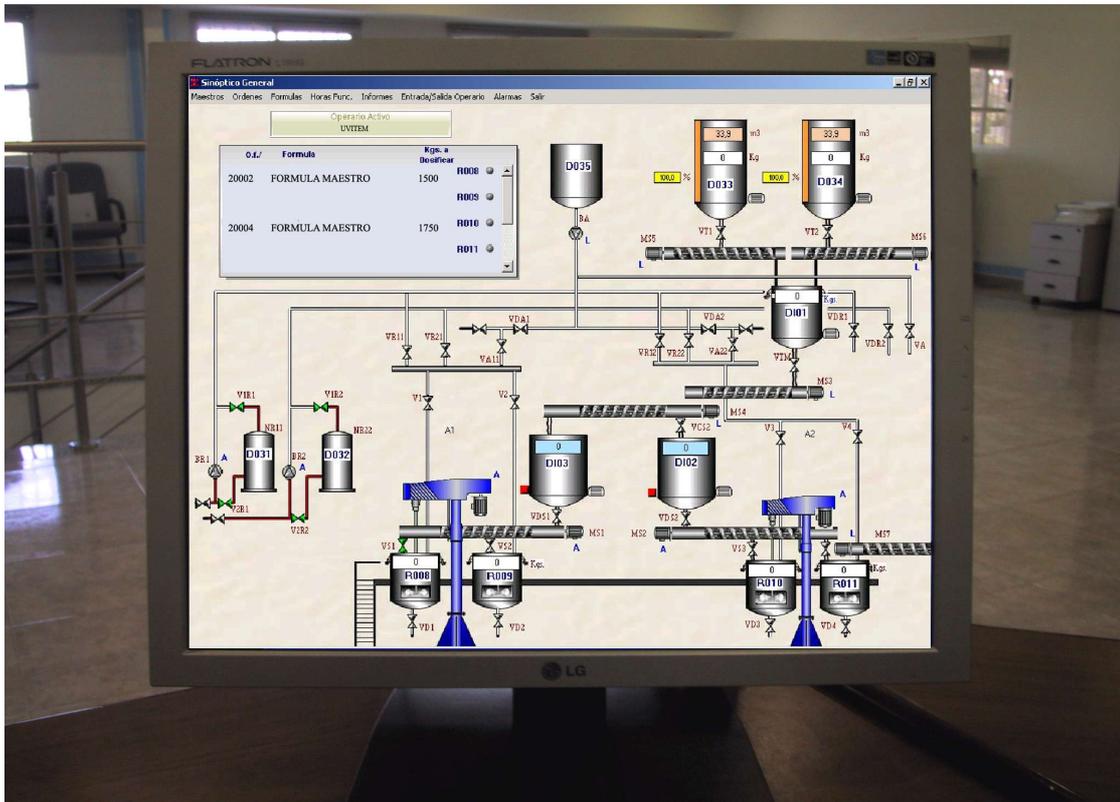


Manufacturing plant for water-based paints

With computerized control system, production, formulation and dosage



NTD builds turn-key installations for production of special products.

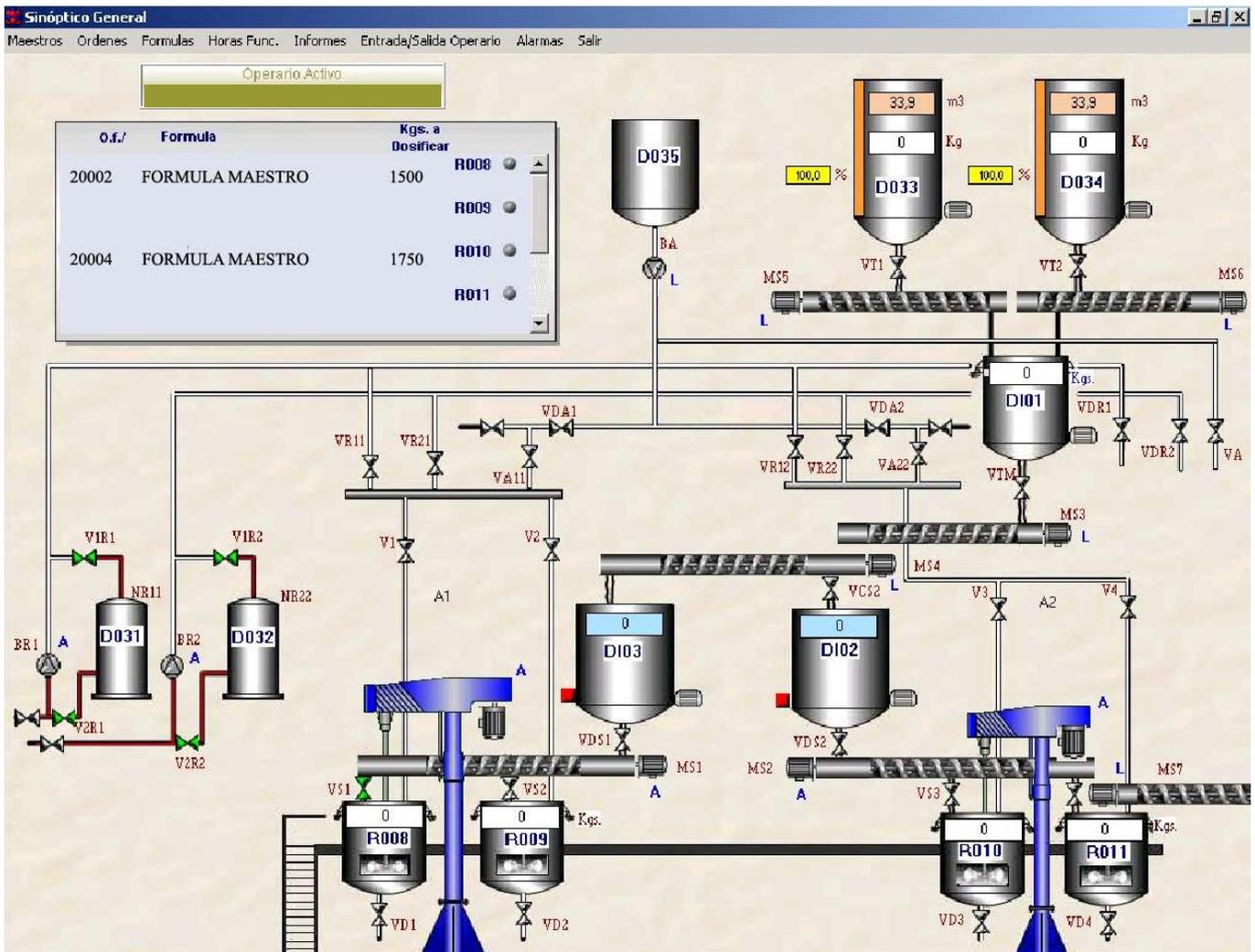
We install from storage parks and circulation systems for liquid raw material, to the unloading and circulation of powders, additives dosage, dispersion equipment, manufacturing tanks, packaging systems, etc.

As a sample, this plant includes:

- Dosage of water-based resins and water is made by weight, as there are loading cells in tanks where products are stored.
- Solids are stored in silos and are dosed on a weighing hopper and moved to the hoppers using worm drives.

Control System of Processes and Production in Industrial Plants

General screen



Control system supplied by NTD 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 the processes, not only operational, but also over production.

Connection 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.



SUPERVISION AND CONTROL SYSTEM ON PRODUCTION OF WATER-BASED PAINTS

- § Weight based resins and water dosing.
- § Powder dosing using silos and weighing hopper

INDEX

	<i>Page</i>
Supervision and Control System.....	4 - 6
Motor, pumps, resins and vibrators.....	6
Menu.....	7
Components.....	8
Workers.....	8
General operations / orders.....	9
Formulas.....	10 - 11
Hours of operation.....	12
Alarm indicator.....	12 - 13
Alarm report.....	14
Automatic production report.....	14
Manual production report.....	14 - 17
Way of operation.....	17
Formulation.....	18 - 23
System general conditions.....	23
Alarms.....	24

SUPERVISION AND CONTROL SYSTEM

MANUAL OF OPERATION

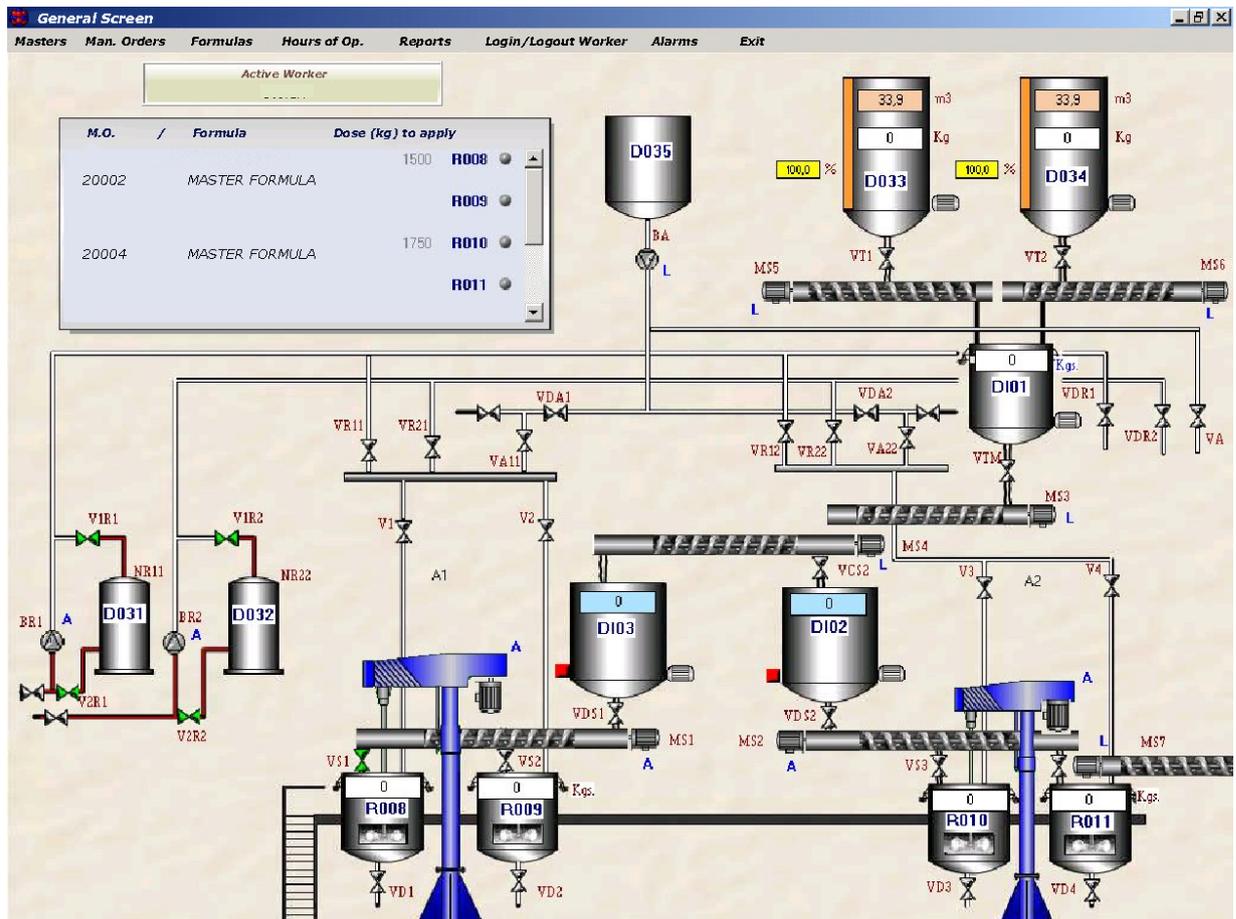
Integrated Control and Supervision Program is built by screenplays containing options that are described in following pages.

The Program is developed in WindowsNT environment, therefore, the appropriate icon must be clicked from desktop to enter the program.

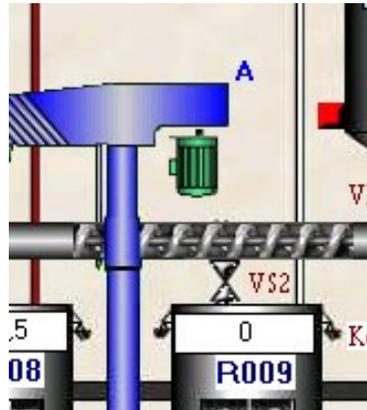
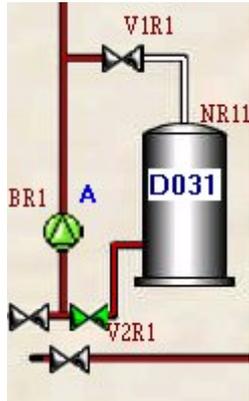
Name of icon in this guide is "NTD".

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

GENERAL SCREEN



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 - Stopped

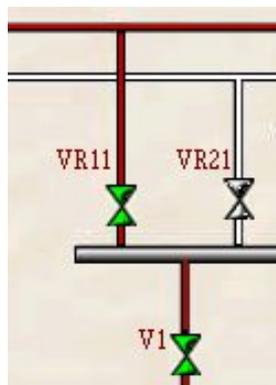
Red - Thermal difference

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 the operation mode:

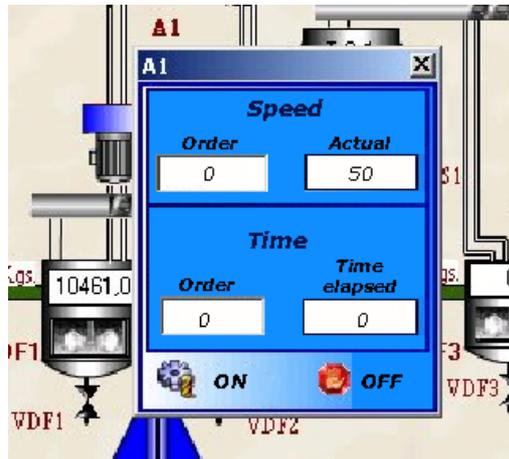
A: Automatic (orders from computer)

L: Local (orders from electrical panel)

Both ways of operation are selected by means of a selector placed in electrical panel.

Motor-Agitator

Two buttons (on/off) placed at one side of each agitator control agitators operation. However, the 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).



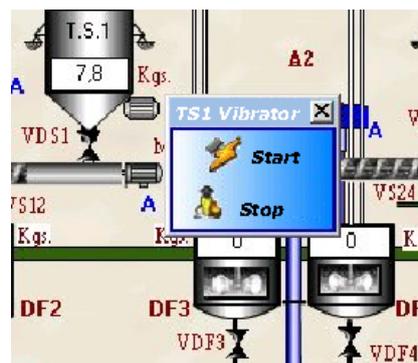
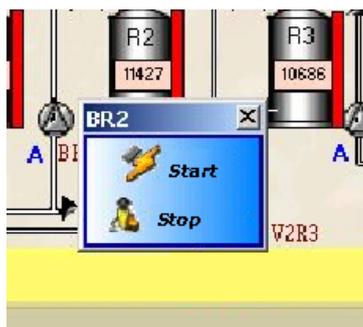
This window contains two fields:

- Speed and time of agitation. Write time and speed of agitation wanted in appropriate field. If you want to keep the agitator working (non-stop), write "0" in time field.

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

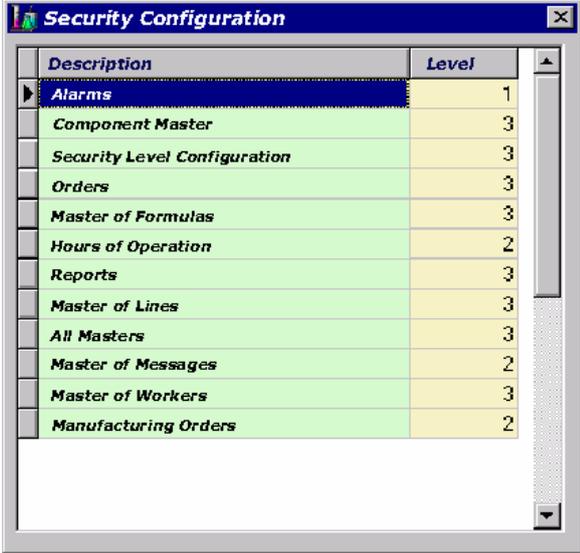
Motor – Pumps, Resins and Vibrators

Vibrators can be activated from computer. Left click mouse on vibrators opens the window to activate or stop motors.



MENU

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



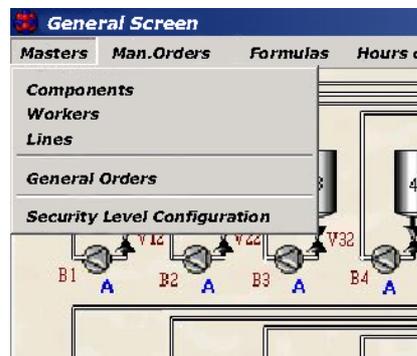
Description	Level
Alarms	1
Component Master	3
Security Level Configuration	3
Orders	3
Master of Formulas	3
Hours of Operation	2
Reports	3
Master of Lines	3
All Masters	3
Master of Messages	2
Master of Workers	3
Manufacturing Orders	2

Access level is defined from 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

Use this master to set up the products required in the process.

Comp.	Description	Density
1	SOLID	1
2	ADDITIVE	1
3	PRODUCT 1	1
4	PRODUCT 2	1
5	PRODUCT 3	1

Component: 5
Description: PRODUCT 3
Density: 1
Registration Date: 18/06/2001

Data fields: Component, Description, Registration date.

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. Prints the masters data.

Exit. Close the window and return to general diagram

Workers

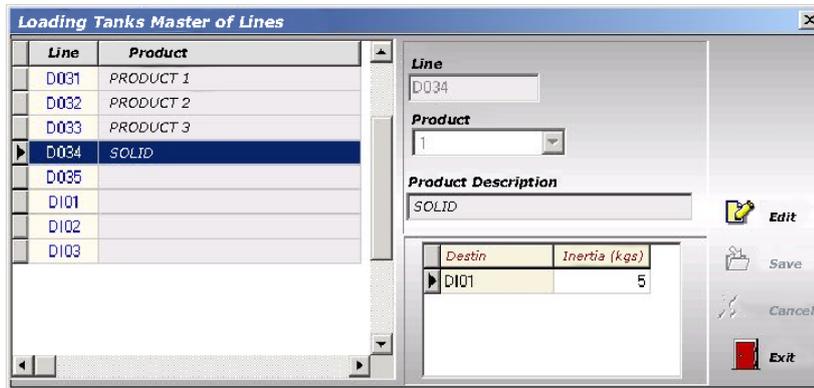
Set Workers in this master assigning them Code, Name, Security Level and Password.

Code	Name
1	

Code: 1
Name: UVITEM
Security Level: 3
Password: 3

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.

General Orders

Here are defined all possible orders.

Component	Description	Value
BR1	MAXIMUM SPEED (0-100%) 1 RESIN VARIATOR	0
BR1	MINIMUM SPEED (0-100%) 1 RESIN VARIATOR	0
BR2	MAXIMUM SPEED (0-100%) 2 RESIN VARIATOR	0
BR2	MINIMUM SPEED (0-100%) 2 RESIN VARIATOR	0
D033	VIBRATOR START TIME (sec)	0
D033	VIBRATOR STOP TIME (sec)	0
D033	LEVEL CONSTANT D033	0
D034	VIBRATOR START TIME (sec)	0
D034	VIBRATOR STOP TIME (sec)	0
D034	LEVEL CONSTANT D034	0
D103	VIBRATOR START TIME (sec)	0
D103	VIBRATOR STOP TIME (sec)	0
D103	SOLIDS CLEANING TIME D103 (sec)	0
D102	VIBRATOR START TIME (sec)	0
D102	VIBRATOR STOP TIME (sec)	0

Orders

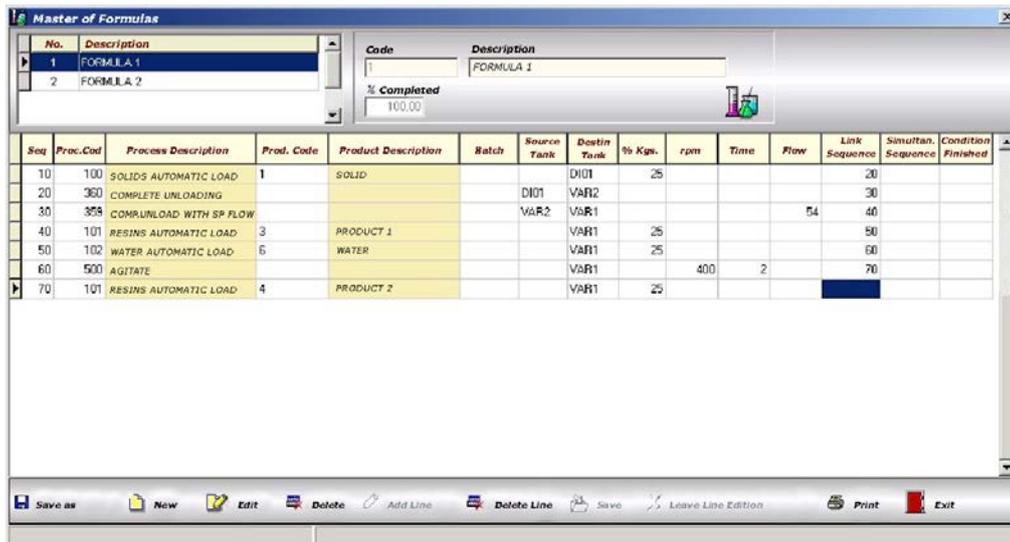
This menu option gives access to planned manufacturing orders. Also, you can create or assign new orders.

No. of M.O.	Formula	Description	Progr. Amount	Comments	State
4000	1	FORMULA 1	200		Stopped

Click 'Add Order' to create a new line and assign No. of M.O (Manufacturing Order), formula and amount. There is a field to add comments and another which indicates state of MO: Stopped, Pendent, Finished

Formulas

You can set up formulas for different manufacturing processes.

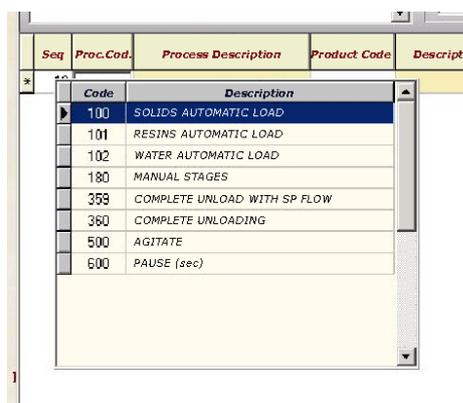


On the lower side of the screen there are buttons to **Create** new formulas, **Edit** formulas, **Delete**, **Delete line**, **Print** and **Save as**. You can create a new formula making changes on an existing one and changing the name clicking on **Save as**.

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 code: 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.



Process description. Indicates in detail selected process.

Product code. Go to this field and click or press any key. Then an info window drops down with a list of components. Go over the product required and press Enter for selection.

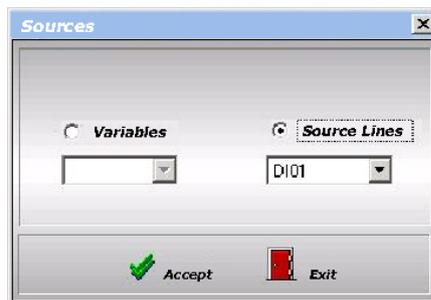
Product Code	Product Description	Batch	Source Tank	Destin Tank	% Kgs.	rpm

Comp.	Description
1	SOLID
5	PRODUCT 3

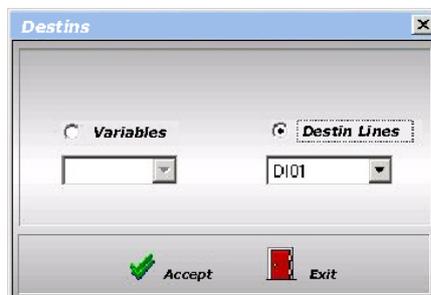
Product description. Shows in detail selected product.

Batch. Enter the No of batch

Source tank. Enter source tank if exists. Double click on this field or press Enter to open the following window:



When source is fixed, it is selected on source line field, when it is not, a variable must be entered. Same for destination:



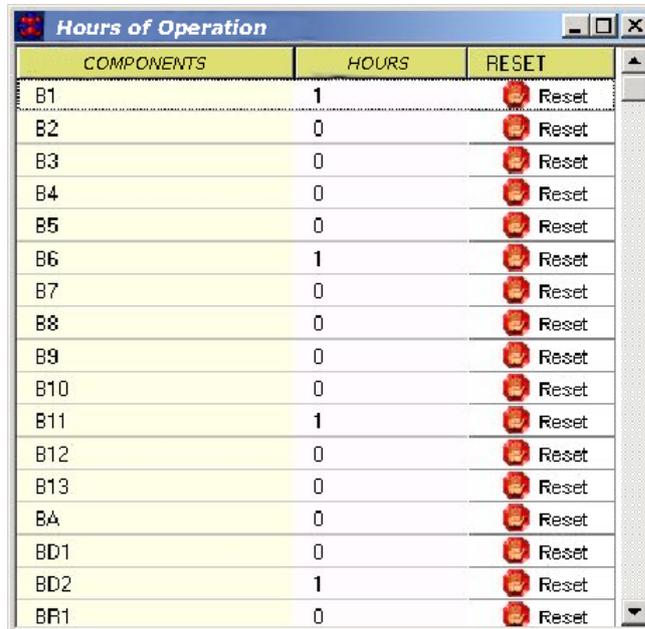
Variables are defined as follows:

VAR2: DI02 Y DI03

VAR1: R008, R009

Hours of operation

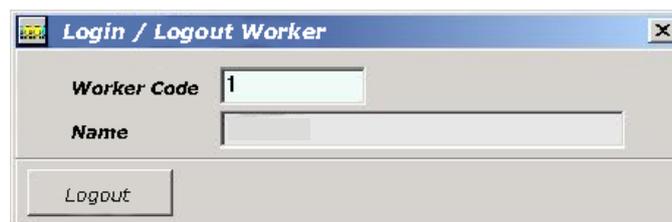
Click on this menu option to enter in a new window, where registered data of hours of operation and control elements (pumps and motor) are listed. You can reset separately each element. This is a helpful option in maintenance of components.



COMPONENTS	HOURS	RESET
B1	1	Reset
B2	0	Reset
B3	0	Reset
B4	0	Reset
B5	0	Reset
B6	1	Reset
B7	0	Reset
B8	0	Reset
B9	0	Reset
B10	0	Reset
B11	1	Reset
B12	0	Reset
B13	0	Reset
BA	0	Reset
BD1	0	Reset
BD2	1	Reset
BR1	0	Reset

Worker

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



Login / Logout Worker

Worker Code: 1

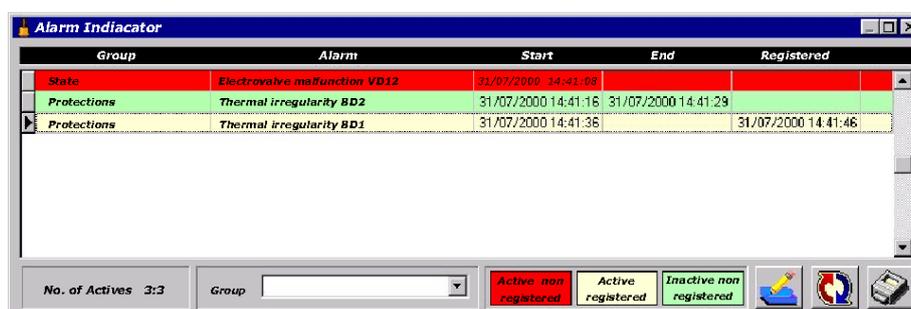
Name:

Logout

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

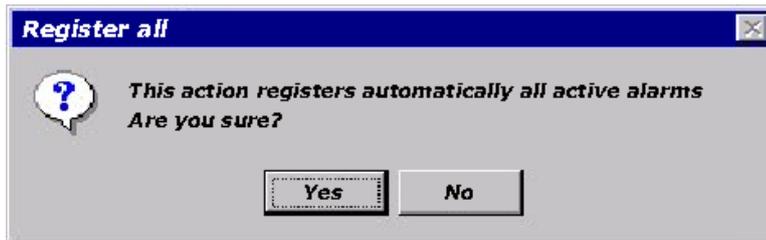
No. of Actives 3:3 Group:

Active non registered Active registered Inactive non registered

When alarm is registered and is still active the indication is green. When alarm is no longer **active** and it has not been registered, the indication is yellow. Likewise, when alarm is registered and after that, loses the “alarm condition”, is deleted automatically from the window and is registered in Alarm history. Double click over alarm registers alarm selected.



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 over the alarm 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.

Reports

From To

Alarm Report

Group

Hot Zone Print

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

Printing Date: 18/06/2001 18:10

Alarm Report
From 17/06/2001 18:18:34 To 18/06/2001 18:18:24

Cod.	Group	Alarm	Start	End	Registered	Duration	User
44	General	Emergency button activated	18/06/2001 17:09:54	18/06/2001 17:11:00	18/06/2001 17:21:11	1 m 6 s	
45	General	Air pressure controller alarm	18/06/2001 17:09:54	18/06/2001 17:11:00	18/06/2001 17:21:11	1 m 6 s	
187	Protections	Thermal irregularity MS7	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
9	Protections	Thermal irregularity DA	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
6	Protections	Thermal irregularity MS2	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
6	Protections	Thermal irregularity MS1	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
4	Protections	Thermal irregularity MA2	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
3	Protections	Thermal irregularity DR2	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
2	Protections	Thermal irregularity DR1	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
1	Protections	Thermal irregularity MS3	18/06/2001 17:09:55	18/06/2001 17:10:40	18/06/2001 17:21:11	45 s	
7	Protections	Thermal irregularity MS3	18/06/2001 17:09:56	18/06/2001 17:10:40	18/06/2001 17:21:11	44 s	
8	Protections	Thermal irregularity MS4	18/06/2001 17:09:56	18/06/2001 17:10:40	18/06/2001 17:21:11	44 s	
18	Protections	Thermal irregularity MS5	18/06/2001 17:09:56	18/06/2001 17:10:40	18/06/2001 17:21:11	44 s	
19	Protections	Thermal irregularity MS6	18/06/2001 17:09:56	18/06/2001 17:10:40	18/06/2001 17:21:11	44 s	

Automatic production report

Automatic production report is ordered between dates or by manufacturing order. The report can be summarized or detailed. If MO field is empty the system will open all of them. If you want a specific report, fill data field required.

Production Report

From: 18/06/2001 To: 18/06/2001

M.O. Batch Tanks

Type of Report

Summarized Detailed

Accept Cancel

Summarized

The screen shows the report and can be also printed.

NTD

Summarized Production Report

From 22/02/2001 To 18/06/2001 Printing Date: 18/06/2001 18:23:58

Man. Order	Reactor	Formula	Batch	D/T Start	D/T End	Program. Kgs.	Real Amount Kgs.
12313	6	1 FORMULA 1		24/05/2001 18:59:13	24/05/2001 19:20:40	1.233	817
1234567890	7	1 FORMULA 1		11/05/2001 14:02:30	11/05/2001 14:07:18	500	
Total Manufactured kg dosed							
							817

As you can see in the detailed report the following fields are included: MO, reactor, formula, batch, D/T start, D/T end, kg,

Detailed

Production Report

From: 22/02/2001 To: 18/06/2001

M.O. Batch Tanks

Type of Report

Summarized Detailed

Accept Cancel

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

Detailed Production Report													Printing Date: 18/06/2001 18:26:20	
NTD			From 22/02/2001 To 18/06/2001											
Manufacturing Order		125			Reactor		R009							
Formula		In												
Date of Start		11/05/2001 14:08:39				Date of End		18/05/2001 13:05:32						
Programmed Amount		100			Batch									
Comments														
D/T Start	D/T End	Seq	Process Description	Source - Destin	Product Description	Batch	Kilos	Dosed kg	Time	Real T	rpm	Worker		
18/06/2001 13:12:51	07/05/2001 11:26:50	10	SOLIDS AUTOMAT. LOAD	D003 D101	D003		2.800	1.014						
24/05/2001 19:19:55	24/05/2001 19:04:52	10	SOLIDS AUTOMAT. LOAD	D004 D101	D004		300,25	304,8				UVITEM		
24/05/2001 19:19:24	24/05/2001 19:08:59	40	MANUAL STAGES	R008 R008			18,5					UVITEM		
24/05/2001 19:11:01	24/05/2001 19:03:05	50	WATER AUTOMAT. LOAD	D006 R008	WATER		240,44	207,4				UVITEM		
24/05/2001 19:19:12	24/05/2001 19:09:23	55	AGITATE	R008 R008	WATER						1200	UVITEM		
24/05/2001 19:13:27	24/05/2001 19:14:44	60	MANUAL STAGES	R008 R008	STAGE		121,3					UVITEM		
24/05/2001 19:14:57	24/05/2001 19:06:16	20	SOLIDS AUTOMAT. LOAD	D003 D101	D003		300,25	304,8				UVITEM		
24/05/2001 19:19:22	24/05/2001 19:14:46	30	COMPLETE UNLOADING	D101 D102								UVITEM		
18/06/2001 17:11:19	18/06/2001 17:27:07		RESINS AUTOMAT. LOAD	D001 R008	D001		7.000	991,6				UVITEM		
18/06/2001 11:15:21	18/06/2001 11:25:40	10	RESINS AUTOMAT. LOAD	D001 R008	D001		25	27,2				UVITEM		
15/05/2001 11:16:46	15/05/2001 11:27:42	20	AGITATE	R008 R008					2	1	600	UVITEM		
15/05/2001 11:17:42	15/05/2001 11:26:11	30	PAUSE (sec)	R008 R008					20	25		UVITEM		
18/06/2001 11:18:15	18/06/2001 11:26:24	40	RESINS AUTOMAT. LOAD	D001 R008	D001		25	27,2				UVITEM		
15/05/2001 11:18:15	15/05/2001 11:28:31		RESINS AUTOMAT. LOAD	D001 R008	D001		25	27,2				UVITEM		

Consumption report

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

The screenshot shows a window titled "Consumption Report" with a close button (X). It contains two main sections: "Dates" and "Products".

Dates:

- Start:** 17/06/2001 0:00:00
- End:** 18/06/2001 18:33:14

Products:

A dropdown menu is present, currently showing a blank space, indicating that all products are selected.

At the bottom of the window are two buttons: "Accept" and "Cancel".

The resulting report is below:

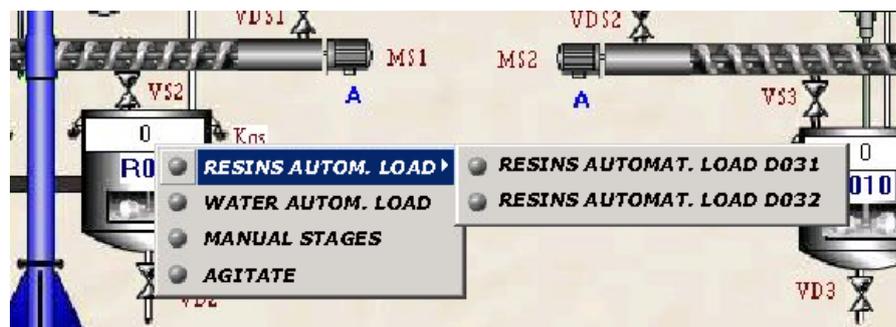
Code	Description	Kilos
1	SOLID	0.0

Exit

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

WAY OF OPERATION

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



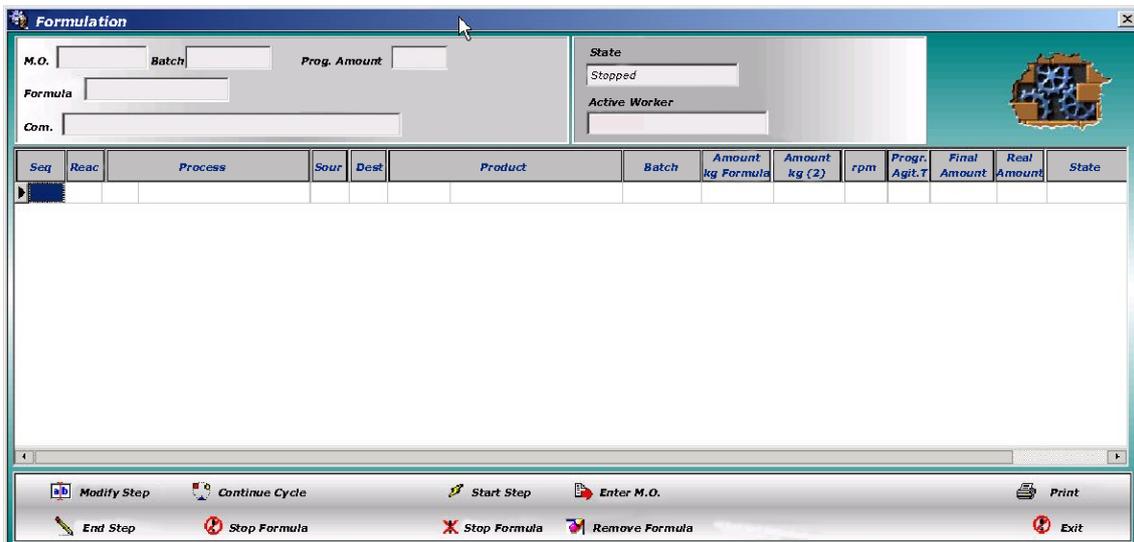
To make an action, right click on appropriate manufacturing tank (Scale) opens a window with different options. Click on action desired to open a new pop-up window to enter conditions of action.



For example, in action “Automatic Unloading of Resins”, select the amount of product and product data (component, batch, inertia). State of action is also indicated: done, in process and interrupted. Likewise, you can select other actions: Continue process, Stop process, End action.

FORMULATION

Set formulas automatically following the process described below:
Left mouse click on manufacturing tank (scale) opens the formulation window.



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 and press enter or double click to access to Master of Manufacturing Order.

M.O.	Formula	Description	Amount
400	1	FORMULA 1	200

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.

Seq	Reac	Process	Sour	Dest	Product	Batch	Amount kg Formula	Amount kg (2)	rpm	Prog. Agit.T	Final Amount	Real Amount	State
10	1	LOAD	D11	TL1	SOLVENT 1		50,00						Pendent
20	6	UNLOAD	TS1	DF1	SOLID		50,00						Pendent
30	6	RESINS	R1	DF1	RESIN		50,00						Pendent
40	6	UNLOAD	TS1	DF1	SOLID 2		20,00						Pendent
50	6	AGITATE	DF1	DF1					444	2			Pendent
60	6	WATER	WAT	DF1	WATER		30,00						Pendent

On the upper side of the tab, there are other fields:
State. Shows state of formula: stopped or executing

At the right end of every line there is a description of states:
Pending. Not executed yet

The screenshot shows the 'Formulation' software window. At the top, there are input fields for 'M.O.' (4000), 'Batch', 'Prog. Amount' (200.00), 'Formula' (1), and 'FORMULA 1'. The 'State' field is set to 'In Process'. Below these fields is a table with the following data:

Seq	Reac	Process	Sour	Dest	Product	Batch	Amount kg Formula	Amount kg (2)	rpm	Prog. Agit.T	Final Amount	Real Amount	State
10	1	LOAD	D11	TL1	1	SOLVENT 1	50,00						Pendent
20	6	UNLOAD	TS1	DF1	9	SOLID	50,00						Pendent
30	6	RESINS	R1	DF1	8	RESIN	50,00						Pendent
40	6	UNLOAD	TS1	DF1	11	SOLID 2	20,00						Pendent
50	6	AGITATE	DF1	DF1					444	2			Pendent
60	6	WATER	WAT	DF1	7	WATER	30,00						Pendent

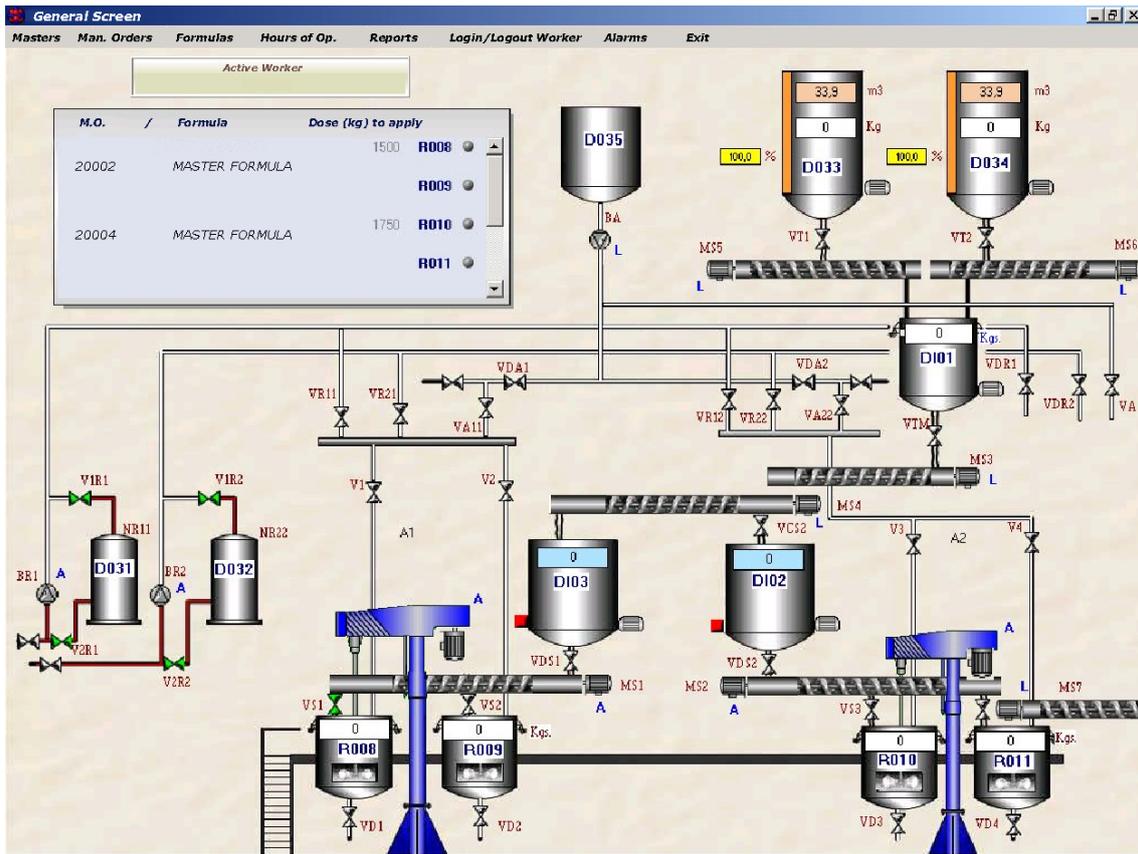
At the bottom of the window, there is a toolbar with buttons: 'Modify Step', 'Continue Cycle', 'Start Step', 'Enter M.O.', 'Print', 'End Step', 'Stop Cycle', 'Stop Formula', 'Remove Formula', 'FORMULA COMPLETED', and 'Exit'.

In process. Executing

The screenshot shows the 'Formulation' software window with the same input fields as above. The 'State' field is still 'In Process'. The table data is identical to the previous screenshot, but the state of the first step has changed:

Seq	Reac	Process	Sour	Dest	Product	Batch	Amount kg Formula	Amount kg (2)	rpm	Prog. Agit.T	Final Amount	Real Amount	State
10	1	LOAD	D11	TL1	1	SOLVENT 1	50,00				1,52		In Process
20	6	UNLOAD	TS1	DF1	9	SOLID	50,00						Pendent
30	6	RESINS	R1	DF1	8	RESIN	50,00						Pendent
40	6	UNLOAD	TS1	DF1	11	SOLID 2	20,00						Pendent
50	6	AGITATE	DF1	DF1					444	2			Pendent
60	6	WATER	WAT	DF1	7	WATER	30,00						Pendent

The toolbar at the bottom remains the same as in the previous screenshot.



Interrupted. The step is interrupted

Formulation

M.O. 4000 Batch Prog. Amount 200.00 State: In process

Formula 1 FORMULA 1 Formula Completed Active Worker

Com. NO

Seq	Reac	Process	Sour	Dest	Product	Batch	Amount kg Formula	Amount kg (2)	rpm	Prog. Agit.T	Final Amount	Real Amount	State
20	3	180	ADD SOLID	SAC	TS1	9	SOLID	50.00				0.00	Interrupted
40	3	180	ADD SOLID	SAC	TS1	11	SOLID 2	20.00					Pendent

Buttons: Modify Step, Continue Cycle, Start Step, Enter M.O., Print, End Step, Stop Cycle, Stop Formula, Remo. Formula, Formula completed, Exit

Finished. The step is already done

The screenshot shows the 'Formulation' software window. At the top, there are input fields for 'M.O.' (4000), 'Batch', 'Prog. Amount' (200.00), 'Formula' (1), and 'FORMULA 1'. The 'State' is 'In Process' and 'Active Worker' is empty. Below this is a table with the following data:

Seq	Reac	Process	Sour	Dest	Product	Batch	Amount kg Formula	Amount kg (2)	rpm	Prog. Agit. T	Final Amount	Real Amount	State
10	1	LOAD	D11	TL1	1	SOLVENT 1	50,00					1,52	In Process
20	6	UNLOAD	TS1	DF1	9	SOLID	50,00						Pendent
30	6	RESINS	R1	DF1	8	RESIN	50,00						Pendent
40	6	UNLOAD	TS1	DF1	11	SOLID 2	20,00						Pendent
50	6	AGITATE	DF1	DF1					444	2			Pendent
60	6	WATER	WAT	DF1	7	WATER	30,00						Pendent

At the bottom of the window is a control panel with the following buttons: Modify Step, Continue Cycle, Start Step, Enter M.O., Print, End Step, Stop Cycle, Stop Formula, Remove Formula, FORMULA COMPLETED, and Exit.

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

Restore step. Source and destination keep original variables to be change.

Variable configuration. Selection of source and destination of a line.

Orders Modification. To modify a step, select the step and then click button "Order modification". A display comes out where data can be changed.

Start. Starts the execution of a formula from the beginning or after a pause or sequence.

End. Finishes a step in process.

Continue. Continues the formula after the interruption (voluntary interruption or because of safety conditions)

Stop. Interrupts the process.

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

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.

Exit. Closes the window

An indicator shows state of formulation:

- Green: Unloaded formula

- Red: Stopped formula

When alarm goes off, an acoustic alarm is also activated. There are two ways to stop acoustic alarm: clicking the appropriate button on alarm indicator screen or pushing reset button at electrical panel.

When a formula is in execution and the process stops as it has reach a step where worker must take action (unload product), the step is marked like "In process". It will not continue until worker gives the order. This action is:

MANUAL STEPS

There is an electrical panel between scales. It contains a pilot light and a push button. When the formula reaches a manual step the pilot light switches on to indicate the worker, manual unload must be done. As it is done, the worker must indicate it to the system. To do it, press push-button or finish the process from computer.

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

SYSTEM GENERAL CONDITIONS

We describe below detailed general conditions of operation of system and some points to be considered.

Way of operation

There are two ways of operation:

Remote: Control from computer.

Local: Control from electrical panel

Agitators

Agitator electrical panels have an Automatic/Manual selector

In automatic mode, orders like time of agitation are registered in computer, so the process will stop automatically. To start press ON button. The process can be stopped at any time.

Manually orders or actions are not registered.

Pumps

Electrical panel contains switch selector for each pump. They have 3 positions:

- Pump in remote mode
- Zero
- Pump local start.

Remote position is the normal condition. Orders are made from the computer.

Position "zero" disables pump operation.

Pump local start position means pump will start when circuit is enabled, that is, a valve is opened.

Local mode performance over electrovalves is made pneumatically.

Alarms

Alarms are visual (light) and acoustic. Acoustic signal stops after 15 seconds. Before, it can be stopped either pressing reset at electrical panel or clicking on "register" button on computer. Visual signal remains until alarm is registered in computer.

Weigh variation security system

The system controls variations on weigh during dosage. When weigh does not change the process stops. Security system acts when weigh does not change within a minute.

Emergency button.

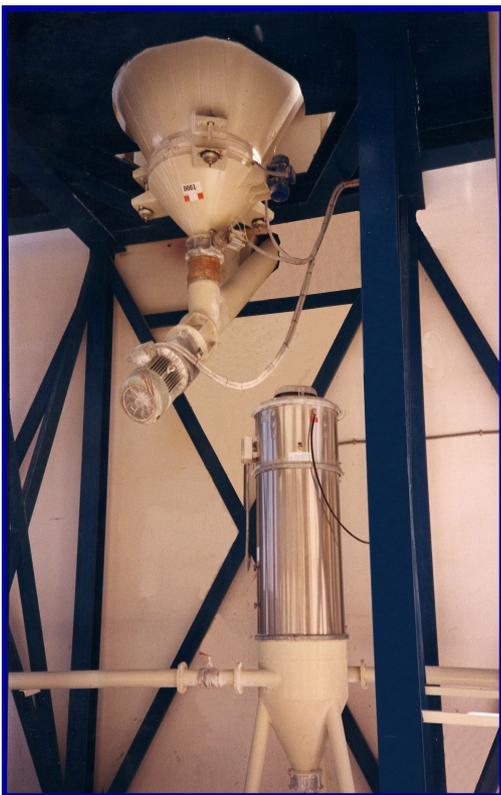
The activation of this button stops actions in process and stops/closes all components of the system



Detail of Manufacturing Plant



Detail of Silos with solids





Detail of Silos and Resin Tanks

Detail of electrical panels

