SCHRAML
member of the LiSEC group

combiFIN

Vertical processing line for processing edges, drilled holes and cut-outs

Cycle time indication

Purpose of the document

The CombiFIN is a universal processing line for the grinding and polishing of glass edges, and for drilling, countersinking, milling and grinding cut-outs. The CombiFIN consists of the GLX grinding machine and M-RX internal processing unit. This document provides information on the typical cycle times of the complete line and the individual machines. The cycle times shown are intended as an indication and not as part of the agreement.

The cycle times are measured on a GLX-3220 P1 ECO with 1 processing head and an M-RX G7. All cut-outs are processed with a solid milling cutter.

Definition of the cycle times

The cycle times include all times from starting the glass sheet at the inlet until the next sheet can be started at the inlet. The cycle time therefore reflects the time from one finished sheet to the next finished sheet. Note: The cycle times of the first and last sheet will be higher (sum totals of GLX and M-RX), because two sheets are not being processed at the same time in these cases. All delays that cannot be influenced by Schraml (waiting times, reduction of the override, etc.) are excluded

Processing steps that are carried out automatically at certain intervals, but cannot be attributed to a sheet of glass, are also not included, e.g.:

- GLX: Re-profiling of the polishing wheels / measurement of the wheel diameter / etc.
- M-RX: The sharpening of drills / tool length measuring / etc.

Reproducibility of the displayed times

The cycle times described are reference times and are dependent on the following factors:

- The cycle times have been measured with standard settings and can usually be reproduced during production (no catalogue values!).
- Type and quality of the tools. We recommend using tools from LiSEC and Innodia.
- Condition and wear of the tools.
- Speeds and feed rates of the tools.
- Quality of the grinding water.

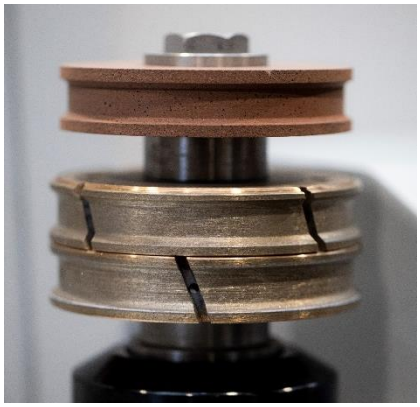
Different glass thicknesses

The cycle times for the specified glass thicknesses apply. Thinner glass lites sheets are processed faster, while thicker glass lites sheets require a longer cycle time.

Processing operation sequence:

To aid understanding of the complete work procedure and to facilitate faultless cooperation between the individual devices, we recommend watching our product video. You can view this at www.combifin.com or directly on https://www.youtube.com/watch?v=oDlMZKlYFHo.

Quality of processing - GLX grinding and polishing machine



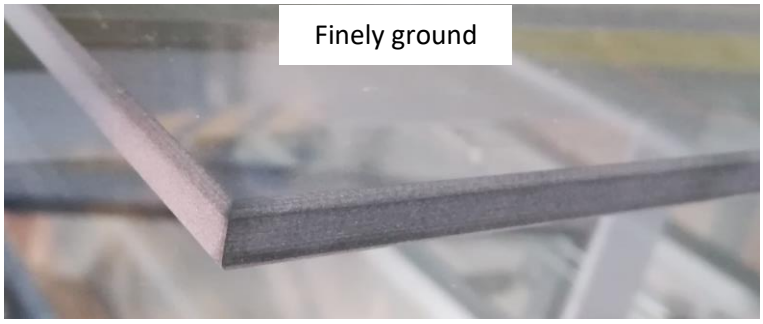
Edge grinding essentially takes place with a "package" of peripheral grinding wheels. Typically, a coarse grinding wheel and fine grinding wheel are mounted on a tool holder; a polishing wheel can be additionally mounted if required.
The particular advantage of this method is that no tool change is necessary within one glass thickness.
Different combinations or tool types can of course be used and mounted.

Rough edge

The edge is produced in a single pass with minimum material removal (< 5mm). Bare spots are permissible. Round corners and bevelled corners up to 5mm can be produced without loss of cycle time.

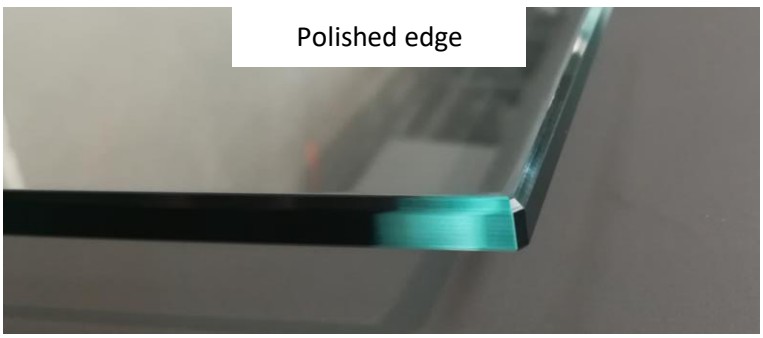
Fine grinding

The edge is produced in two passes (rough grinding and fine grinding).
Round corners and bevelled corners up to 5mm can be produced without loss of cycle time.



Polished edge

The edge is produced in three passes (rough grinding, fine grinding, polishing)
Round corners and bevelled corners up to 5mm can be produced without loss of cycle time.



Quality of processing - M-RX drilling and milling centre

Rapid processing

Round holes are produced with drilling tools without further processing (no countersinking)

Cut-outs are milled with a solid milling cutter (no grinding)

Drilled hole

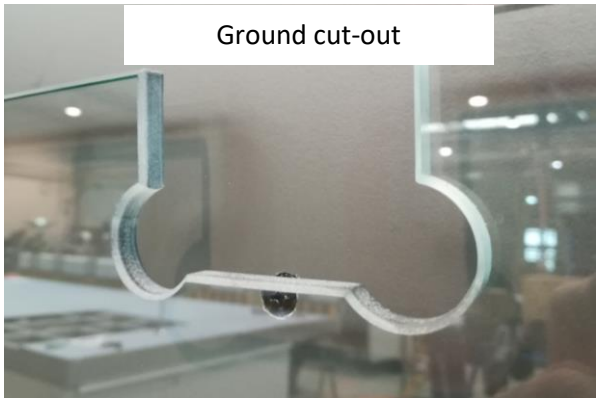
Milling

Ground / countersunk

Round holes are produced using drilling tools. After drilling, the holes are countersunk on both sides. All holes are countersunk for the specified cycle time.

Cut-outs are milled with a solid cutter and then ground. All cut-outs are ground for the specified cycle time.

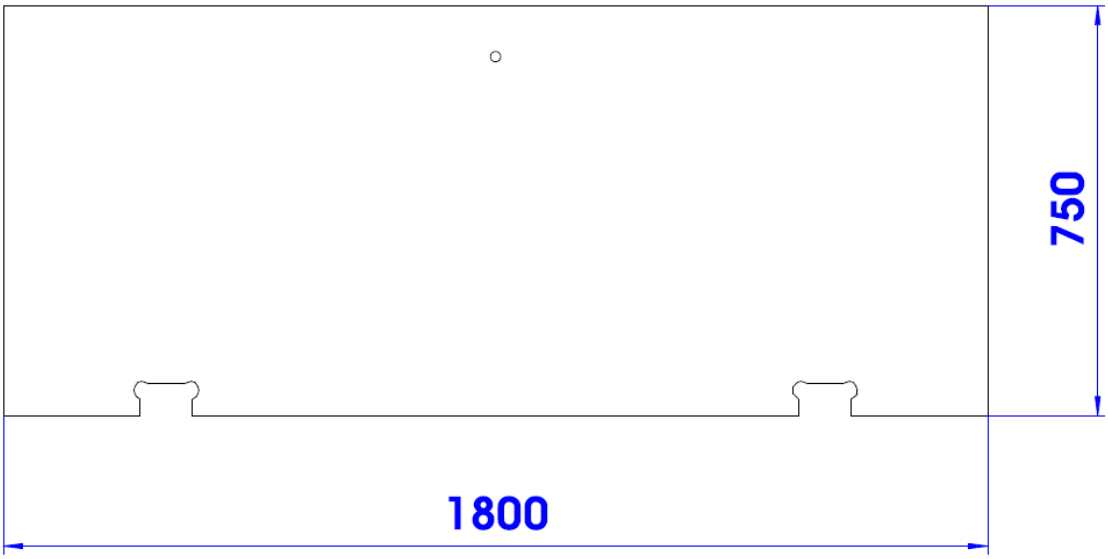
Ground cut-out



Waterjet cut (additional note):

The M-RX is also available with the "waterjet cut" option. This even faster version is NOT taken into account in the cycle time calculation here.

Sheet	Dimensions	Internal processing
1	Glass size: 1800 x 750mm Glass thickness: 10mm Glass type: Float	2 x Mickey Mouse: 74 x 45mm 1 x drilled hole ø 20mm

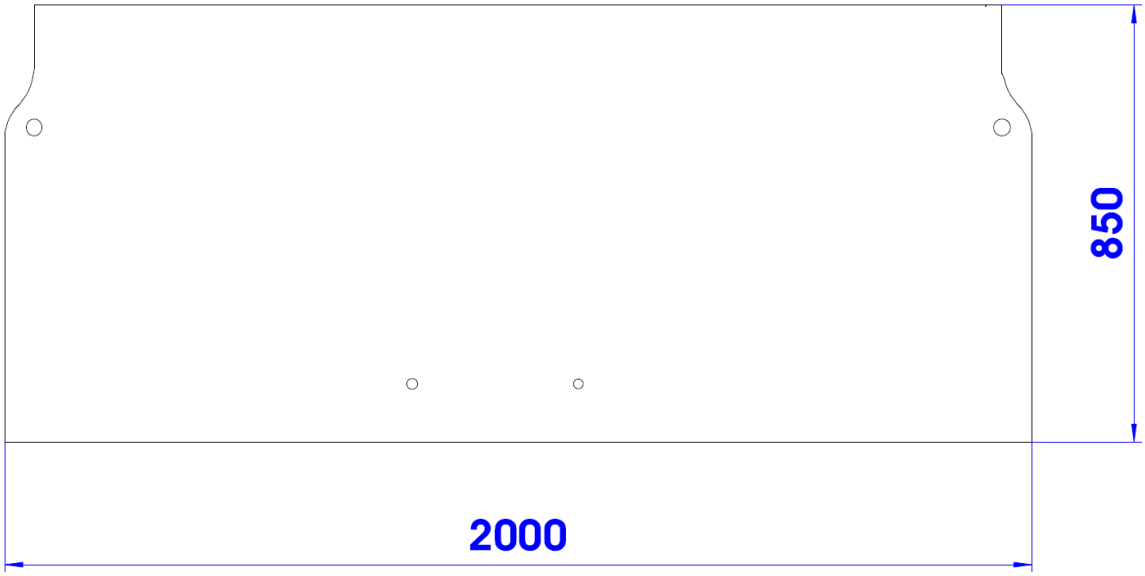


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	248	133	172

Sheet	Dimensions	Internal processing
2	Glass size: 2000 x 850mm Glass thickness: 10mm Glass type: Float	2 x PT: 161 x 37mm & 2 x ø 20mm

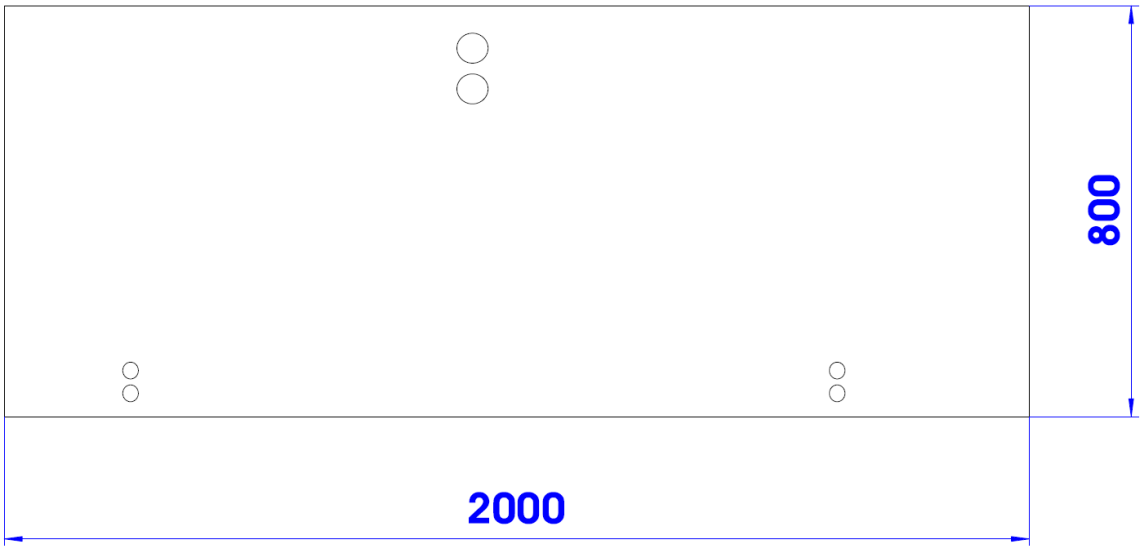


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	273	190	275

Sheet	Dimensions	Internal processing
3	Glass size: 2000 x 800mm Glass thickness: 8mm Glass type: Float	2 x drilled hole ø 20mm 2 x drilled hole ø 45mm

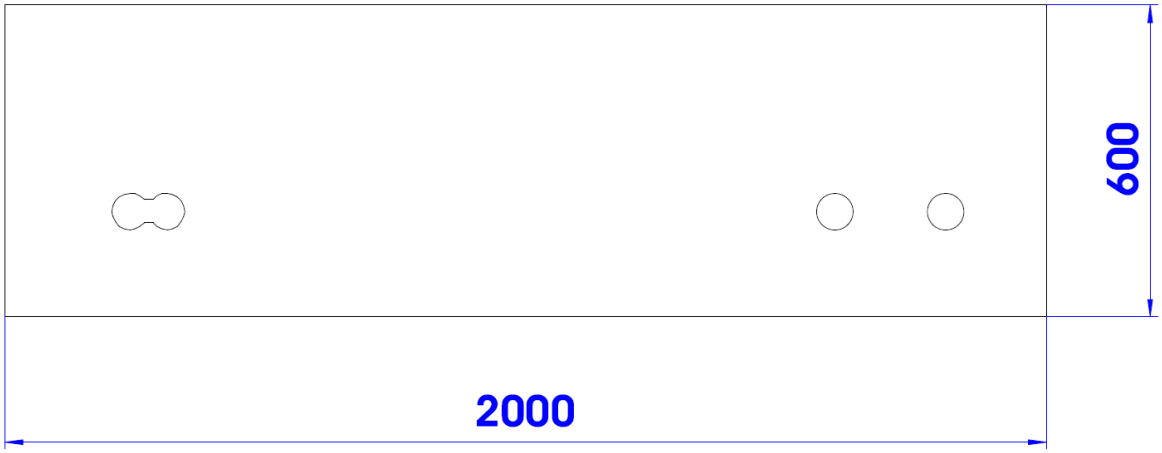


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	258	159	205

Sheet	Dimensions	Internal processing
4	Glass size: 2000 x 600mm Glass thickness: 6mm Glass type: Float	1 x double socket cut-out: 135 x 75mm 2 x drilled hole Ø70mm

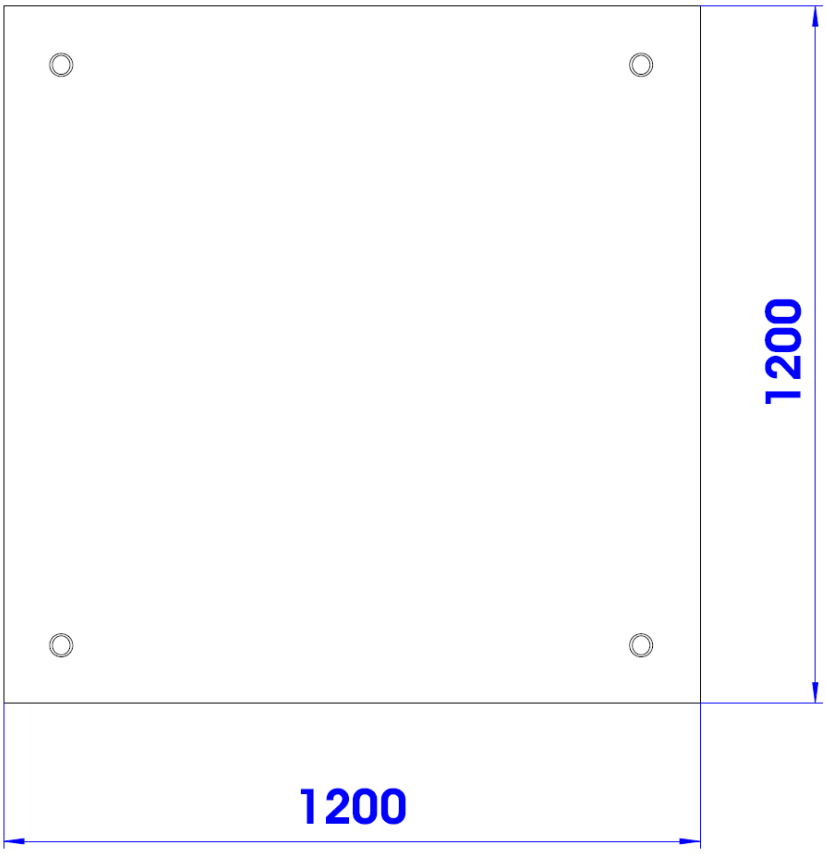


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Edge **finely ground**	Rapid processing	Ground / countersunk
Seconds	117	153	200

Sheet	Dimensions	Internal processing
5	Glass size: 1200mm x 1200mm Glass thickness: 12mm Glass type: Float	4 x drilled hole: 20mm

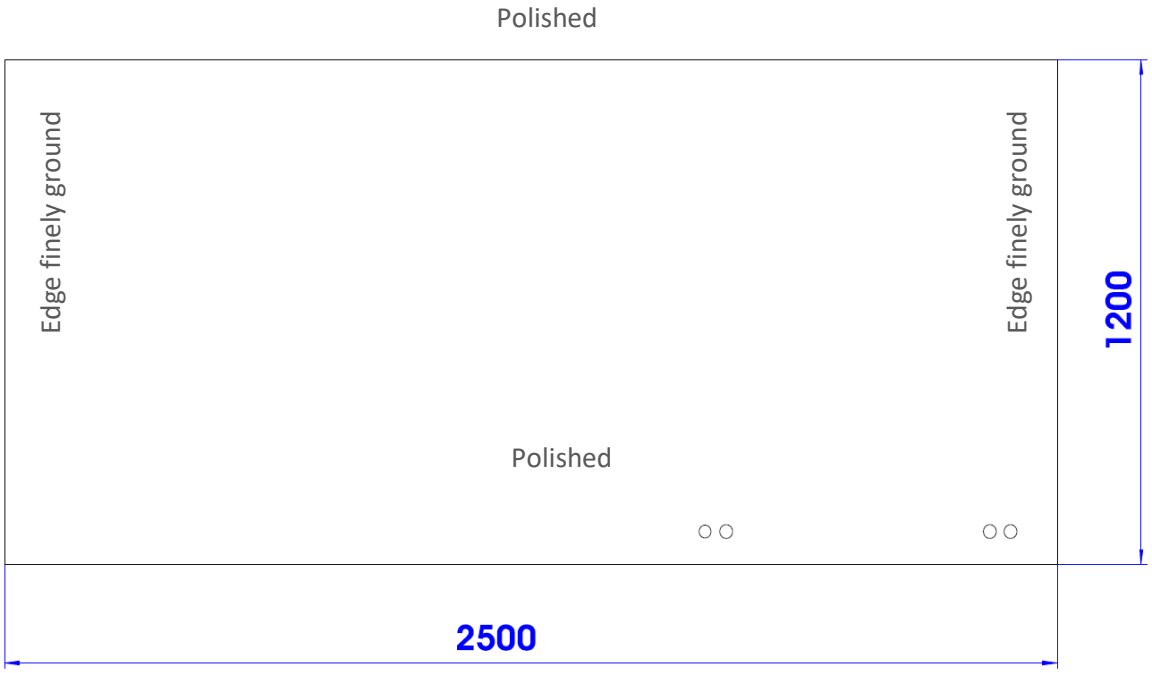


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	255	127	200

Sheet	Dimensions	Internal processing
6	Glass size: 2500 x 1200mm Glass thickness: 12mm Glass type: Float	4 x drilled hole: 20mm

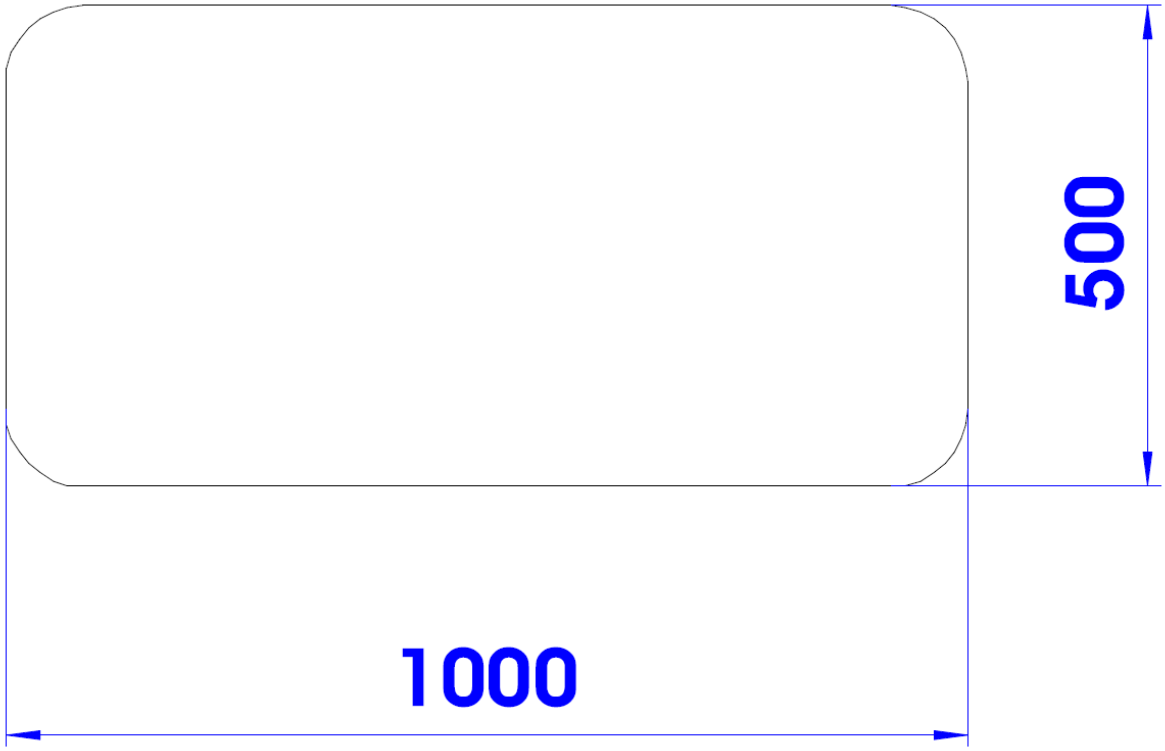


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Edge polished / finely ground	Rapid processing	Ground / countersunk
Seconds	312	116	190

Sheet	Dimensions	Internal processing
7	Glass size: 1000 x 500mm Glass thickness: 8mm 4ST round edges R=50mm Glass type: Float	/

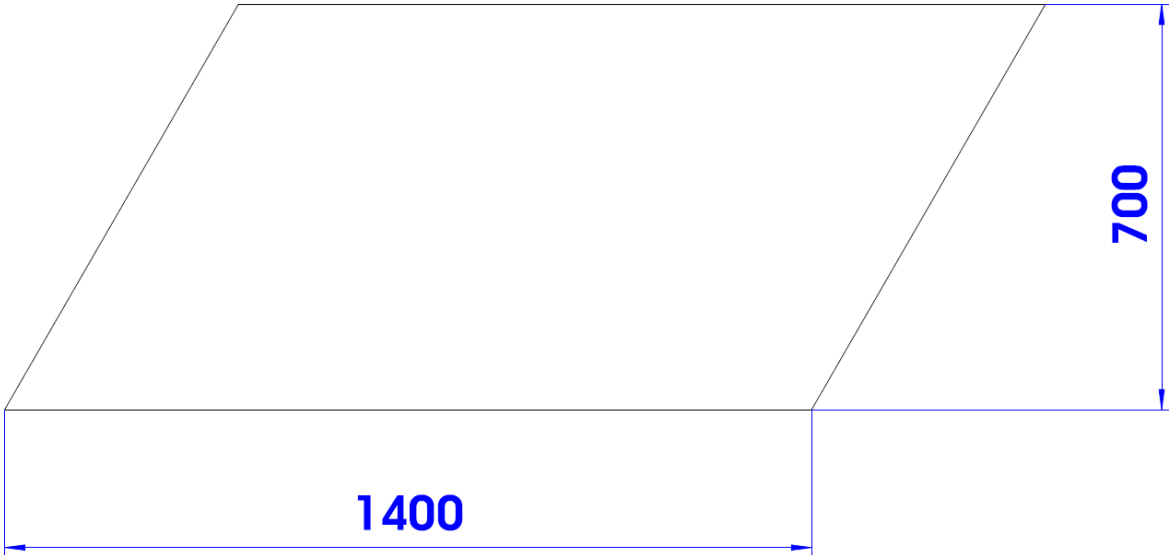


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	160	/	/

Sheet	Dimensions	Internal processing
8	Glass size: 1400 x 700mm Glass thickness: 6mm Glass type: Float	/

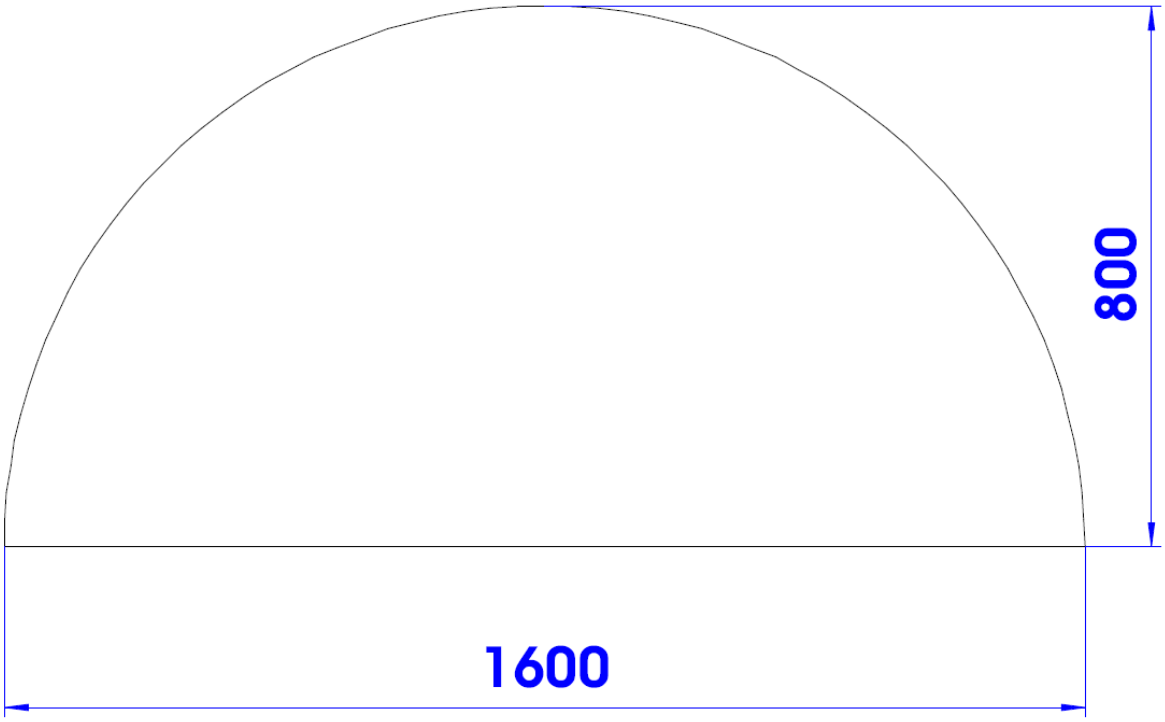


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	194	/	/

Sheet	Dimensions	Internal processing
9	Glass size: 1600mm x 800mm Glass thickness: 8mm Glass type: Float	**/**

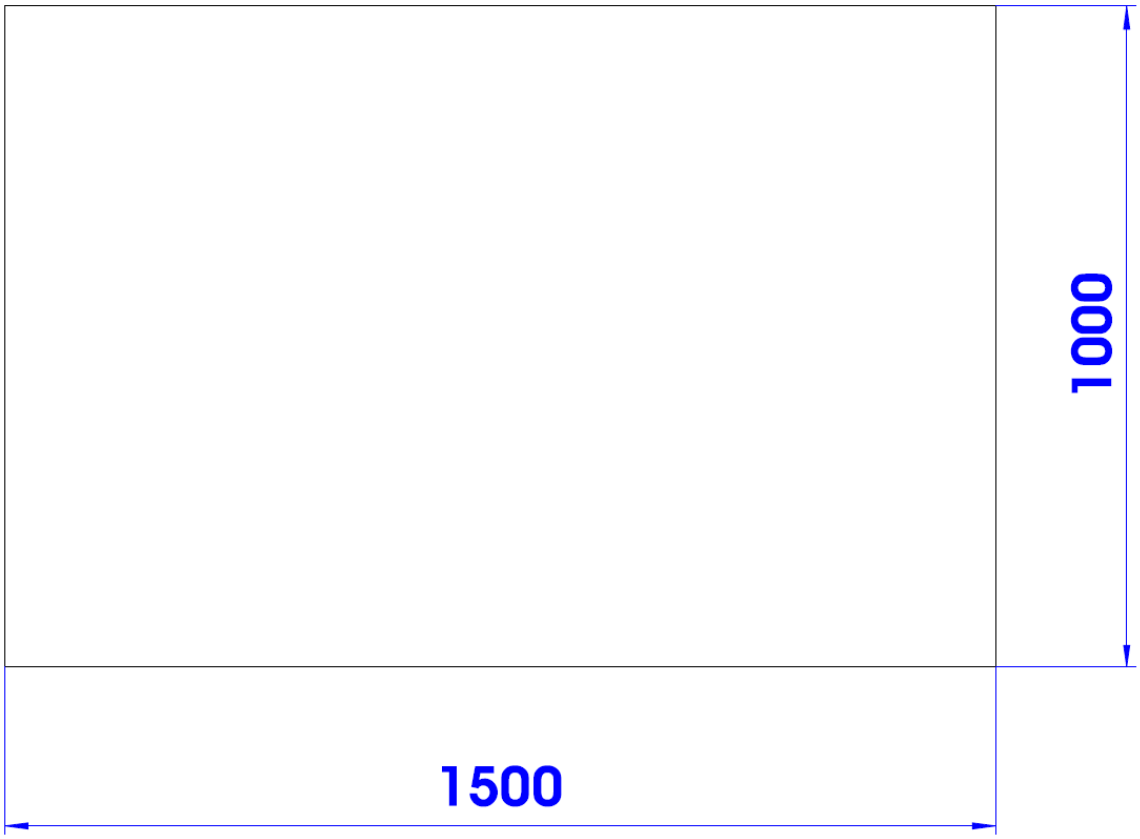


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Seconds	198	/	/

Sheet	Dimensions	Internal processing
10	Glass size: 1500 x 1000mm Glass thickness: 8mm Glass type: Float	/

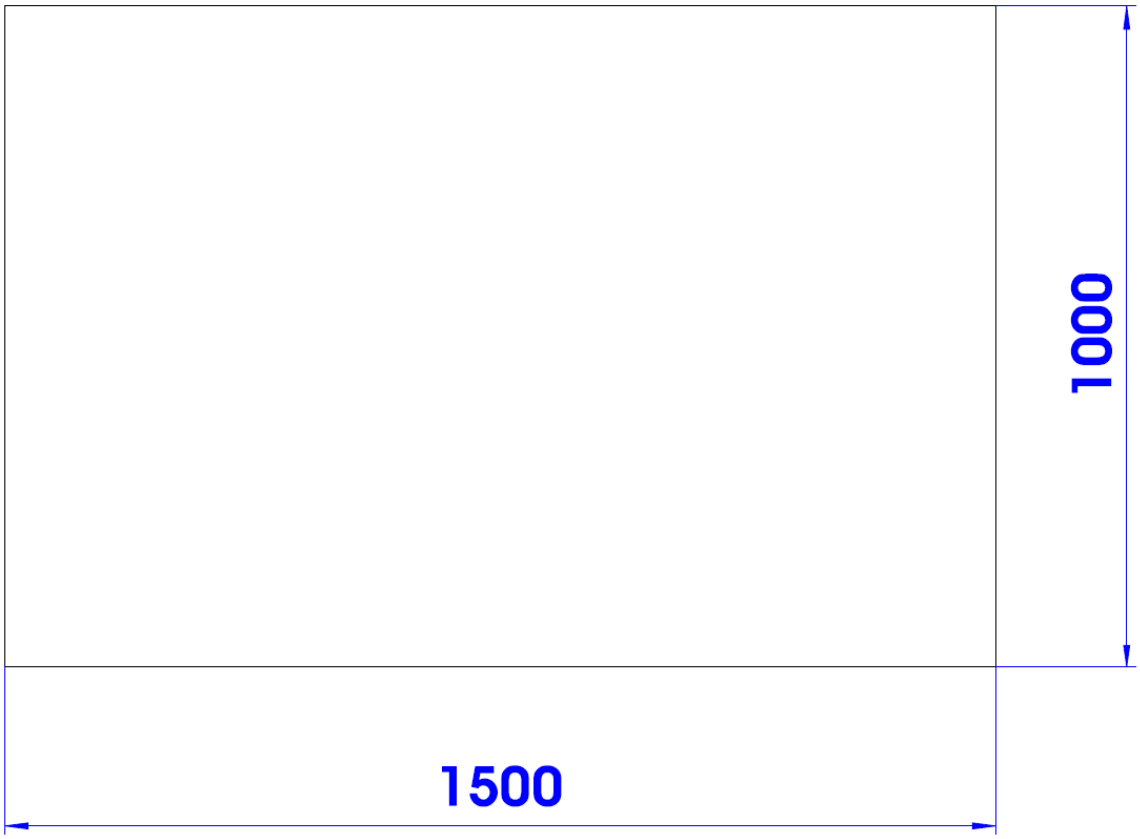


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Edge finely ground	Rapid processing	Ground / countersunk
Seconds	133	/	/

Sheet	Dimensions	Internal processing
11	Glass size: 1500 x 1000mm Glass thickness: 6mm Glass type: Float	/

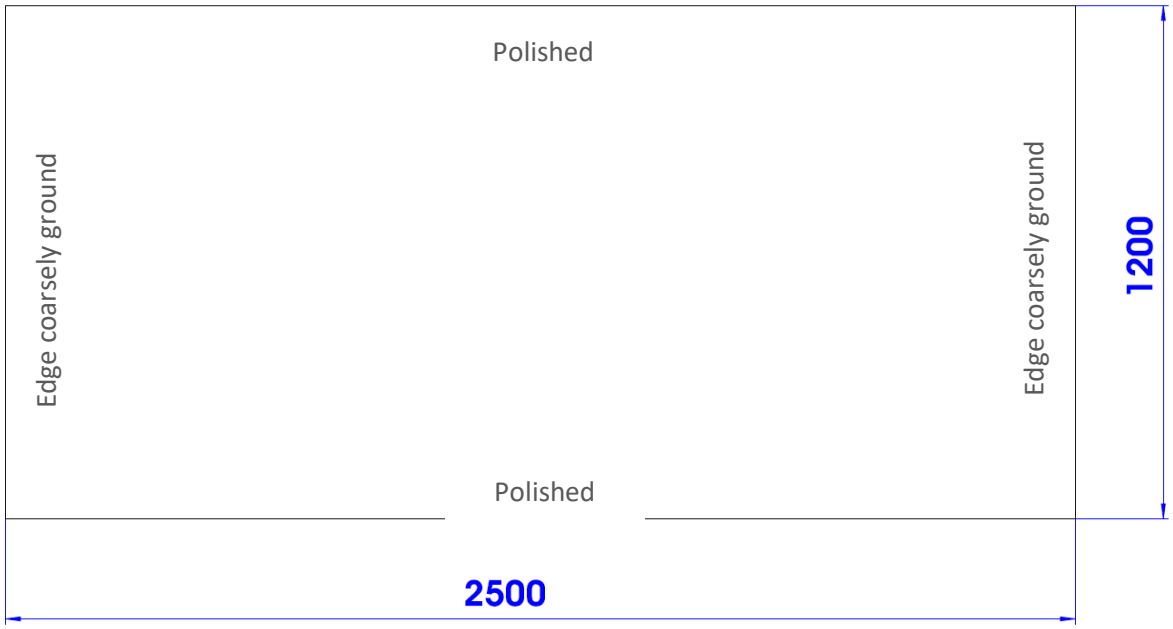


Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Edge seamed or edge rough	Rapid processing	Ground / countersunk
Seconds	49	/	/

Sheet	Dimensions	Internal processing
12	Glass size: 2500 x 1200mm Glass thickness: 10mm Glass type: Float	/



Cycle time

Note: The longer time of GLX and M-RX define the total cycle time during normal production. The times do not have to be added together because both machines work in parallel on two different sheets.

Machine	GLX	M-RX	M-RX
Quality	Edge polished / coarsely ground	Rapid processing	Ground / countersunk
Seconds	297	/	/