

AICROV

SMART FILLING

PRODUCT CATALOGUE

**AICROV FILLING
MACHINE
MODEL : LSG**



aicrov.com

Semi-automatic machine from the "Plug & Fill" Series for filling weight filling of containers from 1 to 60 litres.

Main features:

- Quick configuration and start-up.
- Easy to use.
- High reliability and durability of the equipment.
- Adjustable packaging height.
- Integrated control system.
- Does not require installation.
- ATEX certification (optional).
- Food grade (optional).



LSG - OPERATION MODE

Steps for its implementation:

1. Enter the values for the filling adjustment: net nominal value for each container in kg, and the cut-off point where the gross fill becomes fine fill.
2. Adjust the height of the filling arm.
3. Place the empty containers and align the bunghole with the nozzle.
4. Press the "fill" button. The nozzle will go down, fill and return to its position.
5. Remove the full container and place an empty one.



LSG - FILLING FUNCTION

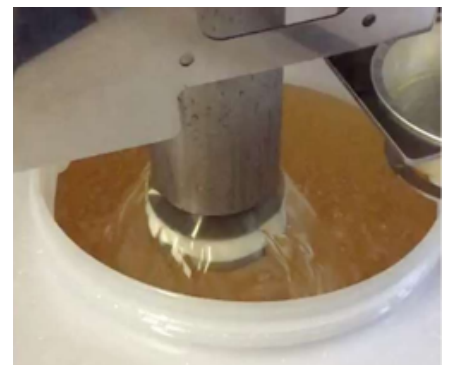
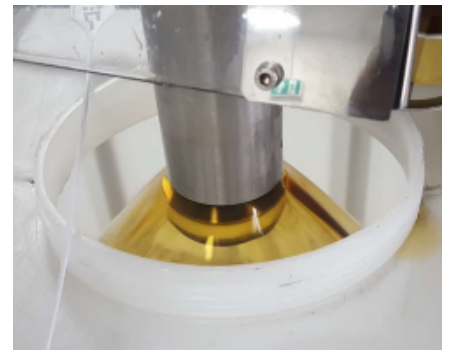
Filling is the main function of this type of equipment and, therefore, all AiCROV machines use the **AicrovFill®** filling function, developed and tested over 22 years.

The goal: to fill the containers with your product in the shortest possible time and with the highest precision.

The filling time & filling accuracy ratio is adjustable.

Each product / company is unique, so that each machine is configured according to customer's needs.

Filling is done at two speeds, gross filling for about 95% of the container and fine filling for the rest.



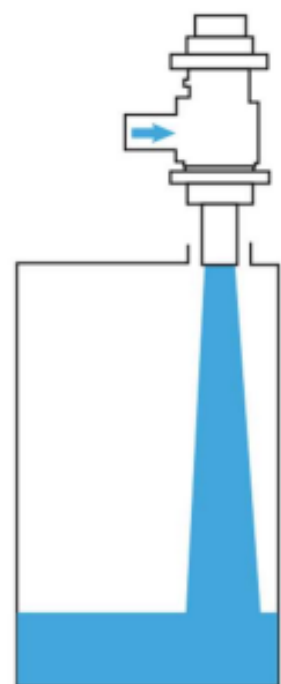
UNDER BUNGHOLE FILLING MODE

In AiCROV machines, filling assembly is the electro mechanical assembly that allows the vertical displacement of the nozzle.

The movement is electric by means of a gear motor and a belt.

This type of under bughole filling mode is suitable for filling products that are non-foaming, non-flammable, non-explosive, with high density or viscosity, etc.

The nozzle descends until it is slightly inserted into the container and fills from that position.

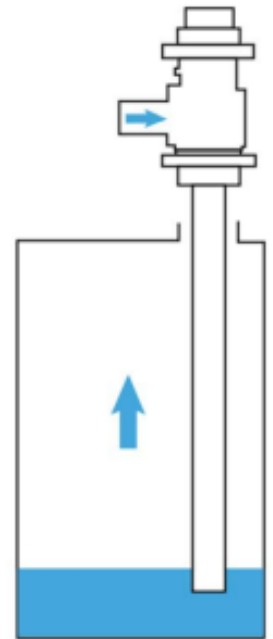


IMMERSION FILLING MODE

Suitable for filling foaming, flammable and explosive products.

With the immersion filling mode, 3 different types of operation can be used:

1. **Under bunghole:** The nozzle works as if the filling was done under the bunghole (see under bunghole mode). It can be used as under bunghole nozzle.
2. **From the bottom of the container:** The nozzle descends to its lowest position and performs all the filling from that position. Suitable for extremely foamy products.
3. **Rising up with the product:** The dispenser raises as the container fills.



IMMERSION FILLING OPTIONS



- **With position control:** In applications where the position between product outlet and product level in the container is critical, we can find the automatic position control. The distance between the dispenser is set in the recipe (positive: above the product; or negative: inside the product) and during filling the dispenser automatically adjusts to that position.
- **Without position control:** By pressing the filling button, the dispenser descends to the lower detector (adjustable) and opens. While filling, it rises at an adjustable speed (potentiometer on the control panel) to the safety detector, a position where the dispenser remains until the filling is complete.

FINE FILLING MODE

AiCROV machines have three different ways of fine-tuning the filling of the container (fine-tuning meaning the moments before the end of the filling, in which we must reduce the flow to be able to adjust the final weight to the objective).

1. Fine-tuning in machine: The dispenser can switch from gross low to fine when necessary. The fine flow level is mechanically adjustable.

2. Proportional fine-tuning: The substitution of an actuator for the opening of the 3-position dispenser (closed – gross – fine) by a proportional actuator, allows the link of the opening level during refining with the filling parameters. Its adjustment is done from the operation panel and not mechanically. Suitable for products of different viscosity.



BASIC FUNCTIONS (1)

Shock control: When the operator presses “fill”, the dispenser descends until it is inserted into the container. If during the descent the scale detects an increase in weight (adjustable on the operation panel) the dispenser returns to its upper position and awaits the operator to press the button again.

Final weight and filling up: When the scale indicates that the nominal net weight value has been reached, the dispenser automatically closes. At this moment and for a period of time (adjustable on the operation panel), a filling quality control is carried out. In case the net weight value is below the nominal value, the dispenser will open again until the nominal value is reached. This operation can be repeated as many times as necessary.

Anti-drip: The machine has a draining function to facilitate the emptying operation of the line and the dispenser when finalizing a batch. In the operational panel, time and maximum weight allowed can be adjusted. When the operator presses “fill” with this function running, the dispenser lowers and opens for the established time or until the set weight is reached. (See FLUSHING accessory).

Filling flow monitoring: During filling, the machine is calculating the flow value in kilograms per second and compares it with a theoretical flow value. If the during filling, flow value decreases approaching the value 0 for a while, the machine stops the filling with an alarm and notifies the operator.

Tare control: When a pallet is inserted into the weighing conveyor (an action that is carried out automatically), the system compares the gross weight of the pallet with the theoretical weight. If the difference in weight is greater than the safety margin (adjustable on the operation panel), the machine warns the operator and waits for instructions. This function prevents overfilling in an incorrect container or with product inside.

Final weight control: When every container on the pallet have been filled, the machine performs a weight comparison to check that the final weight is within the expected tolerances. The machine compares the current gross weight of the pallet (with filled containers) with the result of the operation of multiplying the number of containers on the pallet by its nominal value and adding the initial tare. The real - theoretical difference must be less than the established filling tolerance.

WEIGHING SYSTEM

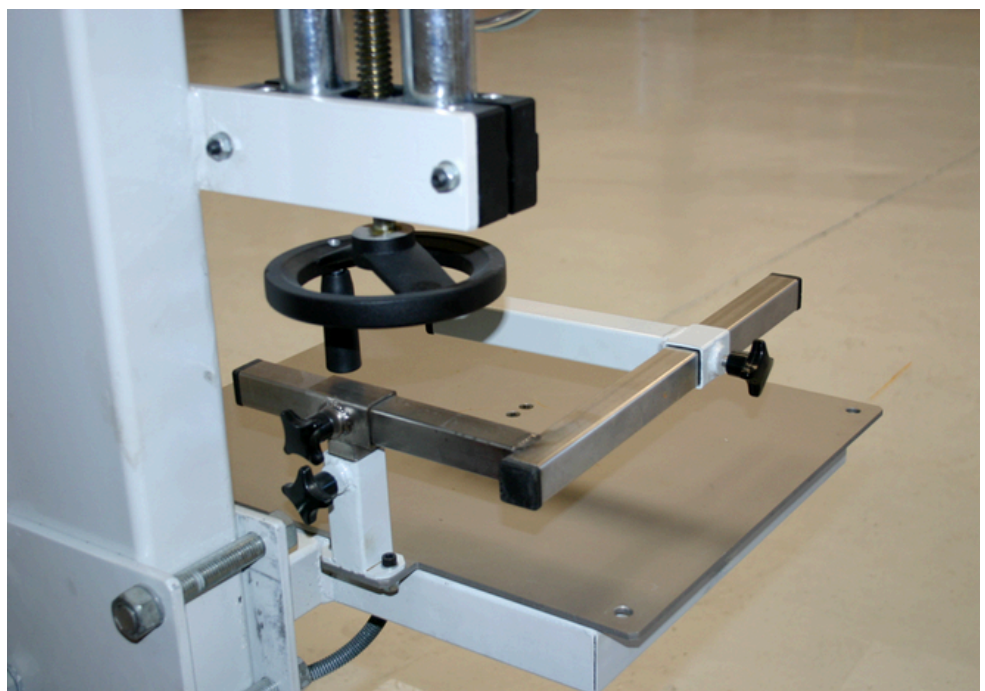
100 kgs weighing platform: Made of stainless steel with a central load cell.

Weighing electronics:

- Top brand weighing electronic integrated in control system.

Homologations:

- CE-M
- EN45501
- OIML R-76
- OIML R-61 (MID)
- OIML R-51 (MID)



LSG – CONTROL CABINETS

LSG machine can have a control cabinet integrated into the machine itself or placed as an independent cabinet.

Integrated: Allows the mobility of the machine when meeting some technical requirements. Time required for installation and start-up is practically non-existent, and can be carried out by the client himself.

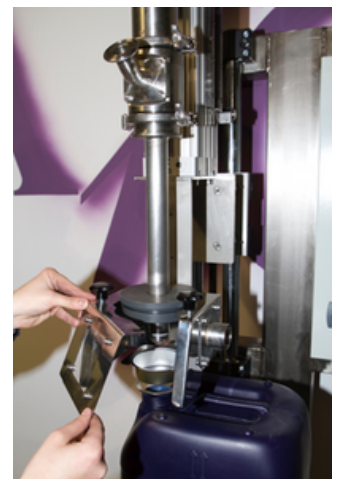
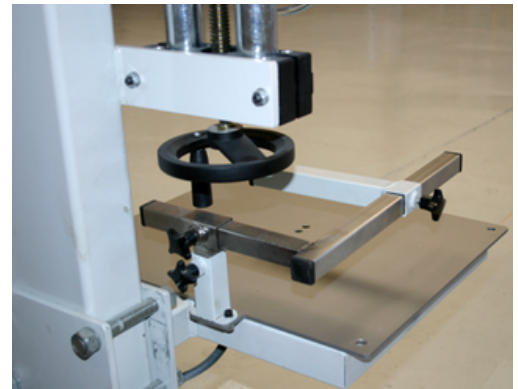
Independent: Can be placed where the client requires it. The position and location of the machine is fixed. Installation must be carried out by specialized technical staff.



MATERIALS AND FINISHES

Materials and finishes of AiCROV's machine are as following:

Materials:	Carbon steel
	Stainless Steel 304 (standard)
	Stainless Steel 316
Surface finishes:	Sandblasted (standard)
	Painted
	Epoxy painted



CONTROL SYSTEM

AiCROV control systems are the following:

CONTROLLERS:	SIEMENS S7-1200 (STANDARD)
	SIEMENS S7-1500
	AB COMPACT LOGIX
HMI:	SIEMENS TÁCTIL 4" COLOR (STANDARD)
	SIEMENS TÁCTIL 9" COLOR
	AB PANEL VIEW 7" COLOR



INERTIZATION WITH NITROGEN

Many products need to be filled in oxygen-free atmospheres, either to prevent oxidation of the product or to prevent possible ignition in explosive or flammable. For these cases, AiCROV has an optional inerting system that allows nitrogen or any other gas to be dosed before, during and at the end of the filling.



Through a dedicated valve, the piping assembly channels the gas to the dispenser and a special double jacket dispenser. Gas flows from the customer connection to the inside of the containers.

Timing of gas flowing can be selected at the HMI.

ZONE CLASSIFICATION

No certification	Machine will not be installed in a classified area nor will it be used to fill explosive or flammable liquid products
Machine with classification ATEX II 3G T4	Machine will be installed in an area classified as 3G or 3GD but will not be used to fill explosive or flammable liquid products
Machine with classification ATEX II 2G T4	Machine will be installed in an area classified as 2G or 2GD and can be used to fill explosive or flammable liquid products



TECHNICAL FEATURES

Nominal production (products similar to water):
120 to 140 25 litre containers per hour.

Weight: 300 kgs.

Scale resolution:

- 3.000 divisions: +/- 20 grams.
- 6.000 divisions: +/- 10 grams.
- 10.000 divisions: +/- 5 grams.

Filling accuracy: Greater than 75 grams.
Adjustable according to precision needs and filling rate.

Power supply: 1 x 220 VAC + N + T
Pneumatics supply: 6 bars



NOZZLES (1)



External opening dispenser

Internal opening dispenser



Special dispenser for the filling of open mouth containers. 3" nominal diameter.

Static closure for the filling of solidifiable or crystallizable products (optional).

Dispenser with double jacket for the contribution of nitrogen (optional).

More than 80 different combinations available depending on the product and container.

NOZZLES (2)



Materials:

- AISI 316L stainless steel (standard).
- Hasteloy.
- Titanium.
- PVC
- Teflon.

Temperatures:

- Up to 80° C (standard).
- Up to 210° C (optional).

Input diameters:

- 1"
- 1'5"
- 2'5"
- 3"

Lance diameters: from 15 mm to 80 mm.

Lance length: from 250 mm to 1300 mm.

Product connections:

- Male camlock (standard)
- DIN flange (optional)



NOZZLES CHANGE

AiCROV machines dispensers are interchangeable easily, quickly, safely and without tools.

The operator does not need to manipulate any electrical or pneumatic connection to perform a change of dispenser.



LSG - MAIN MEASUREMENTS

All measurements are in international metric system.
Todas las medidas según sistema métrico internacional.

Approximated weight: 350 kgs.
Peso aproximado: 350 kgs.

	Nombre	Fecha	N° Plano:	Rev.: 00	Fecha:	Din-A3H
	Dibujado					
Comprobado			LSG Filling Machine Llenadora LSG		 AUTOMATIC CONTROL (ING. S.L.)	

La información contenida en este documento se considera confidencial, queda completamente prohibida su duplicación, reproducción y distribución sin el consentimiento previo escrito de AICROV, S.L.

LSG	CC	NS	NE	XT	ENV	ACT	IN	AC	CH	C1	P4	NE
	CL	NN	EL	AM	OT	IND	NI	I4	PI	C2	P9	3G
				AP		OT		I6	PE	C3	PX	2G
	1	2	3	4	5	6	7	8	9	10	11	12

- 1 Filling mode. CC- under bunghole; CL- by immersion.
- 2 Filling station with N2 input. NS - Yes; NN - No.
- 3 Filling equipment type. EL - electrical;
- 4 Type of fine-tuning. AM – Fine-tuning in machine; AP – Proportional fine-tuning; OT- Other.
- 5 Weighing platform type. PTA – Plataform in U; EMP – Embedded plataform; OT - Other.
- 6 Weighing electronics type. ACT - Verifiable; IND – non-verifiable; OT - Other.
- 7 Control cabinet situation. IN - Integrated; NI – Non-integrated
- 8 Machine materials. AC – Carbon steel; I4 - AISI 304 Steel ; I6 – Steel AISI 316; OT - Other.
- 9 Surface finish. CH - Sandblasted; PI – Standard Paint; PE – Epoxy painted; OT - Other.
- 10 Control type: C1 - Siemens S7-1200; C2 - Siemens S7-1500; C3 - Allen Bradley Compact Logic; OT – Other.
- 11 HMI type: P4 - Siemens 4”; P9 - Siemens 9”; PX: Allen Bradley; OT: Other.
- 12 Ex certification. NA – No certification EX; 3G - ATEX II 3G T4 certification; 2G - ATEX II 2G T4 certification

ACCESSORIES

Gas hood extractor.
 Drip collection cup.
 Anti-drip system.
 Filling records management.
 Electrostatic discharge control.
 Product hose holding arm.
 Cleaning system CIP.
 Draining set.
 Proportional filling.
 Product pump control.
 Connection with site.

Filling recipes.
 Nozzle support rack.
 Nozzle number control.
 Overfill detection.
 Integrated extractor in machine.
 Capping and sealing station.
 HMI rotation set.

GAS HOOD

Passive hood located between the nozzle and the bunghole of the container to be filled.
It has a D40 connection to be connected to the extractor (optional).
Made of polished stainless steel.
Includes pointer to facilitate the work of the operator.



The gas hood supports and includes a product scraper and an anti-drip set (optional, several options).

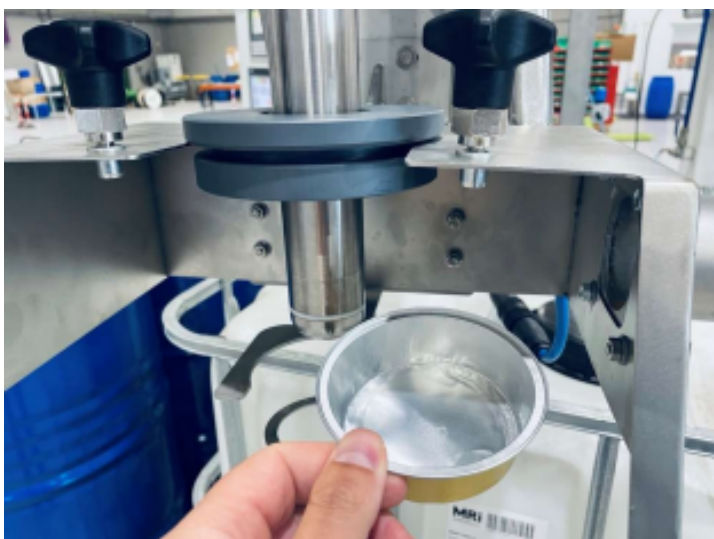
Easily removable front panel without the need for tools, including a transparent polycarbonate peephole.

DRIP COLLECTION CUP

Pneumatically actuated, a disposable aluminium cup is placed under the nozzle while in rest position.

When the nozzle goes down, a pneumatic actuator previously moves the cup to a safety position.

The cup can be removed and emptied by the operator without the need of tools.



The standard cup supplied is a disposable aluminium cap, but optionally and on request, we can manufacture cups in different materials such as AISI 304, stainless Steel, PVC, or others.

Recommended for pasty, crystallizable or solidifiable products.

Suitable for food products.

ANTI-DRIP SYSTEM

Actuated by the nozzle, a spoon collects the drained product from the nozzle and returns it to the container in the next movement of the nozzle.

With this system, is not necessary to change the drip collecting cup, the rest of the product is recovered in the next filled container.



The spoon is made of 304 stainless Steel, but optionally and on request, we can manufacture it in different materials such as PVC or others.

Recommended for non-pasty, non-crystallizable or solidifiable products.
Not suitable for food products.

FILLING RECORDS MANAGEMENT

HMI or operation panel generates a *.csv type data file on an SD memory card placed on the back of the HMI itself. This file can be opened with any word processing program such as Microsoft Excel.



The system saves a line for each filled container. By default, the information is stored as: Date - Time - Container tare(Kg.) - Net dosed (Kg.).

Date	Time	Tare (kg)	Net (kg)
10/10/10	09:50:05	17,5	200,2
10/10/10	09:51:10	17,2	200,1
10/10/10	09:52:00	17,4	200,2
10/10/10	09:53:21	17,6	200,3

ELECTROSTATIC DISCHARGE CONTROL

Electrostatic discharge of metal containers before and during filling is a mandatory requirement for products considered explosive or flammable, or when filling is done in ATEX classified environments.

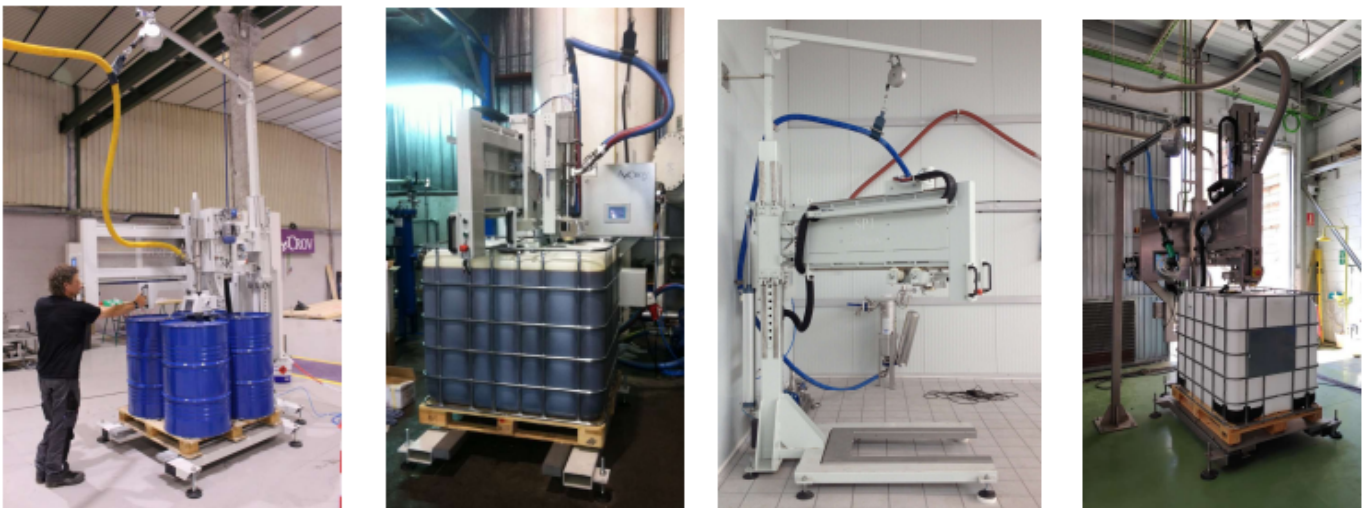


The operator must place a clamp on each container to be filled. The clamp is connected to an electronic system that monitors that the container is grounded, giving the permission to proceed with the filling. The filling valve closes automatically if the system loses the filling permission.

As functional safety, the system checks that the operator removes and reconnects the clamp after each filling.

PRODUCT HOSE HOLDING ARM

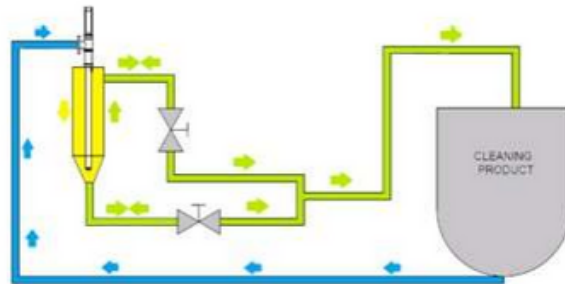
Depending on the position of the product connection to the product hose and its length (Please note that product hose is not supplied with the equipment), it will be necessary to support the weight externally, so that the nozzle does not have to support the weight of the hose with the product, limiting the useful life of the equipment.



CLEANING SYSTEM C.I.P

CIP system is a mechanical assembly that allows the draining and subsequent internal and external cleaning of the nozzle.

The system works with pressure, which is capable of recirculate the cleaning product.



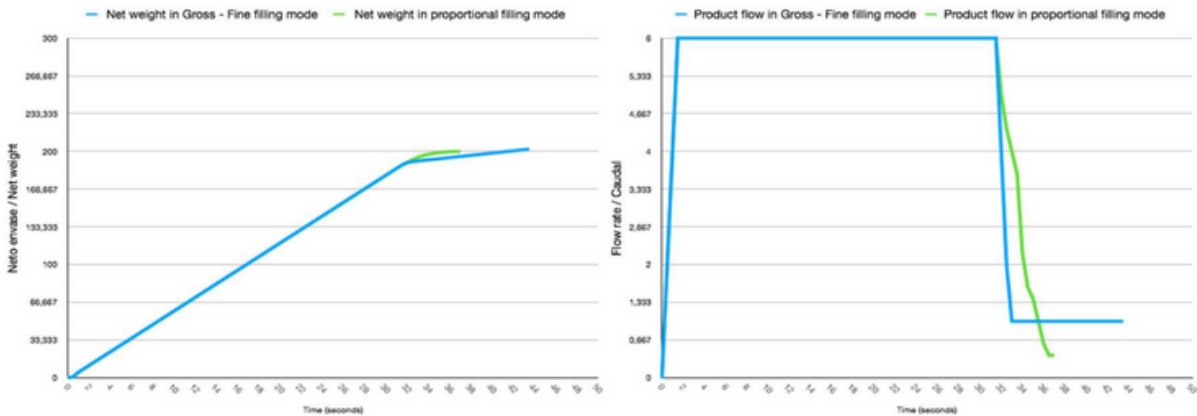
DRAINING SET



The draining set consists of a funnel on which the nozzle is placed. By means of a wringing program, it descends to a known position and opens.

The program ends when the established time for draining has expired.

PROPORTIONAL FILLING



Proportional filling is used to increase the speed of the filling, decreasing the final refining time and increasing the productivity of the machine.

It can be done directly in the nozzle (a recirculation system or reduction of the product flow rate connected to the machine is recommended) or using other external methods such as product pump control, proportional valves, recirculation control, etc.

The aim is to control the product flow in real time according to filling level and speed.

PRODUCT PUMP CONTROL

A control panel for the product pump is included in the equipment supply. This panel includes magneto-thermal protection and a frequency variator to regulate the speed of the pump. Speed adjustment is made directly on the machine’s operating panel.



This accessory can be used in two different ways:

- To turn on or turn off the pump and to switch from gross to fine flow. In this way, overpressures in the dispenser and the piping system are avoided.
- To regulate the flow, together with the “Proportional filling” accessory. In this case, the pump should not be more than 30 linear meters from the machine in order to be effective.

Different options are available for connecting the machine with site:

Option 0: Standard.

Standard on all machines. 3 x potential-free output signals: machine running, alarm, gross filling, fine filling.

Option 1: 4In / 4Out.

4 x potential-free input signals: filling permissive, valves open, free, free. 4 x potential-free output signals: machine running, alarm, gross filling, fine filing.

Option 2: Simple industrial communication.

4 x input signals: filling permissive, paths open, free, free. 4 x output signals: machine running, alarm, gross filling, fine filling. With the “Proportional filling” accessory, the required flow signal is included in ggs per second.

Option 3: Complex industrial communication.

Same as above but with filling parameters communication (nominal value, fine-tuning value).

Option 4: Customized.

During the project definition phase, communication variables are agreed.

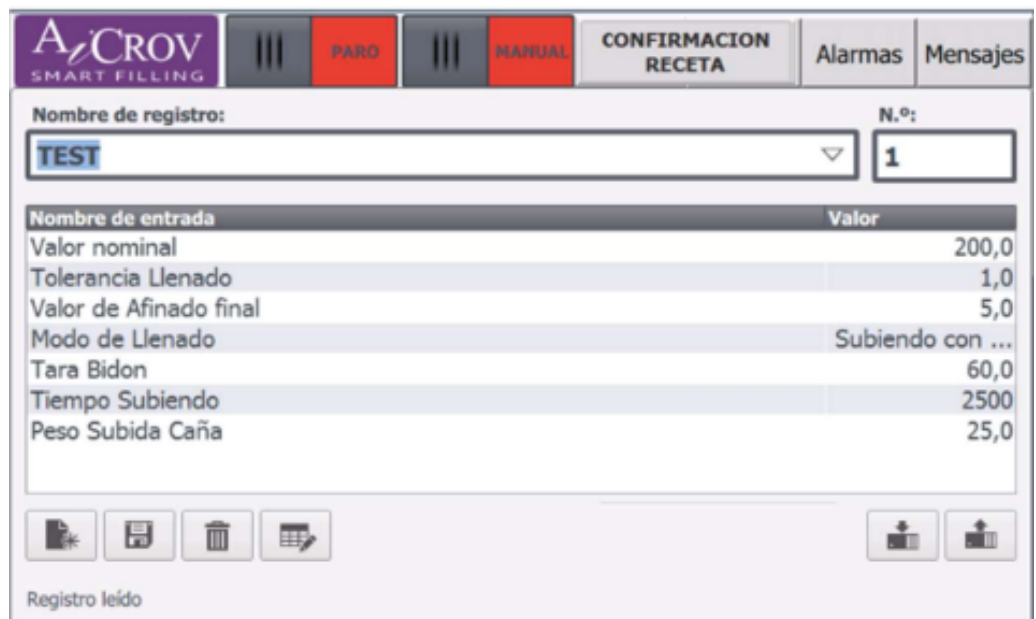
FILLING RECIPES

SP1 filling machine operation is very simple.

1. Working or stopped,
2. Automatic or Manual,
3. Nominal value to fill,
4. Tuning value,
5. Various values depending on options.

Using the recipe system allows saving in the HMI terminal hundreds of predetermined recipes, so that the operator only has to select the correct one according to the

product or container, or according to the work order to be carried out. Recipes can be named with the code that customer prefers: batch number, product, family, SAP...



NOZZLE SUPPORT RACK



Different nozzle Support racks are available:

- Support for 2, 4, 6, 8 o 10 nozzles.
- Support for 2, 4, 6, 8 o 10 nozzles and a cleaning station.
- Support for 2, 4, 6, 8 o 10 nozzles with a dedicated cleaning station per nozzle.

NOZZLE NUMBER CONTROL

Do you have different nozzles? Do you have different product families to be used on the same machine? The chance of error should be minimized to the maximum.

For this, we have a nozzle coding sytem. The system confirms that the nozzle mounted in the machine is the one chosen in the active recipe.

If the number of the selected nozzle does not correspond to the one mounted, the machine does not allow filling.



OVERFILLING DETECTION

An electro-pneumatic system placed in the nozzle detects if the level of the product inside the container is higher tan the safety level.

The machine stops filling with an alarm and awaits for instructions from the operator.



CAPPING, UNCAPPING AND SEALING STATION

Cannister threading station



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