



LiSEC & Schraml Flat Glass Processing

LiSEC

best in glass processing

best in glass processing

For increased performance and profitability: LiSEC

Facts and figures:

- 1961 founding year
- 1 strong brand
- 1.200 employees
- 231 million Euros turnover (2015)
- 7 - 8 % of turnover for R&D
- 60 R&D specialists
- 500 software installations worldwide
- 3.500 gas filling presses worldwide
- 20 sites
- 90% export rate
- 35 % equity ratio
- more than 250 patents

Reliable processes, good quality, solid profit: LiSEC solutions provide flat glass processors around the world with security and drive in a challenging environment.

For the last 50 years, we have been working hard to enable you to sustainably boost the efficiency, the system availability and the quality output of your flat glass production process. Thanks to forward-looking thinking, continuously striving to find the best solution and a great deal of personal commitment from our employees, we have grown from a one-man company to a technology leader.

Our advanced solutions generate a great cost-to-benefit ratio throughout the entire lifecycle of your machines and systems.

Customers around the world can benefit from this: be they experienced manufacturers or newcomers to the industry; from family businesses to industrial glass processors. Three main factors are essential for long-term success:

1. Complete System Provider

Only LiSEC can offer you all solutions required for flat glass processing from a single source. Our well-established team of specialists for engineering, automation, machine construction and service develops tailor-made solutions to ensure your competitive edge.

2. Operational know-how

As the only solution provider in the flat glass processing business with more than 50 years of operational know-how, we know from first-hand experience how to handle glass. We can communicate eye to eye because we are familiar with the challenges you face.

3. Service

In order to help our customers quickly on site, we have developed the worldwide largest service network in the flat glass industry. High service availability, start-up support and consulting are the added value of our services.

The benefits:

- Over 50 years of partnership, pioneering spirit and stability
- Investment security due to the size of our company
- Leading technology with a high resale value
- Great cost-to-benefit ratio throughout the entire system lifecycle

LiSEC INDUSTRY 4.1

Strategy

Your benefit

- integration with your customer
- cost reduction
- transparent processes in real time
- production without surprises
- consistent quality

is our mission: best in glass processing

Integration with your customers

Strategic partnerships with e.g. Klaes, a leading software company for window, facade and conservatory construction, as well as other partners for transport organisation, product configuration

Transparent workflows accessible in real time

allowing you to e.g. check the status of your production anywhere and anytime, even from your smart phone

Consistent quality

- No manual glass handling
- Production information traceability incl. relevant production parameters

Cost reduction

- Graphical capacity planning supports additional resource optimisation
- Innovative, quick and easy order entry
- Continuous optimisation reduces material and process costs

No surprises

- Intelligent machines / lines as „smart factory“ are self-monitoring and warn about upcoming maintenance requirements and wear parts needing to be replaced
- Online services and offices worldwide offer local support

„We could increase our capacity by nearly 15% and have 10-12% less waste now. On the IG lines, the improved organisation allows us to produce in 8 hours the same output that used to take us 12 hours.“

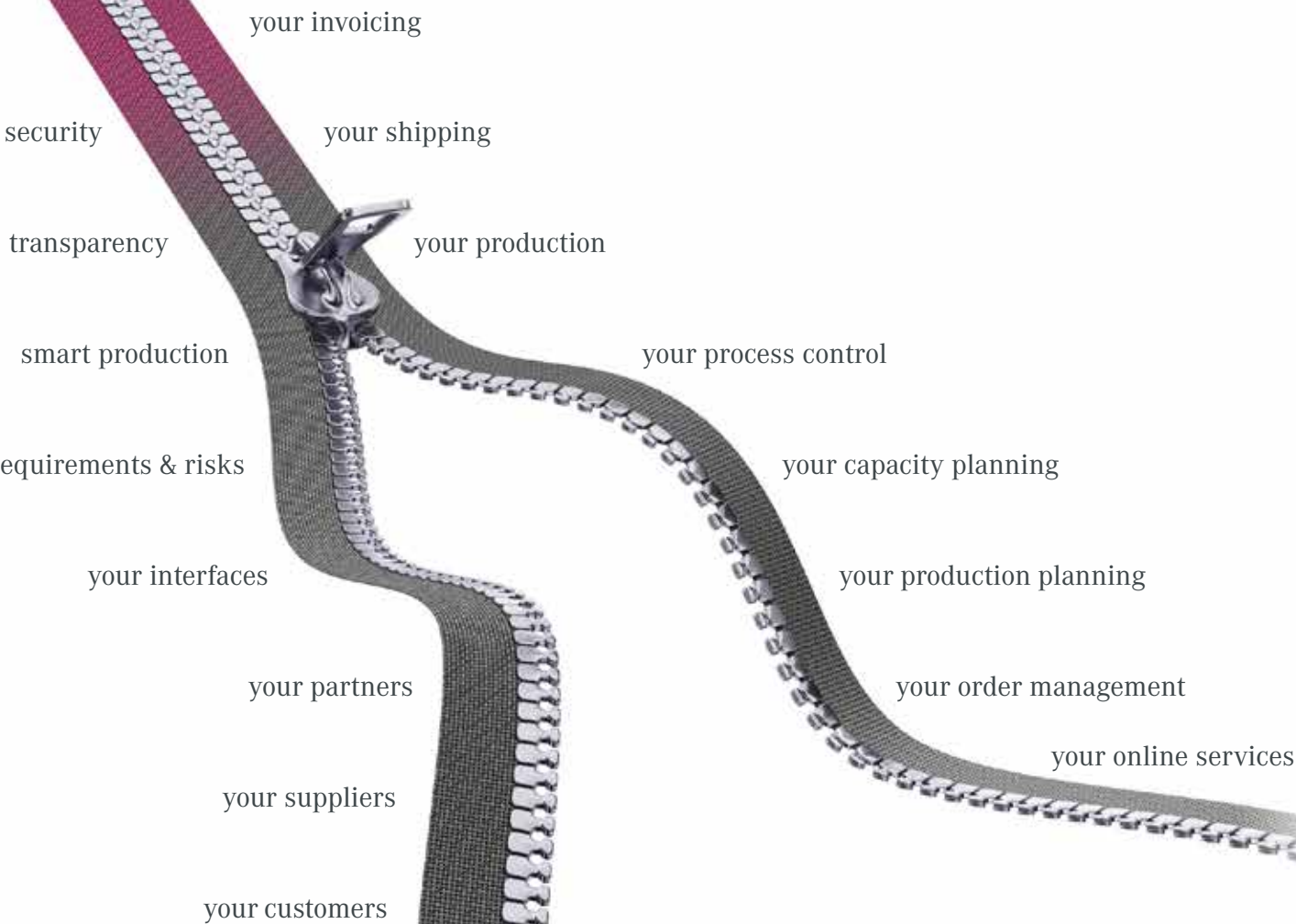
Crystal Units Ltd, England

„Increasing production efficiency through transparency with LiSEC’s Industry 4.1. The collection and interpretation of performance data alone allows me to increase machine availability and achieve a higher output.“

Internorm, Austria

through:

- ... many proven strategies for improvement
- ... many intelligent innovations
- ... best practice solutions
- ... a successful cooperation with us, your single-source supplier



PROCESSING POSSIBILITIES OVERVIEW

Edge processes are a main concern for every glass producer. The varied demands regarding edge quality and the production of inside, corner and edge cut outs require different processes and processing machines.

	LiSEC Machinery			Schraml topDRILL Machinery			
	KSR / KSV	KBU	KBF	M-RX	RX	nc	Easy
Edge Processing							
Seamed edge (KGS)	✓	-	-	-	-	-	-
Rough edge (KMG)	-	✓	✓	-	-	-	-
Ground edge (KGN)	-	✓	✓	-	-	-	-
Polished edge (KPO)	-	✓	✓	-	-	-	-
Inside Processing							
Drill holes	-	-	✓	✓	✓	✓	✓
Countersinking	-	-	✓	✓	✓	-	-
Milling	-	-	✓	✓	-	-	-
Grinding	-	-	✓	✓	-	-	-
Polishing	-	-	✓	-	-	-	-
Machine design							
Shapes	✓	✓	✓	✓	✓	✓	✓
Fully automatic	✓	✓	✓	✓	✓	✓	-
Automatic tool change	-	✓	✓	✓	✓	-	-



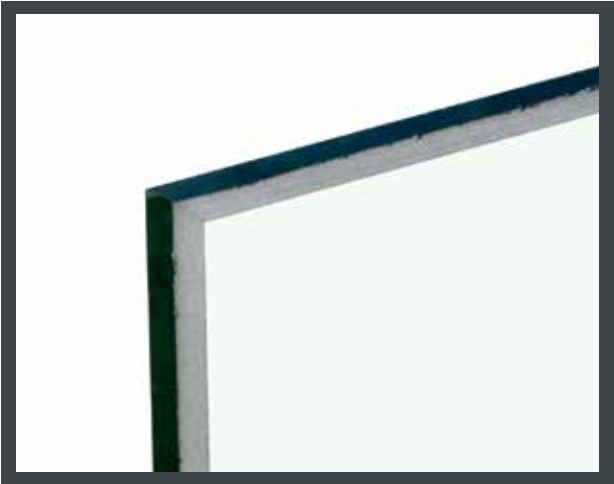
EDGE SEAMING

Glass sheets with no particular edge quality requirements are usually seamed anyway, to remove sharp edges and small chips caused by cutting. Further processing in a tempering furnace – e.g. LiSEC Aeroflat – is only reliably possible with seamed edges. Glass handling is also considerably safer. With the LiSEC KSR, edge seaming with grinding belts is quick and efficient. Combined with a KSV, even the cycle time requirements of fast IG lines can be guaranteed.

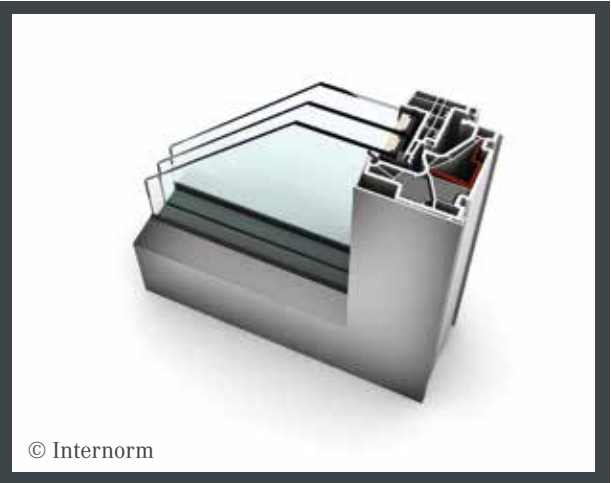
Ideal production machine: KSR / KSV



GLASS EDGE AND DETAILS



FINAL PRODUCT



PROCESSING OF EXPOSED EDGES

The visible edges and corners of glass sheets are usually processed with higher quality. The most popular finishing types variants are ground and polished edges. Edges are predominately produced with a trapezoid finish (FA), the C-shaped edge (PE) is also popular in many regions. Corners are usually rounded or bevelled, which considerably improves the optical quality of the end product. Another significant consideration throughout the entire process is the protection of the different glass coatings. At best, coated areas remain untouched. The LiSEC KBU offers numerous high quality processing of glass edges and corners. In addition to edge processing the LiSEC KBF offers the production of inner-, corner- and edge-cutouts in one machine only.

Ideal production machine: KBU, KBF



GLASS EDGE AND DETAILS



FINAL PRODUCT



INSIDE, CORNER AND EDGE CUT OUTS

Especially for interiors and architecture, high-value glass is steadily rising in significance. Many doors, wall elements, cover panels, furniture parts, staircases and banisters are produced from glass. This wide variety of applications necessitates different levels of quality (for example for fittings, handles, sinks, sockets). Often the glass needs to be cut in special shapes which have to fit precisely into a given geometry. With the topDRILL series Schraml offers a big selection of processing machinery which provide many applications – from simple holes up to complex milling and grinding operations.

Ideal production machine: topDRILL series



GLASS EDGE AND DETAILS



FINAL PRODUCT



LiSEC

STAND-ALONE MACHINES



KSR & KSV

Compact Vertical Glass Edge Seaming Machine for Rectangles and Shapes

Vertical compact grinding machine for the seaming of glass sheets on all four sides in a fully automatic cycle. The glass edges are ground by wet-diamond belts which simultaneously process the front and rear side of a glass edge. The grinding head moves on a vertical guide unit and can also rotate 360 degrees, allowing it to reach all four sides of a glass sheet. This grinding process achieves a perfect and gentle seaming of glass edges with the shortest cycle times and minimizes the quantity of required abrasive tools.

The grinding belts automatically adjust to the respective sheet size and thickness. The grinding width is adjustable from 0.5 mm to 2 mm. The compact dimension of the machine results from only one grinding head processing all sides of a rectangular or shaped glass sheet. Optional equipment for flat grinding (roughening) the glass edges as well as for grinding (shaping) the corners of the glass sheed are available.

Combining the KSR with the compact grinding machine KSV to seam the horizontal bottom edge of the glass sheet can reduce the cycle time by up to 35%. The combined KSR & KSV is perfectly suited for applications in the insulating glass industry.



Technical Data

Glass height	2 m / 2,5 m / 2,7 m / 3,3 m
Glass thickness	2,3 - 19 mm (pass-through transport up to 30 mm)
Minimal size	350 x 180 mm
Maximal size	6.000 x 3.300 mm
Processing length max.	2.500 mm, 3.500 mm, 5.000 mm, 6.000 mm - Longer versions available upon request
Transport height	520 mm
Seaming speed max.	30 m/min at 2,3 - 9,2 mm
Speed surface grinding max.	30 m/min at 2,3 - 3,7 mm
Speed surface grinding max.	20 m/min at 3,7 - 5,6 mm
Load max.	150 kg/lm, 250 kg/lm at pass-through transport

Highlights

- 35% shorter cycle times with combined KSR and KSV
- Compact dimension - only one grinding head
- Perfect seaming in extremely short cycle times
- Complete machine body made of stainless steel
- Can easily be connected to vertical washing machines and production lines
- Best choice for high quality tempered glass

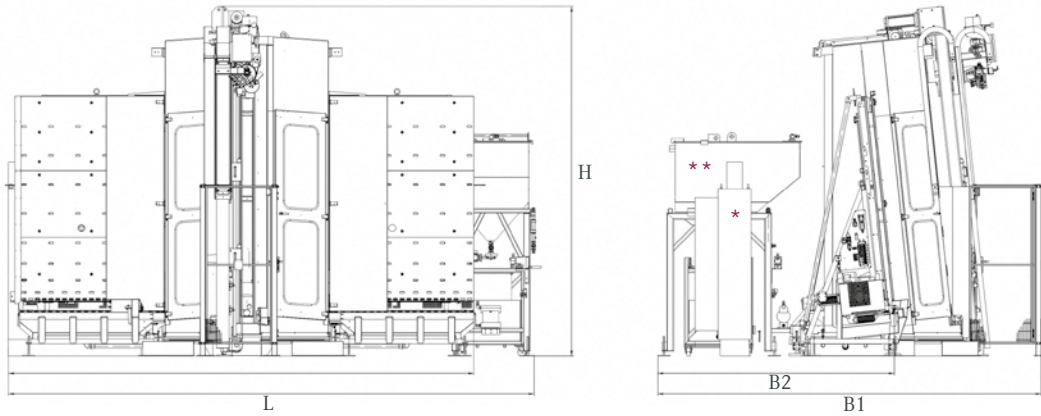
Optional

- Shapes according to LiSEC shape catalogue
- Corner seaming and front-sided surface grinding of rectangles and shapes
- Combination of KSR with KSV

Available software



GPS.lineserver



* Control cabinet
** WRA-1000

	L (mm)	B1 (mm)	B2 (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
KSR-21	7350	4640	2800	3810	19,3	6	600	3	0,6
KSR-25	7350	4640	2800	4206	19,3	6	600	3	0,6
KSR-27	7350	4640	2800	4405	19,3	6	600	3	0,6
KSR-30	7350	4640	2800	4703	19,3	6	600	3	0,6
KSR-33	7350	4640	2800	5005	19,3	6	600	3	0,6

* Water consumption if used with a water treatment system

KBU

Vertical Edge Processing Center for the Outer Edges of Glass Sheets

LiSEC's fully automatic edge processing center KBU has been developed to convert CNC grinding of glass into one continuous process, making the arduous production process previously applied for many CNC products a thing of the past. The KBU achieves an outstanding grinding and polishing quality which is virtually independent of the glass size, type or thickness processed. Whether it is used in the construction field or interior design, for functional glass or solar glass, the vertical edge processing center is a highly versatile system which meets all modern demands.

Superior quality

The KBU is equipped with a patented spindle guide, guaranteeing a consistent polishing quality and perfectly parallel seams, even on glass sheets with a length exceeding 10 meters. Furthermore, thanks to the new technology used, the KBU is perfectly suited for processing coated glass sheets, since the face of the glass is never touched throughout the entire grinding process.

Over 50 percent increase in processing speed

The system's vertical design and the automatic tool changer render tool set-up and positioning times nearly irrelevant. In addition, the vertical construction involves significant advantages in glass handling. Thanks to the continuous process, the KBU can achieve shortest cycle times.



Technical Data

Glass height	2,7 m / 3,3 m
Glass thickness	2-23 mm
Min. size	570 x 180 mm
Max. size	6.000 x 3.300 mm
Max. processing length	3.500 mm / 5.000 mm / 6.000 mm - Longer versions available upon request
Transport height	520 mm
Inclination for glass transport	6°
Automatic tool changer	20 positions
Tool diameter	150 mm
Spindle speed	0 - 14000 r/min
Max. load	200 kg/lm

Highlights

- Spindle guide system with water cushion
- Flawless processing of coated glass
- Superior polish quality among vertical processing machines
- Flexible product change
- Shape processing supported
- Completely automated

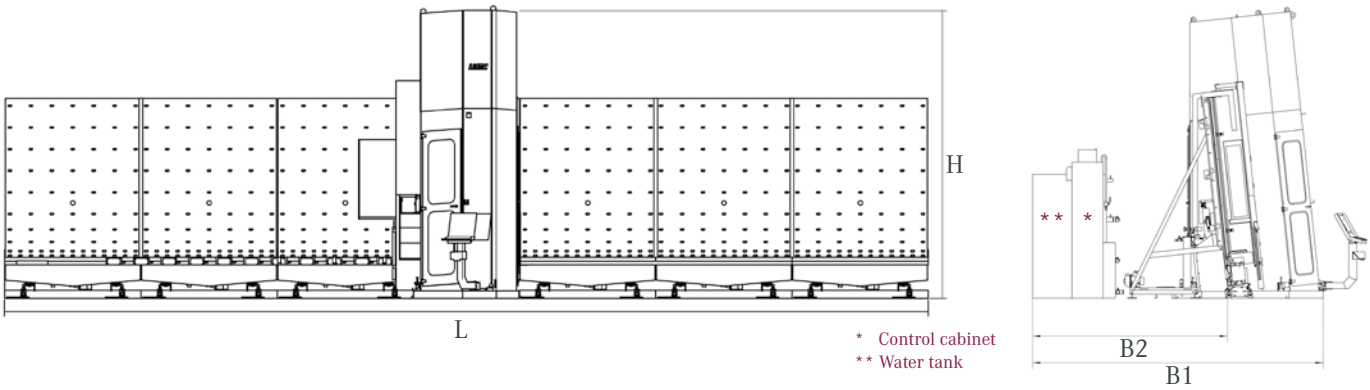
Available software



GPS.lineserver



GPS.cadcam



	L (mm)	B1 (mm)	B2 (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)
KBU-35/27	12.510	4.760	3.160	4.695	43	6	800
KBU-50/27	14.910	4.760	3.160	4.695	43	6	800
KBU-60/33	16.911	4.760	3.160	5.390	43	6	800

KBF

Vertical Edge Processing Center with Integrated Single-Sided Drilling and Milling Function

LiSEC's fully automatic KBF edge processing center has been designed to convert CNC processing of flat glass into a continuous process. This puts an end to a tiresome production process for many CNC products. Almost regardless of the glass size, type and thickness, the system ensures outstanding grinding and polishing quality. Furthermore, the integrated drilling and milling function enables processing of milled cut-outs and drilled and countersunk holes in just a single working cycle. A highly precise CNC unit achieves precision tolerances and a maximum level of quality, and the 40-fold tool changer enables very short set-up times. Whether used in the structural glazing or interior design fields, for functional or solar glass, the vertical edge processing center is extremely versatile and meets the highest quality standards.

Versatile system

The edge processing center is capable of grinding and polishing nearly all glass types and shapes with a thickness from 2 to 23 mm. The processing of large-sized and very heavy glass sheets in one cycle is a standard function of the KBF. It can process glass edges of premium quality and is also suitable for FA- and PE-grinding. Graphical menu navigation via the touch screen guarantees intuitive and speedy operation.



Technical Data

Glass height	2,7 m / 3,3 m
Glass thickness	2 - 23 mm (grinding and polishing)
Minimum size	570 x 180 mm
Maximum size	9.000 x 3.300 mm
Max. processing length	3.500 mm / 5.000 mm / 6.000 mm / 7.000 mm / 9.000 mm – longer versions upon request
Transport height	520 mm
Inclination for glass transport	6°
Automatic tool changer	40-fold
Max. tool diameter	150 mm
Spindle speed	0 - 14000 r/min
Max. load	200 kg/lm

Highlights

- Spindle guide system with water cushion
- Inner and outer processing in one go guarantees highest precision
- Milling and drilling of shapes
- Production of large cut-outs using break-out laces
- Tempering of glass sheets without grinding of holes possible

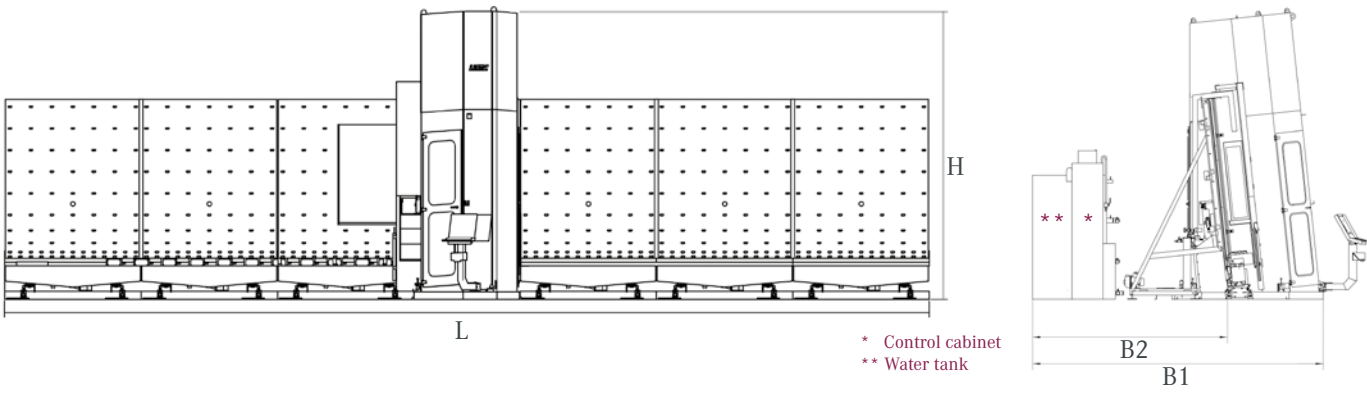
Available software



GPS.lineserver



GPS.cadcam



	L (mm)	B1 (mm)	B2 (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)
KBF-35/27	12.510	4.760	3.160	4.695	43	6	800
KBF-50/27	14.910	4.760	3.160	4.695	43	6	800
KBF-60/33	16.911	4.760	3.160	5.390	43	6	800

WRA-1000

Water Treatment System

The WRA-1000 water treatment system, which supplies your equipment with perfectly clean and reusable water, is the water saving solution for all kinds of processing machines. Optionally the water treatment system can be equipped with a 1200-liter reservoir, which supplies CNC machines with water through pumps and piping systems.

The best possible way of separating dirt particles from water is to add flocculant and mix it with the dirty water, and to use a lamella package. The sludge that deposits is automatically drained to the big bag underneath. An integrated lift pump simultaneously pumps excess water back to the system. This sophisticated concept reduces the amount of waste water to a minimum. Full big bags can be easily removed and disposed using the integrated heavy-lift trolley.

The WRA's modular design allows you to remain flexible. The system requires little space and has a low construction height. The corrosion-resistant, compact and solid stainless steel construction makes it a future-proof investment in the efficiency of your production



Technical Data

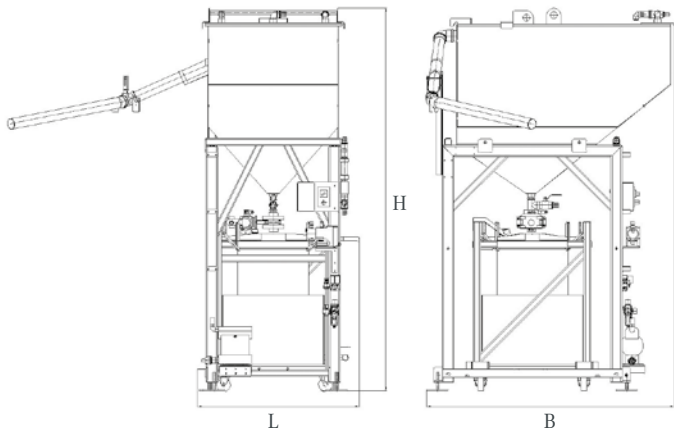
Capacity	1 m³
Weight	610 kg

Highlights

- Saves water
The sophisticated system supplies the maximum amount of reusable water
- Increases production, reduces maintenance
The time consuming cleaning of tanks and machines is kept to a minimum
- Plug & play
No need for individual control of the WRA thanks to the control system of the connected CNC machine

Optional

- 1200-liter tank
A 1200-liter reservoir for cleaned water can be offered, if required.
- Connection to third-party machines
The WRA also offers optimized water treatment for machines from other suppliers



	L (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)
WRA-1000	1135	1734	2688	0,02	6	500

VHW-E

Automatic washing and drying plant for flat glass

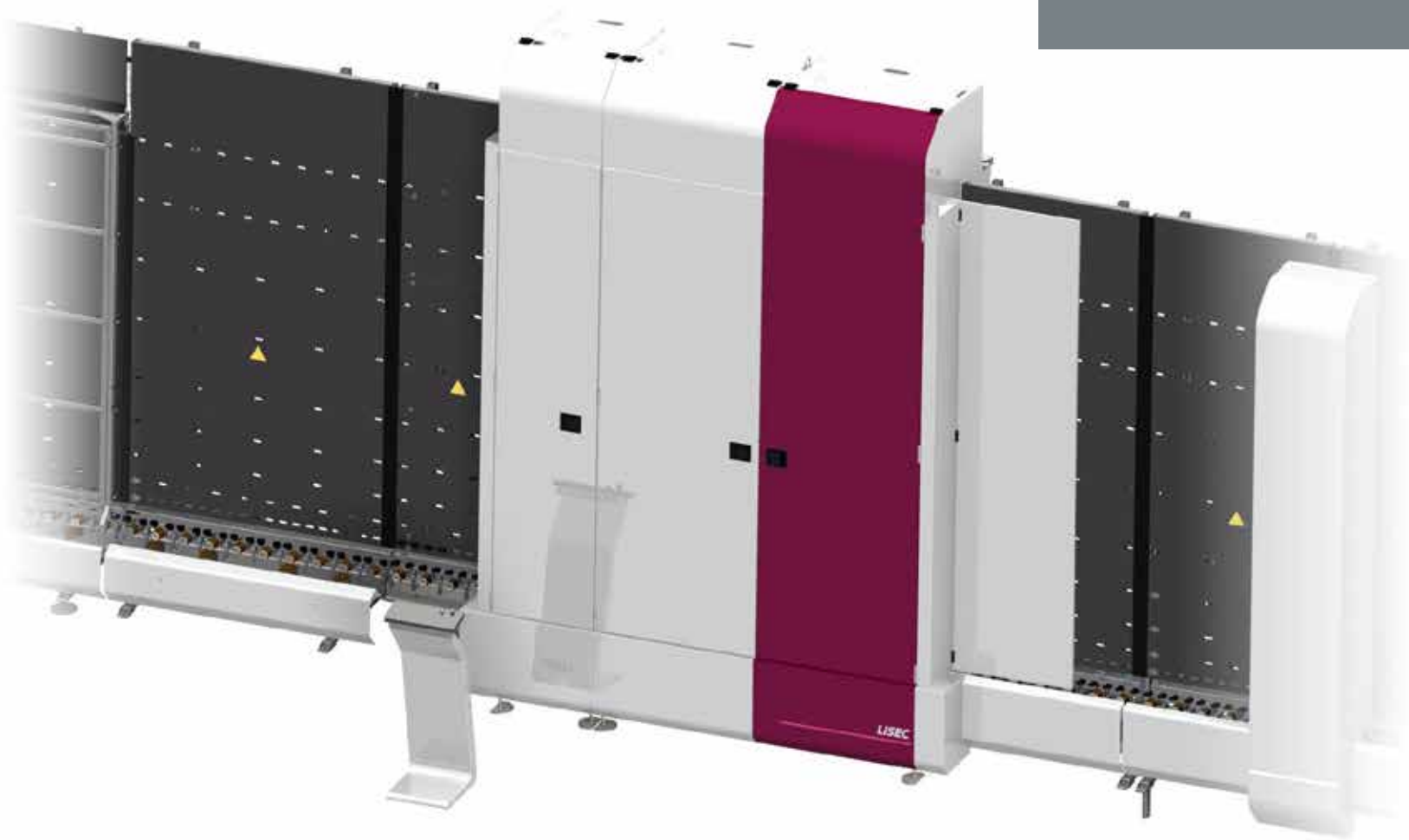
Our newly developed washing and drying plant offers our customers the possibility to start with a washing machine for basic requirements and to gradually (even over years) adjust and upgrade this machine to meet their growing needs. But not only its flexible upgradability, also the extreme revision of the functional and technical facilities of this plant offer significant benefits.

Highlights

- No scratching of glass sheets or coating (infinitely adjustable brushes)
- Faster and more efficient drying process
- More compact construction
- Saving up to 50% energy with hot water generator

Optionen

- Shapes according to the LiSEC shape catalog
- Speed control for rolling brushes front/rear
- Automatic coating detection
- 1000l tank and sand filter
- Brushes with denser bristles
- Additional pair of brushes for the main washing zone
- Additional heating element for the integrated heating tank
- Water temperature and conductance monitoring



Technical data

VHW-E	
Glass height	2 m / 2,5 m / 2,7 m / 3,3 m
Glass thickness	2 - 60 mm
Minimal size	350 x 180 mm
Heating unit for the washer	Integrated hot water generation
Number of brushes	4 brushes (VHW-D/4), 6 brushes (VHW-D/V6), 8 brushes (VHW-D/V8)
Transport speed	8 m/min (4 brushes), 12 m/min (6 brushes), 15 m/min (8 brushes)
Load max.	250 kg/lm

SCHRAML STAND-ALONE MACHINES

SCHRAML
member of the LiSEC group



topDRILL M-RX

Vertical double-sided CNC Drilling and Milling Center

The fully automatic milling and drilling machine topDRILL M-RX makes a convincing argument with its high performance and its easy use. Drilling and countersinking processes are as easily accomplished as complex milling and grinding operations for corner, edge and inner cutouts. The vacuum belt system enables a flexible and continuous production. The drilling and milling center works fully automated and supports a data connection to external systems. The graphical input of the processing program as well as the automatic selection of all parameters for the drilling and milling processes support an easy, error-free operation.

Machine configurations for any requirement

The topDRILL M-RX can be configured according to customer requirements. The linear-8 tool changer allows a very easy operation, the Roto-10 changers help increase the processing speed. Modular extensions of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. The intelligent machine design allows mounting the machine directly against a wall.



Technical Data

Glass height	Open at the top (M-RX 130) / 2,600 mm (M-RX 200)
Max. processing height	1,300 mm (M-RX 130) / 2,000 mm (M-RX 200)
Glass thickness	4 - 20 mm
Minimum glass size	600 x 160 mm
Maximum glass size	approx. 3,200 mm, can be increased with extension modules
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	80 mm
Spindle speed	0 - 12,000 rpm
Spindle power (rating)	2 x 5.5 kW
Number of tools	8 + 8 in case of Linear 8 / 10 + 10 in case of Roto 10
Max. load	150 kg/lm

Highlights

- Milling and drilling in one work step
- Two types of tool changers available
- Modular design
- Continuous production without loading times
- Flexible product change
- Highly dynamic vacuum system for secure hold
- Easy operation and programming

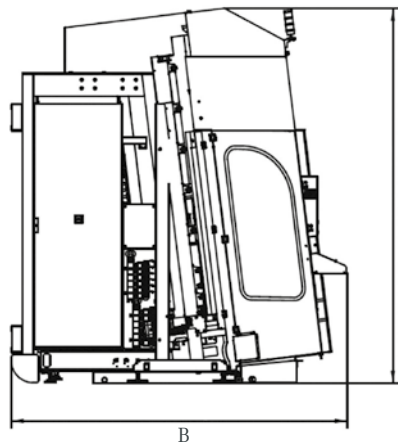
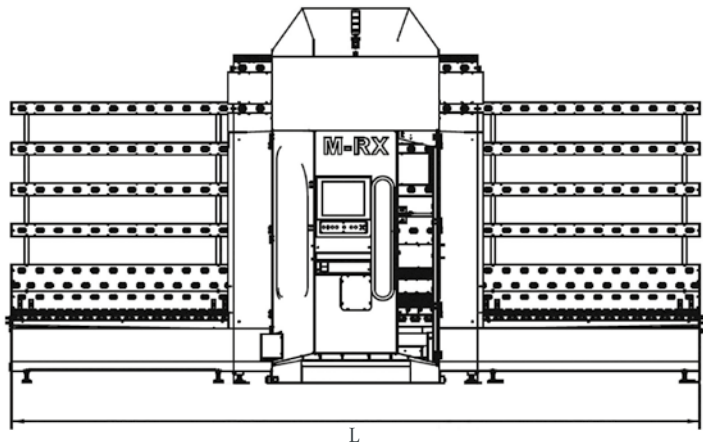
Options

- Automatic drill sharpening unit
- Vacuum system
- Air-conditioning unit for the switch cabinet
- Software interface and drawing programs

Available software



cadcam



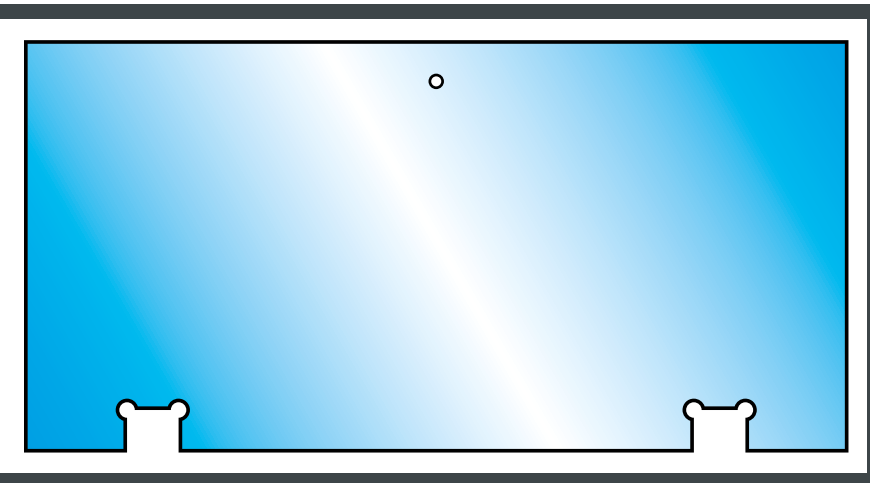
	L (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
topDRILL M-RX 130 linear-8	6200	2755	2695	19	7	200	2 - 3	3,5
topDRILL M-RX 130 roto-10	6200	2755	2695	19	7	200	2 - 3	3,5
topDRILL M-RX 200 linear-8	6200	3027	3364	19	7	200	2 - 3	3,5
topDRILL M-RX 200 roto-10	6200	3027	3364	19	7	200	2 - 3	3,5

* Water consumption if used with a water treatment system

topDRILL M-RX

Cycle times and scope of processing

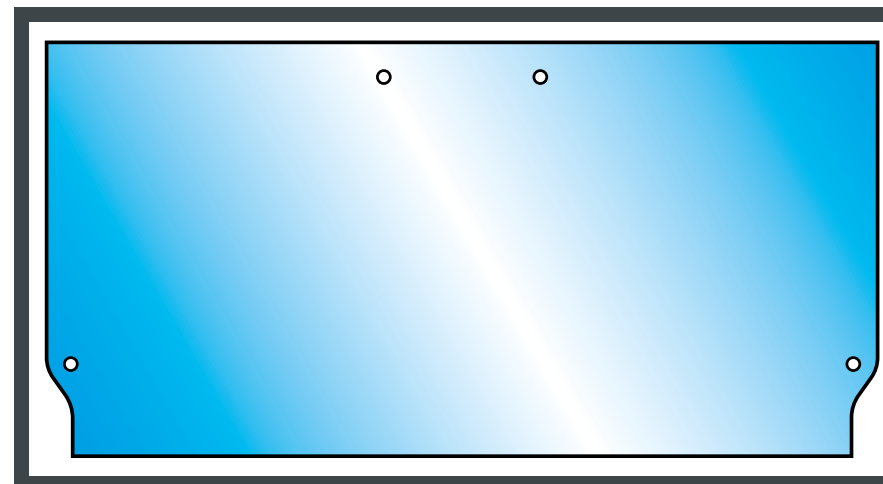
The M-RX is the ideal solution for all drilling, sinking and milling processes. All machine configurations support fast, flexible and high-quality processing. The use of the Roto-10 tool changer on both processing spindles optimizes the cycle time when different tools are used on one glass sheet.



Shower Door

- Dimensions: 800 x 1,800 mm
- 2 Mickey Mouse edge cutouts
- 1 handle drilling

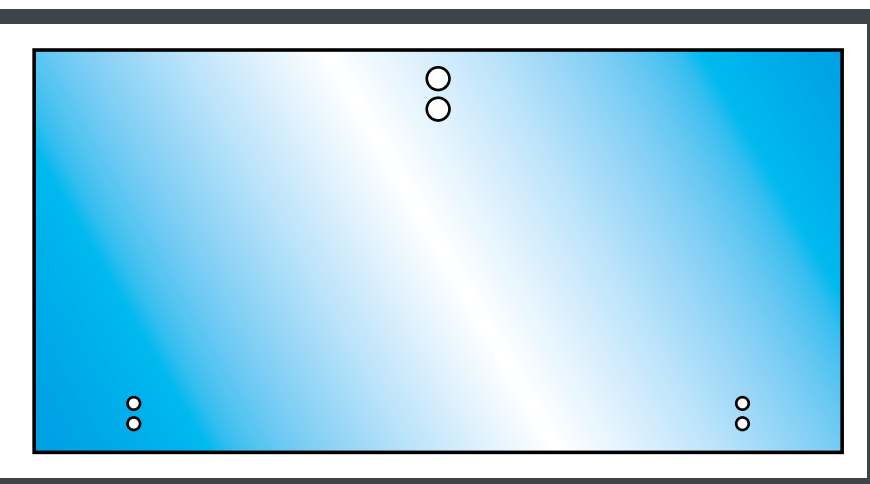
Cycle time for the entire processing: 210 seconds



Swing Door

- Dimensions: 1,000 x 2,000 mm
- 2 pieces PT fittings
- 2 handle drilling

Cycle time for the entire processing: 240 seconds



Single-action Door

- Dimensions: 800 x 2,000 mm
- 6 drillings, all countersink drilling

Cycle time for the entire processing: 360 seconds

Advantages of the M-RX series



Fast and flexible processing

optimized for the fast processing of individual glass sheets – also for small batch sizes:

- Dynamic vacuum system without set-up time and also for shapes
- Roto-10 tool magazine directly on the spindle for anticipatory tool changes
- Drilling, (deep) countersinking, milling and grinding finished in one single cycle
- Perfectly adapted milling feed due to automatic parameter data



Fast and simple operation

without any specialist or CNC knowledge

- Graphical input of all processing operations
- Program generation for the next glass sheet during the processing
- Automatic selection of all processing parameters by the machine
- Autonomous setting of all auxiliary holes and puncture operations
- Program generation at the machine via network or USB



State-of-the-art machine technology

for a long machine lifetime and maximum precision

- Control of all movements by servo drives
- Solid ball screw for stroke and drill axes
- Fully automatic central lubrication of all essential machine components
- Network connection resp. remote maintenance option via remote access



Fast glass handling

for continuous production

- No set-up times for positioning the suction cups
- Different glass sizes, shapes and thicknesses without changeover
- Loading of the next glass sheet during the processing
- Trouble-free combination with previous or following module (e.g. washing machine)

topDRILL RX

Vertical double-sided Drilling Center with Automatic Tool Turret

The topDRILL RX is the first choice for fully automatic drilling and sinking processes. The ingenious tool changer of the smart-5 series can be used very quickly, set up fast, and is absolutely easy to use. The speed-10 tool turret doubles the maximum number of available tools. Countersink holes can be carried out at the front and back without restrictions, regardless of the drilling diameter. The first tool change is already carried out during the drilling process on the opposite side. The high-performance drilling spindles are water-cooled, extremely robust and durable. Maintenance costs are reduced to a minimum.

Flexible configuration, solid quality

The topDRILL RX can be configured depending on the customer's requirements. In addition to the two types of tool changer, the modular extension of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. All drilling and countersinking operations are precisely produced in one clamping process. The torque control prevents glass breakage during countersink drilling. Standard includes processing of both float and laminated safety glass sheets.



Technical Data

Glass height	Open at the top (RX 130) / 2,600 mm (RX 240)
Max. processing height	1.300 mm (RX 130) / 2.400 mm (RX 240)
Glass thickness	3 - 30 mm
Minimum glass size	600 x 160 mm
Maximum glass size	approx. 3,200 mm, can be increased up to 8,000 mm with extension modules
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	80 mm
Spindle speed	0 - 5.000 rpm
Spindle power (rating)	2 x 5,5 kW
Number of tools	5 + 5 in case of Smart 5 / 10 + 10 in case of Roto 10
Max. load	150 kg/lm

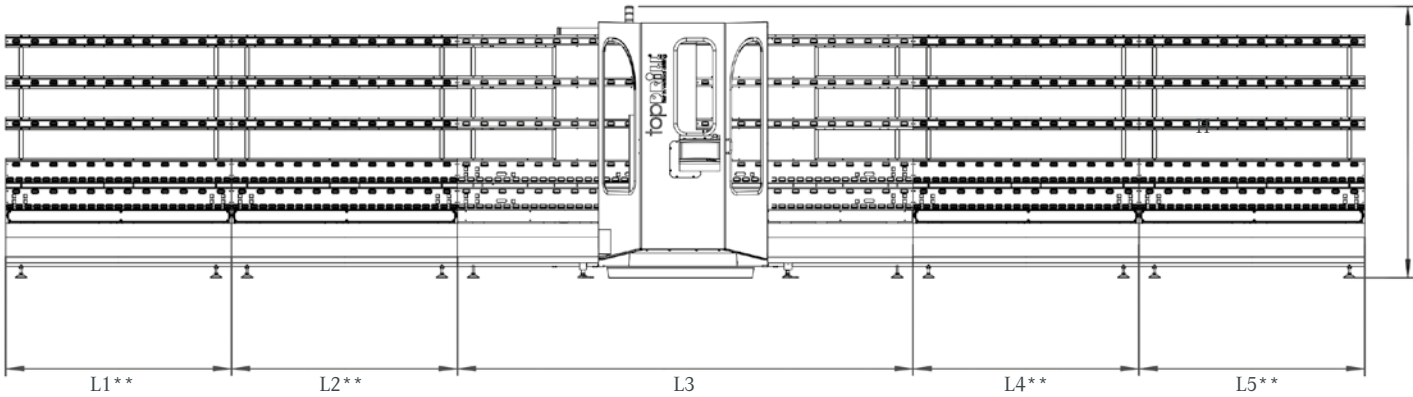
Highlights

- Compact, modular design
- Automatic tool change at front and back
- Automatic length measuring of the tools
- Continuous production without loading times
- Easy operation and programming

Options

- Automatic drill sharpening unit
- Y-axis ball screw for smart-5 (standard in case of roto-10)
- Vacuum system
- Air-conditioning unit for the switch cabinet
- Software interface and drawing programs

Available software



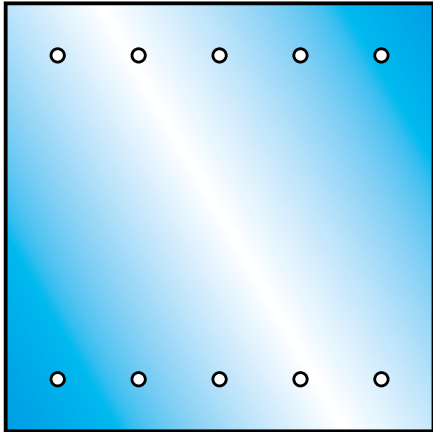
	L1** (mm)	L2** (mm)	L3 (mm)	L4** (mm)	L5** (mm)	B (mm)	H (mm)	Power consump- tion (kW)	Opera- ting air pressure (bar)	Air consump- tion (l/min)	Operating water pressure (bar)	Water consump- tion (l/min) *
topDRILL RX 130 smart-5	1000 or 2000	1000 or 2000	4032	1000 or 2000	1000 or 2000	2397	2401	12,5	6 - 7	10	2 - 3	0,5
topDRILL RX 130 roto-10	1000 or 2000	1000 or 2000	4032	1000 or 2000	1000 or 2000	2397	2401	12,5	6 - 7	10	2 - 3	0,5
topDRILL RX 240 smart-5	1000 or 2000	1000 or 2000		1000 or 2000	1000 or 2000				6 - 7		2 - 3	
topDRILL RX 240 roto-10	1000 or 2000	1000 or 2000		1000 or 2000	1000 or 2000				6 - 7		2 - 3	

* Water consumption if used with a water treatment system
** Extension modules

topDRILL RX

Cycle times and scope of processing

The RX is the ideal solution for all drilling and countersinking processes. All machine configurations allow fast, flexible and high-quality processing.



Glass sheet

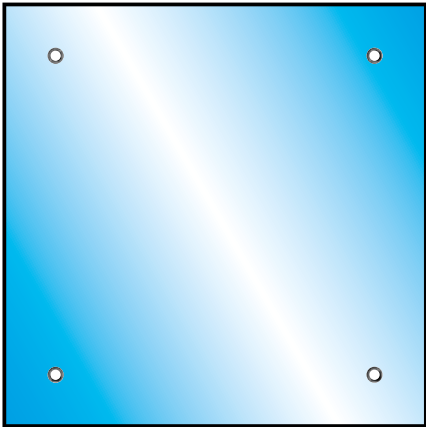
- Dimensions: 1,000 x 1,000 mm
- 10 drillings standard

Cycle time for the entire processing: 160 seconds

Glass sheet

- Dimensions: 1,000 x 1,000 mm
- 4 drillings, countersunk double-sided

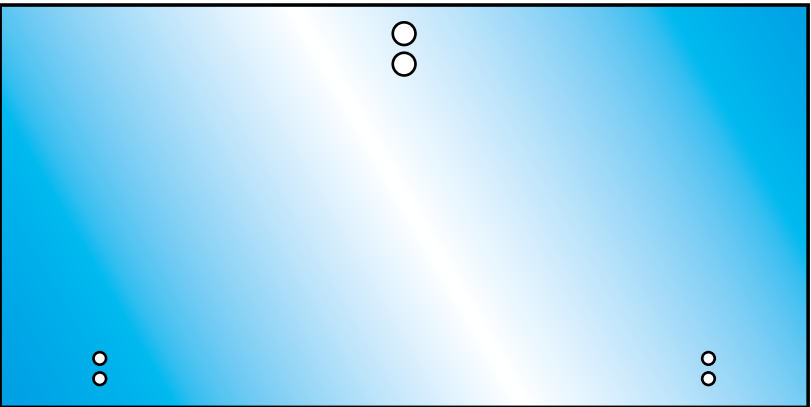
Cycle time for the entire processing: 160 seconds



Single-action door

- Dimensions: 800 x 2,000 mm
- 6 drillings, all countersink drilling

Cycle time for the entire processing: 320 seconds



Advantages of the RX series



Intelligent and fast cycle

- Simultaneous drilling from front and back (starting at 6mm) – for faster cycle times
- Simple tool changing during drilling or countersinking – cycle time reduction
- 5 resp. 10 drills or countersinks per side, individually programmable
- Automatic calculation of the drill depth using a stored formula
- Fully automatic measuring of the tool length – for drills and countersinks.



Easy operation

- Fully automated processing, no adjustments on the machine required
- Fully automatic recognition and adjustment of the drill length resp. drilling parameters
- Programming, data import or adjustments also during the operation
- User manual and spare parts list available online on the screen



Fast glass handling

for continuous production

- No set-up times for positioning the suction cups
- Different glass sizes, shapes and thicknesses without changeover
- Loading of the next glass sheet during the processing
- Trouble-free combination with previous or following module (e.g. washing machine)
- No scratches or glass breakages due to the vertical construction

topDRILL nc

Fully Automatic Vertical Double-Sided Drilling Center

The topDRILL nc is a fully automatic double-sided glass drilling machine with digital drilling heads and an automatic glass transport. All movements are controlled via the 15 inch display, manual adjustments are not required. The drills are automatically measured after every change, the operator only has to mount the glass sheet and start the program. Glass thicknesses of up to 40 mm and drilling diameters of up to 100 mm support a flexible production.

Freely configurable

The topDRILL nc can be configured according to the customer’s requirements. The modular extension of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. Versatile extensions – such as an automatic drill sharpening unit or a data connection to an ERP system – allow adapting the topDRILL nc to the specific requirements of the production.



Technical Data

Glass height	Open at the top (130 nc) / 2,600 mm (240 nc)
Max. processing height	1,300 mm (130 nc) / 2,400 mm (240 nc)
Glass thickness	3 - 40 mm
Minimum glass size	600 x 150 mm
Maximum glass size	approx. 3,200 mm, can be increased up to 8,000 mm with extension modules
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	100 mm
Spindle speed	0 – 5,000 rpm
Spindle power (rating)	2 x 5.5 kW
Max. load	150 kg/lm

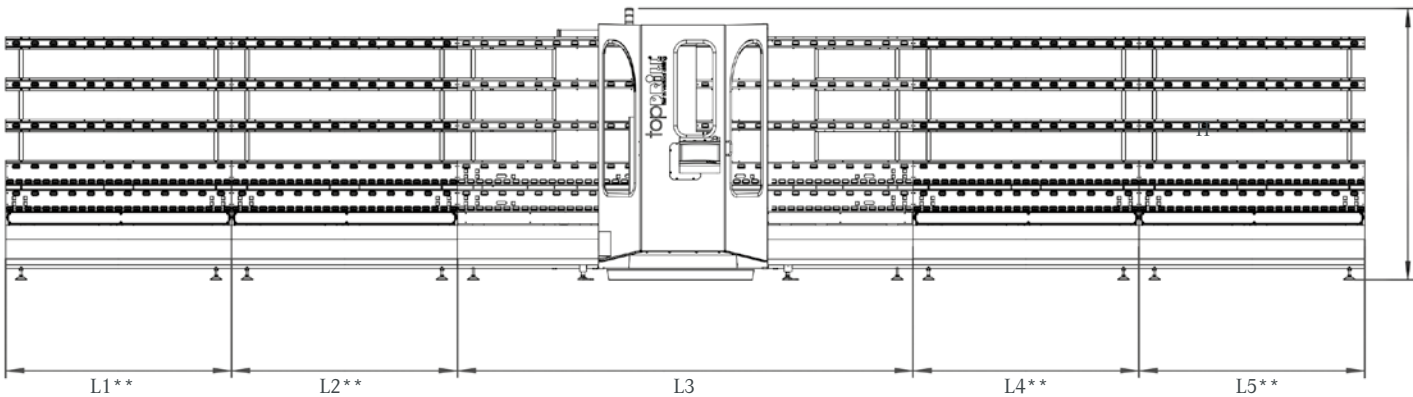
Highlights

- Very compact construction and modular design
- Automatic drilling length measuring
- All movement axes with servo motors
- Simple operation and programming

Options

- Automatic drill sharpening unit
- Quick-change system for CMX drills
- Air-conditioning unit for switch cabinet
- Software interface and drawing programs

Available software



	L1** (mm)	L2** (mm)	L3 (mm)	L4** (mm)	L5** (mm)	B (mm)	H (mm)	Power consump- tion (kW)	Operating air pressure (bar)	Air consump- tion (l/min)	Operating water pressure (bar)	Water consump- tion (l/min) *
topDRILL 130 nc	1000 or 2000	1000 or 2000	4034	1000 or 2000	1000 or 2000	2095	2401	12,5	6 - 7	10	2 - 3	0,5
topDRILL 240 nc	1000 or 2000	1000 or 2000	4034	1000 or 2000	1000 or 2000	2095	2401	12,5	6 - 7	10	2 - 3	0,5

* Water consumption if used with a water treatment system
** Extension modules

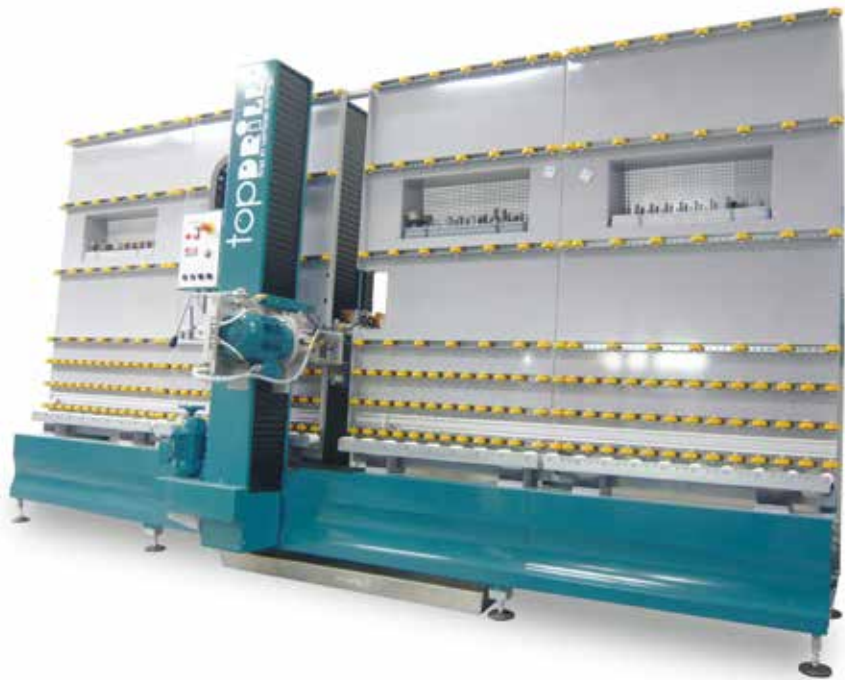
topDRILL Easy

Vertical Double-sided Drilling Machine

The topDRILL easy is a double-sided glass drilling machine with digital display for motorized setting of the drilling height. The manual handwheel allows fine adjustments to 1/10 mm. Marking the drill holes or additional laser markings are no longer necessary. The length adjustment via a double row of foldable, serial limit stops allows rapid processing of glass sheets of the same size. The glass sheet is transported manually. The patented drilling depth adjustment and the operation via central hand lever at the front render any adjustment for the glass thickness unnecessary. The drilling speed can be adjusted continuously, a selector switch activates one-sided drilling.

Configuration options

Extension modules allow an easy extension of the maximum possible processing glass length of the topDRILL to the customer's requirements. The optional DRITOP CMX quick-change system minimizes the set-up times of the machine. The topDRILL easy offers convincing arguments with its demonstrable, decades-long durability as well as its high precision with easy operation.



Technical Data

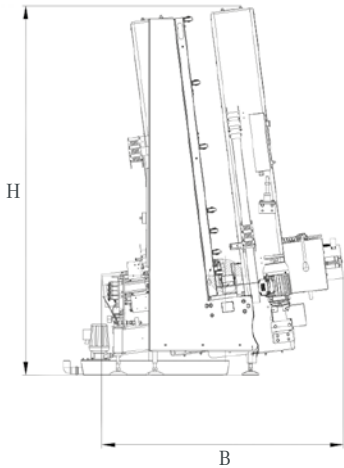
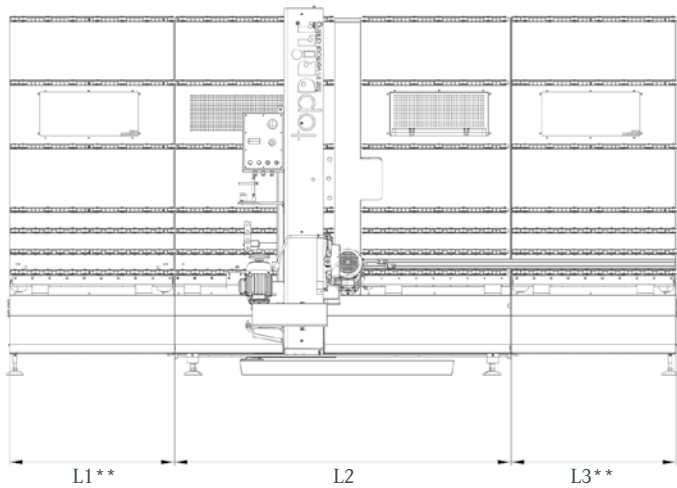
Glass height	Open at the top
Max. processing height	1,300 mm
Glass thickness	3 - 30 mm
Minimum glass size	200 x 100 mm
Maximum glass size	2,500 x 1,500 mm
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	100 mm
Spindle speed	0 - 5.000 rpm
Spindle power (rating)	2 x 5,5 kW
Max. load	100 kg/lm

Highlights

- Very compact, modular design
- Single lever operation of the entire drilling process
- Motorized setting of the drilling height with digital display
- Patented system for the adjustment of drilling depth and drill wear

Options

- CMX Drill Quick-Change System



	L1** (mm)	L2 (mm)	L3** (mm)	B (mm)	H (mm)	Power consump- tion (kW)	Operating air pressure (bar)	Air consump- tion (l/min)	Operating water pressure (bar)	Water consump- tion (l/min) *
topDRILL 130 Easy	1000	2040	1000	1465	2233	4,2	6 - 7	10	2 - 3	0,5

* Water consumption if used with a water treatment system
** Extension modules

SOFTWARE





Data Transfer to Insulating Glass Line

The LiSEC software solution lineserver bridges the gap between the production planning and the IG line. The lineserver takes over the data from the production planning at the predefined sequence and generates the appropriate CNC-code per machine. This solution visualises every IG item including item preview, component information, texts, steps and Georgian bar details, as well as status information on each station. Furthermore, single glass sheets as well as batches can be entered by the operator directly at the line.

Highlights

- Facilitates automatic production of free shapes (DXF)
- Automatic double/triple switch
- Informing all affected stations if a glass sheet breaks
- Control and monitoring of the production progress
- Regulate different gas fillings
- Quality assurance through integration of LiSEC quality scanner
- Merging the order- and scan data for tracking

Functions

- Import of production batches
- Input editor for manual entry of single productions
- Supplying CNC-data for the single plant parts
- Feedback of ready messages and remakes
- Interfaces to label printer, laser marker and quality scanner
- Coating recognition with plausibility check
- Line Overview
- Target/actual comparison of measurement data with order data

Extensions & Additional Products: the add-ons



prod



assetcheck



CAD solution for flat glass processing add-on to ORDER, OPT

Its full integration into the order processing and production planning solutions makes cadcam the best construction program for the glass processing sector. Specifically developed functions support the construction of all imaginable product variants. cadcam can also be integrated as a stand-alone construction program within your existing software landscape.

Highlights

- Simple placement of complex cutouts/ fittings from the catalogue
- Optimisation and smoothing of contours are crucial for continuous cutting
- Low training effort due to intuitive and user-friendly graphical interface
- Integration depth up to the processing machine (CNC code converter)
- Extension of your shape catalogue with own drawings

Functions

- Full range of functions of a CAD/CAM system
- LiSEC shape catalogue
- Variable graphics
- Supporting digitizing tables
- Automatic calculation of grinding additions
- Automatic calculation of decoating contour for edges and cutouts
- Administration of cutouts/fittings
- Supported formats: .DXF & LiSEC formats (.ZEI & .GPS)

Supported digitizing tables



Nestler



SummaGraphics



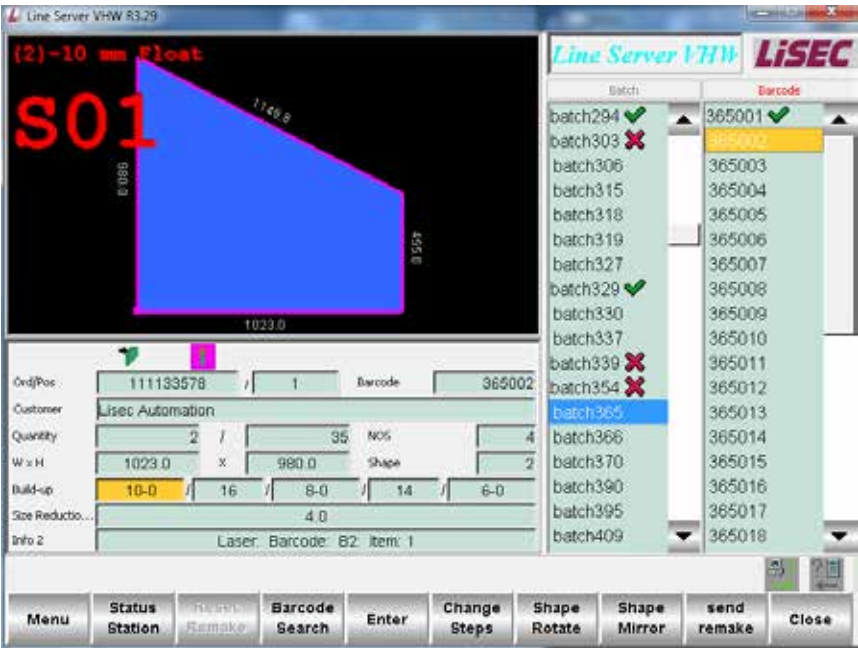
Neolt



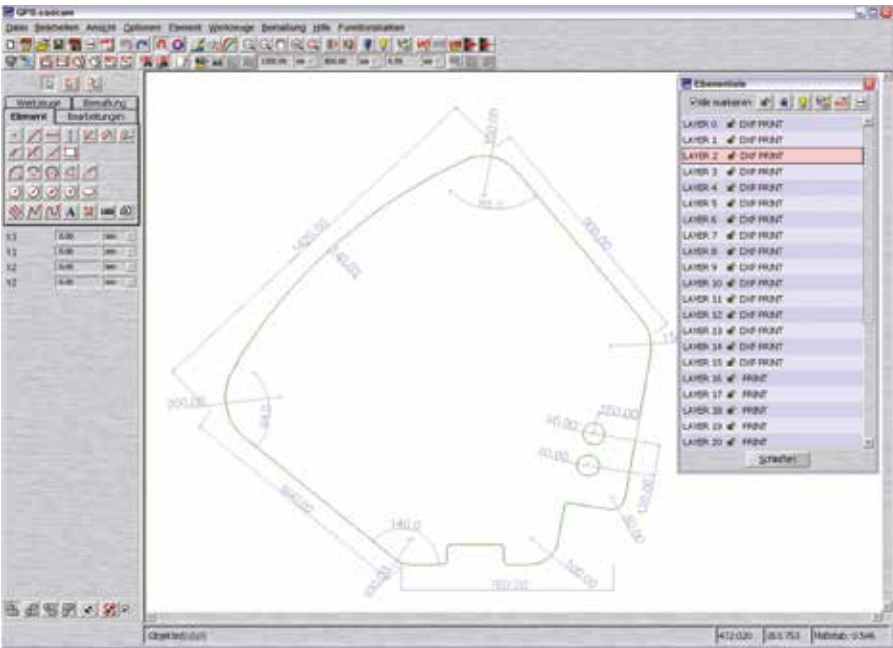
CalComp



ISIS



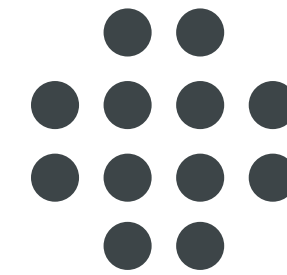
Sample display of glass sheet at washing machine



Main screen from cadcam

TEMPERING





LiSEC **AEROFLAT**

Air Cushion Technology since 1996

As the specialists in the field of the processing and refining of flat glass, we set the objective to always go one step further. 20 years ago we revolutionized the tempering of flat glass and since then, we have continuously developed this technology. World-wide, there are already numerous furnaces by means of which flat glass is tempered in an industrial production environment with LiSEC technology.

Trust in the inventor.

Handle with AIR!

High-quality products deserve the best treatment. This is why we only allow trustful heads – and air – to get in touch with glass. With the patented AEROFLAT air-cushion system, the surfaces of the glass sheets are not touched during the tempering process. The result of the innovative technology: top quality flat glass – economic and future-proof.

LiSEC tempering process by means of Air Cushion Technology officially taken up in a standard

The LiSEC tempering process has officially been published in a standard as „Air Cushion Process“. As the first country in the EU, Great Britain has published the BS EN 12150-1:2015 in September 2015. The publication of the German and English version via the Austrian Institute for Standardization was performed in November 2015.

The EN 12150-1 is a harmonized standard to the Construction Products Regulation, i.e. that LiSEC customers are state-of-the-art with the tempering according to the „Air Cushion Process“ and that their products comply with the Construction Products Regulation. Andreas Winter, managing director of the company Glastech Produktions- und Verfahrenstechnik GmbH (Glastech production and process engineering): „If a product does not comply with the Construction Products Regulation, it is subject to extra examination and approval. If the product is modified only slightly this product is required to reexamine the product. If you are within the standard, it is possible to perform any changes that are within the standard limits. From now on, safety glass tempered by means of the LiSEC air cushion process is considered state-of-the-art.“

At the LiSEC Glass Forum, the AEROFLAT technology for tempering is used. For further information on AEROFLAT or our Glass Forum please contact office@glastech.co.at

One technology, four advantages!

Visions need courage. You need people who push limits and dare to try new things. In 1996, we set new standards in terms of the tempering of flat glass with the revolutionary AEROFLAT air-cushion system. Now we are continuing the story.

1

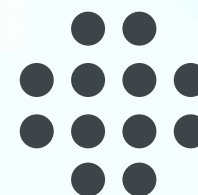
A high competitiveness is the result of the interaction of quality and cost effectiveness/profitability.
COST EFFECTIVENESS by LiSEC

- No waiting time when the types of glass are changed
- Wear-free ceramic components
- Significantly shorter heating time
- No cooling of the heating zone required in case of glass breakage
- Identical cycle time for coated and uncoated glasses
- Operators trained in only five days
- 50% less staff required compared to conventional plants

2

Trend-setting technology is the result of forward-looking thinking.
TECHNOLOGY by LiSEC

- LiSEC is the inventor of the patented air-cushion technology
 - No touching of the glass surface throughout the entire process
 - Tempering of double-sided coated and printed glass sheets is possible
 - Tempering of structural glass is possible
 - Maximum convection in the circulatory system
 - Thermal tempering of glass is possible from 1 to 10 millimeters
 - Patented cooling air routing
- No SO₂ gas required – environmentally friendly & sustainable



LiSEC AEROFLAT
Air Cushion Technology since 1996

4

The future of tempering begins with the best processes.
FUTURE-PROOFNESS by LiSEC

- LiSEC stands for...
- best in glass processing
 - strategic safety
 - thin glass for technologies of the future
 - a dense service network

3

Perfect products are the result of unquestionable quality.
QUALITY by LiSEC

- No roller waves
- No white stripes
- No roller pickups
- Coating-friendly process due to a shorter standing time in the furnace
- Improved anisotropy
- High quality due to stable processes
- More than 95 % plant availability



Perspective with potential.

Flexible, light-weight and robust – thin glass opens up so far unimaginable possibilities in particular in the field of solar applications, in the production of insulating glass or in the interior architecture.



Multiple insulating glass

- The use of tempered thin glass enables significantly lighter modules with significantly better thermal insulation values. This leads to advantages in production but also in the assembly. Thanks to the non-contact transport, LiSEC AEROFLAT is ideally suited for coated glass sheets.

Architecture

- Light, flexible and robust glasses without optical distortions are excellently suited for the use in modern architecture. Tempered thin glass convinces due to its visual attractiveness while the low weight reduces the requirements on the profiles and fittings.

Flat glass for the automotive industry

- Tempering compliant with the prevailing standards of the automotive industry.

Functional glasses

- One glass, many possible applications. In the industry and architecture, special functional glasses are in demand as never before. Regardless whether with a high thermal insulation and sound insulation, self-cleaning or as a highly esthetic glazing – tempered flat glass provides numerous variants of application.

Photovoltaics

- New generation frameless photovoltaics modules. The LiSEC casing technology with glass-glass-modules is independent from the used solar cells. Thanks to tempered thin glass and the hermetic sealing, the modules convince with an increased performance and a longer service life. They are diffusion-resistant, more stable and more flexible and can produce faster.

Solarthermics

- Cold bent thin glass for the use in parabolic mirrors: the tempered thin glass may be bent on site and placed into the construction. The unique technology provides for advantages in terms of transport (due to a low weight and the reduction of the transport volume) and therefore a massive saving of costs.



MEM4Win

Buildings are responsible for approx. 40 % of the energy consumption in Europe. A decisive role in the improvement of the energy efficiency play facades and windows. In the future, windows will even produce energy and will, in a smart way, take over other functions, which are decisive for the well-being of the building users – for example shadowing, directing of light, illumination or sound reduction. In the project „MEM4WIN“, sponsored by the EU, the „Window of the future“ is developed in which all functions are integrated. We coordinate this international research project.

Objectives

- By means of innovative quadruple insulating glass units, the heat transition shall be reduced by half (to 0.3 W/m²K) compared to the so far reached U-values.
- The weight of the windows shall be reduced by 50 % by means of the use of tempered thin glass and the windows shall produce energy.
- The sound insulation shall be increased by approx. 20 % by means of the 4-sheet window construction.

Profitability

The manufacturing costs shall be reduced by 20 % compared with windows with similar functions.

Research tasks

- Tempered ultra-thin glass membranes
- Anti-reflective coating
- Innovative edge compound for a 4-sheet (window) construction, which also allows a frameless openable casement in all-glass facades.
- Sealing for the integration of PV and OLED, which provides for a long-term diffusion-tightness.



I am Service.

Because we support our customers with the largest service network worldwide.



Advantages:

- Minimal downtime thanks to rapid support
- Guaranteed availability of spare parts or equivalents - for at least ten years
- Worldwide supply with spare parts
- Operator training directly on site or at a local training centre
- Added value throughout the entire lifecycle of your systems



Machines and systems for flat glass processing are in use for many years, sometimes even for decades. Ongoing maintenance and optimisation are essential to keep performance, efficiency and availability at a consistently high level and to ensure high-quality glass products.

Wherever you are located, LiSEC offers spare parts and extensive support thanks to the largest service network in the flat glass industry. Our specialists are here to help you and provide solutions on site during installation and start-up of the equipment. Training of your personnel on technology as well as operator and maintenance training is provided either at the LiSEC facilities or on site. With online support as well as phone service we are here for you whenever help is needed.



Regardless whether your LiSEC system is 10 weeks, 10 years or even older - we offer you worldwide service and the fastest spare parts supply.

The service portfolio as presented below is only valid for LiSEC machines and plants and not for Schraml stand-alone machines.

Service portfolio

- Spare parts
- Online support
- Long life
- Hotline
- Installation
- Repairs
- Training
- Maintenance

Facts & figures

The LiSEC service network:

- 160 service engineers worldwide
- 45 branch offices/representatives
- Service for around 390 different machine types
- Approx. 4,700 customer locations in over 100 countries worldwide
- The largest global service network in the glass industry
- One-of-a-kind in the industry: Competence through operators' know-how



Hotline

LiSEC attributes great importance to customer efficiency from the very beginning. The company is now taking it to a new level of quality.

We will quickly process your request:

Sunday 22:00 - Friday 21:00 hrs (CET)

Phone: +43-7477 405-5701

Fax: +43-7477 405-89

Email: tbe.service@lisc.com

Standby service for urgent cases outside of office hours:

SAT 06:00 - 22:00 hrs (CET)

SUN 06:00 - 22:00 hrs (CET)

Phone: +43-7477 405-5701

- Economy: within 5 working days (MON - FRI)*
- Express: within 1 working day (MON - FRI)*
- Saturday deliveries and special transport available on request*

Phone: +43-7477 405-5703

Fax: +43-7477 405-89

Email: spares@lisc.com

* Warehouse availability required. This does not include items that must be programmed, processed or tested. Valid within the European Union. There may be delays with third countries due to customs procedures.



Long Life

Electrical components generally have a shorter life cycle than mechanical ones. Systematic upgrades can increase the lifetime of many plants. The result is a longer machine life - Longlife. The Longlife department provides modifications beyond the usual spare part range, such as PC upgrades, drive retrofitting and similar modifications.

Replacing outdated components and enhancing the machine with new, modern technology brings existing plants back up to date. The advantage for the plant operator is the lower cost of modernizing an existing plant compared to the purchase of equivalent new equipment. The solid basic components of the machine remain unchanged.

Phone: +43-7477 405-1220
Email: aftersales@lisec.com

The service portfolio as presented below is only valid for LiSEC machines and plants and not for Schraml stand-alone machines.

Online Support

Services:

- Telephone support with direct data connection to your LiSEC machines for immediate and specific diagnosis and resolution of stoppages and errors
- Access software with multi-level security procedures preinstalled on all connectable new machines

Phone: +43-7477 405-5701
Email: tbe.service@lisec.com

Advantages:

- Immediate help during stoppages saves time and costs
- 24/5 and standby support on weekends and holidays
- Increased system availability
- Full transparency of provided support work
- Better preparation for on-site repairs
- Remote access only with express authorization and supervision by the customer



LiSEC Glass Forum

Competence Center for research, production and training in the field of flat glass processing



Facts and figures:

- Opened October 2015
- Latest LiSEC technologies
- 70 employees
- Investment 5 million Euros
- 15 million Euros turnover
- Approx. 100 customer visits per year
- Glass storage with 96 rack positions
- 3 insulating glass lines
- 2 cutting lines for float, laminated and special glass
- Automatic sorting/shuttle logistics
- Planned ahead maintenance schedule
- Automatic production planning and machine addressing
- Bidirectional office – machine communication in real-time

The new LiSEC Competence Center for research, production and training in the field of flat glass processing was opened in Hausmening at the end of 2015. It aligns completely with the LiSEC claim „Best in Glass Processing“. The Competence Center „Glass Forum“ makes LiSEC the only machine manufacturer on the market who profitably processes flat glass. This operator know-how allows LiSEC to share and therefore fully understand their customers' problems and challenges.

The „Glass Forum“, a LiSEC investment of approximately five million Euros, accommodates the latest LiSEC technologies for each step of glass processing – from cutting and edge processing to a sophisticated sheet logistics system to the production of insulating glass units and laminated safety glass including tempering. In the Glass Forum, flat glass is processed under real life production conditions. The state-of-the-art plants and software applications are also used for research, testing and training.



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