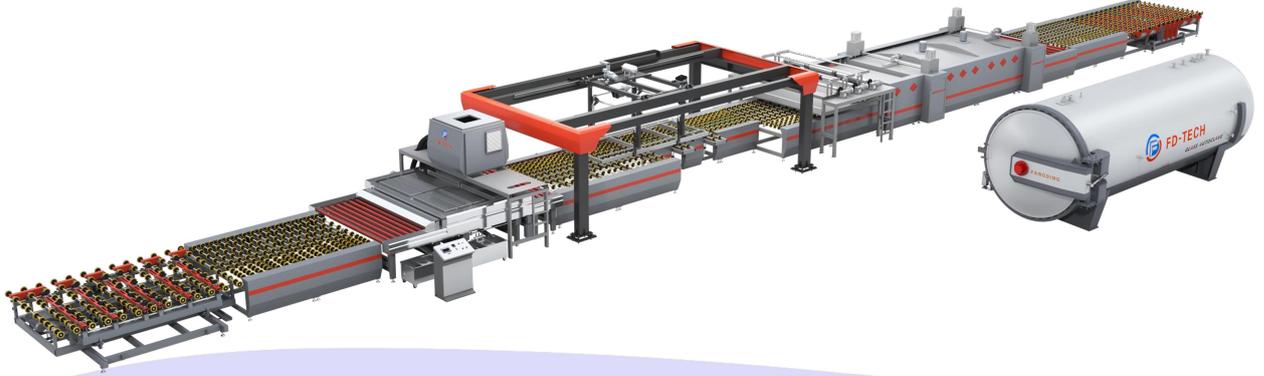


Fully-Automatic Laminated Glass Production Line



2850x6000 laminated line (for reference)

Installation requirements:

Site: Linear layout, about 60 meters in length, 8 meters in the widest part, and about 4.5 meters in other parts. (If the site is difficult, provide the maximum site width and length that can be reserved, and design separately)

Electricity consumption: The minimum transformer capacity is 500KVA, and the total power of the whole line is about 400KW, including a 55KW air compressor.

If it is not used at the same time, the film is combined during the day and the kettle is opened at night, the capacity of (autoclave 230KW + air compressor 55KW) needs to be above 315KVA.

1. Specifications For Processing Glass

1. Maximum glass size: 2500x6000mm
Minimum glass size: 400x400mm
2. Glass thickness: 6-80mm
3. Thickness of using glass: 3-19mm
4. Assembling accuracy: ± 0.5 mm
5. Electricity demand: 220/380/440V, 50/60HZ

2. Composition of the whole line

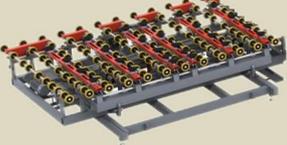
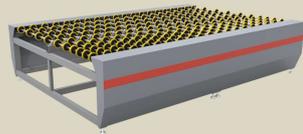
- ✓ Automatic mechanical single arm glass loading machine
- ✓ The frequency conversion transition conveyor A
- ✓ The Multifunctional glass washing & drying machine
- ✓ The High precision glass positioning conveyor
- ✓ The Double station glass combining machine
- ✓ The automatic movable suction cup hanger
- ✓ The horizontal 3-roller film storage machine
- ✓ The frequency conversion transition conveyor B
- ✓ The infrared roller pressing machine
- ✓ The frequency conversion transition conveyor C Glass unloading machine
- ✓ Autoclave

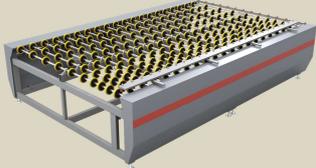
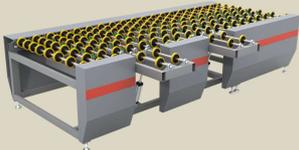
3. Process Flow

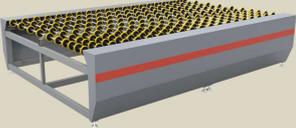
1.1 The flat laminated glass

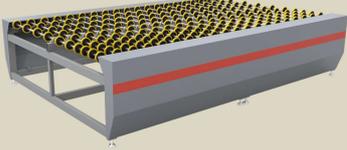
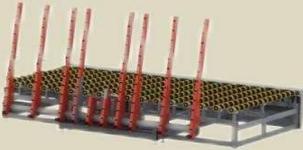
- ❖ Glass loading
- ❖ Cleaning and drying
- ❖ Glass combination
- ❖ Transition
- ❖ Preheat and prepress
- ❖ Unloading
- ❖ Enter autoclave
- ❖ Finished product

4.Full-Automatic Production Line Equipment Price

| No. | Name& Model | Main configuration | Remarks |
|-----|--|--|---|
| 1 |  <p>Automatic mechanical single arm glass loading machine SPT-3722</p> | <p>1. Touch screen, PLC: Siemens</p> <p>2. Inverter: Delta</p> <p>3. Main vital parts: Schneider/Chint</p> | <p>1. single arm</p> <p>2. PLC centralized control</p> |
| 2 |  <p>The frequency conversion transition conveyor A SO-2500</p> | <p>1. Inverter: Delta</p> <p>2. Main components: Schneider/Chint</p> | <p>Whole line control, frequency conversion speed regulation</p> |
| 3 |  <p>The Multifunctional glass washing & drying machine QX-2500</p> | <p>1. Touch screen, PLC: Siemens</p> <p>2. Inverter: Delta</p> <p>3. Main components: Schneider/Chint</p> | <p>1. Cleaning speed: 0~12M/min, frequency conversion speed regulation</p> <p>2. Appearance protection sheet metal and sink are made of stainless steel</p> <p>3. Air valve intelligent control, strong wind/weak wind conversion</p> |

| | | | |
|---|---|---|--|
| 4 |  <p>The High precision glass positioning conveyor DW-2500</p> | <p>1. Inverter: Delta 2. Main components: Schneider/Chint</p> | <p>1.Side thrust positioning and front positioning rod combined two-way positioning, accurate and fast. 2.Equipment with omnidirectional</p> |
| 5 |  <p>The Double station glass combining machine SGW-2500</p> | <p>1. Inverter: Delta 2. Main components: Schneider/Chint 3. Cylinder: AirTAC</p> | <p>1: Double-station combined design 2: universal ball table with pneumatic lift 3: Pneumatic widening extension table. 4:super large glass mode, Automatic mode, Manual mode, three modes to achieve various order sizes,Efficient and reasonable operation mode,</p> |
| 6 |  <p>The automatic movable suction cup hanger DJ-2500</p> | <p>1. Servo motor: Yaskawa 2. Touch screen, PLC: Siemens 3. Inverter: Delta 4. Main components: Schneider/Chint 5. Cylinder: AirTAC</p> | <p>1: Automatically walking, absorbing, positioning, taking glass and combining glass 2: Precise positioning</p> |

| | | | |
|---|--|---|---|
| 7 |  <p>The horizontal 3-roller film storage machine SGT-2500</p> | <p>1. Inverter: Delta 2. Main components: Schneider/Chint</p> | <p>1: Automatic retractable film with detailed design of supporting film shaft 2: With waste film curling function 3: The three rubber rollers are controlled by independent motors, 4: Two modes of remote control/button control.</p> |
| 8 |  <p>The frequency conversion transition conveyor B SO-2500</p> | <p>1. Inverter: Delta 2. Main components: Schneider/Chint</p> | <p>Whole line control, frequency conversion speed regulation</p> |
| 9 |  <p>The infrared roller pressing machine GY-2500</p> | <p>1. PLC, touch screen: Siemens 2. Inverter: Delta 3. Main components: Schneider/Chint 4. Cylinder: AirTAC</p> | <p>1: Mid-wave and far-infrared heating method 2: Design of convection air circulation on roller press 3: One stage of preheating zone and two stages of heating zone 4: Pre-press roller + final press roller two pairs of large press rollers 5: Independent motor control, good rolling effect</p> |

| | | | |
|----|---|---|---|
| 10 |  <p>The frequency conversion transition conveyor C SOC-2500</p> | <ol style="list-style-type: none"> 1. Inverter: Delta 2. Main components: Schneider/Chint | <p>With a timing belt, it can move the glass to one side, which is convenient for the unloading table to grab the glass</p> |
| 11 |  <p>Glass unloading machine XPT-3722</p> | <ol style="list-style-type: none"> 1. Touch screen, PLC: Siemens 2. Inverter: Delta 3. Main vital parts: Schneider/Chint | <p>The transmission adopts frequency conversion motor, controlled by frequency converter</p> |
| 12 |  <p>The glass autoclave DN2860x6000</p> | <ol style="list-style-type: none"> 1. PLC, touch screen: Siemens 2. Main components: Schneider/Chint | <p>Equipment with 37kw FAN forced convection Possess the qualification of pressure vessel production</p> |

We will adjust the configuration according to your needs

5. Introduction To Main Equipment Of Production Line

(I) Introduction of the whole line

1. All sections of the line adopt PLC centralized control system, frequency control and three HMI interface operations.
2. The special purpose segment is equipped with encoder and servo motor to ensure equipment stability and machining accuracy.
3. High efficiency, energy saving, environmental protection, noise and other special controls shall be considered in the whole line design.
4. The film roller system adopts automatic film release and rolling up. 3 reels easy to operate, quick and easy film change.
5. The combination system equipped with three sets of lamination process modes, that is, super large glass mode (3.66m-6m), automatic mode (1.5m-3.66m), small glass mode (0.4m-1.5m), all selected at the man-machine interface and can flexibly operate large and small glass, adopts wireless remote control and centralized control, two people can complete the combination, and the operation is flexible and convenient
6. The structure of the pre-press is reasonable, easy to operate. The whole machine runs smoothly and stability, and is centrally controlled by the assembling room. The heating area is evenly , and domestic medium-wave infrared heating tube is adopted for heating. The temperature is measured and controlled in the zone, and the maximum temperature is 250°C (adjustable). The transmission section in the heating box is made of PTFE sleeve material, which has good wear resistance and pressure resistance, and does not need to be replaced
7. The glass autoclave is automatically controlled by PLC and operated by HMI interface to achieve safety, reliability, high efficiency and energy saving.

(II) Technical Parameters And Characteristics Of Main Machines

1. Automatic mechanical double arms glass loading machine



1.1 Working principle :

Mainly used for automatic glass loading. Put the glass at the designated position, give a signal to take the glass, the big arm will turn up about 95° through the turning mechanism, and the whole machine will start to move forward. When the sensing device on the small arm touches the glass, the whole machine will stop walking, and then the suction cup sucks the glass through the vacuum system, the arm lift motor lifts the glass back and up by about 80mm, and the travel motor retreats while the arm falls. When the big arm is in place, the suction cup under the glass starts to blow air, and when the small arm falls, the glass falls on the conveying wheel, and finally the glass is transported to the washing machine through the conveying wheel.

1.2. Machine composition:

It is mainly composed of frame mechanism, turning mechanism, suction cup lifting mechanism, whole machine walking mechanism, conveying mechanism, vacuum and air circuit control system, and electrical control system.

1.3 It meets the needs of users for glass of different thicknesses and colors in the production of laminated glass, thus achieving balanced, synchronous and rhythmic production.

1.4 Technical parameters:

Maximum glass size: 2600×3600mm;

Glass thickness: 3~19mm

Suction glass depth: 700mm

Machine walking speed: 8-20m/min (adjustable)

Transmission speed: 5-25m/min(adjustable)

Number of flip arms: 6 arms (double flip)

Number of suction cups on signal arm: 4

Loading time: 50S

Table height: 920±50mm

Power: 12KW

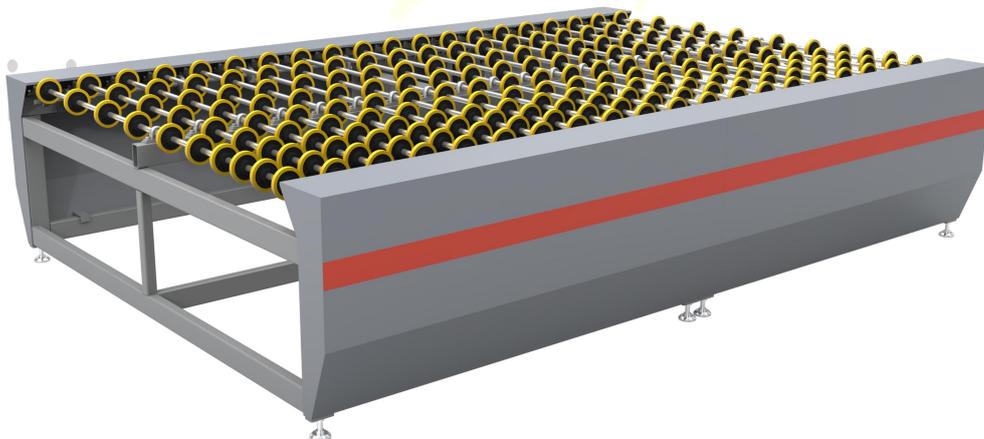
External dimension: 3700×3180×920mm

Vacuum degree: -50~-99Kpa (adjustable according to glass thickness)

Power supply: customized

Pressure 0.6-0.8mpa

2. The frequency conversion transition conveyor A



The structure adopts the frame structure of the side-push positioning machine.

2.1. Transition section features: it is designed for the best synchronous, balanced and rapid production of the line.

3. The Multifunctional glass washing & drying machine



It consists of an loading segment, a cleaning and drying segment, a unloading segment, an independent air supply system and a cleaning water circulation system. The design is updated on the basis of the traditional model, the appearance is simple and beautiful, and the overall structure is stronger. Some wearing parts and corrosive parts are replaced with popular light materials, which are more durable and have a longer service life.

3.1 Features of glass cleaning and drying machine:

3.1.1 the loading section and the unloading section are equipped with induction sensors, when the loading section senses that there is no glass entering within the set time, the washing machine stops and enters the standby state. When the unloading part senses that the glass is in the waiting state, the fan will stop to avoid wind knife marks on the glass, and the water pump will stop. If the waiting time is too long, the washing machine will also enter the standby state.

3.1.2 Independent air supply system, unique design of the fan box, good internal sound insulation.

High-efficiency high-pressure energy-saving fans are adopted, with sufficient air volume and high wind pressure. The air inlet is controlled by an air valve, and the air outlet has an electric heating device for removing water mist. The aluminum alloy (zigzag arrangement) straight air knife can easily blow away the fine water marks on the glass surface, making the glass cleaner.

3.1.3 This machine has three pairs of brush rollers, the bottom three are hard brushes, and the upper one is hard brush and two soft brushes, which can wash LOW-E glass. There are a pair of bristle brushes at the entrance, and the upper brushes are controlled by the cylinder. When washing the LOW-E glass, the cylinder lifts the upper brushes without touching the glass to avoid scratching the LOW-E surface.

3.1.4 The water tank is external, which is convenient for changing water and cleaning silt.

3.1.5 It is designed with a lower support structure that can be lifted by 400 mm, which is convenient for equipment maintenance and inspection.

3.2. Technical parameters:

3.2.1. Maximum glass width: 2500mm

3.2.2. Minimum glass specification: 400x400mm

3.2.3. Glass thickness: 3~19mm

3.2.4. Speed range: 0-12m/min, frequency conversion speed regulation

3.2.5. Transmission speed limit of brush roller: frequency Control, low-e glass can be washed.

3.2.6. The blower outlet has control valve, saving 1/3 of energy consumption

3.2.7. Appearance size: Host: 5000x3600x1200mm, fan frame: 1300x4300x2800mm

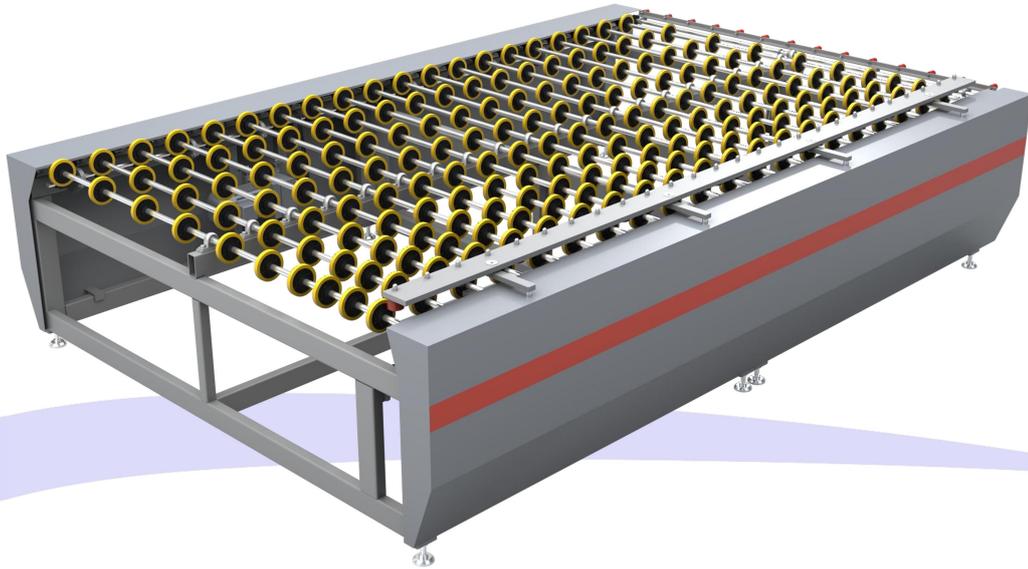
3.2.8. Height of stick table: 920±50mm

3.2.9. Total power: 32KW

3.2.10. Water source: Self-circulation, it is recommended to use deionized water (Low-E glass)

3.2.11. Weight: 5000 kg

4. The High precision glass positioning conveyor



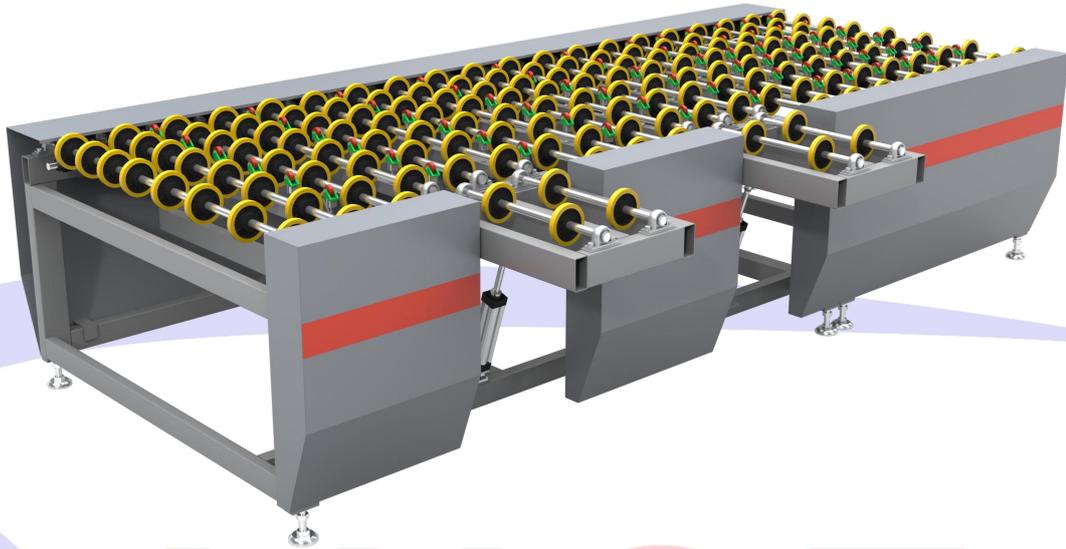
4.1. Features:

- 4.1.1. There are two designs of side push positioning and front positioning, which cooperate with each other to make the glass positioning more accurate
- 4.1.2 Positioning accuracy: ± 0.3 mm.
- 4.1.3 The roller wheel of this machine is made of special materials to ensure that there is no trace on the glass surface, so as to ensure the production of high-quality products.
- 4.1.4 Fast positioning speed, high precision, suitable for large glass production.
- 4.1.5 The machine adopts split design, which is convenient for transportation and assembly.

4.2. Technical parameters:

- 4.2.1 Maximum glass size: 2500 x 6000 mm Minimum: 400x400mm
- 4.2.2. Positioning accuracy: ± 0.5 mm
- 4.2.3. Transmission speed: 0-26m/min, with speed following function
- 4.2.4 Speed regulation mode: frequency conversion speed regulation
- 4.2.5. Appearance size: 4100x2600x1060mm
- 4.2.6 Height of stick table: 920 \pm 50mm
- 4.2.7. Total power: 1.5kw
- 4.2.8. Air source: 0.6mpa, 20L/min
- 3.2.9 Weight: 2000kg

5. The Double station glass combining machine



5.1 Features:

5.1.1 The whole frame is composed of two parts, which are divided into the front station (station 1, with two folding worktables) and the rear station (station 2), which are respectively controlled by two geared motors. It can be combined manually and automatically. With lifting universal wheels, it is convenient for workers to combine and cut films.

This machine is equipped with three sets of lamination process modes, that is, super large glass mode (3.66m-6m), automatic mode (1.5m-3.66m), manual mode (0.4m-1.5m), all selected at the man-machine interface

① super large glass mode

The first piece of glass stops at the assembling position, and the suction cup is manually operated to pick up the glass, and then the second glass is transported to the assembling position to stop, the film is laid, and then the worker operates the suction cup for assembling

② Automatic mode

The first piece of glass stops after being precisely positioned with the positioning conveyor, the suction cup automatically picks up the glass, puts down the glass at the position where the sheet is combined, the suction cup rises and automatically returns to the pick-up position, and lays the film. Repeat the above actions for the second piece to perform multi-layer lamination

③ small glass mode

In this mode, the suction cup hanger is not allowed to move. The combining machine has two stations. The first piece of glass stops at the front station, the second piece of glass stops at the rear station, and all the connections at the back stop for standby. Then carry out the worker's lamination. After the lamination, the glass will be passed away, and the subsequent connection will automatically perform patching. Repeat the above actions, and multi-layer lamination can also be carried out.

5.1.2 Positioning accuracy: $\pm 0.5\text{mm}$.

4.1.3 The up and down movement of the universal wheel platform through the cylinder can realize automatic operation, which is convenient and quick.

5.2. Technical parameters:

5.2.1 Maximum glass: 2500x6000 mm Minimum: 400x400mm

5.2.2. Adjustable width range : 1200mm-2500mm

5.2.3 Transmission speed: 0-26m/min, frequency conversion speed regulation

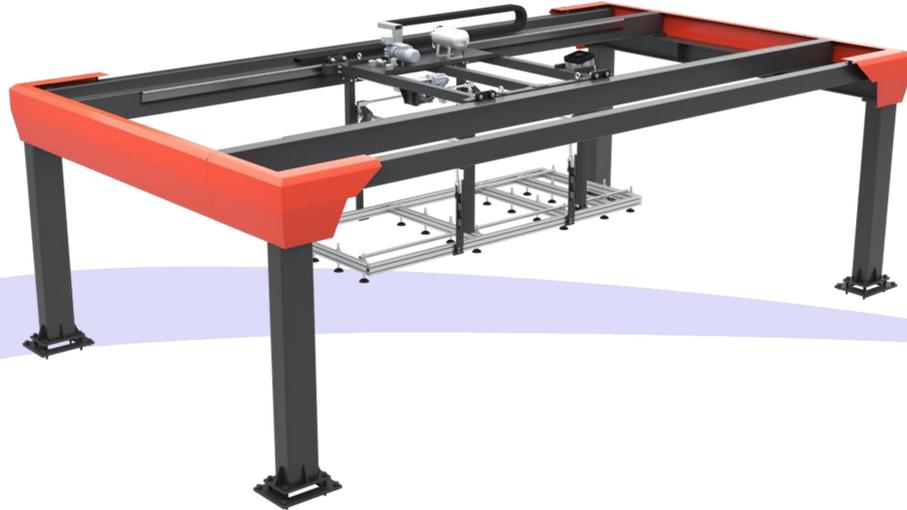
5.2.4. Appearance size: 4000x1600(2200mm after unfolding)x920mm, including front station
2600x1600 (2200 after unfolding)x920; rear station 1400x1600x920mm

5.2.5. Total power: 1.5kwx2=3KW

5.2.6. Air source: 0.6mpa, 20L/min

5.2.7 Weight: 2000kg

6. The automatic movable suction cup hanger



6.1 Features:

6.1.1 The distribution of high-precision suction cups is reasonable, and the suction cups are permanently combined without moving the suction cups during the production process.

6.1.2. Each sucker is equipped with a slide valve to control the opening and closing of the air path. When the glass size changes, the unnecessary slide valve is required to be closed, so as to ensure that there will not be a vacuum leakage phenomenon caused by half of the sucker getting stuck at the edge of the glass.

6.1.3 All vacuum pipelines adopt lock nut structure to ensure that the pipeline does not leak. In the case of power failure, ensure that the glass does not fall down for 30 minutes, so as to achieve safe production.

6.1.4 The suction cup can be fitted with a special material non-trace cover to ensure that the glass surface does not leave traces and ensure the production of high-quality products.

6.1.5 Servo control, high positioning accuracy.

6.2. Technical parameters:

- 6.2.1 Walking speed: Max 30m/min
- 6.2.2. Maximum absorbed weight: 600Kgf
- 6.2.3. Motor power: 4KW
- 6.2.4. Air source: pressure 0.6mpa, flow 8.3 L/min
- 6.2.5. Maximum vacuum pressure of sucker: -0.08mpa
- 5.2.6. Number of suckers: 24 pcs
- 6.2.7. Assembling accuracy: ± 0.5 mm
- 6.2.8. The total weight of the equipment is about 7000KG

7. The Horizontal three-roller film storage machine



Aluminium, Glass & Woodworking Machinery

The brackets on both sides are all welded structures, welded with ladder steps, connected by bridges in the middle, can be used as a bridge, automatic film release, automatic rewinding.

7.1. Features of intelligent film storage system:

7.1.1. The 3-roller can be equipped with PVB of different thickness, width and color, and can be registered on the HMI human-machine monitor. If necessary, the required roll can be selected on the monitor to automatically rotate into position.

7.1.2. There is a film release and rewinding device.

7.1.3. Design the automatic winding device with lining film to make the production site clean and orderly.

7.2. Technical parameters:

7.2.1. Quantity of loading film: 3 rolls

7.2.2. Working mode of roller: automatic film release, electric rewinding

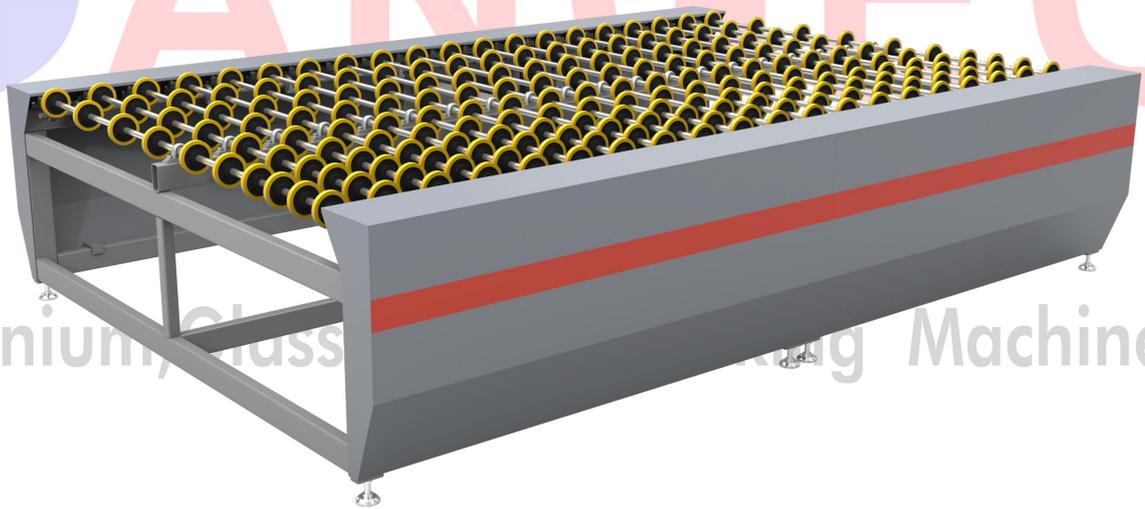
7.2.3. Automatic film feeding speed: Max. 40m/min

7.2.4. Power: 4.5KW

7.2.5. External dimension: 2600*4560*1900mm

7.2.6. Total weight of the equipment: 1500KG

8. The frequency conversion transition conveyor B



The structure adopts the frame structure of the side-push positioning machine.

8.1. Transition section features: it is designed for the best synchronous, balanced and rapid production of the line.

8.2. Technical parameters:

8.2.1. The maximum glass: 2500x6000mm

8.2.2. Minimum glass: 400x400mm

8.2.3. Transmission speed: 0.5-21M/min

8.2.4. Motor: 2.2 KW

8.2.5. Appearance size: 6000*3200mm

8.2.6. Weight: 1100KG

9. The infrared roller pressing machine



Including preheating box, initial press, heating box, final press and unloading section.

9.1 Features:

9.1.1. The independent roller press adopts a streamlined design and a solid structure. Each pressure roller is controlled by an independent geared motor, the adjustment accuracy of the upper and lower pressure rollers is improved, the structural design is optimized, the wear of the parts is reduced, and the service life of the parts is prolonged.

9.1.2. The distance between conveying rollers is further optimized to allow 400*450 glass to pass through easily.

9.1.3 The heating section and the preheating section are equipped with mid-wave infrared heating elements to effectively heat the film.

9.1.4 The upper and lower cabinets of the heating section and the preheating section are

designed separately for easy maintenance.

9.1.5 The transmission section in the heating box is made of PTFE sleeve material, which has good wear resistance and pressure resistance, and does not need to be replaced

9.2. Technical parameters:

9.2.1. Maximum glass width:2500mm

9.2.2. Minimum glass size: 400x400mm

9.2.3. Thickness of processed glass: 6-80mm

9.2.4. Transmission speed: 0.5-3.0m/min

9.2.5 Total power: 123kw(1 section preheating and 2 sections heating)

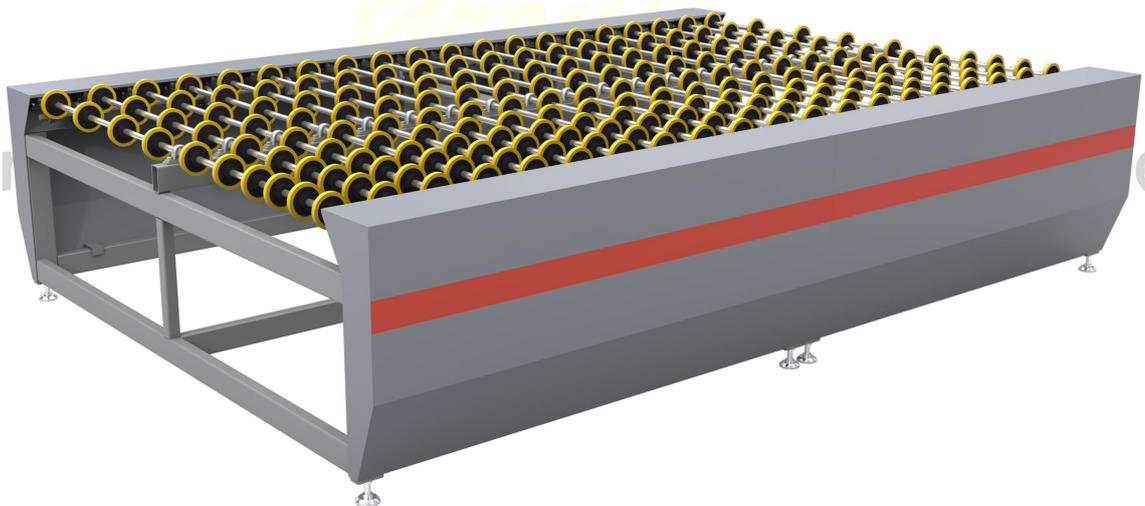
9.2.6. Appearance size: 9200*3300*2200mm

9.2.7. Total weight: 8000 kg

9.2.8 Heating up time: 10-15 minutes (from start-up to preset temperature)

9.2.9. Air source: pressure 0.5-0.8mpa, flow 4.67l /min

10. The frequency conversion transition conveyor C



With a timing belt, it can move the glass to one side, which is convenient for the unloading table to grab the glass

11. Glass unloading machine



The transmission adopts frequency conversion motor, controlled by frequency converter, and the speed can be continuously adjusted within a certain range to meet the requirements of use. The mechanical pendulum type unloading is adopted, and the swing arm is stable. Adopt double flip structure on both sides.

11.1. Technical parameters:

11.2.1. Maximum glass size: 2500x6000mm

11.2.2. Minimum glass specification: 600x600mm

11.2.3. Glass thickness: 6-60mm

11.2.4. Table height: 920mm

11.2.5. Transmission speed: 0.5-5m/min

11.2.6. Function setting: raise glass under 4000x2500mm with big arm.

11.2.7. Power: 11 KW

11.2.8. Appearance size: 4200×2800×920 mm

11.2.9. Weight: 4500kg

12. Glass autoclave DN2850×6000



12.1 Technical parameters:

12.1.1 **Effective inner diameter:** 2850mm. **Effective length:** 6000mm

12.1.2. Specifications for processing glass:

Maximum glass size: 2500mm×6000mm (small quantity)

Minimum glass size: no requirement

Glass thickness: no requirement

Thickness of original glass: 2.8~19mm

12.1.3. Power distribution requirements:

Power supply: 380-440VAC, 3P+N+PE, 50/60hz, >=400KVA

The total power distribution is about 290KW(including the air compressor unit and water pump), among which the total power of the glass autoclave is 230KW, the total power of the air compressor unit is about 55KW, and the water pump unit power is about 3KW.

12.1.4. Water and air source requirements

Cooling pool volume: above 30 cubic meter

Water pressure requirement: 3-6kg/square meter

Maximum air source pressure of glass autoclave: 1.3mpa

12.1.5. Building foundation requirements:

cover an area of 16m x8m (length x width)

Foundation bearing capacity :> = 40 tons

12.2 Technical features

12.2.1 **The autoclave body:** designed and manufactured fully in accordance with the GB150-2011 standard of "pressure vessel" , the vessel cap and body are made from pressed/rolled Q345R steel plate, cap flange and body flange are made from overall forging processed 16Mn .

12.2.2 **Quick opening system:** the opening and closing system of the autoclave is designed and manufactured on the premise of ensuring maximum safety and life. The whole system is composed of three parts, which are a pair of tooth-shape flanges, the driving device and the sealing ring. The sealing ring material is made from silica gel. The way of opening the door is: cross arm swing structure, hydraulic opening.

12.2.3. Insulation system

- Heat preservation way: internal heat preservation
- Insulation material: aluminum silicate + rock wool
- Insulation package version: stainless steel wire drawing board, 0.8mm
- Thickness of insulation layer: 80mm

12.2.4. Floor supports and rails

- Rail loading weight: 20000kg. If overloaded, the user shall be specified separately.
- Rail form: unequal angle steel
- Bottom support loading weight of the kettle: 500kg. If the weight is increased, the user shall be specified separately

- Bottom support form of the autoclave : anti-slip inverted plate (4mm)

12.2.5. Electric heating system:

1. The heating system is composed of the main heating area and the auxiliary heating area, and the heating elements are distributed in the tail of the body and in the wind channels on both sides to ensure the uniformity of the inner temperature of the autoclave during the heating process, and shorten the heating time to achieve the purpose of energy saving.
2. Inside the air duct, there is a heating element, and the hot air circulates from back to front, heat temperature reduced, during the process of heating glass, this heating element can make the circulating hot air replenish heat again, so as to achieve the temperature uniformity in the whole heating process. It is especially important to heat the glass autoclave with long specification.
3. Ni-cr finned heating element with high electric conversion rate and service life, with electric conversion rate above 95% and service life of 15,000 hours.
4. Heating element on-off control is regulated by solid state relay (SSR) to ensure service life and stability.

12.2.6. Pressure system

1. Intake and exhaust using pilot solenoid valve control pneumatic ball valve, each one, carbon steel structure, can achieve automatic control.
2. Manual control exhaust ball valve, 2 pieces, carbon steel structure.
3. It is equipped with a special pressure sensor at high temperature to ensure the constant and accurate feedback of pressure in the autoclave. The control precision is $\pm 0.05\text{kg/cm}$
4. The pressure relief system is equipped with a silencer (used during installation, the customer chooses to buy as required).

12.2.7 Heat exchange system (also known as cooling system)

1. Serpentine cooler are arranged on both sides of the inner autoclave (inside the air duct) as auxiliary cooler. The overall galvanized seamless boiler tube is made of aluminum fins with high heat exchange efficiency, long service life and easy maintenance. This structure is used for super long autoclave, the cooling effect is very obvious.
2. A surface cooling fin heat exchanger is installed at the tail of the autoclave as the main cooler, with large cooling area and high heat exchange efficiency.

3. Drainage structure is specially designed for the cooling system to prevent a large amount of steam generated during the heating process and to avoid freezing the cooling system at low temperature.

12.2.8. Forced convection system (hot air cycle)

1. System parameters: blower power: 37KW, centrifugal impeller.

2. Shaft sealing form: direct connection convection system, shaft rotating dynamic seal using mechanical seal, using silicon carbide graphite as static ring sealing material, bearing using ha-shaft high temperature resistant series of special bearings. When working, use water cooling in the cooling chamber to ensure the minimum service life of 8000 hours, design structure, easy to maintain.

3. U type duct structure, duct distribution in the autoclave body on both sides and at the bottom, duct extension have diversion device, specially designed with a return air structure at autoclave gate position. It can ensure the sufficiency of hot air circulation: the bottom air duct, on the one hand, makes the bottom temperature get three compensation, on the other hand increases the area of the air duct, so that the forced convection efficiency in the kettle reaches more than 90%, to ensure the rate of temperature rise and uniformity.

12.2.9. Temperature monitoring component

1. Air temperature thermocouple: 2 circuits, PT100 thermal resistance. Participate in monitoring, data exchange and control.

2. High temperature limited thermocouple :1 circuit, PT100 thermal resistance. Participate in monitoring and control.

12.2.10. Vacuum pipeline system

1. Vacuum pipelines are reserved in the autoclave which has 6 independent pipelines in total. It can be used with vacuum pump and vacuum bag for the vacuum operation of the glass in the autoclave, suitable for the synthesis of bending glass, realizing multi-purpose of one machine.

2. Each vacuum line includes

A. Connection with 1/2 inch internal thread.

B. External manual through valve, 6 in total, stainless steel structure. (to be prepared by user)

C. Stainless steel tube :1/2 inch. (to be prepared by user)

12.2.11. Control system

1. The control system was developed based on the research and exploration of the manufacturing process of laminated glass, It consists of a PLC core control part, a touch screen operating system and a network. The control of the whole system is based on our exclusive development of PLC control software.

2. Special control software: PLC control software, ensure that the temperature and pressure with interlock control function in the process of heating and boosting, can realize temperature match pressure, and pressure match temperature control technology, to ensure the process of temperature and pressure by setting by a simultaneous line: and in the process of constant temperature and pressure, automatic temperature compensation and automatic pressure compensation control function, ensure the stability of the pressure and temperature. In order to ensure safe operation, a safety interlock procedure is added in the program. Only when the conditions such as the door closed are met, the heating and pressurizing program be started: when the cooling water, fan and other components fail, the heating and pressurizing program will not start. Added functions such as automatic over-temperature and over-pressure alarm, automatic exhaust, cooling and component failure alarm.

3. PLC software can achieve data exchange, data output, storage process parameters, call process parameters and other functional requirements, can achieve storage, call process parameters for storage, call process parameters for 30 sets.

4. Temperature, pressure and other data display on time, automatic recording, data can be transferred to read.

5. Digital figure control: Fully automatic operation controls and monitors working conditions. The manual control interface allows customers to manually control the temperature, pressure display, vacuum, valves and other components. Parameter editing is in the form of excel, which can set as required ways and call the real-time trend analysis of parameters to monitor and display the alarm information of component faults to simulate the graphical operation process, so that the working state is clear at a glance.

12.2.12. Safety interlocking system:

1. The autoclave door is opened and closed with mechanical and electrical interlock devices,

which can realize the autoclave cannot be opened if there is pressure inside, automatic alarm under overtemperature and overpressure, automatic cooling under overtemperature and automatic relief pressure under overpressure .

2. There is an alarm on the autoclave body, which will automatically alarm when over temperature and over pressure.

| Item | DN2850×6000 |
|----------------------------------|--|
| Max. Glass width | 2500mm |
| Max. Glass length | 6000mm |
| Inside diameter | 2850mm |
| Door opening method | Electric door opening |
| Door opening direction | Determined by the customer |
| Insulation method | Internal insulation, thickness 80mm |
| Detect temperature difference | ±3℃ (Insulation and pressure preservation) |
| Detect pressure difference | ±0.3Bar |
| Working cycle | 3-5h |
| Door opening temperature | 45℃ |
| Opening pressure of safety valve | 1.4Mpa |
| Design temperature | 150℃ |
| Working temperature | 135℃ |
| Heating power | About 290kw |
| Orbital distance | 1000mm |
| Fan power | 37kw |
| Total power | About 290kw |
| Dimension | 16m x8m |
| Weight | About 21 tons |

※The above technical requirements are confirmed by both parties. If customer requests additional functions, structures and changes, the costs shall be borne by customer.

※GIFT ACCESSORIES

| | Name | Quantity |
|---------------------|---------------------|----------|
| PVB Production Line | Roller heating tube | 5pcs |
| | Polyurethane wheel | 5 pcs |
| | Sucker | 2pcs |
| | Pneumatic connector | 1 set |
| | Toolbox | 1pc |
| Autoclave | Heating tub | 5pcs |
| | Door sealing ring | 1pc |
| | Wheel | 12pcs |
| | Toolbox | 1pc |

※Customers need to bring their own accessories (or entrust our company to purchase)

| Combine Room | |
|--------------|--|
| 1. | 2stes 3 HP air conditioners (vertical, with dehumidification function) |
| 2. | 2sets industrial dehumidifiers(3-4kw/set),Each dehumidification volume is 150m ³ |
| 3. | hoisting machine(1t) |
| Autoclave | |
| 1. | Air compressor 90KW |
| 2. | Dryer |
| 3. | 3 sets of precision filters |
| 4. | cooling pool(40m ³) +cold tower (optional) |
| 5. | Two water pumps (one submersible pump, used for autoclave tail cooling; one main cooling water pump, 38m lift) |
| 6. | silencer |
| 7. | 2stes glass shelf |
| 8. | 7pcs tracks (18kg/pc 6m/pc) |
| 9. | Waterways, airways and pipelines |