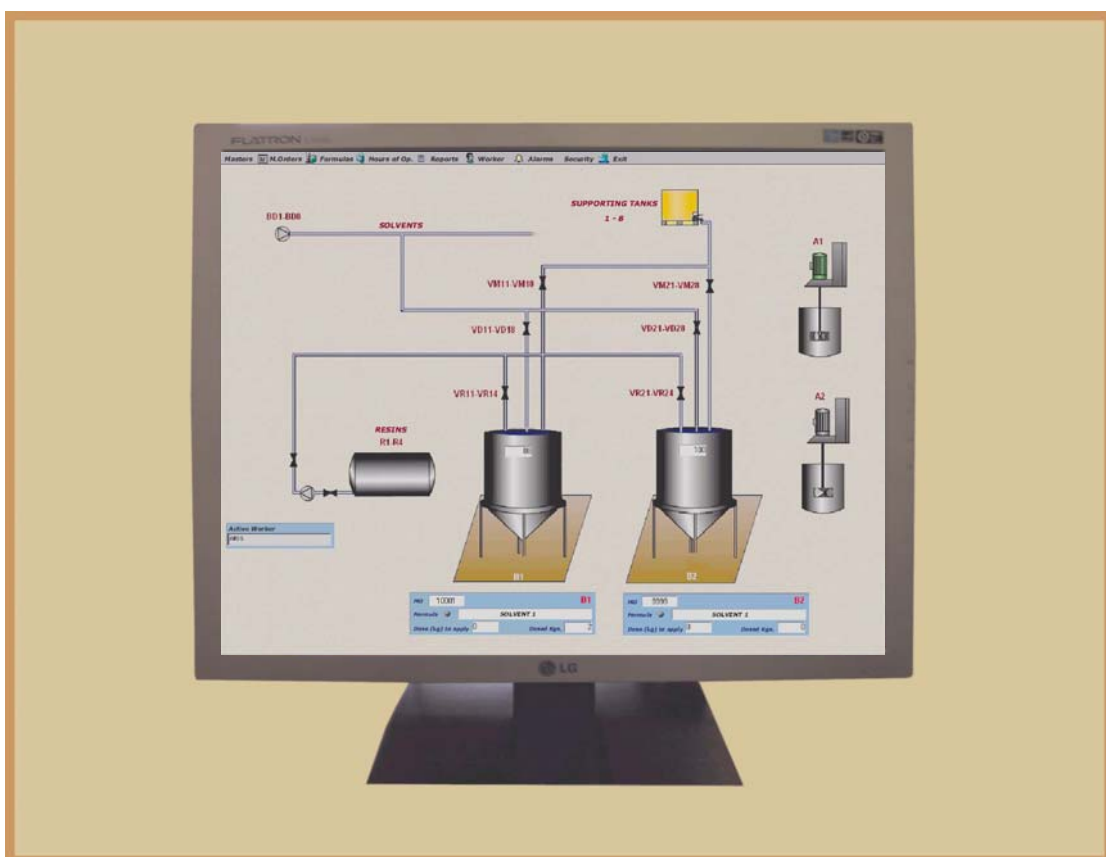


Manufacturing Plant for Production of Varnishes

Plant provided with computerized control system, production,
formulation and dosage



Uvitem builds turn-key installations for production of especial products. We installed from storages and circulation systems of liquid row material, to the unloading and circulation system of dusts, additives dosage, dispersers, manufacturing tanks, packers, etc.

As a sample, this plant includes:

- Dosage system is made over two built-in floor scales.

Control System of Processes and Production in Industrial Plants

Control system supplied by **Uvitem** is a database developed in Windows environment with the following features:

- General screen. It shows a diagram of all different processes of the plant. It gives a dynamic view of all control devices.
- Possibility of action over components (motors, pumps, valves etc.)
- Setting-up of masters: products, lines, workers, etc.
- Starting and monitoring processes (M.O.)
- Alarm management and setting.
- User management (workers).
- Reporting: formulas, consumption of products, alarms, etc.

This system eases an absolute control over processes, not only operational, but also over production.

Link with other management systems (AS-400, BAAN, SAP, etc.) is also possible.

Easy use. Only basic knowledge of computers is required to work with the program.

INDEX

	page
Supervision and control system.....	2-4
Agitator Motor.....	5
Menu.....	6
Components.....	7
Workers.....	7
General operations / orders.....	8-9
Formulas.....	10
Hours of operation.....	11-12
Alarm indicator.....	12-13
Alarm report.....	13-14
Production report.....	14-15
Consumption report.....	16-17
Way of operation.....	18-19
Formulation.....	20-23

SUPERVISION AND CONTROL SYSTEM

MANUAL OF OPERATION

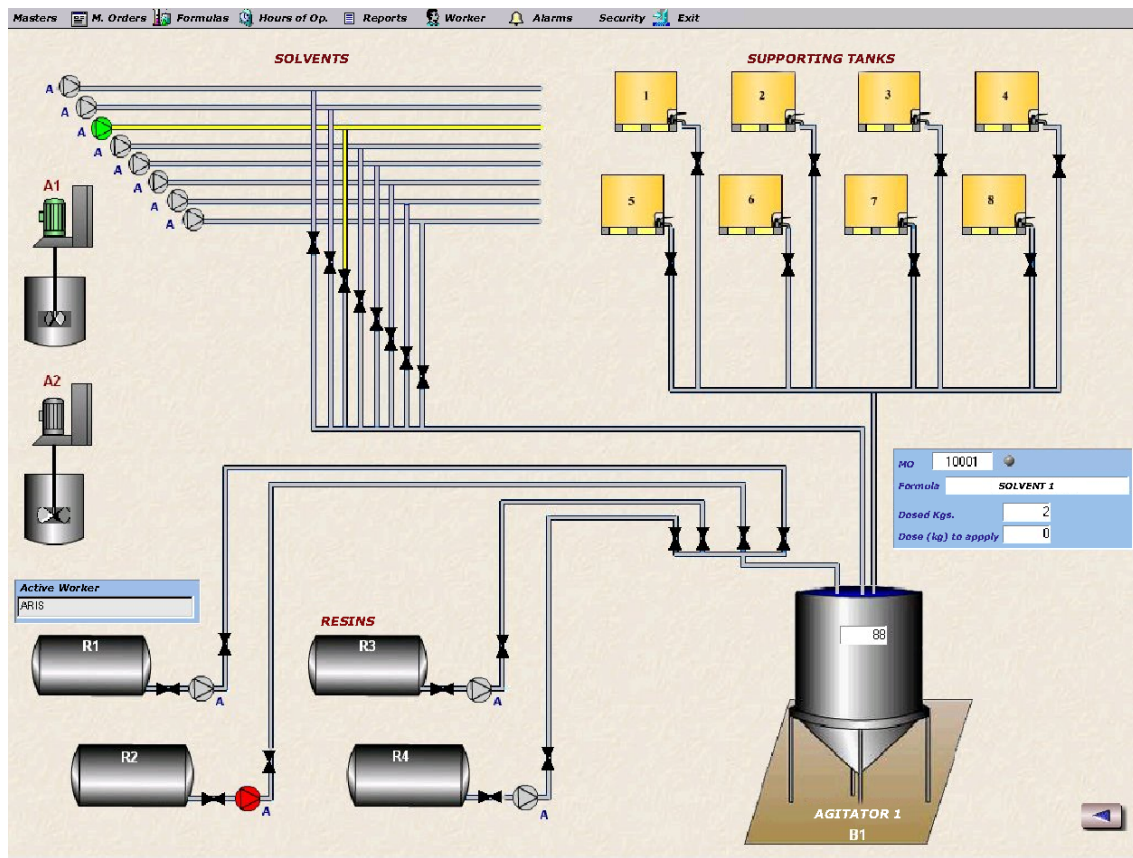
Integrated Control and Supervision Program is built by screenplays containing options that are described in following pages.

The Program is developed in WindowsNT environment; therefore, the appropriate icon must be clicked on desktop to execute the program.

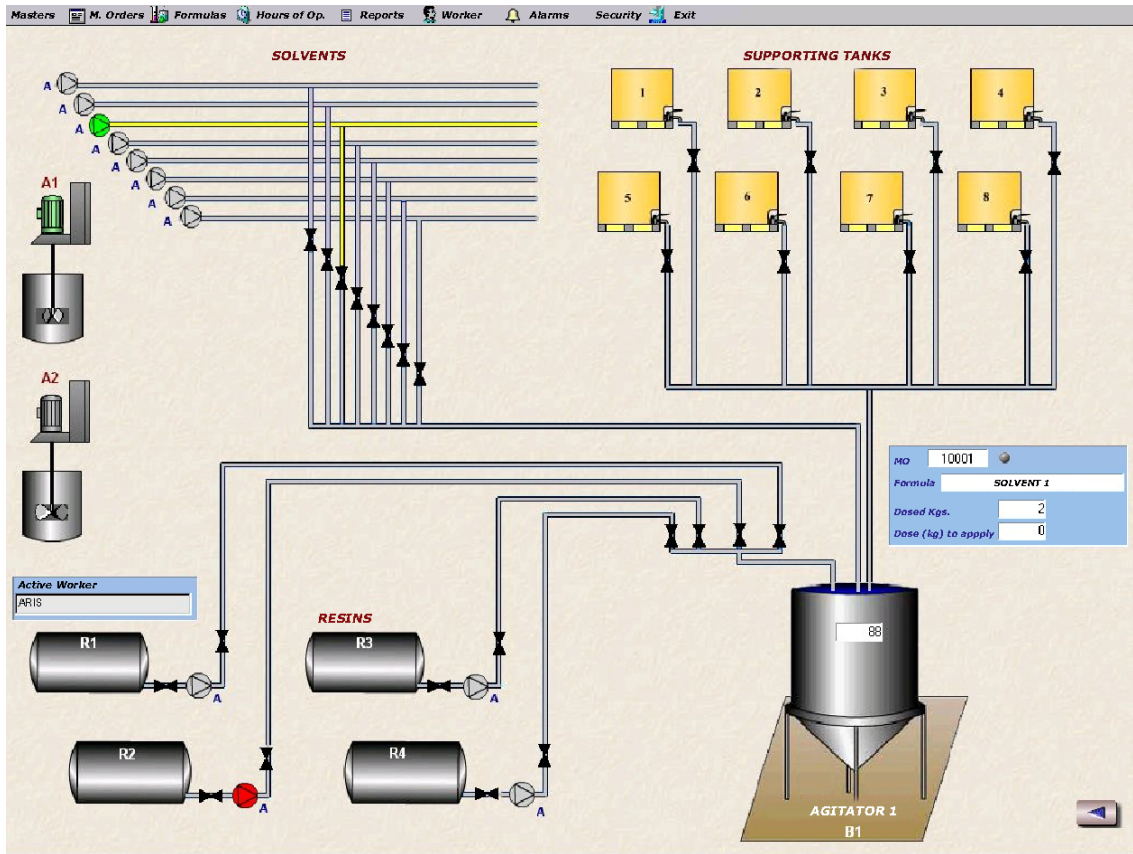
Name of icon in this guide is “UVITEM”.

Mouse double click on the icon executes the program, coming out the general screen. This is the centre of operations and the access to detailed screens and Menu options, which links with the operations.

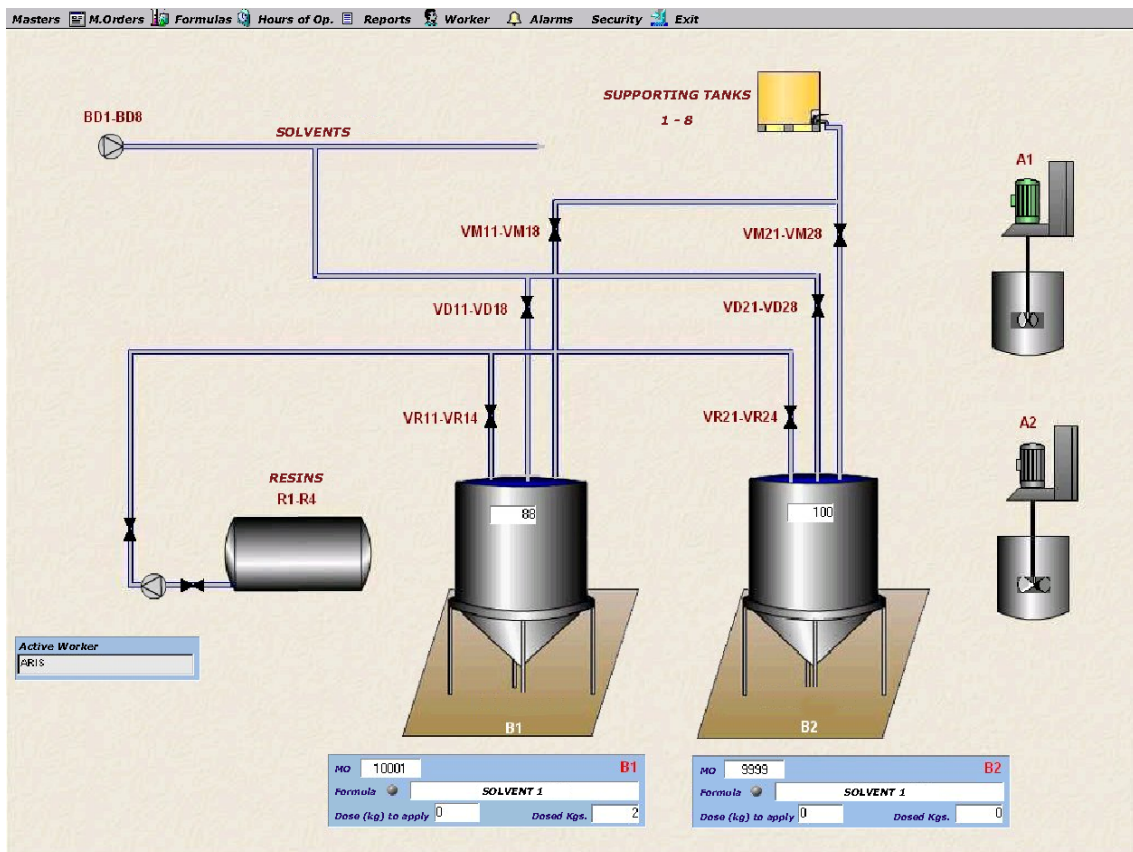
GENERAL SCREEN



Click on manufacturing tank 1 (Scale y 1) or 2 from general display to get details of components.



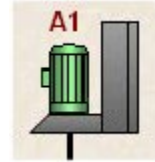
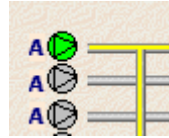
Click on arrow key on right-down side of screen to go back to general display.



As you can see on pictures below, there is a general view of all components of installation. State of control elements are classified with different colours:

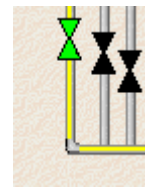
Pumps, motors

- Green – In Process
- Grey - Stop
- Red – Thermal difference



Valves

- Green - Opened
- Black - Closed
- Red – Irregularity: after request of open, the valve remains Closed.



Besides, when product is circulating (valve opened and pump in operation) the line is coloured.

In addition, a legend indicates pumps operation mode:

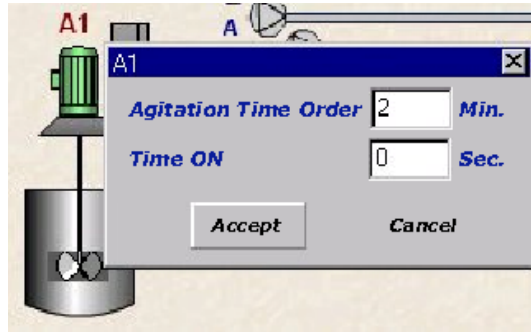
- A: Automatic (orders from computer)
- L: Local (orders from electrical panel)

Choose the way of operation by means of a selector placed in electrical panel.

Click on tanks to know the product in them.

Motor-Agitator

Two buttons (on/off) placed at one side of each agitator control agitators operation. However, computer registers their state, and time of operation can be also controlled from computer. Adjust time of operation on the pop-up display after clicking on motor. (That is only possible from detailed screens 1 and 2 –not in general display).



This window contains two fields:

- Time of agitation. Write time of agitation wanted in appropriate field. If you want to keep the agitator working (non-stop), write “0” in time field.

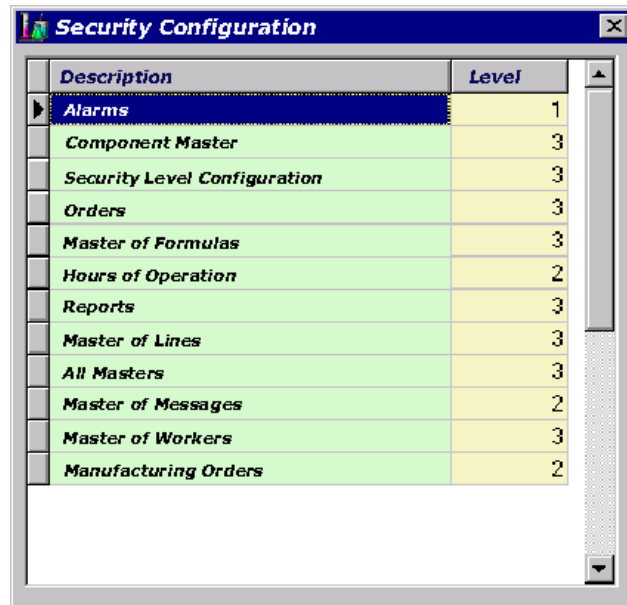
Click Accept to register Time of agitation.

- You can see elapsed time of agitation in seconds on line below.

Apart from accessibility to different components, we can use a toolbar on the upper side of general display. This toolbar is the menu, which gives access to different options. They are described below.

MENU

The program has three access levels with their respective passwords. Number 3 means maximum priority and 1 minimum priority.



Description	Level
Alarms	1
Component Master	3
Security Level Configuration	3
Orders	3
Master of Formulas	3
Hours of Operation	2
Reports	3
Master of Lines	3
All Masters	3
Master of Messages	2
Master of Workers	3
Manufacturing Orders	2

Set up access level on menu option “Security Level Setting”.

According to the configuration, you have access to some of the functions after clicking on enable options and enter the appropriate password.

Masters

Masters are described below.



Components

Set up products used in processes in this master.

Comp.	Description
D001	SOLVENT 1
D002	SOLVENT 2
D003	SOLVENT 3
D004	SOLVENT 4
D005	SOLVENT 5
D006	SOLVENT 6
D007	SOLVENT 7
D008	SOLVENT 8
M001	SUPPORTING TANKS 1
M002	SUPPORTING TANKS 2
M003	SUPPORTING TANKS 3

Component: M003 Description: SUPPORTING TANKS 3

Registration Date: 31/07/2000

Buttons: New, Edit, Delete, Save, Cancel, Print, Exit

Data entered are: Component. Description and Registration Data

Action buttons in all masters have the same meaning:

New. Create new register

Edit. Allow to modify registered data

Delete. Eliminate a register

Save. Record new data

Cancel. Modifications are not saved.

Print. Print data from master.

Exit. Close the window and return to general screen

Workers

Set Workers in this master assigning them Code, Name, Security Level and Password.

Code	Name
0092	JOSE LUIS
1111	FELIX
9999	ARIS

Code: 0092

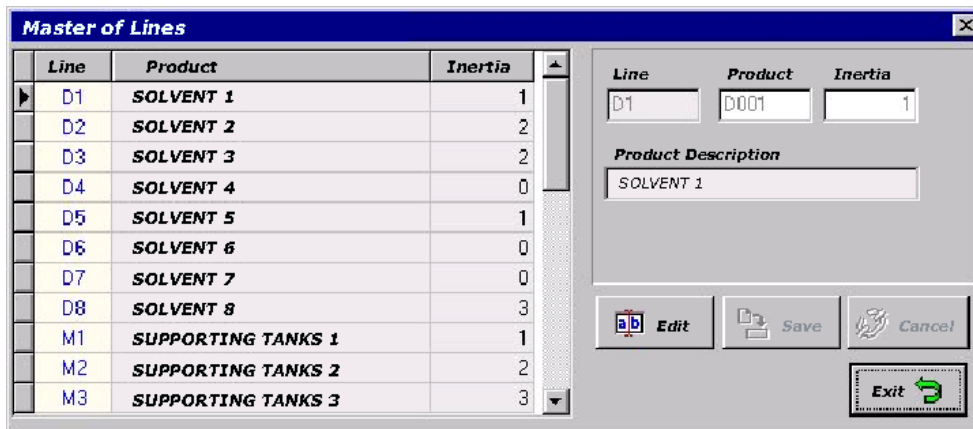
Name: JOSE LUIS

Security Level: 3 Password: 3

Buttons: New, Edit, Delete, Save, Cancel, Exit

Lines

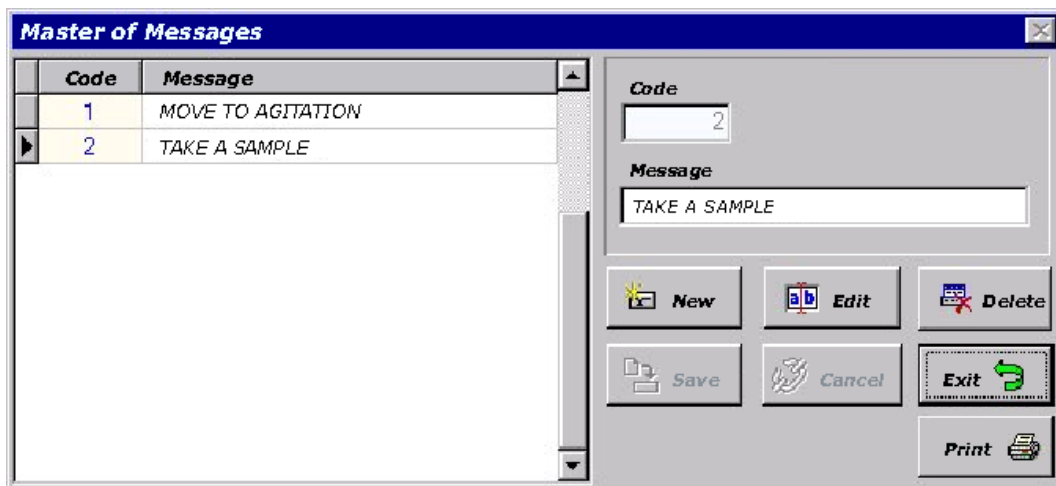
Assign products to automatic lines



In this master, you can also enter inertia data in kg. used to close the valve in order to compensate pipe inertia.

Messages

Set any possible messages that will pop up during automatic execution of formulas.



Orders

Click on this menu option to open manufacturing orders tab. You can create or assign new orders.

No. of MO	Formula	Description	Prog. Amount	Comments	State
1313	1313	Test	1000		
13213	10001	SOLVENT 1	545	difa	
1324	8989	Test	4854	asdf	
454	1313	Test	544		
5464	1312	65465	21		
6546	8989	Test	654	dsafas	
777	1313	Test	878		
98798	1313	Test	6546		
9999	10001	SOLVENT 1	500	lk.flk.lfk	Stopped
asdhasd	10001	SOLVENT 1	500	3321321	

Click *new order* to add a new line, then write manufacturing plant, No. of manufacturing order, formula and amount. There is an empty field to add Comments. On the right end of the line, another field indicates state of MO: stopped, pendant, finished.

Formulas

You can set up formulas for different manufacturing processes.

No.	Description
100	GENERIC FORMULA
10001	SOLVENT 1
1312	65465

Seq.	Proc. Cod.	Process Description	Product Code	Product Description	Batch	Mess. 1	Mess. 2	% kgs.	Agit. Min.
10	1	SOLVENT	D001	SOLVENT 1				24	
20	1	SOLVENT	D002	SOLVENT 2	123			41	
30	4	ADD SOLID	S001	SOLID 1				1	
40	10	RESINS	R001	RESIN 1	222			10	
50	11	SUPPORTING TANKS	M006	SUPPORTING TANKS 6	333			5	
60	11	SUPPORTING TANKS	M007	SUPPORTING TANKS 7				18	
70	5	ADD ADDITIVE	A001	ADDITIVE 1				1	

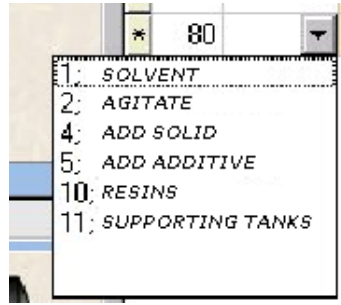
On the lower side of the screen, there are buttons to **Create** new formulas, **Edit** formulas, **Delete**, **Delete line**, **Print** and **Save as**. You can create a new formula making changes on an existing one and changing the name clicking on **Save as**.

Set the formula entering parameters of action and sequence of execution.

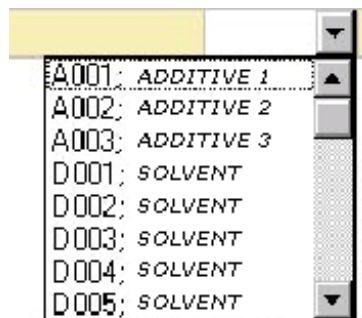
Enter data as follows:

Sequence No: Better, enter from 10 to 10 to enable the addition of steps between sequences.

Process: Go to this field and press Enter. An info window drops down a list with all possible actions. Go to the wanted option and press Enter to select it.



Product. Go to this field and click or press any key. Then an info window drops down with a list of components.



Batch. Enter the No of batch

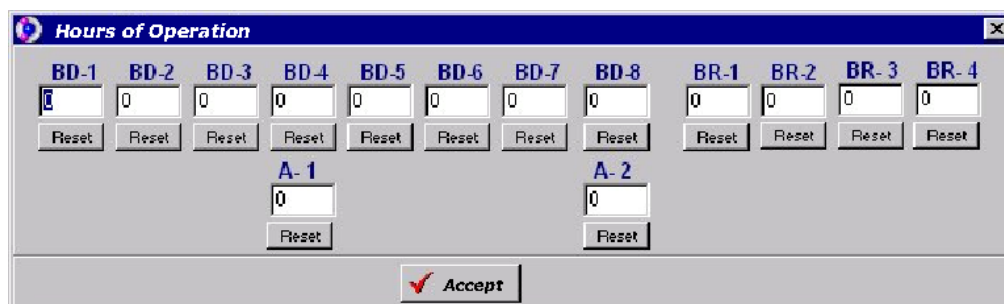
Message 1. This messages appear before starting an action. Press Enter to open master of messages and select the messages.

Message 2. This message pops up when an action is finished. Click on Accept to execute next action.

%Kg. Kg percentage of product to be dosed.

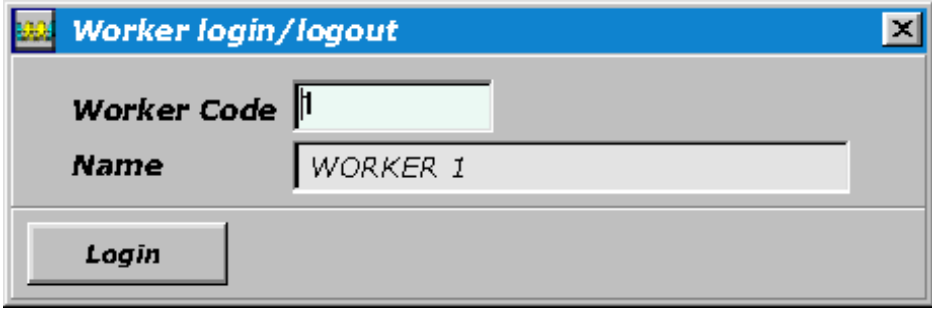
Hours of operation

Click on this menu option to enter in a new window, data of hours of operation and control elements (pumps and motor). You can reset separately each element. This is a helpful option in maintenance of components.



Worker

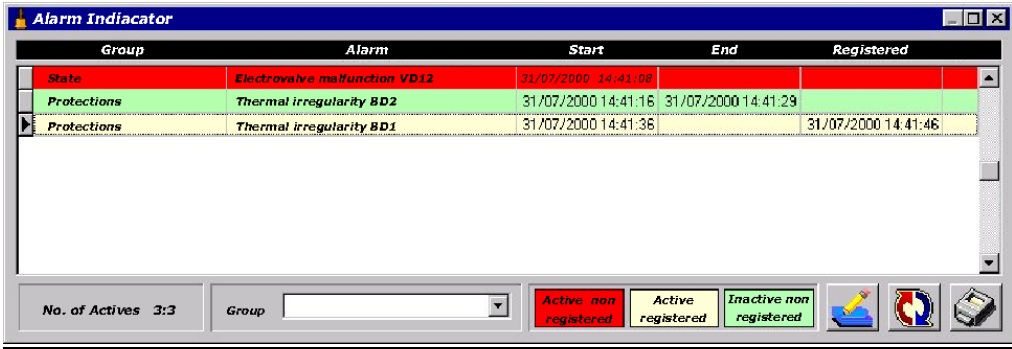
Click on this option to enter the worker code that works on the process. This data is important as data processed is assigned to one worker.



Alarm indicator

Alarms

When an alarm goes off during the process, a window comes out (alarm indicator). It shows in red, date/time of the alarm.



Group	Alarm	Start	End	Registered
State	Electrovalve malfunction VD12	31/07/2000 14:41:08		
Protections	Thermal irregularity BD2	31/07/2000 14:41:16	31/07/2000 14:41:29	
Protections	Thermal irregularity BD1	31/07/2000 14:41:36		31/07/2000 14:41:46

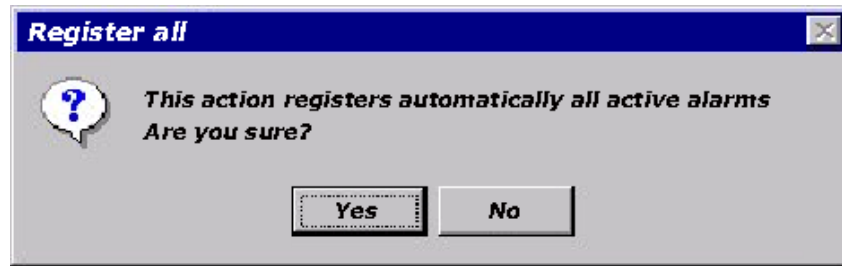
When alarm is registered and is still active you will get a green indication. If the alarm is no longer active and nobody has registered it, the indication is yellow.

Likewise, if an alarm is registered and after that, it loses the “alarm condition”, the alarm is deleted automatically from the window and registered in Alarm history.

Double click on alarm to register it.



Click on that button to register all alarms. You will be prompted with a dialogue box to confirm the action:



There are two more buttons:



Click on this option to add comments about alarms. Single click on alarm wanted opens a window with a blank field to write comments.



Click here to print the alarm report.

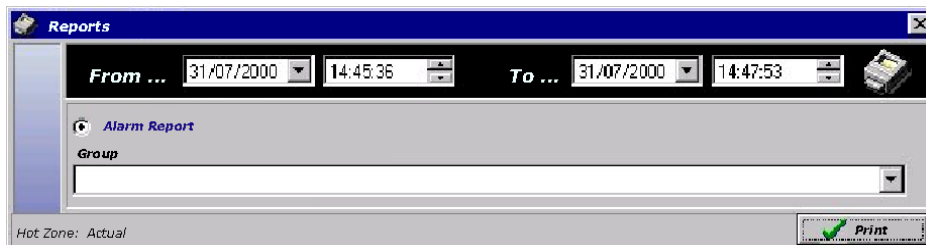
Reports

This option gives access to all processed and stored data. Data is stored in different reports that are described below:

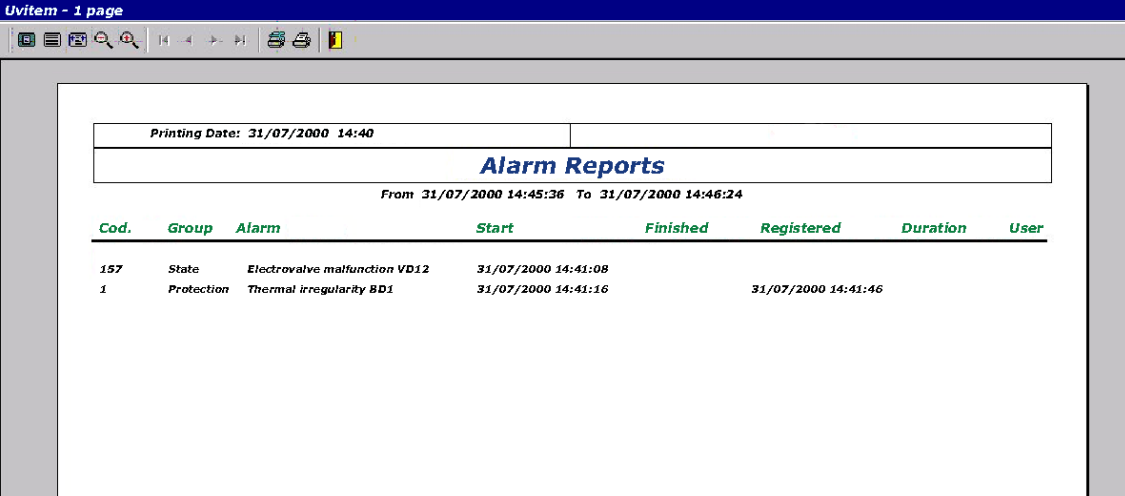


Alarm report

Order the report within dates.



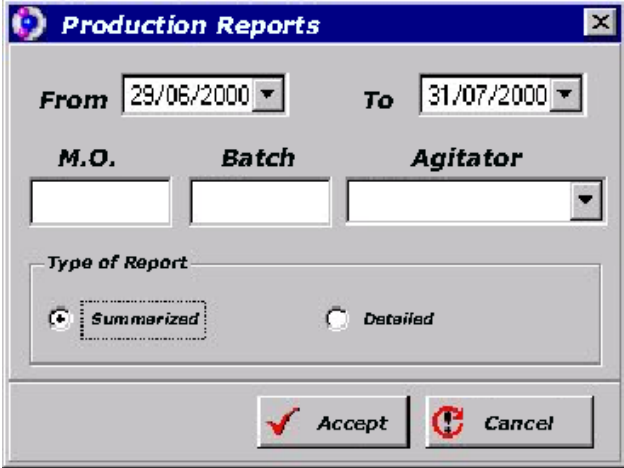
Data included in the report are alarm occurred, date/time of start, End date/time, date/time of registration, duration and worker.



Cod.	Group	Alarm	Start	Finished	Registered	Duration	User
157	State	Electrovalve malfunction VD12	31/07/2000 14:41:08				
1	Protection	Thermal irregularity BD1	31/07/2000 14:41:16		31/07/2000 14:41:46		

Production report

Production report is ordered between dates or by manufacturing order. The report can be summarized or detailed. To get all reports, leave fields empty. If you want specific report, fill data field required.



Production Reports

From: 29/06/2000 To: 31/07/2000

M.O. Batch Agitator

Type of Report

Summarized Detailed

Accept Cancel

Summarized

The screen shows the report and can be also printed.

M.O.	Reactor	Formula	Batch	Date of start	Date of end	Programmed Kgs.	Real Amount Kgs.
10001	Agitator 1	10001 SOLVENT 1		29/06/2000 14:06:17	29/06/2000 14:06:21	1.000	
10001	Agitator 1	10001 SOLVENT 1		29/06/2000 19:21:54		1.000	
1313	Agitator 1	1313 tset		29/06/2000 14:06:28	29/06/2000 16:26:10	1.000	5.218
1324	Agitator 2	8989 tset		29/06/2000 19:21:33	31/07/2000 10:51:39	4.654	
9999	Agitator 2	10001 SOLVENT 1		31/07/2000 10:51:51		500	
Total Kgs. Manufactured						8.154	5.218

As you can see in this detailed report following data are included: MO, Reactor, Formula, Batch, startD/T, end D/T, and planed and real amount of product.

Detailed

Production Reports

From: 29/06/2000 To: 31/07/2000

M.O.: 1313 Batch: Agitator:

Type of report:

Summarized Detailed

Accept Cancel

Formulas Report

Uvitem

Page 1
Date 31/07/2000

Detailed Formulation Report
From 29/06/2000 To 31/07/2000

N.O.	1313
Formula	1313 test
Batch	Reactor Agitator 1
Programmed Amount	1.000 kgs.
D. of Start	29/06/2000 14:06:29
D. of End	29/06/2000 16:26:10

Date of Start	Date of End	Action	Tank	Component	Batch	Programmed Amount (Kgs.)	Real Amount (Kgs.)	Ag. Min. Worker
29/06/2000 14:06:55	29/06/2000 14:07:26	SOLVENT	D6	DVD11	8	340	26	ARIS
29/06/2000 14:07:26	29/06/2000 14:09:37	AGITATE	B1				25	ARIS
29/06/2000 14:09:44	29/06/2000 14:15:43	RESINS	R1	RCD56	1	360	352	ARIS
29/06/2000 14:15:54	29/06/2000 14:22:05	RESINS	R2	RCD57	2	400	368	ARIS
29/06/2000 14:22:10	29/06/2000 14:28:50	RESINS	R3	RCD63	3	400	391	ARIS
29/06/2000 14:28:57	29/06/2000 14:36:00	RESINS	R4	RFD70	4	420	416	ARIS
29/06/2000 14:36:02	29/06/2000 14:43:33	SUP.TANKS	N1	NTD11	1	440	440	ARIS
29/06/2000 14:43:37	29/06/2000 14:51:25	SUP.TANKS	N2	NTD12	2	460	459	ARIS
29/06/2000 14:51:29	29/06/2000 14:59:36	SUP.TANKS	N3	NTD13	3	480	478	ARIS
29/06/2000 14:59:38	29/06/2000 15:08:06	SUP.TANKS	N4	NTD14	4	500	497	ARIS
29/06/2000 15:08:09	29/06/2000 15:16:15	SUP.TANKS	N5	NTD15	5	490	476	ARIS
29/06/2000 15:16:41	29/06/2000 15:24:02	SUP.TANKS	N6	NTD16	6	460	455	ARIS
29/06/2000 15:24:05	29/06/2000 15:31:24	SUP.TANKS	N7	NTD17	7	440	434	ARIS
29/06/2000 15:31:32	29/06/2000 15:38:35	SUP.TANKS	N8	NTD18	8	420	413	ARIS
29/06/2000 15:38:29	29/06/2000 16:26:34	ADD SOLID	D1	C0406	1	300	3	ARIS
29/06/2000 16:26:36	29/06/2000 16:26:53	ADD ADDIT.	D1	AD303	2	10	10	ARIS
Total Kgs. Manufactured						5.218		

Page 1 of 1

This report details all formulation steps and indicates start D/T, end D/T, and planned and real amount of product.

Consumption report

This report details product consumption data. Range of data is selected between dates, which are entered in the appropriate fields. You can request consumption of only one product or consumption of all of them leaving the field empty (blank).

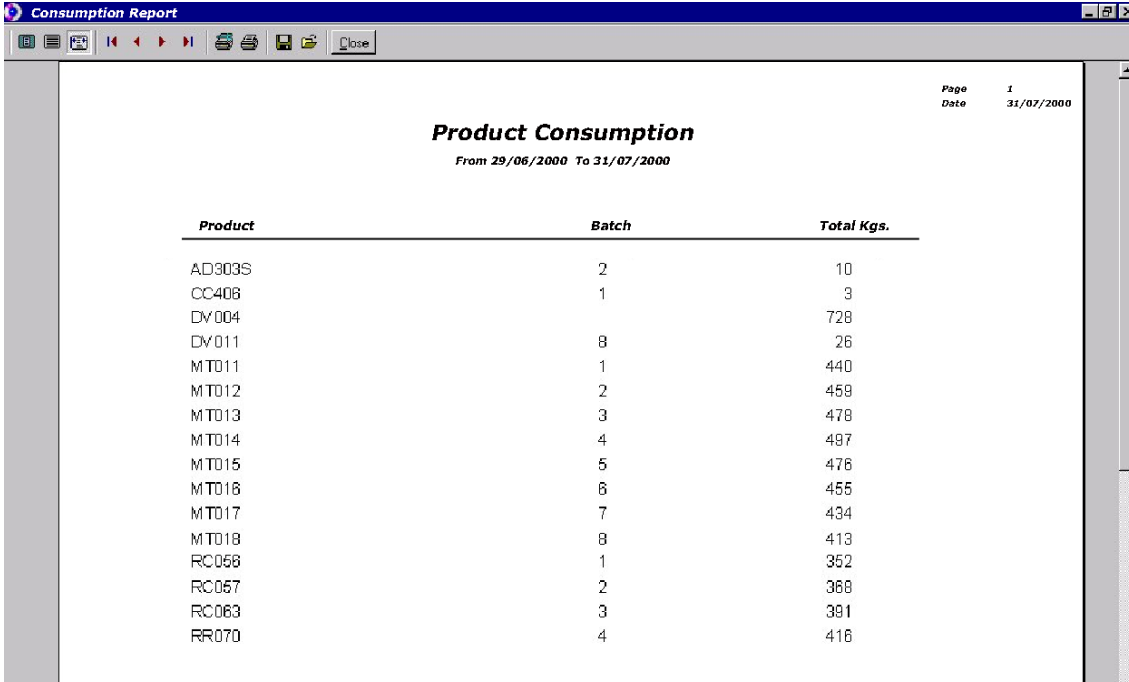
Consumption Report

From: 29/06/2000 To: 31/07/2000

Product:

Accept Cancel

The resulting report is below:



The screenshot shows a window titled "Consumption Report" with a toolbar containing icons for back, forward, print, and close. The report content is as follows:

Page 1
Date 31/07/2000

Product Consumption
From 29/06/2000 To 31/07/2000

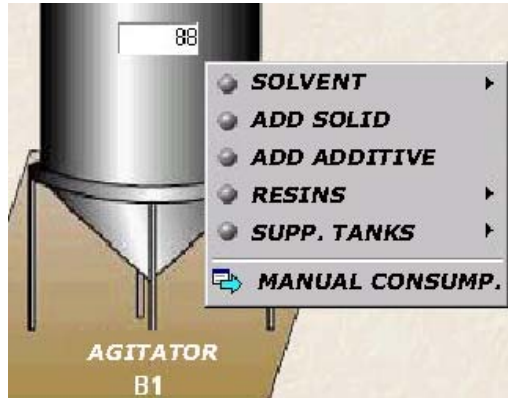
<i>Product</i>	<i>Batch</i>	<i>Total Kgs.</i>
AD303S	2	10
CC406	1	3
DV004		728
DV011	8	26
MT011	1	440
MT012	2	459
MT013	3	478
MT014	4	497
MT015	5	476
MT016	6	455
MT017	7	434
MT018	8	413
RC056	1	352
RC057	2	369
RC063	3	391
RR070	4	416

Exit

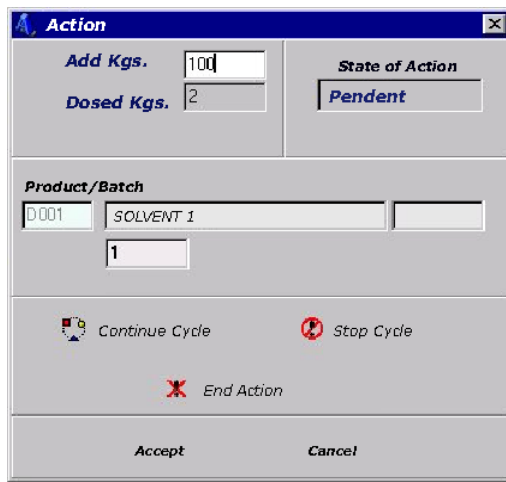
Click Exit to leave the application. Before, a dialogue box pops up to ask confirmation.

WAY OF OPERATION

The system has been developed to execute control actions individually or linked with execution sequences, according to settled formulas. The selector on electrical panel must be in “automatic position”.

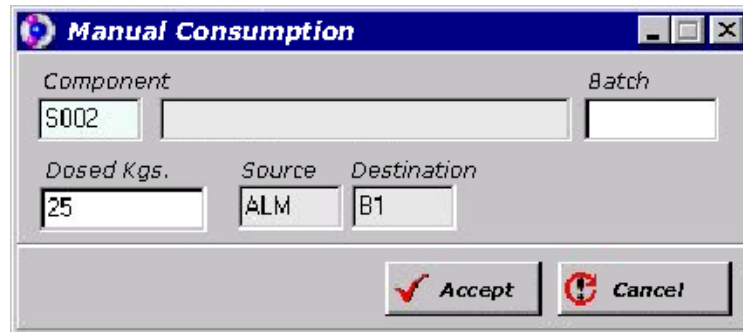


To make an action, right click on appropriate manufacturing tank (Scale) opens a window with different options. Click on action desired to open a new pop-up window to enter conditions of action.



For example, clicking on “Add solvent”, opens a window where amount of product and product data (component, batch, inertia) can be selected. State of action is also indicated: done, in process, interrupted. Likewise, other actions can be selected: Continue process, Stop process, End action.

In actions menu there is another option: *Manual consumption*. Click on this option to open a tab and enter product and kg. This option is helpful to enter data of products consumed in the process and also to control product consumption.



Component	Batch
S002	

Dosed Kgs.	Source	Destination
25	ALM	B1

Accept Cancel

IMPORTANT

In order to perform automatic dosages, either individual or sequential, the system needs to confirm there is a tank on the scale. To give the confirmation, two selectors are installed in a panel between scales. They must be in enabling position.

FORMULATION

Set formulas automatically following the process described below:

Left mouse click on manufacturing tank (scale) opens formulation window.

Seq.	Reac.	Process	Sour.	Dest.	Product	Batch	Amount	Min. Agit.	Real Amount	State
10	1	1	SOLVENT	D1	B1	D001	SOLVENT 1		48	Pendent
20	1	1	SOLVENT	D2	B1	D002	SOLVENT 2	123	82	Pendent
30	1	4	ADD SOLID	B1	B1	S001	SOLID 1		2	Pendent
40	1	10	RESINS	R1	B1	R001	RESIN 1	222	20	Pendent
50	1	11	SUP. TANKS	M6	B1	M006	SUP. TANKS 6	333	10	Pendent
60	1	11	SUP. TANKS	M7	B1	M007	SUP. TANKS 7		36	Pendent
70	1	5	ADD ADDITIVE	B1	B1	A001	ADDITIVE 1		2	Pendent

This window shows detailed information about process and many actions can be executed.

When no formula is registered, formulation window appears empty. Therefore, the first action is *Enter M.O.* clicking on the appropriate button.

After clicking, the window above comes out. Go to MO field and press enter or double click to access to Master of Manufacturing Order. Select the manufacturing

order and upload indicating Batch No. and pressing Enter. In this moment, the tab is filled with formula data and a calculation in Kg for each product.

On top of the tab, there are other fields:

State. Shows state of formula: stop or executing

Kg. Indicates the amount in kg of dosage product.

At the right end of every line, there is a description of states:

Pending. Not executed yet

In process. Executing

Interrupted. The step is interrupted

Finished. The step is already done

Likewise, at the lower side of the tab there are different buttons for different actions:

Step Modification. Modify a step, select the step and then click button “Order modification”. A display comes out to change data.

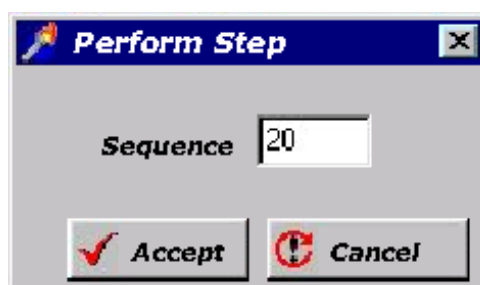
End. Finish a step in process.

Continue. Continue the formula after an interruption (voluntary interruption or due to safety conditions)

Stop. Interrupt the process.

Stop Formula. Interrupt the formula. Finish step in process and do not start the following step.

Start Formula. This option starts the execution of a formula from beginning or after another step if the process was stopped.

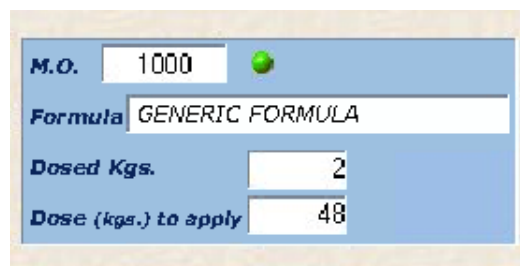


End Formula. This option ends formula in process. Clicking this button, data disappear from the screen and is registered in database of process history.

Print. Print formulation tab.

Exit. Close the window

When a manufacturing tank has a formula registered a tab next to it shows the appropriate description. In addition, it shows planned Kg and Real Kg of product which is being dosed.



The screenshot shows a software window with a light blue background. It contains the following fields and values:

M.O.	1000	●
Formula	GENERIC FORMULA	
Dosed Kgs.	2	
Dose (kgs.) to apply	48	

A GREEN SPOT INDICATES STATE OF FORMULA:

- Green: Unloaded formula
- Red: Stopped formula.

During the process, some messages or alarms may pop up.

If an action has a message assigned, you may be prompted with it. To continue the process press Accept.



Alarms can also come out. Some of them inform and others stop or act over the process.

When an alarm goes off visual and acoustic signal are activated. You can stop them either pressing reset at electrical panel or clicking on “register” button on computer.

When a formula is in execution and the process stops –it stops when reaches a step when worker must perform an action (unload product)-, the step is marked like “In process”. It will not continue until worker gives the order. Actions to add products manually are divided in two types:

- ADD SOLIDS
- ADD ADDITIVES

Between the scales, there is an electrical panel with 2 selectors, 2 pilot lights and 2 push buttons.

When process reaches a manual step, pilot light is switched on to indicate a worker must perform the unloading of product. As it is done, the worker must indicate it to the system. To do it, press push-button or finish the process from computer.

The criterion to register dosed kg is:

- ADD SOLID. Kg recorded are those the scale registers by difference of weight
- ADD ADDITIVE. “Planned” kg are registered by default. This data can be changed in “step modification” option in formulation tab.

To make an action (dosing) during an automatic formula, the formula must be stopped. Right click opens a window with different options; when the formula is in process, you cannot click on any options. However, you can choose any option when the formula is stopped.