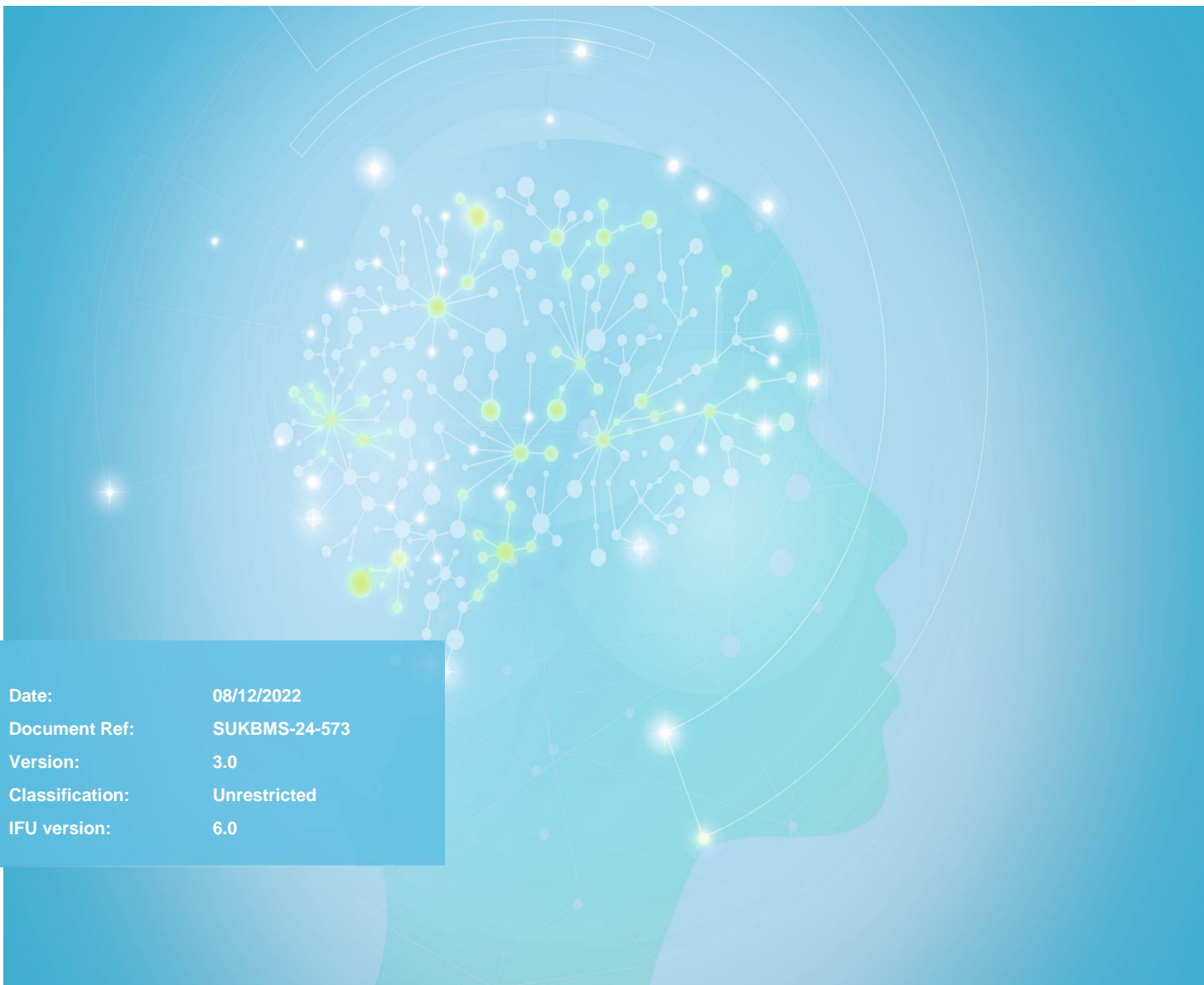


Routine Use Training Workbook

Extended IPU (EPU)



| | |
|-----------------|---------------|
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Disclaimer

Please note, the information contained in training resources provided by Sysmex should not be used as an alternative to your sites Standard Operating Procedure (SOP)/Contract. If you have any particular questions regarding any site specific use of reagents, consumables and/or equipment please contact your Management Team.

Revision History

| Revised section | Alteration | Name | Date |
|----------------------|---|---------|---------------|
| All | New document to replace the following document: - EPU Onsite Training Workbook | N.Bowen | March 2021 |
| Contact Us | 'Online' removed | N Bowen | July 2021 |
| Splash Screen Layout | Role and User updated | N Bowen | July 2021 |
| Introduction to EPU | Information added regarding EPU environments, datamanager and clients. | N Bowen | December 2022 |

Reference Documents

| Document title | Version | Date |
|------------------|---------|---------------|
| Extended IPU IFU | 6.0 | November 2020 |

Overview of EPU

Extended IPU also known as EPU is a validation software that sits between the Laboratory Information System (LIS) and Sysmex analysers. EPU is customisable enabling laboratories to design their workflow through EPU to ensure lean work streams, benefiting both laboratory staff and patient.

| Features | |
|-----------------------|--|
| Analyser connections | XN-Series XN-L Series CS-Series CN-Series SP-Series Starrsed-Series TS-Series TOSOH G11 |
| Unlimited connections | EPU can have unlimited connections to analysers, meaning it can be deployed across sites and networks. |
| Capacity | Database can hold 500,000 records. |
| Customisable rules | Laboratory specific rule sets ensure appropriate reflexing to improve turnaround times. |
| Validation of results | Customisable parameters limits to allow for auto validation of results or BMS validation. |
| Blood film reporting | Manual differentials can be performed in EPU. |

Introduction to EPU

EPU Set Up

EPU can be installed on a physical PC, physical rack mounted server or a virtual server. As each site has different requirements, Sysmex UK can install EPU on any of these platforms.

IMPORTANT: Please familiarise yourself with the relevant setup for your laboratory.

Physical PC's



Physical PC's are Dell tower PC's provided by Sysmex UK. The PC will be installed in the laboratory with the EPU software installed on it and connected to the hospital network with the help of your hospital's IT department. Sysmex recommend that this PC is not routinely used for validation, as any time a change is required or an issue needs troubleshooting, Sysmex UK will require access to the EPU software on the physical PC.

It is recommended that a physical PC is rebooted weekly to allow for Windows updates on the PC but also to reset the PC, as prolonged running time without a reboot can result in PC processes running slow. In the event of an EPU software or hardware issue, Sysmex UK will often ask for this PC to be rebooted, therefore, please ensure you are aware of its location.

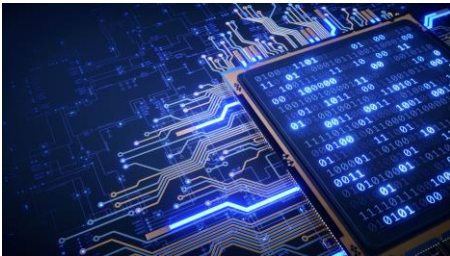
Physical Rack Mounted Server



Physical rack mounted servers provided by Sysmex UK are Dell rack mounted servers. They are installed by Sysmex UK with the help of hospital IT in a server room within the hospital. As with the physical PC these servers are accessed by Sysmex UK to make any changes required or to perform troubleshooting steps.

Unlike the physical PC, the rack mounted server will be located away from the laboratory, therefore, it is important to consider who has access to it, who can reboot it and how often reboots will happen. In the event of an out of hours issue it is important to determine who can reboot the server.

Virtual Servers

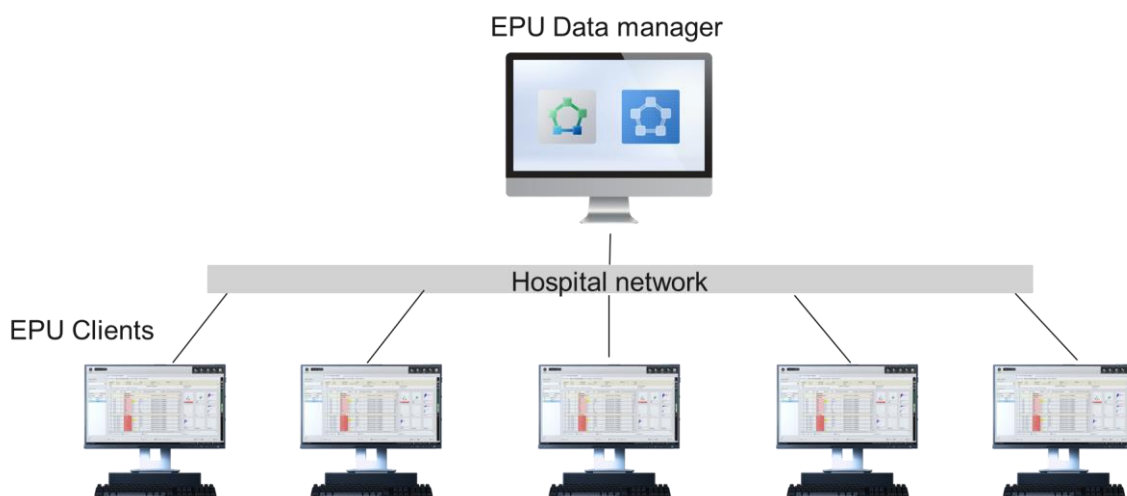


Virtual servers are housed on the hospital IT infrastructure, with space being allocated to Sysmex UK for EPU software to be installed on. A virtual server will work in the same way a physical server or PC, but as it is provided by hospital IT, they will be responsible for the virtual server's maintenance. In the event of issues with performance, hospital IT will be the first port of call, as they will need to ensure the server is running as expected.

To report issues to hospital IT, please ensure you are aware that EPU is installed on a virtual server and know the host name or IP address of the virtual server, to provide to hospital IT. After these initial investigations please contact Sysmex UK to investigate the software.

Virtual devices will also require a reboot to allow for Windows updates and ensure performance. Hospital IT will have access to do this, therefore, please schedule these reboots with hospital IT to ensure they are at convenient times for the laboratory.

EPU Data Manager and EPU Clients



EPU Data Manager

The terminology [EPU Data Manager] refers to the primary location where the EPU software is installed i.e., physical PC, rack mounted server or virtual server.

Whilst using the EPU data manager as a routine PC is not an option for rack mounted servers or virtual servers, in the instance of physical PC installation it is advised that the primary EPU data manager is not used for day-to-day use. We would ask this is left free in case of support being required remotely.

EPU Client

EPU clients are for day-to-day laboratory use of the EPU software. These PC's enable access to EPU without accessing the EPU data manager. EPU clients are connected to the EPU data manager using ethernet connections across the hospital network.

All EPU processes can be performed on these PC's. EPU Clients can be located wherever laboratories require across laboratory networks (single or multiple sites).

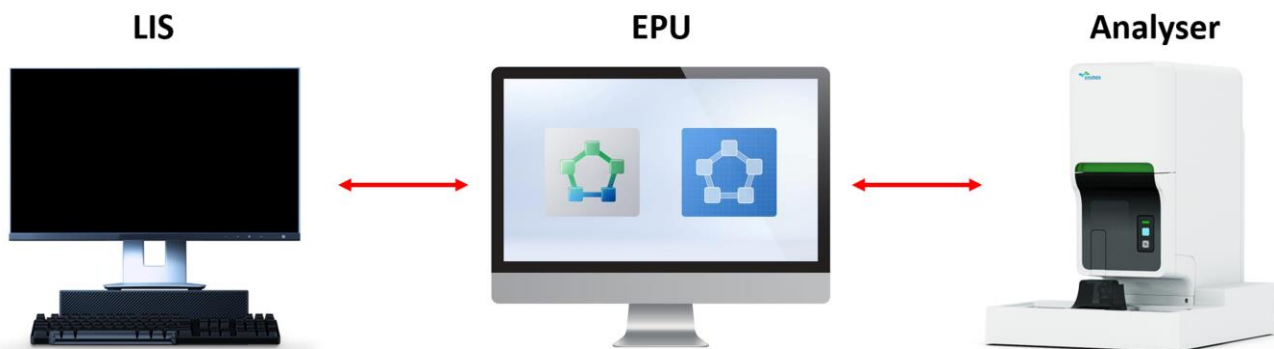
Functionality

EPU is designed to assist lab personnel to correctly analyse and validate diagnostics results obtained in haematology and/or coagulation.

EPU offers a wide range of functionalities:



- Pre-analytical functionalities that allow users to prepare analytical processes and to manage patients, samples, and orders efficiently (e.g., order management, patient management, sample management).
- Analytical functionalities that assist lab personnel in analytical processes, ensuring efficient working and reliable results (e.g., result management and result verification);
- Post-analytical functionalities that support technicians and clinical staff in finalising the analytical process (e.g., archiving and reporting).
- Administrative functionalities, such as user management, statistics, and workflow monitoring.

Communication Pathway



Icons

The EPU software has two icons which can be found on the desktop:

| EPU Routine | EPU Configuration |
|---|---|
|  |  |
| <p>Day-to-day use of the EPU software e.g., sample validation, searching for samples, analyser connections.</p> | <p>Used mainly by Sysmex to configure the system but can be used by senior laboratory users to manage users and configure other aspects of EPU.</p> |

Log On/Log Off

Individual users of EPU are issued with their own log in details, with certain user rights. **NOTE:** Not all users will have the same user rights.

To log in to EPU:

1. Double-click on the relevant EPU icon on the desktop which will display the following dialogue box:

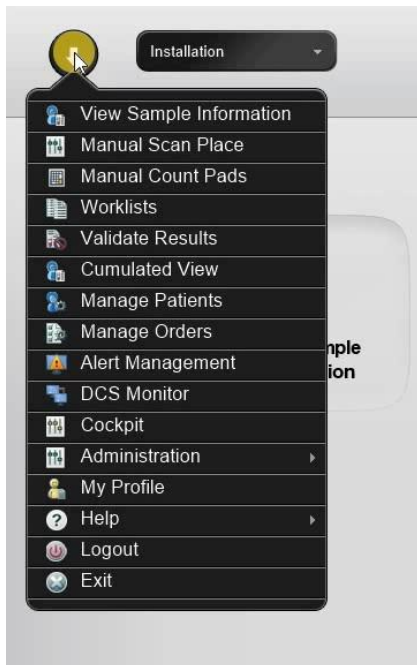


2. Enter your username in the [Username] field.
3. Enter your password in the [Password] field. **NOTE:** The password is case-sensitive. Password policy settings i.e., password requirements and password expiration, are laboratory definable, being set by a senior member of staff.
4. Click [Ok].

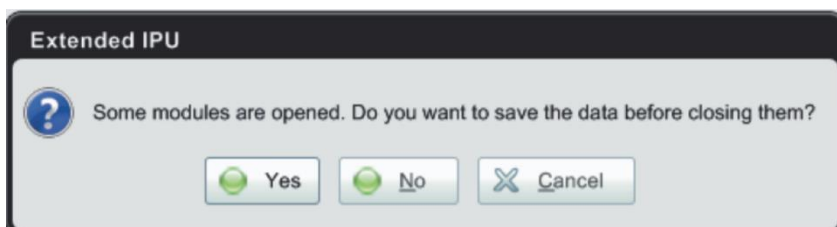
Once logged in the 'Splash Screen' will appear. From here it is possible to access the various functions within EPU.

To log out of EPU:

1. Open the menu located on the top left of the screen.

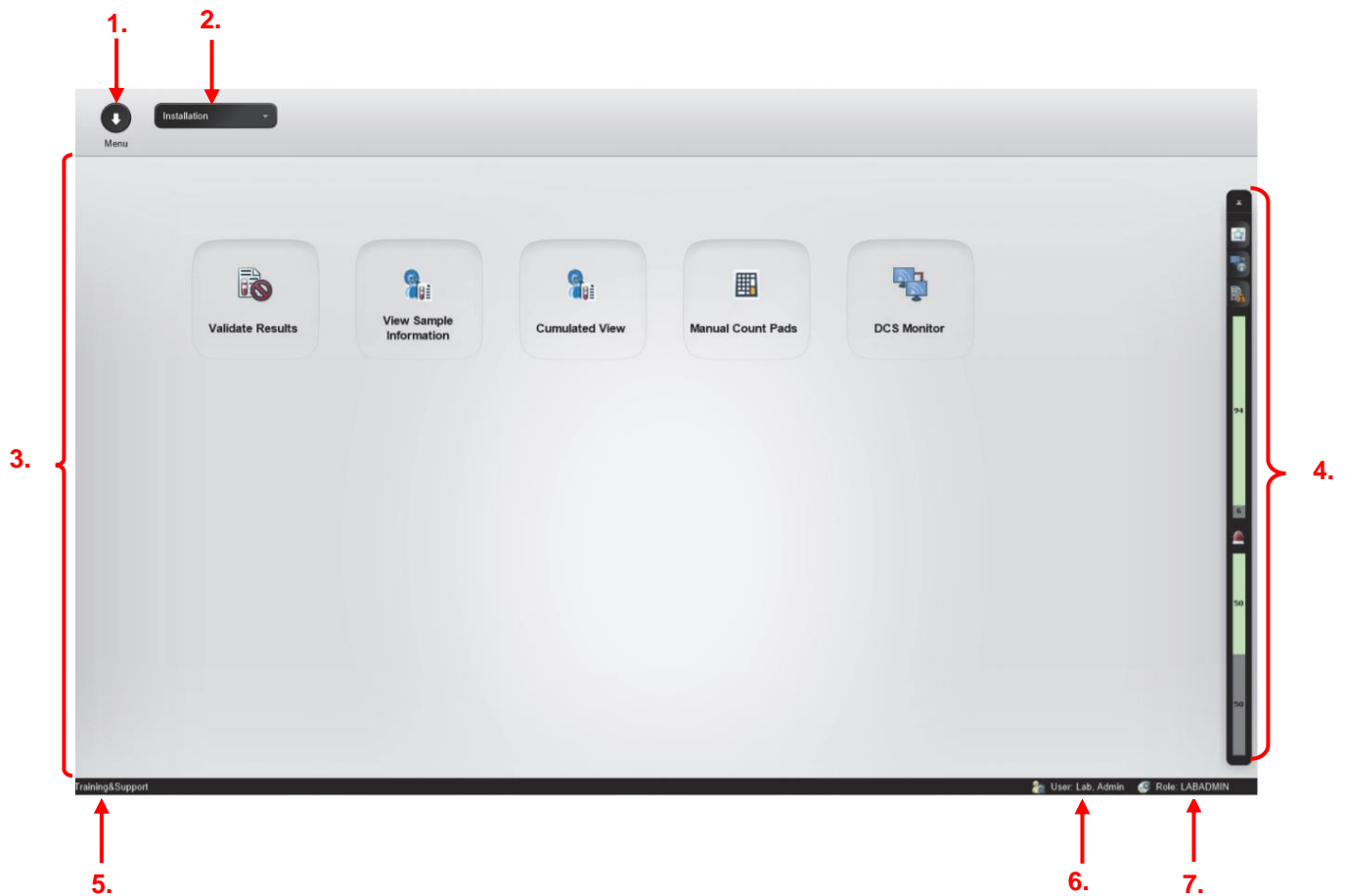


2. Select the [Logout] menu item. **NOTE:** If an EPU tab is open when you click [Logout], the following dialogue box appears:



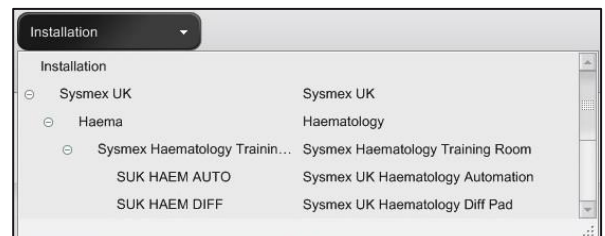
3. Click [Yes] to save the data before closing. Click [No] to close without saving.

Splash Screen Layout



1. Menu – Provides a drop-down list of additional menu items. **NOTE:** Menu items marked with an arrowhead contain submenu items.

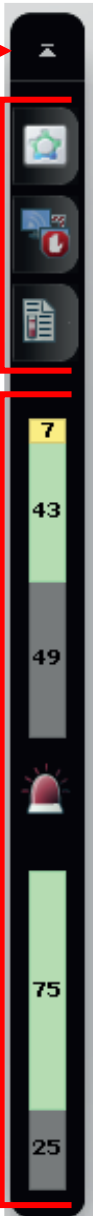
2. Lab Hierarchy Choice Box – provides a drop-down menu of all the locations connected to EPU. The user can select which location/workplace they wish to work from. **NOTE:** This location will be remembered each time you log in to any EPU client independent of the PC used.



3. Splash Screen – icons displayed on the splash screen can be customised by the user to provide short cuts to the options most commonly used. This can be done using [My Profile] within EPU. **NOTE:** If a dialogue box is open, the splash screen is hidden and the icons present on the splash screen appear in the top right corner of the screen.




4. **Client Monitor** – Provides an up-to-date overview of the status information of the samples being processed and the EPU software. Data displayed is from midnight to midnight and is workplace dependent and is refreshed every 60 seconds.

The client monitor consists of;



a. Arrowhead – which opens the [View Cockpit] tab.

b. Message Zone – which notifies the user of alerts generated by EPU. These include:

-  **System alerts** - Selecting takes you to [View Alerts].
-  **Communication alerts** - Selecting takes you to [DCS monitor].
-  **Workflow alerts** - Selecting takes you to [View Alerts].

c. Monitor Zone – which displays the distribution of four possible sample statuses.

The first bar chart displays the various statuses of all samples and the second bar chart displays the different statuses of STAT samples.

The share of each status is displayed as a percentage value of the total number of samples currently in progress. **TIP:** Hovering over the percentage displays the exact number of samples currently included for that status.

The sample statuses are:

- Samples released and not reported.
- Samples blocked for validation.
- Samples in production.
- Samples not in production.

IMPORTANT: The client monitor flags high priority alerts with a flashing action: the client monitor background colour changes from black colour (default) to red colour. Please ensure any error alerts are escalated to a senior member of staff, or alternatively contact Sysmex.



5. **Site Name / Information** – The site name is displayed in white. **NOTE:** Occasionally information will be displayed next to the site name in red. This is normally an action message related to a change in your system. Please perform the action as and when required.

Sysmex UK Some configuration changes have been updated. Please restart the application.

6. **User** – Displays the username of the currently logged in user.
7. **Role** – Displays the currently logged in users access level.

My Profile

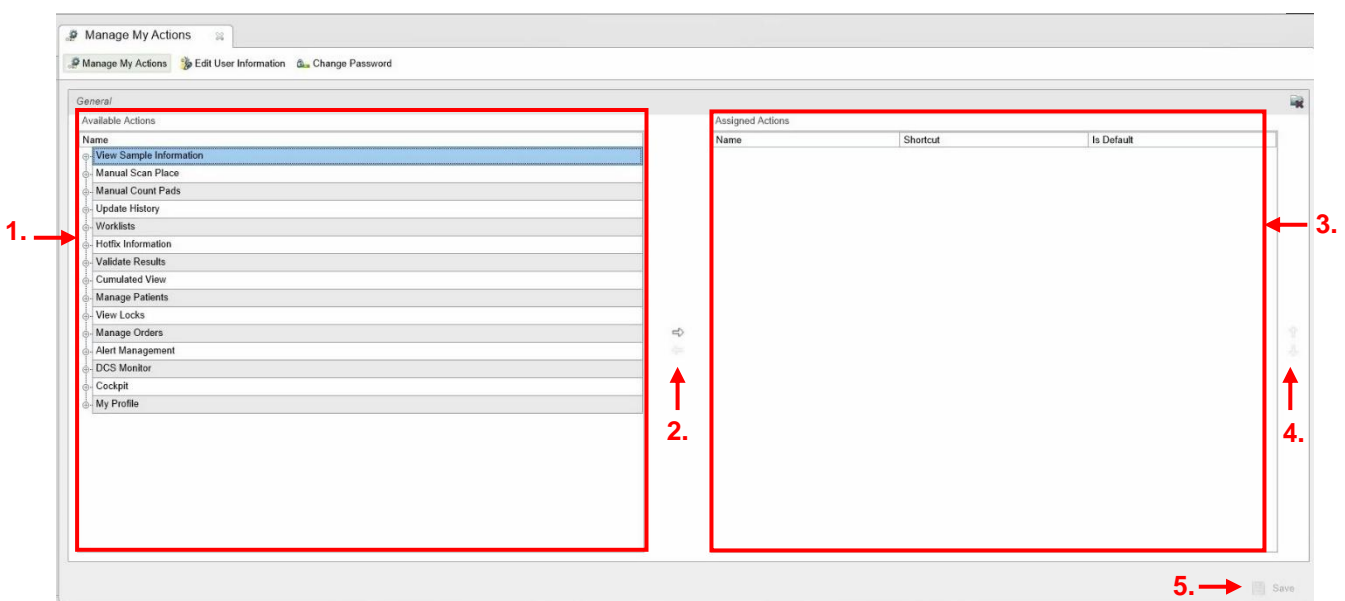
The [My Profile] screen within EPU allows modification of the icons displayed on the splash screen, as well as changing user information and changing a password.

To access [My Profile] click the [Menu] and locate [My Profile] to open the tab.



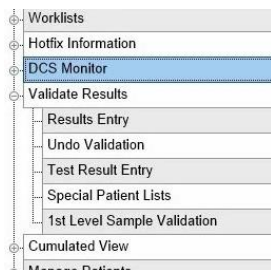
Manage My Actions

[Manage My Actions] allows the user to customise the icons displayed on the splash screen and define a default tab that opens upon start-up of EPU.



To assign icons to your splash screen:

1. Locate the relevant option within the [Available Actions] list. **NOTE:** Expanding the options using the (+) will display further sub options.



2. Click the right arrow to move the option to the [Assigned Actions] list.
3. To define a default tab to open following EPU log in, tick the [Is Default] box alongside the relevant option within the [Assigned Actions] list:

| Assigned Actions | | |
|-----------------------------|----------|--------------------------|
| Name | Shortcut | Is Default |
| 1st Level Sample Validation | | <input type="checkbox"/> |
| View Sample Information | | <input type="checkbox"/> |
| DCS Monitor | | <input type="checkbox"/> |

4. To change the sequence of the icons on the splash screen, use the up and down arrows accordingly. **NOTE:** The order from top to bottom in the [Assigned Actions] list is how they are displayed left to right on the [Splash Screen].
5. Click [Save] followed by [OK]. **NOTE:** For changes to take effect you must log out and log back in to EPU.

Edit User Information

Enables the user to edit (to complete or correct) user information, to reset the splash screen and the [My Actions] tool bar, as well as the preferences.

Change Password

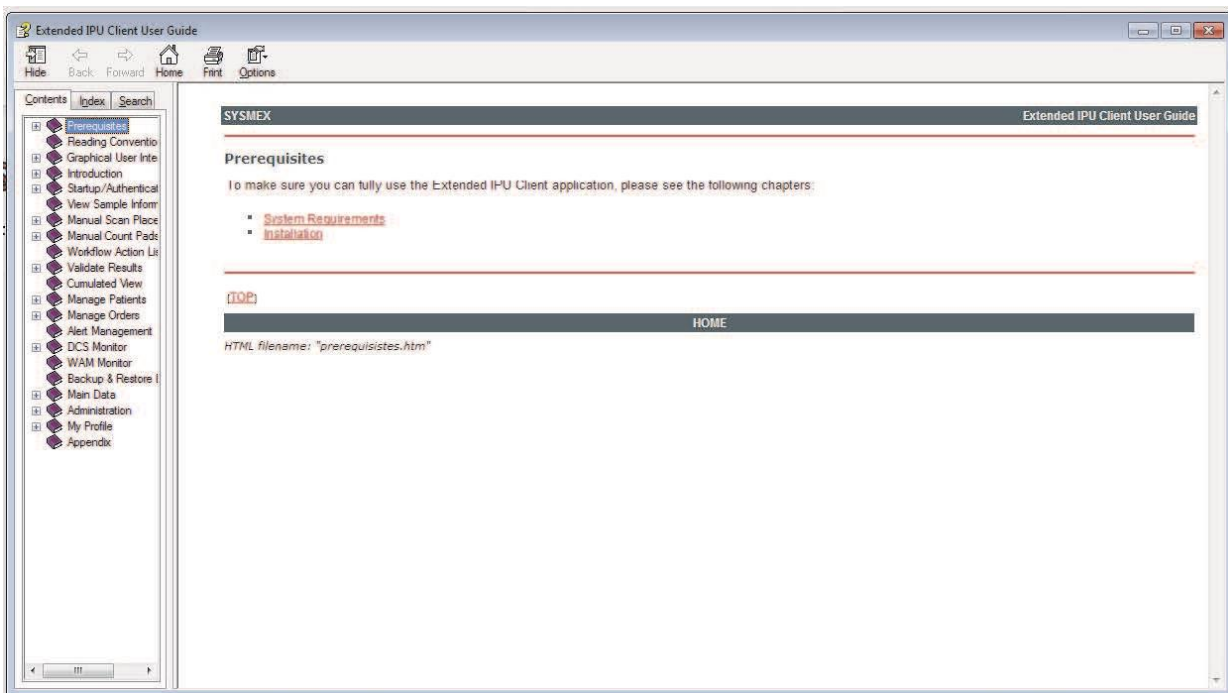
| General | |
|------------------|--------------------------|
| Old Password | <input type="password"/> |
| New Password | <input type="password"/> |
| Confirm Password | <input type="password"/> |

Enables the user to change their password at any time if required. **NOTE:** Password policy settings i.e., password requirements and password expiration, are laboratory definable, being set by a senior member of staff.

Help

The [Menu] can be used to access the EPU user guide. **TIP:** Pressing F1 will also open the EPU User Guide, automatically navigating to the correct page within the user guide for the screen currently accessed on EPU.

The user guide contains different chapters, shown by the purple books and a search function to search by keyword.



Routine Client: Sample Management

Manage Orders

The [Manage Orders] section of EPU allows for the adding/modifying of sample orders in the absence of a LIMS connection and the registering of samples within EPU that have results attached but no order.

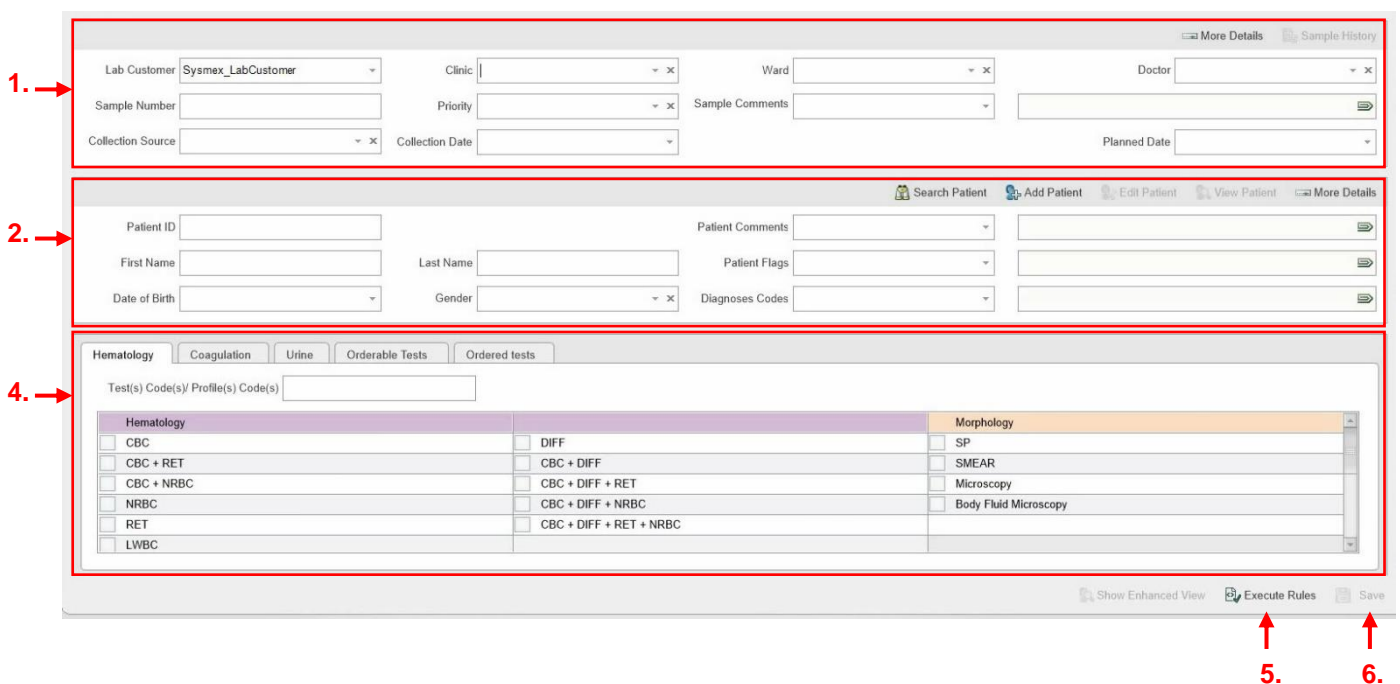
To access [Manage Orders] click the [Menu] and locate [Manage Orders] to open the tab.



IMPORTANT: Depending on the version of EPU being used [Manage Orders] may not be available.

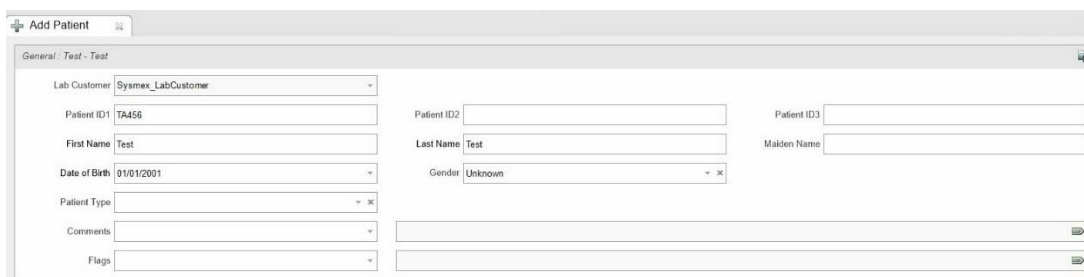
Add Orders

The [Add Orders] option enables a new order to be added and to define the tests to be ordered, allowing the laboratory workflow to continue with all relevant rules being applied to samples. If using [Add Orders] during LIMS downtime, be sure to restart the LIMS connection when LIMS functionality has resumed, to allow any results to link up to orders within the LIMS.



To add an order:

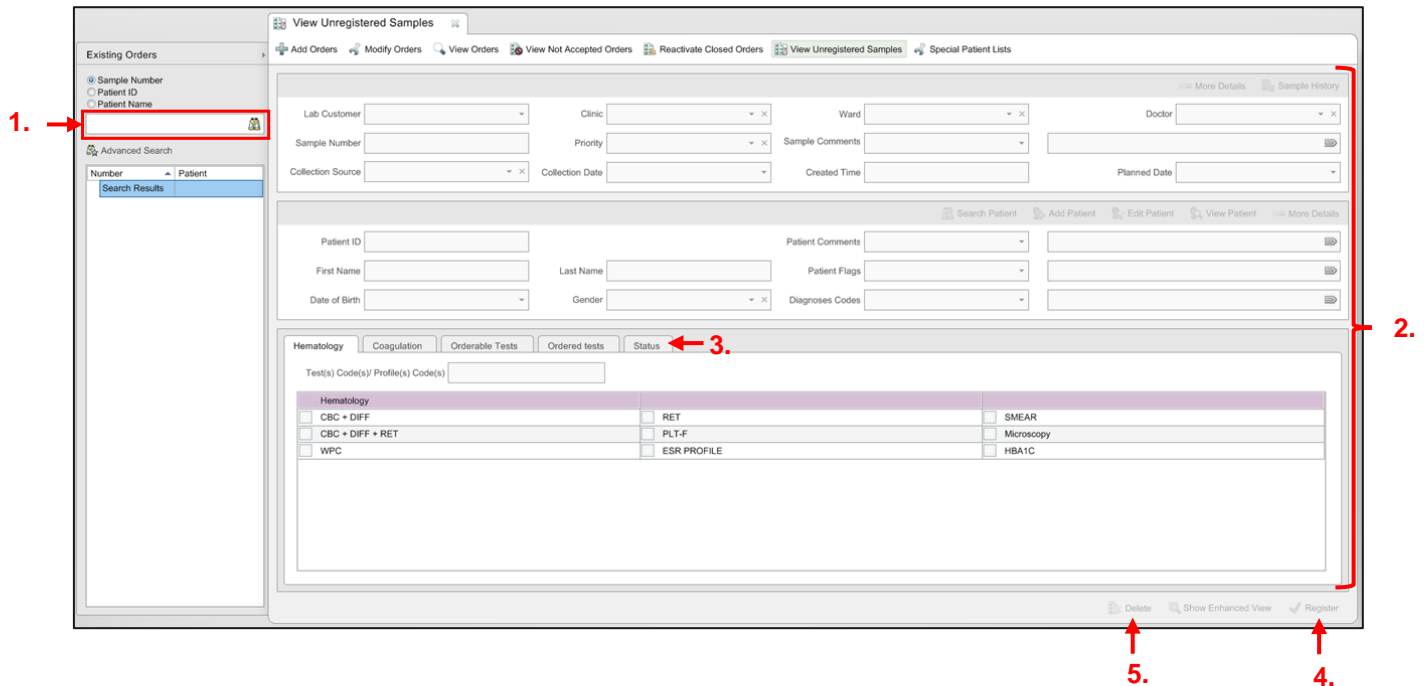
1. Enter all relevant information for the sample in the sample information zone. **NOTE:** [Sample Number] is mandatory. **TIP:** Some drop down lists can be filtered by typing the first few letters of the word.
2. Enter the [Patient ID] in the patient information zone. If known to EPU, pressing enter, will populate all other patient information field.
3. If not known to EPU, you will be prompted to add the patient to the EPU database. Complete the relevant information as required and click [Save] on the [Add Patient] tab.



4. Select the tests required from the relevant test tab. **NOTE:** Certain test sets may be grouped together. **IMPORTANT:** At least 1 test is mandatory.
5. Click [Execute Rules] to ensure all relevant rules are applied to the sample.
6. Click [Save]. The order will appear in the [Added Orders] column to the left of the screen.

View Unregistered Samples

[View Unregistered Samples] displays unregistered samples and enables you to register them. A sample is unregistered when a result for a sample number is received prior the creation of the order i.e., the sample has been processed before being booked in.



The screenshot shows the 'View Unregistered Samples' window. On the left, the 'Existing Orders' sidebar has a search box (1) and a 'Patient' tab. The main area contains several sections: a top section for sample and patient details (2), a middle section for patient information (3), and a bottom section for test results (4). At the bottom right, there are buttons for 'Delete' (5), 'Show Enhanced View', and 'Register'.

To action unregistered samples:

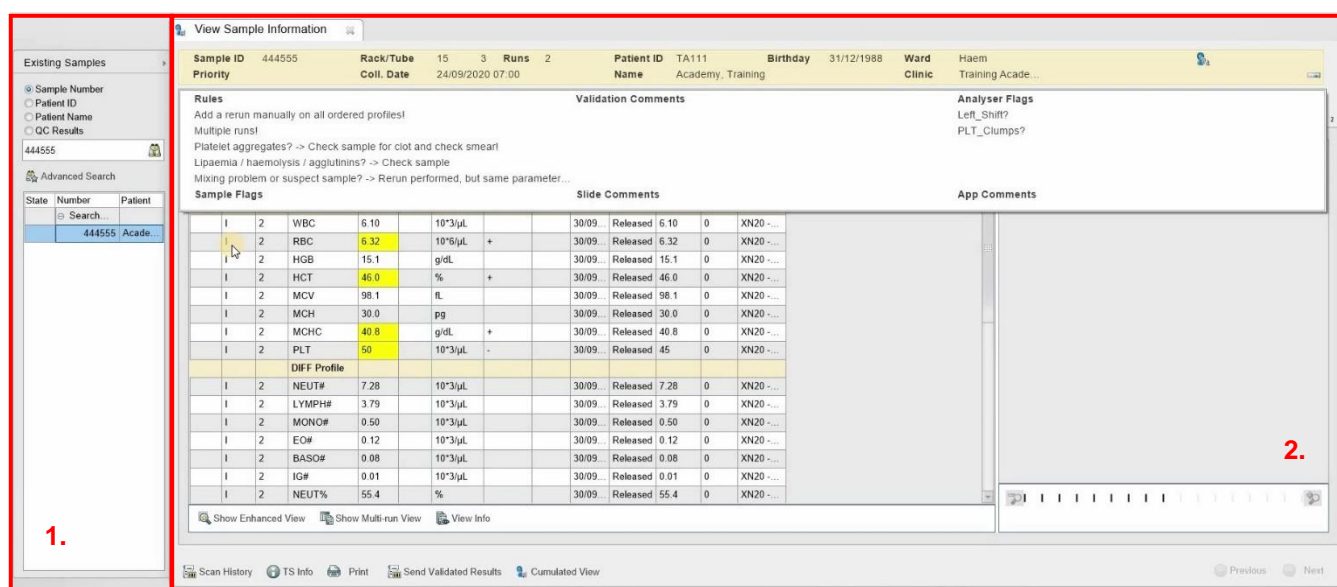
1. Open the unregistered sample by using the search box in the [Existing Orders] section.
2. If wishing to register the sample, complete the sample and patient information zones and the test set required for the sample, as described in the [Add Orders] section.
3. To view the results attached to the sample, select the [Status] tab.
4. Click [Register] to register the orders for the sample.
5. If you wish to delete the sample from the [View Unregistered Sample] list, skip steps 2 – 3, and click [Delete].

View Sample Information

The [View Sample Information] tab can be used to search for and view any sample results that are held within the EPU database. **NOTE:** The EPU database is not infinite and when full will delete the oldest record to ensure the newest record can be held, therefore, results will not be available indefinitely.

IMPORTANT: The [View Sample Information] tab is not designed to release results or to perform any validation procedures like assigning result comments and add/cancel orders (see [1st Level Sample Validation] for further information).

To access [View Sample Information] click the [Menu] button and select the [View Sample Information] option.



The [View Sample Information] tab is split in to the:

1. Existing Samples section
2. Display section of [View Sample Information]

Searching for a Sample

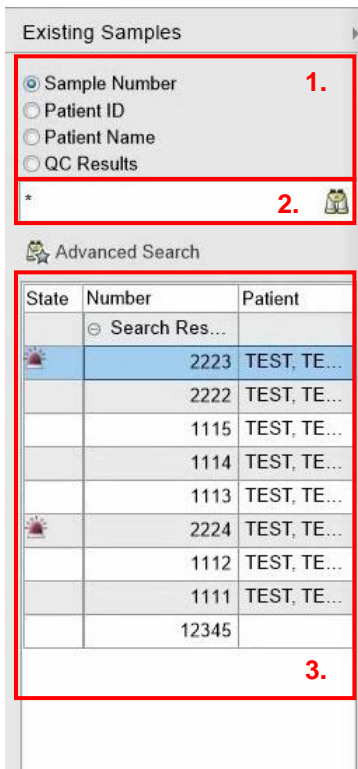
Searching for a sample makes use of the [Existing Samples] panel at the left-hand side of [View Sample Information].

A search can be performed by sample number, patient name, patient ID or alternatively using the [Advanced Search] function. If the full details are not known, a wild card search can be performed using an asterisk (*).

The existing samples area can be reduced or opened by selecting the following icon:



To search for a sample:



Existing Samples

☒ Sample Number 1.

☐ Patient ID

☐ Patient Name

☐ QC Results

* 2.

Advanced Search

| State | Number | Patient |
|-------|--------|-------------|
| | 2223 | TEST, TE... |
| | 2222 | TEST, TE... |
| | 1115 | TEST, TE... |
| | 1114 | TEST, TE... |
| | 1113 | TEST, TE... |
| | 2224 | TEST, TE... |
| | 1112 | TEST, TE... |
| | 1111 | TEST, TE... |
| | 12345 | |

3.

1. Select the relevant search option i.e., sample number, patient name, or patient ID.

2. Type the relevant information in the white search bar. **NOTE:** It is possible to perform wild card searches from the white search bar using an asterisk (*).

Wild card search options:

* An asterisk alone will search for all samples within the EPU database, however, will show only the 500 most recent samples.

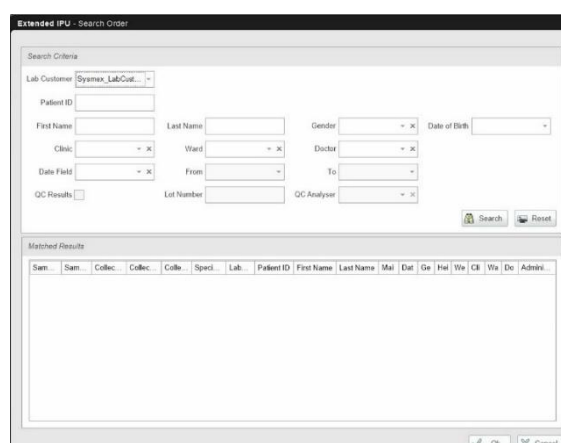
111* The asterisk can be used at the end of a set of numbers to display all samples starting with those specific numbers.

*111 The asterisk can be used at the start of a set of numbers to display all samples ending with those specific numbers.

3. The relevant sample(s) will appear in the existing samples list. Click the relevant sample to view the sample information. **IMPORTANT:** [View Sample Information] will display **ALL** samples regardless of test status (see below for a list of a test status descriptions).

To perform an advanced search:

1. Select the option from the [Existing Samples] section to display the pop-up box. Complete the [Search Criteria]



Extended IPU - Search Order

Search Criteria

Lab Customer: Sysmex_LabCust...

Patient ID:

First Name: Last Name: Gender: Date of Birth:

Clinic: Ward: Doctor:

Date Field: From: To:

QC Results: Lot Number: QC Analyser:

Search Reset

Matched Results

| Sam | Sam | Collec | Collec | Collec | Spec | Lab | Patient ID | First Name | Last Name | Mail | Dat | Ge | Hel | We | CR | Wa | De | Admin |
|-----|-----|--------|--------|--------|------|-----|------------|------------|-----------|------|-----|----|-----|----|----|----|----|-------|
|-----|-----|--------|--------|--------|------|-----|------------|------------|-----------|------|-----|----|-----|----|----|----|----|-------|

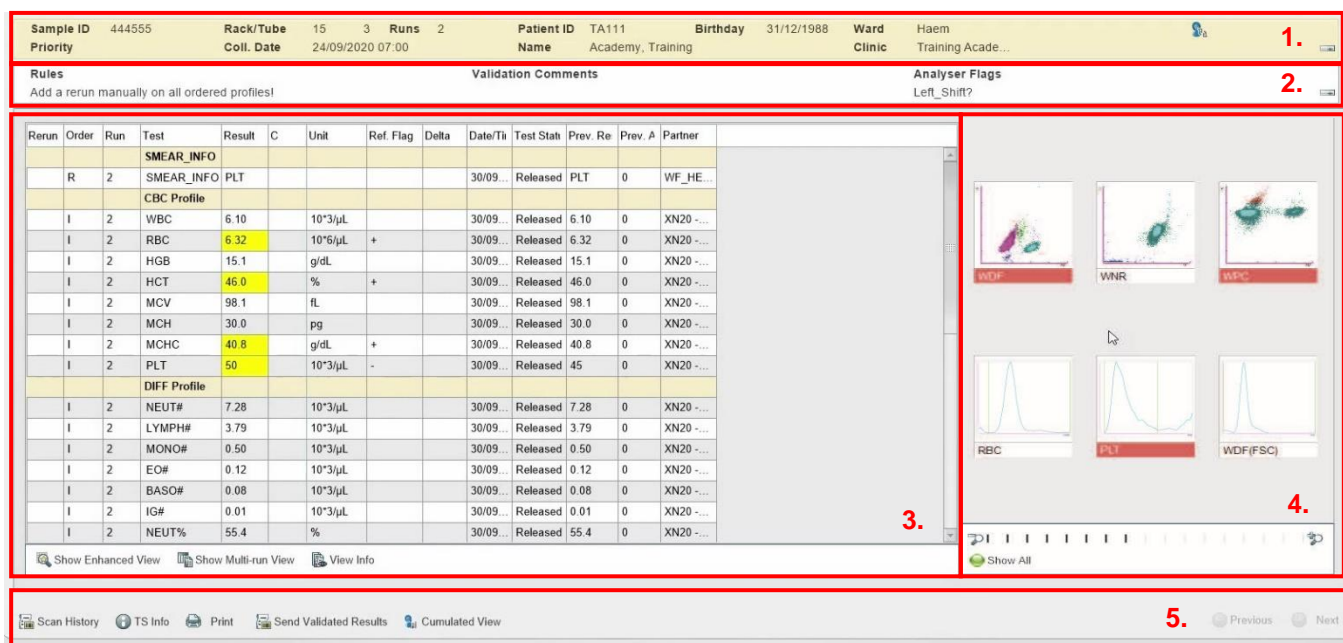
OK Cancel

2. Press [Search] to display the relevant samples in the [Matched Results] section.
3. Select the relevant sample from the list and press [OK] to display the results within the [View Sample Information] tab. **IMPORTANT:** [View Sample Information] will display **ALL** samples regardless of test status (see below for a list of a test status descriptions).

Layout of View Sample Information Display section

When a searched sample is selected in the existing samples list, the display section of view sample information will display the relevant information. The display section is split into five areas:

- Patient demographics zone
- Sample information zone
- Results table zone
- Analyser graphics and images zone
- Tool bar



The screenshot shows the 'View Sample Information' interface. At the top, a header bar displays patient and sample details. Below this, a section contains 'Rules', 'Validation Comments', and 'Analyser Flags'. The main area is a large table of test results. To the right of the table is a panel with various flow cytometry plots. At the bottom, a toolbar contains icons for 'Scan History', 'TS Info', 'Print', 'Send Validated Results', and 'Cumulated View'.

| Sample ID | 444555 | Rack/Tube | 15 | 3 | Runs | 2 | Patient ID | TA111 | Birthday | 31/12/1988 | Ward | Haem |
|---------------------|---|------------|------------|-------|------|---|------------|-------------------|----------|------------|--------|-------------------|
| Priority | | Coll. Date | 24/09/2020 | 07:00 | | | Name | Academy, Training | | | Clinic | Training Acade... |
| Rules | Add a rerun manually on all ordered profiles! | | | | | | | | | | | |
| Validation Comments | | | | | | | | | | | | |
| Analyser Flags | Left_Shift? | | | | | | | | | | | |

| Rerun | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Ti | Test Stat | Prev. Re | Prev. A | Partner |
|-------|-------|-----|--------------|--------|---|---------------------|-----------|-------|----------|-----------|----------|---------|-----------|
| | | | SMEAR_INFO | | | | | | | | | | |
| R | 2 | | SMEAR_INFO | PLT | | | | | 30/09... | Released | PLT | 0 | WF_HE... |
| | | | CBC Profile | | | | | | | | | | |
| I | 2 | | WBC | 6.10 | | 10 ³ /μL | | | 30/09... | Released | 6.10 | 0 | XN20 -... |
| I | 2 | | RBC | 6.32 | | 10 ⁶ /μL | + | | 30/09... | Released | 6.32 | 0 | XN20 -... |
| I | 2 | | HGB | 15.1 | | g/dL | | | 30/09... | Released | 15.1 | 0 | XN20 -... |
| I | 2 | | HCT | 46.0 | | % | + | | 30/09... | Released | 46.0 | 0 | XN20 -... |
| I | 2 | | MCV | 98.1 | | fL | | | 30/09... | Released | 98.1 | 0 | XN20 -... |
| I | 2 | | MCH | 30.0 | | pg | | | 30/09... | Released | 30.0 | 0 | XN20 -... |
| I | 2 | | MCHC | 40.8 | | g/dL | + | | 30/09... | Released | 40.8 | 0 | XN20 -... |
| I | 2 | | PLT | 50 | | 10 ³ /μL | - | | 30/09... | Released | 45 | 0 | XN20 -... |
| | | | DIFF Profile | | | | | | | | | | |
| I | 2 | | NEUT# | 7.28 | | 10 ³ /μL | | | 30/09... | Released | 7.28 | 0 | XN20 -... |
| I | 2 | | LYMPH# | 3.79 | | 10 ³ /μL | | | 30/09... | Released | 3.79 | 0 | XN20 -... |
| I | 2 | | MONO# | 0.50 | | 10 ³ /μL | | | 30/09... | Released | 0.50 | 0 | XN20 -... |
| I | 2 | | EO# | 0.12 | | 10 ³ /μL | | | 30/09... | Released | 0.12 | 0 | XN20 -... |
| I | 2 | | BASO# | 0.08 | | 10 ³ /μL | | | 30/09... | Released | 0.08 | 0 | XN20 -... |
| I | 2 | | IG# | 0.01 | | 10 ³ /μL | | | 30/09... | Released | 0.01 | 0 | XN20 -... |
| I | 2 | | NEUT% | 55.4 | | % | | | 30/09... | Released | 55.4 | 0 | XN20 -... |

1. **Patient Demographics Zone** - The patient demographics zone displays selected patient and sample information. Information about the ward, patient comments, and sample comments that are displayed, is received from the LIMS. The information on runs and order status are determined by EPU. **TIP:** Click within the patient demographics zone to enlarge/minimise accordingly.

| | | | | | | | | | | | |
|--------------------------|-----------------|------------|---------------------|------|---|------------|------------|----------|------------|--------|--------|
| Sample ID | 55680 | Rack/Tube | | Runs | 0 | Patient ID | 14 | Birthday | 07/04/1953 | Ward | MU |
| Priority | Routine | Coll. Date | 08/05/2016 14:40 | | | Name | 44, Sample | | | Clinic | |
| Partner | | Reg. Date | 10/05/2016 14:40:59 | | | Gender | Female | | | Doctor | Dr. Pi |
| Collection Source | | | | | | | | | | Phone | |
| Order Status | Created | | | | | | | | | | |
| Diagnoses Codes | | | | | | | | | | | |
| Patient Comments | Patient Comment | | | | | | | | | | |
| Special Patient Comments | | | | | | | | | | | |
| Sample Comments | Order Comment | | | | | | | | | | |

- 2. Sample Information Zone** - The sample information zone displays selected sample information. **TIP:** Click within the patient demographics zone to enlarge/minimise accordingly. **NOTE:** The sample information zone will automatically open when a sample is selected. **DO NOT** ignore information contained within the sample information zone.

| | | |
|---|----------------------------|--|
| Rules PLT low -> Check for clot WBC morphology review -> Smear! Analyser DIFF of low reliability! Abnormal lymphocytes? - Atypical lymphocytes suspect neoplastic WBC > X -> Inform doctor or ward! | Validation Comments | Analysers Flags Leukocytosis Lymphocytosis WBC_Abn_Scattergram Abn_Lympho? Positive_Diff Positive_Morph Positive_Count App Comments |
| Sample Flags | Slide Comments | |

The sample information zone is split into the following sections:

| Section | Function |
|---------|----------|
|---------|----------|

| | |
|----------|---|
| [Rules]: | Displays information about the rules triggered by the configured rule sets. |
|----------|---|

| | |
|------------------------|---|
| [Validation Comments]: | Displays comments entered during the 1st level sample validation process. |
|------------------------|---|

| | |
|-------------------|--|
| [Analyser Flags]: | Displays flags generated by the relevant analyser. |
|-------------------|--|

| | |
|-----------------|---|
| [Sample Flags]: | Displays section comments which are triggered on LIS order entry level. |
|-----------------|---|

| | |
|-------------------|---|
| [Slide Comments]: | Displays comments from the digital imaging device (e.g., DI-60) or from the manual count pad. |
|-------------------|---|

| | |
|-----------------|---|
| [App Comments]: | Displays information on the workflow triggered by the activated apps. |
|-----------------|---|

- 3. Results Table Zone** – The results table zone displays the detailed results of sample analysis, with the results table itself comprising of different columns and additional result table buttons also available.

| | a. | b. | c. | d. | e. | f. | g. | h. | i. | j. | k. | l. | m. | n. | |
|---|-------|-----|----------------|--------|----|---------------------|-----------|-------|----------|-----------|----------|---------|----------|----|--|
| Rerun | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Ti | Test Stat | Prev. Re | Prev. A | Partner | | |
| | | | SMEAR_INFO | | | | | | | | | | | | |
| | R | 2 | SMEAR_INFO PLT | | | | | | 30/09... | Released | PLT | 0 | WF_HE... | | |
| | | | CBC Profile | | | | | | | | | | | | |
| | I | 2 | WBC | 6.10 | | 10 ³ /μL | | | 30/09... | Released | 6.10 | 0 | XN20 ... | | |
| | I | 2 | RBC | 6.32 | | 10 ⁶ /μL | + | | 30/09... | Released | 6.32 | 0 | XN20 ... | | |
| | I | 2 | HGB | 15.1 | | g/dL | | | 30/09... | Released | 15.1 | 0 | XN20 ... | | |
| | I | 2 | HCT | 46.0 | | % | + | | 30/09... | Released | 46.0 | 0 | XN20 ... | | |
| | I | 2 | MCV | 98.1 | | fL | | | 30/09... | Released | 98.1 | 0 | XN20 ... | | |
| | I | 2 | MCH | 30.0 | | pg | | | 30/09... | Released | 30.0 | 0 | XN20 ... | | |
| | I | 2 | MCHC | 40.8 | | g/dL | + | | 30/09... | Released | 40.8 | 0 | XN20 ... | | |
| | I | 2 | PLT | 50 | | 10 ³ /μL | - | | 30/09... | Released | 45 | 0 | XN20 ... | | |
| | | | DIFF Profile | | | | | | | | | | | | |
| | I | 2 | NEUT# | 7.28 | | 10 ³ /μL | | | 30/09... | Released | 7.28 | 0 | XN20 ... | | |
| | I | 2 | LYMPH# | 3.79 | | 10 ³ /μL | | | 30/09... | Released | 3.79 | 0 | XN20 ... | | |
| | I | 2 | MONO# | 0.50 | | 10 ³ /μL | | | 30/09... | Released | 0.50 | 0 | XN20 ... | | |
| | I | 2 | EO# | 0.12 | | 10 ³ /μL | | | 30/09... | Released | 0.12 | 0 | XN20 ... | | |
| | I | 2 | BASO# | 0.08 | | 10 ³ /μL | | | 30/09... | Released | 0.08 | 0 | XN20 ... | | |
| | I | 2 | IG# | 0.01 | | 10 ³ /μL | | | 30/09... | Released | 0.01 | 0 | XN20 ... | | |
| | I | 2 | NEUT% | 55.4 | | % | | | 30/09... | Released | 55.4 | 0 | XN20 ... | | |
| <div><div> Show Enhanced View</div><div> Show Multi-run View</div><div> View Info</div></div> | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

Results table columns:

- a. **Rerun** - Displays one of the following:

[Rerun]: A rerun is pending.

[On Hold]: Protects parameters from being released.

- b. **Order** - Displays a letter to indicate where the order was generated:

| Order Indicator | Order source |
|-----------------|--|
| I | Initial order |
| A | Order generated at the analyser |
| R | Order generated from a rule |
| O | Other order (i.e. special patient order) |
| V | Order added in validation |
| C | Order added in manual count pad |

- c. **Run** - Displays a number to identify from which run each test gets its results. NOTE: The number of [Runs] can be found in the [Patient Demographics Zone].
- d. **Test** – Displays the test name. A dark red background colour indicates the test has been blocked for validation.
- e. **Result** - Displays test results. Results are highlighted in different colours depending on user definable reference intervals and critical/panic limits.

| Colour | Explanation |
|--------|--|
| White | Results <u>WITHIN</u> reference intervals |
| Yellow | Results <u>OUTSIDE</u> reference intervals |
| Blue | Results <u>OUTSIDE</u> critical limits |
| Red | Results <u>OUTSIDE</u> panic limits |


- f. **C** - Displays comments added to individual parameters. These can either be symbols or manual comments. Symbols are produced by EPU as information about a parameter, (see table below). Please note comments can only be added via [1st Level Sample Validation].

| Symbol | Explanation |
|--------|------------------------------|
| @ | Data outside linearity range |
| & | Corrected data |

- g. **Unit** – Displays the unit assigned to each parameter.
- h. **Ref. Flag** - Used to indicate significance of results. Displays symbols when results fall outside of the configured reference ranges:

| Symbol | Explanation |
|--------|--|
| + | Results above reference range |
| - | Results below reference range |
| ! | Results above/below critical or panic limits |

NOTE: Ranges are definable by the laboratory for each parameter.

- i. **Delta** – Displays an orange warning triangle  if results trigger a delta check. **NOTE:** Trigger limits for delta checks are user definable.
- j. **Date/Time** - Displays the analysis date and time.
- k. **Test Status** - Displays one of the following messages to indicate the test status:

| Test Status | Explanation |
|---------------------------|---|
| In Production | Sample registered and has been seen by analyser |
| In Validation | Sample held on validation queue |
| Released | The sample has been either auto-validated or released from a validation queue. |
| Ordered | Registered sample <u>NOT</u> seen by analyser |
| Cancelled by Result Rules | The test/profile has been cancelled by the validation rules. Cancelled test/parameter appear greyed out. |
| Cancelled by User | The test/profile has been cancelled by the user. Cancelled test/parameter appear greyed out. |
| Closed | Order is closed and can no longer be modified. The time at which a sample is closed can be set by the laboratory. NOTE: The sample number for a [Closed] sample can be reused. |

- l. **Prev. Result 1** - Displays the previous result value.
- m. **Prev. Age 1** - Displays the previous result age in days.
- n. **Partner** - Displays the analyser where the analysis has been performed or the logged in user who entered or edited a result manually.




Results table buttons:

- o. Show Enhanced View** - Switches from default to enhanced view. Once the enhanced view is displayed, the button is labelled [Show Default View]. The enhanced view allows the user to view two previous sets of results, the parameter reference ranges as well as any research data.

IMPORTANT: The letter 'W' within the [Abn. Flag] column indicates the results for that specific parameter are unreliable. Treat results with caution when they have the letter 'W' present in the [Abn. Flag] column and note further testing may be required.






An '*' generated by the XN-Series analysers is shown as the letter 'W' in EPU.

| Rerun | Order | Run | Test | Result | C | Unit | Blocked for | Reported | Ref. Range | Ref. Flag | Delta | Abn. Flag | Date/Time |
|---------------------|-------|-----|----------------|--------|---|---------------------|-------------|----------|------------|-----------|-------|-----------|-----------|
| CBC Profile | | | | | | | | | | | | | |
| | R | 1 | Film Requested | N | | | | ✓ | | | | | 22/04/20 |
| | I | 1 | WBC | 8.74 | | 10 ⁹ /L | | ✓ | 4.00-11.00 | | | | 22/04/20 |
| | I | 1 | RBC | 3.05 | | 10 ¹² /L | | ✓ | 3.80-5.30 | - | | | 22/04/20 |
| | I | 1 | HGB | 96 | | g/L | | ✓ | 120-150 | - | | | 22/04/20 |
| | I | 1 | HCT | 0.31 | | Ratio | | ✓ | 0.37-0.45 | - | | | 22/04/20 |
| | I | 1 | MCV | 101.0 | | fL | | ✓ | 83.0-100.0 | + | | | 22/04/20 |
| | I | 1 | MCH | 31.5 | | pg | | ✓ | 27.0-32.0 | | | | 22/04/20 |
| | I | 1 | MCHC | 312 | | g/L | | ✓ | 310-350 | | | | 22/04/20 |
| | I | 1 | PLT | 371 | | 10 ⁹ /L | | ✓ | 150-400 | | | | 22/04/20 |
| | I | 1 | RDW-CV | 19.3 | | % | | ✓ | | | | | 22/04/20 |
| | A | 1 | RDW-SD | 69.0 | | fL | | | | | | | 22/04/20 |
| | A | 1 | MPV | 9.0 | | fL | | | | | | | 22/04/20 |
| | A | 1 | P-LCR | 16.0 | | % | | | | | | | 22/04/20 |
| | A | 1 | PDW | 8.6 | | fL | | | | | | | 22/04/20 |
| | A | 1 | PCT | 0.33 | | % | | | | | | | 22/04/20 |
| | A | 1 | MicroR | 1.6 | | % | | | | | | | 22/04/20 |
| | A | 1 | MacroR | 12.2 | | % | | | | | | | 22/04/20 |
| DIFF Profile | | | | | | | | | | | | | |
| | A | 1 | NEUT | 6.8 | | 10 ⁹ /L | | | 1.5-8.0 | | | | 22/04/20 |
| | A | 1 | LYMPH | 1.3 | | 10 ⁹ /L | | | 1.0-4.0 | | | | 22/04/20 |
| | A | 1 | MONO# | 0.5 | | 10 ⁹ /L | | | 0.2-1.0 | | | | 22/04/20 |

 Show Default View
  Show Multi-run View
  View Info

- p. Show Multi-run View** - Displays all the previous runs performed on the same sample. Once the multi-run view is displayed, the button is labelled [Show Single-run View]. The multi-run view displays the results, images, and flags for all results. **NOTE:** Multi-run View will not be available if the [Run] column is hidden or only one run was performed.

| Test | Used | Run 2 | Run 1 |
|-------------------|-------------|---------|---------|
| SMEAR... | 30/09/20... | 30/0... | 30/0... |
| SMEAR... | PLT | PLT | PLT |
| CBC Pro... | | | |
| WBC | 6.10 | 6.10 | 6.10 |
| RBC | 6.32 | 6.32 | 6.32 |
| HGB | 15.1 | 15.1 | 15.1 |
| HCT | 46.0 | 46.0 | 46.0 |
| MCV | 98.1 | 98.1 | 98.1 |
| MCH | 30.0 | 30.0 | 30.0 |
| MCHC | 40.8 | 40.8 | 40.8 |
| PLT | 50 | 50 | 48 |
| DIFF Pr... | | | |
| NEUT# | 7.28 | 7.28 | 7.28 |
| LYMPH# | 3.79 | 3.79 | 3.79 |
| MONO# | 0.50 | 0.50 | 0.50 |
| EO# | 0.12 | 0.12 | 0.12 |
| BASO# | 0.08 | 0.08 | 0.08 |
| IG# | 0.01 | 0.01 | 0.01 |
| NEUT% | 55.4 | 55.4 | 55.4 |

 Show Single-run View
  Show Enhanced View
  Show Results
  Show Images
  Show Flags

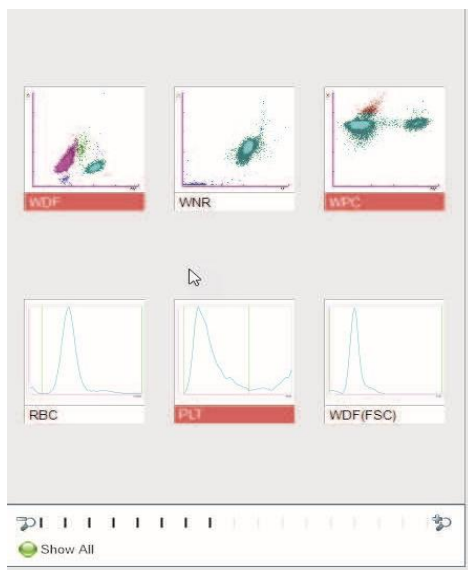
- q. View Info** – Displays the suspect flags and corresponding [Q-Flag] values produced by the XN-Series analysers.

Extended IPU - Information Window

| Test | Result | Abn. Flag |
|-------------------------|--------|-----------|
| Flags Profile | | |
| Atypical_Lympho? | 10 | |
| Fragments? | 0 | |
| HGB_Defect? | 70 | |
| Iron_Deficiency? | 70 | |
| Left_Shift? | 0 | |
| PLT_Clumps? | 0 | |
| RBC_Agglutination? | 70 | |
| Turbidity/HGB_Interf... | 80 | |
| Blasts/Abn_Lympho? | 40 | |
| Giant_Platelet? | 0 | |

Close

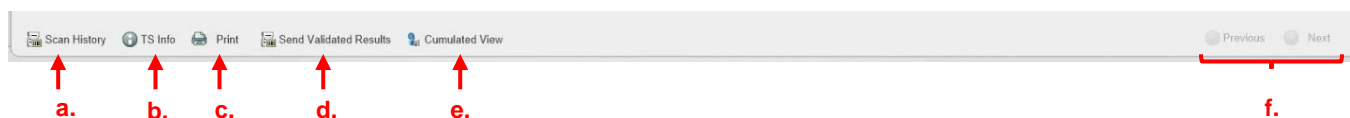
- 4. Analyser Graphics and Images Zone** – Display all analyser graphics and images e.g., XN-Series scattergrams and histograms, CS-Series coagulation curves and TOSOH G11 chromatograms. **NOTE:** A red image title indicates an abnormality.



The analyser graphics and images zone has the following functionalities:

- | | |
|-------------------------------|--|
| Zoom in icon: | Displays the image(s) in a larger or more detailed view. |
| Zoom out icon: | Displays the image(s) smaller and more images simultaneously. |
| [Show All] button: | Display all images simultaneously. |
| Double click an image: | Displays a larger and more detailed view of the image in a pop-up box. |

5. Toolbar – The toolbar contains buttons for further actions.



- a. **Scan History** - Whenever a sample barcode is read by an analyser or track system, the relevant information is recorded within scan history.

Extended IPU - Sample Scan History

| Timestamp | Initiator Type | Initiator Code | Rack Number | Tube Position | Device | Action | Inquiry Type | Unit Number |
|------------------|----------------|----------------|-----------------|---------------|--------|---------------------|----------------------|-------------|
| 22/04/2020 11:19 | Partner | Hospital | CT-90 | 000368 | 03 | 10.161.190.37:50... | Query from partner | B (BT-40) |
| 22/04/2020 11:24 | Partner | Hospital | CT-90 | 000368 | 03 | 10.161.190.37:50... | Query from partner | C (CVR) |
| 22/04/2020 11:20 | Partner | Hospital | XN analyser IPU | 000368 | 3 | 10.161.190.37:50... | Query from partner | |
| 22/04/2020 11:22 | Partner | Hospital | XN analyser IPU | 000368 | 3 | 10.161.190.37:50... | Query from partner | |
| 22/04/2020 11:22 | Partner | XN10 No2 | | 000368 | 3 | 10.161.190.37:50... | Results from partner | |

- b. **TS Info** - Shows the storage position of the sample within a tube sorter or manual scan place within EPU. In the dialogue box each row contains the timestamp of each record as well as the destination of each sample.

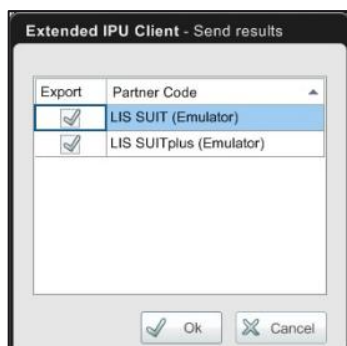
TIP: The target codes show the location the sample was last placed into, this could be a location within the sort tray(s) or an archive rack.

Note: The [TS Info] button is disabled when no information about sorting or archiving is available.

Extended IPU - Sample TS Information

| Timestamp | TS Partner Code | Message Type | Work Cycle Name | Work Cycle Index | Barcode Status | Target Index | Target Code | Rack... | P... | CT-90/T... |
|------------------|-----------------|--------------|-----------------|------------------|----------------|--------------|--------------|---------|------|------------|
| 22/04/2020 15:12 | TS-10 | OrderInquiry | | 1 | Ok | | | | | 1 |
| 22/04/2020 15:12 | TS-10 | Order | | 1 | | 1 | ARCHIVE | | | 1 |
| 22/04/2020 15:13 | TS-10 | Confirmation | | 1 | | 1 | HAEM ARCHIVE | 000092 | 100 | 1 |

- c. **Print** – Prints a copy of the results report.
- d. **Send Validated Results** - Resends the validated results to the LIMS. **NOTE:** The [Send Validated Results] button is enabled only when the test status is [released].



To resend results select [Send Validated Results] and the [Send Results] pop up box will open, displaying all LIMS connections in EPU. Select the connection required using the tick box and click [OK].

- e. **Cumulated View** – Displays all previous results for the patient that are linked via Patient ID (hospital number). Each sample will be listed with the associated sample number and the date and time of processing. The cumulated view displays the results, images, and flags for all results and access to [Enhanced View] can be obtained. **NOTE:** Cumulated View will only display results within the EPU database.

| | Test | Unit | 444555 | 222333 | 111222 | 333444 |
|--------------------------|------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <input type="checkbox"/> | SMEAR_INFO | | 30/09/2020 16:25:45 | 30/09/2020 15:27:31 | 30/09/2020 15:27:24 | 20/09/2020 15:40:30 |
| <input type="checkbox"/> | SMEAR_INFO | PLT | | PLT | RBC | RBC |
| <input type="checkbox"/> | CBC | | | | | |
| <input type="checkbox"/> | WBC | 10 ³ /μL | 6.10 | 6.10 | 6.10 | 6.10 |
| <input type="checkbox"/> | RBC | 10 ⁶ /μL | 6.32 | 6.32 | 6.32 | 6.32 |
| <input type="checkbox"/> | HGB | g/dL | 15.1 | 15.1 | 15.1 | 15.1 |
| <input type="checkbox"/> | HCT | % | 46.0 | 46.0 | 46.0 | 46.0 |
| <input type="checkbox"/> | MCV | fL | 98.1 | 98.1 | 98.1 | 98.1 |
| <input type="checkbox"/> | MCH | pg | 30.0 | 30.0 | 30.0 | 30.0 |
| <input type="checkbox"/> | MCHC | g/dL | 40.8 | 40.8 | 40.8 | 40.8 |
| <input type="checkbox"/> | PLT | 10 ³ /μL | 50 | 45 | 48 | 232 |
| <input type="checkbox"/> | DIFF | | | | | |
| <input type="checkbox"/> | NEUT# | 10 ³ /μL | 7.28 | 7.28 | 7.28 | 7.28 |
| <input type="checkbox"/> | LYMPH# | 10 ³ /μL | 3.79 | 3.79 | 3.79 | 3.79 |
| <input type="checkbox"/> | MONO# | 10 ³ /μL | 0.50 | 0.50 | 0.50 | 0.50 |
| <input type="checkbox"/> | EO# | 10 ³ /μL | 0.12 | 0.12 | 0.12 | 0.12 |
| <input type="checkbox"/> | BASO# | 10 ³ /μL | 0.08 | 0.08 | 0.08 | 0.08 |
| <input type="checkbox"/> | IG# | 10 ³ /μL | 0.01 | 0.01 | 0.01 | 0.01 |
| <input type="checkbox"/> | NEUT% | % | 55.4 | 55.4 | 55.4 | 55.4 |
| <input type="checkbox"/> | LYMPH% | % | 29.1 | 29.1 | 29.1 | 29.1 |
| <input type="checkbox"/> | MONO% | % | 8.4 | 8.4 | 8.4 | 8.4 |
| <input type="checkbox"/> | EO% | % | 0.9 | 0.9 | 0.9 | 0.9 |
| <input type="checkbox"/> | BASO% | % | 0.4 | 0.4 | 0.4 | 0.4 |

☐ Show Enhanced View
 ☐ Show Images
 ☐ Show Flags

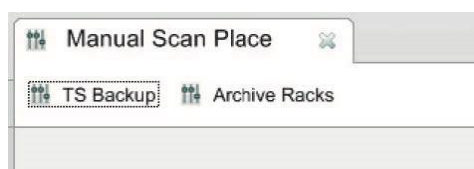
☐ Show Graphical Flow for Test Results

- f. **Previous/Next button** - Shows the previous/next sample available in the [Existing Samples] list.

Manual Scan Place

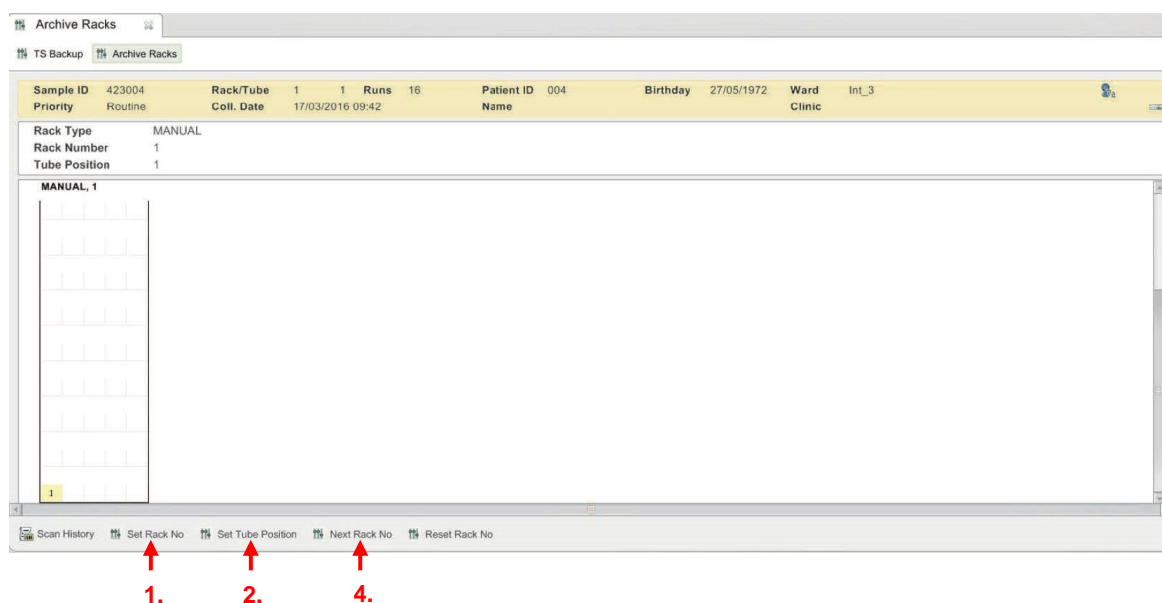
Manual scan place can be used to manually archive samples that cannot be processed by a tube sorter or for manual archiving of samples into laboratory archiving racks.

To access [Manual Scan Place] click the [Menu] and locate [Manual Scan Place] to open the tab.



Archive Racks

For the manual archiving of samples select the archive racks button. **NOTE:** The rack sizes within archive racks can be configured to your laboratory racks.



1. To set the rack number you wish to use for archiving select the [Set Rack No] button and enter the rack number required.
2. If required, select [Set Tube Position] to input the rack position you wish to use to start archiving.
3. To archive a sample, insert the sample number into the white box and press enter. **NOTE:** The barcode number can be scanned. Continue this process until all samples are archived. When all positions are filled, it will automatically change to the next rack.
4. To manually change to the next rack, click the [Next Rack No] button or alternatively select [Set Rack No] to manually input the rack number you wish to use.

NOTE: Archive positions can be found using the [TS info] button on the [View Sample Information] tab.

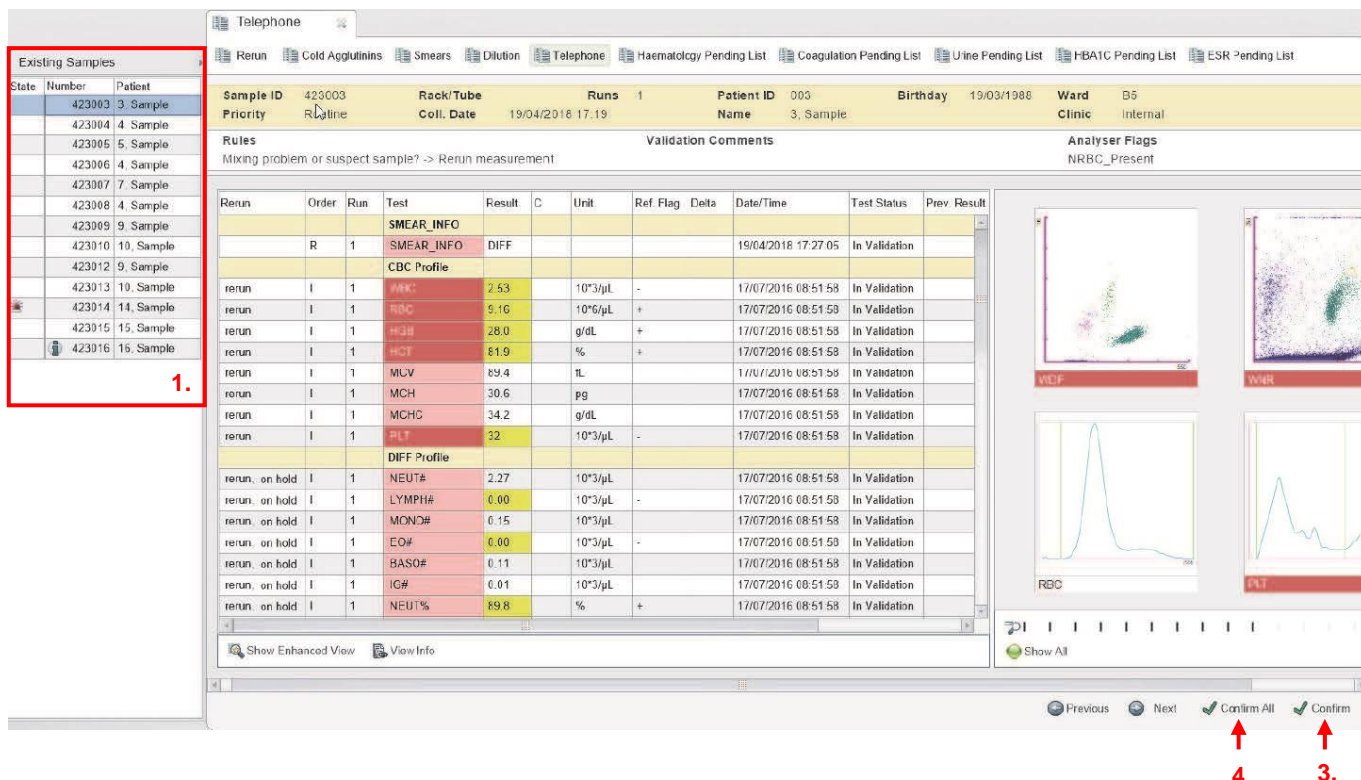
Worklists

The [Worklists] within EPU are populated based on rule sets and can be customised to the laboratory.

To access [Worklists] click the [Menu] and locate [Worklists] to open the tab.



All worklists within EPU have the same layout:



Existing Samples

| State | Number | Patient |
|-------|--------|------------|
| | 423003 | 3. Sample |
| | 423004 | 4. Sample |
| | 423005 | 5. Sample |
| | 423006 | 4. Sample |
| | 423007 | 7. Sample |
| | 423008 | 4. Sample |
| | 423009 | 9. Sample |
| | 423010 | 10. Sample |
| | 423012 | 9. Sample |
| | 423013 | 10. Sample |
| | 423014 | 14. Sample |
| | 423015 | 15. Sample |
| | 423016 | 15. Sample |

1.

Sample ID: 423003 **Rack/Tube:** R1/T1 **Runs:** 1 **Patient ID:** 003 **Birthdate:** 19/03/1988 **Ward:** B5 **Clinic:** Internal

Rules: Mixing problem or suspect sample? -> Rerun measurement

Validation Comments:

Analysed Flags: NRBC_Present

| Rerun | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Time | Test Status | Prev. Result |
|----------------|-------|-----|---------------------|--------|---|---------------------|-----------|-------|---------------------|---------------|--------------|
| | | | SMEAR_INFO | | | | | | | | |
| | R | 1 | SMEAR_INFO | DIFF | | | | | 19/04/2016 17:27:05 | In Validation | |
| | | | CBC Profile | | | | | | | | |
| rerun | I | 1 | WBC | 2.53 | | 10 ³ /μL | - | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | RBC | 5.16 | | 10 ⁶ /μL | + | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | HGB | 28.0 | | g/dL | + | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | HCT | 81.9 | | % | + | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | MCV | 89.4 | | fL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | MCH | 30.6 | | pg | | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | MCHC | 34.2 | | g/dL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun | I | 1 | PLT | 32 | | 10 ³ /μL | - | | 17/07/2016 08:51:58 | In Validation | |
| | | | DIFF Profile | | | | | | | | |
| rerun, on hold | I | 1 | NEUT# | 2.27 | | 10 ³ /μL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | LYMPH# | 0.00 | | 10 ³ /μL | - | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | MONO# | 0.15 | | 10 ³ /μL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | EO# | 0.00 | | 10 ³ /μL | - | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | BASO# | 0.11 | | 10 ³ /μL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | IG# | 0.01 | | 10 ³ /μL | | | 17/07/2016 08:51:58 | In Validation | |
| rerun, on hold | I | 1 | NEUT% | 89.8 | | % | + | | 17/07/2016 08:51:58 | In Validation | |

2.

3.

4.

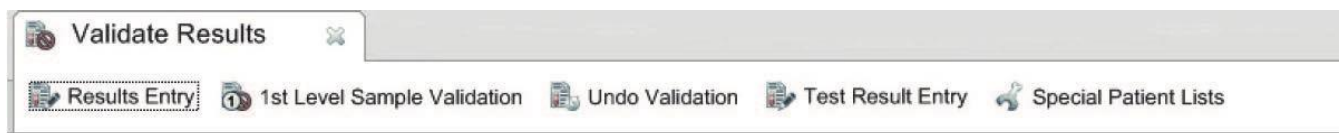
1. The [Existing Samples] list displays all samples on the worklist accessed. **NOTE:** The layout of the information is the same as that within the [View Sample Information] tab.
2. To navigate through the list the next and previous buttons can be used.
3. To remove a sample from the list, click the [Confirm] button. **NOTE:** The next sample in the list will be shown automatically.
4. To remove all samples from the worklist, click the [Confirm All] button.

Routine Client: Validation

The validation section will look at:

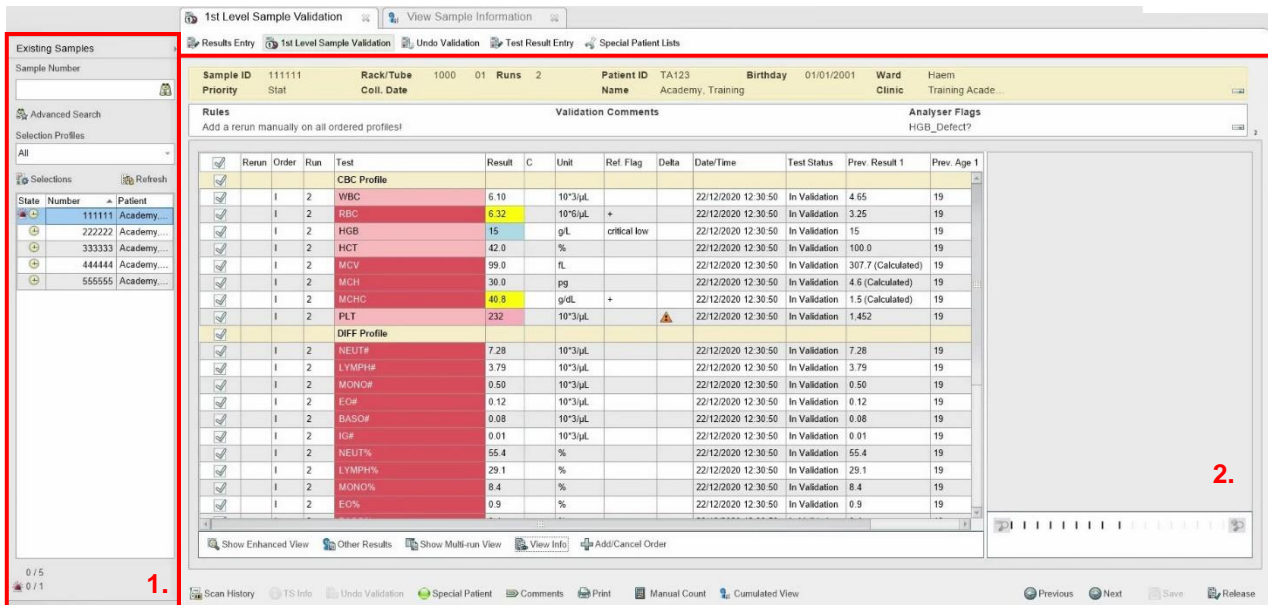
- 1st Level Sample Validation
- Special Patients
- Undo Sample Validation
- Manual Results Entry
- Locked Samples

To access [Validate Results] click the [Menu] and locate [Validate Results] to open the tab.



1st Level Sample Validation

Sample validation is carried out using the [1st Level Sample Validation] option on the [Validate Results] tab.

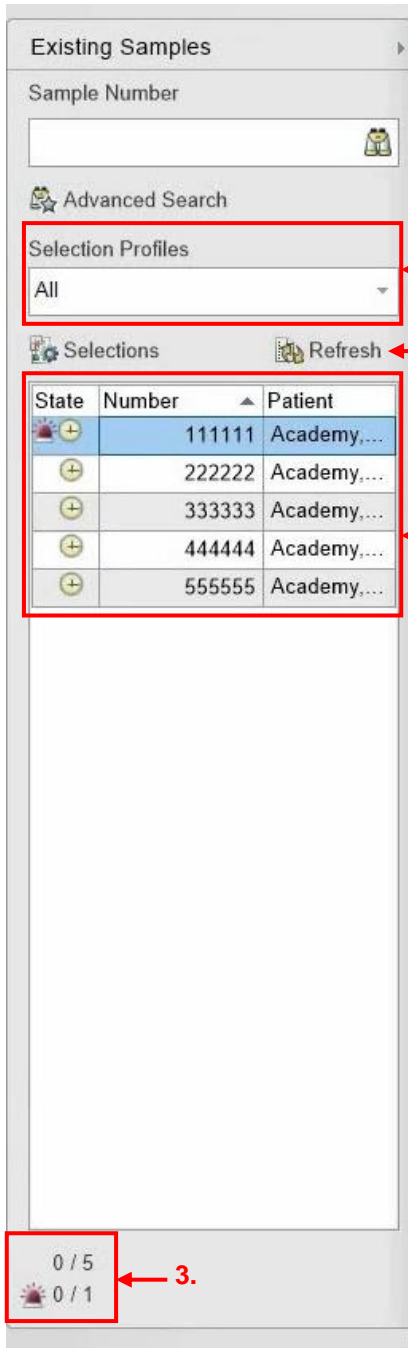


The [1st Level Sample Validation] tab is split in to the:

1. Existing samples section
2. Display section of [1st Level Sample Validation] – with the layout replicating [View Sample Information], except for [1st Level Sample Validation] specific functions (see below).

Searching for a Sample

Searching for a sample makes use of the [Existing Samples] panel at the left-hand side of [1st Level Sample Information]. Searching for a sample using the sample number or advanced search function is identical to searching for a sample within [View Sample Information].



Existing Samples

Sample Number

Advanced Search

Selection Profiles

All

Refresh

| State | Number | Patient |
|-------|--------|-------------|
| | 111111 | Academy,... |
| | 222222 | Academy,... |
| | 333333 | Academy,... |
| | 444444 | Academy,... |
| | 555555 | Academy,... |

0 / 5
0 / 1

1. The [Selection Profiles] drop-down box displays different validation queues within EPU and when selected will display all samples blocked for validation within that selection profile. **NOTE:** The selection profiles available can be customised to each laboratory but the standard profiles are [All], [Stat] and [On-Hold].

2. The [Existing Samples] list will display all samples within the specified selection profile and can be split in to three columns' state, number and patient.

The [State] column can display different icons depending on the status of the sample:

| Icon | Description |
|------|---|
| | The green clock indicates that the sample result has been created less than 60 minutes ago. |
| | The yellow clock indicates that the sample result has been created between 60 to 120 minutes ago. |
| | The red clock indicates that the sample result has been created more than 120 minutes ago. |
| | On hold indicates that a sample has tests with status [On Hold]. |
| | The key indicates that a sample is locked by another user. |
| | The flashing red light indicates a STAT sample. |
| | The green tick indicates that the sample is released from [1st Level Sample Validation]. |

3. The two number pairs indicate how many samples are awaiting validation. The first number pair represents the total number of samples, and the second number pair represents the STAT samples.

4. The existing samples list does not auto refresh, therefore, to update the list the refresh icon needs to be clicked.

NOTE: The [1st Level Sample Validation] existing samples section is replicated in [Manual Count Pad].

[Other Results] button

The [Other Results] button can be found within the [Results Table Zone] and allows access to other results within EPU linked to the Patient ID of the sample currently being viewed. **NOTE:** Clicking the [Other Results] button will open the [View Sample Information] tab.

[On Hold] Status

During sample validation certain parameters may have the [On Hold] status automatically assigned due to specific rules set up within EPU, or it is possible to manually assign the [On Hold] status to parameters.

NOTE: Parameters with the [On Hold] status assigned cannot be released until the [On-Hold] status is removed, or the sample is validated using the manual count pad. If part of the order is [On-Hold], for example the DIFF profile, releasing the results will only release the CBC profile results, ensuring the DIFF profile results are held back.

To assign the [On Hold] status:

1. The [On Hold] status can be applied to the entire order, using the main header row, a specific profile, using the profile header row, or an individual parameter, using the specific parameter row (see image below).

| Run | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Time | Test Status | Prev. Result 1 | Prev. Ag |
|---------------------|-------|--------|------|--------|---|---------------------|--------------|-------|---------------------|---------------|--------------------|----------|
| CBC Profile | | | | | | | | | | | | |
| I | 2 | WBC | 6.10 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 4.65 | 19 |
| I | 2 | RBC | 6.32 | | | 10 ⁶ /μL | + | | 22/12/2020 12:30:50 | In Validation | 3.25 | 19 |
| I | 2 | HGB | 15 | | | g/L | critical low | | 22/12/2020 12:30:50 | In Validation | 15 | 19 |
| I | 2 | HCT | 42.0 | | | % | | | 22/12/2020 12:30:50 | In Validation | 100.0 | 19 |
| I | 2 | MCV | 99.0 | | | fL | | | 22/12/2020 12:30:50 | In Validation | 307.7 (Calculated) | 19 |
| I | 2 | MCH | 30.0 | | | pg | | | 22/12/2020 12:30:50 | In Validation | 4.6 (Calculated) | 19 |
| I | 2 | MCHC | 40.8 | | | g/dL | + | | 22/12/2020 12:30:50 | In Validation | 1.5 (Calculated) | 19 |
| I | 2 | PLT | 232 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 1,452 | 19 |
| DIFF Profile | | | | | | | | | | | | |
| I | 2 | NEUT# | 7.28 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 7.28 | 19 |
| I | 2 | LYMPH# | 3.79 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 3.79 | 19 |
| I | 2 | MONO# | 0.50 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 0.50 | 19 |
| I | 2 | EO# | 0.12 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 0.12 | 19 |
| I | 2 | BASO# | 0.08 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 0.08 | 19 |
| I | 2 | IG# | 0.01 | | | 10 ³ /μL | | | 22/12/2020 12:30:50 | In Validation | 0.01 | 19 |
| I | 2 | NEUT% | 55.4 | | | % | | | 22/12/2020 12:30:50 | In Validation | 55.4 | 19 |
| I | 2 | LYMPH% | 29.1 | | | % | | | 22/12/2020 12:30:50 | In Validation | 29.1 | 19 |
| I | 2 | MONO% | 8.4 | | | % | | | 22/12/2020 12:30:50 | In Validation | 8.4 | 19 |
| I | 2 | EO% | 0.9 | | | % | | | 22/12/2020 12:30:50 | In Validation | 0.9 | 19 |

2. Right click click the relevant row.
3. Select [Set on Hold Status].
4. Click [Save] on the toolbar. **NOTE:** If at least one test has been set to [On Hold], the sample will now appear on the [On Hold] selection profile.

To remove the [On Hold] status:

1. Right click the relevant row.
2. Select [Reset on Hold Status].
3. Click [Save] on the toolbar if you do not wish to release the results immediately.

[Re-run] Status

During sample validation if an order needs to be re-run on an analyser, for example, to check a result, a re-run must first be requested on EPU.

The re-run status can be applied to the entire order, a specific profile, or a specific parameter, as with the [On Hold] status.

To assign the [Re-run] status:

1. Right click the relevant row for the order, profile or parameter as require.
2. Select [Rerun All], [Rerun profile] or [Rerun test] respectively. **NOTE:** when selecting rerun test, depending on the parameter, the entire profile or order may be re-run. This will depend on the analyser capabilities.
3. Click [Save] on the toolbar prior to analysis on the relevant analyser.

Following completion of re-analysis of the sample and the location of the sample within [1st Level Sample Validation], the number of runs on the sample will have increased. **NOTE:** The results shown in the results table will be the most recent set of results.

To compare the current results with previous, the [Show Multi-run View] button can be used.



| Test | Used | <input checked="" type="checkbox"/> Run 3 | <input type="checkbox"/> Run 2 | <input type="checkbox"/> Run 1 |
|------------|-------------|---|--------------------------------|--------------------------------|
| CBC Pro... | 22/12/20... | 22/1... | 22/1... | 22/1... |
| WBC | 6.50 | 6.50 | 6.10 | 6.10 |
| RBC | 6.32 | 6.32 | 6.32 | 6.32 |
| HGB | 15 | 15 | 15 | 15 |
| HCT | 43.0 | 43.0 | 42.0 | 46.0 |
| MCV | 100.0 | 100.0 | 99.0 | 98.1 |
| MCH | 30.0 | 30.0 | 30.0 | 30.0 |
| MCHC | 40.8 | 40.8 | 40.8 | 40.8 |
| PLT | 232 | 232 | 232 | 232 |
| DIFF Pr... | | | | |
| NEUT# | 7.28 | 7.28 | 7.28 | 7.28 |
| LYMPH# | 3.79 | 3.79 | 3.79 | 3.79 |
| MONO# | 0.50 | 0.50 | 0.50 | 0.50 |
| EO# | 0.12 | 0.12 | 0.12 | 0.12 |
| BASO# | 0.08 | 0.08 | 0.08 | 0.08 |
| IG# | 0.01 | 0.01 | 0.01 | 0.01 |
| NEUT% | 55.4 | 55.4 | 55.4 | 55.4 |
| LYMPH% | 29.1 | 29.1 | 29.1 | 29.1 |
| MONO% | 8.4 | 8.4 | 8.4 | 8.4 |
| EO% | 0.9 | 0.9 | 0.9 | 0.9 |
| BASO% | 0.4 | 0.4 | 0.4 | 0.4 |

1. The run selected for validation will be displayed within a black box and a tick alongside the run number.

2. To select an alternative run for validation, select the tick box alongside the relevant run number. **NOTE:** The multi-run view displays the results, images, and flags for all results.

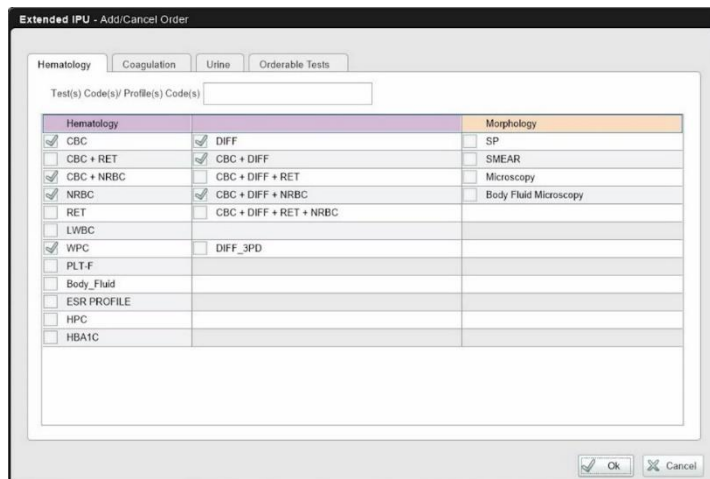
3. Click [Show Single Run View] followed by [Yes] to save the changes.

4. The results displayed on the result table will update to reflect the chosen run.

NOTE: Any additional tests added to the sample may appear as an additional run.

[Add/Cancel Order] Button

Tests can be added or cancelled using the [Add/Cancel Order] button. This will open the [Add/Cancel Orders] pop up box. **NOTE:** Depending on the version of EPU, this functionality may not be available.



The dialog box titled "Extended IPU - Add/Cancel Order" has tabs for Hematology, Coagulation, Urine, and Orderable Tests. The Hematology tab is active. It contains a search field "Test(s) Code(s)/ Profile(s) Code(s)" and a table of test options.

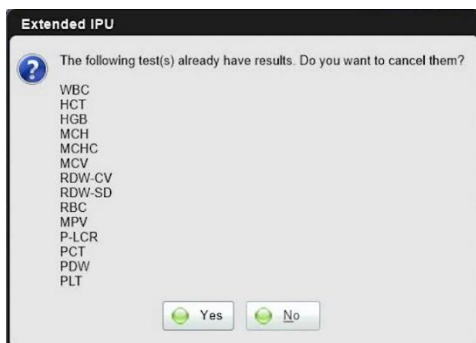
| Hematology | | Morphology |
|--|---|--|
| <input checked="" type="checkbox"/> CBC | <input checked="" type="checkbox"/> DIFF | <input type="checkbox"/> SP |
| <input type="checkbox"/> CBC + RET | <input checked="" type="checkbox"/> CBC + DIFF | <input type="checkbox"/> SMEAR |
| <input checked="" type="checkbox"/> CBC + NRBC | <input type="checkbox"/> CBC + DIFF + RET | <input type="checkbox"/> Microscopy |
| <input checked="" type="checkbox"/> NRBC | <input checked="" type="checkbox"/> CBC + DIFF + NRBC | <input type="checkbox"/> Body Fluid Microscopy |
| <input type="checkbox"/> RET | <input type="checkbox"/> CBC + DIFF + RET + NRBC | |
| <input type="checkbox"/> LWBC | | |
| <input checked="" type="checkbox"/> WPC | <input type="checkbox"/> DIFF_3PD | |
| <input type="checkbox"/> PLT-F | | |
| <input type="checkbox"/> Body_Fluid | | |
| <input type="checkbox"/> ESR PROFILE | | |
| <input type="checkbox"/> HPC | | |
| <input type="checkbox"/> HBA1C | | |

Buttons: [Ok] [Cancel]

A tick alongside the order indicates that order has already been requested, whereas an empty tick box indicates orders that have not been requested.

To add or cancel orders:

1. Tick or untick the relevant tick boxes.
2. Click [OK]. **NOTE:** Any cancelled orders that have results attached will generate the following message:



The dialog box titled "Extended IPU" contains a question mark icon and the text: "The following test(s) already have results. Do you want to cancel them?". Below the text is a list of test codes:

- WBC
- HCT
- HGB
- MCH
- MCHC
- MCV
- RDW-CV
- RDW-SD
- RBC
- MPV
- P-LCR
- PCT
- PDW
- PLT

Buttons: [Yes] [No]

3. Click [Yes] to proceed.
4. Cancelled orders will be displayed grey in the results table, with the test status updated to reflect this. **NOTE:** The results will remain but will not be transmitted to the LIMS.
5. Click [Save] on the toolbar before processing the samples on the relevant analyser for the added orders.


Adding Comments

There are three different types of comments that can be assigned to a sample within [1st Level Sample Validation]:

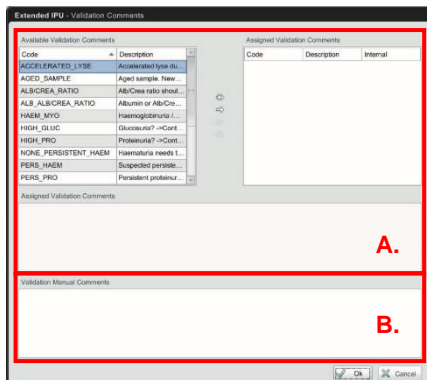
Validation Comments

Validation comments are attached to the entire order for the sample number.

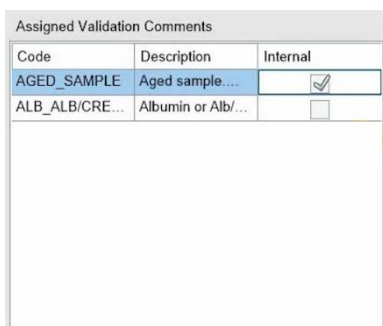
To assign a validation comment:

1. Click the [Comments] button  on the toolbar to display the validation comments pop-up box, which can be split into the pre-set comments section (A) and the manual comments section (B):

NOTE: The pre-set comments are user definable.



2. Highlight the comment required in the [Available Validation Comments] list and select the [→] key or double click the comment.
3. The comment will appear in the [Assigned Validation Comments] list. **TIP:** To remove comments from this list select the [←] key or double click the comment.
4. To make a pre-set comment internal i.e., it will not be sent to the LIMS, select the [Internal] tick box alongside the relevant comment.



5. Type any manual validation comments in the [Manual Comments] section.
6. Click [OK]. The validation comments will now appear under the validation comments heading in the [Sample Information Zone].

Result Replacing Comments

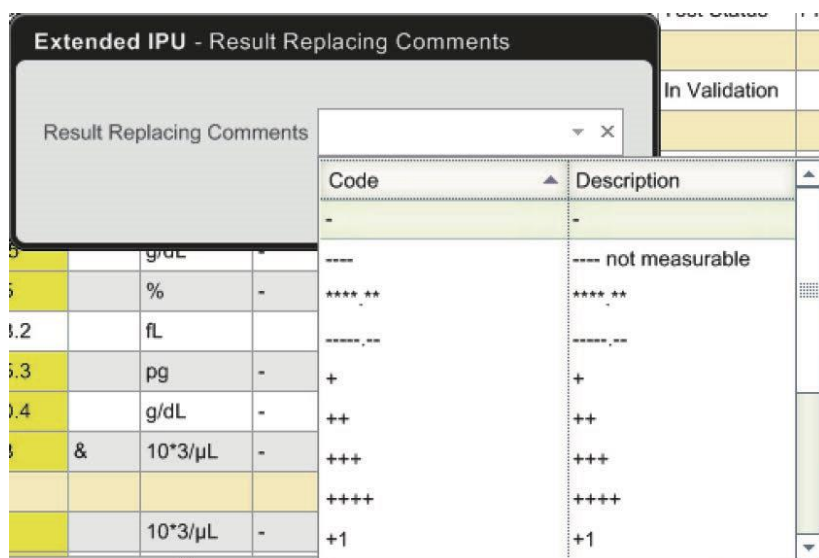
Result replacing comments can be assigned to the entire order or a specific profile as with the [On Hold] status.

To assign a result replacing comment:

1. Right click the relevant row for the order or profile as required.

| CBC Profile | | |
|-------------|-----|------------------------------|
| WBC | 0.9 | Set Result Replacing Comment |
| RBC | 2.9 | Set on Hold Status |
| HGB | 7.5 | Reset on Hold Status |
| HCT | 25 | Rerun Profile |
| MCV | 83 | Cancel Rerun |

2. Select [Set Result Replacing Comment].
3. Select the relevant comment from the drop-down list. **TIP:** If known start typing the comment to navigate through the list.



4. Select [OK]. All results for the profile selected are replaced by the selected comment.

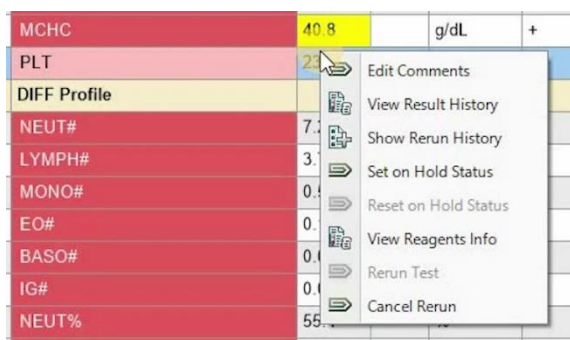
NOTE: When a result replacing comment has been assigned, you will need to click the [Execute Rules] button on the toolbar before saving or releasing your results. If a result replacing comment has been assigned accidentally, the show multi run view button can be used to reselect the correct set of results.

Parameter Comments

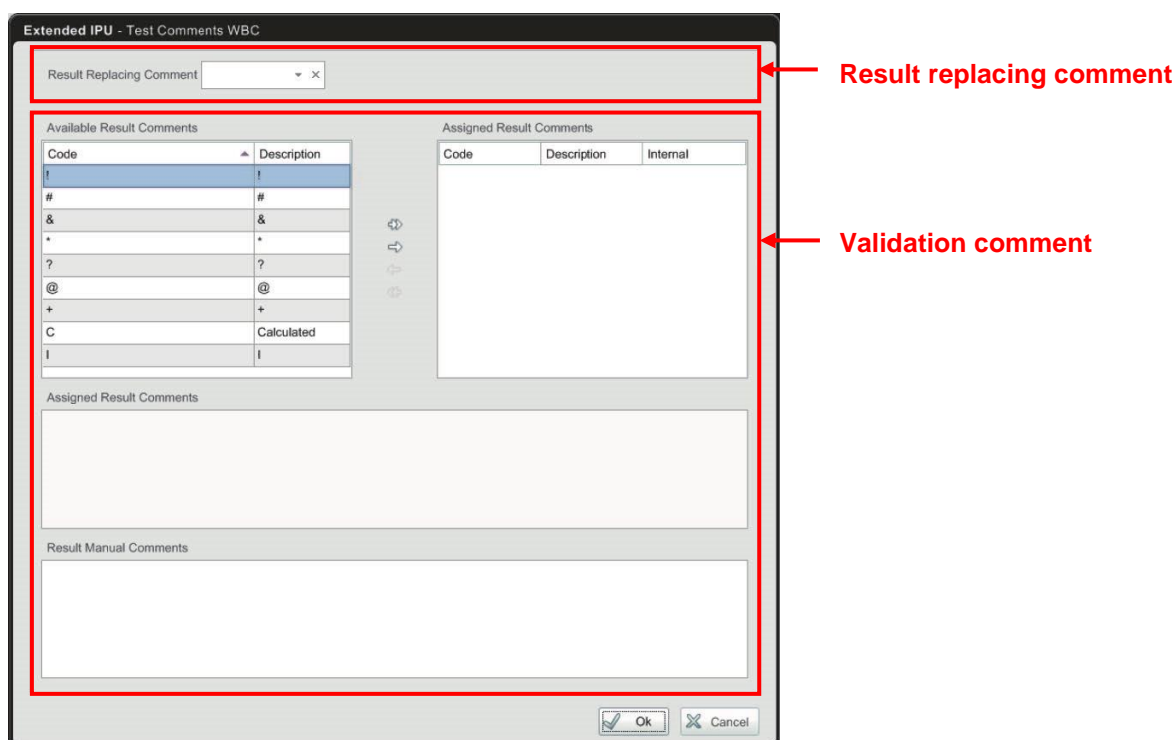
Parameter comments are assigned to individual parameters within an order.

To assign a parameter comment:

1. Right click the relevant parameter row.



2. Select [Edit Comments]. **NOTE:** The test comments pop-up box combines the same functionality as that described for [Result Replacing Comment] and [Validation Comment].



3. Assign the relevant comments required.
4. Click [OK].

NOTE: Parameter comments will appear in the [C] column of the results table.

Changing Parameter Results/History of Parameter Results

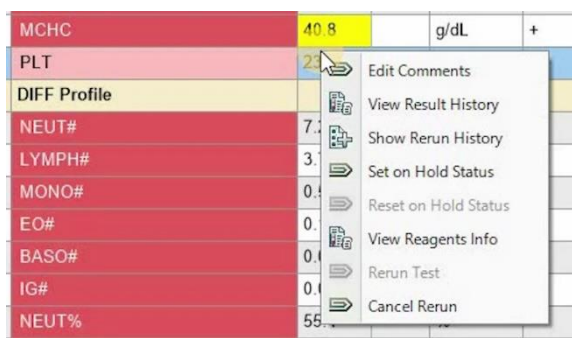
Manually changing a parameter result can only be done if the test status is [In Validation].

To manually change a parameter result:

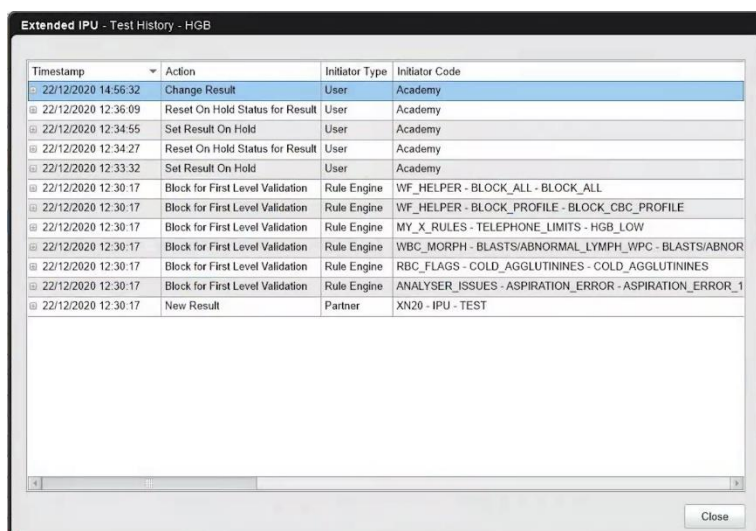
1. Click the relevant [Result] cell for the parameter required.
2. Enter the required result. **NOTE:** Only numerical characters can be used.
3. Press [Enter] on the keyboard. A pencil icon will appear alongside the modified result.

To access the history of a parameter result:

1. Right click the row of the relevant parameter.



2. Select [View Result History] to display any changes that have been made to the parameter. **NOTE:** The [Initiator Code] column will display the username of the relevant user.



Releasing Results





Releasing results (authorisation) should be done according to individual laboratory protocol. It is possible to release all or part of an order using the selection column within the results table.

To release a result:

1. Tick/Untick the relevant parameters you wish to release in the selection column. **NOTE:** Ticked parameters will be released.

| <input checked="" type="checkbox"/> | Run | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Time | Test Status | Prev. Result 1 | Prev. A |
|-------------------------------------|-----|-------|-----|---------------------|--------|---|---------------------|--------------|-------|---------------------|---------------|----------------|---------|
| <input checked="" type="checkbox"/> | | | | CBC Profile | | | | | | | | | |
| <input checked="" type="checkbox"/> | I | 1 | | WBC | 6.10 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | RBC | 6.32 | | 10 ⁶ /μL | + | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | HGB | 15 | | g/L | critical low | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | HCT | 46.0 | | % | + | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | MCV | 58.1 | | fL | | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | MCH | 30.0 | | pg | | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | MCHC | 40.8 | | g/dL | + | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | I | 1 | | PLT | 232 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | | |
| <input checked="" type="checkbox"/> | | | | DIFF Profile | | | | | | | | | |
| <input checked="" type="checkbox"/> | I | 1 | | NEUT# | 7.28 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 7.28 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | LYMPH# | 3.79 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 3.79 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | MONO# | 0.50 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 0.50 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | EO# | 0.12 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 0.12 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | BASO# | 0.08 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 0.08 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | IGM | 0.01 | | 10 ³ /μL | | | 22/12/2020 12:29:58 | In Validation | 0.01 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | NEUT% | 55.4 | | % | | | 22/12/2020 12:29:58 | In Validation | 55.4 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | LYMPH% | 29.1 | | % | | | 22/12/2020 12:29:58 | In Validation | 29.1 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | MONO% | 8.4 | | % | | | 22/12/2020 12:29:58 | In Validation | 8.4 | 0 |
| <input checked="" type="checkbox"/> | I | 1 | | EO% | 0.9 | | % | | | 22/12/2020 12:29:58 | In Validation | 0.9 | 0 |

2. Click the [Release] button on the toolbar. **NOTE:** [Execute Rules] will be available on the toolbar if any changes have been made to the order. Ensure this is selected prior to release to ensure any relevant rules are assigned to the sample.
3. When released the state column in the existing samples list will show a green tick, and if any further samples are available, the next sample in the list will automatically open.

| State | Number | Patient |
|---|--------|-------------|
|  | 222222 | Academy,... |
|  | 333333 | Academy,... |
|  | 444444 | Academy,... |
|  | 555555 | Academy,... |

Special Patients


The special patient function within EPU can be used to easily identify specific patients based on their samples being processed by ensuring they stand out. The special function also allows for the automatic addition of certain tests to a sample, regardless of the order within the LIMS.

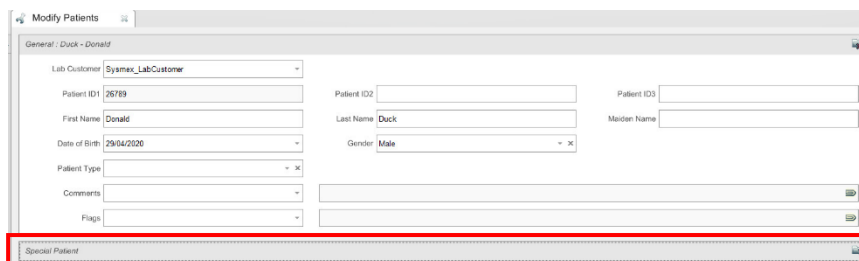
It is advised that the special patient status is used for patients that always require further testing or investigation of their sample prior to the release of results. Using the special patient status for patients that do not necessarily require further investigation or testing each time their sample is processed is not a suitable use for the capability.

Assigning the [Special Patient] status

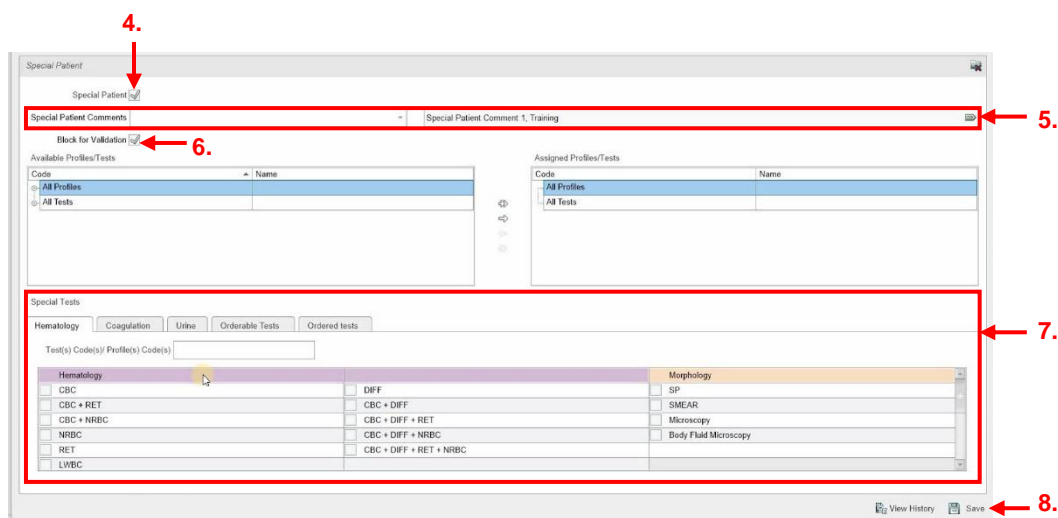
The special patient status can be assigned when accessing a patient sample via [1st Level Sample Validation].

To assign the special patient status:

1. Click the [Special Patient]  **Special Patient** button on the toolbar.
2. The [Modify Patients] tab will open for the specific patient.
3. Select the [Special Patient] zone.



4. Select the [Special Patient] tick box.



- Assign special patient comments using the drop-down box (at the left) or using the paperclip icon at the right.
- If required, all future samples for the patient can be blocked for validation by placing a tick in the [Block for Validation] box.
- It is possible for EPU to add additional tests to an order prior to processing, regardless of the initial order from the LIMS, by ticking the relevant tests required in the [Special Tests] section.
- Click [Save] when complete.

The [Special Patient] status is identified by a blue [Patient Information Zone] which will contain any special patient comments, and any samples for that special patient will appear blue in the existing samples list.

| Selections | | Refresh | |
|------------|--------|-------------|--|
| State | Number | Patient | |
| | 333333 | Academy,... | |
| | 444444 | Academy,... | |
| | 555555 | Academy,... | |

| Sample ID | Priority | Rack/Tube | Coil. Date | Runs | Patient ID | Birthdate | Ward | Clinic |
|-----------|----------|-----------|------------|------|------------|------------|------|-------------------|
| 333333 | | 1000 | 01 | 1 | TA123 | 01/01/2001 | Haem | Training Acade... |

| Rules | | Validation Comments | | Analyser Flags | |
|--|--|---------------------|--|--------------------|--|
| Add a rerun manually on all ordered profiles! | | | | HGB_Defect? | |
| Aspiration error? -> Rerun measurement | | | | Left_Shift? | |
| Cold agglutinins? -> Recount sample (37°C) | | | | RBC_Agglutination? | |
| Abnormal lymphocytes or blasts? -> Measure WPC channel | | | | Blasts/Abn_Lympho? | |
| Hgb < X -> Inform doctor or ward! | | | | | |

| Sample Flags | | Slide Comments | | App Comments | |
|-------------------------------------|---|----------------|-----|--------------|--|
| <input checked="" type="checkbox"/> | I | 1 | HGB | 15 | |
| <input checked="" type="checkbox"/> | I | 1 | HCT | 46.0 | |

Viewing All Special Patients

The [Special Patients List] will display all patients within EPU with the [Special Patient] status assigned and can be opened from the [Validate Results] tab.

To view the special patients:

- Expand one of the preset filters by selecting the (+) icon. **NOTE:** The right-hand side of the screen will display more information for the patients within the list.

Lab Customer
Sysmex_LabCustomer

Patient ID/Name

| Patient ID | Last Name | First Name |
|--------------|-----------|------------|
| All Speci... | | |
| TA123 | Academy | Training |
| TEST... | TEST | TEST |
| TEST... | TEST | TEST |
| Patients... | | |
| Patients... | | |
| Search... | | |

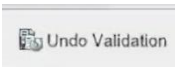
- To view further information regarding a specific patient, double click the relevant row.
- Changes can be made as described in the [Assigning the Special Patient Status] section. **IMPORTANT:** The special patient status can only be removed when using the [Special Patient] button via [1st Level Sample Validation].

Undo Sample Validation

IMPORTANT: If there is a requirement to undo the validation of a sample, this will only undo the validation within EPU. Any validated results will have already been transmitted to the LIMS, therefore, the results may have already been transmitted to the requesting location. Please follow your laboratory SOP when unvalidating any results in EPU.

Undoing sample validation can be carried out using two methods.

If the sample is listed in the existing samples in [1st Level Sample Validation]:

1. Select the sample within the list.
2. Select the [Undo Validation] button  on the toolbar.
3. Select [Yes] to confirm.
4. Insert a comment explaining why the sample is being unvalidated.
5. Click [OK].

If the sample is **NOT** listed in [1st Level Sample Validation]:

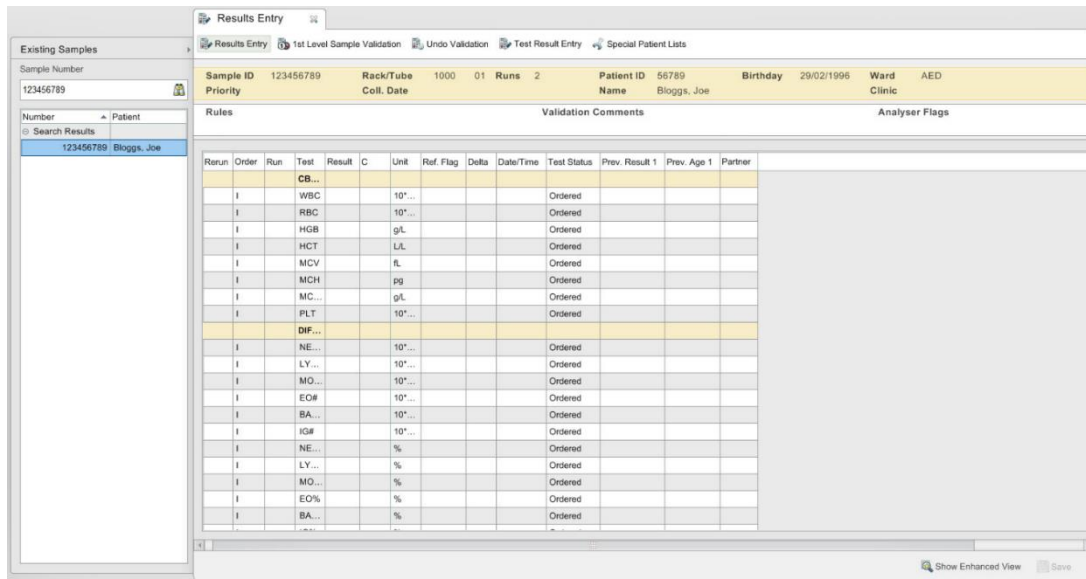
1. Open the [Undo Validation] submenu on the [Validate Results] tab.
2. Search for sample using the existing samples section. **NOTE:** Searching for a sample using the sample number or advanced search function is identical to searching for a sample within [View Sample Information].
3. Select the sample from the existing samples list.
4. Follow steps 2 – 5 above.

Following undo validation on a sample the comments entered can be found in the [Sample Information Zone] and the test status will change to in validation. The sample will then be available in 1st level sample validation to be actioned.

Manual Result Entry

Manual result entry can be used to enter sample results when for example, the results haven't been transmitted to EPU from the analyser, or the sample isn't suitable for processing.

Manual result entry can be accessed using the [Result Entry] submenu on the [Validate Results] tab.
NOTE: You may be prompted to select a manual workplace from the [Lab Hierarchy] before commencing.




To manually enter results:

1. Search for the sample in the existing samples section. **NOTE:** Searching for a sample using the sample number is identical to searching for a sample within [View Sample Information].
2. Select the sample from the existing samples list.
3. Select the blank cell for the parameter required and enter the result. **IMPORTANT:** The parameter test status will change to [Released] following manual entry of the result.
4. Continue step 3 until all parameter results are entered.
5. Alternatively, a [Result Replacing Comment] can be assigned as explained in the [Adding Comments] section.
6. Click [Save] on the toolbar. **NOTE:** Any calculated parameters will not be automatically released, therefore, the calculated results will either need to be overridden manually, or the results released using [1st Level Sample Validation].
7. To access [1st Level Sample Validation] for the specific sample, click the [Validation] button on the toolbar. **IMPORTANT:** Please follow the steps for sample validation above, according to laboratory SOPs.

Locked Samples

A sample is locked while it is actively in use by another user.

A locked sample is indicated by a key icon  on the following tabs:

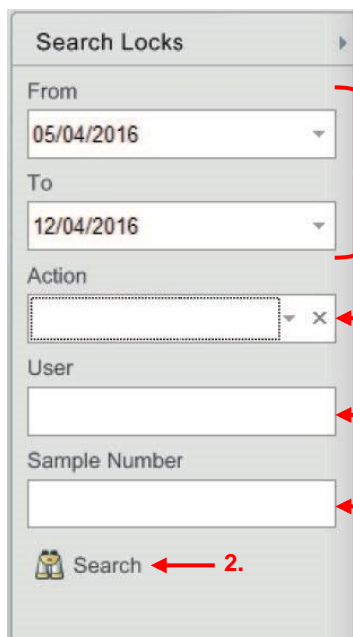
- Manual Count pad
- Results Entry
- Validate Results
- Modify Orders

If you try to open a locked sample, an error box will appear indicating the sample is currently locked by another user in a specific tab. **IMPORTANT:** Please **DO NOT** unlock samples that are being worked on by other EPU users. However, a sample can also get locked permanently, for example, due to a power failure of the client computer. In this case it is necessary to unlock the sample manually, using the [View Locks] function in EPU.

To access [View Locks] click the [Menu] and locate [Administration] to view the [View Locks] sub option.

To unlock a sample:

1. Use the [Search Locks] panel on the left-hand side to search for locked samples using one or several of the following search criteria:

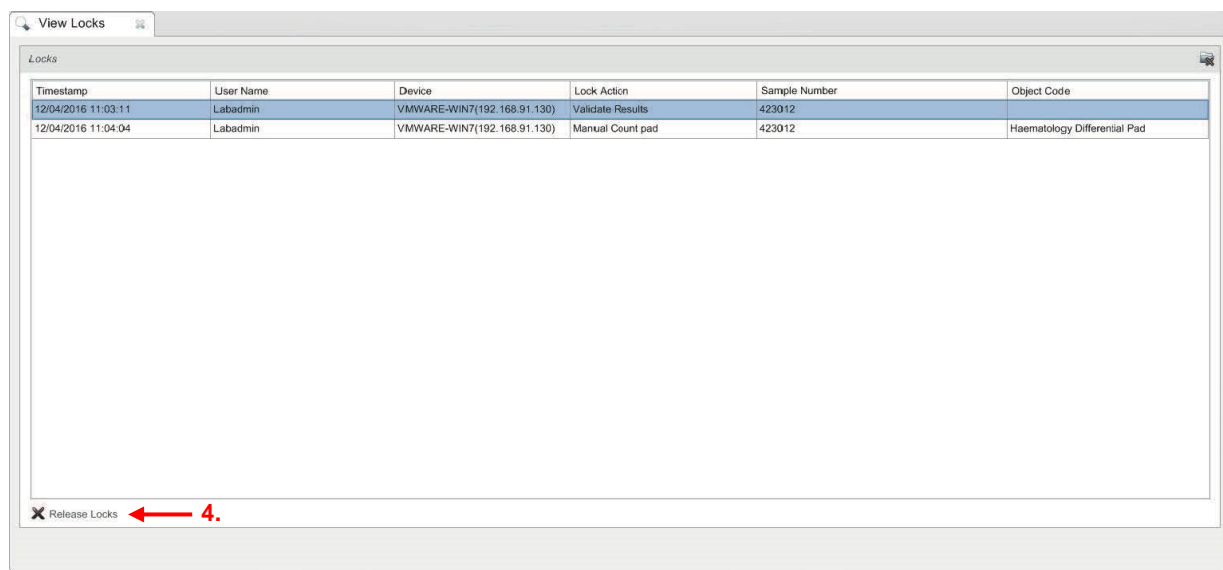


The screenshot shows the 'Search Locks' panel with the following fields and annotations:

- From:** 05/04/2016 (indicated by a red bracket and text: 'Indicate [From] and [To] to set up a timeframe (mandatory)')
- To:** 12/04/2016 (indicated by a red bracket and text: 'Indicate [From] and [To] to set up a timeframe (mandatory)')
- Action:** (empty dropdown menu, indicated by a red arrow and text: 'Select an [Action] that caused the lock')
- User:** (empty text box, indicated by a red arrow and text: 'Enter a [User] who caused the lock')
- Sample Number:** (empty text box, indicated by a red arrow and text: 'Enter the [Sample Number] of the locked sample')
- Search:** (button with a magnifying glass icon, indicated by a red arrow and text: '2.')

2. Press the [Search] icon. All matching locked samples are displayed on the main tab.


3. Select the relevant sample from the list.



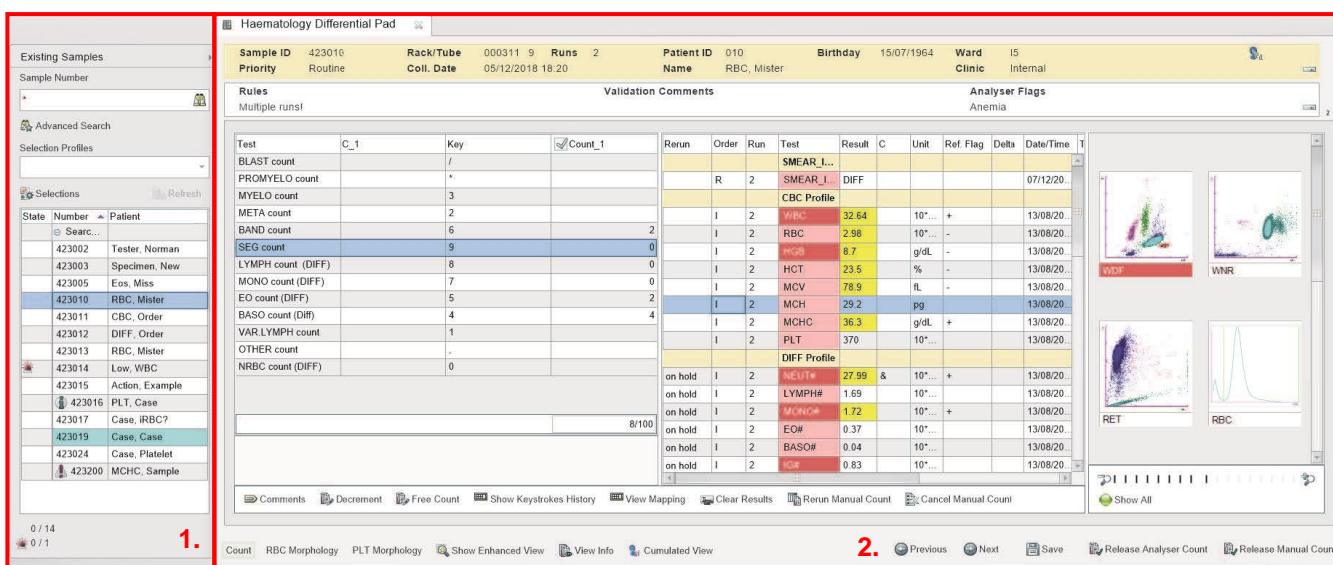
4. Click the [Release Locks] button to unlock the sample. **IMPORTANT:** Please **DO NOT** unlock samples that are being worked on by other EPU users.

Routine Client: Manual Count Pad

[Manual count Pad] within EPU allows the user to perform manual microscopy on a sample, including performing manual differentials, grading red blood cell and platelet morphology, adding smear comments and releasing the manual differential count over the analyser differential count and vice versa.

[Manual Count Pad] can be accessed for a specific sample within the [1st Level Sample Validation] tab using the [Manual Count]  button on the toolbar, however, the most efficient way is to open the [Manual Count Pad] directly.

To access [Manual Count Pads] click the [Menu] and locate [Manual Count Pads]. **NOTE:** If several count pads are installed on EPU you will be prompted to select a manual count pad workplace in the [Lab Hierarchy] choice box.



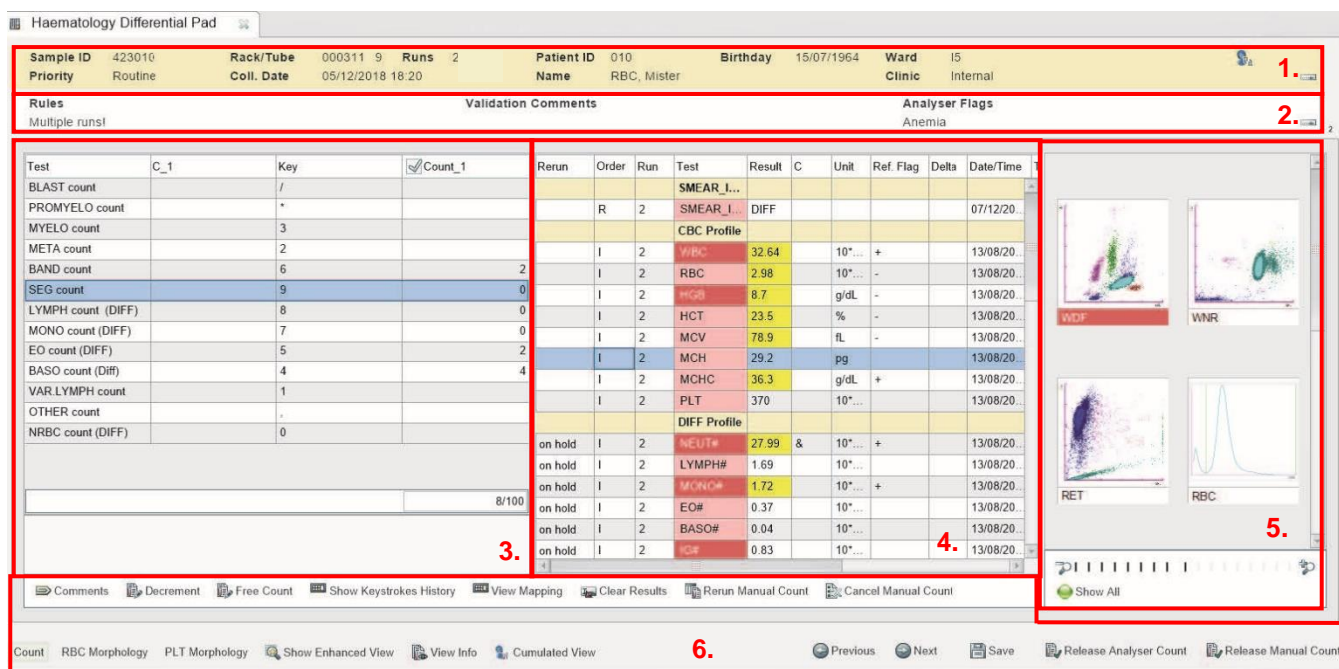
The [Manual Count Pad] tab is split in to the:

1. Existing Samples section – which functions the same as within [1st Level Sample Validation].
2. Display section of [Manual Count Pad].

Layout of Manual Count Pad Display section

When a searched sample is selected in the existing samples list, the display section of manual count pad will display the relevant information. The display section is split into six areas:

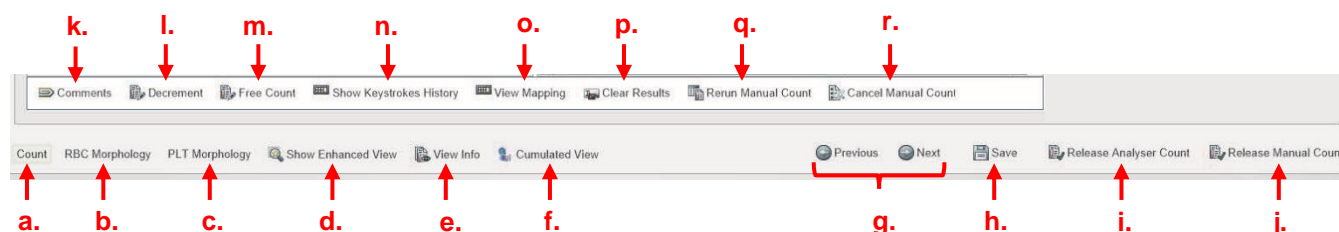
1. **Patient demographics zone** – the same as [View Sample Information]
2. **Sample information zone** – the same as [View Sample Information]
3. **Morphology tab zone**
4. **Results table zone** – the same as [View Sample Information]
5. **Analyser graphics and images zone** – the same as [View Sample Information]
6. **Toolbar**



The screenshot displays the 'Haematology Differential Pad' interface. The top section (1) contains patient demographics: Sample ID 423010, Rack/Tube 000311, Runs 2, Patient ID 010, Birthday 15/07/1964, Ward I5, Clinic Internal, Name RBC, Mister. Below this (2) is sample information: Rules Multiple runst, Validation Comments, and Analyser Flags Anemia. The main area (3) is the Morphology tab zone, showing a table of test results. The Results table zone (4) displays a table with columns: Test, C_1, Key, Count_1, Rerun, Order, Run, Test, Result, C, Unit, Ref. Flag, Delta, Date/Time. The Analyser graphics and images zone (5) shows four scatter plots: WDF, WNR, RET, and RBC. The bottom section (6) is the toolbar, containing buttons for Comments, Decrement, Free Count, Show Keystrokes History, View Mapping, Clear Results, Rerun Manual Count, Cancel Manual Count, Count, RBC Morphology, PLT Morphology, Show Enhanced View, View Info, Cumulated View, Previous, Next, Save, Release Analyser Count, and Release Manual Count.

| Test | C_1 | Key | Count_1 | Rerun | Order | Run | Test | Result | C | Unit | Ref. Flag | Delta | Date/Time |
|--------------------|-----|-----|---------|-------|-------|-----|--------------|--------|-------|---------------------|---------------------|-------|-------------|
| BLAST count | | / | | | | | SMEAR I... | | | | | | |
| PROMYELO count | | * | | | | | SMEAR I... | DIFF | | | | | 07/12/20... |
| MYELO count | | 3 | | | | | CBC Profile | | | | | | |
| META count | | 2 | | | | | WBC | 32.64 | | 10 ⁹ ... | + | | 13/08/20... |
| BAND count | | 6 | 2 | | | | RBC | 2.98 | | 10 ⁹ ... | - | | 13/08/20... |
| SEG count | | 9 | 0 | | | | HGB | 8.7 | | g/dL | - | | 13/08/20... |
| LYMPH count (DIFF) | | 8 | 0 | | | | HCT | 23.5 | | % | - | | 13/08/20... |
| MONO count (DIFF) | | 7 | 0 | | | | MCV | 78.9 | | fL | - | | 13/08/20... |
| EO count (DIFF) | | 5 | 2 | | | | MCH | 29.2 | | pg | - | | 13/08/20... |
| BASO count (DIFF) | | 4 | 4 | | | | MCHC | 36.3 | | g/dL | + | | 13/08/20... |
| VAR.LYMPH count | | 1 | | | | | PLT | 370 | | 10 ⁹ ... | - | | 13/08/20... |
| OTHER count | | - | | | | | DIFF Profile | | | | | | |
| NRBC count (DIFF) | | 0 | | | | | on hold | LEU1+ | 27.99 | & | 10 ⁹ ... | + | 13/08/20... |
| | | | | | | | on hold | LYMPH# | 1.69 | | 10 ⁹ ... | - | 13/08/20... |
| | | | | | | | on hold | MONO# | 1.72 | | 10 ⁹ ... | + | 13/08/20... |
| | | | | | | | on hold | EO# | 0.37 | | 10 ⁹ ... | - | 13/08/20... |
| | | | | | | | on hold | BASO# | 0.04 | | 10 ⁹ ... | - | 13/08/20... |
| | | | | | | | on hold | IG# | 0.83 | | 10 ⁹ ... | - | 13/08/20... |

Toolbar Buttons



The diagram shows the toolbar buttons with labels a. through j. pointing to specific buttons:

- a. Count
- b. RBC Morphology
- c. PLT Morphology
- d. Show Enhanced View
- e. View Info
- f. Cumulated View
- g. Previous
- h. Next
- i. Save
- j. Release Analyser Count
- k. Comments
- l. Decrement
- m. Free Count
- n. Show Keystrokes History
- o. View Mapping
- p. Clear Results
- q. Rerun Manual Count
- r. Cancel Manual Count

- a. Count Tab** – Changes the morphology tab zone to display the WBC differential parameters and allows for manual differential counting. **NOTE:** Test column is user definable.

| Test | C_1 | Key | Count_1 |
|--------------------|-----|-----|---------|
| BLAST count | | / | |
| PROMYELO count | | * | |
| MYELO count | | 3 | |
| META count | | 2 | |
| BAND count | | 6 | |
| SEG count | | 9 | 0 |
| LYMPH count (DIFF) | | 8 | 0 |
| MONO count (DIFF) | | 7 | 0 |
| EO count (DIFF) | | 5 | 0 |
| BASO count (Diff) | | 4 | 0 |
| VAR.LYMPH count | | 1 | |
| OTHER count | | + | |
| NRBC count (DIFF) | | 0 | |
| | | | |

- b. RBC Morphology Tab** - Changes the morphology tab zone to display the RBC Morphology and allows for RBC morphology grading. **NOTE:** Test column is user definable.

| Test | - | + | ++ | +++ |
|--------------|-----------------------|-----------------------|-----------------------|-----------------------|
| POLY | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HYPO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ANISO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MICRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MACRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| POIKILO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TARGET | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SCHISTO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HELMET | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SICKLE | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SPHEROCYT | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ELLIPTO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| OVALO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TEARDROP | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| STOMATO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ACANTHO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ECHINO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| H_JOLLEY | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| PAPPENHEIMER | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| BAS. STIP. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

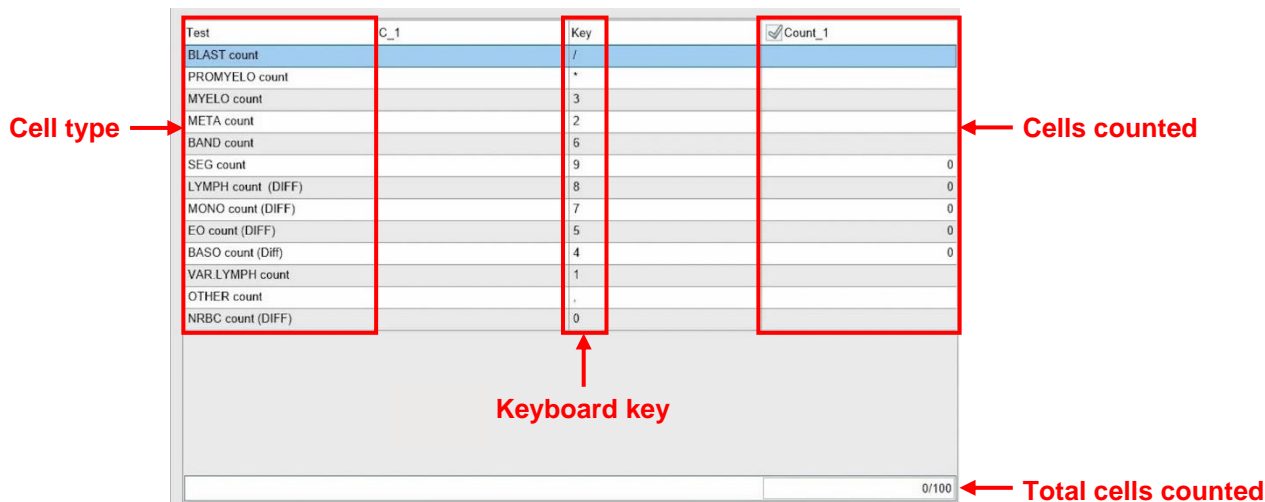
- c. PLT Morphology Tab** - Changes the morphology tab zone to display the PLT Morphology and allows for PLT morphology grading. **NOTE:** Test column is user definable.

| Test | - | + | ++ | +++ |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|
| P_AVERAG | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| P_LEVEL | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| P_ESTIMATE | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

- d. **Show Enhanced View** - the same as [View Sample Information]
- e. **View Info** - the same as [View Sample Information]
- f. **Cumulated View** - the same as [View Sample Information]
- g. **Previous/Next button** - Shows the previous/next sample available in the [Existing Samples] list.
- h. **Save** – Saves any modifications.
- i. **Release Analyser Count** - Releases analyser differential results from the manual count pad.
- j. **Release Manual Count** - Releases manual differential results from the manual count pad.
- k. **Comments** – Allows comments to be added to [Count], [RBC Morphology] and [PLT Morphology] tabs independently. (See Adding Morphology Comments below).
- l. **Decrement (Count Tab only)** - Decreases the count of a particular parameter. When [Decrement] is selected, the button displays changes to [Increment].
- m. **Free Count (Count Tab only)** – Allows parameter counts to be entered manually instead of using keyboard counting. When [Free Count] is selected, the button displays [Keyboard Count].
- n. **Show Keystrokes History (Count Tab Only)** - Traces every keystroke performed while counting.
- o. **View Mapping (Count Tab Only)** - Displays the mapping of keyboard keys assigned to the manual count pad. **NOTE:** The keyboard mapping is user definable.
- p. **Clear Results (Count Tab Only)** – Resets the manual count.
- q. **Rerun Manual Count (Count Tab Only)** – Allows a second manual count to be performed. (See Performing a Manual Differential below).
- r. **Cancel Manual Count** – Cancels the order for the smear. **NOTE:** Other orders on the sample will remain.

Performing a Manual Differential

Manual differentials can be performed using the [Count Tab] of the manual count pad. The manual differential table is user definable, with the first column showing the cell type i.e. neutrophils, lymphocytes etc, the key column displaying the relevant keyboard key required to input that specific cell type, and the count 1 column displaying the manual differential results, with the total cell count found at the bottom right.



| Test | C_1 | Key | Count_1 |
|--------------------|-----|-----|---------|
| BLAST count | | / | |
| PROMYELO count | | * | |
| MYELO count | | 3 | |
| METAL count | | 2 | |
| BAND count | | 6 | |
| SEG count | | 9 | 0 |
| LYMPH count (DIFF) | | 8 | 0 |
| MONO count (DIFF) | | 7 | 0 |
| EO count (DIFF) | | 5 | 0 |
| BASO count (Diff) | | 4 | 0 |
| VAR LYMPH count | | 1 | |
| OTHER count | | . | |
| NRBC count (DIFF) | | 0 | |

0/100

To perform a manual differential:

1. Select the sample from the existing samples list.
2. Select the relevant keyboard keys of the cells being counted until 100 cells are counted. **NOTE:** Pressing F2 will increase the total cell count required by 25.
3. To restart the manual differential, click the [Clear Results] button.
4. To manually enter the cells counted press the [Free Count] button.
5. Click [Save] if you do not wish to release the results immediately. **NOTE:** Switching between the [Count], [RBC Morphology] and [PLT Morphology] tabs are possible without losing any inputted information.

Performing a second manual differential

Within manual count pad it is possible to perform two manual differentials on the same sample, compare the results and select which manual differential to release.

To perform a second manual differential:

1. Click the [Rerun Manual Count] button on the toolbar to display the [Count 2] and [Count Average] columns.

| Test | C_1 | Key | <input type="checkbox"/> Count_1 | C_2 | <input checked="" type="checkbox"/> Count_2 | <input type="checkbox"/> Count_Average |
|--------------------|-----|-----|----------------------------------|-----|---|--|
| BLAST count | | / | | | | |
| PROMYELO count | | * | | | | |
| MYELO count | | 3 | | | | |
| META count | | 2 | | | | |
| BAND count | | 6 | | | | |
| SEG count | | 9 | 0 | | 0 | 0 |
| LYMPH count (DIFF) | | 8 | 50 | | 0 | 25 |
| MONO count (DIFF) | | 7 | 100 | | 0 | 50 |
| EO count (DIFF) | | 5 | 50 | | 0 | 25 |
| BASO count (Diff) | | 4 | 0 | | 0 | 0 |
| VAR LYMPH count | | 1 | | | | |
| OTHER count | | , | | | | |
| NRBC count (DIFF) | | 0 | | | | |
| | | | | | | |
| | | | 200/200 | | 0/100 | 100/150 |

2. Perform the second manual differential as described previously. **NOTE:** To restart the second manual count, press F12 on the keyboard, and reselect the [Rerun Manual Count] button. **IMPORTANT: DO NOT** select the [Clear Results] button as this will clear both count 1 and 2.
3. When complete, select [Count 1], [Count 2] or [Count Average] by selecting the relevant tick box.

| | | | |
|----------------------------------|-----|---|--|
| <input type="checkbox"/> Count_1 | C_2 | <input checked="" type="checkbox"/> Count_2 | <input type="checkbox"/> Count_Average |
|----------------------------------|-----|---|--|

4. Click [Save] if you do not wish to release the results immediately. **NOTE:** Switching between the [Count], [RBC Morphology] and [PLT Morphology] tabs are possible without losing any inputted information.

Grading RBC/PLT Morphology

RBC and PLT grading can be performed on the [RBC Morphology] and [PLT Morphology] tabs respectively, and both are performed the same way.

Levels of grading

Morphology features →

| Test | - | + | ++ | +++ |
|--------------|-----------------------|-----------------------|-----------------------|-----------------------|
| POLY | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HYPO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ANISO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MICRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MACRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| POIKILO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TARGET | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SCHISTO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HELMET | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SICKLE | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SPHEROCYT | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ELLIPTO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| OVALO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TEARDROP | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| STOMATO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ACANTHO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ECHINO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| H_JOLLEY | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| PAPPENHEIMER | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| BAS_STIP | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

To perform RBC/PLT morphology grading:

1. Select the sample from the existing samples list.
2. Open the relevant morphology tab.
3. Assign the relevant morphology grading. **NOTE:** How the gradings appear on the LIMS is dependent on the LIMS system and how it is configured.

| Test | - | + | ++ | +++ |
|--------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| POLY | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HYPO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ANISO | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MICRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| MACRO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| POIKILO | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TARGET | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SCHISTO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| HELMET | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SICKLE | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SPHEROCYT | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ELLIPTO | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| OVALO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TEARDROP | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| STOMATO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ACANTHO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ECHINO | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| H_JOLLEY | <input type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| PAPPENHEIMER | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| BAS_STIP | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. Click [Save] if you do not wish to release the results immediately. **NOTE:** Switching between the [Count], [RBC Morphology] and [PLT Morphology] tabs are possible without losing any inputted information.

Adding Morphology Comments

It is possible to assign morphology comments to:

- A sample – via the [Count] tab
- The RBC Morphology tab
- The PLT Morphology tab
- A Parameter (Cell type) – within the [Count] tab

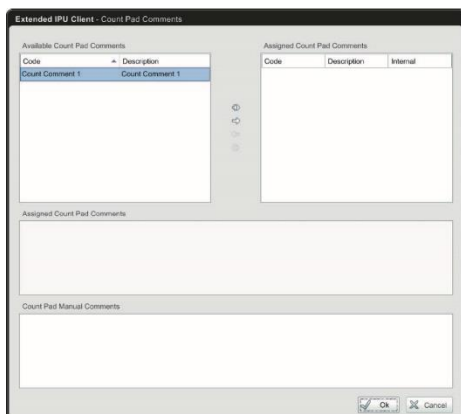
NOTE: Assigning sample comments and RBC/PLT morphology comments is performed the same way, however, only comments assigned via the [Count] tab will appear under the [Slide Comments] section of the [Sample Information Zone]. **NOTE:** If configured all morphology comments can be transmitted to the LIMS.

| | | |
|---|--|--|
| Rules PLT low -> Check for clot WBC morphology review -> Smear! Analyser DIFF of low reliability! Abnormal lymphocytes? - Atypical lymphocytes suspect neoplastic WBC > X -> Inform doctor or ward! | Validation Comments | Analyser Flags Leukocytosis Lymphocytosis WBC_Abn_Scattergram Abn_Lympho? Positive_Diff Positive_Morph Positive_Count App Comments |
| Sample Flags | <div style="border: 2px solid red; padding: 2px;">Slide Comments</div> | |

Assigning comments to the [Count]/ [RBC Morphology] and [PLT Morphology] tabs

To assign a tab comment:

1. Select the sample from the [Existing Samples] list.
2. Select the relevant tab required.
3. Click the [Comments] button on the toolbar to display the [Count Pad Comments] pop up box.
NOTE: Pre-set comments are user definable.



The dialog box titled 'Extended IPU Client - Count Pad Comments' contains three main sections: 'Available Count Pad Comments' on the left with a list of codes and descriptions, 'Assigned Count Pad Comments' on the right with a table for assigning codes, and 'Count Pad Manual Comments' at the bottom for free-text input. Navigation buttons (back, forward, search, etc.) are in the center, and 'OK' and 'Cancel' buttons are at the bottom right.

4. Assign comments as described for [Validation Comments] in the [Adding comments] section of [1st Level Sample Validation].

5. Click [OK] when complete.
6. The comments can be seen under the relevant morphology tab zone.

| Test | C_1 | Key | Count_1 |
|-------------------------|-----|-----|---------|
| REAST count | | 7 | |
| PROMYELO count | | * | |
| MYELO count | | 3 | 15 |
| MET count | | 2 | 10 |
| BAND count | | 6 | 14 |
| SEG count | | 9 | 3 |
| LYMPH count (DIFF) | | 8 | 6 |
| MONO count (DIFF) | | 7 | 1 |
| EO count (DIFF) | | 5 | 17 |
| BAO count (DIFF) | | 4 | 19 |
| UAG LYMPH count | | 1 | 15 |
| OTHER count | | . | |
| NRBC count (DIFF) | | 0 | |
| 100/100 | | | |
| Neutropenia Training | | | |

7. Click [Save] if you do not wish to release the results immediately. **NOTE:** Switching between the [Count], [RBC Morphology] and [PLT Morphology] tabs are possible without losing any inputted information.

Assigning Cell Type comments

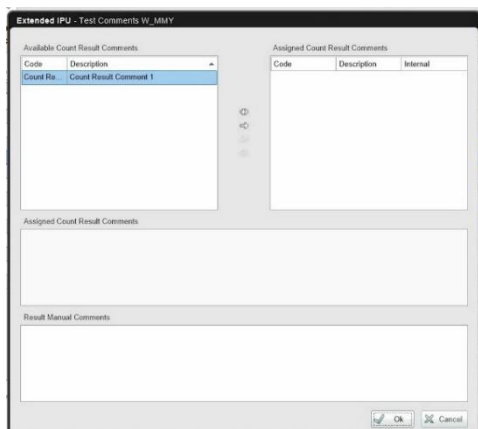
Within the [Count] tab it is possible to assign comments to the individual parameters (cell types).

To assign a parameter comment:

1. Open the [Count] tab for the specific sample.
2. Right click the relevant parameter row.

| | |
|--------------------|---------------|
| PROMYELO count | |
| MYELO count | |
| MET count | |
| BAND count | Edit Comments |
| SEG count | |
| LYMPH count (DIFF) | |

3. Select [Edit Comments] to display the [Test Comments] pop up box.



4. Assign comments as described for [Validation Comments] in the [Adding comments] section of [1st Level Sample Validation].
5. Click [OK] when complete.
6. The comments will be displayed in the comments column for count 1 or count 2, depending on how many manual counts have been performed on that sample.

| Test | C_1 | Key | <input checked="" type="checkbox"/> Count_1 |
|--------------------|----------|-----|---|
| BLAST count | | / | |
| PROMYELO count | | * | |
| MYELO count | | 3 | 15 |
| META count | training | 2 | 10 |
| BAND count | | 6 | 14 |
| SEG count | | 9 | 3 |
| LYMPH count (DIFF) | | 8 | 6 |
| MONO count (DIFF) | | 7 | 1 |
| EO count (DIFF) | | 5 | 17 |
| BASO count (Diff) | | 4 | 19 |
| VAR LYMPH count | | 1 | 15 |
| OTHER count | | . | |
| NRBC count (DIFF) | | 0 | |

7. Click [Save] if you do not wish to release the results immediately. **NOTE:** Switching between the [Count], [RBC Morphology] and [PLT Morphology] tabs are possible without losing any inputted information.

Releasing Analyser/Manual count

When all steps have been completed for the relevant sample within [Manual Count Pad], i.e., the manual differential is complete and comments have been added, the final step is to release the results. It is possible to release the analyser count or the manual count from the [Manual Count Pad]. **NOTE:** If using a digital imaging analyser connected to EPU, the option [Release DM Count] may also be available.

NOTE: If additional parameters are yet to be released on a sample when releasing either the manual count or analyser count within [Manual Count Pad], this will need to be carried out separately within [1st Level Sample Validation].

Releasing Analyser Count

To release the analyser count:

1. Locate the sample in the [Existing samples] list.
2. Select the [Release Analyser Count] button on the toolbar.

IMPORTANT: Clicking the [Release Analyser Count] button will cancel the manual count parameters from the sample, as well as remove any red cell or platelet grading, and any comments that have been added.

Releasing Manual Count

To release the manual count:

1. Locate the sample in the [Existing samples] list.
2. Select the [Release Manual Count] button on the toolbar.

IMPORTANT: Clicking the [Release Manual Count] button will release the RBC and PLT morphology as well as any comments added and will automatically release the manual differential and cancel the analyser differential.

Routine Client: Alert Management & Communications

The alert management and communications section will look at the alerts generated by EPU and where they can be viewed, the connections between EPU and the LIMS or attached analysers, how to start and stop these connections, basic connection troubleshooting and how to resend a batch of results from EPU to the LIMS.

These functionalities can be found across three different sections of EPU:

- [Cockpit]
- [View Alerts]
- [DCS Monitor]

When any alert has been generated by EPU, one or more icons can be found in the message zone of the [Client Monitor]. The icons can be associated with the 'System' alerts, the 'DCS monitor' alerts or the 'workflow' alerts and clicking the system or workflow button, will open the [View Alerts] tab and clicking the DCS monitor button will open the [DCS monitor].

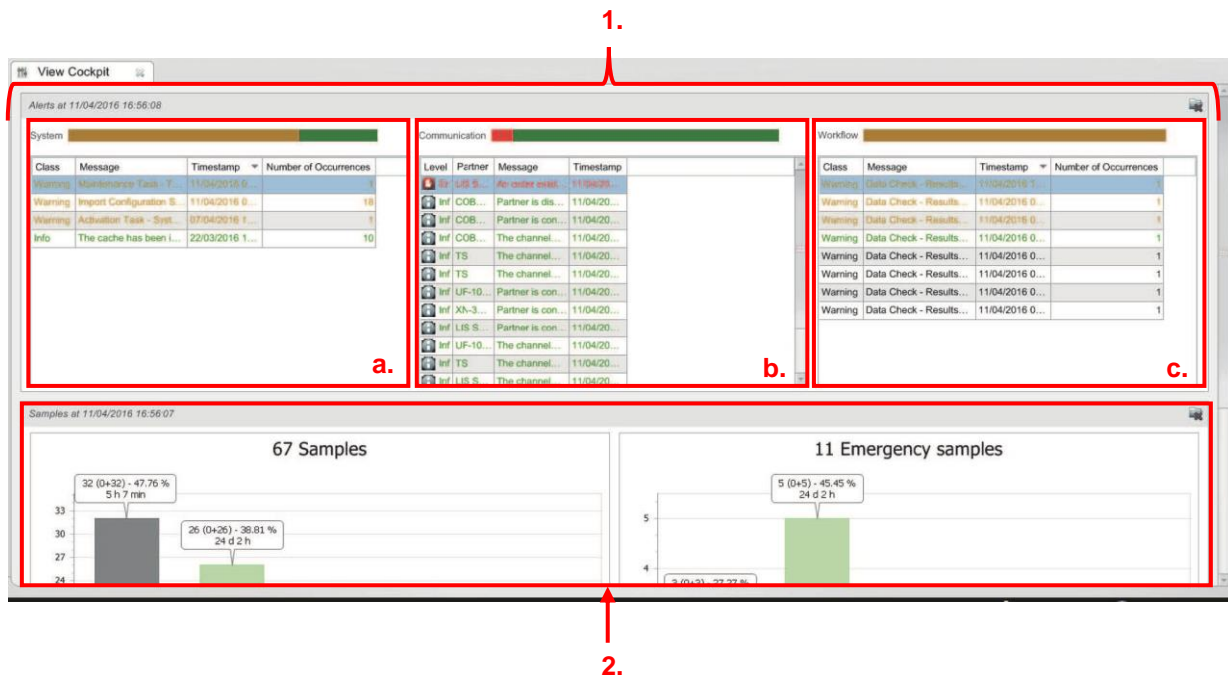
IMPORTANT: The client monitor flags high priority alerts with a flashing action: the client monitor background colour changes from black colour (default) to red colour. Please ensure any error alerts are escalated to a senior member of staff, or alternatively contact Sysmex.



Cockpit

The [Cockpit] tab displays all alerts and sample statuses. The information displayed in the [Cockpit] is dependent upon your site and the Lab Hierarchy.

To access the [Cockpit] click the [Menu] and locate [Cockpit], or alternatively, click the arrowhead on the [Client Monitor] **NOTE:** The client monitor will disappear when viewing the [Cockpit] tab.



The [Cockpit] tab is split in to the:

- Alerts Section** – displays all alerts generated by EPU and is split in to three sections:
 - System Alerts** - displays all system alerts generated by EPU, e.g., any database maintenance that has occurred or backups that have been performed.
 - Communication Alerts** – displays all communication alerts generated by EPU, e.g., when analyser connections have been started or stopped.
 - Workflow Alerts** – displays all workflow alerts that have been generated by EPU, e.g., sample results that have not been transmitted by EPU to the LIMS. **NOTE:** This will not take into account results that have not been received by the LIMS.
- Samples Section** – displays a further breakdown of the status of the samples being processed.

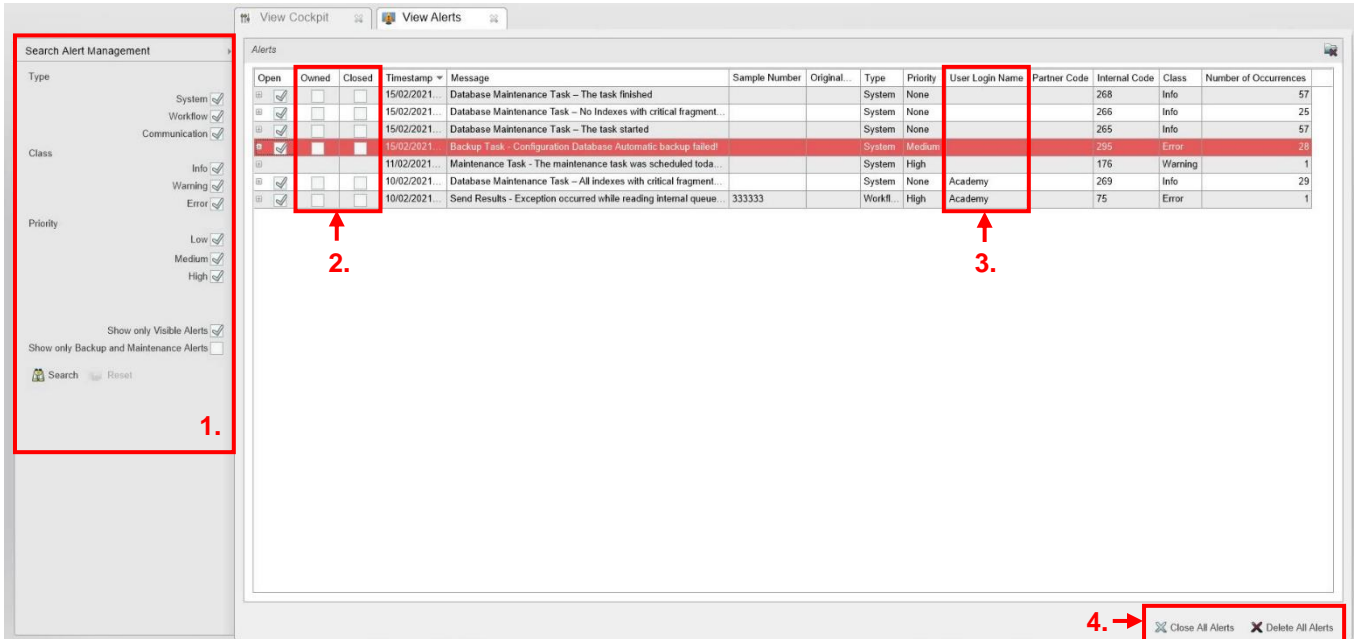
All alerts generated by EPU work on a traffic light principle, with green representing information alerts, orange/brown representing warning alerts, and red representing error alerts. **IMPORTANT:** Error alerts must be escalated to a senior member of staff or to a Sysmex representative.

To view further information regarding these alerts, double clicking the relevant row will open the [View Alerts] tab, or in regard to the communication alerts, the [DCS Monitor].

View Alerts

The [View Alerts] tab displays a list of all system, workflow and communications alerts that have been generated by EPU.

To access the [View Alerts] click the [Menu] and locate [View Alerts], or alternatively, click the relevant icon on the [Client Monitor] or double click an alert within the [View Alerts] tab.



The screenshot shows the 'View Alerts' window. On the left is a 'Search Alert Management' sidebar with filters for Type (System, Workflow, Communication), Class (Info, Warning, Error), and Priority (Low, Medium, High). It also has checkboxes for 'Show only Visible Alerts' and 'Show only Backup and Maintenance Alerts', and 'Search' and 'Reset' buttons. The main area is a table of alerts with columns: Open, Owned, Closed, Timestamp, Message, Sample Number, Original, Type, Priority, User Login Name, Partner Code, Internal Code, Class, and Number of Occurrences. Red boxes and arrows highlight specific features: 1. The Search Alert Management sidebar. 2. The 'Owned' and 'Closed' columns in the alert table. 3. The 'User Login Name' column in the alert table. 4. The 'Close All Alerts' and 'Delete All Alerts' buttons at the bottom right.

| Open | Owned | Closed | Timestamp | Message | Sample Number | Original | Type | Priority | User Login Name | Partner Code | Internal Code | Class | Number of Occurrences |
|-------------------------------------|--------------------------|--------------------------|------------|---|---------------|----------|-----------|----------|-----------------|--------------|---------------|---------|-----------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15/02/2021 | Database Maintenance Task – The task finished | | | System | None | | 268 | | Info | 57 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15/02/2021 | Database Maintenance Task – No indexes with critical fragment... | | | System | None | | 266 | | Info | 25 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15/02/2021 | Database Maintenance Task – The task started | | | System | None | | 265 | | Info | 57 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15/02/2021 | Backup Task - Configuration Database Automatic backup failed! | | | System | Medium | | 295 | | Error | 28 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11/02/2021 | Maintenance Task - The maintenance task was scheduled toda... | | | System | High | | 176 | | Warning | 1 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10/02/2021 | Database Maintenance Task – All indexes with critical fragment... | | | System | None | Academy | 269 | | Info | 29 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10/02/2021 | Send Results - Exception occurred while reading internal queue... | 333333 | | Workfl... | High | Academy | 75 | | Error | 1 |

1. To filter the alerts, select/deselect the relevant tick boxes and select [Search].
2. To 'Close/Own' an alert, select the relevant tick box in the [Closed] or [Owned] column when any necessary steps have been taken for the alert generated.
3. The user who owned or closed the alert is recorded in the [User Login Name] column.
4. To close or delete all the alerts present in the list select the [Close All Alerts] or [Delete All Alerts] button, respectively.

DCS Monitor

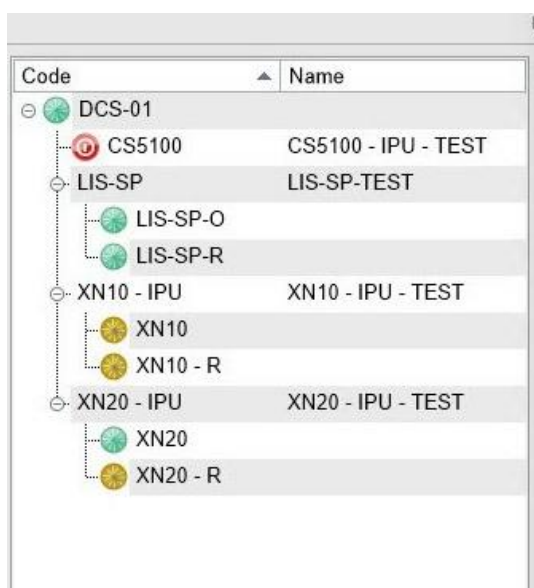
DCS is an abbreviation for [Device Communication Server] and is the area of EPU that displays the connection between EPU and the LIMS, as well as the connections between EPU and the relevant connected analysers.

To access [DCS Monitor] click the [Menu] and locate [DCS Monitor], or alternatively, click the communication icon on the [Client Monitor].



The [DSC Monitor] tab is split in to the:

1. **Connections Panel** – displays the connections between EPU and the LIMS, and connected analysers (devices) along with connection statuses:



| Icon Colour | Connection Status Meaning |
|-------------|-----------------------------|
| Green | Running (Connected) |
| Yellow | Started (but NOT connected) |
| Red | Stopped |

NOTE: The letter 'R' following an analyser connection name indicates the 'reagents' connection, except for the LIS connection, with the 'R' representing 'Results'.

A yellow warning triangle on the connection icon indicates an error, which can be due to, for example, there being no order for a sample, the sample not being recognised by EPU or a communication error. Further information regarding the error can be found in [View Alerts].

IMPORTANT: The top [DCS] connection controls ALL connections within EPU.

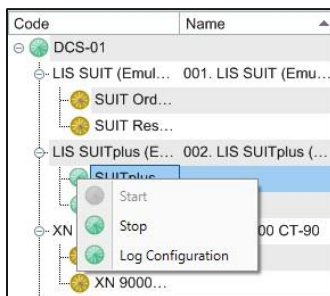
2. **Communication Display Section** – displays further information regarding the selected connection.

Starting/Stopping Connections

Starting and stopping connections within the [DCS Monitor] may be required to aid with troubleshooting of connection problems between the connected device and EPU.

To stop a connection:

1. Ensure the status icon for the required connection is green or yellow.
2. Right click the connection required.



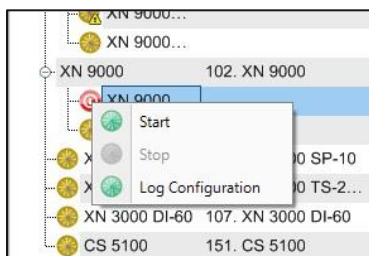
3. Select [Stop] from the drop-down box.

NOTE: When stopping a connection, it is advised that the host connection on the relevant analyser is also stopped, before restarting both connections.

IMPORTANT: The top [DCS] connection controls ALL connections within EPU, and if stopped the communication of all online devices is stopped.

To start a connection:

1. Ensure the status icon for the required connection is red.
2. Right click the connection required.



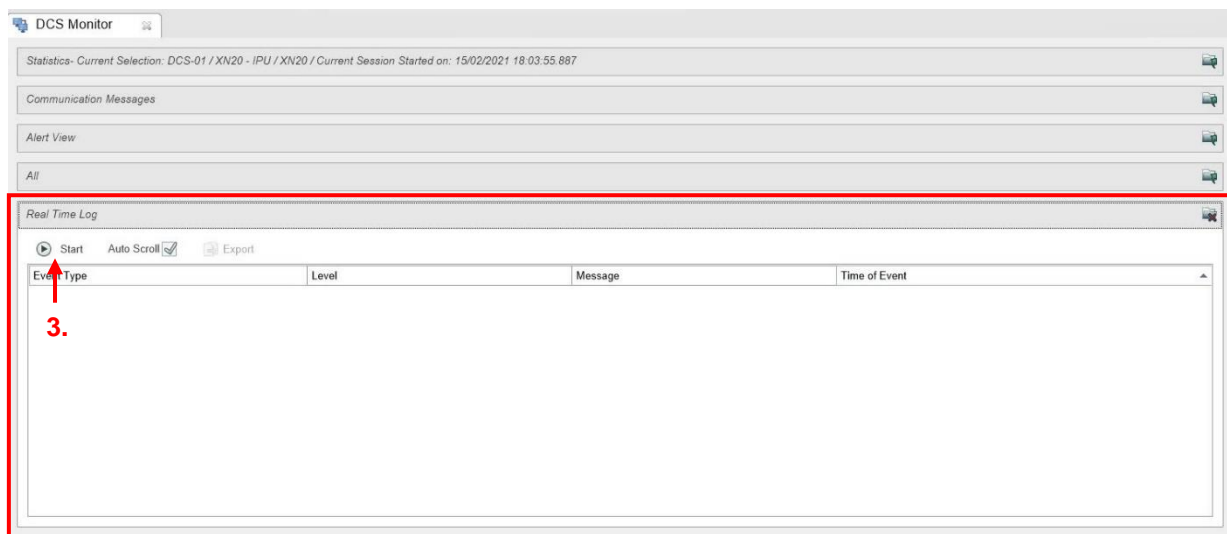
3. Select [Start] from the drop-down box.

Real Time Log

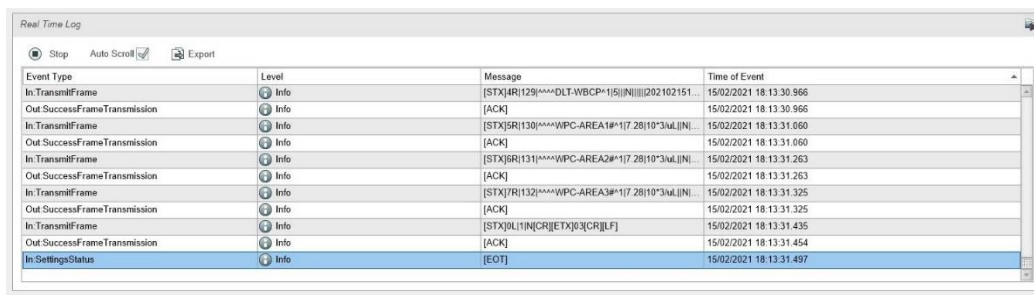
The [Real Time Log] within [DCS Monitor] can be used to help troubleshoot connection/result transmission problems between EPU and the connected analyser.

To run the [Real Time Log]:

1. Select the relevant analyser connection from the [Connection Panel]
2. Select the [Real Time Log] option from the display section.



3. Press the [Start] button.
4. Process samples on the relevant analyser or alternatively resend results to the host from the specific analyser.
5. If the real time log starts populating with information, this indicates that the results are being transmitted and received by EPU.



6. If the real time log remains empty, this indicates that the results are either not being transmitted by the analyser, or not being received by EPU.

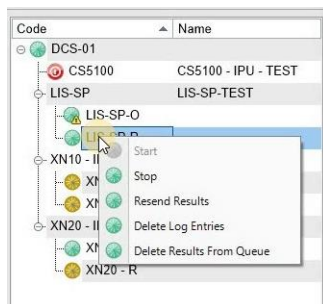
IMPORTANT: This information allows Sysmex to help with troubleshooting, therefore, before contacting Sysmex with connection problems, please run the real time log.

Resending Results

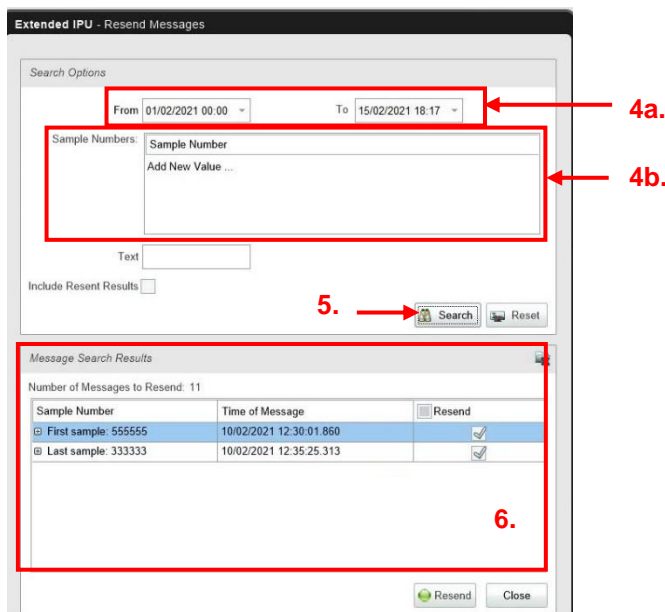
Within [DCS Monitor] it is possible to batch send results to the LIMS if there have been connection problems.

To resend results:

1. Locate the LIMS connection for results. **NOTE:** It will be identified with the letter 'R' or 'Results'.
2. Right click the connection.

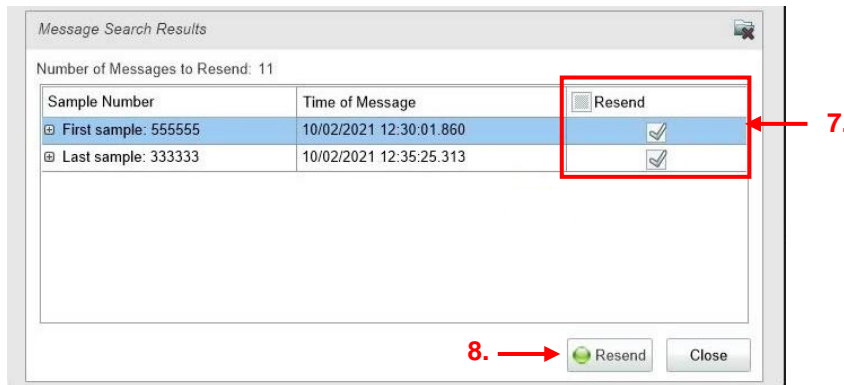


3. Select [Resend Results].



4. Enter the search criteria in the relevant fields of the [Search Options] section. It is possible to search:
 - a. All samples within a date and time range
 - b. Using a sample number. **NOTE:** Multiple sample numbers can be entered.
 - c. Using a combination of both methods.
5. Select the [Search] button.

6. The search results box will display the matching samples based on search criteria. **NOTE:** If the search was based on a timeframe, only the first and the last samples are listed. The label [Number of Messages to Resend] indicates how many samples have been found.



7. To select the samples to be resent to host, select or deselect the checkboxes in the [Resend] column. **NOTE:** It is possible to resend results that may have already been received by the LIMS. In this instance it is important to determine how the LIMS will manage the additional transmission of the same results.
8. Select the [Resend] button.
9. Select [Yes] to confirm.



Contact Us

Mail

Training Academy
Sysmex UK Ltd
Garamonde Drive
Wymbush
Milton Keynes
MK8 8DF

Phone

Product Hotline
For urgent application support 0333 320 3466 (UK)

Service Hotline
For technical support and service team 0333 320 3467 (UK)

Reagent ordering 0333 320 3470 (UK)

Email

| | |
|-------------------------------|----------------------------------|
| Product IT (non-urgent) | it.support@sysmex.co.uk |
| Training Academy (non-urgent) | academy.training@sysmex.co.uk |
| Jennifer Hammersley | hammersley.jennifer@sysmex.co.uk |
| Karl Elgerton | elgerton.karl@sysmex.co.uk |
| Natalie Bowen | bowen.natalie@sysmex.co.uk |

Sysmex Academy

<https://uk.sysmex-academy.com/>

