

220N

FLAT DOUBLE EDGER “TITAN 220N” MODEL

STRUCTURE, OPERATION AND TECHNICAL DESCRIPTION

The machine comprises of quite a large electro-welded steel base (over 2 meters). The fixed shoulder and the group of round steel guides for the movement of the mobile shoulder rest on this base. The opening and closing system comprises of a pair of pinions that are engaged with precision racks which face downwards (both heat treated to ensure a high superficial hardness). The lubricating system the double edger is equipped with is completely automatic and is managed by the program which controls the machine. Drippers enable the right quantity of oil to be sent out, thus avoiding undesired excesses. The shoulder slide (bronze, anti-friction material) has some grooves which allow the lubricating oil to arrive in each point of the sliding surfaces. The wideness of the structure and the distance of the guides and the pinions ensures a high positioning precision of the mobile shoulder even after exacerbated use and many years of operation.

The shoulder opening encoder has been positioned in an intermediate stage of the reduction gear using the remaining speed reduction ratio to increase reading precision. The central part of the base is used for the elimination of the machine's waste water, which is directed to an end of the base, in an area which is more easily accessible for the removal and the cleaning of the decantation tank. All parts of the base that can come into contact with water are in stainless steel.

The spindles used are equipped with three different types of water seals.

The wheel box (stainless steel) is wide, for an easy access, and the door is in stainless steel to ensure conformity to accident prevention laws. Tool substitution takes place through a special programme command, which determines the lifting of the pressure pads (150 mm) and the opening of the mobile shoulder (up to a minimum of one meter). The wheel is fixed to the flange via a single central screw.

The polishing wheels driving system comprises of membrane pneumatic cylinders (with very little friction in movement) and their work pressure adjusters that correspond to the relevant polishing wheels. The blocking brake is also pneumatic. Also, each spindle has a mechanical security stop to avoid that, in the event of the breaking of a glass, the wheel should reach the belt thus damaging it and damaging itself.

The transport of the glass is through lower motorised belts that are synchronised via a circular section steel rod of sizeable diameter (50 mm), chemically nickel-plated to avoid corrosion phenomena. These belts are made in polyurethane with internal steel cables (closed link) and are rectified on the edges and the sides, ensuring the perfectly straight movement of the glass inside the double edger. The track beams are especially long in the entry area to enable an easier centring cycle (especially for larger sized glass). The upper V belts are idle and pulled by the ones underneath in an totally synchronous movement. The

presence of springs ensures the right pressure of the upper belts on the glass (according to the thickness).

At one end of the transmission rod there is a ratiomotor that transmits the movement to the draft belts. The advancement of the glass, checked by an inverter, is adjusted via a potentiometer on the control panel.

On the fixed side of the double edger there is an adjustable support guide for the introduction of the glass to be machined. This guide is adjustable according to the desired removal of the material.

Speed is adjustable from 0,6 to 6 m/min. (or, alternatively, at the customer's discretion, from 1.0 to 10 m/min.)

Machine axes: the mobile shoulder has been dealt with previously (see base). The thread group is particularly sturdy and it moves through a particularly large guide and a pair of screws and nut screws. The pressure pads move on round guides with a large diameter (85 mm) to ensure precision of movement in time and the sturdiness of the system. The position of the axes is picked up through encoders.

The amperometers for the reading of the current absorbed by the working motors have been placed near the corresponding spindles, to ease their reading by the operator who is engaged in wheel regulation (with a graduated handwheel for the diamond wheels or pressure regulating for the polishing wheels). The control panel, which includes the 13" liquid crystal display and the keyboard, is placed on the electric panel in a position adjacent to the entry of the glass and can be positioned to the operator's convenience. The electric panels have been created in console version, so that from the entry of the first double edger it is possible to keep under control the entire group of machines.

ELECTRONIC MANAGEMENT OF THE DOUBLE EDGER

A normal office personal computer was used which "dialogues" with a PLC. All elements inside the electric panel (PLC, inverters, electro-mechanical components) have been provided by a primary importance producer with offices and services all over the world. An encoder, connected to a dedicated electronic card, counts the passage of the glass from its entrance into the machine until it is close to the first polishing wheel; at this point electronics send various signals to the electro-pneumatic system which releases each polishing tool as the glass passes on it. The electronic system thus allows the automatic wear recovery of the wheels.

The machine is managed in its main operations by a computer and a PLC connected to it. A liquid crystal colour monitor (13") and a keyboard make the introduction of the machining data (size and thickness of the glass to be edged) and the memorizing of the production data very simple. The program allows for the display at any time of a great quantity of data relative to production (metres of glass machined by each tool, quantity of edged glass, position of the axes, etc.), as well as the actual position of the glass inside the double edger.

CORNER DUBBING DEVICE (not standard)

The machine can be equipped with a special corner dubbing system, comprising of two peripheral wheels (one for each side) that machine the four corners of the glass. The maximum speed at which this device can be used is of 8 m/min., but it must be decreased for thickness lower than 4 mm or for particularly small glass sizes.

TANKS AND PUMP (not standard)

The double-edger can be equipped, upon request, with a pair of tanks and an immersion pump that can ensure a water supply of 800 lt./min. The tanks, in stainless steel, have a capacity of 500 lt. and 1500 lt. and they are at one end and at the side of the base, in a convenient position for cleaning operations.

90° TRANSFERER (not standard)

In the event of wanting to make up a system of two double edgers in sequence, a 90° transferer can be provided, to remove the glass from the first machine and take it into the second one. The transferer is made up of two work surfaces:

upper: formed by a pair of arms that support the belts which accompany the glass. Of the two arms is fixed, whereas the other one is connected to the mobile shoulder of the double-edger (which guides it, thus adapting its position to the size of the glass). When the glass reaches a particular position, the arms open enabling the "fall" of the glass onto the lower surface.

lower: formed by a series of belts which insert the glass in the second double-edger. Naturally the advancing speed is synchronised to that of the belts of the machine that follows.

The same type of transferer can be used at the exit from the second machine in a group to re-direct the glass to a possible washer.

INCREASED SPINDLE SPEED (not standard)

It consists in an inverter connected to the diamond edge spindles to increase the rotation speed of the wheels. In certain conditions this allows the possibility of increasing the advancement speed of the glass in production.

PRE-SETTING FOR AUTOMATIC LOAD (not standard)

A special device, at the entry of the machine and made up of two series of wheels, one of which moved by a pneumatic cylinder, allows for the glass to be received directly from an automatic loader and introduce them in the double edger without operator intervention. A photocell detects the arrival of the glass thus starting a cycle which aligns the edge of the glass for the machining.

AUTOMATIC SYSTEM FOR THE RECOVERY OF THE WEAR OF DIAMOND TOOLS FOR THE EDGE (not standard)

The spindle slides of the flat edge are controlled in their glass approach movement by step-by-step motors which, controlled by the machine's software, recover the correct machining position. The zeroing cycle of the wheels is thus rendered especially fast and efficient regardless of the operator's skill.

GENERAL TECHNICAL SPECIFICATIONS

Min. glass size	160 x 160 mm
Max. glass size	1600, 2000, 2600, 3000, 3600, 4000mm
Glass thickness	3 – 30 mm
Polishing degree	Optimun shine
Wheel no (20 per cup)	3 + 3 diamond for edge (φ150 mm) 1 + 1 diam. upper thread (φ130 mm) 1 + 1 diam. lower thread (φ130 mm) 1 + 1 polish upper thread (φ130 mm) 1 + 1 polish lower thread (φ130 mm) 3 + 3 polishing for edge (φ150 mm)
corner dub.	1 + 1 tangential wheels (optional)
Edging outline	Flat edge and threads
Installed power	56 KVA (45 KW)
Absorbed current	81 A (35 mm ² wire)
Compressed air consumption	300 NI/min.
Operation pressure	Minimum 7 bar
Work surface height	950 +/-50 mm
Overall size	Refer to Bottero lay-out
Total weight	6090 kg (run 4000 mm) variations of 300 kg for each meter of opening
Advancement speed	0,6 – 6 m/min. (1-10 m/min. optional)

ATTENTION: the technical specification presented above refers exclusively to a single double-edger. In the event of a line comprising of two double-edgers and an intermediate transferer the minimum sizes vary as follows:

If the transfer supplied is STANDARD (maximum load of 300 kg) the minimum size is 200 x 200 mm.

If the transfer is supplied with "additional equipment for weights over 300 kg (max. 700 kg)" the minimum size is 350 x 350 mm.

ATTENTION: if the double-edger, even when single, is equipped with the special "soft" upper belts, which are more suitable for machining coated sheets of glass, the minimum size is 250 x 250 mm. There is absolutely no guarantee that it will be possible to grind all type of low-e glass, therefore grinding tests must be carried out before the machine is supplied.

ATTENTION: if the double-edger is supplied with the "automatic movement of supports for large sheets of glass" option IN ALL CASES the minimum size glass that can be machined must be increased by 100 mm for one support and 150 mm for two automatic supports.

WORKING CONDITIONS

Environmental temperature	storage -25°C to + 70°C running +5°C to +40°C
Humidity (running and storage)	90% at 20°C, 50% at 40°C
Waterproof equipment on control panel	IP65
Power supply	it is admitted only a max. 10% variation from the value set in order confirmation.
Insulation	1500V input/output and logic to earth

ADOPTED STANDARDS

Bottero double edgers are in line with the following regulations: IEC 204/I, CENELEC EN 60204-1, CEI 44-5

They are also in line with the prEN 13035-10 "MACHINES AND EQUIPMENT FOR THE MANUFACTURING, THE TREATMENT AND THE MACHINING OF FLAT GLASS – SAFETY NORMS – PART 10: EDGING AND POLISHING MACHINES".