

# 746 - AVL LINEA

## **AUTOMATIC LINE FOR CUTTING-BREAKING-SEPARATING LAMINATED GLASS.**

MAX. CUTTING LENGTH L=4600 MM

Machine to cut, break and separate laminated glass.

The machine is formed by:

LOADING TABLE WITH TRANSPORT BELTS (100 BLC)

CUTTING-BREAKING-SEPARATION MODULE

ABUTMENT AND WORKING TABLE

Once the sheet loading is completed on the table 100BLC the operation cycle starts, which consists in the following phases:

- Sheet transported automatically from the 100BLC to the cutting machine.
- Glass type detection and consequently machine setting automatically.
- Automatic positioning of the sheet at approximately 30-mm before the abutment bridge reference lugs which had already been positioned with the lugs upwards.
- Sheet positioning manually against the abutment lugs.
- Once the positioning is performed, the scoring, breaking and separation sub-plate cycle starts.
- Once the sub-plate separation is done, the remaining sheet returns backwards to the loading table (100BLC) to permit the eventual manual rotation of the sub-plate, or wait the operator command to perform the next score.

### GENERAL FEATURES:

Structure made of electro-welded steel pipes, protected with two paint coats: anti-rust and coloured paint

The working tabletop is made of wood with flatness accuracy and covered with woollen felt, to assure the air cushion of maximum efficiency.

Table edges made of hard wood to allow the manual glass breaking.

Powerful system of forced air, produced with a fan to create the "air cushion" between the table and the glass surface.

This allows to reduce the friction consistently and make the glass movement operations easy.

The noise level of the air forced system is included into the established limits according to the standards.

LOADING TABLE TILTING AND WITH TRANSPORT BELTS (SEE THE RELEVANT TECHNICAL SPECIFICATIONS).

CUTTING-BREAKING-SEPARATION MODULE :

HP resistance: infra-red rays emitter. The physical properties of the infra-red rays permit to heat the PVB without overheating the glass, avoiding so the glass cracking when performing the next score.

A couple of bridges with an automatic clamping system to permit the glass cutting, breaking and PVB separation, to produce a right-angle glass edge without splinters, PATENTED BY BOTTERO.

The machine is equipped with a device that detects all the variables regarding the glass and PVB thickness. This system processes and manages the above mentioned data so that these variables may be a factor in the complete machine cycle.

The system is electronically settled and controlled to obtain cutting, breaking and separation optimum phases for every glass and PVB thickness, PATENTED BY BOTTERO.

Cutting head carriages moved by a transmission system formed by motorreductor, pulleys and toothed belts.

Cutting length determined by a double photocell according to the glass sheet dimension.

Lubrication system with the flow concentrated on the score.

Possibility of processing low-e glass. Thanks to the traction roller covered with a special rubber material, it is possible to treat low-e without scratching the coated surface.

Possibility of excluding the lower cutting head to score monolithic glass up to 19mm thickness.

Possibility of performing the monolithic glass breakout up to 10-mm thickness.

Possibility of excluding the lubrication flow during the score.

Possibility of working on automatic or manual mode. In the last case every single function must be performed step by step: clamping, cutting, breaking of the glass, heating and PVB separation.

Easy and intuitive dialogue between the operator and the machine thanks to a software interface developed by taking in consideration all the end user necessities.

During the cutting data inputs and on every operative machine function the operator is guided step by step by the software that helps and highlights possible errors.

#### ABUTMENT AND WORKING TABLE:

Pneumatic tilting arms used to load or unload glass sheets, case sizes or sub-plates.

Retractable lateral abutment lugs of reference, pneumatically controlled.

Sheet abutment bridge placed underneath the table, which permits to let the working tabletop free.

Retractable front abutment lugs of reference, pneumatically controlled.

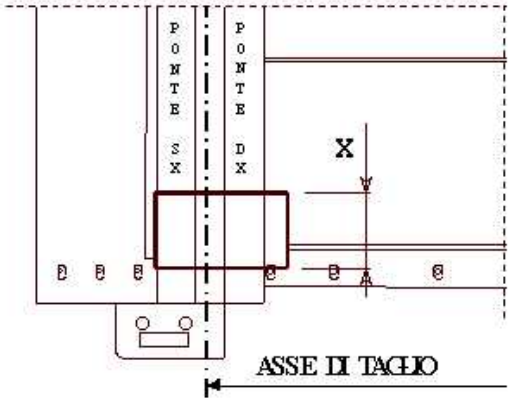
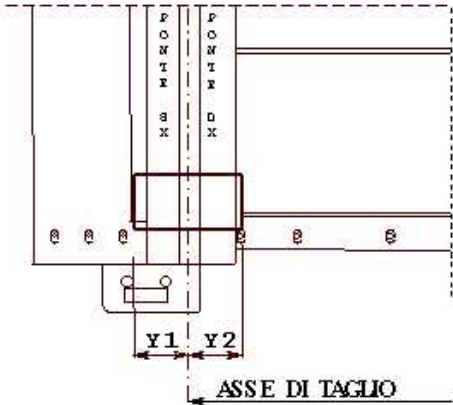
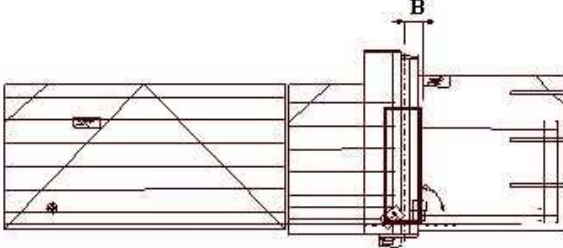
Photocell to position the sheet in proximity to the abutment size.

The electric power circuits for the drivers to control the motors and the safety circuits for the bridge are managed by a P.C. placed on board the machine.

**TECHNICAL SYNTHESIS**

<b>Operator interface</b>	Operator interface by a LCD panel view and a diaphragm keyboard equipped with specific keys for every function available, or by a connection with a program loaded on a P.C. to manage the working sequences.
<b>Data inputs</b>	Operator interface by a LCD panel view and a diaphragm keyboard equipped with specific keys for every function available, or by a connection with a program loaded on a P.C. to manage the working sequences.
<b>Arms tilting</b>	Pneumatic by means of 1 cylinder
<b>Air cushion device</b>	Air cushion device to sustain the glass sheet pneumatically.
<b>Working Table surface</b>	Working tabletop covered with woollen felt, accurate flatness and without any obstacles on the sheet movement area.
<b>Sheet squaring</b>	Automatic performed against the mechanical reference lugs
<b>Cutting</b>	Cutting head carriage made of aluminium light alloy motorised by a pulley-toothed belt transmission. Cutting head with automatic lubrication for the scoring wheel, cutting pressure setting, performed by a pressure regulator placed on the control console side.
<b>Lower breaking</b>	Breaking head with automatic pressure setting performed by a pressure regulator, according to the glass thickness.
<b>Upper breaking</b>	Upper breaking cycle given by simultaneous movements of the left lower and upper bridges. PATENTED BY BOTTERO .
<b>Heating</b>	Infra-red rays HP resistance that approaches the glass by a pinion-rack transmission system and heats the PVB layer for some seconds (according to the thickness). Such type of resistance has the property to heat the PVB without overheating the glass.
<b>Separation</b>	Clamping system performed by bridges and a rotation shaft, so called detachment, which permits the sheet traction and separates the PVB layer already melted. PATENTED BY BOTTERO.
<b>Glass type detection</b>	The system is electronically controlled and settled to obtain cutting-breaking and separation ideal phases for every glass and PVB thickness type. PATENTED BY BOTTERO

**PERFORMANCES**

<p><b>Max. cutting length</b></p> <p><b>X=4600 mm</b></p> <p><b>Min. cutting length</b></p> <p><b>X=150 mm</b></p>	
<p><b>Minimum breaking</b></p> <p><b>Y 1 = 160 mm</b></p> <p><b>Y 2 = 125 mm</b></p>	
<p><b>Minimum abutment</b></p> <p><b>L=150 mm</b></p> <p><b>Maximum abutment</b></p> <p><b>L=3210 mm</b></p>	

<b>Maximum sheet to process</b>	Sheet 6100 x 3300 mm	
<b>Air cushion power</b>	Minimum 200 mm water column.	
<b>Thickness range to process</b>	Monolithic: 3 - 10 mm Laminated: 3 + 0.38 + 3 (33-1) minimum 8 + 4.56 + 8 (88-12) maximum	
<b>Maximum sheet to process with a Jumbo-tilting table combined.</b>	Sheet 6000 x 3210 mm	
<b>Maximum carriages speed</b>	100 m/min	
<b>Arms tilting time (rising + lowering)</b>	30 s	
<b>Cycle times for L=3400 mm (cutting, breaking, separation)</b>	Times in seconds (environmental temperature equal to 18° Centigrade)	
GLASS	P.V.B.	STANDARD
3+3	0,38	25
4+4 / 3+5	0,38	26
5+5	0,38	27
6+6	0,38	28
3+3	0,76	32
4+4	0,76	33
5+5	0,76	34
6+6	0,76	35
3+3	1,52	41
4+4	1,52	43
5+5 / 4+6	1,52	45
6+6	1,52	47
8+8	4,56	130

**CUTTING PRECISION**

<b>Max. cutting tolerance</b>	+/- 0,5 mm
<b>Max. straightness tolerance</b>	0,5 mm
<b>Max. parallelism tolerance</b>	1 mm

It is understood that the tolerance has been checked on 2-mm thick glass.

**SAFETY EQUIPMENT**

<b>Electromechanical safety</b>	Hardware circuits done by means of using special safety modules
<b>Control of the moving units.</b>	Electromechanical hardware locking brake (guaranteed by a mechanical limit switch intervention)

**INSTALLATION AND USE CONDITIONS**

<b>Overall dimensions</b>	5820 X 12200 mm
<b>Weight</b>	8800 Kg
<b>Working table height</b>	Adjustable from 900 up to 940 mm
<b>Installed Power</b>	36 KVA
<b>Compressed air max. consumption</b>	500 NL/Min
<b>Storage, temperature and humidity tolerances</b>	From - 25 °C up to + 75 °C, reference pressure 1 Bar 90% relative humidity at 20 °C (without condensation) 50% relative humidity at 40 °C (without condensation)
<b>Working, temperature and humidity</b>	From 5 °C up to 40 °C, reference pressure 1 Bar 90% relative humidity at 20 °C (without condensation) 50% relative humidity at 40 °C (without condensation)
<b>Powers Supplied</b>	Voltage: 400 V (+/- 10%), Frequency 50 Hz Compressed air: Minimum pressure 7 Bar Dew point < 5 °

**DESIGN AND PRODUCTION STANDARDS**

	<b>Standards Adopted</b>
<p>The machine has been designed, produced and installed according to the Safety regulations in force.</p> <p>Great importance has been given to the following aspects:</p> <p>Easy use. Ergonomics working place. Easy access to the parts subject to maintenance. Machine and its components reliability. Noise limits maintained in the allowed tolerances. Energy saving.</p>	<p><b>IEC 204/1, CELENEC EN 60204-1, CEI 44- 5, Low Voltage Norms 73/23/CEE, Norm 93/68/CEE.</b></p> <p><b>The following versions are provided for:</b></p> <p><b>Equipment corresponding to the European Standards, C.E. sealed</b></p> <p><b>Equipment corresponding to the American Standards, UL - CSA sealed (OPTIONAL)</b></p>

**OPTIONAL AVAILABLE**

<b>Diagonal score positioning laser</b>	Reference system to perform diagonal scores.
<b>Blade</b>	Blade cutter to separate the PVB, improving a lot the cycle time on heavy thickness. The maximum length admitted to cut with the blade is 3210 mm