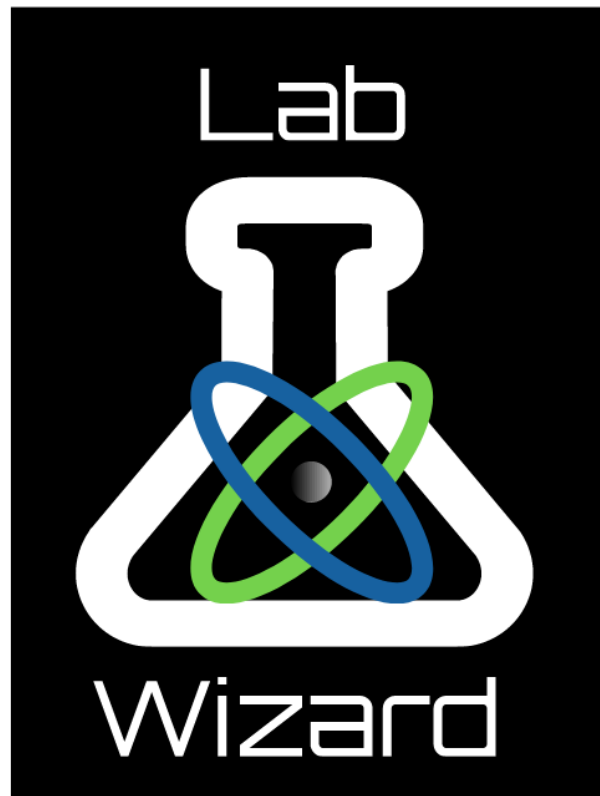


Lab Wizard 12 User's Guide



Binary Process Solutions

Lab Wizard® Version 12

Preface

This instruction manual describes the use of Binary Process Solutions Lab Wizard software and is written to cover as many applications as possible. Please do not hesitate to contact Binary Process Solutions or an authorized representative with questions or concerns.

The information in this instruction manual is subject to change without notice as improvements are made and does not represent any commitment whatsoever on the part of Binary Process Solutions.

Contact Information

To contact Binary Process Solutions technical support:

Visit <https://lab-wizard.com/contact.html>

Email to support@lab-wizard.com

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Lab Wizard

Introduction

Lab Wizard has been designed to handle all the lab scheduling, information management, and statistical process control involved in or associated with the wet processing area of a manufacturing environment including preventive maintenance scheduling of the associated equipment.

Upon installation and setup of the program, Lab Wizard will alert the lab tech when any process has a station due for a make-up or analysis. For station make-up, Lab Wizard will print a recipe for make-up of the station. For analysis, the lab tech enters the analysis value of a component and Lab Wizard will calculate the concentration and amount of the addition to bring the component to its target concentration. Lab Wizard will then automatically print an add sheet for the additions that need to be made. If the analysis is out of spec or out of control, Lab Wizard will display a control chart for that component, which will require the lab tech to enter an out of spec cause. If the concentration is beyond the action limits, the appropriate message will be displayed. With the aid of Lab Wizard's trending and SPC charts, the lab tech can easily optimize the interval between analysis by using the dynamic triggers provided for analysis and new make-up scheduling.

These dynamic triggers are separate triggers for each required action. The trigger's interval is maintained based on the three options available. They are time, product, both (triggered by the first due), and none (no triggering). Individual triggers are available for each station's new make-up and for analysis of each component within that station. The station trigger is used for new station make-up. Station make-up may also be triggered by a limit on component concentration value or by the accumulation of adds made since the last make-up. Component triggers are used for analysis. When the triggering is set for time, the time elapsed is the actual time a process is used. The time is process independent and calculated for each process using the "Weekly Work Schedule", accessible through the "Process Update / Work Schedule" menu on the main screen. This is easily accessed and changed to meet the demands of fluctuating work schedules. When a trigger is set for product, the number used is the product output of the process. This number is obtained from the data entered by the operator, by using either the scheduled process pop-up screen, or the "Process Update / Product Throughput" menu on the main screen.

Three symbols are used to help identify the scheduling of events such as analysis or make-ups.

◆ Pre Event ✓ Event Due ✕ Event Overdue

These symbols are a diamond, a check mark, or an X and appear in the list boxes on the main screen. A diamond symbol is used for notification of a pending event. The check mark appears in place of the diamond when the event is due. The X mark appears when an event is overdue. An event report is also available for print out. This report will display all events that are overdue, due and almost due, for a user defined, look ahead period.

Enhanced reporting capabilities include:

1. Pareto analysis of all processes by the month or months.
2. An SPC (Statistical Process Control) printout for each component. The SPC printout includes a concentration trending chart that provides a number for any out of spec data, a list displays the out of spec causes for each out of spec data point, a concentration control chart with out of control points numbered, a list of numbered out of control points with the SPC rule violation and corrective action, a moving range chart and a process capability plot.
3. Cpk Report (Capacity, Performance, Quality) for any process displayed down to the component level. Fields displayed are spec limits, control limits, sigma, # of data points, PCI (Process Control Instrumentation) or Cp (Critical Process) and Cpk.
4. Preventive Maintenance Report displays all PMs (Preventative Maintenance) with their current status.
5. Out of Spec Report for any combination of processes. Displays any component analysis that is out of spec for any time period specified. Options include displaying out of control data and excluded from SPC data.

Run-Time or product throughput triggers?

The most important feature of the Lab Wizard software is its dynamic triggers used to schedule analysis and make-ups by time (run-time) and product throughput. This is the reason the software was created and why it stands alone in the manufacturing community. This is NOT an SPC program. It is a Lab Scheduling and Information Management software that provides fully integrated SPC tools to optimize the interval for analysis and station make-up. The goal of scheduling is to only analyze the components that need analysis and only when necessary while maintaining a consistent interval between analysis. It will be very evident how to attain this goal by using the tools provided.

Most labs use an appointment type of scheduling for analysis and station make-up. Some tanks are analyzed on Monday, Wednesday, and Friday. Some tanks are analyzed on Tuesday and Thursday. Some tanks are analyzed every day or multiple times a day. Unfortunately, several inherent problems occur when using this approach. First, the analysis interval is based on twenty-four hours and has nothing to do with the actual run time of individual processes, unless you run

24 hours seven days a week. Second, the interval between analyses is consistent only when the analysis is done once a week (or weeks), once a day, or multiple times a day. Most manufacturing operations run either five or seven days a week. Five and seven are prime numbers (can only be divided evenly by themselves or one) and therefore the reason an appointment schedule is limited to only daily (or fractions thereof) and weekly appointments that can achieve consistent analysis intervals. For a five-day work week example, if analyses are done Mondays, Wednesdays, and Fridays the interval between analyses will be inconsistent because the run-time interval between Friday and Monday is only one day whereas the other intervals between the weekdays are two days. If analyses are done on Tuesdays and Thursdays, the intervals between analyses are still inconsistent due to the three-day interval between Thursday and the following Tuesday. Why should you have consistent analysis intervals? Analysis intervals that are not consistent are producing data that is not representative of how the process is operating. The SPC and process capability of a process with inconsistent analysis intervals are not a true representation of the process.

Which is better, time (run-time) or product throughput triggers? The clear-cut choice is the product throughput trigger when dealing with chemical processing. The factor that changes concentration the most is drag-in and drag-out of chemistry for most baths. This trigger also accounts for fluctuations of production through a process. The data resulting from analysis triggered by product throughput gives an accurate picture of how the process is really doing, by removing the noise caused by varying amounts of product through a process within an analysis interval. Do you base bath make-ups on time? If you do, start using product throughput as the basis for new make-ups. Use the manufacturer's recommended product throughput for new make-ups and the savings on chemical costs will pay for this software.

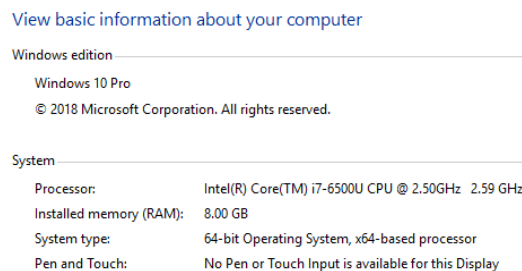
The time trigger is used whenever it is not practical to use product throughput for analysis or new make-ups. The time trigger is designed to be much more accurate than time used in an appointment type schedule. Time is only accumulated for a process when the process is scheduled to run. This schedule is setup using the weekly work schedule and can be changed at any time. The interval between analyses is maintained by resetting the trigger each time an analysis is done. The data produced will be more representative of true conditions than that of an appointment schedule. This is due to consistent analysis intervals and the time being the actual process operating time.

A trigger setting of "both" (time and product throughput) should be considered when an analysis that is normally triggered by product throughput exhibits a loss of concentration due to internal chemical reactions. This will trigger an analysis once either setting is reached.

Hardware Requirements

1. Personal computer using an Intel Core i5 processor with a minimum speed of 2 GHz.
2. Operating System: 64-bit Windows 10.
3. Ram (minimum): 8GB.
4. Storage (minimum): 3GB.
5. Video Adapter: capable of 1920x1200 resolution.
6. Monitor: 24" (or larger) with video resolution of 1920x1200.
7. Internet Connection: An active internet connection is recommended for software updates.

You can view your computer specifications by clicking the start menu, search for 'This PC', right-click 'This PC' and select 'properties'. You will see a screen like the following:



NOTE: For accurate process data, it is recommended to use a dedicated computer running Lab Wizard during all processes.

To set the video resolution:

1. Right click on the desktop.
2. Select 'Display Settings'
3. Scroll down to 'resolution' and select 1920x1200 from the drop-down menu.

Installation Instructions

If you are upgrading an existing Lab Wizard, you must rename or backup the LabWizard directory BEFORE installing this version. The new windows installer will delete the existing version.

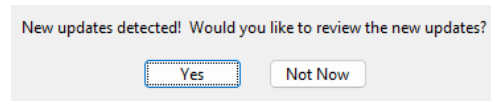
1. If you are upgrading from a previous version, please contact the Lab Wizard team to get a quote for data migration as the new database used is MySQL, which is not compatible with databases used in previous versions.
2. Ensure the Operating system has all updates installed and the system has been restarted.
3. Download the latest version of the Lab Wizard software using the link in your email.
4. Once the download is complete right-click the LabWizard.zip file and select 'Extract All' then click the 'Extract' button.
5. Close out all active programs and any open windows.
6. Double-click the setup.exe file and follow the prompts.
7. You must have administrator privileges in order to install the software. If you are prompted, enter the administrative credentials and select "Yes".
8. Proceed through the installation using all the default options, once the entire installation is complete you will be prompted to restart, DO NOT exit before this.
9. This software requires a license file, which is generated by the Lab-Wizard team. If you are having trouble starting the software due to a missing LW.ini file, please contact support for assistance.

After completing the above steps, start the program. Click on the current user to log in. The default admin password is "admin".



Updating Lab Wizard

Any time Lab Wizard is launched it will check if there is a new update available, if there is an update available then a small window will appear to alert the user.

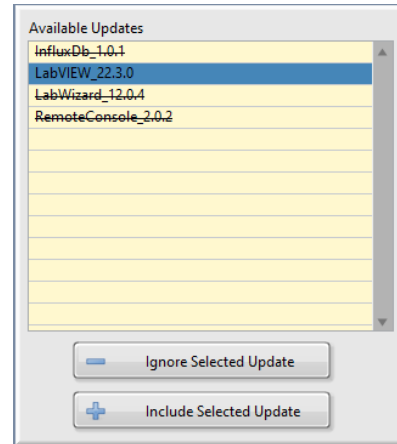


Selecting 'Yes' from this screen will close Lab Wizard and launch the updater to review any available updates. Selecting 'Not Now' will continue the Lab Wizard start up process.

Selecting Updates

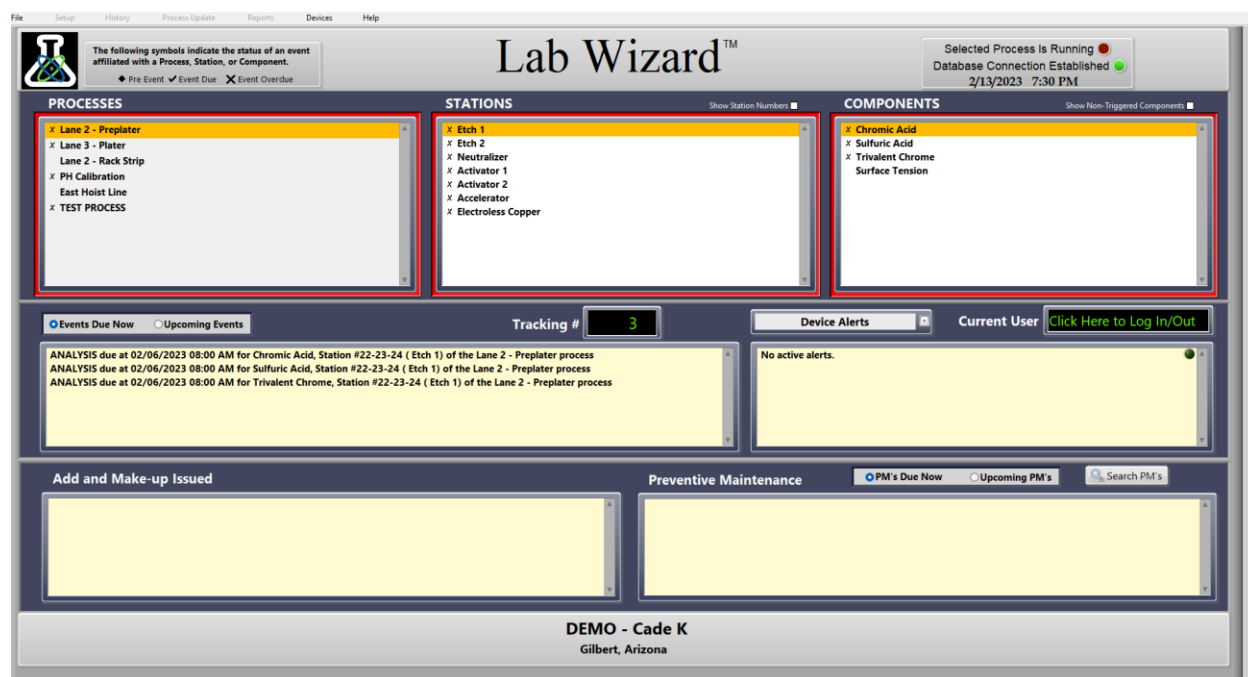
To choose an update, click on it within the "Available Updates" section with your left mouse button. To include it, click on "Include Selected Update". To dismiss it, click on "Ignore Selected Update". This will mark the update as ignored and will not download it.

To download the updates selected, navigate to the bottom of the Update Manager window and click on "Install Updates". If you wish to cancel all updates and close the Lab Wizard, click "Exit" instead.



If an error is returned such as that the Update Manager was unable to reach Lab-Wizard.com, a computer restart is recommended to fix the issue. If the issue persists, please contact support.

Main Screen



The main screen displays the current status of all processes by placing a symbol next to the processes that need attention. The list box labeled “Process” shows all the processes. The “Stations” list box shows all the stations of the process that are highlighted in the “Process” list box. The “Components” list box shows all the components of the station that are highlighted in the “Stations” list box. When an event is almost due (user defined), a diamond symbol appears in the list box next to the item. A check mark symbol appears next to any item when the event is due, and an “X” symbol indicates an event is overdue. A red border around these three list boxes will appear when an action is overdue. The event becomes overdue when it has been due for a percentage of the trigger value (user defined).

Select the “Events Due Now” option to see the events due for the highlighted station in the “Stations” list box and select the “Upcoming Events” option to display events that are not currently due but are scheduled for that station later. The “Tracking #” indicator displays the last number used for an add or make-up sheet. The “Current User” indicator displays the name of the operator that is logged on.

The bottom left text box lists all add and make-up sheets that have been issued and not closed out. The check mark to the left will become an X (overdue) if the action is not completed before a user defined percentage of the analysis trigger value. A red border around this text box indicates that one of the entries is overdue.

To close out a listed action, click the action and the following screen appears:

Binary Process Solutions

Gilbert, Arizona

Add Sheet

ADD SLIP

Tracking #000001

Date: 9/12/2021

Time: 2:56 PM

Process: Lane 3 - Plater

Station: Copper Strike

Station #: 56-57

Safety Equipment: Wear Safety glasses, gloves and apron.

PLEASE MAKE THE FOLLOWING ADDITIONS:

Copper Sulfate --> 168.00 pounds

Sulfuric Acid --> 5.47 gallons

Chloride (HCL) --> 30.96 mls

Issued By: admin

Initials: _____

Adds Made By: _____

Date: _____

Time: _____

Completed By

Sarah

Print

Action Completed

Cancel

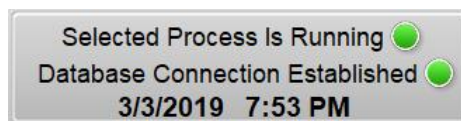
Press the “Action Completed” button to close out the issued sheet. Another copy of the sheet can be printed from this window with the “Print” button. Users with access level 4 or 5 can mark the issued sheet as completed by a different user by the “Completed by” drop-down list.

The bottom right text box lists any preventive maintenance items that are due. The check mark to the left will become an X (overdue) if the preventive maintenance is not completed by the number of days specified in the preventive maintenance setup for the displayed item. To close out the line item, click on the line and the following screen appears:

The screenshot shows a dialog box titled "Weekly Activator 1000 Addition". Inside, there is a section labeled "PM Instructions" with a yellow background containing the text: "Follow all safety guidelines in the MSDS and add the calculated amount of Activator 1000." Below this, there is a "Completed by:" field with "admin" entered, a "PM Completed" button with a green checkmark, a "Print" button, a "# of copies" field with "1" entered, and a "Cancel" button with a red X.

Click on "PM Completed" button to mark the PM as complete. A print option is also available if printing the PM instructions are desired. Users with access level 4 or 5 can change which user completed the PM via the "Completed by" drop-down list.

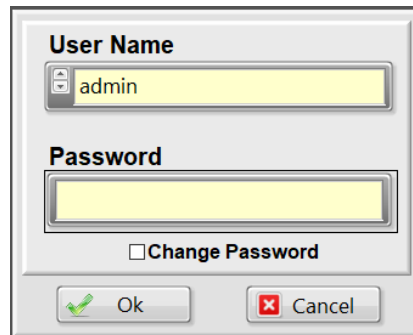
Date and time are displayed in the upper right portion of the screen. The colored dot next to "Selected Process Is Running" indicates if the selected process is accumulating time. Green means the process is running and accumulating time. Red means the process is not running and is not accumulating time. This is controlled by the weekly work schedule located in the "Process Update" – "Work Schedule" main screen menu. The other colored dot next to "Database Connection Established" should always be green indicating the database is connected.



To exit the program: click on the File menu and choose Exit.

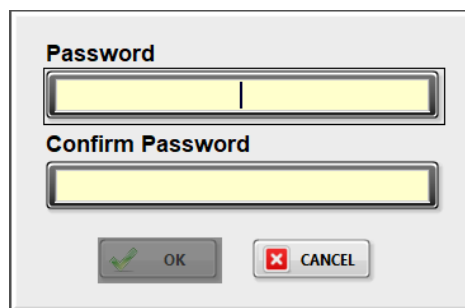
Operator Log In

Click on the “Current User” control. A user log in screen appears. Click on the User Name field to select the user, type in the password (case sensitive) and the “OK” button will become active to log in.

A dialog box titled "User Name" and "Password". The "User Name" field contains the text "admin". The "Password" field is empty. Below the password field is a checkbox labeled "Change Password". At the bottom are two buttons: "Ok" with a green checkmark icon and "Cancel" with a red X icon.

Changing the Password

To change the password, enter the current password on the login screen and the “Change Password” option will become visible, click the box then click “OK” to get to this screen:

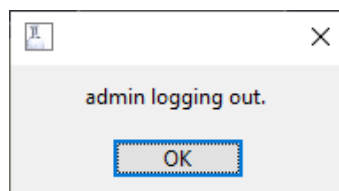
A dialog box titled "Password" and "Confirm Password". The "Password" field is empty. The "Confirm Password" field is empty. At the bottom are two buttons: "OK" with a green checkmark icon and "CANCEL" with a red X icon.

Enter the new password, type it again to confirm, then select “OK” to change the password.

Passwords for users can also be changed from the **User Management** window.

Operator Log Out

To log out click on the “Current User” control while logged in and the following prompt will appear:

A small dialog box with a title bar containing a question mark icon and a close button (X). The text inside says "admin logging out." Below the text is a single button labeled "OK".

Performing Due Analysis

Select the process and station that is due for analysis.

PROCESSES

- X Lane 2 - Preplater
- X Lane 3 - Plater
- X Lane 2 - Rack Strip
- X PH Calibration
- East Hoist Line
- X Strip Etch Strip

STATIONS Show Station Numbers ☐

Copper Strike

- X Bright Acid Copper 1
- X Bright Acid Copper 2
- X Bright Acid Copper 3
- X Bright Acid Copper 4
- X Bright Acid Copper 5
- X Bright Acid Copper 6
- X Satin Nickel 1
- X Satin Nickel 2
- X Semi-Bright Nickel 1
- X Semi-Bright Nickel 2
- X Semi-Bright Nickel 3

Optionally station numbers can be displayed to the right of each station by selecting the “Show Station Numbers” checkbox.

Select the “Events Due Now” radio box to display the events due.

☒ Events Due Now ☐ Upcoming Events

Click the line that contains the text “ANALYSIS”.

Station #EC04 (748 Microetch) of the Electroless Copper process due for DUMPING: 120.00 Square Feet past due
ANALYSIS due for Sulfuric Acid (PC Grade), Station #EC04 (748 Microetch) of the Electroless Copper process: 1.02 hours overdue

Then the Component Analysis screen will appear.

Component Analysis

[illegible]

All the components within the station that have an analysis trigger are listed in the above analysis screen. The input units, concentration units, add units, spec window, and comments are also listed for each component. If the component has a complex formula, that component name is shaded in yellow. The components that have a scheduling symbol associated with them show white in the input column. Components that are added through conditional formatting will have a dark gray background in the input column. These components do have an input option but will be given an add amount from another component. See the **Complex Formula** section for more information.

The bottom right displays a “Historical Analysis?” check box to include the data recorded in this analysis to track this process over time, a date may be selected in the “Date to use for this analysis record” box, set to the current date by default.

Clicking in the input column will bring up the following screen associated with the row that was clicked on.

Analysis Entry

Enter the value from analysis. The concentration and add amounts are calculated. Should the calculated add be less than the add threshold value, the add amount shown will be zero.

Station #EC13 (Electroless Copper) of the Electroless Copper Process

Cuposit "Z"

Enter Your Measured Value Here -->

0.0000

mls

Concentration-->

0.0000

g/l

Delta-->

8.0000

Add Threshold

0.0

liters

The amount for you to add is -->

9.6

liters

☐ ANALYSIS PROCEDURE

Edit Add Amount

OK

Cancel

An option to edit the add amount is available for components that do not have a complex formula. The option to edit the add amount is only available for level 5 users. More information about levels can be found in the **Users and Permissions** section.

The calculated add amount is set to zero and “The amount for you to add is” control can now be edited. Type in the add amount and click on the “OK” button.

Note: When editing the add amount the target value for this add is calculated based on the edited add, and replaces the default target value in the log entry.

[illegible]

The concentration from analysis is displayed in green if it is within the spec window or red if outside the spec window. The calculated add appears in the add column. If the add is below the add threshold value for the component, the add will be zero.

Procedure
Trend Chart
Show Formula
Maint. Add
Exclude Data
Comments
Cancel

Analysis Menu Options

Procedure

This will bring up the analysis procedure for the component.

Analysis Procedure for Sulfuric Acid (PC Grade)

REAGENTS:

1. 1.0N Sodium Hydroxide Solution: Dissolve 40.0 grams of sodium hydroxide C.P. into 500 mls of deionized water and dilute to 1 liter.
2. Methyl Orange Indicator: Dissolve 100 mg of methyl orange and distilled water and dilute to 100 ml.

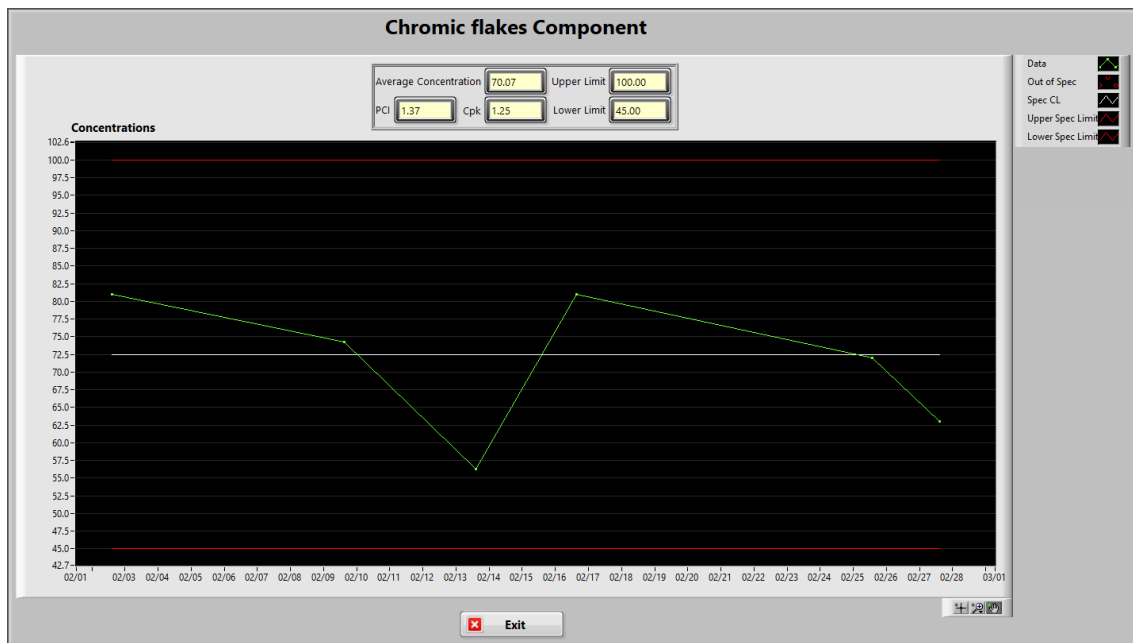
PROCEDURE:

1. Pipette 1 ml of etch solution into one 250 ml flask.
2. Add 100 mls of deionized water and 2-3 drops of methyl orange indicator
3. Titrate with 1.0N sodium hydroxide solution until color changes from pink to yellow.
4. Enter the number mls used into the "Enter Your Measured Value Here" of the analysis screen.

A

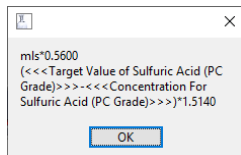
Trend Chart

This will display a trending chart for the component.



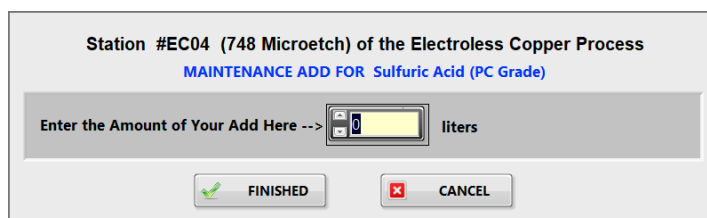
Show Formula

This allows you to view the formula used to calculate the concentration and add.



Maintenance Add

The following screen appears when choosing maintenance add.

A screen titled "Station #EC04 (748 Microetch) of the Electroless Copper Process" with a subtitle "MAINTENANCE ADD FOR Sulfuric Acid (PC Grade)". Below this is a text input field with the prompt "Enter the Amount of Your Add Here -->" and a numeric keypad icon. To the right of the input field is a label "liters". At the bottom are two buttons: "FINISHED" with a green checkmark icon and "CANCEL" with a red X icon.

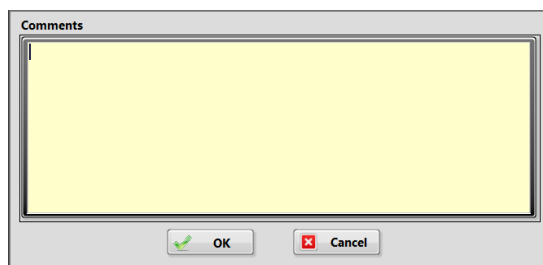
Enter the add amount and click on the “Finished” button. The add will appear for the component with “(Not Analyzed)” appearing in the concentration column. It should be noted that the analysis trigger is NOT reset. The only way to reset an analysis trigger is to perform the analysis.

Exclude Data

Choosing this option will place “(NOT INCLUDED)” in the comment column. This will cause the data entry for this component to be excluded from all SPC data sets and calculations. This is designed for analysis being performed to start up a process. This should only be used when no product was processed with this bath concentration.

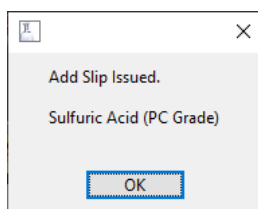
Comments

This option will bring up a screen where you may type in any comment to be associated with this analysis. This is for a general comment and is not for Out of Spec comment or Out of Control corrective action. It will however appear with this data point in the trending charts in the component history.

A dialog box titled "Comments" with a large text area for input. At the bottom are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

Click the “OK” button to save any comments made.

The next thing that happens depends on how the station is setup. If the “Automate Add Printout” option is checked in the station setup, the adds are automatically printed out. The basis for determining whether to include an add in the printout is done by comparing the add amount to the “Add Threshold” value. If any of the adds are equal or greater than the add threshold, the following prompt will appear listing each component that meets the criteria.





If the “Automate Add Printout” is not checked in the station setup, the following screen appears after exiting the analysis screen.

Station #48-49-50 (Electroless Copper) of the Lane 2 - Preplater Process

CONFIRM THE ADDS BELOW THAT ARE TO BE PRINTED BY CLICKING ON THE CORRECT LINE WITH YOUR MOUSE - THEN CLICK THE ISSUE & PRINT ADD SLIP BUTTON

Caustic (NaOH)	Concentration =5.6000 gms/liter, Add 3.98 gallons	ADD ISSUED
Formaldehyde (HCHO)	Concentration =3.3750 gms/liter, Add 1.35 Gallons	ADD ISSUED
Ultradep 30A	Concentration =1.9050 gms/liter, Add 4.19 Gallons	
Ultradep 61B	Concentration =0.0900 molar, Add 0.08 gallons	

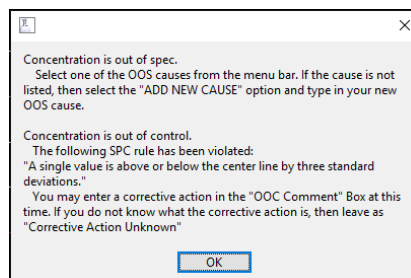
 **Issue & Print Add Slip**  **Do Not Issue Adds**

This screen lists the calculated concentration and adds for each of the components that were analyzed. For maintenance adds, the component will show that it was not analyzed. To confirm the add is to be made to the station, click on each line (“ADD ISSUED” will appear). Click on the “Issue & Print Add Slip” button to print out an add sheet.

Note: If the lab tech fails to click on the line to confirm that an add is to be made, Lab Wizard will not log the add nor will it be included in the add sheet. It will, however, log the analysis and concentration and reset the trigger for that action.

Real Time SPC

After closing out the print add sheet screen or clicking the “OK” button on the prompt, Lab Wizard retrieves data from the log files for each component analyzed. The control limits are calculated and compared to the concentration from analysis. The spec limits are also compared with the concentration. If the concentration is out of spec or out of control, the following prompt appears.



This prompt informs the operator of an out of spec or out of control condition. If the concentration is out of control, the SPC rule or rules that are violated are listed. Click on the “OK” button and the following screen appears.



A control chart is displayed with the last data point being the concentration of the analysis just performed. The data interval used is dictated by the number of days entered in the SPC setup. The dashed red lines are one standard deviation apart. The solid red lines are the control limits. When an out of spec condition occurs, an out of spec cause must be chosen before exiting this screen. To apply an out of spec cause, click on the drop-down list “Select OOS Cause Here Before Exiting” and click on the appropriate cause. If an out-of-control condition occurs, the operator can type in the comment in the text box at the bottom of the screen. This is optional. If the corrective action has not been determined, leave the default “Corrective Action Unknown” in the text box.

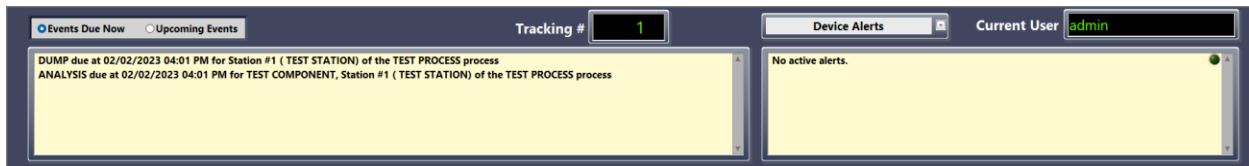
If the out of spec cause is not listed in the out of spec drop down list, click on “Add New Cause” option at the bottom of the list. The following screen appears.

Type a new cause into the text box and click on the “Add New Cause” button. The new cause is applied to the data point and added to the bottom of the list of causes.

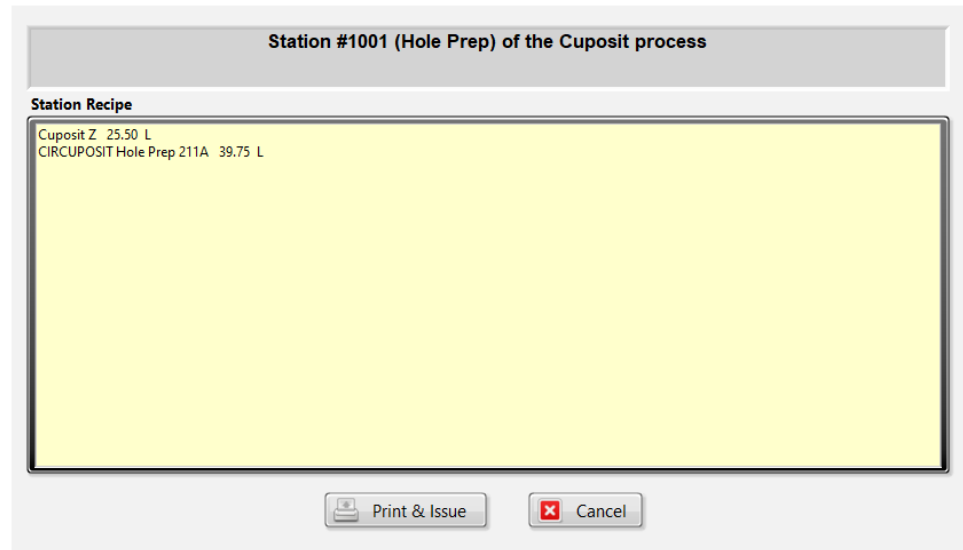
The control chart will normally only appear after an analysis that is either out of spec or out of control. However, if the option “Display control chart after every analysis” is checked in setup, the control chart will appear after every analysis. If the action limits are enabled and the concentration is beyond either limit and not beyond the control limits or spec limits, a prompt will appear containing instructions for that situation.

Scheduled Station Make-up

When a scheduled station dump is due, it will appear in the “Events Due Now” window.

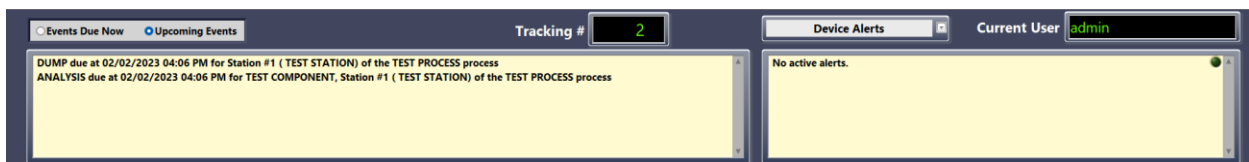


Click on the line that shows the station is due for dumping and the following screen appears.



This screen shows the station recipe for a new make-up. Click on the “Print & Issue” button to print out a make-up sheet. When the “Print & Issue” button is clicked, the station make-up is logged along with the adds required to make-up the station and the make-up trigger is reset.

To perform an early analysis or station make-up, Click on the “Upcoming Events” option.



Click on the appropriate line and continue as described in the previous sections on scheduled analysis and station make-up. Note: The station trigger is reset for make-up and component triggers are reset for each component included in the make-up.

Tracking Number

This number is the last number printed for an add or makeup sheet. The number is cumulative and cannot be reset.



Main Screen Menu

File	Setup	History	Process Update	Reports	Devices	Help
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File

Exit: Shuts down the program.

Setup

Process Setup: Opens the main process setup screen.

Users and Permissions: Allows adding, deleting, and editing users and passwords.

Dashboards: Opens the dashboards screen. See the **Dashboards** section for details.

History

Process History: Opens the process history screen.

Station History: Opens the station history screen.

Component History: Opens the component history screen.

PM History: Opens the preventative maintenance history screen.

Advanced History: Opens the advanced history screen.

Device Alerts History: *Sensor hardware integration COMING SOON.*

Process Update

Product Through-put: Allows entry of process through-put.

Work Schedule: Allows changing process time accumulation schedule.

Reports

Events Status Report: Opens the events status report screen.

Events Completed Report: Opens the events completed report screen.

Out of Spec Report: Opens the out of spec report screen.

Cpk Report: Opens the Cpk report screen.

Preventive Maintenance Report: Opens the preventative maintenance report.

Station History Report: Opens the station history report screen.

Devices

Sensor hardware integration COMING SOON.

Help

Version: Displays the current version of Lab Wizard.

Setup

Users and Permissions

Choosing the above menu displays the following screen.

The screenshot shows a web application interface titled "User Management". On the left, there is a list of users: "admin", "Brady", "Sarah", "Reports", and "Operator". The "admin" user is selected and highlighted in blue. To the right of the list, the details for the selected user are displayed in a black box with green text: "User--> admin", "Level--> 5", "Password--> *****", and "Department--> all". Below this, there are two main sections. The left section contains two buttons: "Change Password" (with a green checkmark icon) and "Update Permission Level" (with a green checkmark icon). Below each button is a text input field. The "Update Permission Level" field contains the number "5". The right section contains a text box explaining permission levels: "Permission levels are used to control user permissions. Each higher level inherits the permissions of the previous levels." followed by a list: "Level 1 - View history & reports", "Level 2 - Handle issued slips & PM tasks", "Level 3 - Perform analysis", "Level 4 - Access to process update menu", and "Level 5 - Full admin access to everything". At the bottom, there are two buttons: "Delete User" (in a red box) and "Create New User" (with a blue plus icon).

Clicking on a name in the user list will display the password level assigned to that person. The password is not displayed but can be changed by typing the new password in the password control.

User Levels

The user levels are used for selectively restricting program access for individual users. The lower the user level the more restrictive the access. Level 5 users have all program access.

Level 1: Allows viewing of all histories and reports.

Level 2: Allows operation of the “Add and Make-up Issued” and “Preventive Maintenance” controls on the main screen.

Level 3: Allows for analysis.

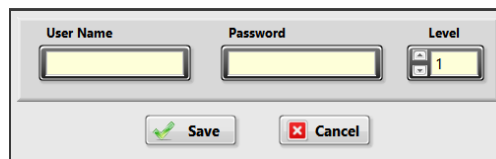
Level 4: Allows updating process through-put and process work schedule. Editing of the station history within the “Station History” and corrective action within the “Control Chart” is also allowed.

Level 5: This is the account which has access to all areas of the software. The default password is blank, you can hit the backspace key and “Ok” to log in. From this point you can enter “Users and Permissions” to set the admin password and add additional users.

Note: You cannot delete the admin account, if you need to reset the admin password please contact the Lab-Wizard support team and we will issue a password.

Add User

Click on the “Create New User” button and the following screen appears.



Type in the user’s name, password, and assign a level. Click on “Save” to save and return to the “User Management” screen. You should now see your newly created user on the list.

Delete User

Select the name to delete. Click on the “Delete User” button. A window will appear to confirm deleting the selected user.

Change User Password

Select the user whose password you wish to change, and type their new password under the “Change Password” field. Click “Change Password”. A window will appear to confirm changing the password.

Click on the “X” in the top right of the window to close the “User Management” window and return to the main screen.

Process Setup

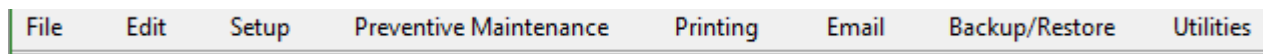
Only level 5 users can access the setup screen.

The screenshot displays the 'Process Setup' window with a menu bar at the top: File, Edit, Setup, Preventive Maintenance, Printing, Email, Backup/Restore, Utilities. The window is divided into three main vertical sections: Process, Stations, and Components, each with a corresponding 'OPTIONS' tab.

- Process Section:** A list box shows 'Lane 2 - Rack Strip' selected. Below it, a 'Units for measuring product' section has a dropdown set to 'Gallons' and a checkbox for 'Out of Spec Printout'. A 'Pop up Screen Schedule' section lists days and scheduled times.
- Stations Section:** A list box shows 'Nitric Acid 2' selected. Below it, a 'Station Number' dropdown is set to '5'. A 'Station Size' dropdown is set to '1800.00'. A 'Unit Describing Station Size' dropdown is set to 'Gallons'. A 'Trigger Station Make-up by:' dropdown is set to 'None'. A 'Product Run Through Process' dropdown is set to '0.00'. A green 'Add Instructions' button is visible.
- Components Section:** A list box shows 'Nitric acid metal' selected. Below it, an 'Analysis / Units / Spec Limits' section has a dropdown set to 'Time'. A 'Hours' dropdown is set to '120.00'. A 'Product Run Through Process' dropdown is set to '0.00'. A 'Bath Concentration Units' dropdown is set to 'oz/gal'. A 'Unit for adds' dropdown is set to '0.000'. A 'Unit for analysis' dropdown is set to 'mls'. A 'Unit for new station make-up' dropdown is set to '0.000'. A 'Make-up Precision' dropdown is set to '0.00'. A 'Concentration Constant' dropdown is set to '0.800'. A 'Add Constant' dropdown is set to '0.000'. A 'Lower Limit' dropdown is set to '1.000'. A 'Upper Limit' dropdown is set to '30.000'. A 'Target Value' dropdown is set to '15.000'. A 'Prompt Lab Technician with the instructions below if component concentration is: <' dropdown is set to '0.00'. An 'Instructions' text box is at the bottom.

The setup screen shows the details of how each process is structured. Choosing a process, station, and component in the list boxes displays the setup values for each. **Nothing can be changed from this screen.** To add, modify, or delete a process, you must use the “Process Options” drop down menu. To add, modify, or delete a station, you must use the “Station Options” drop down menu. To add, modify, or delete a component, you must use the “Component Options” drop down menu. The green dropdown menus have a corresponding text box which will change to the value based on the data that has been entered for that selection.

All other program attributes are accessed through the menus at top of the screen.



Menu Options

File

- Cancel**
- Save and Exit**

Edit

- Pareto Causes**
- Global Constants**

Setup

- User Mode**
- Event Triggering Symbols**

Preventive Maintenance

- Preventive Maintenance**

Printing

- Add Template**
- Make-up Template**
- Out of Spec Template**

Email

- Email Server**
- Email Addresses**
- Email Recipients**
- Test Email**

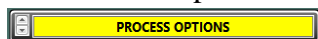
Backup/Restore

- Backup**
- Restore**
- Import Migration File**

Utilities

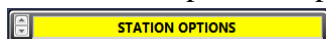
- Remote Config**

The Process Options drop down menu has the following:



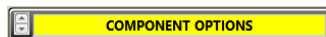
- Add Process**
- Modify Attributes of Selected Process**
- Delete Process**
- Duplicate/Rearrange**

The Station Options drop down menu has the following:



- Add Station to Selected Process**
- Modify Attributes of Selected Station**
- Delete Station from Selected Process**
- Duplicate/Rearrange**

The Component Options drop down menu has the following:



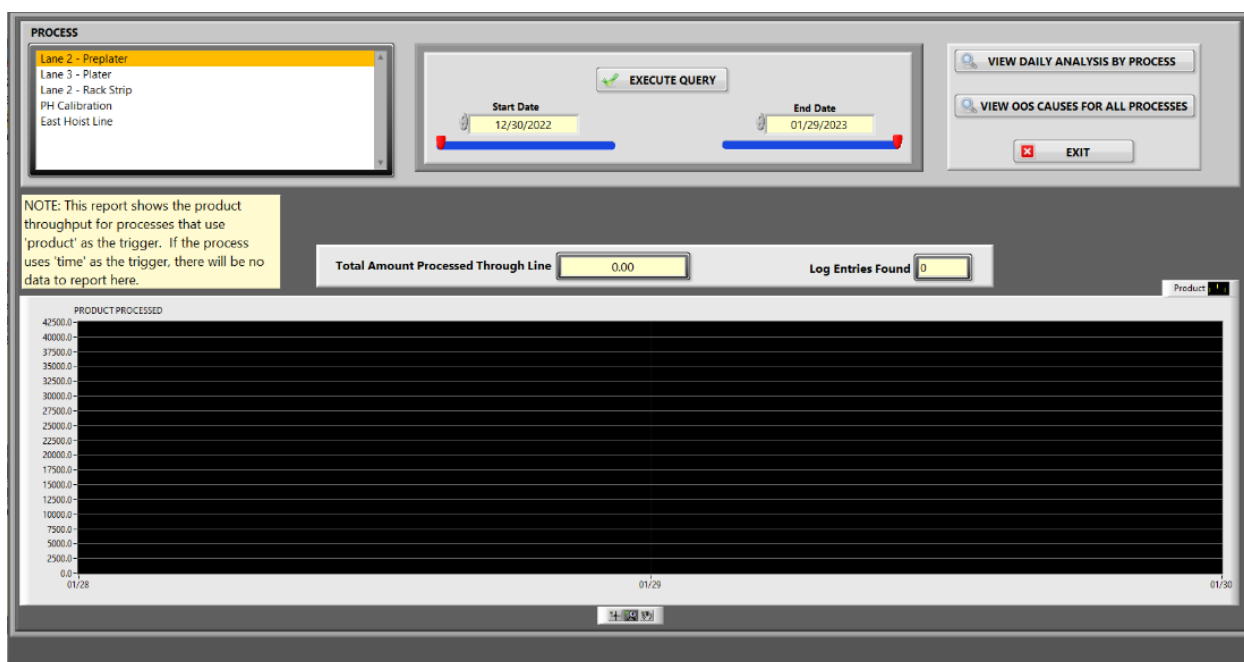
- Add New Component to Selected Station**
- Modify Attributes of Selected Component**
- Delete Selected Component**
- Duplicate/Rearrange**


For a detailed description of the above menu options, refer to the **Component Setup** section.


History

Process History

The process history screen displays a chart of the product throughput for the process highlighted in the list box. The time range shown in the chart is determined by the setting of the start date and the end date (default is the last 30 days). Choose the process and time interval then click on the “Execute Query” button and the appropriate data is graphed. The “Total Amount Processed Through Line” window indicates the total amount with units for the time period selected. To view the throughput for other processes, click on the process in the list box.



 [VIEW DAILY ANALYSIS BY PROCESS](#)

 **Execute Query**

[illegible]

The information is displayed as follows.

1. Process
2. Station
3. Station Number
4. Component
5. Date
6. Time

Event Information (Depending on the report type) includes:

- a. Analysis concentration with out of spec causes, out of control corrective action, and general comments.
- b. Add amount
- c. Make-ups
- d. All the above.
8. Amount overdue
9. Technician

To edit or print the data, click on the “Copy to Clipboard” button to paste the data into another program.

Clicking on the “View OoS Causes for All Processes” button brings up the following screen.

Out of Spec Causes Pareto Screen

Year/Month

201807
201808
201809
201810
201811
201812
201901
201902
201903

Note: Select more than one month by holding down the CTRL key and selecting.

Incidences Found 14

List By % occurrence

CAUSE	Percentage
Controller not keeping up with pump.	42.86
conc.add possibly made	21.43
plated too long	7.14
bath was carbon treated	7.14
bath is being used for rework also	7.14
Tank level too high	7.14
Bath needs to be replenished with new solution.	7.14

Exit

This screen displays the out of spec causes used for all processes. The time interval is chosen by the month or months. The out of spec causes are listed by “% occurrence” or “frequency” which can be toggled by pushing the button.

Station History

The station history screen displays the log file entries for the selected station with the most recent file listed first and the oldest entry listed last, it also shows the option to view the analysis inputs. Choose the process and station from the list boxes. Select the “Start Date” and “End Date” interval (default is 30 days), select whether to view analysis input values, then click on the “Execute Query” button to retrieve the log file information. The displayed log file entries are date, time, action taken, operator, result, out of spec cause (if any), out of control corrective action (if any), and general comments.

The screenshot shows the 'Station History' application window. It features two list boxes on the left: 'PROCESS' and 'STATIONS'. The 'PROCESS' list includes items like 'DES', 'Alternative Oxide', 'Electroless Copper', etc. The 'STATIONS' list includes 'Inner Layer Etcher', 'DV-6450', 'Photoresist Strippers', etc. To the right of these lists is a 'TIME PERIOD' section with 'Start Date' (01/21/2023) and 'End Date' (02/20/2023) fields, and checkboxes for 'View Dump Events' and 'View Analysis Input Values'. Below this is an 'EXECUTE QUERY' button. Further right are buttons for 'Station Setup', 'Export Data to Excel', 'Copy to Clipboard', 'Print Log', and 'Exit'. At the bottom left, there is a 'Data Entries Found' label with a value of '0' and an 'Edit Mode' checkbox. The main area of the window is a large, empty table with many rows, intended for displaying log entries.

Note: The text box will auto size depending on the number of “data entries found”.

To print out the displayed data, click on the “Print Log” button. Click on the “Edit Mode” box to edit the log entries. This function requires a level 4 or 5 user to be logged in. Locate the line that needs to be changed and click on that line.

The following screen appears.

The screenshot shows a software interface for editing log entries. The 'Log Information (Read Only)' section on the left contains four text boxes: 'Process' with 'Electroless Copper', 'Station' with 'Conditioner 3320', 'Component' with 'Conditioner 3320', and 'Event' with 'ANALYSIS'. The 'Analysis Fields' section on the right is titled 'Analysis Fields' and contains three sub-sections: 'Value' (0.1000), 'Unit' (normality), and 'Lab Tech' (admin); 'Out of Spec Comment Fields' (Bath needs to be replenished with new solution.); 'Corrective Action Fields' (N/A); and 'Comment Field' (empty). At the bottom are three buttons: 'Ok', 'Delete', and 'Cancel'.

This screen displays the fields of the log entry, the fields on the right-hand side can be edited. To edit an entry, click in the field that you want to edit and enter the changes. If the entire entry is to be deleted from the log file, click on the “Delete” button, otherwise click on the “OK” button to save the changes. The changes will not appear in the station history screen until the “Execute Query” button is clicked again.

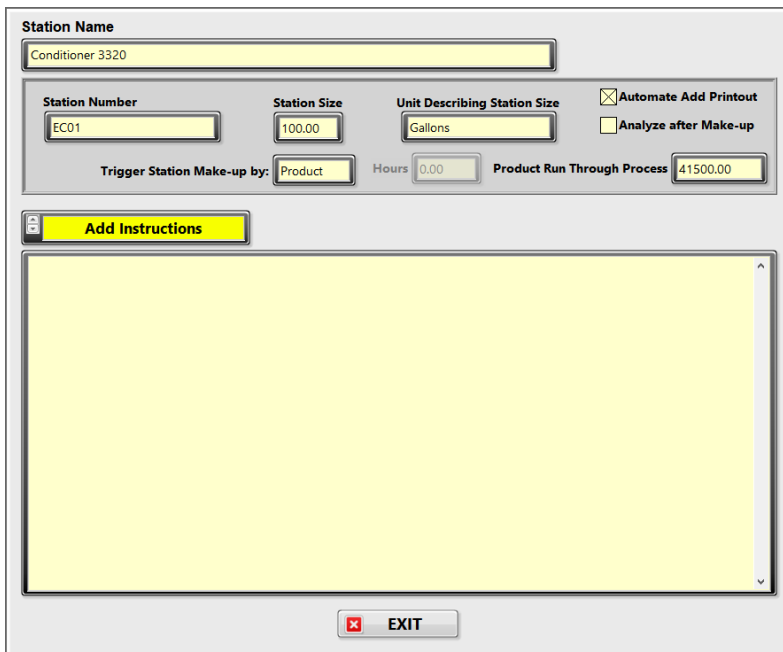
Note: The editable fields change depending on whether the log entry is for an analysis, add, or make-up. This also edits the database.

The station setup can be viewed from this screen by clicking on the “Station Setup” button. The following screen appears.

Click on the “Exit” button to leave the station history screen and return to the main screen.

Station Setup

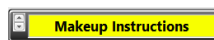
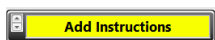
The Station Setup feature provides the following information to configure your plating line chemical analysis process: Station Name, Station Number, Station Size and the Units describing its size, Automate Add Printout option, the ability to require an Analysis after Station Makeup, the Trigger Method for initiating a new makeup, and the Number of Units required to trigger a new Station Makeup.



The Station Setup dialog box contains the following fields and controls:

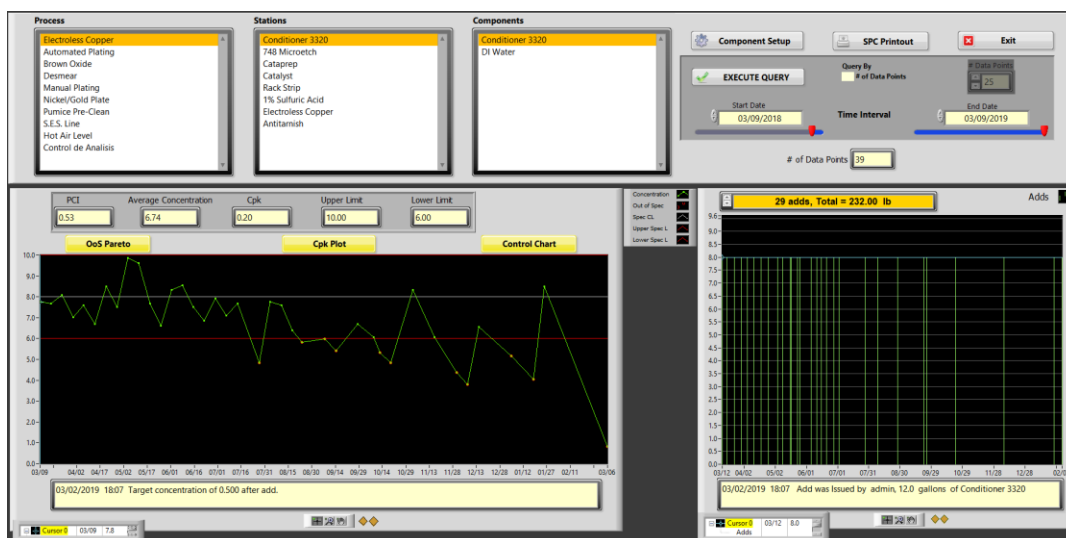
- Station Name:** A text field containing "Conditioner 3320".
- Station Number:** A text field containing "EC01".
- Station Size:** A text field containing "100.00".
- Unit Describing Station Size:** A dropdown menu showing "Gallons".
- Automate Add Printout:** A checked checkbox.
- Analyze after Make-up:** An unchecked checkbox.
- Trigger Station Make-up by:** A dropdown menu showing "Product".
- Hours:** A text field containing "0.00".
- Product Run Through Process:** A text field containing "41500.00".
- Add Instructions:** A button with a document icon.
- Instructions Area:** A large yellow rectangular area for text input.
- EXIT:** A button with a red X icon.

This screen is only to view the component settings, to configure the component see the “Process Setup” section. The only setting that can be toggled is the drop down menu to display the “Add Instructions” Or the “Makeup Instructions”



Click on the “Exit” button to return to Station History then click on the “Exit” button to leave the station history screen and return to the main screen.

Component History



The component history screen displays two charts. Click on the process, station, component, and adjust the time period (30-day default) or choose the option to display the latest specified number of data points. Next click on the “Execute Query” button to display the data. The “# of Data Points” indicator displays the number of data points contained in the concentration chart. The two charts display the following information.

1. Concentration chart:

- Plots the concentration of the component and the target value if an add was made.
Note: “Have control chart display target value after every add” must be checked to display target value. This setting is found within the process setup screen.
- Plots the upper and lower spec limits for the component concentration.
- Plots the spec center line.
- Displays the average concentration for the specified time period.
- Displays the Cpk for the specified time period.
- Plots the upper and lower action limits along with the upper and lower limit values if the action limit option is enabled.

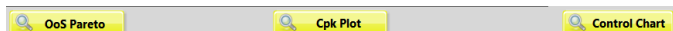
2. Adds chart:

- Shows each add that was made for the specified time interval.
- Indicates the total amount for the adds made in the specified time interval. When add and make-up units are different, the drop-down menu shows the total for each unit.

In each chart, you can access log information for individual data points by using the cursor on the left side. Dragging it over a data point will display relevant details in the text window located at the bottom of the chart. The log information displayed in the "Concentration Chart" includes date, time, component name, actions taken, operator name, concentration level, reason for any out-of-spec occurrences (if applicable), any out-of-control comments (if applicable), and general comments (if applicable). For the "Add Chart", the log information displayed includes date, time, operator name, and the name and quantity of the added component.

Additional SPC charts

Charts are accessed with the buttons at the top of the concentration chart.



1. Out of Spec Pareto Chart
2. Cpk Plot
3. Control Chart

SPC Printout

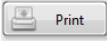


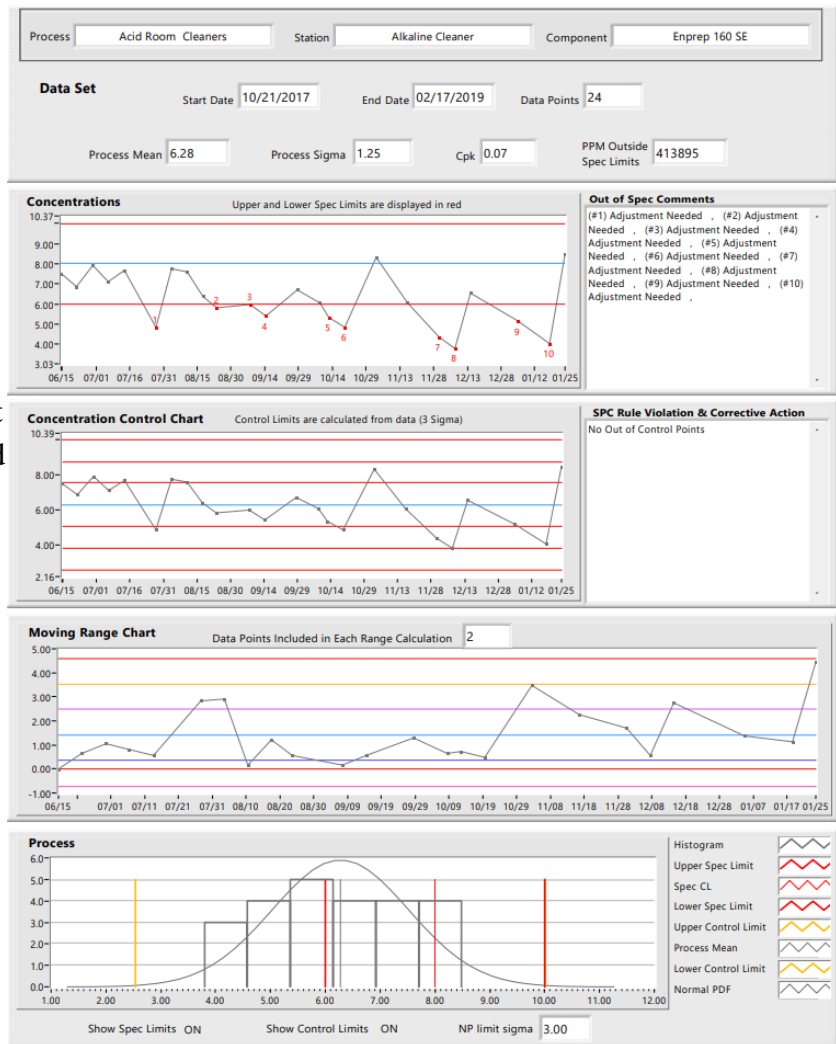
Provides a printout of the following on a single page.

1. **Concentrations Trending Chart:** Plots the upper and lower limits with the concentration data. Any out of spec data is numbered for reference in the comment box.
2. **Out of Spec Comments:** Lists any Out of Spec comments for out of spec data point in the trending graph.
3. **Concentration Control Chart:** Plots the upper and lower control limits with the concentration data. Any out-of-control data points are numbered for reference in the comment box.
4. **SPC Rule Violation & Corrective Action:** Lists the SPC rule violations and the corrective action for any out-of-control data points in the control chart.
5. **Moving Range Chart:** Plots a moving range chart
6. **Process Capability Plot:** Plots the process capability curve

The top chart labeled “Concentrations” is the concentration trending chart. Out of spec data is numbered and the corresponding out of spec cause and any general comment is listed in the text box to the right of the chart.

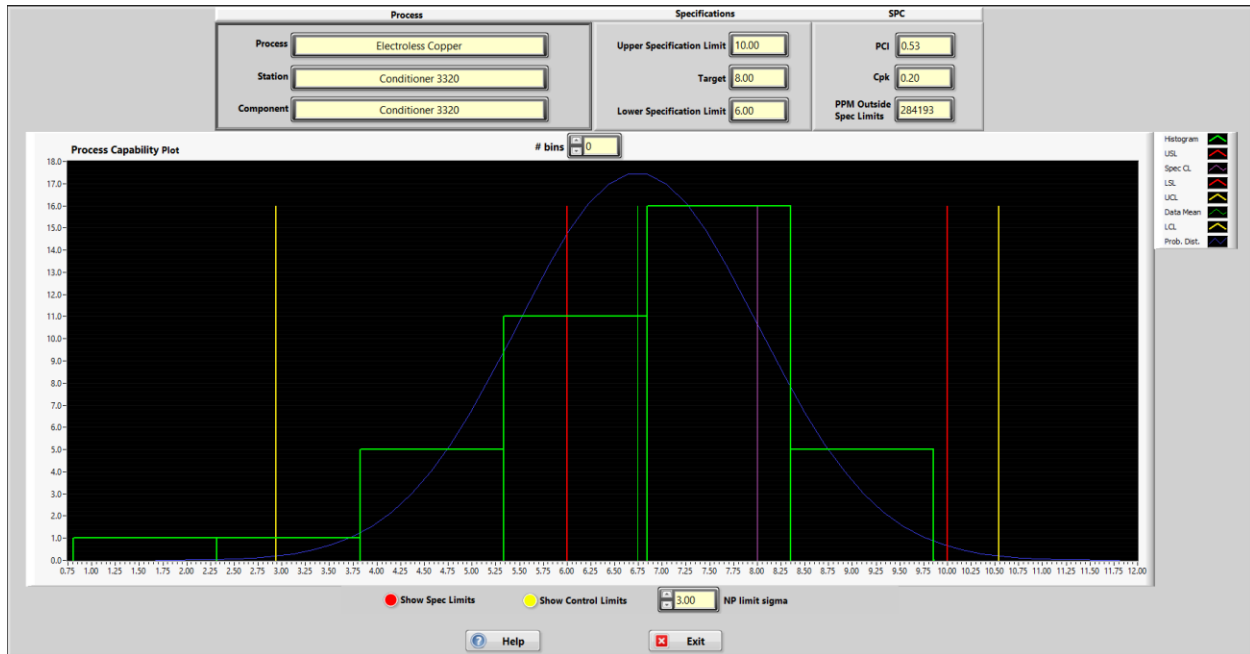
The “Concentration Control Chart” numbers all data points that are out of control. These numbered points are listed in the comments text box, to the right of the chart, along with the SPC rule violation, corrective action, and general comment for each data point.

Below the control chart is the “Moving Range Chart”. The bottom chart is the Cpk Plot or the “Process Capability” chart. Click on the  button to print out the page and return to the Component History screen.



Note: The data set is determined by the start and end dates in the component history screen. Any changes made to the Cpk Plot or the Control Chart will automatically be passed on to the SPC Printout.

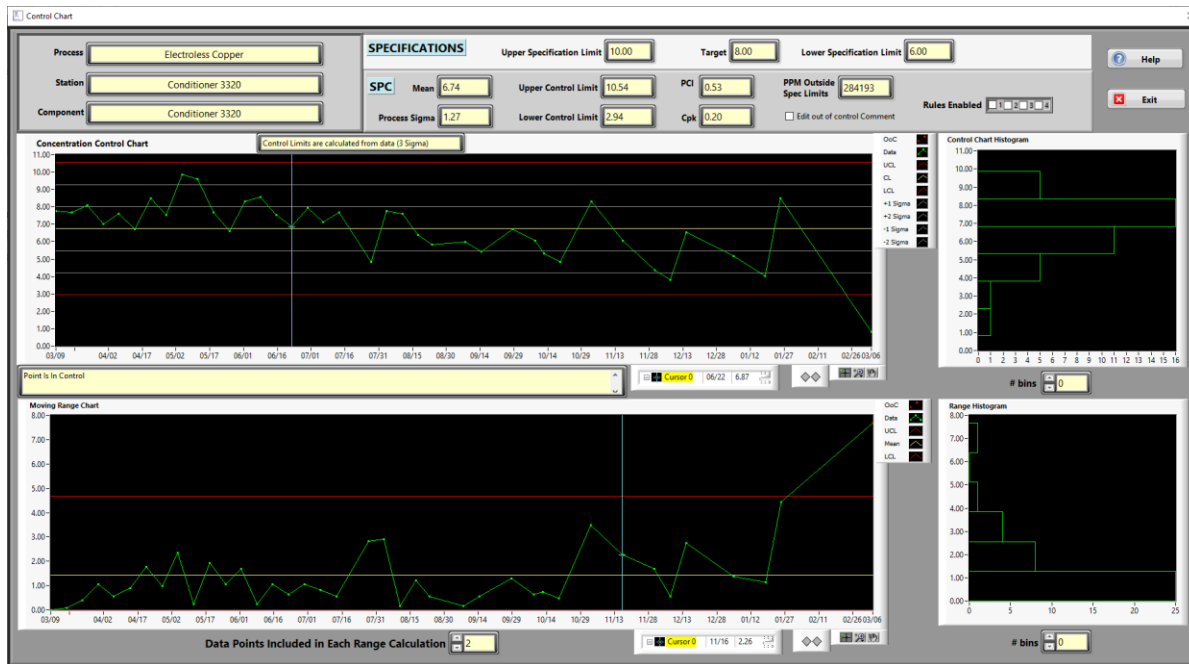
Cpk Plot



This plot is very useful in determining if the process is centered and if the frequency of analysis is correct. The following information is displayed in the chart.

4. Histogram of the data (interval picked in the component history screen).
5. Upper Spec Limit
6. Spec Center Line
7. Lower Spec Limit
8. Upper Control Limit
9. Data Mean
10. Lower Control Limit
11. Normal Probability Distribution Function

Control Chart



Displays two charts:

1. Control chart with associated Histogram.
2. Moving Range chart with associated Histogram.

Control Chart: Out of control data is displayed as red data points.

1. **Concentration Control Chart:** Contains the following.
 - a. Plots concentration, upper control limit, and lower control limit and control limits center line. The dashed lines are the first and second standard deviation lines.
 - b. Top Text Box: Indicates how the control limits are determined.
 - c. Bottom Text Box: Provides information about the data point that the cursor is on.
 - i. Point is in control.
 - ii. Point is out of control, which SPC rules are violated and corrective action.
 - d. Histogram of data displayed on the Y axis with the number of data points in each bin located on the X axis.
 - e. Add/Modify out of control comments. The “add or modify check box” is only visible when the cursor is on an out-of-control data point.
2. **Moving Range Chart:** Out of control range is displayed as red points.
 - a. Plots the range, range mean, and lower and upper control limit.
 - b. Select the number of data points per range calculation.
 - c. Histogram of range data plotted on the Y axis with the amount of data within each bin plotted on the X axis.

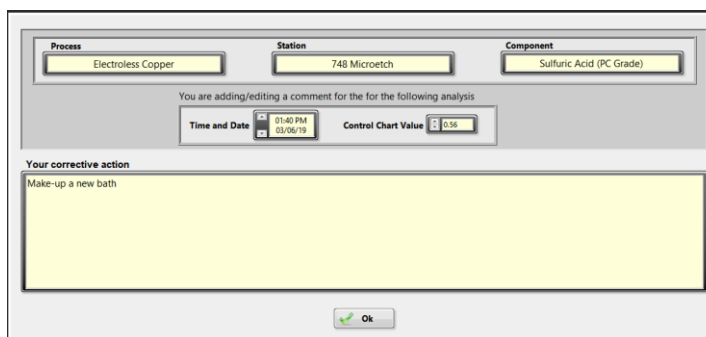
Editing Corrective Action

To edit the out-of-control corrective action comment, place the cursor on the OoC data point. The control pictured appears.

☐ Edit out of control Comment

Click on the control and the following screen appears. **Note:** requires a level 4 user to access.

Click in the text box to edit the corrective action for the data point selected. Clicking “OK” edits the log file and database to change the comment and returns to the control chart screen.



Note: Placing the cursor on an out-of-control data point that is a result of an add will not enable the Add/Modify out of control comment control. This is because only analysis data points have corrective action comments, add entries do not.

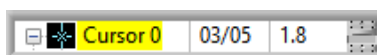


Chart Controls

Below the charts are the following controls.

The three sections above display the cursor name, date and value of data point where the cursor is located.



Clicking on either button steps the cursor in that direction.



This control determines how the mouse functions with the chart.



Allows the mouse to drag the cursor.



Zoom control, clicking this displays the following options.



Zooms in an area of the chart.



Zooms in an area of the chart on the x-axis.



Zooms in an area of the chart on the y-axis.



Zooms in or out to automatically scale the chart.



Zooms in. Holding shift will switch to zooming out.

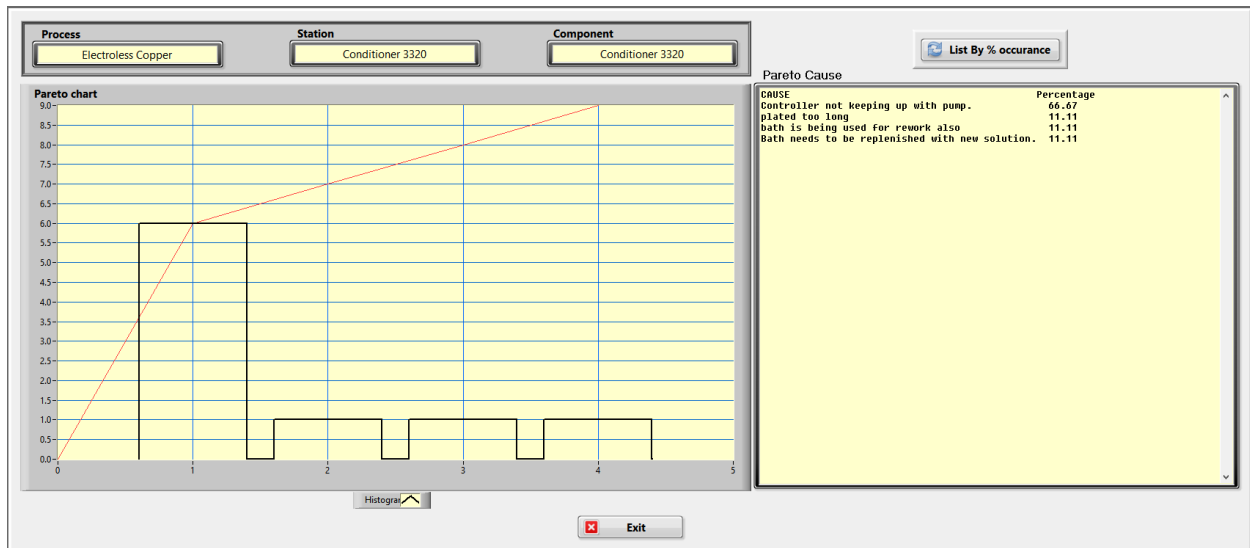


Zooms out. Holding shift will switch to zooming in.



Allows the entire contents of the chart to be moved by clicking and holding down the left mouse button while moving the mouse. The cursor will change to a hand when this is active.

Out of Spec Pareto Chart



The left chart is a histogram breakdown of causes.

On the right there are 2 options available to view the causes which can be selected by pressing the button.

The options to view the causes are:

By the percentage of each occurrence.

By frequency of occurrences.



Component Setup

The component setup can be viewed by clicking the  button.

This screen is useful for the quick review of the component being viewed.

Note: The component can only be viewed from this screen, to edit the component see the **Global Constants** section.

Preventive Maintenance History

The preventive maintenance history screen allows easy tracking of when a preventive maintenance is being completed.

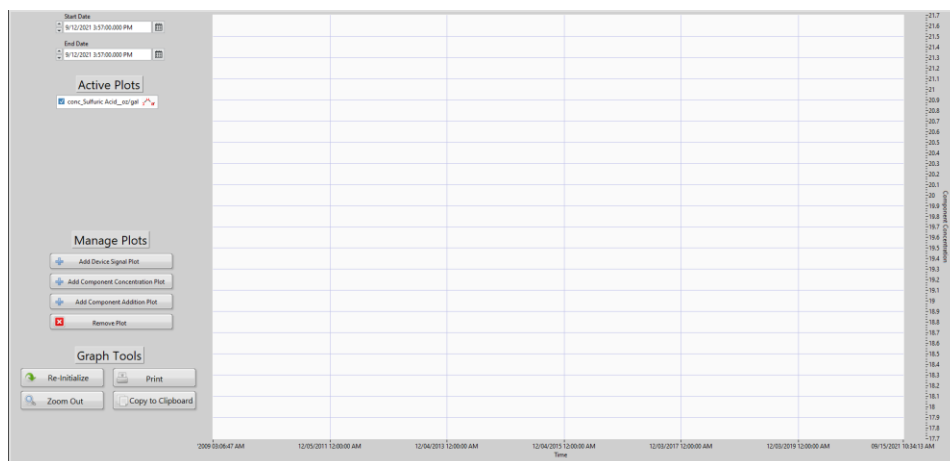
Select a given PM list in the left portion of the screen to show the history for that item.

The default is to only list the latest 32 entries, the number of entries can be changed with the “Maximum Entries to Display” option in the top right of the window. The “Search” button allows for searching the text for a specific PM, all PMs that match the searched text will be displayed. The search criteria can be cleared by clicking on the “Clear Search” button that will be in the place of the “Search” button.

[illegible]

Advanced History

The advanced history viewer allows for graphing multiple plots on the same graph for easier comparisons. The options include Device Signal Plot, Component Concentration Plot, and Component Addition Plot. Any combination of these options can be plotted for a given time period on one graph with the key listed under the “Active Plots” section on the left side of the screen.



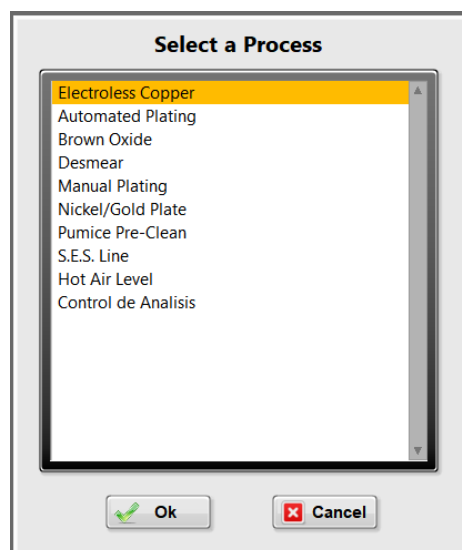
Device Alerts History

Sensor hardware integration COMING SOON.

Process Update

Product Through-put

Choose this when you want to update process throughput at any unscheduled time. The first screen prompts you to pick a process for updating. Select the process and then click on the “OK” button.



The following screen shows the history of entries and asks for the new amount to be entered. After the entry is made, click on the “OK” button to return to the main screen.

[illegible]

Work Schedule

The work schedule is used to set up the time intervals for how each process will calculate times that events are due. The number of hours for when an analysis or make-up is triggered is based off the number of hours for that process as entered on this screen.

Note: The program accumulates time even while Lab Wizard is not running.

To schedule a process run time, select the process. Then, toggle the Enable/Disable button to set the days of the week the process will run. Input the start and finish time for each day, using 24-hour format. Finally, click the "Save" button to confirm and apply the changes.

Process

- Electroless Copper
- Automated Plating
- Brown Oxide**
- Desmear
- Manual Plating
- Nickel/Gold Plate
- Pumice Pre-Clean
- S.E.S. Line
- Hot Air Level
- Control de Analisis

Work Schedule

Click on the "enable" button to make a certain day working day.
Enter the hour the process starts up and the hour the process shuts down.

SUNDAY	DISABLE	START	7.0	FINISH	17.0
MONDAY	ENABLE	START	7.0	FINISH	17.0
TUESDAY	DISABLE	START	7.0	FINISH	17.0
WEDNESDAY	ENABLE	START	6.0	FINISH	20.0
THURSDAY	ENABLE	START	6.0	FINISH	20.0
FRIDAY	ENABLE	START	7.0	FINISH	17.0
SATURDAY	DISABLE	START	5.0	FINISH	17.0

Save

Cancel

Reports

Events Status Report

To view the Event Status Report, select the desired processes, specify the report type and the number of minutes to look ahead. Then, press the "Execute Query" button to generate the report, which is arranged by process. The report is sorted by process. Clicking on the heading of the column to be sorted can change this.

The generated report can be exported to Excel or copied to the clipboard to be pasted into another program by selecting either button in top right of the window.

Process	Station	Station#	Component	Status	Calculations	Last Done
Lane 2 - Preplater	Etch 1	22-23-24	Chromic Acid	overdue	13.68 hours overdue	
Lane 2 - Preplater	Etch 1	22-23-24	Sulfuric Acid	overdue	13.68 hours overdue	
Lane 2 - Preplater	Etch 1	22-23-24	Trivalent Chrome	overdue	13.68 hours overdue	
Lane 2 - Preplater	Etch 2	25-26-27	Chromic Acid	overdue	13.66 hours overdue	
Lane 2 - Preplater	Etch 2	25-26-27	Sulfuric Acid	overdue	13.66 hours overdue	
Lane 2 - Preplater	Etch 2	25-26-27	Trivalent Chrome	overdue	13.66 hours overdue	
Lane 2 - Preplater	Neutralizer	34	<Station Dump>	overdue	6661.13 hours overdue	
Lane 2 - Preplater	Neutralizer	34	Hydrochloric Acid	overdue	12.67 hours overdue	
Lane 2 - Preplater	Neutralizer	34	Macuplex 9339	overdue	12.67 hours overdue	
Lane 2 - Preplater	Activator 1	41	Hydrochloric Acid	overdue	13.00 hours overdue	
Lane 2 - Preplater	Activator 1	41	Macivate 360	overdue	13.00 hours overdue	
Lane 2 - Preplater	Activator 1	41	Tin (Sensitizer 78)	overdue	13.00 hours overdue	
Lane 2 - Preplater	Activator 2	42	Hydrochloric Acid	overdue	12.98 hours overdue	
Lane 2 - Preplater	Activator 2	42	Macivate 360	overdue	12.98 hours overdue	
Lane 2 - Preplater	Activator 2	42	Tin (Sensitizer 78)	overdue	12.98 hours overdue	
Lane 2 - Preplater	Accelerator	45	Hydrochloric Acid	overdue	12.38 hours overdue	
Lane 2 - Preplater	Accelerator	45	Maccelerator 25	overdue	11.83 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Caustic (NaOH)	overdue	20.36 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Formaldehyde (HCHO)	overdue	20.36 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Ultradeep 30A	overdue	20.36 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Ultradeep 618	overdue	2.65 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Specific Gravity	due now	0.38 hours overdue	
Lane 2 - Preplater	Electroless Copper	48-49-50	Plate Thickness	overdue	19.42 hours overdue	
Lane 3 - Plater	Satin Nickel 1	76	Nickel sulfate	overdue	65.11 hours overdue	
Lane 3 - Plater	Satin Nickel 1	76	Nickel chloride	overdue	65.11 hours overdue	
Lane 3 - Plater	Satin Nickel 1	76	Boric acid	overdue	65.11 hours overdue	
Lane 3 - Plater	Satin Nickel 2	77	Nickel sulfate	overdue	65.59 hours overdue	

Events Completed Report

The Events Completed Report shows details of all completed add or makeup events for a chosen station. The report can be generated for only add events, only makeup events, or a combination of both.

Process	Station	Event	Date Completed	Operator	Time to Complete (min)
Lane 3 - Plater	Copper Strike	Add	2021-09-15 10:45:23	admin	4067
Lane 3 - Plater	Copper Strike	Add	2021-09-15 10:45:23	admin	4067
Lane 3 - Plater	Copper Strike	Add	2021-09-15 10:45:23	admin	4067

Out of Spec Report

The out of spec report will display analysis that is out of spec for any or all processes during the date interval indicated by the start and end date.

Process	Station	Station #	Component	Spec Limits	Date	Time	Event Info	Amount Overdu	Technician
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/06/2019	12:27	Concentration = 6.1600 %, OoS Cause: Tank level too high	-79.56	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/06/2019	13:40	Concentration = 0.5600 %, OoS Cause: bath was carbon treated Out of Control: Make-up a new bath	-78.80	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:34	Concentration = 5.6000 %, OoS Cause: High temp--reduce etch time	-79.97	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:34	Concentration = 6.1600 %, OoS Cause: Not enough ventilation, PH high	-80.00	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:34	Concentration = 6.7200 %, OoS Cause: Bath needs to be replenished with new solution.	-80.00	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:35	Concentration = 7.2800 %, OoS Cause: New Bath: Make Up of New Bath is High.	-79.98	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:35	Concentration = 7.8400 %, OoS Cause: Due for dump Out of Control: Corrective Action Unkown	-80.00	admin
Electroless Copper	748 Microetch	EC04	Sulfuric Acid (PC Grade)	1.75 to 3.00	03/09/2019	17:35	Concentration = 8.4000 %, OoS Cause: Previous add not made Out of Control: Corrective Action Unkown	-80.00	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:12	Concentration = 0.1000 normality, OoS Cause: plated too long	-2.97	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:31	Concentration = 0.1000 normality, OoS Cause: bath is being used for rework also	-23.68	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:45	Concentration = 0.1000 normality, OoS Cause: Controller not keeping up with pump.	-23.77	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:46	Concentration = 1.0000 normality, OoS Cause: Controller not keeping up with pump.	-23.98	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:47	Concentration = 0.1000 normality, OoS Cause: Controller not keeping up with pump.	-24.00	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:47	Concentration = 0.1000 normality, OoS Cause: Controller not keeping up with pump.	-24.00	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:47	Concentration = 1.0000 normality, OoS Cause: Controller not keeping up with pump.	-23.98	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	13:47	Concentration = 1.0000 normality, OoS Cause: Controller not keeping up with pump.	-24.00	admin
Electroless Copper	Conditioner 3320	EC01	Conditioner 3320	0.45 to 0.55	03/06/2019	17:28	Concentration = 0.1000 normality, OoS Cause: Bath needs to be replenished with new solution.	-20.32	admin

In the Out of Spec, the options to "Show Out of Control" and "Show Excluded Data" can be selected to include analysis entries that were out of control or excluded for SPC calculations. By clicking on the column title, any column can be sorted alphabetically, and the sort direction can be determined by the position of the "Sort Data" button.

Table data can be copied to the clipboard by clicking on the "Copy to Clipboard" button. Click on the "Exit" button to return to the main screen.

This is a Cpk (Process Capability Index) Report by process. Any combination of processes may be selected. Stations are only listed when there is a component within that station with the component attribute “Include in Cpk Report” checked.

The “Number of data points” control sets the number of data points to query for. Click the “Execute Query” button to generate the report. If the number in the “Number of data points” field is less than the number queried for, there is not enough data or there are too many data points excluded from SPC. The data within this report contains the latest data recorded. To print out the table, click on the “Print” button. Clicking on the “Copy to Clipboard” button will copy the data so that it can be pasted into another program.

The preventative maintenance report lists all preventive maintenance items according to their date due. Items in red are overdue with the first item the most overdue. Next are the items in green that are due with the first item being the first to go overdue. Next are the items that are not yet due, and they are listed in the order of those that will be due first. For a printout with color coded text, click on the “Print” button.

Preventative Maintenance Report 3/10/2019

Green Highlight is Due Now

Red Highlight is overdue

PM Item Name	Interval (days)	Days to Complete	Date Due
Nickel Sulfamate Adhesion Test- AMS 2424 Quarterly	30	-8	2019-03-03
Monthly Hydrogen Embrittlement - Electroless Ni	30	-8	2019-03-03
Monthly Adhesion Testing - low carbon steel- AMS 2405	30	-8	2019-03-03
Monthly Adhesion Test- Aluminum AMS 2404, AMS-C-26074)	30	-8	2019-03-03
Five Extruder Cintas Annual Maintenance	365	-32	2019-02-07
Digital Temperature Indicator Calibration	360	-1	2019-03-10
Yearly Cyanide Scrubber Clean-up	365	-55	2019-01-15
Check Inventory Stock Levels	30	-38	2019-02-01
Scrubber Clean up-Suite 104	180	1	2019-03-12
System Accuracy Test	90	1	2019-03-12
Transfer Filter Gold	60	1	2019-03-12
Crest Trusweep Ultrasonic Generator	365	3	2019-03-14
Branson 1200 Ultrasonic Bath	365	3	2019-03-14
Crest Ultrasonic Generator	365	3	2019-03-14
Crest Trusweep Ultrasonic Generator	365	3	2019-03-14
Branson 7000 Ultrasonic Generator	365	3	2019-03-14
Pressure Gauge Replacement	360	6	2019-03-17
Pressure Gauge For Replacement	360	6	2019-03-17
clean/calib of pH electrode of final discharge	90	7	2019-03-18
Fluke True-rms Multimeter w/backlight and Temp	365	8	2019-03-19
Check Electrical Connections (Group 2)	200	12	2019-03-23
Check electrical connections	200	12	2019-03-23
5 g Weight Replacement	365	15	2019-03-26
10 g Weight Replacement	365	15	2019-03-26
Hazardous Materials Business Plan (HMBP) (EH&S)	365	15	2019-03-26
Timer Calibration	365	15	2019-03-26
Digital Temperature Controller Calibration	365	15	2019-03-26
Digital Temperature Controller Calibration	180	15	2019-03-26
Digital Temperature Controller Calibration	180	15	2019-03-26
Digital Temperature Controller Calibration	180	15	2019-03-26
Thermocouple Replacement	180	15	2019-03-26

Print

Exit

The station history report displays all analysis and make-up events for the selected station. This report will list all concentrations and add amounts associated with that analysis on the same line for an easier viewing. The report can copy to the clipboard with the “Copy to Clipboard” button so that the data can be pasted into another program.

[illegible]

Devices

Sensor hardware integration COMING SOON.

Help

Version

Displays the current version of Lab Wizard.

Lab Wizard Setup

To enter the main process setup, click on “Setup” then “Process Setup” from the main screen menu. **Note: Only level 5 users have access to this screen.**

Adding a Process

From the setup screen, choose “Add Process” from the “Process Options” drop down menu. Click in the “Process Name” box and enter the name for your process. Next click in the “Product Measured in” box and choose the units that describe how the product being processed is measured. The “Product” trigger for this process will use this data if the product option is selected for the trigger mode. This applies to the station make-up and component analysis. If you are not going to use product through- put as a trigger, this field can be left blank. **Note: Make sure the spelling is correct because after leaving this screen the only way to change the name is to delete the process and start over.**

Process Name: Electroless Copper

Product measured in-->: Square Feet

☒ Out of Spec Printout

Pop-Up Screen Schedule

Weekday

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Select the weekday then enable and set the notification times to prompt the operator to enter the amount of product that has been run through the process.

Notification Times

ENABLED	1300
DISABLED	0100
DISABLED	0100
DISABLED	0100

Ok Cancel

The pop-up screen schedule is the next step in setting up the process. The pop-up screen schedules when the operator will enter the amount of product that has been run through the process. *If the process will not have any station makeups or component analysis that is triggered by product throughput or a both time and product throughput, then the pop-up screen will not be used. To schedule the pop-up screen, highlight the day of the week in the “Weekday” list box, click on the button in the “Notification Times” window to enable, then click on the time box and choose the time. For each day of the week, you can schedule up to four daily pop-ups. The above procedure must be repeated for each day of the week. When all the days of the week are accounted for, click the “OK” button. The process now appears in the “Process” list box of the setup screen.

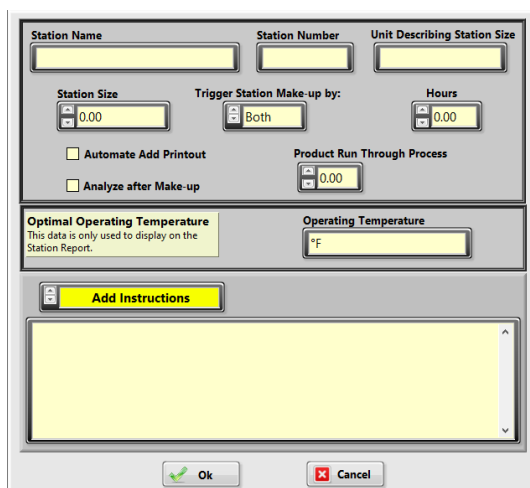
Checking the “Out of Spec Printout” box will cause an out of spec printout to be automatically printed anytime any analysis within the process is out of spec.

Adding Stations to the Process

Make sure the process that you want to add stations to is highlighted in the “Process” list box. From the Station Options drop down menu select “Add Station to Selected Process”. Click in the “Station Name” box and type in the station name. Next type in the station number by clicking on the “Station Number” text box. Enter the volume of the station by clicking in the “Station Size” box and typing the numbers. Click in the “Unit Describing Station Size” box and choose the unit for station volume. Click in the “Trigger Station Make-up by:” and choose the trigger option for station make-up. This trigger will notify the lab tech when a new station make-up is due. The options available are:

1. **Time:** The number of hours of elapsed process time before station make-up is due.
2. **Product:** The amount of product processed before new station make-up is due. The unit of this trigger is the unit specified in “Product Measured In” of the process setup.
3. **Both:** This option uses time and product parameters for new station make-up. Notification of new station make-up is based on either option coming due.
4. **None:** With this option selected there will not be any notification of new station make-up and the option to print out a station make-up is not available.

Click in the box or boxes that appear by selecting “Trigger Station Make-up by:” (The boxes that appear depend on the trigger option. They are “Hours” or “Product Run Through Process” or both.) Enter the number in the box that specifies the amount of time and/or product run through process before notification of new station make- up.



Click the “Automate Add Printout” to automate the add printout for this station. Click on “Analyze after make-up to require analysis after a new make-up. The optimal operating temperature can also be set here so that it will be displayed on the station report. The drop-down menu below the text box has two options, Add Instructions and Makeup Instructions. To enter text for either option, click the text box and type the instructions in the screen that follows.

Click on the “OK” button. The new station now shows up in the “Stations” list box. Highlight the new station, the settings for the station are displayed below the stations list box.

Adding Components to the Station

Make sure that the process and station that you are adding a component to are highlighted in the “Process” and “Stations” list boxes. Use the “Component Options” menu to click on “Add New Component to Selected Station”. Click in the “Name of Component” box.

and type in the name of the component. **Note: Care should be exercised when choosing this name. It is recommended to have the component name be the same name as on the chemical container that is used in making adds or station makeup since this will be the name printed on add and makeup sheets.**

Event Triggering

Component Name:

Analysis Triggered by: ☐ Time ☐ Product Run Through Process

Hours:

Make-up Setpoint:

☐ Trigger Make-up based on adds
☐ Re-analyze after Add
☐ Re-analyze after Out of Spec Analysis

Units

Bath Concentration Units:

Units for Analysis:

Units for Adds:

Units For New Bath Make-up:

Add Precision:

Add Threshold:

Make-up Precision:

Component SPC Setup

☐ Have control chart display target value after every add
☐ Display control chart after every analysis
☐ Include in Cpk Report

SPC Rules

☐ Number of days to check for SPC chart after each analysis:

☐ Flag data point when any single value from analysis is above or below the mean by three standard deviations

☐ Flag data point when 2-out-of-3 consecutive points fall outside two standard deviations below or above the mean

☐ Flag data point when 4-out-of-5 consecutive points all appear below or above one standard deviation from the mean

☐ Flag data point when ☐ 7 ☐ 8 points in-a-row on one side of the mean

☐ Manually Define Control Chart Parameters Below

Upper Control Limit:

Lower Control Limit:

Moving Range Average:

Moving Range Upper Control Limit:

Component Constants

Concentration Constant:

Add Constant:

Amount For New Bath Make-up:

Spec Window

Lower Limit:

Target Value:

Upper Limit:

Station Make-up Prompt

☐ Prompt Lab Technician with the instructions below if component concentration is:

Instructions:

Action Limits

Action limits should be used to alert a technician with specific instructions when an action limit is reached. Normally this will be set up to prompt for action before a control limit is reached.

☐ Enable Action Limits

Lower Action Limit:

Upper Action Limit:

Action Limit Instructions:

Optimum Range

Lower Limit:

Upper Limit:

The optimal operating range is not used in calculations. This data is only displayed in the Station Report to display the optimal operating range.

No Instructions for Analysis

Component Setup

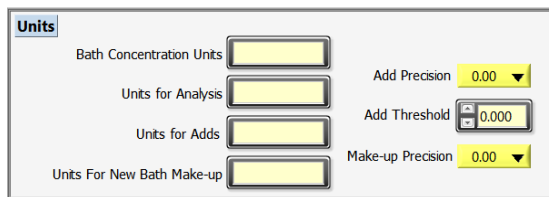
Event Triggering

Check the “Re-analyze after Out of Spec Analysis” to require another analysis after the add is made for an out of spec analysis. The trigger value is reset to due (0) after the initial out of spec analysis. To initiate a new station make-up after a set total amount of adds, click on “Trigger Make-up based on adds” option then enter the total add value in the “Make-up Set point” control.

Click in the “Trigger Analysis by:” box and choose the type of trigger for notification of analysis due. There are four options to choose from.

1. **Time:** Analysis due is determined by the elapsed process time since the last analysis or make-up. A time of “Inf” can be entered if analysis needs to be entered for this component, but no alerts triggered for when to complete the analysis.
2. **Product:** Analysis due is determined by the amount of product processed (the units selected by “Product Measured In” of the process setup) since the last analysis was performed.
3. **Both:** Analysis due is determined by either time or product, whichever comes due first.
4. **None:** Entering analysis data will not be allowed for this component.

Depending on which trigger mode is selected, click in the appropriate box and enter the interval between analyses.



The screenshot shows a window titled "Units" with four input fields on the left and two dropdown menus on the right. The input fields are labeled "Bath Concentration Units", "Units for Analysis", "Units for Adds", and "Units For New Bath Make-up". The dropdown menus are labeled "Add Precision" (set to 0.00) and "Add Threshold" (set to 0.000). There is also a "Make-up Precision" dropdown set to 0.00.

Units

Click in the “Bath Concentration Units” box and type the units to be used for the concentration of this component. Click in the “Units for analysis” box and enter the unit used when performing analysis. Click in the “Units for Adds” box and choose the unit to be used for making adds to the station. **Note: This unit must be the same unit that was used to calculate the “Add Constant”.** Choose the add precision for the add variable. Click in the “Units for New Bath Make-up” box and choose the unit to be used for the component when a new station make-up is required. This unit will be used in the recipe for new station make-up and will be printed in the makeup sheet. Choose the makeup precision for the makeup variable. Click in the “Add Threshold” box and enter the required add to issue an add sheet.

Note: If there is no unit corresponding to this component leave the box blank. For example, if the component is not used when making a new make-up, leave the units for station make-up blank. Both “Units for New Bath Make-up” and “Amount for New Bath Make-up”

must have something entered for this component to be included in the make-up print out. To log adds in the log file for a station make-up, the “Bath Concentration Units” and the “Units for New Bath Make-up” must be filled out.

Component Constants

Click in the “Concentration Constant” box and enter the number that when multiplied by the measured value from analysis gives the concentration in the units specified in the “Bath Concentration Units” box, i.e. (measured value in units for analysis) x (concentration constant) = concentration.

Click on the “Add Constant” box and enter the amount needed to increase the concentration by one unit (the unit that was specified in “Bath Concentration Units” box) in the units specified in the “Units for Add” box.

Concentration Calculation

Example: Concentration Measured In: % by volume
Station size: 50 Gal.
Units for add: Liters.

For a 1% change in concentration, the add constant would be:

$.01 * (50 \text{ Gal}) * (3.785 \text{ Liters/Gal}) = 1.89 \text{ Liters} / \%$. For every 1% change in concentration, an addition of 1.89 Liters must be made. The add constant in this case would be 1.89 (the add amount to change the concentration by one unit).

To test the calculation of the concentration and addition of this component, click the “Test Calculation” button. **Note: The “Test Calculation” button will only work if the component screen has been opened from the “Modify Attributes of Selected Component” menu option, if this is a new component then the screen will need to be closed with the “OK” button and reopened to test the calculations.** The analysis screen appears.

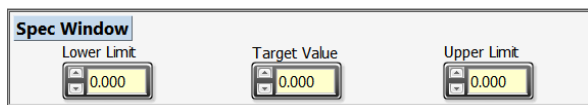
Enter a number in the “Enter Your Measured Value Here” that simulates the analysis for the component. Compare the value shown in the “Concentration” box with your calculated value using the units to the right of the “Concentration” box. If the numbers are the same, the “Concentration Constant” is correct.

If the numbers are not the same, recheck the calculation of the “Concentration Constant” paying attention to the units specified. Next check the “Delta” value. This value is the difference between the “Target Value” and the calculated concentration. The equation for this is: $\Delta = [(\text{target concentration}) - (\text{measured concentration})]$.

Now check the number in the “The amount you add is” box and compare the number to your calculated add. If both numbers are the same, the “Add Constant” is correct. If both numbers are not the same, recalculate the “Add Constant” paying attention to the units specified. This equation is used to calculate the addition: $\text{Add} = (\Delta) \times (\text{add constant})$. If the component concentration or add amount cannot be accurately calculated with these formulas, then the complex formula option can be used. See the **Complex Formulas** section for more information.

Note: Changing the “Target Value” does not affect any of the constants and the add amount will remain correct. Changing units, method of analysis, or station size will cause an error and the affected constant will have to be recalculated.

Process Specification Window

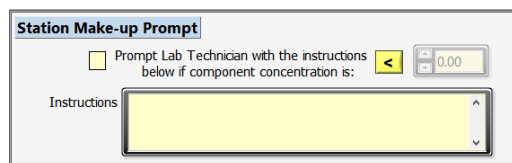


The Spec Window interface contains three input fields: "Lower Limit", "Target Value", and "Upper Limit". Each field has a numeric keypad icon to its left and a text box containing the value "0.000".

Click in the “Lower Limit” box and enter the number for the lower limit of the process specification for this component. The units associated with this number are the same as those selected in the “Bath Concentration Units” box. The lower limit is used in the component history trending chart and the component SPC screen. Click in the “Target Value” box and enter the target concentration desired after an addition to the station is made. The unit associated with this number is the same as in the “Bath Concentration Units” box. The target value is used in the add calculation after the analysis is entered. Click in the “Upper Limit” box and enter the upper limit of the process specification for this component. The unit for this number is the same as “Bath Concentration Units”. The upper limit is used in the component history trending chart and the component SPC screen.

Station Make-up Prompt

To prompt a lab tech with a message, check this box. Clicking on the > or < button as desired. Enter the concentration value in the space provided. Type the desired message in the text box labeled “Instructions”.



The Station Make-up Prompt interface includes a checkbox labeled "Prompt Lab Technician with the instructions below if component concentration is:". To the right of the checkbox is a numeric keypad with "<" and ">" buttons and a text box containing "0.00". Below these is a text box labeled "Instructions" with a yellow background and a scroll bar.

Component SPC Setup

Component SPC Setup

☐ Have control chart display target value after every add

☐ Display control chart after every analysis

☐ Include in Cpk Report

SPC Rules

☐ Number of days to check for SPC chart after each analysis: 30

☐ Flag data point when any single value from analysis is above or below the mean by three standard deviations

☐ Flag data point when 2-out-of-3 consecutive points fall outside two standard deviations below or above the mean

☐ Flag data point when 4-out-of-5 consecutive points all appear below or above one standard deviation from the mean

☐ Flag data point when 7 points in-a-row on one side of the mean

☐ 8 points in-a-row on one side of the mean

☐ Percent Deviation from last data point: 0
Enter 0 to disable

☐ Manually Define Control Chart Parameters Below

Upper Control Limit: 0.000

Lower Control Limit: 0.000

Moving Range Average: 0.00

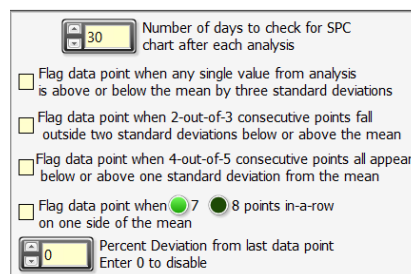
Moving Range Upper Control Limit: 0.00

The SPC setup options are as follows:

1. **Have control chart display target value after every add:** With this option enabled the target value will be plotted whenever an addition is made. This option should be used so that the full range of concentrations are displayed in the trending and SPC charts.
2. **Display control chart after every analysis:** Enable this if you want to see a control chart after every analysis. If disabled, the control chart will only appear if the analysis is out of control or out of spec.
3. **Include in Cpk Report:** Check this to include the component in the Cpk Report.
4. **Manually Define Control Chart Parameters Below:** Use this option with care. This option should only be used when the value of the upper control limit, lower control limit, moving range average, and moving range upper control limit are known. The purpose of this setting is to identify drift of a process that is in control.
5. Check the rules that you want to be applied to the data for this component in the component control charts. Based on these rules, the control chart will indicate any data points that are out of control. The choice of rules is listed below.

SPC Rules

Enter the number of days of history to include in the SPC calculations. **Note: You should disable the SPC rules until there is enough history to calculate the control limits.** This can be accomplished by un-checking all the rules.



Number of days to check for SPC chart after each analysis: 30

- ☐ Flag data point when any single value from analysis is above or below the mean by three standard deviations
- ☐ Flag data point when 2-out-of-3 consecutive points fall outside two standard deviations below or above the mean
- ☐ Flag data point when 4-out-of-5 consecutive points all appear below or above one standard deviation from the mean
- ☐ Flag data point when 7 or 8 points in-a-row on one side of the mean

Percent Deviation from last data point: 0
Enter 0 to disable

1. Flag data point when any single value from analysis is above or below the mean by three standard deviations.
2. Flag data point when 2-out-of-3 consecutive points fall outside two standard deviations below or above the mean.
3. Flag data point when 4-out-of-5 consecutive points all appear below or above one standard deviation from the mean.
4. Flag data point when 7 or 8 (you must choose one) points in-a-row on one side of the mean.
5. Percent deviation from last data point, triggers only if the deviation is larger than the value entered on the component setup screen.

Action Limits



☒ Enable Action Limits

Lower Action Limit: 0.000

Upper Action Limit: 0.000

Action Limit Instructions: Lower

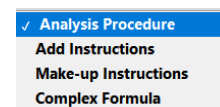
Check this option to enable action limits. Enter the values for the upper and lower action limits. **Note: The value of these limits must be inside the value of the control limits and the spec limits.** Enter the upper and lower limit instructions to be displayed when the respective limit is exceeded. **Note: These instructions are not displayed if any of the control or spec limits are exceeded.**

The  drop-down menu at the bottom of the screen contains other options.

Click this drop-down menu to select the function of text box above the menu.

Analysis Procedures

Click on “Analysis Procedures” in the bottom drop down menu. Click in the text box. Type the analysis procedure in the text box that appears. Click on the “Exit” button. A file is created in the sub-directory of Lab Wizard called procedures. The file name is made as follows: component name-station name-process name.doc.



✓ Analysis Procedure

- Add Instructions
- Make-up Instructions
- Complex Formula

Add Instructions

Click on “Add Instructions” in the bottom drop down menu. Click in the text box. Type the instructions into the text box that appears. Click on the “Exit” button. The instructions will appear to the right of the component when it is printed out in the add sheet.

Make-up Instructions

Click on “Make-up Instructions” in the bottom drop down menu. Click in the text box. Type the instructions into the text box that appears on the next screen. Click on the “Exit” button. The instructions will appear to the right of the component when it is printed out in the station make-up sheet.

Complex Formulas

Click into the text box and the formula screen will appear. See **Complex Formulas** section for details. Formulas must be input from the “Modify Attributes of Selected Component” option.

Click on the “OK” button when done updating the component attributes to save any changes.

Note: Leave all data entries blank if they do not apply.

By default, the following entries are required if the component has a trigger.

1. Trigger value
2. Limits (Lower and Upper)
3. Target Value
4. Concentration constant (This number will not be used when a complex formula is used.)

Note: The setup data is not saved until you exit from setup. It is suggested that you exit setup every 30 minutes to save the setup data.

Setup Menu

The main setup menu resides at the top of the setup screen.

File	Edit	Setup	Preventive Maintenance	Printing	Email	Backup/Restore	Utilities
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File

- 1 **Cancel:** Exits the setup menu without saving.
- 2 **Save and Exit:** Saves all modified data and exits the setup menu.

Edit Pareto Causes

This screen allows you to add, remove, and determine how a cause is executed. The pareto cause screen is initiated when any analysis is out of spec (determined by the upper and lower limits). This screen requires the operator to choose a listed cause or add a new cause. This “Out of Spec” cause is then associated with that data.

1. **Include/Exclude Selected Cause from Charts, Paretos, SPC Calculations** button. Highlight the cause to change and click on this button to alternate between include and exclude options. Excluded causes will also not trigger an out-of-spec email to be sent.
2. **Delete Selected Cause** Highlight the cause to be deleted and click on the button.
3. **Add New Cause** Click in the “New Pareto Cause” window and type in the new cause. Click the “Add New Cause” button.

Pareto Causes

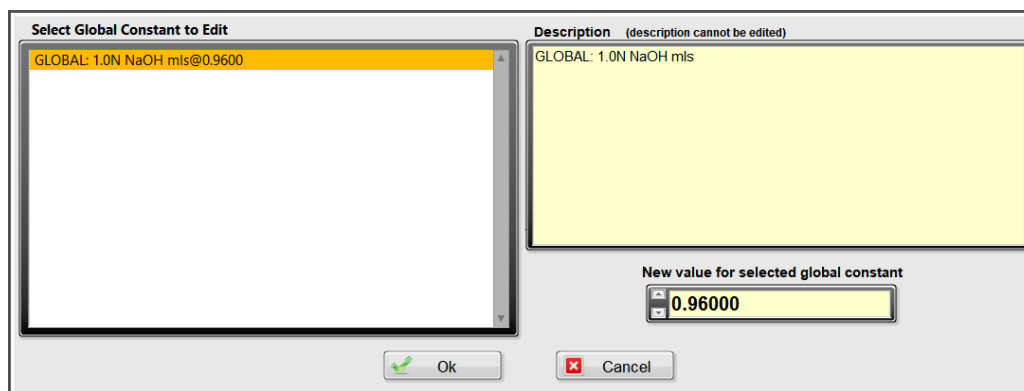
(Cause is Included on Charts, paretos, and SPC calculations)	Start up
(Cause is Included on Charts, paretos, and SPC calculations)	Analysis too far apart
(Cause is Included on Charts, paretos, and SPC calculations)	Analysis overdue
(Cause is Included on Charts, paretos, and SPC calculations)	Tank level too low
(Cause is Included on Charts, paretos, and SPC calculations)	Tank level too high
(Cause is Included on Charts, paretos, and SPC calculations)	Concentration high due to previous add
(Cause is Included on Charts, paretos, and SPC calculations)	Previous add not made
(Cause is Included on Charts, paretos, and SPC calculations)	POSSIBLE PROBLEM WITH RECTIFIER
(Cause is Included on Charts, paretos, and SPC calculations)	New Bath: Make Up of New Bath is High.
(Cause is Included on Charts, paretos, and SPC calculations)	Due for dump
(Cause is Included on Charts, paretos, and SPC calculations)	New Bath: Make Up of New Bath is Low
(Cause is Included on Charts, paretos, and SPC calculations)	High temp--reduce etch time
(Cause is Included on Charts, paretos, and SPC calculations)	BATH OVERFILLED
(Cause is Included on Charts, paretos, and SPC calculations)	entered wrong number
(Cause is Included on Charts, paretos, and SPC calculations)	NEW BATH--Sp.G. normally low
(Cause is Included on Charts, paretos, and SPC calculations)	Not enough ventilation, PH high
(Cause is Included on Charts, paretos, and SPC calculations)	maint.add possibly not made
(Cause is Included on Charts, paretos, and SPC calculations)	plated too long
(Cause is Included on Charts, paretos, and SPC calculations)	Controller not keeping up with pump.
(Cause is Included on Charts, paretos, and SPC calculations)	bath was carbon treated
(Cause is Included on Charts, paretos, and SPC calculations)	Circulation in bath keeps stopping.
(Cause is Included on Charts, paretos, and SPC calculations)	Bath needs to be replenished with new solution.
(Cause is Included on Charts, paretos, and SPC calculations)	conc.add possibly made
(Cause is Included on Charts, paretos, and SPC calculations)	operator overetched
(Cause is Included on Charts, paretos, and SPC calculations)	possibly time to change the bath
(Cause is Included on Charts, paretos, and SPC calculations)	bath is being used for rework also

New Pareto Cause

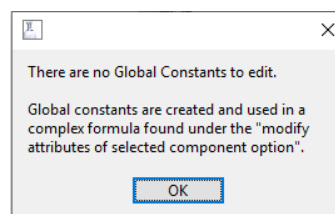
Click on the “Close” button to exit this screen.

Global Constants

This screen is used to change the value of existing global constants. You cannot change the name or delete the entry. To change a value, highlight the global constant you want to change. Enter the new value in the control provided then click on the “OK” button. The new value will be used in all formulas that have this global constant.



If no global constants have been defined you will be presented with the following error message.

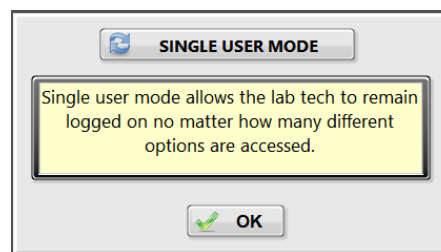


For more information about global constants see the **Global Constants** section.

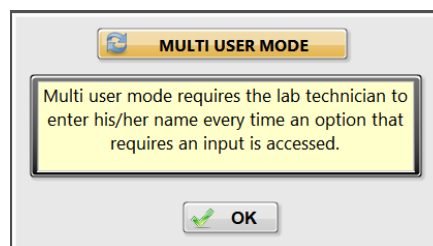
User Mode

These screens regulate the protocol used for user log on. Access is allowed (without logging on) to any option that does not require data to be input.

- 1 **Single User Mode:** The user remains logged in until they log out or the software is restarted.



- 2 **Multi-user Mode:** Requires the user to log in every time an option is picked that requires input. After this option is completed, the user is automatically logged out.



Event Triggering Symbols

Use this screen to setup how the pre-event and overdue symbols activate. Pre-event symbols that use a time trigger for a station or component can be set to show up any number of minutes before that event is due. Just enter the number of minutes desired in the control. Pre-event symbols that use a product throughput trigger for a station or component can be set to show up by any number of product throughput units before the trigger is due.

The setting for the overdue event involves choosing a percent of the appropriate trigger. When the station or component remains due for the entered percentage of the trigger value, the overdue symbol will appear.

The screenshot shows a software interface for configuring event triggering symbols. At the top left, a legend box contains the following items:

- Event Not Due
- ◆ Pre-Event Warning Symbol
- ✓ Event Due Symbol
- ✗ Event Overdue Symbol

The main area is divided into two sections:

Settings for Pre-Event Warning Symbol

Time Triggers: Show symbol before an event is due (Minutes). [60]

Product Through-put Triggers: Show symbol before an event is due by this amount. [100]

Settings for Overdue Symbol

Time Triggers: Show overdue symbol after the event has been due for n% of it's trigger value (hrs.). [5.0] n%

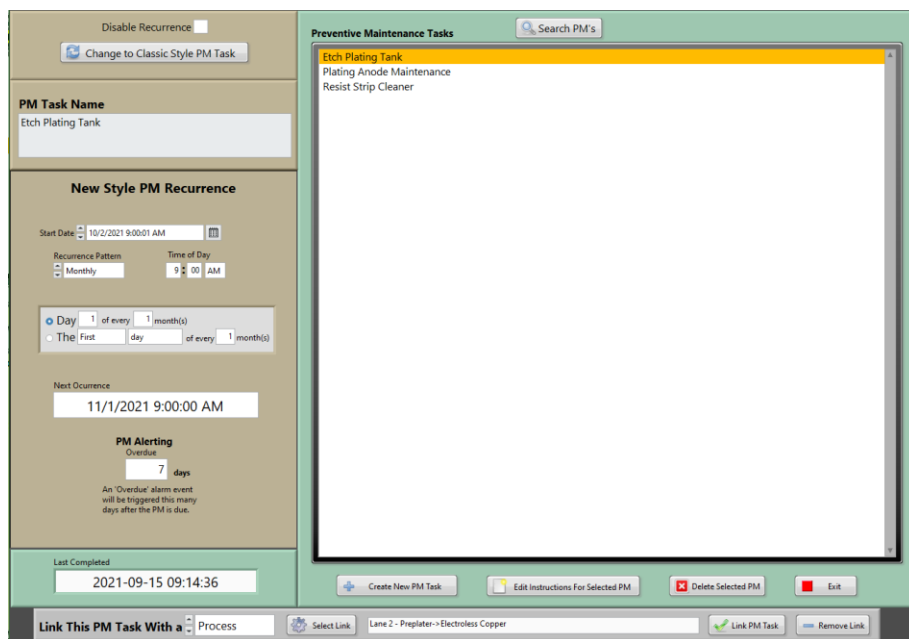
Product through-put Triggers: Show overdue symbol after the event has been due for n% of its trigger value. [5.0] n%

At the bottom center is an **Exit** button with a red 'X' icon.

Example: If the entered value is 10% and the trigger value is 4 hours. The overdue symbol will appear when the event has been due for 0.4 hours. If the product throughput trigger value is 10000 sq. ft. and the entered value is 1%, then the overdue symbol will appear when the event has been due for 100 sq. ft.

Preventative Maintenance

This screen displays the preventive maintenance list. Clicking on an item shows the maintenance recurrence schedule and the next occurrence of the item. Overdue (days) is the number of days, after the pm is due, that it will become overdue if not completed. Both the maintenance recurrence schedule and overdue (days) can be edited from this screen.



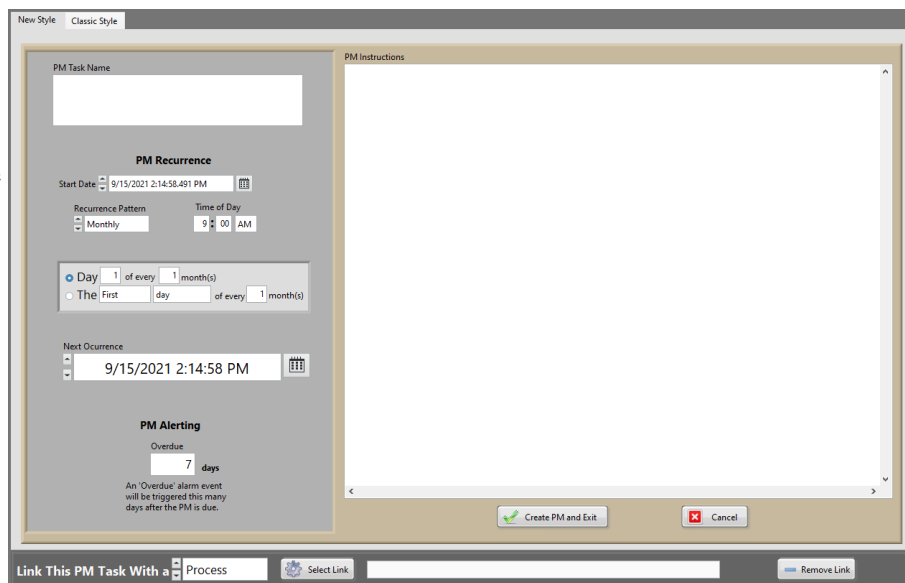
If a PM task will no longer need to be completed, but the data for past completions needs to be kept, then selecting the “Disable Recurrence” checkbox will stop Lab Wizard from triggering any future occurrences of the task.

Create New PM Task

Use this screen to add a new preventive maintenance task.

Enter the name that will be displayed on the main screen under “PM Task Name” and enter the instructions in the box to the right.

Set the date and time for the start of the PM recurrence schedule at the “Start Date.”



Note: The start date will not be the first occurrence of the PM. The start date can be set to a date in the past to target a specific date for the first occurrence. Check the date listed under “Next Occurrence” to ensure the date is correct.

The recurrence pattern can be set to weekly, monthly, or yearly. The time of day to issue the PM can also be specified.

Weekly Recurrence Pattern

If the recurrence pattern is set to weekly, then the options will be changed to match that pattern. The number of weeks between each occurrence can be set and each day of the week the task should occur on can be selected.

The screenshot shows the 'Recurrence Pattern' dropdown set to 'Weekly'. The 'Time of Day' is set to 9:00 AM. Below, the 'Recur every' field is set to 1 week(s). The 'on:' section has checkboxes for each day of the week: Sunday, Monday (checked), Tuesday, Wednesday, Thursday, Friday, and Saturday.

Monthly Recurrence Pattern

For a monthly recurrence pattern the task can be scheduled for a specified day number and recurring a set number of months. If the listed day number is not in one of the months that the task would occur on then it will instead trigger on the closest day number for that month, i.e., if the task is to occur on the 30th of each month then in February the task will occur on the 28th instead. Alternately, the task can be scheduled to recur on the first, second, third, or fourth specified day of the week every set number of months.

The screenshot shows the 'Recurrence Pattern' dropdown set to 'Monthly'. The 'Time of Day' is set to 9:00 AM. Below, the 'Recur every' field is set to 2 month(s). The 'on:' section has two radio buttons: 'Day' (selected) and 'The'. The 'Day' option is set to 30 of every 2 month(s). The 'The' option is set to First Tuesday of every 1 month(s).

Yearly Recurrence Pattern

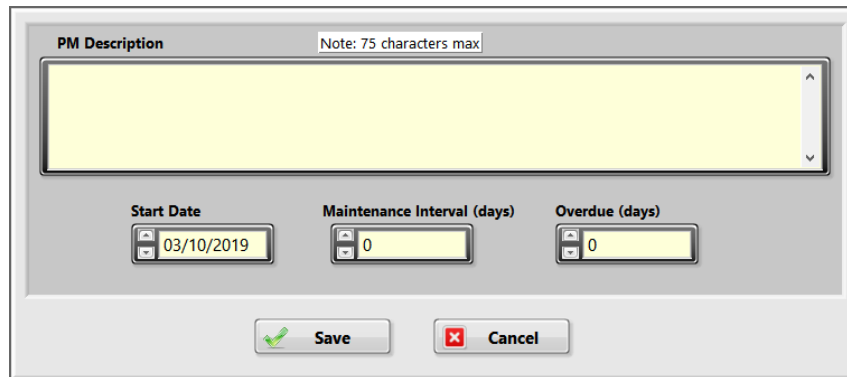
If a yearly recurrence pattern is selected, then the number of years between each occurrence can be specified. The task can be scheduled to occur on a specified month and day number. Or the task can be scheduled for the first, second, third, or fourth specified day of the week of a specified month.

The screenshot shows the 'Recurrence Pattern' dropdown set to 'Yearly'. The 'Time of Day' is set to 9:00 AM. Below, the 'Recur every' field is set to 1 year(s). The 'on:' section has two radio buttons: 'On' (selected) and 'On the:'. The 'On' option is set to January 1. The 'On the:' option is set to First day of January.

The PM task can also be linked to a process, station, or component. Linking the task with a process, station, or component will display the link in the **Dashboards** if activated. When finished setting up a new PM task, click the “Create PM and Exit” button to return to the manage PM tasks screen.

If the Classic Style of PM tasks is preferred then selecting the “Classic Style” tab will display the window shown below.

Note: The PM description is limited to 75 characters.

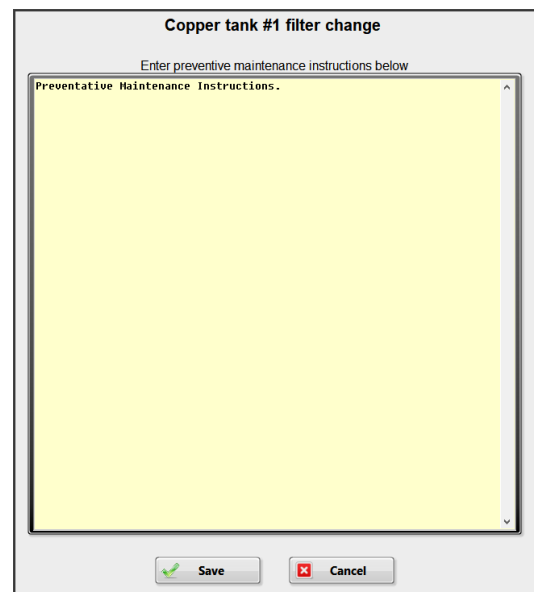
A screenshot of a software window titled "PM Description". At the top, there is a text input field with a placeholder "Note: 75 characters max". Below this is a large, empty text area for the description. Underneath the text area are three input fields: "Start Date" with a date picker showing "03/10/2019", "Maintenance Interval (days)" with a numeric spinner showing "0", and "Overdue (days)" with a numeric spinner showing "0". At the bottom of the window are two buttons: "Save" with a green checkmark icon and "Cancel" with a red X icon.

Fill in the preventive maintenance description, maintenance interval (days) and overdue (days). Click on the “Save” button to save and return to the preventive maintenance list screen.

PM Instructions

The instructions for a selected component can be changed by clicking the “Edit Instructions for Selected PM” button.

Type the instructions and click the “Save” button to save and return to the PM list screen.

A screenshot of a software window titled "Copper tank #1 filter change". Below the title is a subtitle "Enter preventive maintenance instructions below". The main area is a large, empty text field labeled "Preventative Maintenance Instructions." at the top. At the bottom of the window are two buttons: "Save" with a green checkmark icon and "Cancel" with a red X icon.

Delete PM Item

Select the PM to delete in the PM list screen. Choose the Delete PM Item menu, a popup window will be displayed to confirm deleting the selected task. Deleting a PM task will also delete all data for that task from the database.

Click the “Exit” button to save all changes and return to the main process setup screen.

Printing

Add Template

This screen is used to create a customized print template for all add sheets. Clicking on an item in the “Fields” column on the left inserts a variable into the template on the right. When the sheet is printed, the variables are replaced with the appropriate data. On the template, variables are enclosed in brackets like <<<variable>>>.

Example: Clicking on the “Date” field on the left inserts <<<Date>>> into the template on the right at the cursor position and when printed, will be replaced with the actual Month/Day/Year.

Once the add sheet template is filled out, click “Setup Print Format” to preview the results.

Below is a detailed description of each field variable.

1. <<<Tracking #>>> This is the tracking number from the main screen which can be included on your printouts. The number increments by one every time an Add slip or a Station Make-up slip is printed. However, it does not increment when you do a test print.
2. <<<Date>>> Provides the current date.
3. <<<Time>>> Provides the current time of day.
4. <<<Station Number>>> Provides the station number.
5. <<<Process>>> Name of the process.
6. <<<Station>>> Name of the station.
7. <<<Add Information>>> List of all components with add amounts along with any instructions to the right of the add amount (if add instructions were created).
8. <<<Technician's name>>> Name of the person logged in.
9. <<<Amount Over Due>>> Displays the hours or product amount that the event was overdue.
10. <<<Spec Parameters>>> Displays the concentration, upper limit, target value, lower limit, and unit for concentration for each component listed.
11. <<<Station Add Instructions>>> Add instructions that are included for all components within a station. These add instructions are created in station setup.

Number of Copies to Print: This setting is limited to a maximum of 4. Setting this to zero will not allow any printouts, however, the add is still issued and appears in the “Add and Make-up Issued” control on the main screen.

Setup Print Format

This screen shows how the printout will look. Clicking on the “Test Print” button will print out a sample copy without changing the tracking number. You can change the print font, font size, font color, and font style. To preview add sheets for different processes and stations, use the “Process” and “Station” pull down menus. To leave this screen and return to the “Print Setup for Add Slips” screen, click on the “Exit” button. If any changes have been made to the print format, a “Save Changes to Print Format?” dialog prompt will appear.

To exit the “Print Setup for Add Slips” screen and return to the “Setup” screen, click on the “Exit” button. If any changes have been made, a dialog screen will appear “Save Changes to Print Setup For Add Slips?”.

Make-up Template

This screen is used to setup the printout for the makeup sheets. This screen setup is the same as the “Add Template” screen with the exception the field list. “Makeup Info”, the component recipe for making up a new station, replaces “Add Information” and “Station Makeup Instructions” replaces “Station Add Instructions”.

Note: For a component to be included in the make-up recipe, the “Unit for New Station Make-up” and “Amount for New Bath Make-up” in the component setup must be filled out. To log the addition to the log file, the “Unit Describing Bath Concentration” of the component setup must be filled out. The order of the components in the recipe can be changed in the “Modify Attributes of Selected Station” selection of Setup.

Out of Spec Template

This screen is for setting up the template for the out of spec sheet. When the out of spec printout option is enabled, a printout is automatically printed using this template.

Print Setup for Out of Spec Printout

Enter what you want to be printed in the box below

Fields

- Tracking #
- Date
- Time
- Process
- Station
- Station Number
- Spec Parameters
- Amount Over Due
- Last Analysis Date
- OoS Cause and Comments
- Technician's Name

OUT OF SPEC NOTIFICATION

Date:<<<Date>>> Tracking#:<<<Tracking #>>>
Time:<<<Time>>>
Process:<<<Process>>>
Station:<<<Station>>>
Station#:<<<Station Number>>>
Component Parameters:
<<<Spec Parameters>>>
<<<Amount Over Due>>>
<<<Last Analysis Date>>>

<<<OoS Cause and Comments>>>

SETUP PRINT FORMAT

HELP

EXIT

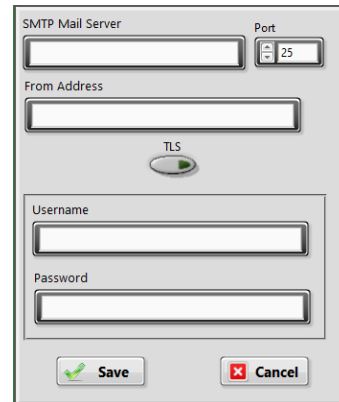
Number of Copies to Print
0

The procedure to make this template is the same as add and make-up templates, only the fields are different. The field choices are Tracking #, Date, Time, Process, Station, Station Number, Spec Parameters, Amount Over Due, Last Analysis Date, OoS Cause and Comments and Technician's Name.

Email

Email Server

Type the address of the SMTP mail server. This is required to enable the email functions. Leave blank if you are not using email. Select the “TLS” switch if this option is needed by the email server. If authentication of outgoing email is required, type in the username and password, otherwise leave blank.

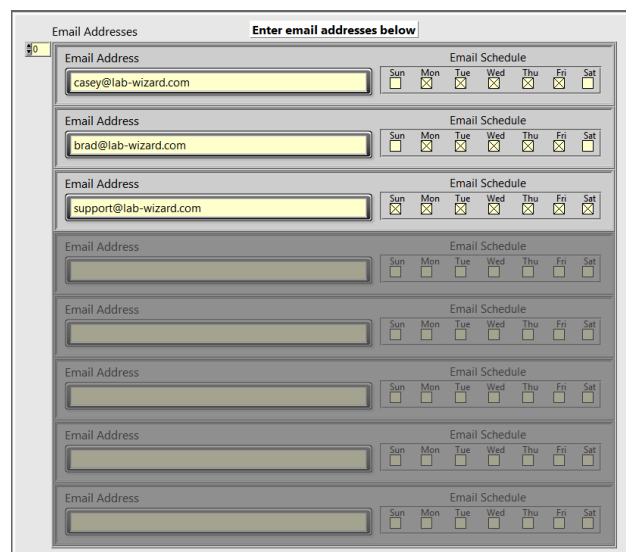


The dialog box is titled "SMTP Mail Server". It contains a "Port" field with a dropdown menu set to "25". Below this is a "From Address" text field. A "TLS" toggle switch is positioned below the "From Address" field. At the bottom, there are "Username" and "Password" text fields. The dialog has "Save" and "Cancel" buttons at the bottom right.

Email Addresses

Type in all email recipients email addresses. Check the days of the week each recipient should receive email.

Use the File>>Save and Exit to save and return to the setup screen.

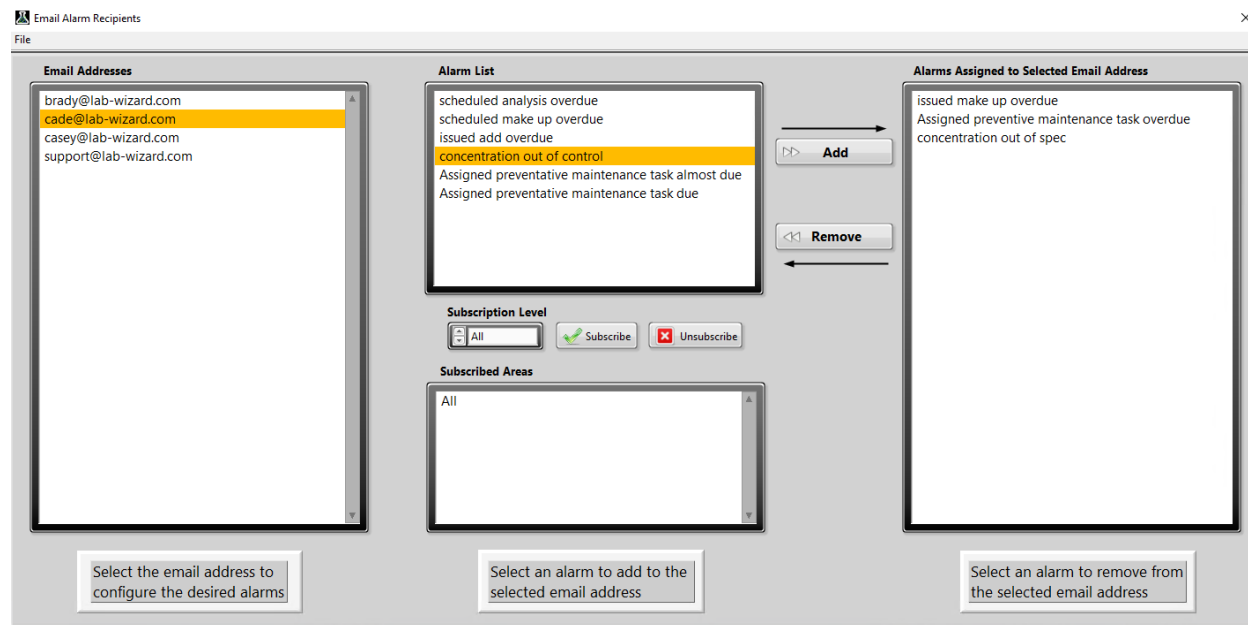


The dialog box is titled "Email Addresses" with a subtitle "Enter email addresses below". It contains a list of email addresses and their corresponding schedules. The first three entries are highlighted in yellow:

Email Address	Sun	Mon	Tue	Wed	Thu	Fri	Sat
casey@lab-wizard.com	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
brad@lab-wizard.com	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
support@lab-wizard.com	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Email Recipients

Click on an email address to display the assigned alarms for that address. To add an alarm, click on the desired alarm in the “Alarm List”, and then click on the “Add” button. The alarm will appear in the “Alarms Assigned to Selected Email Address” list box. To remove an assigned alarm, click on the alarm in the “Alarms Assigned to Selected Email Address” list box, and then click on the “Remove” button. The alarm will appear back in the “Alarm List”. When any assigned alarm is activated, all recipients that have the alarm assigned are emailed if that day is scheduled for email.




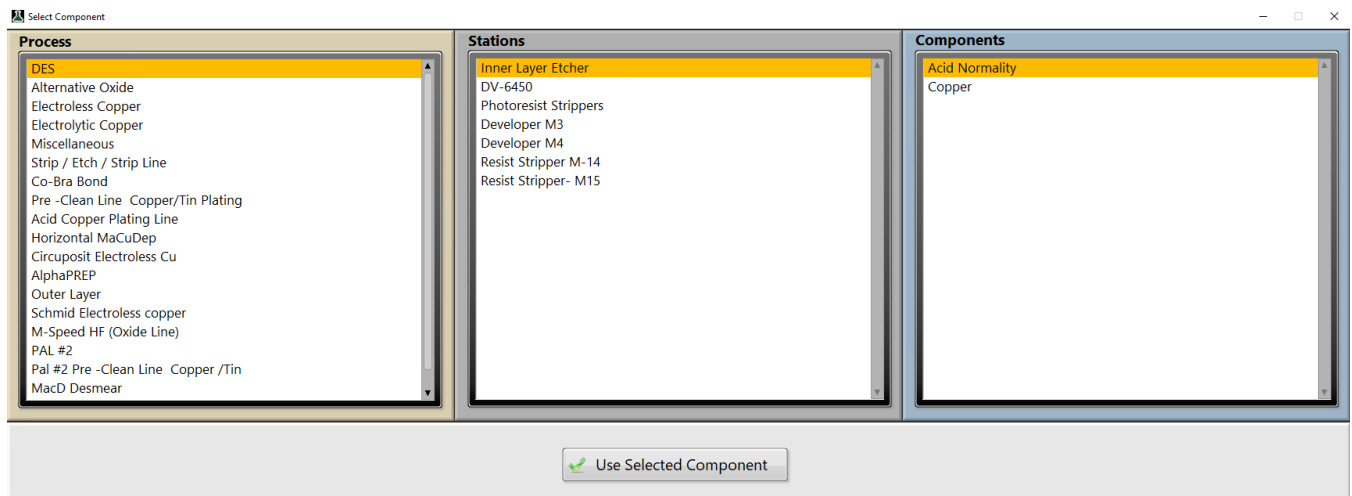
The assignable alarms are:

1. Scheduled analysis overdue.
2. Scheduled make up overdue.
3. Issued add overdue.
4. Issued make up overdue.
5. Assigned preventative makeup task overdue.
6. Concentration out of spec.
7. Concentration out of control.
8. Assigned preventative maintenance task almost due.
9. Assigned preventative maintenance task due.

Choose File>>Save and Exit menu to save and return to the setup screen.

Subscription Levels

Subscription levels define the areas that an email receives alerts from. This is set to All by default and can be changed under “Subscription Level”. To choose what processes, stations, or components give alerts to the selected user, select what level you would like to subscribe the user to with the drop-down box and then click . A variation of the following screen will appear depending on the level selected.



Select the desired process, station, or component, and click the “Use Selected ____” button to save and add the selected option to the alerts.

Note: each user is not limited to one level of subscription. A user may receive alerts for multiple processes, components, and stations.

Test Email

Use this screen to test the email function. Type the mail server address, recipient email address (To Address), subject, and message. The “From Address” is optional. If password authentication is required for outgoing email, type in the username and password (leave blank if authentication is not required). Activate the “TLS” switch if this option is needed by the email server. Click the “Send” button. The program and server communication are recorded in the “Server Response” window to aid in troubleshooting.

The screenshot shows a window titled "Test Email" with a "File" menu. The window is divided into several sections:

- SMTP Server Address:** A text input field.
- Port:** A numeric input field with "25" entered.
- TLS:** A toggle switch.
- From Address:** A text input field.
- To Address:** A text input field.
- Subject:** A text input field.
- Message:** A large text area for the email body.
- Username:** A text input field.
- Password:** A text input field.
- Server Response:** A large text area for the server response.
- error details:** A section with a table showing status, code, and source.

Buttons for "Send" and "Cancel" are located at the bottom left. The "Send" button has a paper plane icon, and the "Cancel" button has a red X icon.

status	code	source
✓	0	

Choose File>>Exit menu to return to the setup screen.

Process Modification

Modifying a Process

To change attributes of a particular process, highlight the process to be modified. Choose “Modify Attributes of Selected Process” from the Process Options pull down menu. The following screen appears.

Make the changes desired and click on the “OK” button.

The screenshot shows a dialog box titled "Pop-Up Screen Schedule". At the top, there are two input fields: "Process Name" with the value "Electroless Copper" and "Product measured in-->" with the value "Square Feet". Below these is a checkbox labeled "Out of Spec Printout" which is currently unchecked. The main section of the dialog is titled "Weekday" and contains a list of days: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. "Sunday" is currently selected and highlighted in yellow. To the right of the list is a text box with the instruction: "Select the weekday then enable and set the notification times to prompt the operator to enter the amount of product that has been run through the process." Below this text box is a section titled "Notification Times" which contains four rows, each corresponding to a day of the week. Each row has a red button labeled "DISABLED" and a time input field set to "0100". At the bottom of the dialog are two buttons: "Ok" (with a green checkmark icon) and "Cancel" (with a red X icon).

Deleting a Process

To delete an entire process, choose “Delete Process” from the Process Options pull down menu. Highlight the process in the screen that appears. A prompt appears asking for confirmation.

The screenshot shows a dialog box titled "Select A Process To Delete". It contains a list of processes: Electroless Copper, Automated Plating, Brown Oxide, Desmear, Manual Plating, Nickel/Gold Plate, Pumice Pre-Clean, S.E.S. Line, Hot Air Le, and Control d. "Brown Oxide" is currently selected and highlighted in yellow. Overlaid on top of this dialog is a smaller confirmation dialog box with the text "Are You Sure You Want to Delete Brown Oxide?". This confirmation dialog has two buttons: "YES" (highlighted in blue) and "Cancel". At the bottom of the main dialog box is a "Cancel" button with a red X icon.

Modifying a Station

To change attributes of a particular station, highlight the station to be changed. Choose “Modify Attributes of Selected Station” from the Station Options pull down menu. The following screen appears:

Everything on this screen can be edited except the station name. This is also the only place to change the order of the components of a station. The components are printed in the order that they appear in the “Station Makeup Order” window. This applies to both add and makeup slips. When you click on a component in the window, the component goes to the top of the list. Therefore, click on the components in the reverse order that you want them to appear. Grayed out components will not appear on add or make-up slips. The station “Add Instructions” and “Makeup Instructions” are accessed by choosing from the drop-down menu. Click into the text box and type the instructions in the screen that appears. These instructions will appear any time a makeup or add sheet is printed (provided the field is in the template). Click “OK” to except the changes or “Cancel” to abort any changes.

Station Name
Bright Acid Copper 2

Station Number 60-61 **Station Size** 4300.00 **Unit Describing Station Size** Gallons

Trigger Station Make-up by: None ☐ Automate Add Printout ☐ Analyze after Make-up

Optimal Operating Temperature This data is only used to display on the Station Report. **Operating Temperature**

Add Instructions
Do not add any salts until the last bar of product has exited the tank. Add all liquid chemicals to the weir if there is prouduct in the tank.

Station Makeup Order
Copper Sulfate
Sulfuric Acid
Chloride (HCl)
VC
Surface Tension (MT-2)
Anode Bags Changed
Filter Cartridge Changed

Ok Cancel

Deleting a Station

To delete a station from a process, highlight the process and station. Choose “Delete Station from the Selected Process” from the Station Options drop down menu. The following prompt appears:

You have chosen to delete the station:
1% Sulfuric Acid
From the Electroless Copper Process.

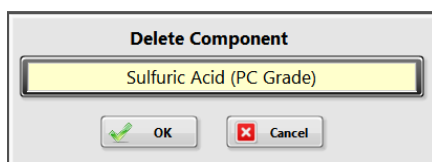
OK Cancel

Click on “OK” to delete or “Cancel” to abort.

Modifying a Component

To make changes to a component, highlight the component. Choose “Modify Attributes of Selected Component” from the Component Options pull down menu. Make the changes desired and be sure to click outside the box of the last entry before clicking on the “OK” button. Failing to do this will nullify the last entry and that change will not take effect.

Note: If a formula is used for the calculation of concentration and add, there must be a formula for both concentration and add. The concentration and add constants will be ignored if a formula is used.

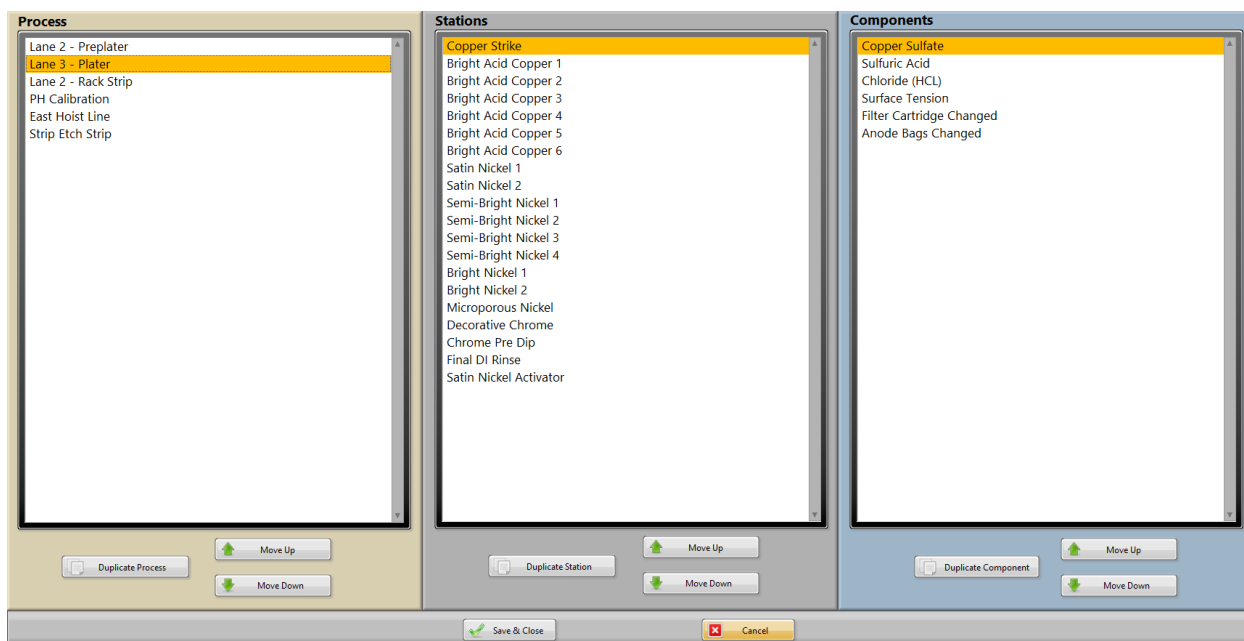


Deleting a Component

To delete a component from a station, highlight the process, station, and component. Choose “Delete Selected Component” from the Component Options pull down menu. The following prompt appears:

Duplicate/Rearrange

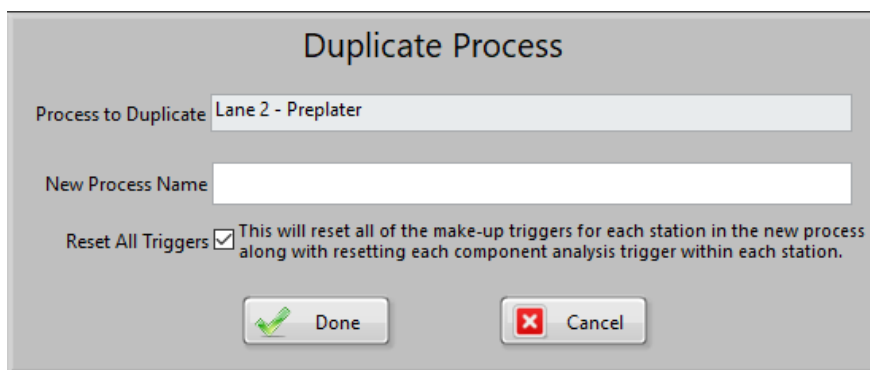
Selecting this option from any of the process, station, or component drop-down menus will bring up the following screen.



The stations and components lists will change based off the selected process and station. The selected process, station, or component can be moved up or down in the list by clicking on the Move Up/Down button in the respective section. Changing the order will change the order the items are listed in on the main screen. Changing the order of the components will also change the order they are listed in on the component analysis screen.

Duplicate Process

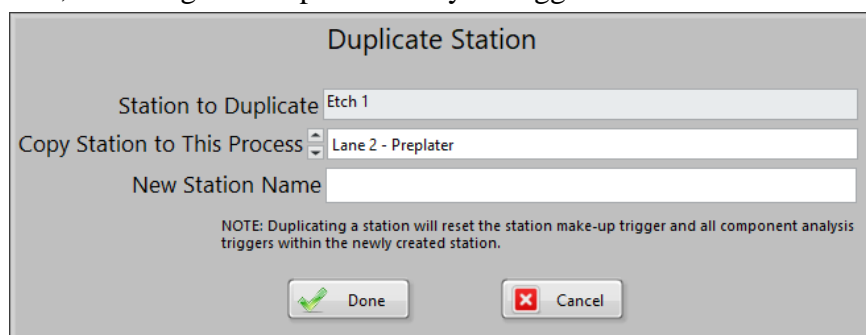
When duplicating a process, a different name will be required. This will duplicate all stations and components within the process. If the “Reset All Triggers” option is unchecked, then the new process will *



The 'Duplicate Process' dialog box has a title bar 'Duplicate Process'. It contains a text field 'Process to Duplicate' with the value 'Lane 2 - Preplater'. Below it is a text field 'New Process Name' which is empty. There is a checkbox labeled 'Reset All Triggers' which is checked. To the right of the checkbox is a note: 'This will reset all of the make-up triggers for each station in the new process along with resetting each component analysis trigger within each station.' At the bottom are two buttons: 'Done' with a green checkmark icon and 'Cancel' with a red X icon.

Duplicate Station

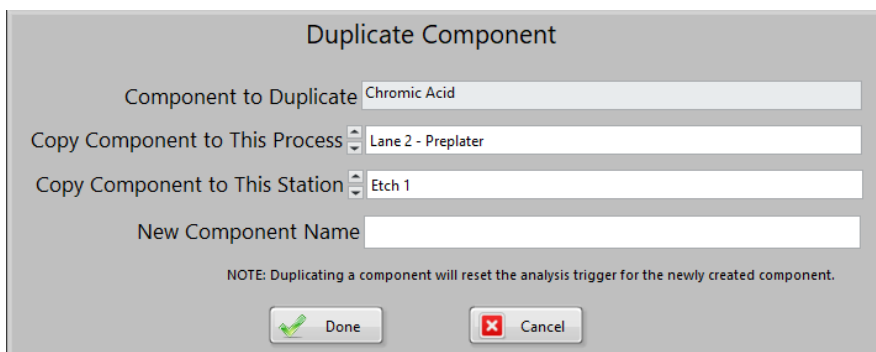
When duplicating a station, the new station can be copied to the same process, or another process can be selected with the drop-down menu. If the new station will be in the same process as the original, then the name must be different than the original name. All event triggers will be reset for the new station, including all component analysis triggers.



The 'Duplicate Station' dialog box has a title bar 'Duplicate Station'. It contains a text field 'Station to Duplicate' with the value 'Etch 1'. Below it is a dropdown menu 'Copy Station to This Process' with the selected value 'Lane 2 - Preplater'. Below that is a text field 'New Station Name' which is empty. A note at the bottom states: 'NOTE: Duplicating a station will reset the station make-up trigger and all component analysis triggers within the newly created station.' At the bottom are two buttons: 'Done' with a green checkmark icon and 'Cancel' with a red X icon.

Duplicate Component

When duplicating a component there will be a drop-down menu for both the process and station. If the component is being copied into the same station as the original component, then the new component will need to have a different name than the original component. The analysis trigger will be reset for the new component.



The 'Duplicate Component' dialog box contains the following fields and controls:

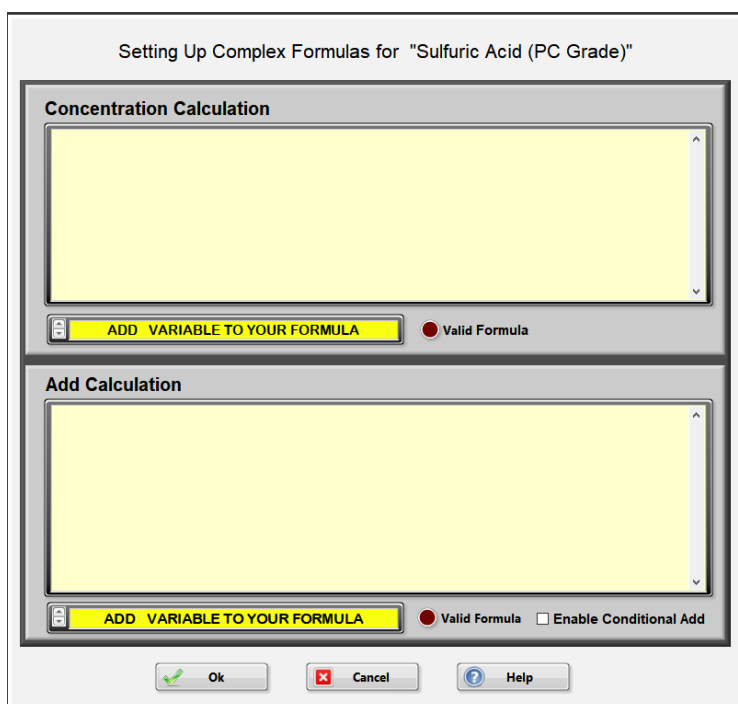
- Component to Duplicate:** A text box containing 'Chromic Acid'.
- Copy Component to This Process:** A drop-down menu showing 'Lane 2 - Preplater'.
- Copy Component to This Station:** A drop-down menu showing 'Etch 1'.
- New Component Name:** An empty text box.
- NOTE:** Duplicating a component will reset the analysis trigger for the newly created component.
- Buttons:** 'Done' (with a green checkmark icon) and 'Cancel' (with a red X icon).

Complex Formulas

To setup a complex formula, enter the component modification screen and choose



from the drop-down menu at the bottom of the screen. Click in the text box above the menu to configure the complex formulas.



The 'Setting Up Complex Formulas for "Sulfuric Acid (PC Grade)"' dialog box contains the following sections and controls:

- Concentration Calculation:** A large yellow text area for entering the formula.
- ADD VARIABLE TO YOUR FORMULA:** A yellow button with a document icon.
- Valid Formula:** A red circle indicator.
- Add Calculation:** A large yellow text area for entering the calculation.
- ADD VARIABLE TO YOUR FORMULA:** A yellow button with a document icon.
- Valid Formula:** A red circle indicator.
- Enable Conditional Add:** A checkbox.
- Buttons:** 'Ok' (with a green checkmark icon), 'Cancel' (with a red X icon), and 'Help' (with a question mark icon).

Note: Variables cannot be typed in the formula box. You must use the “Add Variable to Your Formula” drop down menu to create the variables

The mathematical functions used are + for addition, - for subtraction, * for multiplication, / for division and ^ for power of x. Parentheses are used to enforce the order of operations.

Built-in Functions

The following list of functions can also be used in the formulas.

- abs(x) absolute value
- acos(x) arc cosine
- acosh(x) arc hyperbolic cosine
- asin(x) arc sine
- asinh(x) arc hyperbolic sine
- atan(x) arc tangent
- atanh(x) arc hyperbolic tangent
- ceil(x) rounds to next highest integer
- cos(x) cosine
- cosh(x) hyperbolic cosine
- cot(x) cotangent
- csc(x) cosecant
- exp(x) exponential e^x
- expm1 (e^x)-1
- floor(x) rounds to next lowest integer
- ln(x) natural log
- lnp1(x) $\ln(x+1)$
- log(x) log base 10
- log2(x) log base 2
- sec(x) secant(x)
- sinc(x) $\sin(x)/x$
- sin(x) sine
- sign(x) if number > 0 returns 1 =0 returns 0 <0 returns -1
- sinh(x) hyperbolic sine
- sqrt(x) square root
- tan(x) tangent
- tanh(x) hyperbolic tangent

Note: All angles used in trigonometric functions must be expressed in radians.

Adding Variables

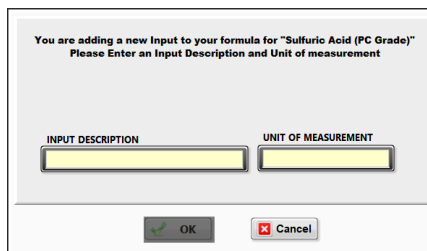
Click the “Add Variable To Your Formula” drop-down menu, the available options are:

1. Create New Input
2. Create New User Defined Global Constant
3. Concentration For
4. Add Amount For
5. Lower Limit of
6. Target Value of
7. Upper Limit of
8. Concentration Constant for
9. Add Constant for
10. Amount for Station Makeup for

Inputs fields are used to input numerical values from the analysis screen into the formula. When entering numbers in the analysis screen, the input fields are listed to the right of the control. Enter the number and click on the appropriate field to assign the number to that field, the number will appear in the box to the left of the assigned field. Enter a new number and click on its appropriate field and so on. When all the inputs have been assigned numbers, the formula will be solved, and a value will be displayed.

Creating a New Input

Choose this option from the “Add Variable to Your Formula” menu and the following screen appears.



Type the description and unit of measurement and click on the “OK” button. The input field created now appears in the complex formula box. You can now act on this input field by typing in a +, -, *, or /. To use a number in the formula, just type it in.

Note: Once the input has been created, it will now appear at the bottom of the “Add Variable to Your Formula” drop down menu and may be used in other formulas.

Example: The following example requires two inputs:

Concentration formula

$((\lll\text{INPUT: Absorbance 526 nm}\ggg * 47.88) + (\lll\text{INPUT: Absorbance 603 m}\ggg * 95.34)) * .172$

Click in the “Concentration Calculation” box on the Complex Formula screen. Into the formula box, type two-left parenthesis “(”. Click on the “Add Variable To Your Formula” menu. Choose “Create New Input”. In the screen that follows, type “**Absorbance 526**” into the “Input

Description” text box. Into the “Unit of Measurement” text box, type “**nm**”. Click on the “OK” button. Now type “* **47.88**) + (” to the right of the input field that was just created.

Click on the “Add Variable To Your Formula” menu. Choose “Create New Input”. In the screen that follows, type “**Absorbance 603**” into the Input Description text box. Into the “Unit of Measurement” text box, type “**nm**”. Click on the “Ok” button. Now type “***95.34**)) * **.172**”. The formula should look identical to the formula above.

Note: When two inputs are used in a concentration calculation, the analysis screen will have all the inputs listed to the right of the numerical input box.

As in a normal analysis, enter your measurement in the “Enter Your Measured Value Here” box, then to the right, click on the appropriate input that was measured. Enter the measurement for the next input and click that input to the right, you will see the measured value to the left of the input name when done correctly. Repeat these steps for all inputs listed. When all the inputs are satisfied, the formula is solved.

To use a value from another component within the station, choose the appropriate item from the “Add Variable to your Formula” menu. The following screen appears:

Click on the desired component and the “OK” button. The field now appears in the “Complex Formula” box.

Add Formula

Example: (<<<Target Value of 3308A>>> - <<<Concentration For 3308A>>>) * 5

Click in the “Add Calculation” box on the Complex Formula screen. Type a left parenthesis “(”. Click on the “Add Variable To Your Formula” menu and choose “Target Value of”. In the next screen, select the component for which the addition is based on (in this example 3308A). Click on the “OK” button and the field appears in the “Add Calculation” box. Type a minus sign “-” to the right of the field that was just created in the formula. Click on the “Add Variable To Your Formula” menu and choose “Concentration for”. In the next screen, select the component for which the addition is based on (in this example 3308A). Click on the “OK” button and that field appears in the “Add Calculation” box. Type the following: a right parenthesis, a multiplication sign and the number five “) * 5” to the right of the last field.

Conditional Add

This feature is used when an analysis may require an addition that can be either one of two different components determined by its analysis value. To use this feature, click on the check box ☐ Enable Conditional Add that is located towards the bottom right of the “Add Calculation” formula box. The following screen appears.

Setting Up a Conditional Add for "Conditioner 3320"

Choose Add Component--> Conditioner 3320 If Analysis result is \geq 0.5000

ADD VARIABLE TO YOUR FORMULA Valid Formula

Choose Add Component--> Conditioner 3320 If Analysis result is $<$ 0.5000

ADD VARIABLE TO YOUR FORMULA Valid Formula

Ok Cancel

In the upper tan colored box choose the component from the drop-down menu that corresponds to the greater or equal than statement for the analysis results. The “If Analysis Result is” value can be changed in the top control only, the bottom control will become the same value. This value, by default, is the target value of the component being analyzed.

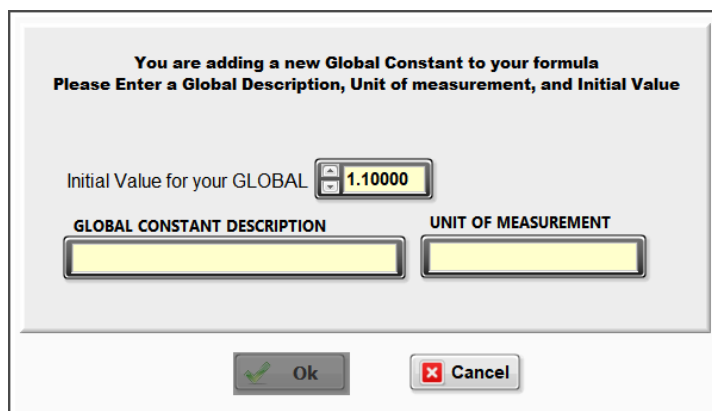
Click on the component drop down menu in the bottom box and choose the component that corresponds to the addition that is satisfied by the analysis result indicated. Next enter the add formula that applies to each component in the respective formula box. Click “OK” to save the change, notice the special formula now appears in the “Add Calculation” formula box.

Note: The two components that are used in the conditional add screen must have “None” for an analysis trigger and the “Unit for add” must have an entry.

Creating Global Constants

Global constants are created and used in formulas where a constant may need to be changed over time (titration solution normality or some calibration factor). With the use of global constants, just changing the value of the global constant changes the value in all formulas where it is used.

To create a global constant, click on the “Add Variable To Your Formula” drop down menu. Click on “Create New User Defined Global Constant”. The following screen appears.



The dialog box has a title bar and a main area with the following text: "You are adding a new Global Constant to your formula" and "Please Enter a Global Description, Unit of measurement, and Initial Value". Below this, there is a label "Initial Value for your GLOBAL" followed by a text input field containing "1.10000". Below the input field, there are two labels: "GLOBAL CONSTANT DESCRIPTION" and "UNIT OF MEASUREMENT", each followed by a text input field. At the bottom of the dialog box, there are two buttons: "Ok" with a green checkmark icon and "Cancel" with a red X icon.

Enter the description, unit of measurement, and initial value. Click on the “OK” button. The global constant now appears in the formula. It is also listed at the bottom of the drop-down menu “Add Variable To Your Formula” for use in subsequent formulas.

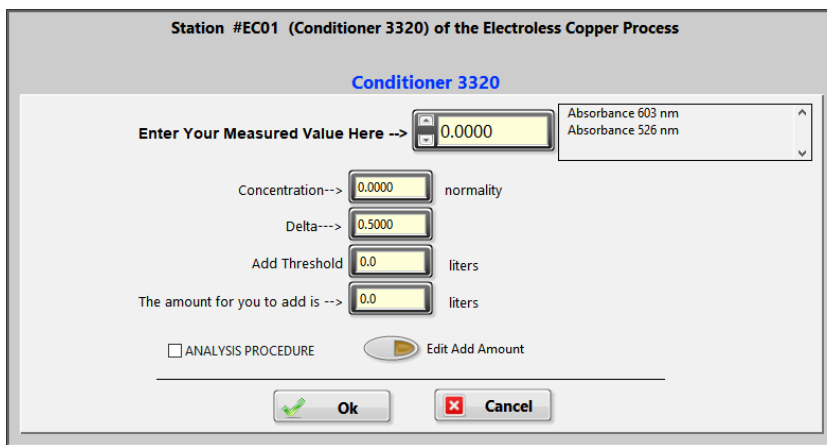
All of the remaining fields that can be used in formulas function very similar to this. For example, to import the concentration of a component into the formula, click on the option “Concentration for” and choose the component from the screen that appears. The field is inserted into the formula at the location where the cursor was.

Note: To edit the value of an existing global constant see the **Global Constants** section.

When using formulas to calculate concentrations and additions, all fields from other components that are used in the formula must be analyzed first. The analysis for a station must remain open until the formula is solved. Closing out the analysis before the formula is solved will cause the values to be lost for the components that have not been analyzed. If you should try to analyze a component that has a field using another component value, and that component has not been analyzed, Lab Wizard will prompt for analysis of that component first.

Test Calculation

After completion of the formulas, click on the  button and the following screen appears.

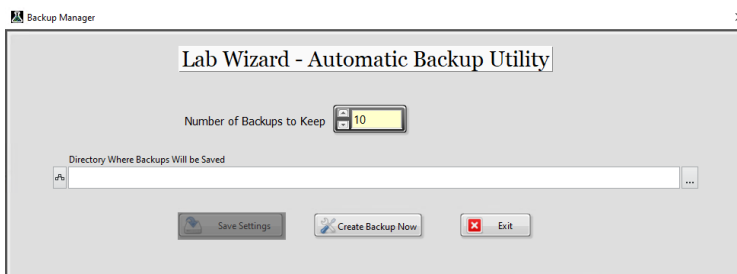


Enter a number in the Measured Value control and click on the input field to the right of the control. Verify the concentration and add calculations are correct.

If the formula contains fields from other components, a prompt will appear to enter a pretend value for each field that is in the formula. When all the prompts are completed, enter in the values for any inputs to solve the formula.

Backups

Lab Wizard automatically creates backups every day at midnight or at startup if it has been over 24 hours since the last backup. To choose the number of backups and the location of backups, select backup under Backup/Restore on the setup page. The following screen will appear.



Here you can choose the file that the backups will be saved to and the number of backups to keep.

It is important to make regular backups of the Lab Wizard directory in case of hardware failure. Please contact Lab Wizard support for help restoring from a previous backup.
support@lab-wizard.com

Remote Console

The Remote Console is installed on a separate computer from the main Lab Wizard installation. Through the remote console other users can view the history and report screens without interrupting technicians entering data. Users that have access level 5 can also make changes in Lab Wizard through the Setup screen from the Remote Console.

Contact sales@lab-wizard.com to enable the Remote Console.

Hardware Requirements

1. Operating System: 64-bit Windows 10.
2. Video adapter capable of 1920x1200 resolution.

To set the video resolution:

1. Right click on the desktop.
2. Select 'Display Settings'
3. Scroll down to 'resolution' and select 1920x1200 from the drop-down menu.

Installation Instructions

1. Ensure the operating system has all updates installed and the system has been restarted.
2. Download the latest version of the Remote Console software using the link in your email.
3. Once the download is complete, right-click on the RemoteConsoleInstaller.zip file and select 'Extract All' then click the 'Extract' button.
4. Close any open programs and windows.
5. Double-click the setup.exe file and follow the prompts.
6. Proceed through the installation using all the default options, once the entire installation is complete you will be prompted to restart, DO NOT exit before this.
7. You must have administrator privileges in order to install the software, when you are prompted enter the administrative credentials.
8. This software requires a license file, which is generated by the Lab Wizard team. The remote console will need to connect with the computer that has the main Lab Wizard installation to access the license file and database.

Updating the Remote Console

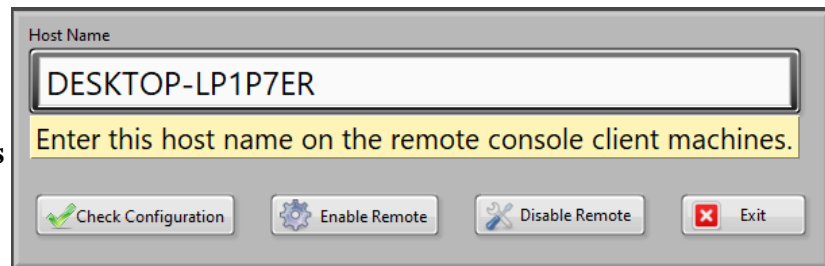
The remote console uses the same method for updates as Lab Wizard. Refer to the section on **Updating Lab Wizard**

Remote Console Setup

On the main Lab Wizard computer

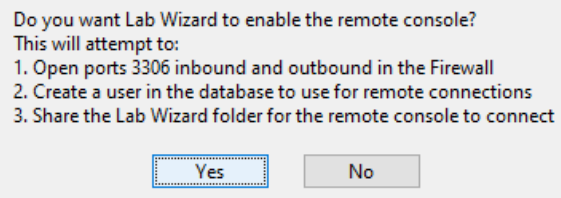
Before launching the remote console, the remote console will need to be enabled from the main Lab Wizard setup screen. In the process setup screen under the Utilities menu option is the Remote Config.

The name displayed in the “Host Name” box will depend on the name of the computer Lab Wizard is installed on, **this name will need to be entered on the remote console to establish the connection.**



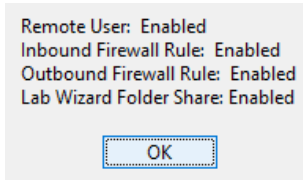
A dialog box titled "Host Name" with a text input field containing "DESKTOP-LP1P7ER". Below the input field is a yellow highlighted instruction: "Enter this host name on the remote console client machines." At the bottom are four buttons: "Check Configuration" (with a green checkmark icon), "Enable Remote" (with a gear icon), "Disable Remote" (with a wrench icon), and "Exit" (with a red X icon).

Click the “Enable Remote” button to allow a remote console to connect to this installation of Lab Wizard. Lab Wizard will make changes to network connections to allow the remote console to connect to this device, this will require administrative access.



A confirmation dialog box asking: "Do you want Lab Wizard to enable the remote console? This will attempt to:" followed by a list of three actions: "1. Open ports 3306 inbound and outbound in the Firewall", "2. Create a user in the database to use for remote connections", and "3. Share the Lab Wizard folder for the remote console to connect". At the bottom are "Yes" and "No" buttons.

After enabling the remote console click the “Check Configuration” button to verify that the appropriate ports are open and the Lab Wizard folder is being shared.

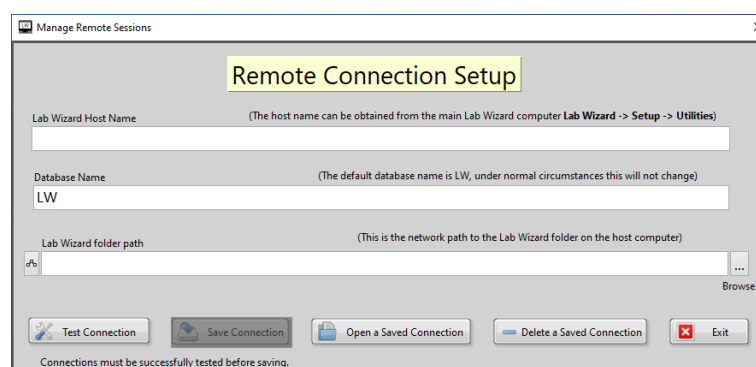


A status dialog box showing the following configuration: "Remote User: Enabled", "Inbound Firewall Rule: Enabled", "Outbound Firewall Rule: Enabled", and "Lab Wizard Folder Share: Enabled". An "OK" button is at the bottom.

To disable the remote console, click the “Disable Remote” button. This will also require administrative access to close the open ports and stop sharing the Lab Wizard folder.

On the remote console computer

The first time the remote console is opened it will bring up the remote connection setup screen.



A dialog box titled "Remote Connection Setup" with the subtitle "Manage Remote Sessions". It contains three input fields: "Lab Wizard Host Name" (with a note: "(The host name can be obtained from the main Lab Wizard computer Lab Wizard -> Setup -> Utilities)"), "Database Name" (with a note: "(The default database name is LW, under normal circumstances this will not change)" and the value "LW"), and "Lab Wizard folder path" (with a note: "(This is the network path to the Lab Wizard folder on the host computer)" and a "Browse" button). At the bottom are five buttons: "Test Connection", "Save Connection", "Open a Saved Connection", "Delete a Saved Connection", and "Exit". A footer note states: "Connections must be successfully tested before saving."

Enter the name of the computer that was displayed on the configuration window from the main Lab Wizard computer in the space for the host name.

The database name will be listed as “LW” by default, this is likely correct unless the name was changed when first installing Lab Wizard.

Click on the “Browse” button to the right of the “Lab Wizard folder path” box to bring up a file browser window, use this window to navigate to the Lab Wizard installation folder on the host computer.

Once all of the connection options are filled, click on the “Test Connection” button to confirm the connection options are correct. A window will appear to confirm the company name and location as displayed at the bottom of the main Lab Wizard screen. Once the connection has been confirmed the “Save Connection” button will no longer be grayed out. Clicking this button will prompt to enter a name for the connection, this can be any name to identify this connection.

Exiting the connection setup screen with a valid connection will bring up the **Operator Log In** screen, this will be the same log in information as for the Lab Wizard installation the remote console is connected to.

Saved connections can be deleted from this window with the “Delete a Saved Connection” button.

Remote Console Main Screen

The main screen will show the active connection. If multiple connections are saved then the connections can be changed with the drop-down menu on this screen, click on the “Re-initialize” button to connect to the newly selected connection.

To log in as a different operator, click on the “Re-initialize” button to bring up the operator log in screen again.



The “Set up Connections” button will bring up the connection setup screen again to add saved connections or make changes to a previously saved connection.

If the Dashboards are enabled, then the ‘Dashboards’ button will appear at the bottom of the window. See the **Dashboards** section for more information.

History drop-down

The history drop-down menu allows access to the same history screens as in the main Lab Wizard installation. The options in this menu are:

- Process History**
- Station History**
- Component History**
- Preventative Maintenance History**
- Advanced History**

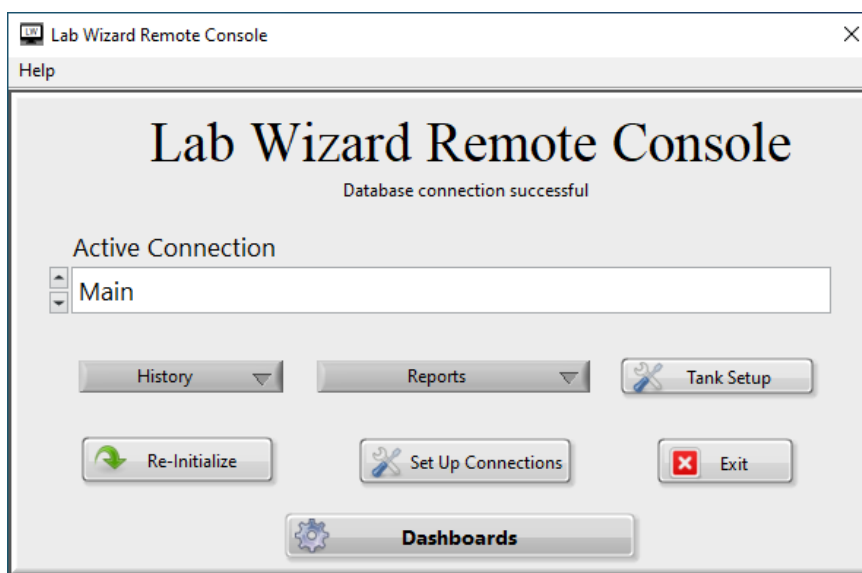
Reports drop-down.

The reports drop-down menu allows access to the same report screens as in the main Lab Wizard installation. The options in this menu are:

- Events Status Report**
- Out Of Spec Report**
- CPK Report**
- Preventative Maintenance Report**
- Station History Report**

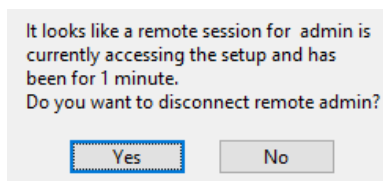
Tank Setup

If a log in with access level 5 is used, then the “Tank Setup” button will appear to the right of the reports drop-down menu. This button gives access to the setup screen, see the **Lab Wizard Setup** section for more information. **Caution should be used when making changes from the remote console! If changes are made while a technician is entering data, then there may be unexpected results.**



If another user is accessing the setup screen, then a pop up will appear asking to disconnect the other user and will state which user is accessing the setup screen. Another window will appear to confirm disconnecting the other user.

The same window will also appear in the main Lab Wizard setup screen if another user is connected through the Remote Console.



Dashboards

The Dashboards can be run from any computer that has the Remote Console installed to allow for a faster checkup on statuses or SPC data from Lab Wizard.

Contact sales@lab-wizard.com to enable Dashboards.

SPC Component Dashboard


The SPC Component Dashboards displays a number of component graphs to easily track the concentrations and insure the components are kept within the spec ranges.



Each dashboard can have multiple pages that it cycles through and will regularly check the Lab Wizard database for updates in the data. A timer for when the page will change is displayed in the top right corner. The frequency of data updates and page changes can be set for each dashboard in the setup screens explained below.

Live Status Dashboards

The Live Status Dashboards displays the event triggers for the processes, stations, or components set to that dashboard. This allows a quick visualization of what analysis, make-ups, or issued adds are due or overdue.

<div>  <div> <div>Live Status Viewer</div> <div>Cuposit</div> <div> Refresh Timer 23 <input type="button" value="Exit"/> </div> </div> </div>					
Station	Analysis	Add Slips	Corrective Action	Other Item	Details
Cuposit -> Promoter	10 Days late				Circuposit Promoter 3308A analysis 10 Days late
Cuposit -> Neutralizer					
Cuposit -> Hole Prep					
Cuposit -> Conditioner					
Cuposit -> G-5 Microetch					
Cuposit -> Catalyst Predip					
Cuposit -> Catalyst	12 Days late				Cataposit 44 analysis 12 Days late
Cuposit -> Electroless Copper	24 Mins due				Cuposit Z analysis 24 Mins due
Cuposit -> Sulfuric Acid		17 Mins late			Sulfuric Acid 93% add 17 Mins late

Preventative Maintenance items that have been linked to a process, station, or component will be displayed in the 'Other Item' column. See the **Preventative Maintenance** section for more information.

A timer for the next update in status times is displayed in the top right corner. The update time can be changed from the setup screen explained below.

Web Based Dashboards

The web based dashboards display similar information as the live status dashboards. The web based dashboards just use a different format to better fit within a standard web browser. Once configured the web dashboards will be broadcast across the local network so that they can be viewed from a web browser on any device connected to the local network, these dashboards do not require the Remote Console to be installed in order to view them on that device. The exact layout of the dashboards will adjust with the screen size.

all processes

Copper Plating

Acid Copper

ANALYSIS due at 05/09/2023 01:30 PM for Sulfuric Acid, Station #465 (Acid Copper) of the Copper Plating process

Degreaser

Issued makeup due at 05/08/2023 13:41 PM

Electroless Copper

Electroless Copper

ANALYSIS due at 09/29/2022 11:24 AM or -100.00 Sq Ft for Sodium Hydroxide, Station #320 (Electroless Copper) of the Electroless Copper process

Micro Etch

DUMP due at 09/26/2022 07:00 AM for Station #310 (Micro Etch) of the Electroless Copper process

ENIG

Electroless Nickel

DUMP due at 11/26/2002 11:31 AM for Station #150 (Electroless Nickel) of the ENIG process

Immersion Gold

pH is Out of Spec
Analysis overdue

If the list of stations for the dashboard is too long to all fit on the screen at the given screen size, then the dashboard will auto-scroll gradually working its way to the bottom of the screen before jumping back to the top of the screen.

Configuring the Dashboards

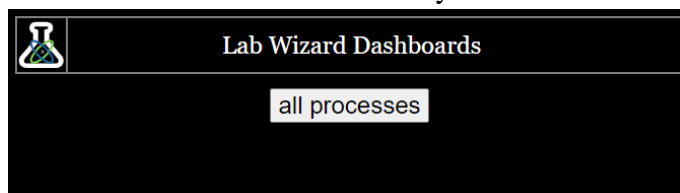
You will need to work with your IT department to configure the dashboards properly as it will depend on specifics with your local network. Navigate to the Lab Wizard directory, usually this will be at C:\Program Files\Lab Wizard, and open the “Lab Wizard.ini” file in any text editor. At the bottom of the file you will add a new line with “wdaship=” without quotes. After the equals sign you will need to enter the IPv4 address of the Lab Wizard computer. Then add another new line with “wdashport=” without quotes, add the desired port number after the equals sign on this line. The port number will need to be a port that is not already being used by this computer and be between 1026 and 49151.

Make sure that there is a blank line at the bottom of the file. Save the file and re-launch Lab Wizard to activate the web dashboards.

Once the dashboards have been configured then the help screen accessed from the web dashboard management screen will display the URL to access the dashboards on your network.



This address will be different for each network and will be dependent on the specific network settings. The URL listed will be for the landing page of the dashboards, from this landing page you will be able to select the active dashboards currently available.




Each dashboard will have its own URL that can be bookmarked or set to be opened to when the browser is opened. **192.168.1.4:2500/allprocesses/**

If Lab Wizard is closed while a dashboard is open in a given web browser, then an error will be displayed in that browser as the dashboards are only broadcast while Lab Wizard is running. The web browser will refresh to the new dashboard once Lab Wizard is started again.

The web based dashboards always display at the station level. The stations for the selected dashboard will be grouped with other stations within their process. The processes will be listed

alphabetically with the stations listed alphabetically under the process header. The web dashboards will only display the stations for that dashboard if they have an alert to be displayed. If there are no alerts to display for a given station then that station will be removed from the dashboard until there is a new alert to display. Processes will also be removed from the dashboard if they do not have any stations with alerts at that time. It is possible that a given dashboard will be empty because there are no alerts for any of the stations selected for that dashboard.

	all processes	
Copper Plating		
Acid Copper	Issued add due at 05/11/2023 10:28 AM	
Degreaser	ANALYSIS due at 05/11/2023 12:28 PM for Temperature, Station #405 (Degreaser) of the Copper Plating process	
Electroless Copper		
Electroless Copper	DUMP due at 02/20/2001 11:31 AM or 99950.00 Sq Ft for Station #320 (Electroless Copper) of the Electroless Copper process	
Micro Etch	ANALYSIS due at 09/29/2022 11:26 AM for Sulfuric Acid, Station #310 (Micro Etch) of the Electroless Copper process	
ENIG		
Electroless Nickel	ANALYSIS due at 09/29/2022 11:26 AM for Nickel Part A, Station #150 (Electroless Nickel) of the ENIG process	
Immersion Gold	ANALYSIS due at 05/11/2023 03:28 PM for Potassium Gold Cyanide, Station #155 (Immersion Gold) of the ENIG process	

The message box for each station will cycle through the alerts that are active for that station. The alerts that are displayed on the dashboard are updated every minute.

Acknowledging Out of Spec Analysis

With the web dashboards an option for acknowledging out of spec analysis has been added. The screen to acknowledge the out of spec analysis can be accessed from the Tools menu of the Remote Consoles.

The screenshot shows a web form titled "Acknowledge Out of Spec Analysis". The form is divided into several sections:

- Out of Spec Components since 05/04/2023**: A list box containing the following items:
 - Copper Plating-> Degreaser-> Cleaner
 - Copper Plating-> Degreaser-> Temperature
 - Copper Plating-> Degreaser-> Temperature
 - Copper Plating-> Degreaser-> Temperature
 - Copper Plating-> Degreaser-> Temperature
 - ENIG-> Immersion Gold-> Potassium Gold Cyanide
 - ENIG-> Immersion Gold-> pH (highlighted in orange)
- Out of Spec Cause**: A section with two input fields:
 - Time**: 2023-05-08 16:30:02
 - Lab Tech**: Brady
- Explanation/Directions to correct Out of Spec analysis**: A large text area for entering the cause and directions.
- Buttons**: "Save" and "Exit" buttons at the bottom.

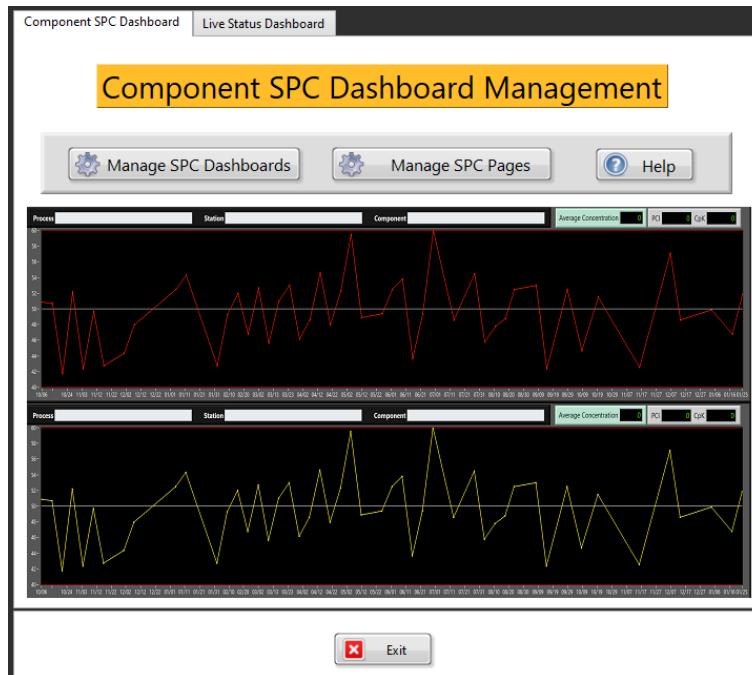
All out of spec data points for the last seven days will be listed by process→ station→ component. Selecting one of the lines will fill in the time the analysis was completed, the lab technician that completed the analysis, and the out of spec cause that was selected by the lab technician. If this data point has already been acknowledged then the lower box for the explanation/directions will also be populated with the explanation/direction that was previously entered.

A data point will be listed with the out of spec cause and the out of spec colors on the web based dashboards until an explanation/direction has been saved to that data point. After an explanation/direction has been saved then the web based dashboards will be updated to include the explanation and switch to the acknowledged color set.

Whether or not a data point has been acknowledged, it will be removed from the web based dashboards once another analysis has been completed and the component is within the spec window or the station has had a make-up issued.

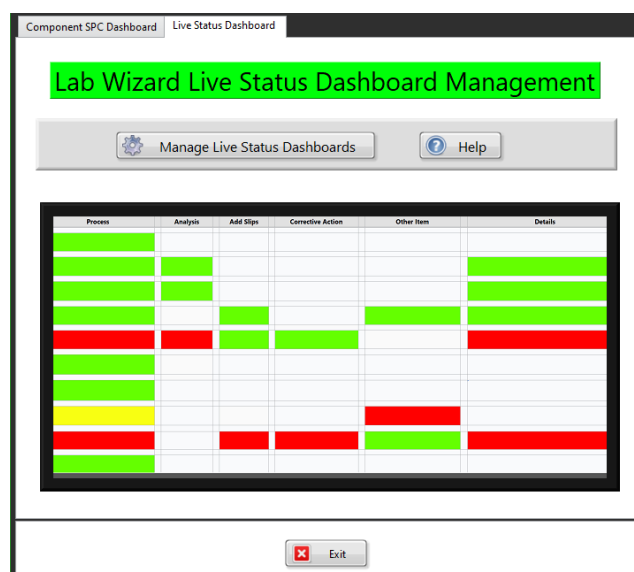
Manage Dashboards Screen

The below screen will appear when the “Manage Dashboards” button is clicked.



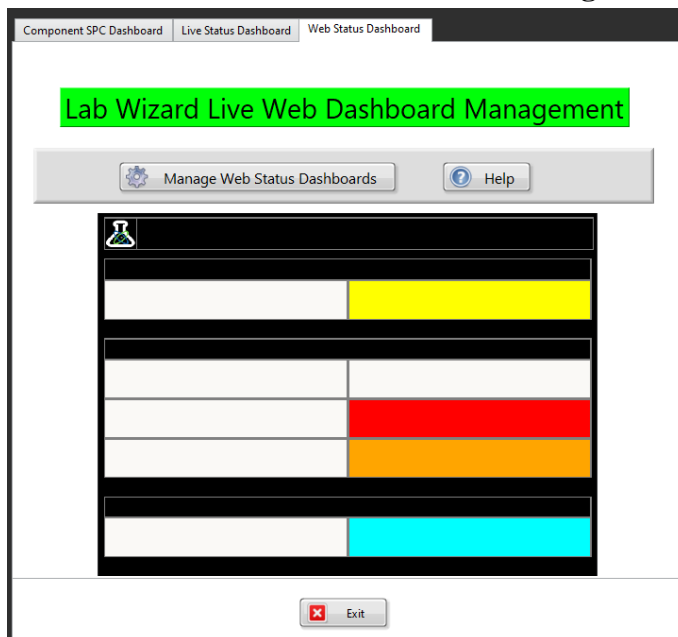
When first setting up a Component SPC Dashboard, begin by clicking on the ‘Manage SPC Pages’ button.

To switch to managing Live Status Dashboards, select the ‘Live Status Dashboard’ tab at the top of the window to show the following screen.



Click on the ‘Manage Live Status Dashboards’ to begin setting up a Live Status Dashboard.

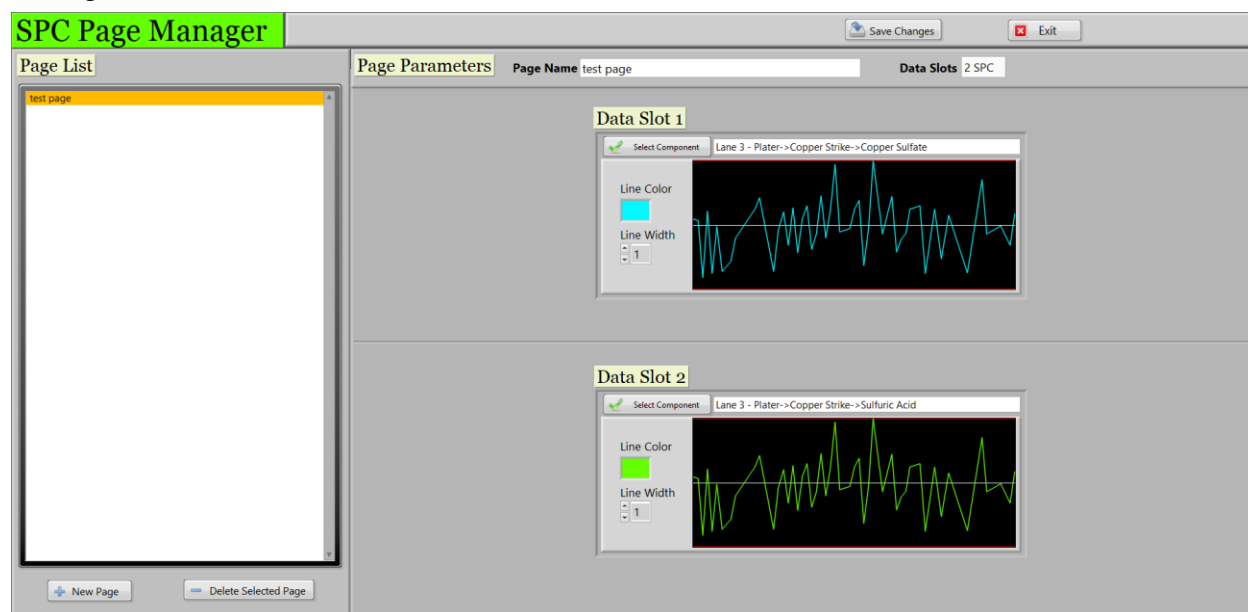
To switch to managing the Web Status Dashboards, select the 'Web Status Dashboard' tab at the top of the window to show the following screen. **Note: the Web Status Dashboard tab will not be displayed if the Web Status Dashboards have not been configured.**



Click on the 'Manage Web Status Dashboards' button to begin setting up a Web Status Dashboard.

Component SPC Page Setup

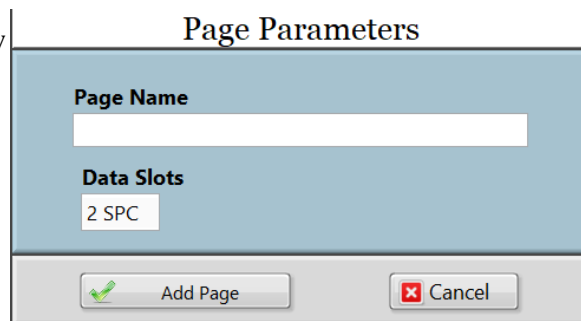
To begin setting up a Component SPC Dashboard click the 'Manage SPC Pages' button on the Manage Dashboards screen.



Clicking on the 'New Page' button will display a window for selecting the page parameters for a new page, the 'Add Page' button will add this page to the Page List on the left of the screen.

The number of Data Slots can be changed with the drop-down menu, the options are two, four, or six component SPC graphs.

These parameters can be changed for the selected page on the SPC Page Manager screen.



The 'Page Parameters' dialog box has a light blue header. Below the header, there is a 'Page Name' label followed by a text input field. Underneath is a 'Data Slots' label followed by a dropdown menu currently showing '2 SPC'. At the bottom, there are two buttons: 'Add Page' with a green checkmark icon and 'Cancel' with a red X icon.

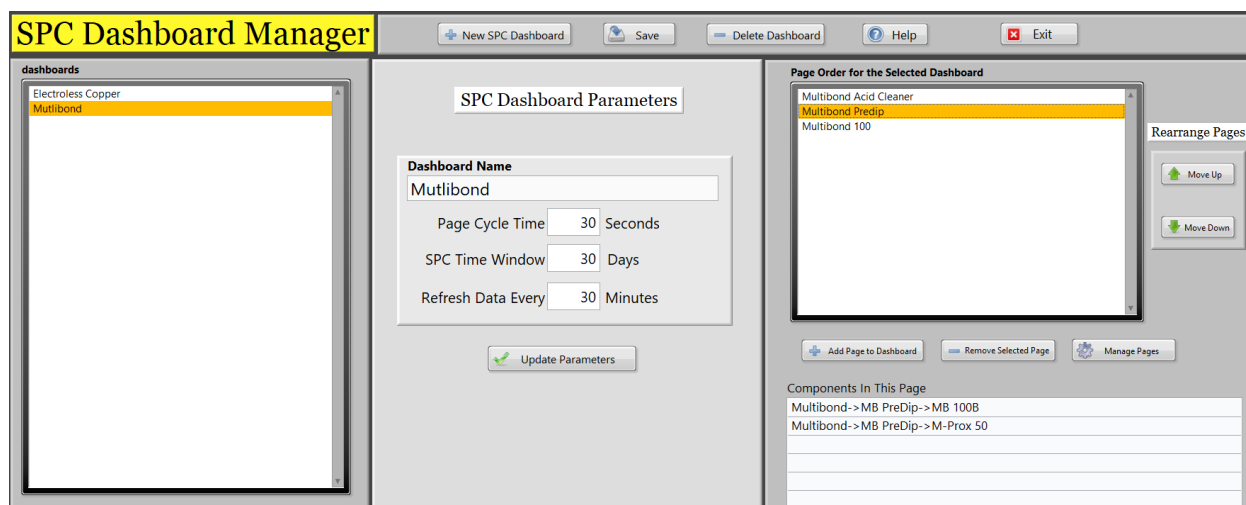
For each data slot the component can be selected with the 'Select Component' button, this will display a pop-up for navigating through the Processes and Stations to select the desired component. The line color can be changed by clicking on the colored square, a small window will appear for selecting any color, brighter colors are recommended on the black background. And the line width can be set to 1-5 with the drop-down menu with 1 being the thinnest line and 5 being the widest.

The selected page can be deleted with the 'Delete Selected Page' button.

Be sure to click the 'Save Changes' button before exiting this window or selecting a different page.

Component SPC Dashboards Setup

Click on the 'Manage SPC Dashboards' button from the Manage Dashboards screen to display the following window.



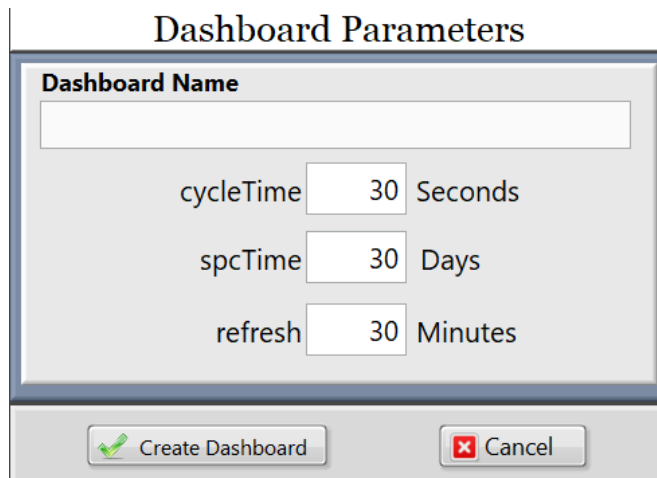
The 'SPC Dashboard Manager' window has a title bar with buttons for 'New SPC Dashboard', 'Save', 'Delete Dashboard', 'Help', and 'Exit'. The main area is divided into three panels. The left panel, titled 'dashboards', shows a list with 'Electroless Copper' and 'Mutlibond' (highlighted). The middle panel, titled 'SPC Dashboard Parameters', contains fields for 'Dashboard Name' (Mutlibond), 'Page Cycle Time' (30 Seconds), 'SPC Time Window' (30 Days), and 'Refresh Data Every' (30 Minutes), with an 'Update Parameters' button at the bottom. The right panel, titled 'Page Order for the Selected Dashboard', shows a list of components: 'Multibond Acid Cleaner', 'Multibond Predip' (highlighted), and 'Multibond 100'. It includes 'Move Up' and 'Move Down' buttons. Below this list are buttons for 'Add Page to Dashboard', 'Remove Selected Page', and 'Manage Pages'. At the very bottom, a section titled 'Components In This Page' lists 'Multibond -> MB PreDip -> MB 100B' and 'Multibond -> MB PreDip -> M-Prox 50'.

Click on the 'New SPC Dashboard' button to display the SPC Dashboard Parameters window.

The 'Page Cycle Time' is the length of time each page is displayed for this dashboard.

The 'SPC Time Window' is the number of days that will be displayed in each graph.

The dashboard will check for new data according to the 'Refresh Data Every' cell. Setting the refresh time too frequent can slow down the system.

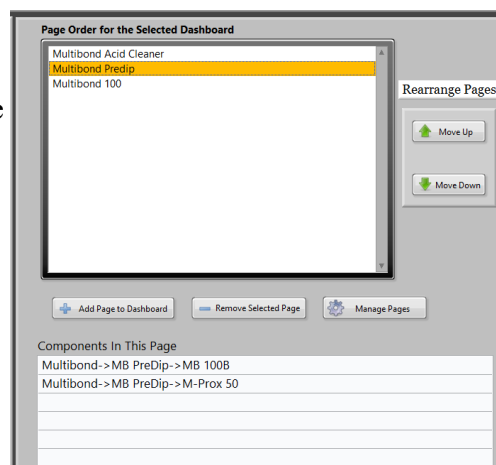


These parameters can all be changed after creating the dashboard as well, be sure to click the 'Update Parameters' button if any changes are made.

The right side of the screen shows the pages that will be displayed for this dashboard. Use the 'Add Page to Dashboard' button to add a page to the list. The 'Manage SPC Pages' screen can be accessed from here with the 'Manage Pages' button.

The pages will be displayed in the dashboard according to the order they are listed on this screen. Use the 'Move Up' and 'Move Down' buttons to reorder the pages.

The components that are tracked for the selected page will be displayed in the box at the bottom of this section.



Be sure to click the 'Save' button before exiting this screen or changing the selected dashboard.

Live Status Dashboard Setup

Clicking on the 'Manage Live Status Dashboards' button on the 'Live Dashboards Management' tab will display the following screen.

Lab Wizard Live Status Dashboard Setup

Status Dashboards

Lane 2
Resist Strip

Dashboard Column Names

Process Analysis Add Slips Corrective Action Other Item Details

Processes in this dashboard:

Lane 2 - Preplater
Lane 2 - Rack Strip

Dashboard Name: Lane 2
Dashboard Level: Processes
Data Refresh (min): 1

Create New Status Dashboard
Delete Selected Dashboard
Save Dashboard
Help
Exit

List Management

Add New
Remove Selected
Move Up
Move Down

The available Status Dashboards will be listed on the left of the screen.

The 'Create New Status Dashboard' button will display a window for naming the new dashboard.

Status Dashboard Name

OK Cancel

The dashboard level can be changed with the drop-down menu below the Dashboard Name. Changing the level will clear all the processes, stations, or components for the current dashboard. The displayed columns names will also change to reflect the selected dashboard level.

Dashboard Column Names					
Station	Analysis	Add Slips	Corrective Action	Other Item	Details

Dashboard Column Names					
Component	Result	Add Slips	Corrective Action	Other Item	Details

The selected dashboard can be deleted with the 'Delete Selected Dashboard' button.

Be sure to click the 'Save Dashboard' button before exiting the screen or selecting another dashboard.

How frequently the dashboard checks for status updates can be changed with the 'Data Refresh' box. Setting the refresh time too low can slow down the system.

To add an item to the dashboard, click the 'Add New' button, a popup will appear to select the process, station, or

Processes in this dashboard:

Lane 2 - Preplater
Lane 2 - Rack Strip

List Management

Add New
Remove Selected
Move Up
Move Down

component according to the level of the current dashboard. The new item will be added to the bottom of the list.

The order of the list will determine the order of the rows as they appear on dashboard, use the 'Move Up' and 'Move Down' buttons to rearrange the list.

An unwanted item can be deleted by selecting it and clicking the 'Remove Selected' button.

Web Dashboards Management Screen

Lab Wizard Web Status Dashboard Setup

Status Dashboards

all processes

Copper Plating->Degreaser
Copper Plating->Acid Copper
Electroless Copper->Micro Etch
Electroless Copper->Electroless Copper
ENIG->Immersion Gold
ENIG->Electroless Nickel

Create New Web Dashboard Delete Selected Dashboard Add Station to Dashboard Remove Selected Station

Save Changes to Dashboards

Almost Due/
Station Name Due Now Overdue Out of Spec -
Unacknowledged Out of Spec -
Acknowledged Out of Control

Background Font Background Font Background Font Background Font Background Font Background Font

Save Colors

Help Exit

The colors for each alert can be customized from the web dashboard management screen. The colors will be applied to all of the web dashboards. To change a color click on the color box for the background or font color for the category that you would like to change. The changes will not be sent out to the dashboards until the colors have been saved.

This screen is also where new dashboards can be created and the list of stations for each dashboard can be managed.