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欧尚元智能装备股份有限公司
Oushangyuan Process & Equipment Intelligent Co.

目录 CONTENTS

PART ONE

COMPANY PROFILE

COMPANY PROFILE

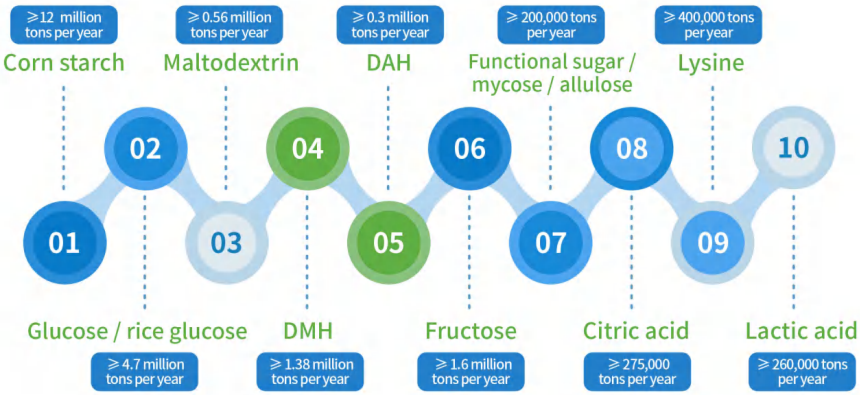
Oushangyuan Process & Equipment Intelligent Co. founded in 2011, located in Tianjin Shuanggang Industrial Park, is an National High-tech Enterprise integrating the whole EPC process of consulting, R&D, design, procurement, construction, training, operation, maintenance, equipment manufacturing, and other comprehensive services.

Yuan Co. is also an industry explorer and technology leader in the industry, guided by the overall process design of starch, modified starch, starch syrup, liquid sucrose, biological fermentation, synthetic biotechnology and material grade lactic acid production line, and takes design, manufacturing, installation and commissioning of the core intelligent equipment as the main business.

Our Advantages

- Strong technology & design team with factory practice and equipment manufacturing experience
- Most skilled process automation integrator
- Pilot test equipment in various fields of bio-chemical industries
- Accurate marketing ability
- High-end equipment manufacturing
- Rich experience in project implementation & production

By May, 2023, Yuan Co. had participated in and implemented the following projects (parts):




Corn Starch Plant


Fructose Plant

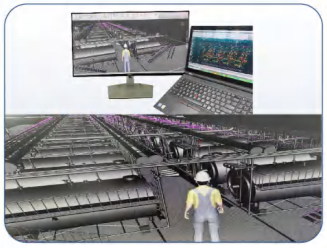

Liquid Glucose Plant

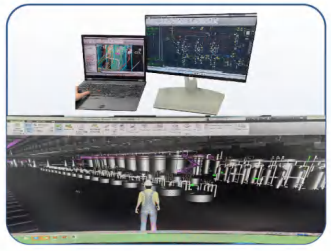

Fermentation Plant


Pilot Equipment at Site


Laboratory Equipment

Since establishment, Yuan Co. has been focusing on the four aspects of quality improvement, energy saving, consumption reduction and efficiency increase, to create a macro profit for customers. Company has a strong technical and design team. The process design engineers are composed of different professional experts, including 3 professor engineers, 14 senior engineers, more than 50 professional and technical personnel in machinery, automation, electronics and thermal engineering; more than 50 professional and technical personnel of biological fermentation and microorganism. They either come from the design institute, or have been as the production technology leader and production manager, have rich experience in technology and production management, so whether it is the process of the project, automation, or 3D design, the design team can start from the actual production, to achieve the perfect combination of design and production. As of May 2023, our company has designed and completed more than 120 sets of starch, starch syrup, functional sugar and fermentation projects. In addition, Company has other logistics and management personnel more than 20 people, production workers more than 110 people, can timely and properly deal with the different requirements of customers.

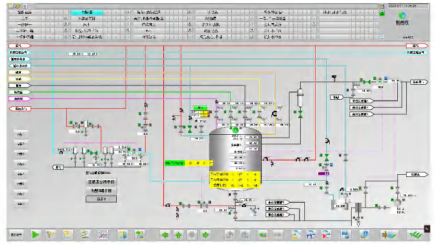




Yuan Co. started from automation, is good at automation design combined with automation and process control, who has a leading market share in the automatic control of starch, starch syrup and fermentation yield. The products involved are: corn starch, glucose, maltodextrin, DMH, DAH, fructose, crystalline fructose, allulose, oligosaccharide, resistant dextrin, maltitol, sorbitol, sodium gluconate, erythritol, lactic acid, iso VC sodium, etc.

Development Results

1. One-button start of liquefaction and saccharification
2. IC card permission management
3. Precise control of starch drying moisture (± 0.25%)
4. Vacuum pan program control
5. Intelligent fermentation system
6. Yuan-Core control system



Automation Development Stage

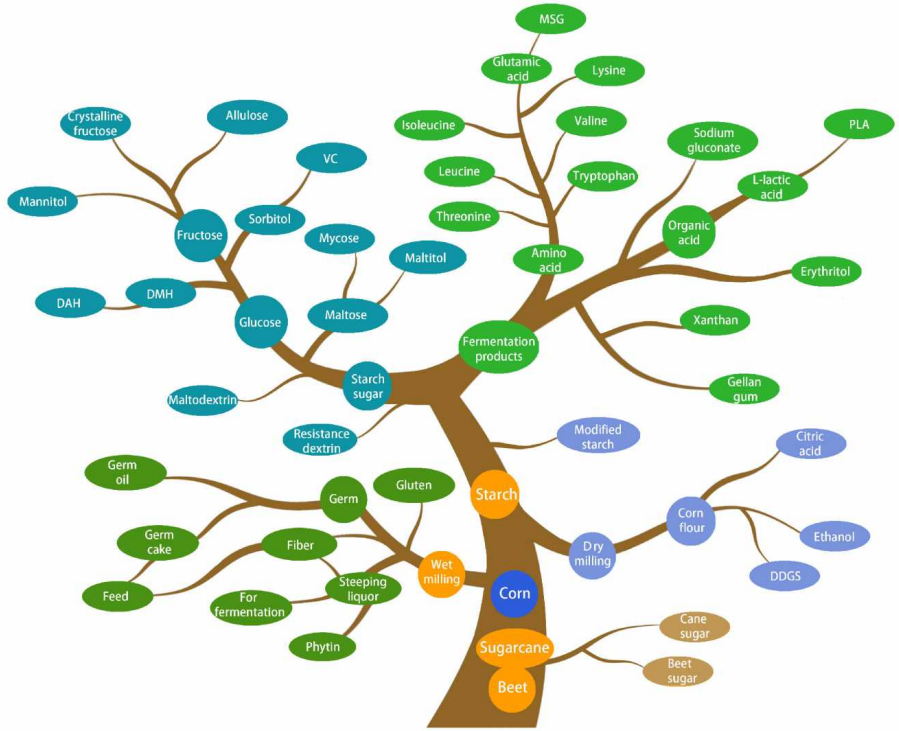
In 2021, reviewed by an expert team led by academicians, four scientific and technological appraisal achievements issued by Tianjin Science and Technology Evaluation Center: valve array type multi-unit continuous ion exchange in starch syrup refinery system, red lactic acid extraction process of high purity lactic acid, molecular distillation equipment for lactic acid preparation process and continuous multi-column automatic resin decalcification system for beet sugar preparation have all reached the international leading level.

Yuan Co. applied for more than 60 pieces of intellectual property rights, and has obtained 17 pieces of invention authorization; Participated in the formulation of 20 national standards, 4 industry standards, and 4 enterprise standards.

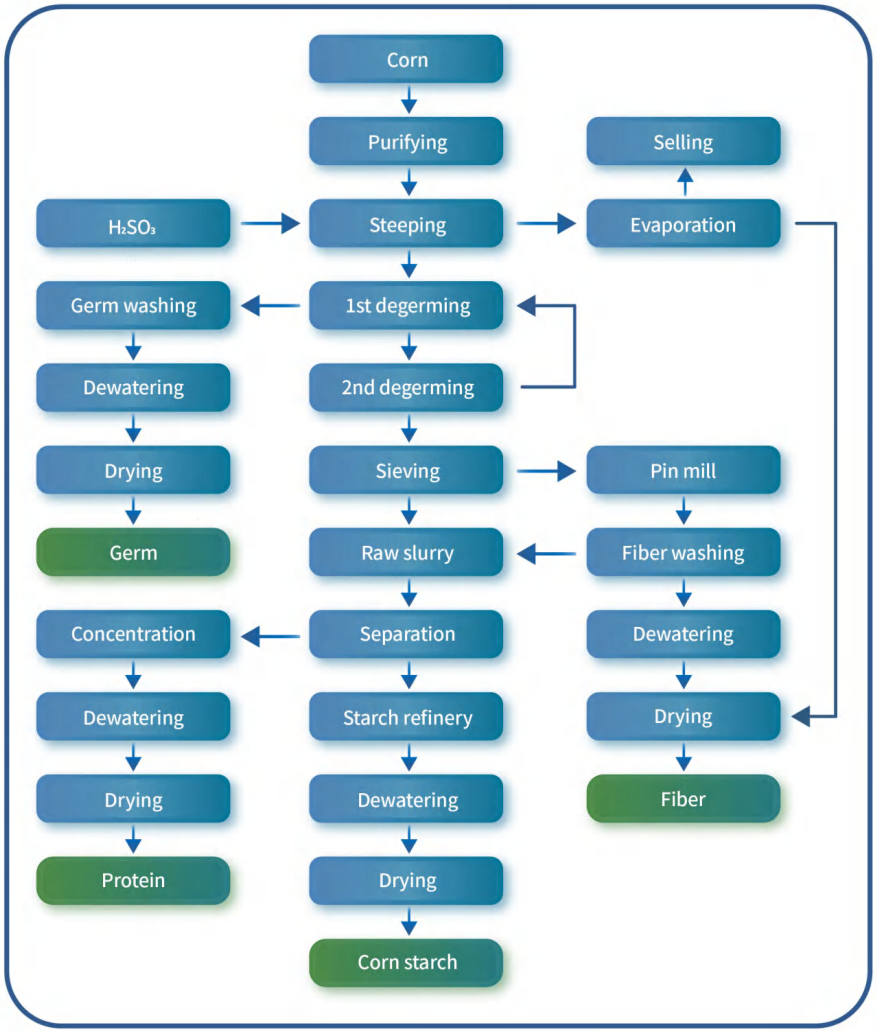
Patents and Honors

PART TWO

MAIN PROJECTS



1. Corn Starch Project



General Introduction

The raw corn after cleaning is screened, iron removed, measured and enters to the corn steeping system. After steeping for a certain period of time, the steeped wet corn was entered into 1st & 2nd degerm mill and 1st & 2nd germ cyclone after stone removing to separate the germ. The corn slurry is sifted through the pressure arc screen, the material under the sieve goes into the slurry tank, and the material on the sieve goes into the pin mill for the fine grinding, so as to free the starch as far as possible which is connected with the fiber. After pin mill, the slurry enters the 6-stage fiber washing system for the fiber washing. The material under the first stage screen enters the slurry tank, which is mixed with slurry taking before pin mill into the starch separation process. The separated fiber on the screen through the fiber press for dewatering, then enter into the fiber bundle dryer for drying to get the fiber products.

The raw slurry enters the main separator for the gluten separation. The overflow gluten water enters the protein concentrator, the bottom flow crude starch milk enters the 12-stage cyclone for counter-current washing to obtain the refined starch milk, then enters the peeler centrifuge and starch air dryer to obtain the dried starch with moisture content less than 14% and packaged as the commercial starch.

The gluten water entering the protein concentrator, after concentration and dewatering, enters the protein bundle dryer for drying to get the finished protein.

Since the overflow germ from the 1st germ cyclone, after the three stages pressure arc sieve washing, enters the germ press for dewatering, then into the germ bundle dryer drying, to obtain the finished germ.

The steeping liquor discharged by steeping is concentrated into CSL through the evaporation system. The CSL is partially mixed with fiber to dry and get the CSL mixed fiber, and partial of the CSL is directly sold to the market.


OCC


Corn starch workshop


Starch air dryer


Degerm mill


Pin mill


Pressure arc screen


Peeler centrifuge

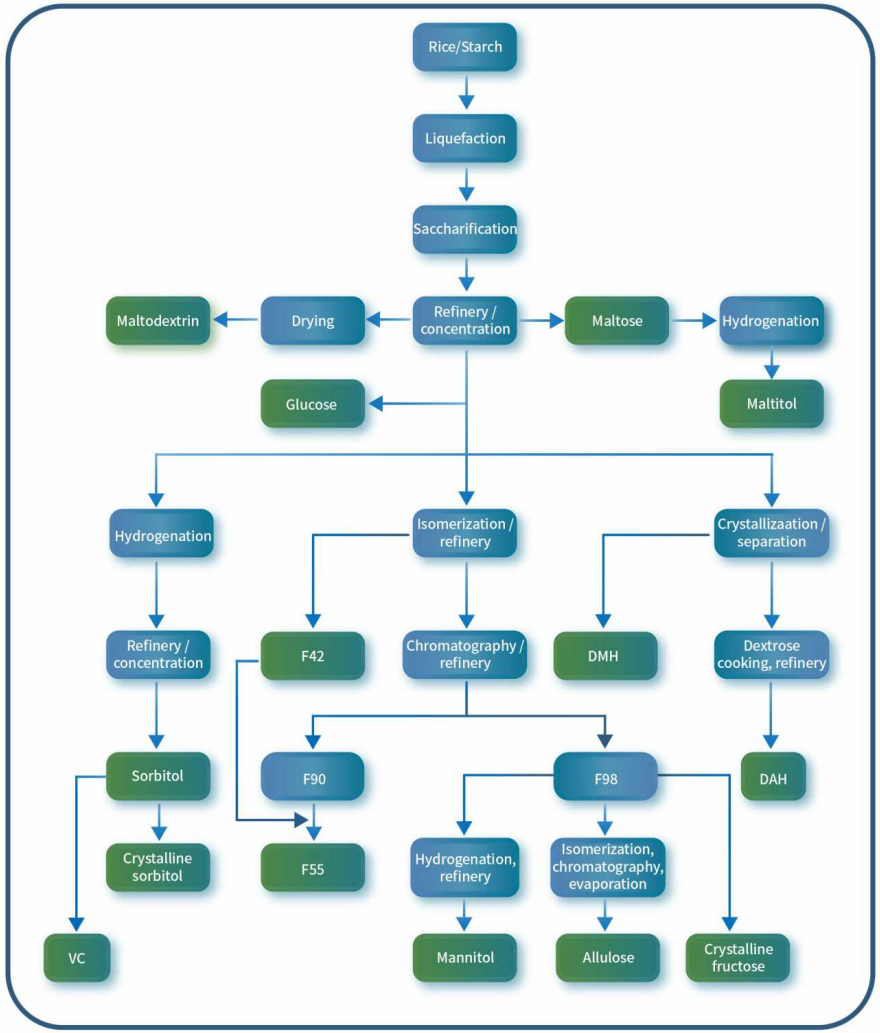

Germ & fiber press


Bundle dryer

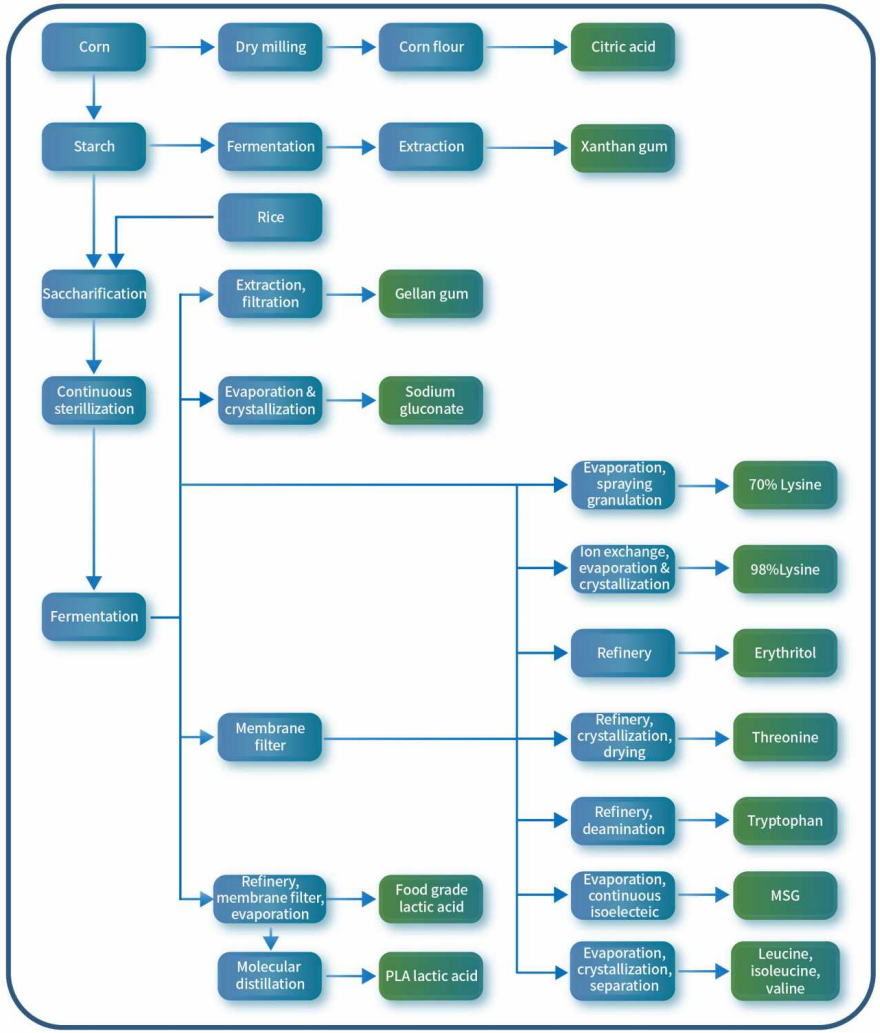

Starch packing system


Robot palletizer

2. Starch Syrup Projects



3. Fermentation Projects



Part Three

MAIN EQUIPMENT

The World's First Automatic Valve Array Type Multi-unit Continuous Ion Exchange

Introduction

The automatic valve array type multi-unit continuous ion exchange system is the same as the ordinary ion exchange system, which is to fill the resin into the ion exchange column to use and regenerate. But for the continuous ion exchange system, just the resin in valve array system is divided into more units for more detailed operation, in order to achieve the purpose of full utilization of resin and reduce consumption.

Advantage

- Improve the utilization rate of resin and save 50-70% of resin investment;
- Reduce the consumption of acid, alkali, water, and waste water emissions by more than 50%;
- Automatic operation, automatic monitoring the working state of resin, ensure the product quality stability;
- Automatic in vitro backwash regeneration of resin, and does not affect the normal production, maintain the good performance of resin.

Application

Widely used in maltose, glucose, fructose, maltodextrin, DMH, sorbitol and other starch derivatives; Lysine, threonine and other amino acid products, as well as citric acid, lactic acid and other organic acids in the production process.

Automatic Simulated Moving Bed Chromatography Separation System

Introduction

Chromatographic separation is carried out in the column containing “stationary phase”, which must have sufficient retention difference to the separated components so that the flow rate of the separated components can be used to separate two or more components. Automatic simulated moving bed chromatography separation system can realize the effective separation of two components and multiple components.

Application

It is widely used in the fields of syrup separation, sucrose and molasses treatment, fructose and glucose separation, purification of organic acids, and so on. It is also suitable for chemical, food and pharmaceutical industries.

Advantage

- According to the operation mode, there are:
  4 columns simulated moving bed, 6 columns simulated moving bed, 8 columns simulated moving bed;
- According to the separation principle of resin:
  ①Isomer separation, such as:
  fructose and glucose separation, fructose and allulose separation;
  ②Different molecular weight size separation, such as: glucose mother liquor recovery, oligosaccharide purification, oligosaccharide purification;
  ③Ion exclusion separation, such as:
  organic acid desalination and decolorization extraction, xylose desalination and decolorization extraction, sucrose and beet molasses extraction sugar recovery.
- Typical operating indicators:
  ①F42 is separated to get F90 fructose, water : material ratio < 0.77; fructose yield > 91%;
  ②F55 is separated to get more than F99 fructose, water : material ratio < 1.25; fructose yield > 95%;
  ③M50 is separated to obtain M98 oligosaccharides, water : material ratio < 3.2; oligosaccharides yield > 95%;
  ④Extraction of organic acid fermentation liquor, water : material ratio < 2.0; acid yield > 99%; salt removal rate > 98%; protein removal rate > 85%.

Automatic Intelligent Continuous Fermentation And Intermittent Fermentation System

Introduction

Automatic intelligent continuous fermentation is an operation mode of fermentation process, in which the fermentation system in a continuous way to feed and collect, in order to achieve continuous fermentation process. Automatic intelligent continuous and intermittent fermentation system is based on advanced equipment and automation technology to achieve efficient and accurate fermentation process control and continuous production.

Application

Automatic intelligent continuous and intermittent fermentation system is widely used in the production process of L-lactic acid, citric acid, malic acid, iso VC sodium, VC, MSG, sodium gluconate, lysine, L-alanine, etc.

Advantage

- Automatic operation, one key start and stop, full automatic implementation of continuous sterilization, real elimination, empty elimination, seed transfer, culture and discharge to avoid the risk of contamination or misoperation caused by human operation. Product yield has been improved.
- Intelligent control system. Precise control of the fermentation process temperature, pH value, nutrient supply and other parameters to ensure the output of high-yield, high-purity products and improve production efficiency.
- The product quality is stable and the fermentation process and finished product quality are guaranteed for each batch.
- Reasonable equipment structure design, simple maintenance, economical, easy to clean and maintain, reduce the equipment failure rate and maintenance cost.
- Low average operation cost, effectively reduce production cost, improve economic benefits.

Automatic Liquefaction System

Introduction

Automatic liquefaction system is applied in the process of starch syrup liquefaction. A lot of waste steam generated in the liquefaction process will be collected for other heating process, such as liquefied flash steam in the form of secondary steam supply to evaporation equipment for reusing to achieve the purpose of heat energy balance, and energy saving.

Advantage

- One-button start automatic control , easy to operate. Operators only need to input the key parameters, click the start button, the system will be started according to the program: start pump, water preheating, flow stability, temperature stability, feed switching and other steps.
- Mass flowmeter controls the feed concentration. Enzyme adding quantity and substrate mass interlocking, which is more scientific and accurate than the flow interlocking.
- Under the complete liquefaction ensuring, the index control is:
  ①When high concentration requirements, DS%: 38-40%; DE value: 16-18%;
  ②When high DX requirements, DS%: 30-32%; DE value: 12-14%;

Application

Fully automatic liquefaction system can be used in food, beverage, bio-pharmaceutical, fermentation, chemical industry and other fields, such as starch syrup, including glucose, crystalline glucose, fructose, crystalline fructose, etc.

Automatic Waste Steam Evaporation System

Introduction

Multi-effect tubular evaporator system is mainly composed of multiple heating chamber and separation chamber. The most commonly used is falling film evaporator.
Plate type evaporator system is a new type of high efficiency evaporator which is composed of a series of corrugated metal sheets. It has the characteristics of high heat transfer coefficient, high evaporation intensity and short contact time.

Advantage

- Multi-effect tubular evaporator system
  ①The tube structure is not easy to block, short one-way residence time, suitable for evaporating heat sensitive materials and processing materials with high concentration.
  ②Large effective temperature difference,can achieve high concentration of product output.
  ③Make full use of waste steam recovered from liquefaction, reduce fresh steam consumption, lower circulation of cooling water, and improve energy utilization efficiency.
- Plate type evaporator system
  ①High heat transfer efficiency, low energy consumption, not easy to scale and blockage.
  ②Small footprint, easy expansion and maintenance, low operating cost.
  ③Make full use of waste steam recovered from liquefaction, reduce fresh steam consumption, lower circulation of cooling water, and improve energy utilization efficiency.

Application

Automatic waste steam evaporator system can be used to deal with starch syrup, glucose, fructose and other substances evaporation and concentration process. In addition, the equipment can also be used in the chemical industry, food industry and pharmaceutical industry.

Automatic Granular Activated Carbon Decolorization System

Introduction

Automatic granular activated carbon decolorization system is to fill the activated carbon into the ion exchange column to decolorize the material, which protect the working environment. After the failure of the activated carbon, it can be regenerated by activated carbon regeneration system to reduce the consumption of activated carbon.

Application

Automatic granular activated carbon decolorization system is mainly used in the production process of starch syrup, including glucose, crystalline glucose, fructose, crystalline fructose, F42, F55, maltose, maltodextrin and so on. It is also suitable for food industry, pharmaceutical industry, thermoelectric industry and chemical industry.

Advantage

- Reduce acid, alkali, water consumption, and waste water emissions by more than 50%.
- Improve granular activated carbon utilization rate and save 50%-70% filler investment.
- The product is easy to elution, less regeneration loss, yield more than 99.5%. The site environment is clean and tidy.

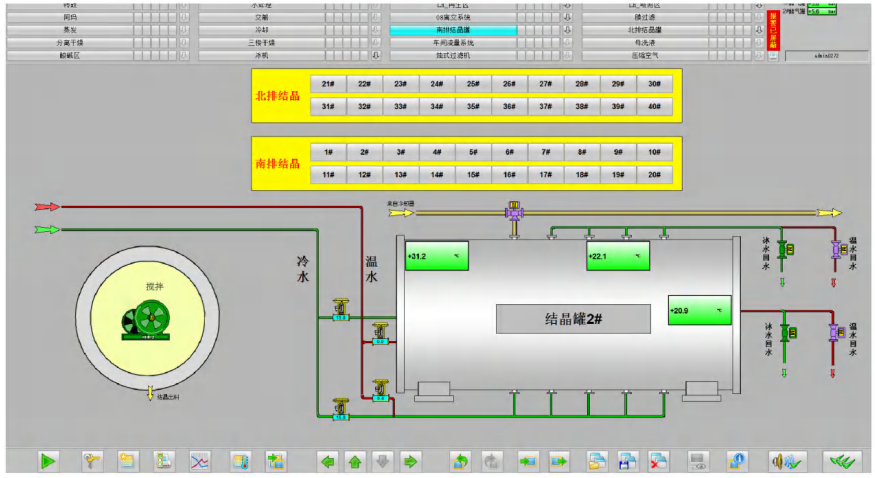
Horizontal Cooling Crystallization Control System

Advantage

- Precise liquid level switch controls the liquid level of the tank feeding and discharge.
- Temperature control curve and temperature protection, improve the efficiency of equipment while avoiding the production of fake crystallization.
- Easy to operate, according to different materials input different parameters: starting and ending temperature, cooling rate, stirring speed, then the system can automatically execute.

Application

Horizontal cooling crystallization control system is widely used in the crystallization of glucose, fructose, allulose, inorganic salt and other materials, also suitable for chemical industry, pharmaceutical industry and metallurgical industry.



Automatic Drying System

Introduction

Air dryer system is a kind of equipment through hot air flow and wet material contact to achieve drying.

Fluid bed dryer system is a kind of equipment for suspending wet materials and drying them by air flow.

Tumble dryer system is a kind of equipment to dry wet materials by rotating drum.

Application

Automatic drying system is suitable for food, chemical, pharmaceutical and other industries, which can dry materials efficiently.

Air flash dryer system

Rotary dryer system

Advantage

- Air dryer system:
  ①Fast, uniform drying, avoid local overheating or excessive humidity.
  ②Good controllability.
- Fluid bed dryer system:
  ①High efficiency, uniform drying, avoid local overheating or excessive humidity.
  ②High thermal efficiency.
  ③With a wide range of adaptability, suitable for different particle size, different humidity and different material properties of material drying.
- Tumble dryer system:
  ①Suitable for drying materials with high solubility and long drying time, it can protect the complete crystal shape of the product and has good glitter.
  ②Easy to operate, easy to control and maintain, suitable for various process conditions and material requirements.

Fluid bed dryer system

Automatic Molecular Distillation System

Introduction

Automatic molecular distillation system is a special liquid - liquid separation system, which is different from traditional distillation which relies on the principle of boiling point difference separation, but by the difference of mean free path of different substance molecules to achieve separation. Molecular distillation mainly includes falling film type, scraping film type, centrifugal type and scraping plate type. Among them, the scraping plate type distillation equipment is more popular than other forms.tions.

Application

Automatic molecular distillation system plays an important role in the production of L-lactic acid and other organic acids. In addition, it also plays a key role in medicine, food, fermentation, metallurgy, printing and dyeing, inorganic salts, chemical and other industries, which is used for material separation and purification.

Advantage

- Low operating temperature to ensure the stability of materials and avoid the damage to heat-sensitive materials.
- Low distillation pressure, safe and reliable operation, reduce potential risks.
- Short heating time, efficient separation.
- Low failure rate and low operation cost, can realize one-button operation and unattended, high degree of automation, save human resources.

Automatic Vacuum Pan System

Introduction

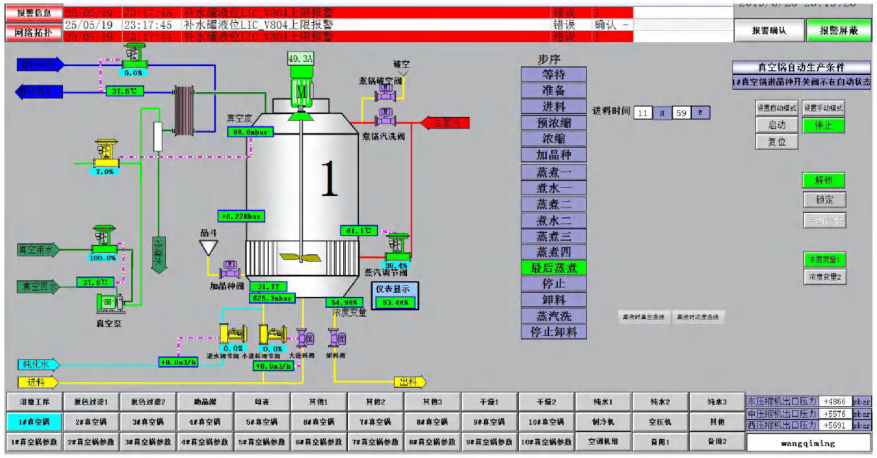
Automatic vacuum pan system applies the advanced instrument, actuator, control method and other automation technology to the production of anhydrous dextrose, and truly realizes automatic dextrose cooking, completely replacing the manual operation, which will become the inevitable trend of the production of anhydrous dextrose in the future.

Application

Automatic vacuum pan system is suitable for sucrose crystalization, anhydrous glucose crystallization, erythritol crystalization, maltitol crystalization, fructose pre-crystallization, allulose pre-crystallization, etc.

Advantage

- The system automatic control achieves the effect of one-button start, and the operation is simple. The operator only needs to enter the key parameters, click the start button, and the system can perform according to the program: vacuum, pre-concentration, concentration, seed adding, crystal cultivation, dilution, cooking, full tank prompt, discharge prompt, discharge, discharge delay, preparation and other steps.

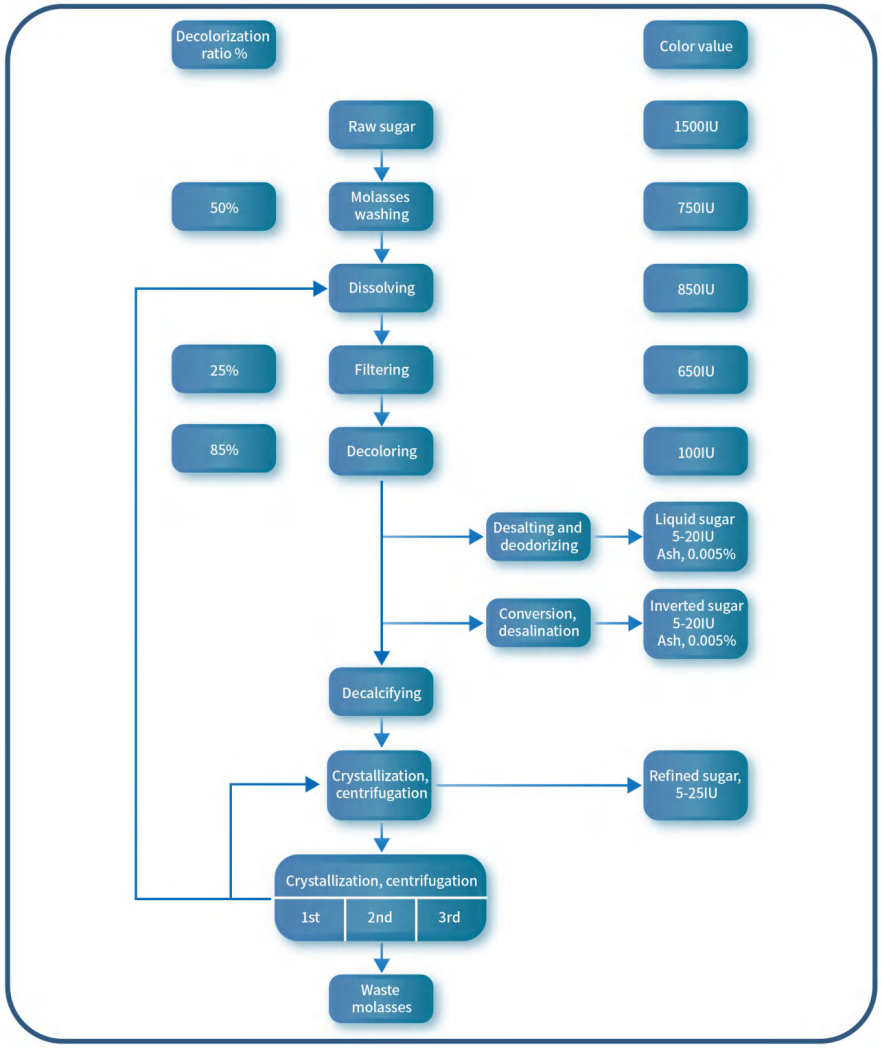


Factory Intelligent Control Platform

Advantage

- Automatic control of all process parameters to ensure the accuracy and stability of the production process.
- Its precise process parameter control ensures excellent product quality.
- Can flexibly adjust and modify the parameters of the whole production line, friendly operation interface and easy operation.
- Reduce the operator's workload, save time and cost.
- High speed CPU and powerful process functions improve productivity and output efficiency.

Sugar Refinery Process



Sucrose Decalcification & Decolorization

Decalcification

The liquid sugar containing more Ca2+ ion through the resin column filled with Na-type cation resin, after exchanging of the Ca2+ ion in the liquid sugar and the Na+ ions in the resin layer, the Ca2+ ion content is reduced to a lower level, that is, it is softened. The benefits of softening liquid sugar to production:

- Reduces the scaling in evaporators and thin juice heaters.
- Eliminate the need for scale inhibitors during evaporation.
- Saves energy and cleaning costs on the evaporator.
- Shorten the time of sugar crystallizing.
- The turbidity of the finished product is significantly reduced, and the quality of the finished sugar is significantly improved.

Our company's decalcification system is applied to decalcification of beet juice and raw sugar refining.

Decolorization

In the refining process of imported raw sugar or two-step sugar production, the decolorizing resin is used to adsorb and remove the pigment substances in the liquid sugar, and the color value can be reduced from more than 600IU to less than 150IU. The saturated resin was regenerated with alkaline brine containing 10% NaCL and 1% NaOH. The regenerated waste brine is recovered by nanofiltration. The automatic valve array type multi-unit continuous decolorization system independently developed by our company has the following advantages compared with the traditional full-chamber bed decolorization system:

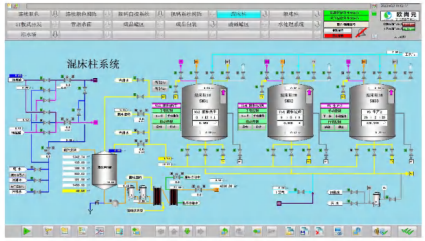
- Improve the utilization rate of resin and save more than 30% of resin investment.
- Partition filling acrylic and styrene resin, give full play to the characteristics of the two resins, the overall adsorption capacity increased by more than 3 times. Regenerated salt and water use is reduced by more than 70%.

Desalination & Liquid Sugar Production

Desalination

According to the requirements of liquid sugar refining, cation and anion desalting can be further used. Our company's desalination system is a fully automatic control of the mixed bed system, its characteristics:

- One-button start automatic control level, automatically complete exchange, leaching, resin backwashing layering, regeneration, washing, resin mixing, quick washing and other steps. Avoid misoperation caused by human factors and ensure the stable operation of the system.
- Good discharge index: conductivity ash < 0.01%, reducing sugar increase < 0.1%, color value < 10IU.



Liquid Sugar Production

The liquid sugar is decolorized, desalted, deodored, and then evaporated to about 67%, which can produce high quality liquid sucrose. In recent years, liquid sucrose has become increasingly popular for the following reasons:

- It can be used directly for ingredients, without the need for additional dissolution and filtration, reducing the cost of use.
- The product quality is uniform and reliable.
- The production enterprises have reduced the process of crystallization, separation and drying, and the cost is reduced and the efficiency is obvious.

Other Equipment Display

Isomerization system

Isomerization system

Filter press

Centrifuge

Mission: Reduce the intake of harmful substances and eliminate the waste of non-renewable resources.

Goal: Let the world more recognized Chinese wisdom and heart!

Philosophy: Let customers share with us the dividend by quality improvement, energy saving, consumption reduction and efficiency enhancement.

Positioning: Industry explorer and technology leader!