

Intelligent concepts and machinery for:

- Architectural Glass
- Automotive Glass
- Solar Glass
- Display Glass



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LEADING IN GLASS PROCESSING EQUIPMENT

**AUTOMOTIVE**



**The BENTELER Group** is an internationally active company with its business divisions BENTELER Automotive, BENTELER Steel/Tube and BENTELER Distribution.

The company was founded 1876 and is still in family ownership today. Since then four generations have contributed to shaping the Group, which now ranks among one of the 100 largest industrial enterprises in Germany.

Operating under the BENTELER name, the business is not only one of the 100 largest independent automotive suppliers, but also one of the most important steel tube manufacturers in Europe. In addition, BENTELER is one of the leading stock holders and processors of steel tubes and stainless steel tubes.

Today, BENTELER employs about 30.000 people at 170 locations in 38 countries.



**BENTELER Glass Processing Equipment**, as an independent division of the BENTELER Automotive, develops and commercializes innovative concepts for Automotive glass processing.

Our focus on material quality, investment in new technologies and creativity in system planning and machine development directly benefits our clients by raising their productivity, optimizing their processes and reducing their costs.

#### Equipment Applications:

- Architectural Glass Processing
- **Automotive Glass Processing**
- Solar Glass Processing
- Display Glass Processing

BENTELER is proud to offer an array of machines and entire line assemblies for your glass processing needs, including: Washing, Drilling and Double-Edging Machines, CNC Processing Centers, Handling-Systems, Screen-Printing as well as Laminating Lines. One focus is on customized production lines and special solutions.

**BENTELER** 





## Fully automatic pre-processing CBG lines

For the production of OEM car glasses as well as replacement glasses we offer fully automatic CBG lines. These lines are designed for the production of car windshields, side lites, rear windows and roof tops. Extendable with a drilling machine. The modular construction allows you any time the arrangement with further lines. In connection with an automatic loading and the BENTELER washing machine you receive a turn key solution for pre processing from one supplier.

### Advantages:

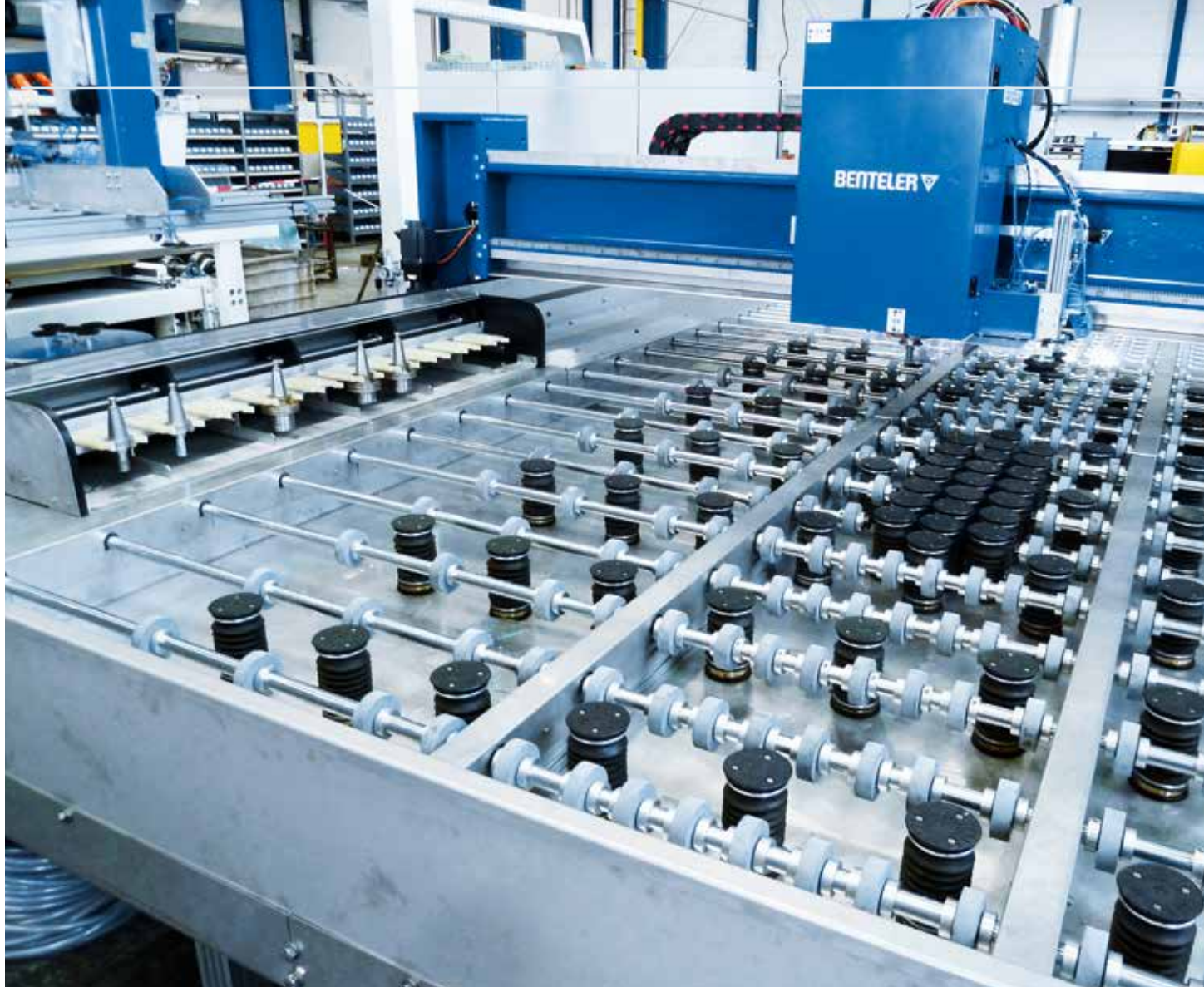
- **Modular design**
  - \_loading, cutting, breakout, grinding and drilling in-line and extendable
  - \_individual line according to your requirements
  - \_in combination with the BENTELER washing machine a complete solution
- **Flexibility**
  - \_free vacuum cup positioning on grinding table
  - \_tool-less model changes = high availability
  - \_high processing speed by new design
  - \_two glass thicknesses on one line by height adjustable spindle
- **Process reliability**
  - \_365/24/7 productions with absolute reliability
  - \_smallest tolerance = the highest edge quality
  - \_separate cutting and break out operations = short cycle times
- **Simple operating**
  - \_menu-driven control panel
  - \_data exchange to network or USB stick
  - \_automatic grinding wheel compensation
  - \_very good accessibility for servicing purposes



### Technical data:

- Max. glass width: 2400 mm
- Max. glass length: 1400 mm
- Glass thickness: from 1.2 to 6.0 mm
- Speed of operation: max. 30 m/min
- Drill diameter: 4 – 70 mm





## CNC-Processing-Center

With the CNC-Processing-Center, BENTELER moved an enormous step forward to support the production of shaped glass in the glass industry. Processing “in-line” with the BENTELER CNC-Processing-Center eases the challenges of handling large sheets of glass with operators and cumbersome pick and place system. With the vast array of workingwidths this machine can be used across many platforms of production.

### Advantages:

- **High precision**
  - \_ automatic re-sharpening at regular intervals guarantees excellent edge quality
  - \_ specially designed tools grind and polish glass plates
- **Flexibility**
  - \_ combination tools
  - \_ BENTELER Interface Management allows direct recall of relevant data of the CNC program
  - \_ milling option for complex contours
- **Process reliability**
  - \_ complete glass production on highest level of automation: grinding and milling operations in one machine save time and improve quality with less handling and set up operations
  - \_ can be integrated into a pre-processing line
  - \_ the use of qualified components minimizes maintenance time and guarantees an economic life-time
- **Simple operating**
  - \_ in-line operation minimizes operator influences and overall fabrication time
  - \_ automatic suction secures glass during the production
  - \_ no interfaces, line from one supplier

### Technical data:

- Max. glass width: 2600 mm
- Max. glass length: 3600 mm
- Grinding and milling spindle revolution: 15000 U/min
- Milling speed: 0 – 2 m/min
- Speed of operation: 0 – 20 m/min







## Multispindle drilling machine

The BENTELER multispindle drilling machine is a process-reliable and especially flexible solution for your drilling requirements. One drilling machine can be equipped with up to 7 pairs of spindle. The spindle pairs can be arranged opposite and in a row. CNC-controlled axes guarantee a high repeat accuracy with minimal setup time for optimal cost effectiveness and high flexibility.

### Advantages:

- **Highest precision**
  - \_ machine frame and components of especially stable design for low vibration
  - \_ drilling with high precision and for high repeatability of the drillings
- **Flexibility**
  - \_ simple upgrade of additional drilling spindles
- **Process reliability**
  - \_ automatic tool sharpening
  - \_ patented BENTELER drilling spindle charged with sealing compressed air for a long service life in wet environments
  - \_ high-speed water removal system, therefore drilling without process water on the glass surface and protection of the sensitive glass surface
- **Simple, comfortable operation**
  - \_ CNC-controlled processing in X, Y and Z directions with an automatic measuring and calibration system for the fully-automatic and precise positioning of the drill
- **Execution with**
  - \_ manual drilling table
  - \_ transfer drilling table
  - \_ drilling turntable

All drilling machines can be connected to other machines by a shuttle or can be integrated into existing lines.



### Technical data:

- Repeat accuracy of the hole placement:  $\pm 0,2$  mm
- Positioning speed: 20 m/min
- Number of drilling spindle pairs per machine: 1 – 7
- Max. Glass size: 1400 x 2400 mm



## tecWasher

The tecWasher model family is a standardized, modular concept for small and medium-sized glass formats as an especially cost-effective alternative to the customized, individual washing machines.

### Advantages:

- **Excellent washing and drying quality**
  - \_spraying zones from above and below
  - \_ultrasonic cleaning section
  - \_a tank with pump and heating for each washing set
  - \_reliable drying by two drying knife pairs
- **High flexibility**
  - \_motorized glass thickness adjustment
  - \_continuously variable transport speed
  - \_small minimal glass size
- **Small dimensions**
  - \_especially compact design
  - \_blower and cabinet are directly integrated in the machine
- **Low operating costs**
  - \_compressed air not necessary
  - \_water-conserving cascading system
  - \_maintenance-free machine components
  - \_energy-saving concept
- **Simple, comfortable operation**
  - \_every tank is removable
  - \_all tank connections with quick release connectors
  - \_easy accessibility to all modules
  - \_faster filter replacement



### Technical data:

- Working width: 2000 – 3000 mm
- Glass thickness: 1.5 – 21 mm
- Working speed: 3 – 13 m/min
- Min. glass lengths: 280 / 350 mm
- Min. glass widths: 175 mm



## Washing machine type 45

The washing machine type 45 is a standardized, modular concept for all glass formats. This machine can be individually adapted to your requirements.

### Advantages:

- **Excellent washing and drying quality**
  - \_ spraying zones from above and below
  - \_ washing sets with cylindrical brushes according to individual requirements
  - \_ a tank with pump and heating for each washing set
  - \_ reliable drying by drying air knives
- **High flexibility**
  - \_ motorized glass thickness adjustment
  - \_ continuously variable transport speed
  - \_ small minimal glass size
- **Small dimensions**
  - \_ especially compact design
  - \_ blower location above the machine
- **Low operating costs**
  - \_ compressed air not necessary
  - \_ water-conserving cascading system
  - \_ maintenance-free machine components
- **Simple, comfortable operation**
  - \_ every tank is removable
  - \_ all tank connections with quick release connectors
  - \_ easy accessibility to all modules
  - \_ fast filter replacement



### Technical data:

- Working width: 1000 – 2800 mm
- Glass thickness: 1.5 – 19 mm
- Working speed: 3 – 24 m/min
- Minimal glass lengths: 280 / 350 mm
- Minimal glass widths: 175 mm



## Washing machine for curved windshields and roof glasses

The BENTELER washing machine for curved windshields is distinguished by its excellent washing quality and is available for different washing speeds. The washing machine is worldwide accepted by OEM producers.

### Advantages:

- **Modular design**  
\_washing and drying zones according to the individual requirements
- **Brush-less washing section**  
\_High pressure and temperature cleaning for thin glass.  
\_available with brushes
- **Heat insulation of washing compartment**
- **Low-maintenance**  
\_made of high-quality materials
- **Drying section air temperature regulation**
- **Low noise level**
- **Low glass temperature after drying**

### Technical data:

- Working width: 1600 – 2100 – 2500 mm
- Min. glass width: 1000 mm
- Min. glass length: 500 mm
- Glass thickness: 1,4 – 6 mm
- Max. bending: 300 mm
- Working speed: up to 18 m/min



## Washing machine for curved side-lites

The BENTELER washing machine for curved side-lites is especially designed for the requirements of the curved glass processing. It guarantees a high washing and drying quality especially before the laminating process.

### Advantages:

- Automatic brush contact adjustment
- Excellent washing quality due to a special nozzle and brush design
- Best drying quality because of adjustable drying nozzles
- Low maintenance  
\_made of high-quality materials
- Low noise level
- Low glass temperature after drying



### Technical data:

- Working width: 600 – 1300 mm
- Min. width of glass: 160 mm
- Min. length of glass: 250 mm
- Glass thickness: 1.5 – 6 mm
- Max. bending: 0 – 80 mm
- Max. working speed: 15 m/min

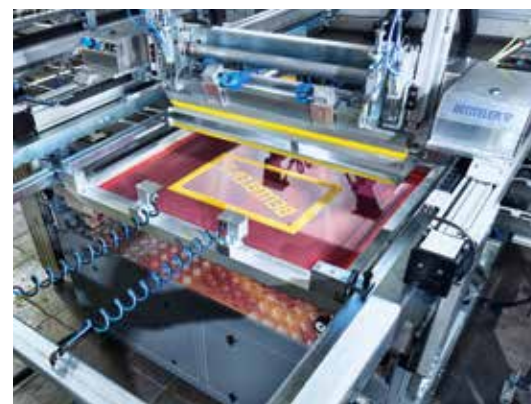


## Screen-Printing Solution

The BENTELER screen-printing solution is designed for a 24/7 operation. The machine promises a high availability and high output due to a high degree of automation. The machine can be used as stand-alone equipment or can be integrated into processing lines. With the BENTELER screen-printing solution highest quality, productivity and precision can be achieved.

### Advantages:

- **Maximum ease of use**
  - \_moving screen frame
  - \_no displacement of adjusted position
  - \_no risk for the operator
- **Minimal setup time**
  - \_alignment by laser projection
  - \_recipe memory for up to 500 models
  - \_refitting with just one person
- **Highest precision**
  - \_accurate and reproducible glass transport
  - \_screen layer adjustment due to fine adjustment
  - \_accuracy:  $\pm 0.1$  mm



### Technical data:

- Max. glass size: 2600 x 1600 mm
- Min. glass thickness: 0.5 mm
- Max. screen size: 3350 x 2150 mm
- Cycle time: 9 sec.
- Repeatability:  $\pm 0.1$  mm



## Handling Systems

BENTELER offers for all applications the optimal Handling System. We develop lines for inspection, assembly, trimming and packing in partnership with our customers.

### Inspection Lines

BENTELER builds and develops for all known measuring systems

- transport and loading systems
- full automatic centering
- vertical transport lines
- loading and off-loading with robots

### Assembly Lines for windshields

- transport lines and handling systems for the complete process
- separation, washing, drying, assembly, foil cutting, spot welding and turning

### Trimming

- automatic foil trimming for laminated windshields, side-lites und back-lites
- high edge quality due to grinding belts
- glass handling with robots

### Paper cutting

- automatic paper roll change
- automatic cutting of paper sizes
- stacking of side-lites

### Stacking of windshields

- stacking with robots
- automatic spacer supply
- turntables for quick rack change over

### Loading and off-loading furnace

- automatic oven loading from glass racks
- furnace off-loading with integrated measuring systems







*»Performance needs passion. We know where to position the lever!«*

## Your Equipment in the best of hands

The BENTELER service is a synonym for comprehensive technical competence and reliable support. We ensure a high availability and we react quickly and flexibly. Our technicians will be pleased to inform you about service solutions tailored to your particular needs, in order to avoid problems before they arise.

- Preventive servicing
- Service contracts
- Relocation of machinery
- Machine repair
- Overhauling of machinery
- Telephone support
- Spare parts service



## We keep up with the latest trends for your benefit

Persisting in global competition needs machinery convincing in technology and performance. In order to improve the process chain in your plant in a lasting way, we can analyse your equipment and your production processes, followed by suggesting optimisation potentials to you.

- Equipment optimization
- Modernization
- Process technology