

GLASS
DECORATING



Welcome

The company was founded in 1945 by Mr. Ernst Pennekamp, a glass engineer with major experiences in the melting and annealing technology.

The at that time still young company realised the opportunity and challenge to develop most reliable machinery for the automated manufacturing process in the growing glass industry.

Nowadays the company is the world's major Lehr and Hot End Automation Manufacturer, operating world wide services for the various glass industries.

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A German expression says: „To become one of the leading suppliers is more easy than remaining in the first position for a long time.“ This expression has proven itself many times.

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Pennekamp has successfully demonstrated that remaining the leader is possible, based on Know How, innovation, high quality standards and the right amount of customer orientation of all employees within the company.

The future aspects are to maintain and further increase this position for the benefit of the customers and to assist the world glass Industry developing new market opportunities.

If it is a question of reliability, commitment and customer orientation – crystal clear – Pennekamp.

The future



Review and Preview



More than 50 years of experience in the glass machinery manufacturing are the base of the success of Pennekamp, located in Ennepetal, Germany.

With the subsidiaries in the United States, Pennekamp is one of the largest and leading manufacturer for Hot End Automation, Lehrs and Cold End Coating Equipment.





Quality Assurance Policy

At a very early stage Pennekamp identified that any kind of innovation is directly linked to the quality standards.

As one of the first lehr and handling manufacturers the official audit for the DIN EN ISO 9001 Certificate was passed, and granted in the year 1994.

Herewith the customer is ensured to always receive quality equipment as well as qualified services and support.

Area of Activities

The area of business covers a small range of products within the glass manufacturing line. The basic philosophy has always been to concentrate all efforts in a small specific area and only within the glass industry.



Scope of Products

In general Pennekamp's scope of supply is specified from after forming to lehr unloading.

Container Glass

- Ware Transfer (Finger Type)
- Lehr Loader (Stackers)
- Cross Conveyors
- Annealing Lehrs
- Cold End Sprays
- Polymer Application System



Table Ware

- Ware Transfer
- Lehr Loader
 - Bar Type
 - Gripper Type
- Charge Conveyor
- Annealing Lehr
- Toughening Lehr



Glass Decorating

- Ware Transfer
- Lehr Loader
 - Finger Type
 - Gripper Type
- Decorating Lehr
- Toughening Lehr



Display Manufacturing

- Loading Automation
- CRT Frit Seal Lehr
- CRT Exhaust Lehr
- Baking Furnace
- LCD and PDP Frit Seal Lehr
- PDP Vacuum Exhaust Furnace
- Discharge Automation



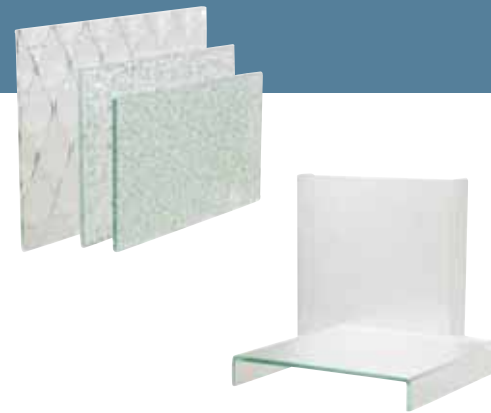
TV Glass

- Panel Automation
- Funnel Automation
- Lehr Loading
- Annealing Lehr
- Discharge Automaton



Flat Glass

- Roller Annealing Lehr for
Figured & Wired Glass
Float Glass
Profile Glass
TFT Glass

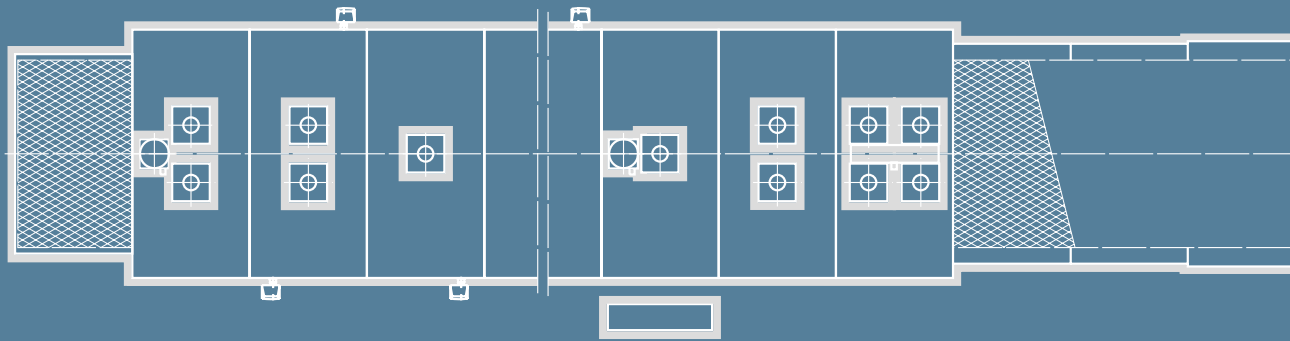


Specialty Glass

- Annealing Lehrs for.
Optical Glass & Lenses
Glass Bricks
Automotive Glass
- Glass Bending Lehrs
- Thin Glass Deformation
- Special Lehrs



Advantages of Decorating Lehr



Fully Automatic Draft Control System for

- Heat recovery system and reduction of energy consumption
- Perfect temperature control and distribution
- Stable temperature curve in case of lehr gaps

- lehr belt width between 1.2 and 4,5 m
- gas or electrical heating
- all heated sections with heat-resistant stainless steel inner hoods, circulation fans, lehr belt skid frames
- special construction of first lehr section with a very efficient fume exhaust system
- fully insulated lehr up to the cold end
- direct shaft circulating fans, no V-belt (maintenance free)
- process controlled air inlets at the fast cooling sections
- reacts to production stops to maintain the temperature curve
- control system to automatically optimise air movements inside the lehr to recover energy and cut down the consumption
- fail-safe compact burner system covering all safety device
- additional control of oxygen content
- special fan blades at cold end to mix cold air with internal air prior to contact with the glass
- system ensures optimal temperature distribution across the lehr belt width
- easy to adjust belt tracking device at the lehr belt drive
- internal belt return with self-cleaning device
- optional blast fan cooling units on the discharge table
- communication link with lehr loading system



Special equipment of the Decorating Lehr



Compact gas burner

- Gas burner for control heating, neutral, cooling
- Compact unit for control monitoring and safety



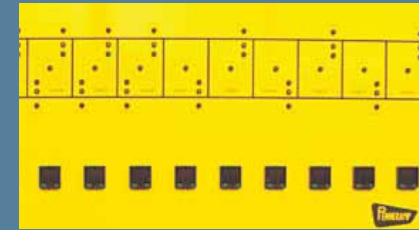
Air Circulation Fan

- with direct shaft and stainless steel fan wheel
- Insulation box



Waste Colour and Air Exhaust Fan

- in stainless steel execution
- Electric operated damper system



Main Control Panel

- with mimic diagram for status indication
- Temperature controllers
- Fuses, switches and relays
- Main switch
- Optional PLC



Belt Tensioning System

- in weight roller execution
- Automatic Length compensation



Cooling Air Inlet

- with special double bladed fan wheels
- Electric operated damper
- Optional filter system



Lehr Belt Drive

- with direct drive gear box (TV Glass) or chain drive type
- Single drive drum
- Discharge roller



Mesh Belt

- in special designs for various glass applications
- Stainless steel or chromium alloy

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