lascom
laser

NEW DIMENSIONS IN GLASS

with innovative machines from lascom

www.lascomlaser.com

lascom laser – the specialist for machines and software for laser structuring of glass

Lascom is a specialist and think tank in the field of "laser processing of glass". We are exclusive distributors of various production and R&D companies (Pelcom, cericom).

Our main business areas are
- Machines to produce electrically heated glass
- Machines for cutting hollow glass

Lascom laser systems guarantee maximum precision as well as fast and environmentally friendly processes - at significantly reduced costs compared to conventional processing methods.

Increase the quality and effectiveness of your production and expand your options in glass processing.

Many leading companies in the glass processing industry, for example from Finland, Poland, France, Austria, Italy, Great Britain, Russia, South Korea and China, have already opted for Lascom: You too can benefit from the advantages of laser processing!

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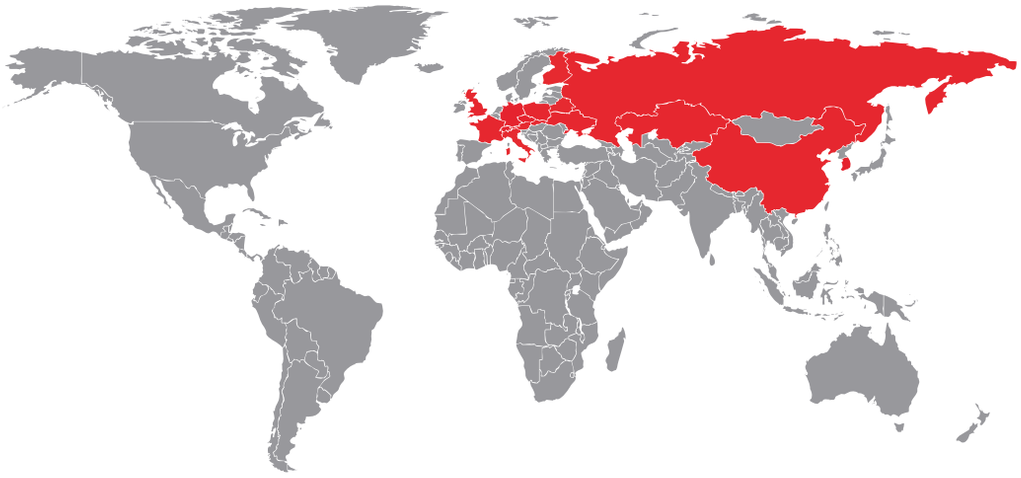


PRODUCT OVERVIEW

Invisible conductors create an effect of cozy warmth emanating from the glass.

Heating with glass

Electrically heated glass is a diverse and rapidly growing market. Regardless of whether it's a question of buildings (cozy warmth) or the automotive and aviation industries (clear view through windows, ice- and fog- free headlights), heated glass offers many advantages. This also applies in the private sector skylights, bathrooms, etc.) and in commercial use, for example in hotels, wellness oases and the culinary industry.

Alarm lines built into the pane reliably report attempted break-ins.

Alarm Glass

Alarm glasses contains built-in sensors that trigger an alarm if the pane is damaged or destroyed. Alarm is often used in shop windows, and is increasingly being used in the private sector.

Better cell phone reception thanks to decoated glass

Radio Frequency Glass

Better mobile phone reception: The frequency impermeable metal coatings on low-E glass can be structured with laser beams so finely and almost optically invisibly that radio waves for mobile phones and radios can be transmitted through these coatings, guaranteeing optimal reception. The energy-saving function is only slightly reduced.

Electrically heated windows can easily be combined with photovoltaic systems.

Photovoltaic

Photovoltaic systems and autonomous heating systems are becoming increasingly important. Electrically heated windows support, and can be easily integrated into, the existing heating system.

One push of a button – and glass becomes almost opaque.

Switchable Smart Glass

Electrochromic glasses can be optically changed by electrical voltage, for example to allow dimmability. Depending on the switching state, LC glasses can be given a clear or frosted glass look.

Architecture

Heated panes ensure cozy warmth when it's unpleasant outside. This way, the seat by the window quickly becomes your favorite, even in winter.

Cold outside, pleasantly warm inside

Railroad

Ice- and fog-free windows and headlights ensure a good view for the passengers and perfect illumination of the rails.

A clear view of the outside is important for the driver and for the passengers.

Ships

When steering ships, perfect all-round visibility is important. Heated glass puts an end to fogged and iced windows.

Exact sailing by sight is of great importance, especially in harbors.

Airplanes

Thanks to heated windows, passengers enjoy unhindered views regardless of the weather.

Important when piloting a helicopter flight: Perfect visibility in all directions.

Cars

Invisible heating elements allow a clear view outside - through all windows. Lascom technology ensures more safety on the road.

Ice and fog-free windshields for an accident-free journey.

L-matrix LDC | Laser DeCoating

The L-matrix LDC removes transparent but conductive layers (e.g. low-E layers) from the glass at speeds of up to 360 mm²/s to create conductor structures of any width and shape for heating.

As an additional option, you receive powerful software for modelling the temperature curve for any glass size and shape - to ensure uniform heating, for example. Conversely, it is also possible to calculate different temperature values in different areas of the glass and thus partially intensify the heating power, e.g. for the parking area of car windscreen wipers.

Laser

Each laser module and the machine are guaranteed for 1 year with no limit on operating hours for the entire machine. Lascom lasers offer a coating removal speed of up to 8 m/s in a straight line and up to 360 mm²/s in the area. The decoating performance of the L-matrix LDC system is up to 15 x higher than the traditional acid etching process.

The laser enables a combination of high speed and precise separation joints - so-called "cutoffs". The width of the generated cutoffs can be varied from 35 µm to several millimetres.

A 0.5 mm wide cutoff provides up to 1 kV of isolation in dry air without breakdown. In a finished construction (e.g. laminated glass), the 0.05 mm wide cutoff can withstand up to 600 volts.

This is achieved by the complete removal of the coating material by laser radiation and without damaging the glass.

The L-matrix LDC offers high productivity, flexibility and precision. In addition, labour requirements can be significantly reduced compared to conventional processes: Only one operator is required to run an entire line for the production of electrically heated glass.

A major advantage of the laser is the environmental compatibility and safety of the process - especially compared to the traditional acid etching method, which is harmful to the environment and personnel.

Possible machine configurations

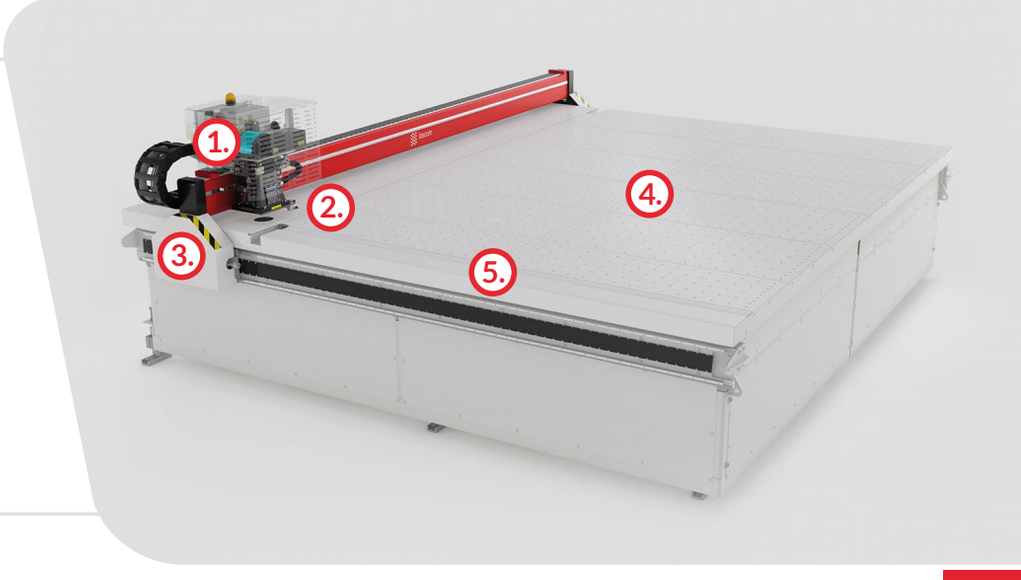
Size				
Model	**Machine LxW, mm**	**Height, mm**	**LxW of glass, mm**	**Thickness of glass, mm**
LDC-25/30	3800 x 4285	910 - 950	2510 x 3210 max. 300 x 300 min.	3 - 12
LDC-40/30	5480 x 4285	910 - 950	4000 x 3210 max. 300 x 300 min.	3 - 12
LDC-60/30	7260 x 4285	910 - 950	6000 x 3210 max. 300 x 000 min.	3-12

Laser Properties	
Type	Ytterbium - YAG
Wavelength	1064 nm
Average transmission power	100 W
Scanning Head processing area	170 x 170 mm
Typical processing speed	130 to 360 mm²/s

Other parameters	
Operating voltage	3/N/PE—50 Hz 380 V
Power consumption	19,15 kW (L-matrix LDC-25/30) 22,15 kW (L-matrix LDC-40/30) 25,15 kW (L-matrix LDC-60/30)
Operating pressure	6±0,5 bar
Air consumption	80 l/min
Noise level	max 80 dB(A)

Please note the L-Heatware software on page 5

1. Laser
2. Extraction
3. Accuracy
4. Processing area
5. Glass positioning



L-matrix GDS | Gas Dynamic Spray

The L-matrix GDS flatbed machine applies a conductive metal powder to the glass surface by means of a high-speed gas jet in a cold process. The powder particles permanently bond to each other and to the conductive glass coating with minimal contact resistance. In this way, a resilient electrical conductor - a so-called busbar - is applied to the glass and thus enables very good conduction and dissipation of high electrical currents.

These busbars can be applied in any desired and optimised layouts to enable the desired heat distribution in the glass. The busbars applied to the glass comply with European standards and have been a product successfully used on the market for years.

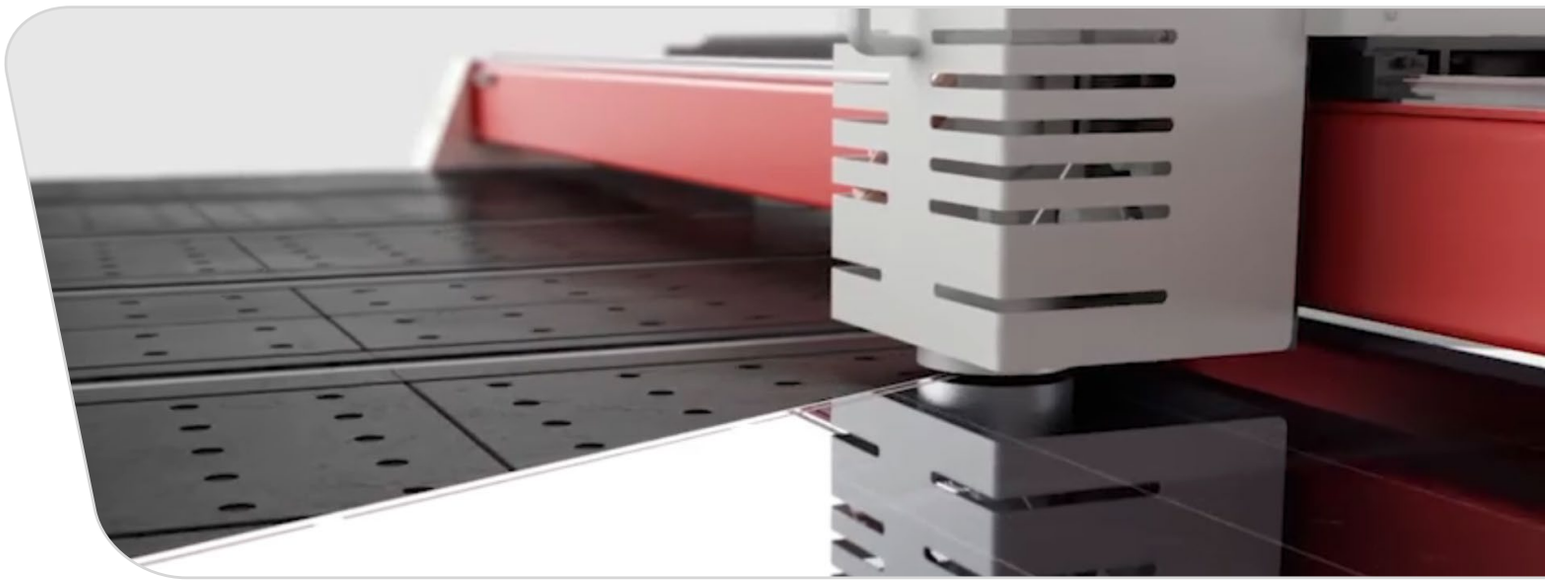
Spraying system

The L-matrix GDS applies conductive busbars at a speed of 40 mm/s. This allows the machine to be used in conjunction with the L-matrix LDC without reducing the overall output of heated glass production. The time needed to apply the busbars is usually shorter than the time needed to laser process the corresponding glass panel.

The warranty period of the L-matrix GDS is normally two years (depending on the terms of the contract. Particles of metal powder of a certain size are accelerated to high speeds in a special way. The stream of these particles is then directed at the glass surface at the desired angle, causing these particles to adhere to the glass in the form of a metallic band.

A small percentage of the particles cannot adhere to the glass for various reasons, but are immediately removed by the suction system directly in the spray zone and do not get into the environment.

The L-matrix GDS meets the requirements for air and noise pollution. The operator usually does not need any special protective equipment. The L-matrix GDS can be placed in a typical glass processing plant.



Possible machine configurations

Size and power consumption					
Model	**Machine LxB, mm**	**Height, mm**	**Working Area (LxW), mm**	**Thickness of glass, mm**	**Power Consumption**
GDS-25/30	3800 x 4285	910 - 950	2510 x 3210 max. 300 x 300 min.	3 - 12	23,25 kW
GDS-40/30	5480 x 4285	910 - 950	4000 x 3210 max. 300 x 300 min.	3 - 12	26,25 kW
GDS-60/30	7260 x 4285	910 - 950	6000 x 3210 max. 300 x 000 min.	3-12	29,25 kW

Spraying system	
Spraying speed	40 mm/s
Spraying material	copper, zinc, aluminium

Busbar parameters	
Width	min 5 ± 0,5 mm
Thickness (over the glass surface)	100 to 300 µm
Cross-section of the busbar	0,4 mm²
Adhesion to the surface	up to 80 Pa (kg/cm²)

Other parameters	
Operating voltage	3/N/PE—50 Hz 380 V
Operating pressure	6±0,5 bar
Air consumption	450 nl/min
Noise level	max 80 dB(A)

1. Spraying system
2. Motors
3. Processing area
4. Positioning locators
5. Extraction system

L-matrix COMBO | A strong Duo

Our "COMBO" is a combined system for the production of electrically heated glass consisting of a table with a special cover, 2 bridges, a bridge with a fixed scanner system, an LDC laser, and the gas-dynamic spray system GDS.

Laser decoating and application of power busbars can be performed on one machine.

GDS bridge

The L-matrix GDS flatbed machine places a resilient electrical conductor - a so-called busbar onto the glass, enabling very effectively the connectivity of low and very high electrical currents between the metallic coating and the power supply.

LDC bridge

The L-matrix LDC removes transparently conductive layers (e.g. low-E layers) from the glass at speeds of up to 360 mm^2/s to create assessed conductive areas of any width and shape for heating.

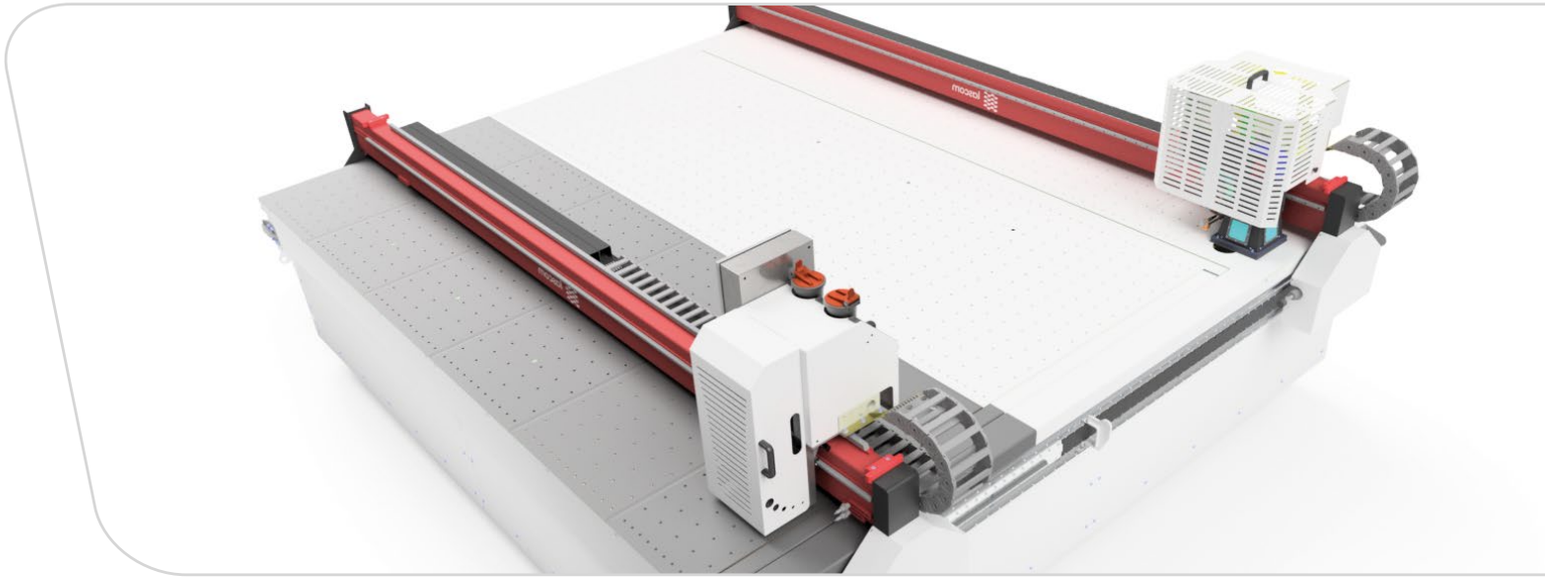
The table is equipped with an air-cushion system and sliding stops for glass positioning. All functions are controlled via a terminal.

The L-matrix COMBO consists of:

- Combination table with 2 bridges
- Software
- Computer terminal for control

Advantage:

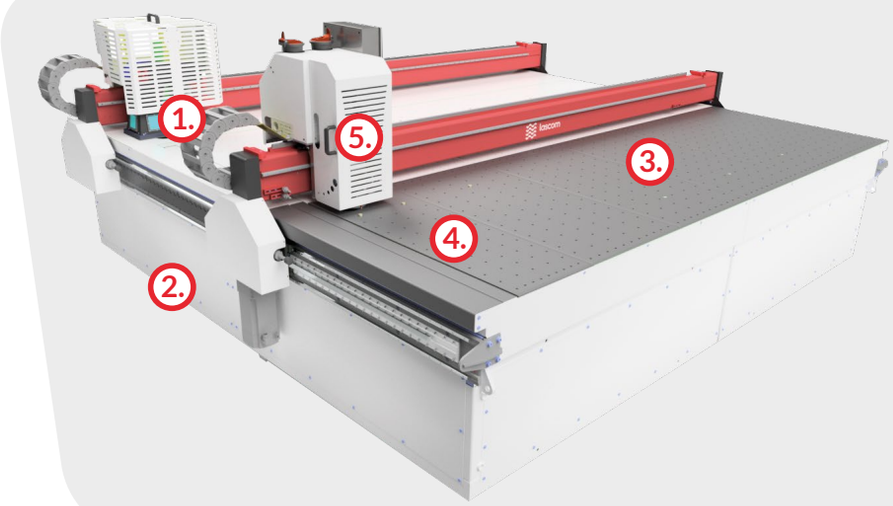
The L-matrix COMBO is a space-saving alternative that combines the processes of two machines in one smaller system.



Technical Specifications

Installation Parameters	
Length	3900 mm
Width	4300 mm
Overall height	1780 mm
Height of worktop surface	950 mm
Glass Properties	
Minimum pane size	500 x 500 mm
Maximum pane size	2500 x 3210 mm
Thickness	3 - 19 mm
Laser Properties	
Type	Ytterbium - YAG
Wavelength	1064 nm
Average transmission power	100 W
Scanning Head processing area	170 x 170 mm
Typical processing speed	130 to 360 mm²/s

1. Spraying System
2. Motors
3. Processing area
4. Transport System
5. Suction System



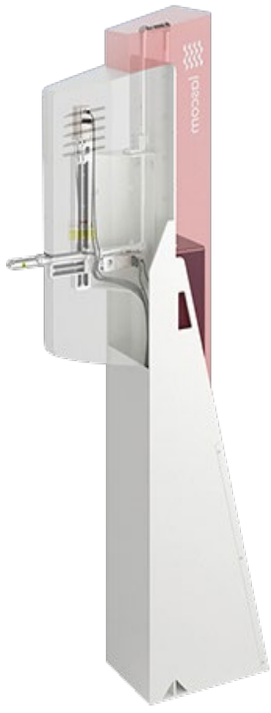
L-professional TLC | Thermal Laser Cutting

The L-professional TLC laser system has been developed for cutting off the top balloon in the manufacturing process of hollow glasses (e.g. drinking glasses, bottles).

The TLC system is usually placed at the mechanical cutting section after the blowing or pressing machine and eliminates the need to process the workpieces with the traditional cutting wheel.

The TLC process can be installed as a stand-alone version (L-professional TLC) or as a module that can be retrofitted to the production line (L-module TLC). It is non-contact and highly precise and also offers other advantages compared to the traditional cutting process, such as

- a high cut quality - a reduction in rejects of up to 90%
- no mechanical damage to the glass
- an optically perfect and almost stress-free cut edge
- minimal maintenance
- no water and gas consumption
- no glass splinters
- no cutting wheel replacement
- only minimal regrinding of the edge



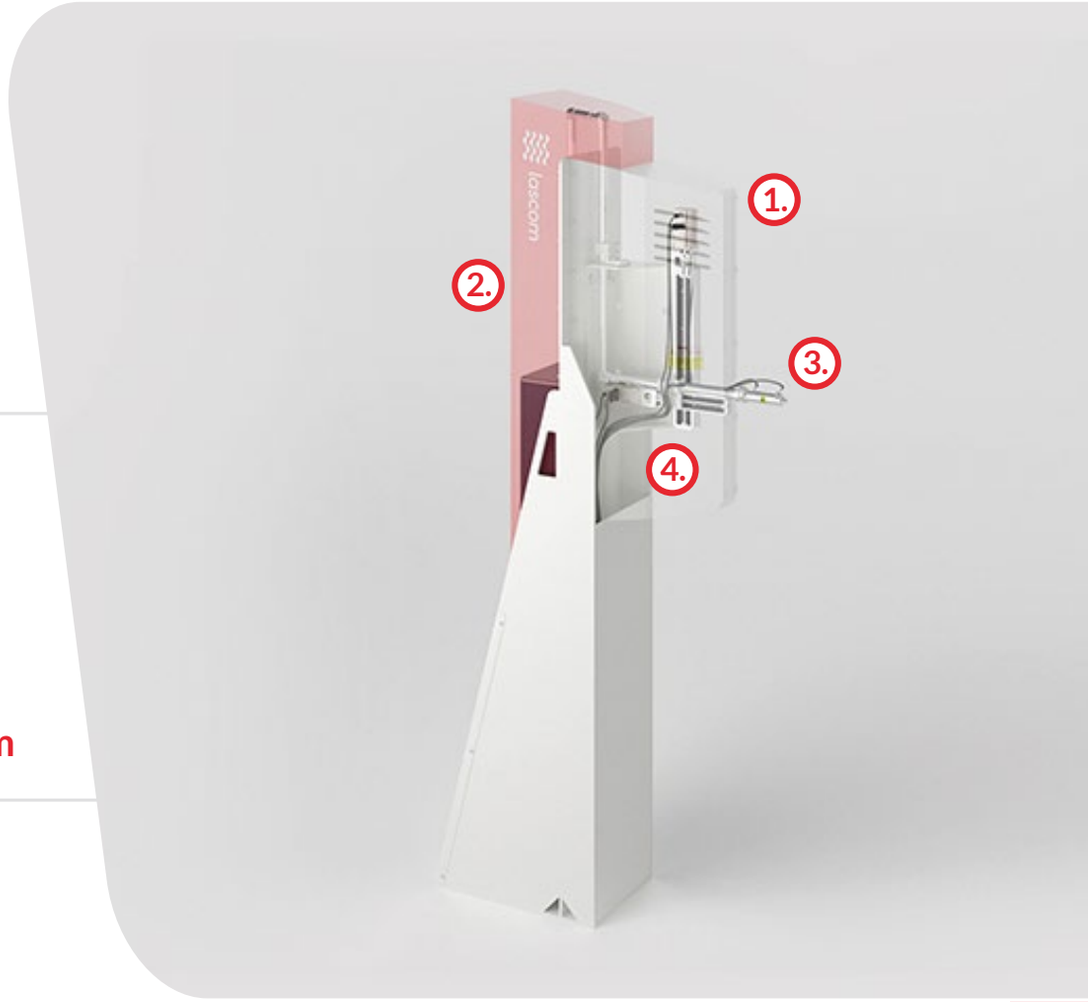
TLC-System

The output of the TLC system depends on the number of lasers installed and can be increased from around16 glasses/min with only one laser to 75 glasses/min with three lasers working simultaneously.

Experience has shown that the Lascom TLC system is easy to integrate mechanically and in terms of control technology as a stand-alone variant or as a module in an existing production line. In coordination with the customer and, if necessary, with an already existing production, the TLC system can be adapted accordingly.

Parameters

Number of lasers	
L-professional TLC-1/16	1
L-professional TLC-2/50	2
L-professional TLC-3/75	3
Capacity	
L-professional TLC	15-16 pcs/min
L-professional TLC-2/50	45-50 pcs/min
L-professional TLC-3/75	70-75 pcs/min
Laser class	4
Operating voltage	3/N/PE-50 Hz 380 V

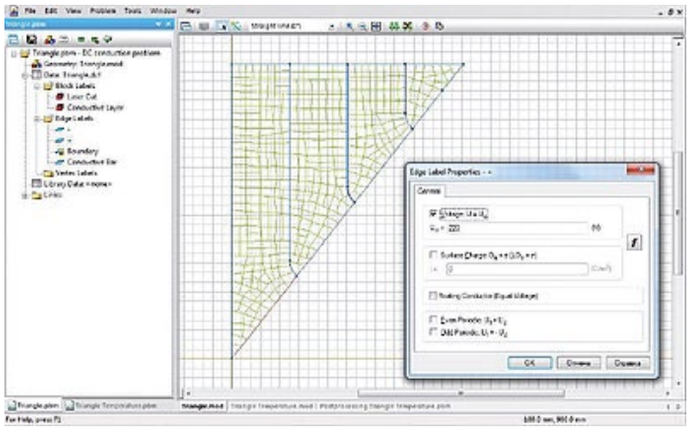


1. Front cover
2. Laser cover
3. Optical system
4. Positioning system

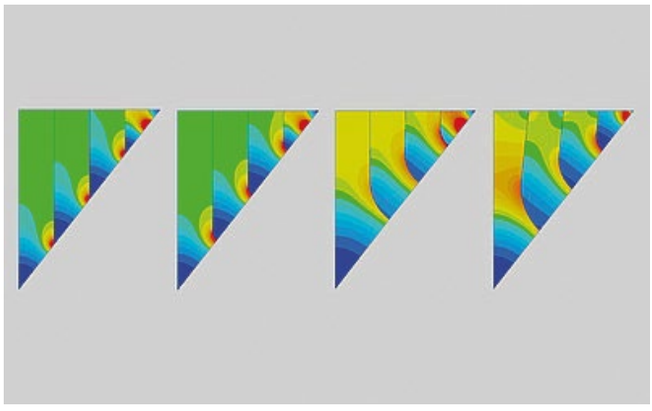
L-Heatware

In order to perfectly control the operation of the L-matrix LDC | Laser DeCoating tables, our engineers have developed software that makes it possible to calculate the heat output (in watts per unit area) even for glasses with complex shapes and to select an optimal arrangement of cutoffs and busbars.

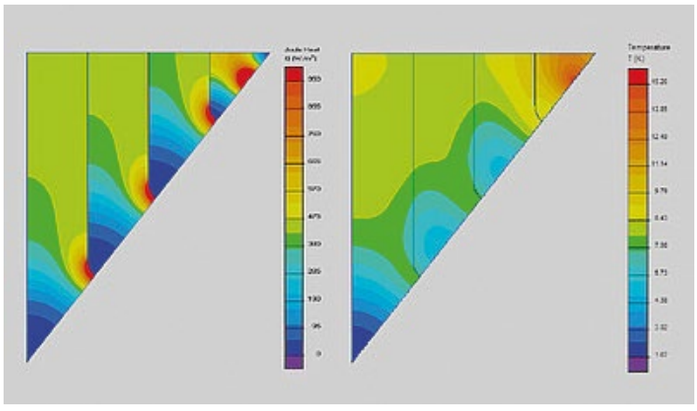
This eliminates the need to create prototypes, which in turn significantly reduces the costs for small series and individual orders.



Model editor and editor for physical properties



Heat distribution in 4 simulations with different cutting shapes



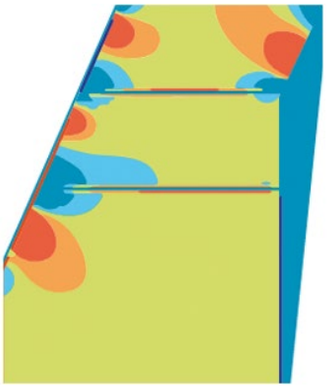
Simulation results: Heat and temperature distribution

For simulating heatable window elements

With the powerful HGM software (HGM=Heated Glass Modelling) developed by Lascom, you can quickly and easily calculate, simulate and graphically display the temperature distributions for rectangular and also for glasses with complex shapes.

The L-Heatware enables you to calculate and optimise the optimal layout of parting lines and busbars. This eliminates the otherwise necessary and costly production of glass samples and the development time and effort can be significantly reduced.

Thermal field without adjustment



Thermal field after adjustment

Service, advice, training and assistance

Contact customer service:

General enquiries and emergency hotline: +43 732 29 60 80

Technical Service

Lascom products are reliable and virtually maintenance-free.

If you have technical questions or problems, you are welcome to use our worldwide, fast and competent service. Our technical hotline is also there for you on weekends and holidays.

With our efficient remote maintenance system, we detect possible faults online and can also rectify them directly in many cases.

In this way, we guarantee our customers minimum downtimes and maximum machine availability.

Advice from 1. hand

Right from the start, we offer you competent, personal advice on all aspects of your business. To this end, we draw on extensive experience in supporting our customers, who are active in a wide range of markets worldwide.

With our professional support, you will be successful from day one.

Training and assistance

We train you and your employees individually and intensively: either with us or on your premises – just as you wish.

And if you need support later: No problem, our staff will be happy to come to you.

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