

AQUA

# LOW-MEDIUM SPEED BOTTLE WASHER



*Performance  
through  
Understanding*

 **Sidel**

# BOTTLEWASHER AQUA



**The Aqua bottle washer has been designed for low-medium speed production (from 7,000 bph up to 30,000 bph 500 ml bottles) and particularly for those clients who are better informed and more demanding from the technological point of view.**

In the effort of reducing the environmental impact of waste from industrial production, there is an increasingly deeply-felt need to recover empty containers, such as glass or plastic bottles.

The single end design allows the machine to fit in various bottling lines configurations, and the Gebo Cermex Aqua models can be supplied with a vast range of options to optimize use, control and maintenance.

Energy saving has become a key problem in industrial plants and from this point of view the Gebo Cermex Aqua series offer highly competitive performances in terms of reducing water, steam and soda consumptions. The elimination of any possible thermal shock is assured in the prewashing area where differentiated stages can be implemented, so to adapt to countries with more extreme climates.

## WASHING CYCLE THE WASHING CYCLE CONSISTS OF FOUR DISTINCT PHASES.

### Pre-wash

The pre-soaking stage takes place in one or two stages; after leaving the presoaking area, the bottles are overturned and emptied; the dripping water falls onto a collection pan and is filtered before returning into the presoaking area itself.

The presoaking area is maintained at a constant temperature and continuously renewed by hot water coming partly from the first rinsing area and partly from the detergent sprayers tank, without any additional energy consumption. An internal sprayer and an external shower perform a double step heat recovery process to increase bottles and carriers temperature before immersion in the main detergent tank.

### Washing

The washing stage takes place in the main detergent bath where also two label extraction stations are located. The time of immersion and the temperature can be set according to the specific characteristics of the bottles being cleaned.

### Caustic spraying

After the soaking in the hot caustic solution the bottles are turned upside down until they're completely emptied. A final washing stage is then performed by a set of sprayers directing a jet of detergent solution inside the bottle.

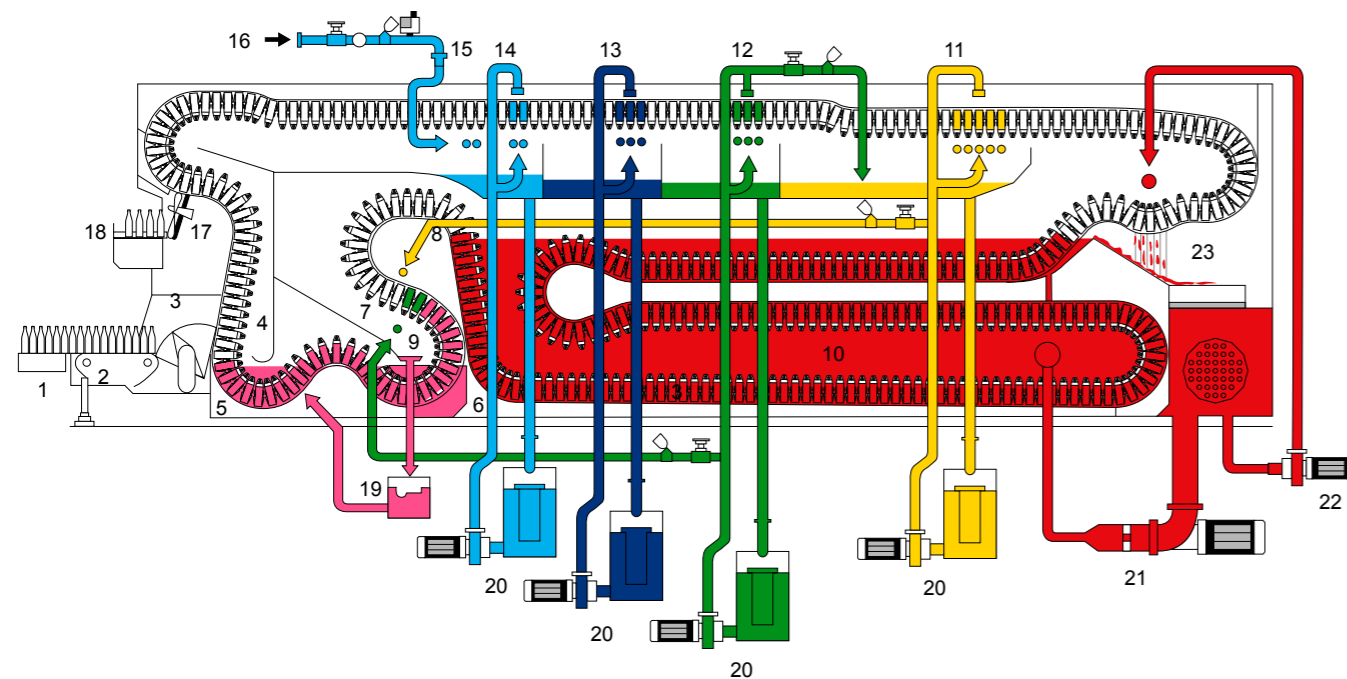
### Rinsing

The rinsing stage is divided into four gradually decreasing temperature zones. The first three ones perform rinsing with internal and external sprays of re-circulated water supplied by centrifugal pumps while the final one with just internal sprays of fresh water. After completion of the rinsing cycle, the rinsing water is conveyed to the presoaking station. Bottles are then properly emptied before being discharged.



# LOADING SYSTEM

## WASHING CYCLE



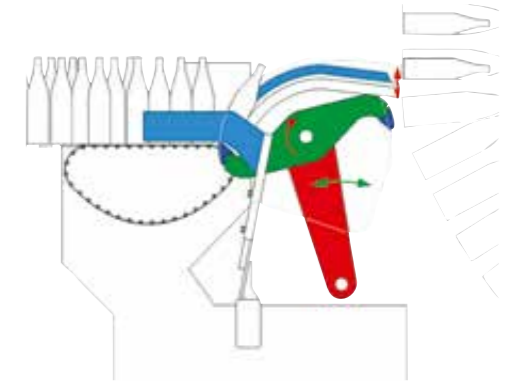
- |                                     |                             |                              |
|-------------------------------------|-----------------------------|------------------------------|
| 01 bottle infeed conveyor           | 09 prewash collection plate | 17 bottle discharge system   |
| 02 bottle accumulation table        | 10 detergent soak           | 18 bottle discharge conveyor |
| 03 bottle loading                   | 11 caustic spraying         | 19 prewash filter            |
| 04 residual liquid collection plate | 12 1st rinse spray          | 20 bag filter                |
| 05 1st prewash stage at 35°C        | 13 2nd rinse spray          | 21 1st label extraction pump |
| 06 2nd prewash stage at 45°C        | 14 3rd rinse spray          | 22 2nd label extraction pump |
| 07 heat recovery sprayer at 65°C    | 15 fresh water spray        | 23 label extraction filter   |
| 08 heat recovery shower at 70°C     | 16 fresh water infeed       |                              |

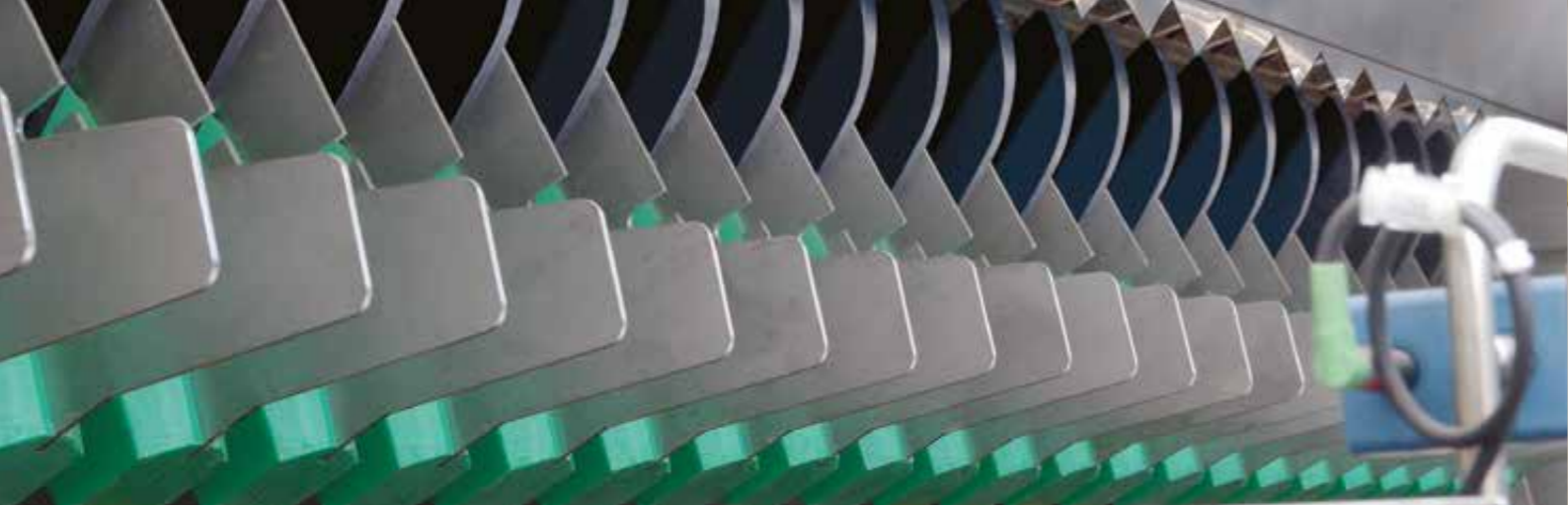
The conveyor belt of the accumulation table conveys the bottles to the automatic loading system, dividing them into separate rows by means of a set of unscrambler devices. The infeed mechanism takes the bottles from the loading table and moves them over a plastic chute in nearly horizontal position, into the pockets of the bottle carriers. The mechanism consists of pairs of fingers mounted on a rotating and swinging shaft.

During bottle transfer from the chutes into the pockets, the chutes move synchronized with the bottle carriers. The infeed mechanism is able to handle a big range of different bottle sizes without any adjustment. Only the guiding plates on the loading table have to be changed if the bottle diameters differ too much.

If movement is hindered by obstacles, a pneumatic safety device is activated, stopping the machine. When the safety devices, positioned both on the rotating and on the swinging shafts, are activated, the air feeding the cylinders is evacuated and the operator can reset the fingers in production position or in opposite direction in order to remove crashed bottles.

The switch-off force can be adjusted by setting the air pressure on a control valve. Fingers are made of treated steel with wear and protection caps are made of special plastic material. The caps can be easily changed by snapping them off and on.

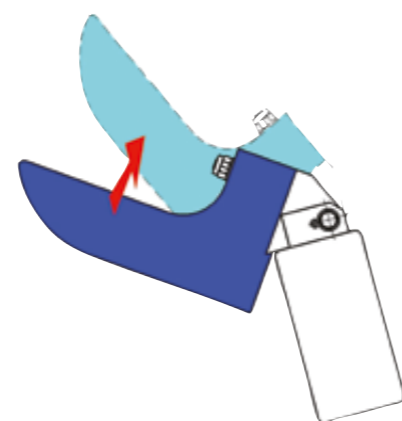




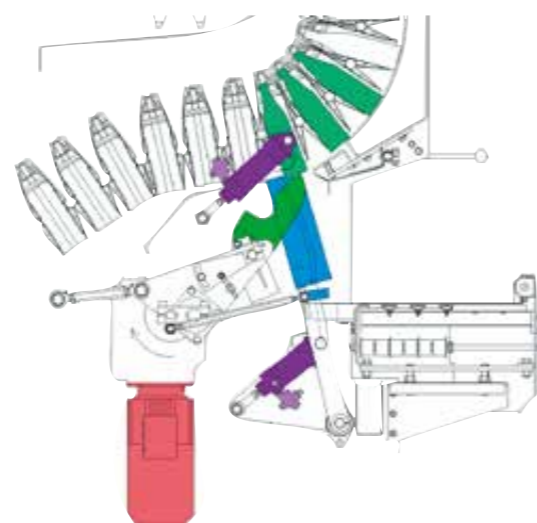
## UNLOADING SYSTEM

The bottle washer has an unloading system enabling bottles to be transferred from the machine to the bottling line conveyors.

The bottles entering the discharge area are supported by a sliding plate in a nearly upright position. When they leave the front edge of the sliding plate, discharge fingers move underneath their bottoms and lift them a few millimeters in the carrier pockets. The fingers then move down and lower the bottles along chutes onto a plastic supporting plate. The transfer from bottle pockets to the fingers is thus realized in a smooth and quiet way, without any sudden falling. From this position the bottles are pushed by the lower part of the divided chute in upright position on the plastic plate and then, at the next unloading cycle, by the following bottle upon the conveyor belt.



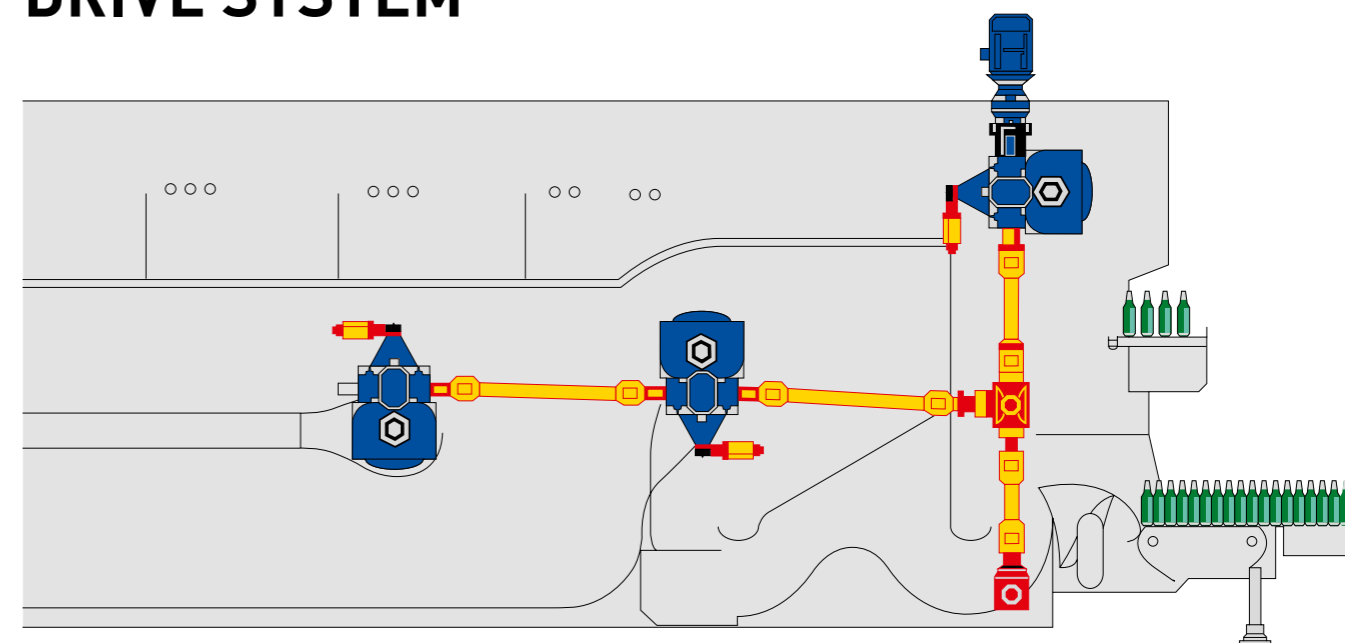
During this final part of the unloading process, the bottles are guided within the prismatic channels of the chutes and so are always properly centered.



In this way a big range of different bottles can be handled reliably without any adjustment or change of the guiding parts. For good access and maintenance all pivots and bearings are located outside the side walls. There are safety devices for the upper and the lower section of the chutes, with adjustable switch-off force to prevent excessive stresses on the mechanism.

Moreover, each single finger can pivot upward, thus allowing to give way in case of obstacles in the path of the fingers themselves. In order to prevent bottles contamination from water dripping, a drip collecting plate is provided. This tray can be easily cleaned by operating a hand lever that permits its releasing and swinging down.

## DRIVE SYSTEM

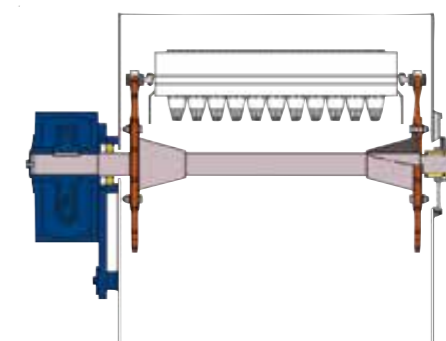


The main shafts with sprockets which move the bottle carrier chain are equipped with epicycloidal gear boxes that are connected with cardan shafts.

A central motor reducer with brake moves the carrier beams chain: a mechanical safety device and a thermal sensor protect the gearmotor against faults and overloading.

The speed control is achieved by continuous speed variation according to line requirements, as well as setting acceleration ramps for starting and deceleration ramps for stopping. All gearboxes can be supplied with a mechanical or electronic safety device to protect them against possible overloading.

All connections among infeed, discharge and main motorization are realized through cardan shafts and rubber belts.



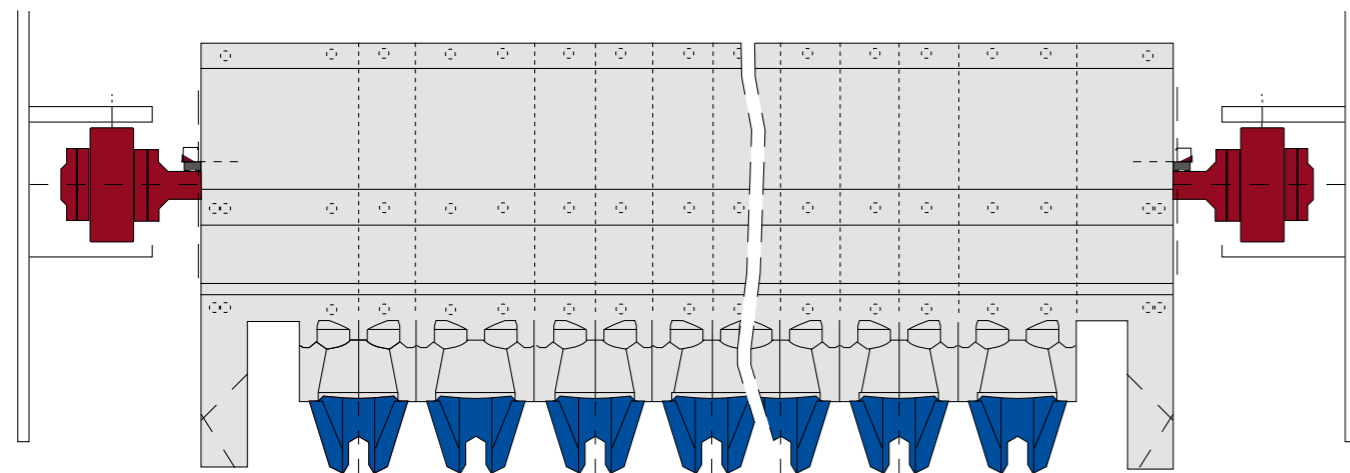
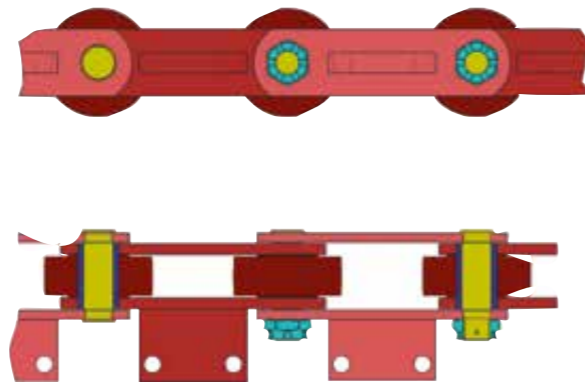
# BOTTLE TRANSPORT

As the bottles are conveyed inside the machine, they are housed in mild steel pockets specifically designed to facilitate label removal and enable perfectly centered spraying on the bottle neck. The nose of the pocket is in a type of plastic that resists prolonged contact with caustic solutions at temperatures of up to 85°C. The nose of the pocket is fitted to the beam by pressure only, without any screws or bolts – a restraint tooth secures the nose to the beam.

Steel pockets with special profiles are spot-welded into carrier frames, thus obtaining high bending and torsion resistance.

The carrier-beam is secured at its end to the conveying chain, by screws and anti-unscrewing plates.

The main chain is constructed using high resistance steels of high surface hardness. The chain guides are in carbon steel and are equipped with removable elements in the areas most subject to wear.



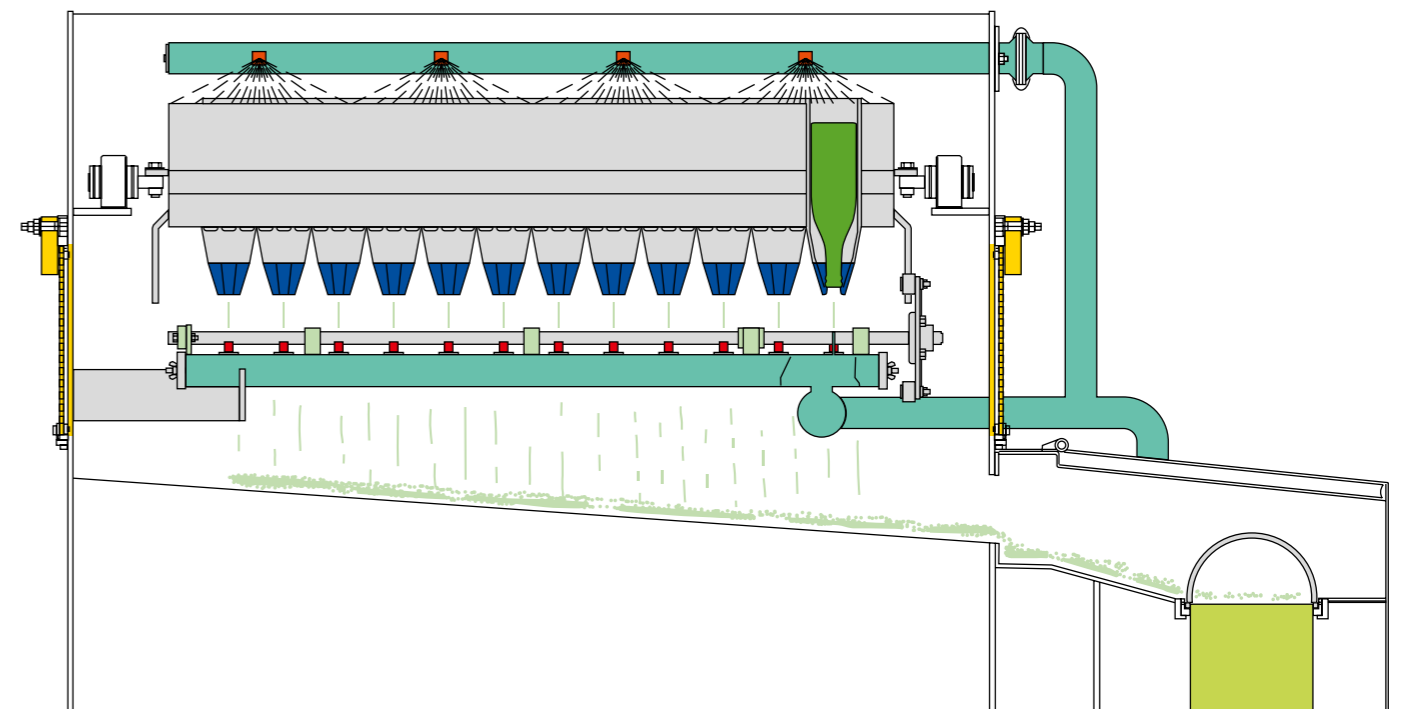
# SPRAYING SYSTEM

**With the exception of the freshwater one, each jetting zone consists of a pump, internal jetting pipes, external spray pipes, filter and tank.**

The rotary type sprayers are driven synchronously by the carrier beams by means of a plate mounted the carrier beams themselves. At a certain distance from the nozzles to the mouth of the bottles the jet stream hits exactly into the bottles and follows their continuous movement due to the rotation effect. Since the shaft is driven by the bottle carriers themselves, a proper centering is always ensured.

Due to the continuous rotation the flow in the nozzle reverses. In this way, the dirt that may eventually obstruct the entrance of the nozzles is blown out during the next cycle. The jet is switched off when the nozzle is not in contact with the hole in the sealing bush. This means that bottles are treated only internally.

Manual bag shaped filters are provided before each jetting pump. The filtering capability can be modified according to the dimensions of the dirt particles by realizing the bag with net of different mesh sizes, i.e. bigger size for the prewash area and smaller size for the rinsing area.





## LABEL EXTRACTION

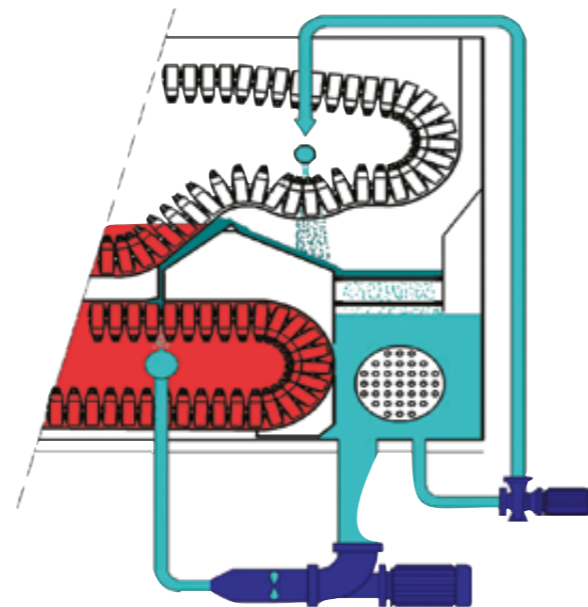
The main caustic tank is provided with a label removal system.

A high-capacity propeller pump generates a caustic flow within the tank. The flow streams through the spraying pipes on to the bottle carrier, flushing the labels away from the bottles. Label extraction takes place in 2 stages: the first while the bottle is still immersed, the second when the bottle leaves the bath at the end of the detergent stage. The water is circulated by a low head pump and directed against the body of the bottle by appropriately positioned nozzles.

The caustic solution with labels is then conveyed through a sieve-belt filter where the labels are extracted and removed. The sieve belts are running perpendicular to the machine in the back side of it.

In this way labels are discharged in only one point (either on the left or on the right side of the machine) and into one label press, if required.

The axial pump with horizontal shaft takes the water already filtered from the caustic area between the label extractor and the tank. In this place no labels are in the caustic.



## ELECTRICS AND OPERATOR INTERFACE

**The machine is designed according to the European norms.**

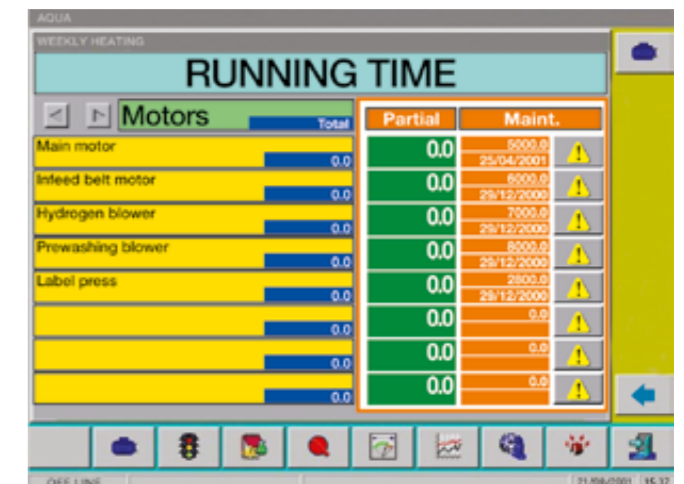
The machine is designed according to the European norms. A control cabinet erected on board on one side of the machine contains main power connection, distribution, safety devices, motor-actuators, frequency controls, and DC-current supply. For control purposes, a field bus connection is provided.

The main operators panel is situated at the infeed side of the machine.

It is a PC-based operator interface that permits to visualize all process parameters and failures information. The main advantages of this solution are:

- A friendly operator interface
- A data acquisition system integrated in the interface.

The possibility of remote correction for diagnostics or updating purposes.



Sidel is a leading provider of equipment and services solutions for packaging beverage, food, home and personal care products in PET, can, glass and other materials.

With over 40,000 machines installed in more than 190 countries, we have nearly 170 years of proven experience, with a strong focus on the factory of tomorrow with advanced systems, line engineering and innovation. Our 5,500+ employees worldwide are passionate about providing solutions that fulfil customer needs and boost the **performance** of their lines, products and businesses.

Delivering this level of performance requires that we stay flexible. We continuously ensure we **understand** our customers' changing challenges and commit to meeting their unique performance and sustainability goals. We do this through dialogue and by understanding the needs of their markets, production and value chains. In turn, we apply our solid technical knowledge and smart data analytics to ensure lifetime productivity reaches its full potential.

We call it **Performance through Understanding**.

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