directly determines the quality of puffed food." By precisely controlling various parameters in the extrusion process, a wide variety of puffed foods with different shapes and textures can be produced. In addition, the upgraded models of twin - screw extruders are also equipped with cooling systems, which further improve the stability of the equipment and the quality of the products.



IV. Oven and Seasoning Line: Key Links for Quality Improvement

In the puffed food production line, the oven and seasoning line are key links for improving product quality and taste. The oven is responsible for drying and shaping the extruded puffed food, while the seasoning line is responsible for adding various flavors to the products, making them more attractive.

The design of the oven can be divided into different numbers of layers, such as single layer, three - layer, five - layer, and seven - layer, according to the production requirements.

Its heating method can be electric heating or fuel - gas heating, but no matter which method is used, the structural design of the oven ensures the uniformity and efficiency of heating. The oven's mesh belt and guard plate are both made of food - grade stainless steel, and the operating speed is controlled by a frequency converter to ensure stable and long-term operation. In addition, the oven is also equipped with a dehumidification system that effectively removes moisture and air to ensure the drying effect of the products.

The seasoning line includes various types of equipment, such as single - drum seasoning machines, double - drum seasoning machines, and octagonal seasoning machines. These devices spray oil onto the surface of the products through a sprayer and then roll and mix the products in the drum to ensure that the surface of the products is evenly coated with oil and seasoning. The unique octagonal shape of the octagonal seasoning machine avoids the problem of raw materials not rolling in traditional round seasoning machines. Its special shape can better achieve the rolling and mixing of materials, thereby improving the seasoning effect.

Industry expert Zhao Li pointed out, "The design of the oven and seasoning line is crucial for improving the quality of puffed food." By precisely controlling the temperature and operating speed of the oven, as well as the oil spraying amount and mixing time of the seasoning line, puffed foods with crispy texture and unique flavors can be produced. The advanced control and precise control of these devices provide a strong guarantee for the quality improvement of puffed food.



V. Cooler and Filling Machine: The Perfect Presentation of Innovative Technology

At the end of the puffed food production line, the cooler and filling machine are key equipment for achieving the final quality and innovation of the products. The cooler is responsible for removing excess moisture from the products to extend their shelf life, the filling machine adds filling materials to the products to enhance their taste and flavor.

The design of the cooler focuses on efficiency and energy - saving. It precisely controls cooling temperature and time to ensure that the products are not contaminated during the cooling process. At the same time, excess moisture is removed to extend the shelf life of the products. Industry expert Liu Yang pointed out, "The performance of the cooler has an undeniable impact on the final quality of the products." By precisely controlling the cooling process, the texture and quality of the products can be kept stable within the shelf - life period.

The filling machine is responsible for injecting filling materials into the extruder to achieve the filling effect of the products. The filling materials are evenly mixed in the drum and accurately injected into the extruder through the injection system, combining with the extrusion materials to form filled puffed food. This innovative technology not only enriches the taste of the products but also improves their nutritional value.

of the products but also provides more choices for consumers.

In addition, the multifunctional forming and cutting machine is also an important piece of equipment in the puffed food production line. It has multiple functions such as traction, conveying, forming, and cutting, and can cut small - sized foods such as cylindrical, long - tube shapes, such as filled rice snacks and rice - based snacks, or multiple - filled foods. The flexibility and multifunctionality of this equipment provide more room for innovation in the production of puffed food.



The parameter of the machine

Model	Installed Power (KW)	Power Consumption (kw)	Capacity (kg/h)	Dimension (m)
LY65 processing line	80kw	55kw	120-150kg/h	21*1.2*2.2

LY70 processing line	115kw	95kw	200- 250kg/h	23*1.5*2.2
LY85 processing line	170kw	140kw	500- 700kg/h	28*3.5*2.2
LY90 processing line	230kw	164kw	800- 1000kg/h	29*2.5*3.5

Conclusion

The development of the puffed food production line is a microcosm of the technological progress in the food industry. From the precise blending of the mixer to the high - temperature and high - pressure puffing of the twin - screw extruder, and then to the improvement of the oven, seasoning line, cooler, and filling machine, each link reflects the advancement and innovation of modern food production technology. As industry expert Ming summarized, "The development of the puffed food production line has not only increased production efficiency but also ensured the quality and safety of products." With the continuous progress of technology, we have every reason to believe that the puffed food production line in the future will become more intelligent and efficient, bringing more high quality and diversified puffed foods to consumers.